Faculty Senate Meeting
Thursday, September 23, 2010
3:30 – 5:30pm – Adelbert Hall, Toepfer Room

AGENDA

3:30pm	Approval of Minutes from the April 21, 2010 Faculty Senate meeting, *attachment*	A. Levine
	President's Announcements	B. Snyder
3:35pm	Provost's Announcements	B. Baeslack
	Chair's Announcements	A. Levine
3:40pm	Report from the Executive Committee	G. Chottiner
	Report from Interim Secretary of the Corporation	C. Treml
3:45pm	Health Insurance Changes	C. Gregory J. Wheeler
3:55pm	Merger/Split of CAS Departments and Updated CAS By-laws *attachments*	C. Taylor K. Ledford
4:05pm	Mentee Handbook *attachment*	G. Wnek Q. Jamieson
4:15pm	Update on Mediation and Conciliation *attachment*	W. Gingerich
4:30pm	Updated Charge to FSCIR *attachment*	K. Lyytinen
4:45pm	New MS and PhD in Systems Biology and Bioinformatics *attachment*	C. Rozek M. Chance
4:55pm	New MS in Medical Physiology *attachment*	C. Rozek T. Nozek
5:05pm	Annual Report on Faculty Diversity & Update from the Office of Inclusion, Diversity And Equal Opportunity	M. Mobley J. Clochesy

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Members Present

Keith Armitage
Bruce Averbook
Bud Baeslack
Jessica Berg
Ben Brouhard
Richard Buchanan
Mark Chance
Gary Chottiner
David Crampton
Lisa Damato
William Deal
Sillas Duarte
Faye Gary
Julia Grant
Jared Hamilton
Sue Hinze
Peterson Huang
Christine Hudak
David Hutter
Quentin Jamieson
Kenneth Ledford
Alan Levine
Kalle Lyytinen
Joseph Mansour
Jim McGuffin-Cawley
Frank Merat
Diana Morris
Heather Morrison
Carol Musil
Roy Ritzmann
Alan Rocke
Jonathan Sadowsky
JB Silvers
Barbara Snyder
Lee Thompson
Susan Tullai-McGuinness
Michele Walsh
David Wilson
Elizabeth Woyczynski
Xin Yu
Nicholas Ziats

Members Absent

Kathryn Adams
Hussein Assaf
Timothy Beal
Ronald Blanton
Lee Blazey
Martha Cathcart
Elizabeth Click
Mary Davis
Elizabeth Kaufman
Jim Kazura
Ken Loparo
Laura McNally
G. Regina Nixon
John Orlock
Daniel Ornt
Leena Palomo
Faisal Quereshy
Mary Quinn Griffin
Cassandra Robertson
Mark Smith
Sorin Teich
Georgia Wiesner
Gary Wnek

Others Present

Daniel Anker
Christine Ash
John Clochesy
Donald Feke
Kurt Fretthold
Wallace Gingerich
Carolyn Gregory
Ginny Leitch
Marilyn Mobley
Minh-Tri Nguyen
Thomas Nosek
Dean Patterson
Charles Rozek
Ginger Saha
Chris Sheridan
David Singer
Donald Stewart
Cyrus Taylor
Colleen Treml
John Wheeler
Jeffrey Wolcowitz

Call to Order
Professor Alan Levine, chair, Faculty Senate, called the meeting to order at 3:30pm.

Approval of minutes
The minutes of the Faculty Senate meeting of April 21, 2010 were approved as submitted.

Provost's announcements

Provost Bud Baeslack thanked the faculty for their service on the Faculty Senate. He appreciates the seriousness of purpose and the spirit of cooperation that senators bring to their work. The Budget System Review Committee completed its work recently; Provost Baeslack hopes to confirm a reorganization of the Faculty Senate Budget Committee this year.

Chair's announcements

Prof. Alan Levine, chair, Faculty Senate commented on the Faculty Senate's August retreat. The main themes for the meeting of the Executive Committee at the retreat were: the progress report from the Budget Systems Review Committee, the university's internal review of CWRU graduate programs, and the preparations for a university-wide discussion about a common undergraduate core curriculum. Senators met with the chairs of the Senate standing committees to talk about committee agendas for the upcoming academic year.

Prof. Levine and Provost Baeslack detailed the anticipated process for considering a CWRU common undergraduate core curriculum. A task force, representing phase zero, chaired by Prof. Gary Chottiner, vice-chair, Faculty Senate, and Don Feke, vice-provost for undergraduate education, is conducting research about common core curricula at peer and aspirant universities and laying out their view of the pros and cons of university common core curricula. The report will be circulated at the beginning of October. In Phase One, the Undergraduate Program Faculty (UPF) and the undergraduate student body will educate themselves and discuss whether or not the university should proceed with drafting a proposed university common undergraduate core curriculum. An *ad hoc* Faculty Senate Committee on a University Common Undergraduate Core Curriculum will organize the outreach effort to engage the undergraduate faculty and undergraduate students in discussing the merits of a common core curriculum for Case Western Reserve University. The deciding vote is scheduled for the meeting of the Faculty Senate in December. If this resolution passes, Phase Two will proceed with drafting a common core curriculum and a process to modify it, if necessary. A proposed common core curriculum would be reviewed by the college and the schools, the Faculty Senate Committee on Undergraduate Education, and the Faculty Senate.

Report from the Executive Committee

Prof. Gary Chottiner, vice-chair, Faculty Senate reported on the September meeting of the Executive Committee. The Executive Committee approved the merger of two departments and the split of two departments in the College of Arts and Sciences, endorsed the *Mentee Guidebook*, and approved the updated charge for the Faculty Senate Committee on Information Resources (whose new name will be Faculty Senate Committee on Information and Communication Technology), and two new degree programs in Systems Biology and Bioinformatics and Medical Physiology.

Report from the Secretary of the Corporation

Colleen Treml, interim general counsel and secretary of the corporation, reported on the September meeting of the Board of Trustees. The trustees approved resolutions for new endowments and new appointments for faculty. There was a report on undergraduate enrollment and university finances, and there was a presentation on the job search for a new dean of the School of Nursing.

Health Insurance Changes

John Wheeler, senior vice president for administration, and Carolyn Gregory, vice president for human resources, presented proposed changes to CWRU's health care benefits. There are several reasons for the proposed changes: avoiding a federal excise tax for "Cadillac" health plans, and an increase in adverse claims and an aging population at CWRU. The proposed changes include: introducing a high deductible medical plan option; close the MMO traditional medical plan option to new entrants, change the premium allocation structure; add a working spouse premium surcharge; change the co-payments for in network services in PPO and HMO plans; add a hospitalization co-payment for in network facilities in PPO plans; increase the annual deductibles for MMO traditional plan and out of network services in PPO plans; adopt a "maintenance choice" prescription drug program; and invest in health management activities for CWRU employees.

Merger/Split of CAS Departments
Dean Cyrus Taylor, College of Arts and Sciences, presented two proposals: 1) to merge the Psychology Department and the Communication Sciences Department into the Psychological Sciences Department, and 2) to separate the Theater and Dance Department into two departments, the Theater Department and the Dance Department. Dean Taylor said these proposals have been under consideration by the faculty of the College of Arts and Sciences for two years. Since the academic departments are listed in the by-laws, a two-thirds vote of approval by the College of Arts and Sciences faculty was required. Prof. Ken Ledford, chair, Faculty Senate Committee on By-laws confirmed the committee's approval for the necessary changes to the by-laws of the College of Arts and Sciences. The Faculty Senate voted to approve the merger of the Psychology Department and Communication Sciences Department into the Department of Psychological Sciences. By separate vote, the Faculty Senate approved the split of the Theater and Dance Department into two departments, the Theater Department and the Dance Department.

Mentee Guidebook
Prof. Alan Levine, chair, Faculty Senate introduced *A Mentee Guidebook for Students*, drafted by graduate student senators, and reviewed, edited and endorsed by the Graduate Student Senate and the Faculty Senate Committee on Graduate Studies. The publication is a companion to *A Mentoring Guidebook for Faculty*, endorsed by the Faculty Senate in 2009-2010. Prof. Alan Levine, chair, Faculty Senate lauded the tremendous effort by CWRU graduate students to publish these two important guidebooks. The Faculty Senate voted to endorse *A Mentee Guidebook for Students*.

Internal/External Review of ITS and Updated Charge to FSCIR
Prof. Kalle Lyytinen, chair, Faculty Senate Committee on Information Resources said that the division of Information Technology Services worked with the Committee on Information Resources to update the committee's charge. The scope of the charge and some of the terms used had become outdated. The updated charge was approved by the Faculty Senate Committee on By-laws in April 2010. The Faculty Senate voted to approve the updated charge to the Faculty Senate Committee on Information Resources, now to be called the Faculty Senate Committee on Information and Communication Technology.

New MS and PhD in Systems Biology and Bioinformatics
Prof. Mark Chance, Center for Proteomics and Bioinformatics, School of Medicine presented the proposed new master's and PhD degrees in Systems Biology and Bioinformatics. The proposed degree programs formalize desired programs of study that have proven difficult for graduate students to pursue through an informal undertaking of combined studies and research in the affiliated departments. Case Western Reserve University will be among the first universities to offer such degree programs through its School of Medicine. The degree programs will fully immerse students in the study of both scientific concepts and computation. Students will seek funded lab positions, secured by signed contracts, in any

of the affiliated departments or centers. The Faculty Senate approved the proposed degree programs in Systems Biology and Bioinformatics for final approval by the Board of Trustees.

New MS in Medical Physiology

Prof. Tom Nosek, Physiology and Biophysics, School of Medicine presented the proposed new master's degree in Medical Physiology. Pre-med students who need to strengthen their preparation in the sciences before being admitted to an MD program can seek a master's degree in Medical Physiology. The educational program is mostly didactic, and less research oriented. It's a self-pay program; no financial aid is available. The Faculty Senate approved the proposed degree program in Medical Physiology for final approval by the Board of Trustees.

President's announcements

President Barbara Snyder welcomed senators for the start of a new academic year. She spoke to the importance of shared governance and her appreciation of the time invested toward productive, two-way communications. She noted that the university's annual fundraising efforts reached their second highest level in the university's history. The university closed its budget for the previous fiscal year in the black. President Snyder called attention to the sidewalk expansion that was underway at the corner of Euclid Avenue and Adelbert Road to accommodate the crowd of pedestrians that gather there when students are changing classes. A crossing guard has been stationed at the intersection to ensure pedestrian safety.

Annual Faculty Diversity Report & Update from Office of Inclusion, Diversity and Equal Opportunity

Marilyn Mobley, vice president for inclusion, diversity and equal opportunity, and John Clochesy, faculty diversity officer, presented the Annual Report on Faculty Diversity. The number of minority faculty at CWRU and other universities is updated annually in November. Rather than talk about the numbers, which have changed only slightly from year to year, Dr. Mobley and Prof. Clochesy said they preferred to talk with senators about strategies to increase the number of minority faculty. They spoke about their efforts to address subtle and unconscious bias in job searches. They've created online resources for this purpose, but they are more than willing to advise and consult in person. They also spoke about the importance of following up with minority faculty who leave the university to see what the university can learn from their experiences at CWRU and their reasons for leaving. As time was short, Prof. Alan Levine invited Dr. Mobley and Prof. Clochesy back to a future meeting of the Faculty Senate to continue the discussion.

Upon motion, duly seconded, the meeting was adjourned at 5:45pm.

APPROVED
by the
FACULTY SENATE

ELIZABETH H. WOYCZYNSKI
SECRETARY OF UNIVERSITY FACULTY

Health Insurance

September 23, 2010

John Wheeler, SVP for Administration

Carolyn Gregory, VP for Human Resources

Changes Are Necessary

Regulatory Changes

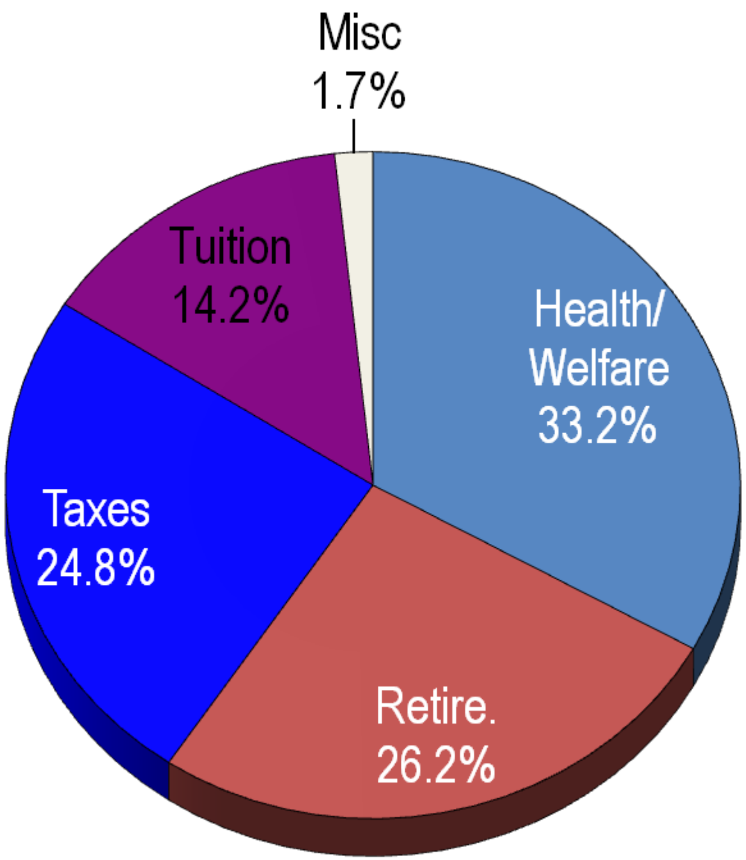
- Comply with Health Care Reform requirements
- Reduce likelihood of triggering “Cadillac Health Plan” excise tax
- Current plans will generate excise tax
  - estimated cost-up to $6.9 million

Challenge: Reduce Total Cost by 2018

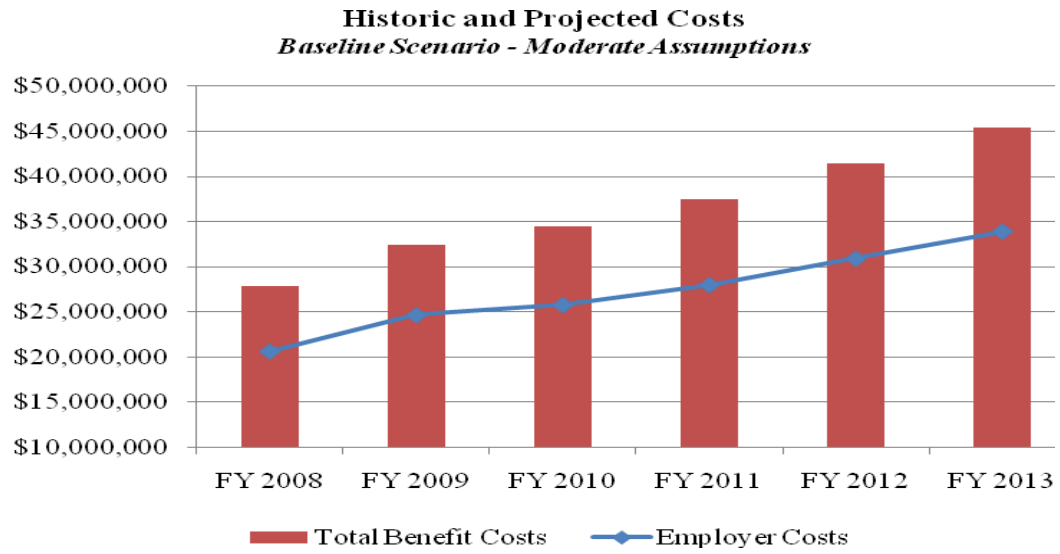
- Cost sustainability is an issue
    - Double-digit health care inflation
    - Adverse claims experience in recent years
    - Mature age of covered population

FY 2011 Fringe Budget

Health/Welfare	$ 29,303,000
Retirement	23,170,000
Taxes	21,882,000
Tuition	12,538,000
Miscellaneous	1,481,000
Total	$ 88,374,000



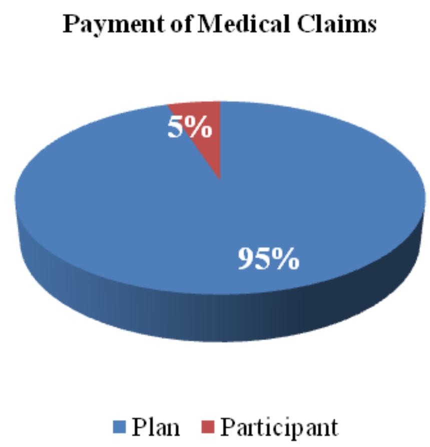
Historic and Projected Costs

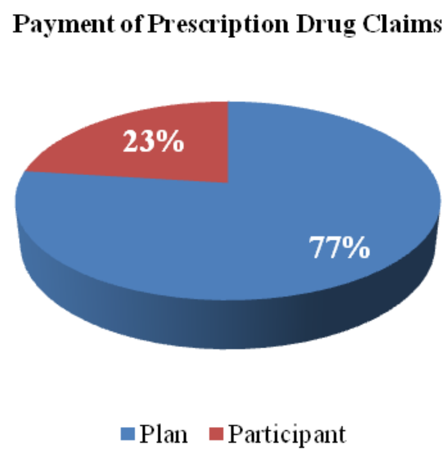


Medical Premium Increases Since 2008

	2008	2009	2010	2011
MMO Traditional	6.0%	1.0%	15.0%	25.5%
MMO SuperMed PPO	6.0%	1.0%	9.5%	9.1%
Anthem PPO	15.0%	7.7%	10.0%	9.1%
Kaiser HMO	5.4%	5.2%	9.6%	5.4%

Current State of Our Health Care Costs





Managing Future Plan Costs

- Premium rates drive “Cadillac Health Plan” tax applicability
- Maximize cost savings/cost containment opportunities through plan design and contract negotiation
- Introduce health insurance options with plan costs lower than current options
- Invest in our employees’ health

We Have Taken Some Action…

Joined Prescription Drug Purchasing Coalition
- Achieved plan savings of $1.1 million
- Additional $0.3 million through December 2011

Issued Health Insurance Vendor RFP for 2011
- Opportunity to at least maintain claims administration fees at current levels

Conducted Dependent Verification Audit
- Ensured enrolled dependents' eligibility for coverage

2011 Changes

1. **Introduce a High Deductible Health Plan Medical Plan Option**
2. **Close to New Entrants the MMO Traditional Medical Plan Option**
3. **Change Premium Allocation Structure**
4. **Add Working Spouse Premium Surcharge**
5. **Change Co-Payments for In Network services in PPO and HMO Plans**

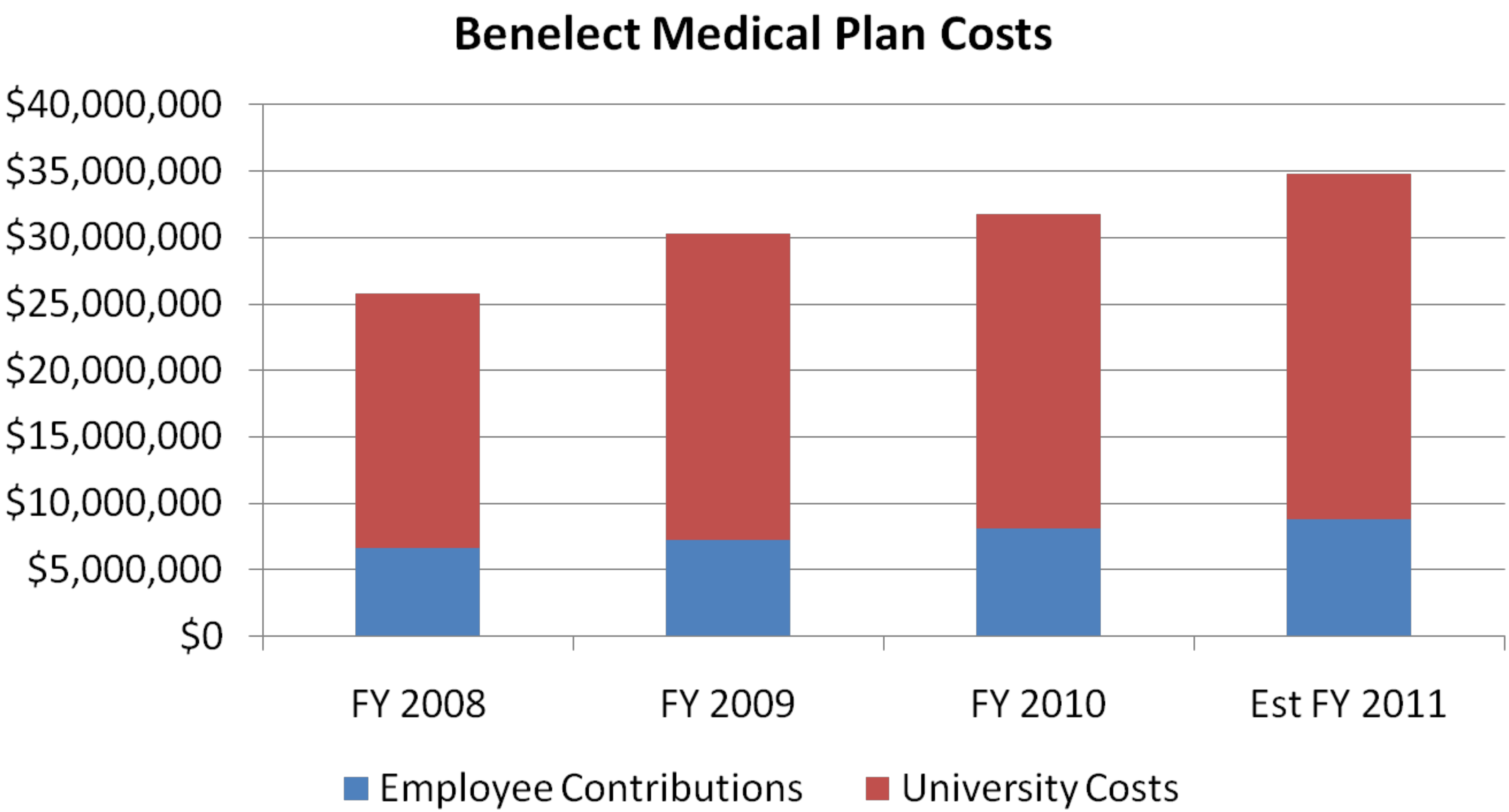
2011 Changes(cont.)

6. Add Hospitalization Co-Payment for In Network Facilities in PPO Plans

7. Increase Annual Deductibles for MMO Traditional Plan and Out of Network Services in PPO Plans

8. Adopt “Maintenance Choice” Prescription Drug Program

9. Invest in Health Management



Benelect Medical Plan Costs
$40,000,000
$35,000,000
$30,000,000
$25,000,000
$20,000,000
$15,000,000
$10,000,000
$5,000,000
$0
FY 2008
FY 2009
FY 2010
Est FY 2011
Employee Contributions
University Costs

Wellness Initiatives

Partnerships
- HR and 1-2-1 Fitness
- Exploring partnership with UH wellness program

Weight Loss and Fitness Programs
- 4 different programs offered by 1-2-1 Fitness
- HR subsidizing employee participation
- First session begins October 2010

Fitness Challenge
- Administration and Finance "10,000 Steps" competition
- Promotes physical activity
- Rewards include 1-2-1 Fitness memberships

Future Cost Considerations

Transition PPO Medical Plans Away from First Dollar Coverage

- Introduce annual deductibles and coinsurance requirements for in-network services
- Multi-year transition: start with low deductibles (e.g., $50), coinsurance (e.g., 5%) and out-of-pocket maximums (e.g., $500)
- Affordable Care Act requires no cost sharing for preventive care so impact of design transition should not discourage participant utilization of services
- Design change reduces total benefit costs

Employer Contributions into Health Savings Accounts

- HDHP participation levels will increase with employer funding of HSAs
- Higher HDHP participation will reduce total benefit costs

Terminate the MMO Traditional Medical Plan Option

- Monitor participation levels and per capita costs to determine when time is right to eliminate this option

CASE WESTERN RESERVE UNIVERSITY
COLLEGE OF ARTS AND SCIENCES

Cyrus C. Taylor, Dean
Albert A. Michelson Professor in Physics
College of Arts and Sciences
Case Western Reserve University
10900 Euclid Avenue
Cleveland, Ohio 44106-7068
Phone 216-368-4437
Fax 216-368-3842
1-800-515-2774
cyrus.taylor@case.edu

MEMORANDUM

TO: Carol Musil, Chair, Faculty Senate
Alan Levine, Chair-Elect, Faculty Senate
Elizabeth Woyczynski, Secretary of the University Faculty
Lois Langell, Special Assistant to the Provost

FROM: Cyrus C. Taylor

SUBJECT: Two Motions to Amend the By-laws of the College of Arts and Sciences

DATE: April 28, 2010

In accordance with the provisions to amend the By-laws of the Faculty of the College of Arts and Sciences, the following two motions have been approved in a faculty-wide vote. We now await Senate action in anticipation of approval by the University Board of Trustees at the earliest possible date.

MOTION: To approve the requested merger of the Department of Communication Sciences and the Department of Psychology into a new Department of Psychological Sciences; and to amend the By-Laws of the Faculty of the College of Arts and Sciences, Article X. Section 32—Departments by deleting Communication Sciences and Psychology and adding Psychological Sciences.

This motion passed by a vote of 151 in favor, 9 against, and 1 abstention. A total of 161 ballots were cast.

MOTION: To approve the requested split of the Department of Theater and Dance to create a separate Department of Dance and Department of Theater; and to amend the By-Laws of the Faculty of the College of Arts and Sciences, Article X. Section 32—Departments by deleting Theater and Dance and adding separate listings for Dance and Theater.

This motion passed by a vote of 129 in favor, 31 against, and 1 abstention. A total of 161 ballots were cast.

Case Western Reserve University
College of Arts and Sciences

MEMORANDUM

Executive Committee
College of Arts and Sciences
Case Western Reserve University
10900 Euclid Avenue
Cleveland, Ohio 44106-7068

TO: Faculty in the College of Arts and Sciences

FROM: John Orlock, Chair
A&S Executive Committee

DATE: March 2, 2010

SUBJECT: Proposed Merger of the Departments of Psychology and Communication Sciences into a New Department of Psychological Sciences

The Executive Committee, following the guidelines established by the College of Arts and Sciences for Creating, Merging, or Splitting a Department (2008) recommends that the request to merge the Departments of Psychology and Communication Sciences – and the creation of a new Department of Psychological Sciences – be approved. In support of this endorsement, we send forward the materials provided by the Departments of Psychology and Communication Sciences in support of their request (submitted October 16, 2009), as well as the assessments of the College Strategic Planning Steering Committee and Budget Subommittee, the Graduate Committee, and the Committee on Educational Programs.

The Executive Committee believes that the formation of the Department of Psychological Sciences would have a number of beneficial consequences to the college and university. It is important to note that these two departments currently have many natural overlaps. For example, the departments are the only two disciplines in the college that have a clinical focus that emphasizes research and training to foster the provision of client services. In addition, many students are dual-majors in Psychology and Communication Sciences, which, once again, reflects the overlapping interests of the faculty. Moreover, several faculty within the two departments have long-standing research collaborations.

In terms of benefits, the merger would address concerns regarding the comparatively small number of total faculty in both the Department of Psychology and Department of Communication Sciences. The size of each department is currently small relative to that of their aspirational peers, and – in the case of Communication Sciences – has in recent years proved an on-going threat to the viability of the department. Furthermore, in creating a single, larger department, the proposed merger would improve mentorship of Communication Sciences faculty, decrease administrative burdens of Communication Sciences faculty, and enhance the breadth and depth of course offerings across the two disciplines.

Finally, although research collaborations already exist between the two departments, the merger is anticipated as serving as an effective catalyst to spur and facilitate an increase in research collaboration, with such collaborations ultimately improving faculty competitiveness for grant funding.

PROPOSAL FOR A MERGER BETWEEN THE DEPARTMENT OF PSYCHOLOGY AND THE DEPARTMENT OF COMMUNICATION SCIENCES

October 16, 2009

We propose that the faculty members currently belonging to the departments of psychology and communication sciences be housed in a new merged department to be called the Department of Psychological Sciences. The new department's website and print materials will specifically list the areas of research and training represented as follows:

Department of Psychological Sciences

- Clinical Psychology
- Communication Science and Disorders
- Health Communication
- Cognition and Cognitive Neuroscience
- Developmental Science and Disorders
- Affective Neuroscience

This merger would create a department of adequate size, national distinctiveness, and enhanced educational and research opportunities.

1. WHY SHOULD THIS MERGER BE APPROVED?

A. Size issues

Like all departments in the College, the psychology and communication sciences departments are smaller than the corresponding departments in institutions to which we compare ourselves. As noted in the benchmarking data submitted to the College, the psychology department is far smaller than any of our peers, with our 15 fulltime faculty coming off badly when contrasted with schools such as Emory (42) or Washington University (34). Although some of our peer institutions do not have departments in communication sciences, the ones that do [such as NYU with 8 tenure-track faculty or Washington University with 11] are significantly larger than our communication sciences department (currently, three tenure track faculty).

Size issues play out differently in the two departments. Frankly, the communication sciences department is so small as to threaten its continued viability as a department; this is a problem that has persisted in various fashions for decades. All departments assume administrative and educational burdens that must be shared among the faculty; these burdens become crushing when carried by a very small number of people, especially when some of the faculty are junior. Mentorship and department leadership also become problematic and particularly time-consuming when faculty size becomes very small. It becomes difficult for senior faculty in tiny departments to devote time to funded research projects, if they are forced by circumstances to spend excessive time carrying out educational and administrative tasks. Moreover, this becomes self-reinforcing, as the heavy burdens imposed by small faculty size make retention of high quality faculty difficult, too often leading to further reductions in faculty size and quality.

In psychology, size issues play out differently. We are of sufficient size to function administratively. However, psychology is both a very diverse field and a very popular one. It is impossible to cover the range of the psychological sciences in a department far smaller than our peers. It is also extremely difficult to deal with the large number of students and majors in psychology classes, particularly when also attending to resource-demanding graduate programs. Too often, we have resorted to what may be termed a 'vanilla' strategy, offering the expected classes, usually in large lecture versions. Moreover, although the department scores well when evaluated on a per capita basis, we have found it difficult to maintain a high degree of national visibility when competing against departments that are far larger. Because we lack the numbers sufficient to address the increasing demands of the field of psychology, we have not been able to consistently offer the University a truly distinctive psychology program.

The merger offers the University the unique possibility of reinvented programs in communication and psychology of sufficient size to maintain themselves without an excessive administrative burden on faculty and of relatively distinctive flavors that will enhance the national visibility of the University. The goal is to have a department of sufficient size to reach the critical mass required for creative scholarship.

B. Distinctiveness

Few, if any, departments across the country combine programs in psychology and communication sciences. A department that combines psychology and communication sciences will automatically be a very distinctive entity.

Of course, not all disciplines belong in merged departments. However, psychology and communication sciences represent a natural fit, especially on this campus. These are the only two disciplines in the College with a strong clinical focus, that is, with an emphasis on research and training in the provision of services to clients. Ideally, clinical training should be multidisciplinary, as it will have to address the needs of clients who may be facing a variety of issues. The newly formed department would incorporate interdisciplinary training through clinical grand rounds and observations. Language and communication are important topics in psychology, and psychological issues represent an important background to consider and program for when considering many issues in communication sciences.

Through accidents of history, communication sciences and psychology have developed in this university in ways that make a merger seem natural. The field of communication sciences addresses a large number of topics, with our department at CWRU choosing as its educational foci communication disorders and speech language pathology. Similarly, the psychology department has long since eliminated as foci topics (e.g., animal models of neuroscience and learning or industrial/organizational) that would be least likely to interact with communication sciences. In practice, clinical psychology and individual differences in cognition (with a strong emphasis on neural bases) represent the two strongest themes in our department, and both of these themes intersect naturally with communication sciences.

We have the possibility of forging a new department with a distinctive multidisciplinary focus – a department that emphasizes viewing communication disorders in the light of psychological theories and research, psychopathology in the light of disorders of speech and language, and human cognition in the light of current research on neural bases of language and speech pathology. This new merger would place us in a position nationally at the cutting edge. It would enhance our visibility, without compromising the missions of the separate departments.

C. Educational opportunities

The undergraduate programs in psychology and communication sciences are already deeply intertwined. Rather than by design, this union between the departments happened naturally as a result of theoretical, logical and practical connections. Double majors in psychology and communication sciences are very common, as undergraduates have perceived the complementary natures of these two disciplines. Even when students do not formally carry out a double major, they often take classes in the complimentary discipline; indeed, four PSCL classes are included in the typical undergraduate COSI major, along with nine other PSCL classes listed as suggested electives. Although this intertwining has occurred in a fit of absent-mindedness, one can argue that it would be best if greater conscious coordination and planning happened at the undergraduate level. Moreover, using a merger to broaden the bases for the undergraduate programs would increase the opportunities for service learning and present a greater range of possible capstone experiences. The plan is to maintain separate majors in psychology and communication sciences, while designing ways to increase the multidisciplinary aspects of both majors through interdisciplinary capstone projects, grand rounds, and interdisciplinary seminars open to all students. Additionally, the Health Communication minor in Communication Sciences attracts students from multiple disciplines across the campus and is another opportunity for interdisciplinary training. A priority in the design of the course work in this minor is to appeal to the needs of the diverse fields in the university's academic community, including psychology, premed, nursing, prelaw, public policy, public health, communication disorders, gerontological studies, nutrition, health management, and social work.

On the graduate level, our programs are more independent of each other. Indeed, they are distinct in their natures. In communication sciences, the Integrated Graduate Studies program is becoming an increasingly important pathway for students interested in pursuing a master's degree and clinical certification. There is a heavy (and increasing) demand for clinical speech language pathologists with this training. In contrast, the IGS program in psychology is moribund, as there is little demand for holders of the MA in psychology; moreover, there is absolutely no interest among the psychology faculty in trying to develop it, as this would seem to be precisely the wrong direction to take. Graduate training in psychology is aimed at the doctoral level. However, graduate education in both departments would benefit from closer cooperation.

Communication sciences will increase its doctoral program over the next decade, and this will be facilitated by close cooperation with psychology, which already offers numerous, exclusively graduate-level classes in topics such as research design and statistics, child development, neural bases, and cognition. Students in clinical psychology, as they enter into a world that is growing increasingly multidisciplinary, would benefit from exposure to practica and populations reflecting communication disorders. The graduate-level class on health communications would be a valuable elective for many students in clinical psychology. Graduate students in experimental psychology, who currently receive little or no exposure to language, would benefit from the expertise in communication sciences on the neural bases of linguistic functioning and language disorders; this should help them compete in an academic marketplace placing increasing emphasis on interdisciplinary training.

The experimental program would particularly benefit from a reinvigoration of, and a return to external funding for, the training grant in mental retardation training. Increasing the interdisciplinary training of the psychology graduate program, and specifically tapping into the expertise of communication-sciences faculty, would greatly facilitate this. The field of developmental disabilities is by definition an interdisciplinary one> Our former training grant would be far more likely to regain external funding if presented in an interdisciplinary context that emphasizes careful documentation of unique phenotypes and practices (i.e. educational, clinical, and environmental) to address these disabilities. The merger of these two disciplines enables us to address broadly the problems faced by persons diagnosed with developmental disabilities. Resubmission and receipt of the training grant would benefit the merged department by allowing the doctoral programs in the two disciplines to benefit from greater cooperation and coordination. That said, the IGS program in communication sciences will necessarily remain somewhat independent of psychology, as there is a strong need locally and nationally for speech-language pathologists.

D. Research opportunities

Merger is not needed for research collaboration; indeed, there is already close research collaboration going on among the faculty of the two departments. Such collaboration is bound to continue whether or not the merger is approved. In the immediate future, merger may have little impact on the amount of collaborative research that is carried out. However, over the long run, a merged department is more likely to foster newer and deeper collaborations. Interactions between faculty members sharing the same hallways and classrooms will spark new ideas. Also, collaborations between faculty members in one discipline and graduate students in another are easier to arrange if they share a common department. Moreover, as new faculty are hired into a merged department, specifically coming into a department that is intended to span the psychological and communication sciences and often hired specifically for their potential to bridge disciplinary divides, creative collaborations appear very likely to be fostered by the new organization. A "bridge" position may be created where the faculty member will be shared by the communication sciences arm and the psychology arms of the new department.

We live in a world in which research and training are increasingly interdisciplinary. The rich collaborations that already exist between the faculties in the two departments attest to the great potential at the intersection of psychological and communication science. We believe that, particularly over the long term, a merged department will lead to new and creative directions in research.

2. WHAT RESOURCES WILL BE NEEDED?

A merger of two departments does not necessarily require a large infusion of new resources. After all, the faculties, staff, and infrastructure of the two separate departments are already in place. A change in organizational structure and mindset does not always require, and does not always benefit from, an infusion of new funds.

Having said that, it is clear that some resources are clearly needed. Faculties of neither department will be interested in the merger if it leads to a reduction in the funds devoted to the disciplines. There will be no cuts in levels of funding of any of the components of the new department. Over the short term, it is wrong to see a merger as a money-saving process. The structure of the budget will remain the same over a transition phase of approximately five years. The funding lines of the two departments should be kept separate and should be maintained at the levels that would presumably have been obtained in the absence of a merger. Just as a merger does not immediately create a need for new personnel or infrastructure, it does not eliminate the educational and staffing needs that are met by the current budgets. This merger requires the implicit assurance that the disciplines of psychology and communication sciences will not be penalized in the future relative to the funding that they would have received in the absence of a merger.

Given certification and training standards the communication sciences department will require additional tenure-track faculty members. Successful completion of the currently approved search for one or more tenure-track faculty in the 2009-2010 academic year is critically important. Increasing the number of tenure-track communication sciences faculty should be a College priority. Because department leadership would be shared with psychology faculty, specifically attracting senior faculty in communication sciences (a task that has proved daunting over the years) will be less urgent than boosting the overall number of tenure-track faculty in the program. During and after the merge, the Department of Psychological Sciences will create a new strategic plan which will incorporate the mission and goals of both COSI and PSCL while also creating new goals. The plan will recognize the importance of fostering new interdisciplinary strength but will also seek to maintain the current strengths within each of the three areas, Clinical Psychology, Experimental Psychology, and Communication Sciences. This strength will be ensured by maintaining a critical mass of faculty with the necessary training, research and teaching expertise essential for the success of each of the three areas.

The total amount of space available in Mather Memorial and the new Hearing and Speech Center building will meet the needs of the new merged department. In addition to fulfilling the department's research, teaching/training, and administrative needs, the use of the space should facilitate interaction and collaborations among all the faculty and students in the department. Some functions that currently take place in Mather Memorial will undoubtedly move to space in the new Hearing and Speech Center building and vice-versa. For example, over the long term, the Psychology Clinic may be able to use therapy rooms in the Speech and Hearing Building as the Clinic further develops their program and grows. Research space currently housed in Mather Memorial may be more appropriately housed in the Speech and Hearing Building. The allocation of space will evolve to meet the needs of the new department.

3. WHAT WILL BE THE STRUCTURE OF THE NEW DEPARTMENT?

The psychology department currently assigns faculty to the experimental or clinical program; this reflects the graduate training in which the faculty member is most responsible for, although a number of graduate courses are taken by students in both programs. The experimental and clinical psychology programs are led by a training director and take sole responsibility for evaluating graduate applicants and making admission decisions; in addition, student evaluation is largely carried out separately by the two programs, although input is obtained from other faculty. The communication science program will also have a director. In addition, the communication science program will have a clinical program director who will oversee the clinical training of the master's students. Decisions regarding student funding are made by the individual programs within the budgetary parameters established by the department chair. All faculty in the department are available to serve as primary research advisors for all graduate students, though the great majority of students work with faculty in their program. Members of thesis and dissertation committees come from all over the department. Decisions regarding advancement to candidacy are departmental, requiring a vote by all departmental faculty with primary appointments in the department. Undergraduate education is somewhat less structured, as the department chair makes teaching assignments reflecting educational needs, rather than program priorities; for example, both clinical and experimental faculty members regularly teach PSCL 101.

The merger will create a tripartite structure, with three programs in place of the current two, with each led by a training director. Dramatic changes in undergraduate or graduate curricula should not be expected over the short term. As under the current structure in psychology, the three graduate programs will function with considerable autonomy, although all will operate within the overall budget established at the department level and advancement to doctoral candidacy will always require a vote of the department faculty. All faculty will be expected to teach at the graduate and undergraduate levels and to participate in advising at both levels.

Currently, psychology and communication sciences have different teaching loads, with the former having the heavier load. After merger, all faculty will be expected to meet the psychology teaching load of two courses per semester, though teaching reductions can be obtained through external funding.

Faculty hiring, evaluation, tenure, and promotion are department, not program, procedures and are based on votes of the whole department faculty. The department faculty, voting as a whole, request a new search and must approve the description/advertisement to be submitted to the dean. When a faculty search is authorized, the department chair appoints a search committee; the number of members varies from three to five. The search committee reviews the applications and carries out preliminary distance interviews; it then proposes to the department faculty candidates who should be invited to campus. The department faculty meet as a whole to select those candidates whose names should be submitted to the dean for formal interviews. Recommendations to the dean regarding hiring are made by the department faculty voting as a whole. New faculty are assigned mentors with relevant expertise, though they could be from any program. Yearly evaluations of junior faculty are carried out by senior faculty as a whole, with faculty mentors typically writing the initial draft. Evaluations of junior faculty are approved, and signed, by all senior faculty. (The evaluation of tenured faculty is carried out solely by the department chair.) In promotion and tenure cases, the names of external evaluators will be submitted to voting faculty prior to being sent to the dean for approval. The current junior faculty will be evaluated by the tenure guidelines of the existing departments at the time of their hire.

4. WHAT WILL BE THE IMPACT OF A MERGER?

It is difficult to forecast what the impact of the merger will be. The compelling force underlying this merger is the recognition that the status quo for either department is not acceptable. While we focus on the beneficial aspects of a merger, we should never lose sight of the negative consequences of failure to make changes. Rather than merely pondering what these programs will look like in five years if the merger proceeds, we should also think about what they will look like if we try to maintain the status quo.

Moreover, the status quo is unnecessary. Communication sciences should be a vibrant and prominent part of the College and University. For decades, it has been more popular as a major among undergraduates than its number of faculty would suggest. The Health Communication Minor has become increasingly popular across the University drawing students from many health-related disciplines, as well as from engineering and business. As a field of graduate study, it has great potential, as the need for speech-language pathologists is increasing year by year. Its plan to use the Integrated Graduate Studies program as one of the pathways for clinical master's degrees and certification is distinctive and shows signs of being highly popular among the students. The concept of the IGS has long been popular among applicants and students, with communication sciences uniquely positioned to utilize this program in a meaningful way. The IGS master's program fills a void locally and nationally, while becoming a clear path to very strong and exciting job prospects for our students. The fields of communication sciences and psychology are directly relevant with the University's priorities of human health and child development. The University has forth as goals to "expand and deepen the University's relationships with the larger community" and to "increase involvement in Cleveland and Northeast Ohio". Maintaining a communication-sciences program that has long and intimate ties with the Cleveland Hearing and Speech Center, that has externships for the training of students with about twenty sites (including community hospitals, schools, and service agencies) in the region and that addresses important clinical needs in the community should be a priority. Strengthening a psychology program that maintains collaborative programs with many University Circle institutions and has a clinical program with strong working ties with more than 25 agencies throughout northeast Ohio should also be a priority. A merger would enhance the contribution of communication sciences and psychology to the University's priorities expressed in its strategic plan.

In its strategic plan, the College discussed the urgency of fostering scholarship beyond departmental boundaries. It also recognized the importance of balancing the need to address small size or critical mass problems within some departments with the selective expansion of other departments. This proposal is clearly intended to enhance the position of the College to address these issues.

5. HOW SHOULD THE MERGER PROPOSAL BE EVALUATED?

We emphasize again that this proposal should be evaluated not merely against the performance of these departments in the recent past but rather what is likely to be their performance in the future if the status quo is maintained. Particularly important benchmarks should include the following:

A. Faculty hiring, retention, and development

As discussed above, one of the major problems that arise from very small programs is the difficulty in retaining and developing faculty when they have to shoulder an excessive administrative load. It also becomes more difficult to hire faculty when a department is perceived as being too small to be sustainable. Therefore, one important benchmark is that we appear competitive in hiring communication sciences faculty, that we can allow them to develop without asking excessive administrative burdens, and that we can retain junior faculty who show promise as scholars and senior faculty with extensive commitments to funded research. Moreover, we have to be able to do this in a way that does not compromise our ability to hire, retain, and develop psychology faculty members. As the programs grow, a faculty hire bridging multiple arms of the department will be made. Successful faculty searches, number of faculty retained and hired, and productivity of faculty in publication and grant submission are all measurable outcomes that would be important in evaluating this benchmark.

B. Graduate training

Psychology must retain the strength of its graduate programs, which attract many more applicants than we have funding for. We must be able to show that we have introduced multidisciplinary training to both the clinical and experimental program. We must increase the external funding support for graduate study, through both research grants and training grants. Communication sciences must develop a larger doctoral program. Graduate programs in communication sciences should be taking advantage of courses and research opportunities in psychology. There will be an emphasis placed on increasing external funding of graduate training in communication sciences. Number and quality of graduate applicants, number of graduate applicants completing their program, and amount of external funding for graduate training are all measurable outcomes relevant to evaluating this benchmark.

C. Undergraduate education

As a result of our distinctive profile, are more undergraduate applicants expressing an interest in psychology and communication sciences? Has the quality of applicants expressing interest in our programs increased? Have we been able to develop distinctive classes and capstone experiences to build on our multidisciplinary nature? Do students majoring in psychology and/or communication sciences feel that they have received an educational experience that they could not have received anywhere else in the country? The number and quality of undergraduate applicants expressing interest in these areas, the number of undergraduate majors declared and completed, and increased expressed student satisfaction would all be measurable outcomes.

D. Research

The National Institutes of Health Roadmap for future investments in the behavioral and social sciences calls for collaborative interdisciplinary research to address the complex scientific issues that we confront today. Have we been able to take advantage of our multidisciplinary structure to take advantage of this vision? Have we increased both number of submissions and amount of research funding? Are we successful in encouraging submission and resubmission by junior faculty? Are the grant submissions truly distinctive and multidisciplinary? The number of publications, research visibility as evaluated by citations, the number of grants submitted, and the amount of external funding obtained would all be measurable outcomes relevant to this benchmark.

Date: Mon, 21 Dec 2009 12:51:26 -0500
From: Lee Thompson <lat@case.edu>
Subject: Report to the Executive Committee: CSPSC and Budget Committee Response to the Proposal to Merge PSCL and COSI
To: John Orlock <john.orlock@case.edu>
Cc: "Cyrus C. Taylor" <cct@case.edu>, Cynthia Stilwell <cynthia.stilwell@case.edu>, Joseph White <jxw87@case.edu>
X-Mirapoint-Loop-ID: 1e40814bac444d26d9c7f036f733f095
X-Junkmail-Status: score=10/50, host=mpv7.case.edu
X-Junkmail-Whitelist: YES (by domain whitelist at mpspam4.TIS.case.Edu)
Original-recipient: rfc822;cas26@spamfree.cwru.edu

Dear John,
The College Strategic Plan Steering Committee and the College Budget Committee in a joint meeting on December 16, 2009 unanimously and enthusiastically supported the proposal to merge the Department of Communication Sciences and the Department of Psychology. No concerns were raised. The CSPSC noted that the merger aligns very well with the College's strategic plan.

Please let me know if you have any questions or concerns.

Best,
Lee

--
Lee Anne Thompson, Ph.D.
Professor
Department of Psychology
Case Western Reserve University
Mather Memorial Building, RM 109
11220 Bellflower Road
Cleveland, OH 44106-7123
216-368-6477
216-368-4891 (F)

CASE WESTERN RESERVE
UNIVERSITY
COLLEGE OF ARTS AND SCIENCES

Graduate Committee

College of Arts and Sciences
Case Western Reserve University
10900 Euclid Avenue
Cleveland, Ohio 44106-7068

MEMORANDUM

To: Executive Committee

From: Gary Deimling, Chair, Graduate Committee

Date: January 6, 2010

Subject: Proposed Merger of Departments of Communication Sciences and Psychology

Please find below individual comments from members of the Graduate Committee concerning the proposal to merge the psychology and communication sciences departments.

The vote from committee members responding (5) was unanimous in favor of the proposal.

COMMENTS:
"They make a case that the small size of the current departments, especially COSI, is crippling; this seems probably true. The concern of course in folding a small department into a larger one is that the smaller group is then forced to compete for resources within the new larger department, where they may be at a disadvantage because of their size. What if votes are taken about areas to search for new faculty or how much to spend on supporting graduate students in each area, and the members of the former COSI department are always outvoted? This may or may not be a concern with the present membership of the departments, but could become a problem at some point in the future even if it doesn't seem to be a problem now. Another possible problem closely related to this is whether the merger will put constraints on what areas of specialization the COSI group will be able to attract; will a COSI group inside a psychology department be equally attractive to all researchers in communications sciences, or will it tend to attract only a certain subset? If so, is this a problem? I'm not suggesting that it is, just asking.

One other thing I find strange is the it is argued that PSCL has problems due to its size, in that "It is impossible to cover the range of the psychological sciences in a department far smaller than our peers" (page 2), while at the same time, later on page 2, it says "Few, if any, departments across the country combine programs in psychology and communications sciences". These two statements seem rather at odds with each other. The implications seems to be that the PSCL department feels uncompetitive compared with other psychology programs due to a lack of breadth, and plans to alleviate that by adding areas of expertise which are not normally in a psychology department. They make a reasonable case that the two departments are a natural fit together, but I don't really see the merger addressing the breadth issues that are mentioned.

In terms of voting, I suppose that on balance I would vote in favor if there is no further discussion."

*

“While I find the general rationale for a merger of the two disciplines too broad to be sufficiently convincing—many disciplines share an interest in or focus on language and communication—the argument for a merger between these two particular departments at Case is much more compelling, especially given the focus in Communication Sciences on communications disorders and speech language pathology. The explanations concerning size also seem very credible to me, saving the faculty in Communications Sciences from the burdensome administering that characterizes very small departments or preventing outright elimination. The Department of Psychology will also gain the heft and diversity that will enable them to achieve the desired increase in national recognition. I agree with the claim that the merger will produce a distinctive program that will stand out from others. I therefore vote IN FAVOR of the PSCL COSI merger.

I note a few small errors in the document:

p. 3, “1C.” line 6: “complimentary” should be spelled “complementary”

p. 3, “1C.” 2nd ¶: a line space separating this paragraph from the prior one is missing

p. 4, “1C.” 1st full ¶: a “<” is used in place of a period.

p. 7, “4.” 2nd ¶, sentence 10 has a grammatically incorrect verb”

To: jmo3 (John Orlock)
From: Cynthia Stilwell <cynthia.stilwell@case.edu>
Subject: CEP Review of Proposal to Merge PSCL & COSI
Cc: cla2 (Cathy Albers)
Bcc:
Attached:

Hi John,
Just a quick note to let you know that the Committee on Educational Programs (CEP) reviewed the proposal to merge the Departments of Psychology and Communication Sciences at its meeting held December 17, 2009. The committee voted to endorse the request based on its review of the curricular aspects of the proposal.
Cynthia

CASE WESTERN RESERVE UNIVERSITY
COLLEGE OF ARTS AND SCIENCES

MEMORANDUM

Executive Committee
College of Arts and Sciences
Case Western Reserve University
10900 Euclid Avenue
Cleveland, Ohio 44106-7068

TO: Faculty in the College of Arts and Sciences

FROM John Orlock, Chair of the Executive Committee

DATE: January 19, 2010

SUBJECT: Proposed Division of the Current Department of Theater and Dance into a *Department of Theater Arts* and a *Department of Dance*

The Executive Committee, following the guidelines established by the College of Arts and Sciences for Creating, Merging, or Splitting a Department (2008) recommends that the request of the Department of Theater and Dance be approved. In support of this recommendation, we send forward the materials provided by the Department of Theater and Dance in support of this request submitted May 1, 2009, as well as the assessment of the College Strategic Planning Steering Committee, the Graduate Committee, and the Committee on Educational Programs (in accordance with step 3 of the guidelines).

The Executive Committee finds persuasive evidence in support of the proposal, which we believe will have a positive impact on the study of theater and dance at CWRU, as well as enhance the overall profile of the performing arts at the university. While the committee recognizes the potential difficulties inherent in splitting theater and dance into two departments of relatively small scale, nonetheless, we believe that the benefits to each of the resulting academic units, the college, and the university outweigh such concerns. In endorsing this proposal, the committee further recognizes the need and benefit for continued assessment regarding the impact of the creation of these two separate departments upon the artistic, research, and learning environment of the university.

In addition to the attached materials, the Executive Committee wishes to offer the following observations with regard to the proposal. The combination of theater and dance into one department at CWRU is of an historic nature and the merging of their respective disciplines was the result of their areas of commonality in the performing arts. However, as CWRU takes steps to enhance the state of the performing arts on campus, the Executive Committee holds it important that each discipline be provided the opportunity to evolve in the ways and means appropriate to that discipline—as opposed to having artistic, academic, and administrative goals compromised by what has now become a forced partnership. Therefore, it is essential to affirm the disciplines of theater and dance as discrete fields of study in their own right, each with its own methodologies of training, professional associations, bodies of discipline-related literature, and recognitions of accomplishment. In short, this proposal appropriately acknowledges and supports the professional integrity of each discipline and provides CWRU with a vision for the performing arts that is both congruent and competitive with its peer and aspirational-peer institutions.

Ron Wilson, Chair
Department of Theater and Dance
(216) 368-6142

May 1, 2009

TO: John Prostasiewicz, Chair
College Executive Committee

FROM: Ron Wilson, Chair
Department of Theater & Dance
Karen Potter, Director
Dance Program

RE: Dance / Theater Program Descriptions

Dear Professor Prostasiewicz:

In response to the Executive Committees request for further information as to the establishment of a separate Department of Theater and Department of Dance, we offer the following information.

The discussion between the Dance Program, the Theater Program and various Deans in the College of Arts and Sciences concerning the separation of the Department of Theater and Dance into separate departments has been going on for a number of years. When the Dance Program was joined with the Theater Department in the '70s, no doubt there were logical reasons for that merger to occur. As the individual programs have evolved over the years, those reasons are either not apparent or have ceased to exist.

When the original merger occurred, actors in the Theater Department (MFA and BA) were required to take dance classes as part of their major requirements. That requirement no longer exists since faculty hires have eliminated the need for student actors in the Theater Department to study dance for a movement training experience. Dance students currently take Introduction to Acting classes in the Theater Program as part of their requirements, but those courses can still be accessed whether the programs are under the same umbrella or not. Other than that, there is no other substantive connection. It is apparent that this combined department has existed as a bureaucratic convenience for the College of Arts and Sciences rather than as a meaningful pedagogical connection. While this arrangement may have worked for the college it no longer serves the programs or the faculty in any productive, meaningful way:

- There is no dynamic synergy in either artistic performance projects or pedagogic experiences between the programs.
- There are no interdisciplinary opportunities for students except on rare occasions.
- The current arrangement has created no expanded grant opportunities for students or faculty.
- There have been no collaborative fund raising efforts, nor would that be appropriate.
- Dance and Theater disciplines are not linked philosophically or aesthetically (simply because they are performance programs does not mean they share similar philosophies – this is a naïve assumption).

For years, each program has been responsible for its own productions, its own curriculum, and its own budget. Currently we neither support, nor contribute to, nor interact with each other (pedagogically or aesthetically) ... except on rare occasions or when we have faculty-meetings. Right now the existence of the two programs in one department is a functionless construct except for P&T situations, and that can just as easily be handled by forming outside committees (this happens in many instances anyway).

The faculty feels that with the programs having their autonomy it would increase their strength of identity that would then assist in greater growth opportunities. The programs are strong enough and established enough that they can certainly stand by themselves. Both programs have been in need of additional faculty for a decade. Given this blatant oversight on the part of previous administrations, we the faculty feel that an even better case can be made if the programs become separate departments.

The College continues to need a larger Arts identity and this would be another step in helping to increase that image of Arts on the campus.

In searching out metrics for the success of separate departments of Theater and Dance, it is obvious that there is no clear way to forecast the future. There are many paradigms ranging from iterations of Theater, Film, Dance, Music, and Art under varying umbrellas. There are as many departments of PE with Dance under the PE umbrella (where our dance program was initially housed). Since our Dance Program has grown so rich as an important aesthetic entity on campus, in the community, and in the region, it is certainly at a place that it can stand on its own as a force for artistic instruction to our undergraduate population.

In response to the College Executive Committee's request for further information regarding Theater and Dance Programs at other universities that have separate departments, we have enclosed the following information (Peer_Institution_Comparison_updated.doc). Also attached is a graph created by the Dance Program (Dance_Programs_Department_structure.xls) showing the many variations of Dance Departments in higher education and their relationships to Theater, Music, and PE departments.

There are numerous other peer institutions or schools in close proximity with Dance and Theater Programs, A few are listed below; others are included in the separate document.

Emory University
The Dance and Theatre Programs exist separately in the College of Arts and Sciences as separate departments.
DANCE - Prof – 3 / Lect – 2 / Teach Specialist – 6
THEATRE – BA - 7 Fac / 8 Instruct/Lect / 10 staff

Ohio University
Separate Departments under the College of Fine Arts
DANCE – BFA – 9 tenure track Faculty / 3 staff
SCHOOL OF THEATRE – BFA / MFA / MA – 13 Fac / 4 lect / 5 staff

Ohio State University
COLLEGE OF THE ARTS
DANCE – BFA / MFA / PhD – 17 Fac / 12 Lect / 8 Emeriti / 7 staff
THEATRE – 16 Fac / 4 Lect / 9 Staff

While these above programs are larger than our Theater and Dance Programs, we have a strong history of theater and dance excellence.

It is time to take these programs off the leash and allow them to flourish.

Thank you for your consideration of our proposal.

Very truly yours,

Ron Wilson, Chair
Department of Theater and Dance

Karen Potter, Director
Dance Program

TO: John Orlock, Chair of the Executive Committee, College of Arts and Sciences

FROM: Lee Thompson, Chair of the College Strategic Plan Steering Committee and Joe White, Chair of the College Budget Committee

DATE: November 4, 2009

SUBJECT: Proposed Split of the Department of Theater and Dance

After review of the proposal from the Department of Theater and Dance to split into two departments, the Department of Theater and the Department of Dance, the College Strategic Plan Steering Committee, including the membership of the College Budget Subcommittee, finds the following points in support of the proposal:

- The current departmental structure appears to be an obstacle to pursuit of the creative and curricular priorities of both the Theater and Dance programs.
- There appear to be minimal if any financial risks associated with the creation of two departments, due to the fact that the theater and dance programs have been operating with a high degree of autonomy, including separate administrative assistance, already.
- Eliminating an artificial connection between the two programs may encourage further creative activity and pursuit of philanthropy and a higher profile for both of the new departments, and therefore for the College's performing arts activities.

Concerns:

The CSPSC and Budget Committees are concerned that while our committees on balance endorse the proposed split based on the very unique circumstances involved, we note, in general the creation of new departments with very small faculty size is not a strategy beneficial for the College's future.

We do not want this statement to be interpreted as endorsement of increasing the size of either department. Those are separate questions that must be addressed on the merits both in terms of their effects on those programs and other ways that scarce funds could be invested to strengthen the College.

CASE WESTERN RESERVE UNIVERSITY
COLLEGE OF ARTS AND SCIENCES

Graduate Committee

College of Arts and Sciences
Case Western Reserve University
10900 Euclid Avenue
Cleveland, Ohio 44106-7068

MEMORANDUM

TO: John Orlock, Chair
Executive Committee

FROM: Gary Deimling, Chair
Graduate Committee

DATE: November 6, 2009

SUBJECT: Proposed Split of the Department of Theater and Dance

This memo is in response to the request from the Executive Committee of the college for input from the Graduate Committee on the proposal to split the Department of Theater and Dance into two departments. We appreciate the opportunity to provide this input and at our first meeting after receiving the request (November 2) we discussed the materials we were provided. Below is a brief summary of our more extensive discussion.

- The split will not likely be disruptive to current students.
- There will likely be no curricular revision required (e.g., dance and theater courses are catalogued as separate classes).
- Separate structures and rubrics in place already will make the split logistically simple and should not adversely affect the social infrastructure of the departments.
- Though it does create a small department, benchmarking data provided in the proposal do not indicate that this would make our programs atypical and should not present a problem.
- Separate departments could raise the profiles of both departments both internally and possibly externally.

After the discussion, the committee with all members present, agreed unanimously by a show-of-hands vote to endorse moving the proposal forward for final consideration. We hope the summary above is helpful in those deliberations. If you have any questions please feel free to contact Gary Deimling, the committee's chair via e-mail (gtd@case.edu) at your convenience.

To: jmo3 (John Orlock), cct (Cyrus Taylor)
From: Cynthia Stilwell <cynthia.stilwell@case.edu>
Subject: CEP Evaluation Re: Theater/Dance Proposed Split
Cc: cla2 (Cathy Albers), jek7 (Jill Korbin)
Bcc:
Attached:

Date: Thu, 19 Nov 2009 13:39:20 -0500
From: Catherine Albers <cla2@case.edu>
Subject: Exec committee document/re:split
To: Cynthia Stilwell <cynthia.stilwell@case.edu>
X-Mailer: Apple Mail (2.936)
X-Mirapoint-Loop-ID: 8b8074da0418f453a81ebc41d0741c2d
X-Junkmail-Status: score=10/50, host=mpv8.case.edu
X-Junkmail-Whitelist: YES (by domain whitelist at mpspam4.TIS.case.Edu)
Original-recipient: rfc822;cas26@spamfree.cwru.edu

At the meeting of the CEP on Nov. 19, 2009, the committee discussed the proposed split in the Department of Theater and Dance and gave their consent to the proposal.

Catherine L. Albers
Professor
Director, Undergraduate Theater Studies
Case Western Reserve University
cla2@case.edu
216-368-5926 Office
216-368-5184 Fax

GSS
The Graduate Student Senate of
Case Western Reserve University

Quentin Jamieson
GSS President

10900 Euclid Avenue
Cleveland, Ohio 44106-4970

Visitors and Deliveries
Robbins Building, E536-E
cell: 440-320-7220
gss-president@case.edu

September 23, 2010

To: CWRU Faculty Senate

A good mentor-mentee relationship is key to a successful graduate school experience. More than just a team of scholarly inquiry, mentors and mentees will develop a close, personal relationship. Mentors have a great opportunity to teach their mentees the value of research, but also the value of communication, teamwork, leadership, and character building exercises. It is the combined result of all of these which will transform today's mentees into effective mentors and leaders in tomorrow's world.

The Mentee Guidebook for Students represents a body of work spanning nearly 3 years of effort which started in 2007. The guidebook would not have been possible without the pioneering work of Kevin Speer, GSS President 2007-2008 and Craig Rudick, Chair, GSS Mentoring Committee 2007-2008 who authored the Mentoring Guidebook for Faculty. Together with the Mentee Guidebook, these resources emphasize that the mentor-mentee relationship is truly a two-way conversation. Additionally I would like to thank James P. Harris, GSS President 2008-2009 who oversaw the creation of the Mentee Guidebook, GSS Mentoring and Diekhoff Award Committee Chairperson Antje Daub, 2009-2010, and Thalia Dorwick, Chair of the Borad of Trustees Academic Affairs & Student Life Committee whose expert editorial reviews contributed significantly to the final documents.

For a brief timeline, the Mentee Guidebook was first reviewed and approved by the Faculty Senate Committee on Research in December 2009 before being re-reviewed by the Faculty Senate Committee on Graduate Studies and on September 1, 2010 which voted unanimously to approve the document. On September 16th, the Faculty Senate Executive Committee voted unanimously to move this document forward for full Faculty Senate review. I am grateful to Professor Wnek and especially grateful to Faculty Senate Chair, Alan D. Levine, Ph.D. for their enthusiastic support of the Handbook.

In closing, the University Strategic Plan "Forward Thinking" mentions the word "Mentoring" no fewer than 10 times in reference not only to recruiting, retaining, and developing students, but also to developing faculty and as criteria for faculty promotion and tenure. Mentoring is a priority of Case Western Reserve University, and I hope the Faculty Senate's endorsement of the Mentee Guidebook for Students will contribute to shaping the culture of mentoring within our university community.

Respectfully,
Quentin Jamieson
GSS President, 2010-2011

GSS
The Graduate Student Senate of
Case Western Reserve University

A PUBLICATION OF THE GRADUATE STUDENT SENATE | CASE WESTERN RESERVE UNIVERSITY

A Mentee Guidebook for Students:

how graduate students can become respected professionals and trusted colleagues

2008-2009

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How Graduate Students Can Become Respected Professionals

and Trusted Colleagues

A Publication of

GSS
The Graduate Student Senate of
Case Western Reserve University

2008-2009

Subcommittee on Mentoring

This Guidebook is a companion to *A Mentoring Guidebook for Faculty*, a resource produced by the 2007-2008 GSS Committee on Mentoring (GSS-MC). It was created by the following members of the 2008-2009 GSS-MC and finalized by the 2009-2010 GSS-MC:

Sarah Busch, *Neurosciences*

Rachel Bryant***, Sociology

Antje Daub, *Sociology*

Kathleen Courtney***, *Nursing School*

Angela Filous, *Neurosciences*

Timothy Franke***, *Control Engineering*

Cassie Freudenrich, *English*

James Harris*, *Biomedical Engineering*

Cara Henry, *Biomedical Scientists Training Program (BSTP)/Biology*

Brett Hoover**, *Biology/Biomedical Engineering*

Sarah Kyker**, *Biology*

Christina Larson, *Art History*

Elaine Lee, *Biomedical Engineering*

Lucas O'Donnell, *Materials Science & Engineering*

Kristin Sullivant***, *Biomedical Engineering*

Craig Rudick**, *Astronomy*

Kevin Speer**, *Electrical Engineering & Computer Science*

* Committee Chair 2008-2009 and headperson for this Guidebook

** Denotes returning member from 2007-2008

***Committee Members 2010

Faculty Reviewers

To get the faculty perspective, the GSS Subcommittee on Mentoring contacted the following group of exemplary Case Western Reserve University faculty mentors, who volunteered to review and offer suggestions on our draft document. The committee cannot possibly thank you enough for your outstanding service, suggestions, advice, and enthusiasm, all of which vastly improved this Guidebook. Each of you truly epitomizes the word ‘mentor’.

Robert Brown, *Physics*

Heath Demaree, *Psychology*

Kimberly Emmons, *English*

Christopher Flint*, *English*

Gary Galbraith, *Theater & Dance*

John Lewandowski, *Materials Science & Engineering*

Christopher Mihos, *Astronomy*

Sandra Russ, *Psychology*

Elizabeth Tracy, *Mandel School of Applied Social Sciences*

Athena Vrettos, *English*

Christian Zorman, *Electrical Engineering & Computer Science*

*Final Faculty Reviewer

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Finally, we would like to extend special appreciation to the University of Michigan's Rackham School of Graduate Studies for their pioneering and inspirational work upon which this document is largely based. (*"How to Mentor Graduate Students: A Guide for Faculty at a Diverse University,"* 2006)

Remarks from President Barbara R. Snyder

"If I have seen further than others, it is only by standing on the shoulders of giants."

Sir Isaac Newton

Your Graduate Student Senate (GSS) has demonstrated remarkable wisdom in identifying mentoring as a key priority in recent years. In the best of these relationships, faculty are able to provide invaluable advice, insight, and support for students. Each has faced similar questions and uncertainty on their own academic journeys; more, they now have the added perspective allowed by time and experiences as professors themselves.

The GSS began this project by developing an outstanding handbook for mentors. Now they complete it with one for students. As the committee members who developed this document well know, effective mentoring rarely happens by chance. Just identifying appropriate mentors involves careful reflection, wide-ranging conversations, and research regarding faculty members' academic interests. From there the task of establishing and maintaining high-functioning relationships becomes even more complex. Ultimately, though, the effort invested has the potential to reap enormous rewards. I commend the committee for once again producing a most thoughtful piece, and encourage every graduate student to review it with care.

Sincerely,

Barbara R. Snyder

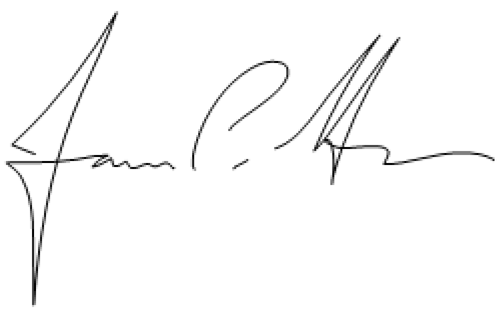
President

Insight from the 2008-2009 President of the GSS

Simply, this is a guide written by graduate students for graduate students. While a trite expression, it sums up the spirit of the guidebook: the best thing you can do for your graduate experience is be proactive and consult others about the lessons they have learned.

Graduate work can often be a solitary experience, but rest assured there are others that have gone before you and can help you. We call these people MENTORS. Your MENTORS, and yes there will be more than one, should be a source for information, not the sole, unquestionable source. Be prepared for meetings and discussions since other people are busy too. Think about questions and anticipate their answers, and soon you will be ready to be a mentor for the next person.

Best Wishes,



James P. Harris

GSS President and Chair Mentoring Committee, 2008-2009

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PART ONE

Developing Relationships with Mentors

I. What Is Mentoring?

"It seems to me that mentoring is a process that should be continually negotiated by the participants. Good mentors are the people who cross our paths at crucial moments, moments when we are ready to learn from their wisdom and experience. So at any given time, the best mentor may be the senior scholar who inspires you with her insight, the graduate student colleague who shares his classroom strategies, and/or the department assistant who takes the time to explain vital graduation paperwork. A good mentor - someone who possesses knowledge, experience, and the ability to explain both to novices in her field - is really only a small part of good mentoring. As a process, mentoring – perhaps counter-intuitively – implies a good measure of self-reliance: the "expert" can only tell you what has worked for her; you have to decide how that information and experience relates to your own hopes, dreams, and talents."

- CWRU Faculty Member

Mentoring involves an ongoing intellectual engagement between two individuals. In addition to contributing to one's academic and professional growth, the relationship can develop into one of mutual care and respect. Although there is overlap between the role of mentors and that of advisors in graduate education, not all mentors are advisors and not all advisors are mentors. Each department and school employs particular practices for academic and research advisors, and the focus of this guidebook is to address mentoring more generally.

The Council of Graduate Schools defines mentors in the following way:

Advisors, people with career experience willing to share their knowledge; supporters, people who give emotional and moral encouragement; tutors, people who give specific feedback on one's performance; co-operative supervisors, in the sense of moral leadership to whom one is apprenticed; sponsors, sources of *information about, and aid in obtaining opportunities; models of identity, of the kind of person one should be to be an academic (Zelditch, 1990; Jacobi, 1991, Crisp and Cruz, 2009; Rose, 2003; Brown and Trevino, 2006).*

As Zelditch (1990) suggests, mentors engage in a constellation of activities that transcend just advising or simply guiding you through a project. Mentors support you throughout all aspects of your graduate careers and beyond. This is not to say that a single mentor can fulfill all of these roles (Rayborn, Denmark, Reuder, & Austria, 2010; Crisp and Cruz, 2009; Rose, 2003). Rather than trying to find one mentor who can support you in every way, it is better to seek out a number of faculty members, each of whom can provide you with one or more of these kinds of support (Jacobi, 1991; Kuh, Kinzie, Schuh, & Whitt, 2010). Indeed, it is to your benefit to have multiple mentors, each influencing you in his or her unique way.

II. Why is Mentoring Important?

"In addition to helping me negotiate the many hoops to be jumped on the way to the degree, my advisor has also given me sound professional advice, assisted me with conference and job preparation, and suggested strategies for balancing work and life issues. Without her guidance and support, I believe my progress would have been much slower and more difficult."

- CWRU Graduate Student

Being a mentee is one of the most important roles you will have as a graduate student at Case Western Reserve University. We encourage you to dedicate yourself to fostering a strong mentoring relationship with faculty members. Doing so will not only enhance your academic experience, but also your professional career. Research shows that students who have good mentoring relationships have higher productivity levels, a higher level of involvement within their departments, and greater satisfaction with their programs (Green & Bauer, 1995). This only underscores the importance of developing strong mentoring relationships early in your graduate career. If you build a strong foundation through these relationships, it will contribute to your growth from student to colleague.

Mentoring can help facilitate your transition from undergraduate to graduate school. Unlike your undergraduate experience, where classes encouraged you to obtain knowledge, in graduate school your goal should also be to contribute knowledge to your field of study. Your coursework and the professional relationships you foster in graduate school with faculty and fellow students facilitate your entry into the scholarly community.

Mentoring goes beyond issues of professional competence. Many aspects of professional socialization and personal support are central to mentoring as well as to your professional life after graduation. In this latter stage, the mentoring cycle comes full-circle, and you may find yourself in the role of mentor—an opportunity to repay the benefits you received in your own former mentoring relationships.

The Importance of Finding Multiple Mentors

Although graduate work often emphasizes the mentoring role of an advisor, you should not limit yourself to one person as your sole mentor. It is very important to your graduate education that you have access to information from and the methodologies of a wide range of academic professionals, not just your departmental advisor. Having mentors outside of your immediate field of study can be extremely valuable in providing you with a broader perspective on your discipline than you might otherwise have. It can also be a source of fresh ideas, strategies, and methodologies.

Faculty members whom you consider to be part of your mentoring team should complement your academic interests. Such professors could share your methodological philosophy or study topics related to your research pursuits. Additionally, it is to your benefit to have a close relationship with at least three or four faculty members whose work you admire, and who are in turn knowledgeable about your work and can attest to its quality when needed for recommendations. Having multiple mentors can also be helpful in the unfortunate instance that your advisor leaves the University or if irreconcilable issues develop between you and a faculty member.

Be creative about the people you include on your mentoring team. Although this Guide focuses on faculty mentors, we also encourage you to seek advice from your peers; advanced graduate students; departmental staff; retired faculty; faculty from other departments, colleges or universities; and professionals outside academia. All of these people can serve as part of your professional network. These individuals may not view themselves as a "team" in the traditional sense of the word; if you have selected them from varied fields or professional sectors, your mentors may not know each other closely, but they are still part of a larger professional network.

III. What are the Challenges and Rewards of Being a Mentor?

"The tangible benefits of mentoring, I suppose, involve having students of yours go on to have successful careers in the field, thus spreading the influence of your research and teaching. However, the intangible benefits seem much more compelling to me. It simply feels rewarding—in a deep human sense—to help others in the way you have been helped (or, I suppose in some cases, to try to improve upon the kind of help you yourself received). Many of the intangible rewards of mentoring are the same rewards of good teaching—having exciting intellectual contact with younger minds who bring fresh perspectives to the field. I get a real sense of accomplishment when a graduate student I've worked with writes a wonderful paper, gets it published, gives a great conference talk, or gets a good job at the end of their degree program. While the credit belongs entirely to the student, there is still great pleasure in feeling you were a small part of their success."

- CWRU Faculty Member

Mentors will often be experienced faculty members who have worked through the challenges you currently face and who have achieved what you hope to achieve. However, as a result of their qualifications, they are often very busy individuals who need to balance many demands on their time. Here are just some of their responsibilities: teaching undergraduate and graduate courses; advising undergraduate and graduate students; serving as the advisor for student organizations; serving on dissertation committees; researching or working on creative projects; writing grants, books and articles; reviewing the work of students and colleagues; serving on departmental and university committees; attending professional meetings; and fulfilling duties for professional organizations in which they are involved.

The pace of these demands does not let up over time. Junior faculty members face the pressure of preparing for their tenure review, which means that they have to be engaged in an especially active research agenda. As faculty members become more senior, and as their national and international prominence increases, there is a concomitant rise in the requests for their time and energy (Tierney & Rhoads, 1994).

Despite all of their other commitments, the vast majority of faculty members find that mentoring graduate students is, in spite of the time it involves, one of the most rewarding of all their professional responsibilities. Faculty members benefit from mentoring graduate students in many ways, including the following.

- Acquiring research assistants whose work is critical to the completion of a research grant.
- Gaining collaborators for current or future projects and creating new support networks with other professionals in the field.
- Providing the personal satisfaction of knowing that the mentor has helped an emerging professional develop his/her potential.
- Creating opportunities for experienced mentors to strengthen their knowledge base and keep abreast of new techniques.
- Enhancing the leadership, teaching, coaching, and communication skills of mentors.

- Demonstrating professionalism and a commitment to their own personal and professional development as well as to that of their colleagues.

- Gaining increased professional stature by shaping future scholars.

- Promoting the professional recognition of mentors for their commitment to developing the talents of new professionals.

Mentoring is not a single task but rather a renewable source of intellectual, professional, and personal fulfillment and a gratifying means by which mentors can pass on the rich lessons they have learned throughout their careers. For these reasons, graduate students and mentors need to ensure that time is reserved for mentoring and that the time is well spent for both parties. Because one individual is rarely able to meet all of your mentoring needs, having just one person as a mentor may put too much pressure on a single relationship. As we have suggested, a mentoring network, in which a series of relationships meets different needs, may be a more realistic way of looking at mentoring.

IV. What Should You Consider When Forming a Mentoring Team?

"I've really benefited from being able to work on multiple projects with different professors. It's allowed me to learn a unique set of diverse skills which gives me a broader perspective and will make me more attractive to future employers."

- CWRU Graduate Student

Consider it *your* responsibility to seek out interactions with faculty members. It is unrealistic to expect a professor to approach you and offer to serve as your mentor. As you get started in your search for faculty mentors, try to look for a balance of both junior and senior faculty members. Each can be of assistance to you, although possibly in different ways. For example, while senior faculty might have more resources to assist you with networking, junior faculty might be more recently familiar with the stresses and strains associated with being a graduate student. Also, as we have suggested, it is probably advantageous for you to find faculty members outside of your department with interests related to yours to act as additional mentors. This can serve a dual purpose, as your department will most likely require you to have someone outside your department to be on your dissertation committee.

It is not unusual for graduate students to feel hesitant about initiating contact with a faculty member to form a mentoring relationship. Especially in the early stages of graduate school, students often feel that they need guidance about how to choose possible faculty mentors. The following considerations should be helpful to you whether you are just starting to form a mentoring team or whether you already have one.

Conduct a Self-Appraisal

Start the mentor selection process by first conducting a critical self-appraisal. Reflect on what will help you to thrive as a graduate student. Use this information later on to match yourself with faculty or others who can provide you with what you need. The following are types of questions you should ask yourself.

- What are my objectives in doing graduate level studies?
- What type of training do I want and/or need?
- What are my strengths?
- What are my weaknesses?
- What skills do I need to develop?
- What kinds of research or creative projects do I want to explore?
- How much independent versus guided work do I want to do?

- What type of career do I want to pursue?

Identify Potential Mentors

You can identify potential faculty mentors within or outside your department using a variety of formal and informal strategies. Here are some suggestions.

Do your Homework

- Familiarize yourself with professors' work to gain a sense of their past and current interests and methodologies.
- Immerse yourself in departmental academic and social activities. Observe how faculty members interact with colleagues and graduate students.
- Enroll in or audit classes taught by the faculty members who most interest you. Attend their public presentations.
- Ask advanced graduate students about their advisors and mentors. Share your interests with other students and ask them for suggestions about whom you should meet.

Explore Mentors' Reputations with Graduate Students and Departmental Staff

When searching for a potential mentor or advisor, talk to other graduate students and departmental staff. These contacts may be able to provide you with information about a potential mentor from a perspective that the mentor cannot offer.

- Does the professor have a history of giving proper attention to his or her protégés?
- Can the professor provide such things as teaching and research opportunities, access to financial resources, guidance for completing your dissertation, access to professional networks, and assistance in career development?

- Have former graduate students of this professor completed their programs in a timely fashion?

- What other scholars have been mentored by the professor, and where do they stand within the field? Ask yourself if that is where you would like to be in a few years.

- Is the professor comfortable talking about issues that are of a personal nature?

- If you are interested in nonacademic careers, what is the professor's attitude toward such decisions? Is he or she interested in training and funding someone who is not necessarily going to stay in academia?

- Has the professor recently reduced or ended a student's (or multiple students') funding, and if so, was it for a fair reason?

- How active is the professor in managing his or her students' research by setting objectives, milestones and metrics?

Explore Mentors' Academic Work:

- Find out how much the mentors' academic work relates to yours. Additionally, find out about the mentors current workload and whether they are open to working with more students.

- Explore additional mentors who can help you with your academic goals.

Don't Limit Your Options

Research clearly shows that the most important keys to good mentoring are sharing mutual research interests and having good rapport (Atkinson, Neville, & Casas, 1991; Faison, 1996; Ragins and Scandura, 1991; Struthers, 1995). Although factors such as race, gender, nationality and sexual orientation are significant aspects of a person's identity, they are only some of the qualities you should consider when selecting a mentor. Faculty members who are *different* from you in these ways can often have valuable insights into you as an individual and into your work. You do not necessarily need to limit yourself to finding mentors who are senior faculty members. Junior faculty may not have had as much national exposure and recognition as their senior faculty colleagues, but they can still be very effective mentors.

Have Realistic Expectations

In order for you to develop good mentoring relationships, you must be proactive. It is your responsibility to find and recruit the mentors who can help you achieve your goals. You also need to have a realistic idea about what any single mentor can do for you. Faculty members are more likely to respond to requests for specific types of assistance they know they can provide. Analyze what you need from a specific faculty member and explicitly ask for those things. Finally, remember that part of your task as a graduate student is to develop and demonstrate your abilities to be an independent scholar. If you ask for an *excessive* amount of help, your faculty mentors may feel that they are doing your work. What is felt to be excessive will vary by professor and by discipline. Discuss this with your advisors and your mentors if you have any concerns.

Clarify Roles and Responsibilities

Problems in mentorship most often develop because of misunderstandings about the expectations each side has of the other. Although you do not need to set up a formal contract, some people find it helpful to specify mutual agreements about their respective roles and responsibilities. Some of the expectations you will need to discuss and clarify, especially if your mentor is also your advisor and/or dissertation chair, include the following: availability (in person or in other ways), goals, meetings, feedback, reminders, and publishing. These are discussed in more detail in Section V: How Do You Develop a Relationship with Potential Mentors?

Before your first meeting with your mentor you should take time to clarify your goals. Develop a work plan that includes both short-term and long-term goals, as well as a timeframe for reaching those goals. At least once each semester (but preferably more often), contact your mentors to discuss your progress, as well as any additional training and experiences you need in order to achieve your goals.

What Are Mentors Looking For in a Mentee?

By considering the preceding items, you will have prepared yourself to identify an appropriate mentor. Before you arrange a meeting, take time to think about things from the faculty member's point of view so you can develop a healthy, two-way mentoring relationship.

Mutual Interests

Faculty members will want to know if you have interests similar to theirs. Share how your prior academic, professional, or personal experiences relate to their interests. Ask about their recent work and discuss with them ways in which these intersect with your own interests.

Compatible Working Styles

Your working style should complement that of your mentor in order to promote a good mentoring relationship. This does not mean you need to befriend your mentors—just that you should be aware of your potential mentor's methodology.

Motivation and Direction

Faculty members want motivated students who are eager to move on to the next level of their professional growth. State your goals as you currently see them. Ask about ways you can further explore these goals, what courses you should take, and whether you can assist with existing projects of the professor's or in the department. Remember that your work will be a reflection on your mentor's efforts.

Initiative

Be proactive. For example, seek further conversations with faculty members about issues discussed in class. Ask professors for suggestions about other people and experiences that will help you develop your skills and knowledge.

Professionalism and Collaboration

Work effectively with other graduate students in your department. This not only includes coursework; you should also plan group trips to professional conferences, as time permits. Professional conferences are effective venues for you to network with other students, professionals, and faculty members in your field of study.

Skills and Strengths

Demonstrate to professors why they should invest in you. Let them know what qualities you bring to this relationship—research abilities, language skills, creativity, analytical techniques, computer skills, willingness to learn, enthusiasm and commitment.

V. How Do You Develop a Relationship with Potential Mentors?

"My advisor and I have developed a great relationship over the years. I feel like I can bring any problem—from personal to academic to research—to either my research or academic advisors and get meaningful, helpful advice."

- CWRU Graduate Student

Finding a clear, open, and honest way of communicating with your mentor is key for a successful mentor-mentee relationship. This section addresses often underestimated details that form the foundation of a successful mentoring relationship.

How to Initiate Contact with a Potential Mentor

The first meeting with a potential mentor can be daunting, and some graduate students are reluctant to take this step. Remember, your insights will guide you if have a good understanding of your own academic and professional goals and if you have familiarized yourself with the professor's past and current work. The goals of your initial meeting are to make a positive impression and to establish a working rapport. You also want to assess whether a particular faculty member is a good fit for you. When considering a potential mentor, however, it is important to remember that this relationship is a two-way street, so your potential mentor will also be assessing you. Both you and your mentor have responsibilities that, if met, will ensure a healthy and productive professional relationship.

Faculty members interviewed for this handbook shared numerous insights about what they look for in graduate students. Students interviewed for this handbook gave many suggestions or important characteristics to look for when choosing a mentor or an advisor. The lists in the following section will give you a better understanding of how to present yourself and what topics to discuss with faculty. That said, don't limit yourself to just what is in these lists. Instead, use them to trigger ideas about what topics are most important to you.

Keep in mind that a mentoring relationship is often one that evolves over time and one that often begins because of a particular need. Your initial meeting with potential mentors is to gauge mutual interests and possible interactions. View this initial conversation as simply the first step in a process, an exploration that will help you decide if you really want the person to be your mentor.

What Students Should Clarify with a Mentor

General Availability

Ask your potential mentors how often they will be available to you. Consider the following questions.

- How often does the potential mentor meet with students in general?
- What are the mentor's current projects, and how much time can that person commit to assisting you? Will that amount of time be sufficient for you?
- Is the mentor planning to go on sabbatical or be away for extended periods of time during your time at the university? If so, what arrangements can be made to keep you in communication with this mentor?
- Does the mentor offer additional ways of helping students? Does s/he delegate some of her/his mentoring tasks to other students or staff?

Communication

Meetings and feedback are crucial to establishing good lines of communication between you and your mentor. Take time to clarify and address the following.

<u>General Communication</u>

- Are you able to easily understand the professor?
- Do you feel you are able to effectively communicate your thoughts and ideas when speaking with him/her?
- Do you think you will be able to work closely with this person?
- Do you think you will be able to accommodate to his or her professional and personal style?

<u>Meetings</u>

- How often will you meet face-to-face, making certain to request the amount of time you need in order to accomplish the goals of a given meeting?
- How often does the mentor like to meet one-on-one?

- Will e-mail contact be suitable for certain issues or questions that might arise between meetings? Does the mentor regularly answer his/her e-mails?

- What are the circumstances, if any, in which the mentor feels that it would be appropriate to be called at home? Be sure to let the mentor know if you have any restrictions about phone calls at home as well. If you both have cell phones, establish rules for calling each other on them.

<u>Feedback</u>

- How often will the mentor give you feedback about your general work and your progress? For feedback on specific work, find out how long it typically takes him or her to return papers or other assignments.

- Promise that, in advance of actually handing the mentor a paper or project to review, you will inquire about his or her current workload and whether timely feedback is still possible.

- Ask if the mentor tends to provide a lot of comments or very few, so you will not be taken aback later either by the amount of comments or the lack of them.

<u>Reminders</u>

Explore with the professor the best ways of reminding him or her about getting your work back within an agreed upon timeframe. Ask if it would be helpful to send your mentor a reminder. If yes, please consider the options addressed as follows.

- "When you are very busy, how should I remind you about a paper you have of mine? Should I e-mail you, call you, or come by your office?"

- "How much in advance should I remind you? Is one week enough time or would you prefer two?"

Setting Expectations with a Thesis Advisor

Often one of your mentors will be your thesis advisor. For a thesis advisor it will be important to clarify the following expectations.

Workload and Funding

- What does the thesis advisor consider to be a normal workload?
- How many hours does he or she think you should be spending on your research or creative project per week?
- Does the thesis advisor have funds to support you? Will these remain available until you complete your program? It is very important that the timeline for available funding for a specific project be well understood by both you and your advisor.
- Does the thesis advisor prefer or require her/his students to apply to scholarships/fellowships and will those scholarships/fellowships suit your academic interests?
- Especially for those in the sciences and engineering: Is there potential for developing a dissertation topic that you would find interesting from the thesis advisor's research project? Does the thesis advisor have appropriate space and laboratory equipment for your needs? What is the size of the thesis advisor's research group and is this optimal for you?

Publishing

- Do thesis advisors in your field offer co-authorship? If yes, does your thesis advisor of interest offer co-authorship with graduate students? If so, what are the guidelines for authorship?
- Does your thesis advisor have a specific requirement for number of publications or other scholarly work that exceeds your department requirements for graduation?
- Is your thesis advisor willing to advise you on your own articles for publication?

- What publishing contacts does your thesis advisor have who might be of assistance to you?

Presentations for Performing and Visual Arts

- Does the thesis advisor collaborate with students in public performances or exhibitions?
- Does the thesis advisor have time available to work with you to help you prepare your projects for public presentation?
- Does the thesis advisor use his or her professional contacts to assist students in presenting their own work to the public?

VI. How to Be a Good Mentee

"I expect a successful student mentee to be a person that can communicate openly and listens earnestly. The successful mentee knows when to take criticism and knows when to hold firm. The successful mentee is able to recognize that all people have strengths and weaknesses, including their mentors, and is able to put the mentoring relationship into its proper context"

- CWRU Faculty Member

"A mentee should be absolutely passionate about his/her research interests. This leads to several positive behaviors – devouring related reading, actively partaking in relevant research, etc. A mentee should be considerate. Mentors and mentees don't always have to be friends, but mentors-mentees should always treat one another with mutual respect. A lack of respect in either direction produces a somewhat toxic interaction, which can make the mentoring process very difficult."

- CWRU Faculty Member

Here are some suggestions that will help your interactions with mentors and other faculty members go smoothly while also helping you to become the strongest mentee that you can be.

Things to Remember When Meeting With Mentors

Respect their time. Be sure you know how much time they have available to give you and be aware of how quickly time is passing. If you need additional time, schedule another meeting to discuss the remaining topics. If you want to develop a professional relationship with faculty, contact the professor(s) again once you have something substantive to discuss. For instance, you can send an e-mail to thank them for their time and let them know the progress you are making in pursuing suggestions they gave you.

In order to be treated as a junior colleague, your actions and attitude must demonstrate to your mentor(s) that you are self motivated, responsible, and driven in the pursuit of your career goals.

Be Serious about your Academic Work

There are many ways to demonstrate your commitment to your studies and to your field. Here are just a few.

- Make the transition from thinking of yourself as a student to seeing yourself as a future colleague.
- Attend departmental lectures, seminars, and other departmental activities. Ask intelligent questions and contribute to thoughtful discussion.
- Network at professional meetings in your field and join the sections related to your dissertation.
- Seek out opportunities to present your work (in your department or through outside conferences and publications).
- Attend teaching workshops and courses offered at the University. Suggest speakers for guest lectures.

Be Responsible

Professors often talk about commitment with the term "owning a subject". Take ownership of your work by becoming the best expert possible in the field of your interest. Keep up to date with the latest literature relevant to your work. In fact, try to keep ahead of your mentors in terms of acquiring and reading the most-recently published work in your field.

Be aware that other faculty and graduate students may be relying on your work. Often your work will be needed for publications, performances, funding applications, etc. Meet deadlines and take time to communicate when goals will not be met in a timely fashion.

It is your responsibility to update your mentors about your progress and also about your struggles. Communicating with your mentor and other faculty can be intimidating when adequate progress on your work has not been made for various reasons. Address the issue and be proactive in seeking advice from your mentors.

Papers and Proposals

Before sharing the draft of a paper or proposal with your advisor or mentor, be sure that it matches the standards on which you and your mentor have agreed. Consider utilizing the CWRU Writing Resource Center (http://www.case.edu/writing/writingcenter.html) or friends with strong editing skills to revise your document. The same stands for the content: if you know somebody who is somewhat familiar with the basis of your thesis idea, ask them to proofread your document. Professors may request an early rough draft of your work or ideas, although this is less common. In these cases, you can decide what is more important: timely submission or a perfectly polished version of your idea.

Here are some additional suggestions to help the paper/proposal draft process proceed as efficiently as possible.

- Mark the sections that you have revised. Your mentor should know which sections you have been working on, so that s/he does not re-read the entire document (unless you have completely edited every section.
- Hold regular meetings with other graduate students to review each other's work, share ideas, and give each other feedback.

Respect Your Mentor's Suggestions

Read the books or articles your mentors recommend, and ask questions about the content. Mentors want to see you become a scholar who has learned from their recommendations, guidance, and insight. If you do not follow a mentor's suggestion, be able to discuss your reasoning.

Meetings

- Be punctual for meetings with your mentors.
- Be proactive in the meeting, have an agenda and a set of goals prepared. The best way to be time efficient is to make a list of prioritized questions so that the most important questions are ensured time for discussion.
- Following a meeting, summarize in writing any achievements and agreements that you have made with your mentor. This is particularly important for two reasons. First, it shows your mentor that you are consciously managing your work. Second, it documents what you have agreed upon by creating a list of decisions,, project goals, and actions that can be used if there is a misunderstanding or in case of unusual circumstances.
- Accommodate your mentor's schedule without sacrificing your goals and concerns.

- Try to avoid canceling a meeting. If you must, make sure that the message reaches your professor in a timely manner. Notification by email can be satisfactory, but for last minute cancellations, you may want to call the department assistant or your mentor directly.

Letters of Recommendation

- Set up a specific appointment to discuss a letter of recommendation.
- Provide updated copies of your *curriculum vitae* to everyone from whom you are requesting a letter of recommendation.
- Leave clear written instructions as to when the letters are due and to whom to send them. Attach a stamped and addressed envelope for each letter.
- If you request several letters from each recommender, create a calendar for your mentor that lists application deadlines.
- If the letters are to be completed on-line, provide each recommender with a list of schools and organizations that they should expect emails from so that they are not lost or overlooked. Offer to assist recommenders with the on-line recommendation process, when appropriate.
- Provide a short description of your grant applications.
- Provide details about how you are structuring your application and what points you would like your mentor to emphasize.
- Submit these materials with enough advance time for your mentor to write a letter.
- In case the professor misplaces the application materials, keep extra copies of all forms, emails, and other relevant materials.

- The University and departments have policies to protect student privacy, and you may have to give written permission to allow mentors to discuss academic performance. Ask your departmental assistant about the details of these policies.

Respect Boundaries

Resist the temptation to drop in on professors for casual conversation; allow professors to initiate this type of interaction. Friendships between students and faculty can develop over time but should never be forced. Friendships with faculty and mentors can be beneficial to your professional socialization and in giving you more access to information when needed, but they also present the danger of losing track of the hierarchical order of your relationship. Always keep in mind that, while you are primarily judged for the quality of your work, you are also judged on your level of professionalism in and outside of the workplace.

Receive Criticism in a Professional Way

Accept critiques of your work in a professional manner. If you disagree with a specific criticism, show your appreciation in a respectful manner but assert your reasoning for why you think differently. Rather than responding on the spot, it is often best to take some time to think about the critique in order to provide the best response.

Take Ownership of Your Degree

While your mentors will be helpful and will aid your success, you must remember that you are ultimately responsible for the progress of your degree. Therefore, remember to:

- Investigate and understand your academic and research requirements for graduation.
- Consistently work hard and responsibly throughout your project.

- Demonstrate independent thinking.
- Show your initiative and motivation to succeed.

VII. What to Do if Problems Arise

"I was very stressed out about finishing my research and other requirements on time for May graduation and finding a job, all at the same time. However, I didn't tell my advisor this. At the end of one of our meetings, he told me that he noticed I had been very stressed and wanted to reassure me that I was on track for graduation. This was a very positive experience in my mind, because he was attentive to my behavior and was able to provide the reassurance that I needed to help me get through the stressful time."

- CWRU Graduate Student

Unexpected Circumstances

It is likely that something unexpected will occur in the course of your graduate career that will hamper your efforts to complete your work, such as the birth of a child, a family illness, a medical condition, etc. While it may be difficult to manage the situation, taking proactive steps to contact your mentors will pay dividends. Discuss your situation with your mentor, giving them as much information as you feel comfortable sharing. If you feel uncomfortable discussing the situation with them or feel that they are unhelpful, there are resources on campus to help you. As soon as possible, discuss a new timeline for completing your degree with your mentors. Take care to construct a new plan that is realistic. Additionally, the Graduate Student Handbook describes a temporary leave of absence policy on page 20. You can consult it at:

http://www.case.edu/gradstudies/downloads/GraduateStudentHandbook09-10.pdf

Availability Issues

Like students, mentors can have unexpected circumstances which may impede their availability. Grant your mentors the same courtesy that you would expect from them in a similar situation.

As previously noted, faculty members have many constraints on their time. There may be a time when their unavailability may impede your work and progress. For example, other demands may hinder your mentor's ability to meet with you or provide prompt feedback about your work. Often a mentor's other commitments directly benefit their students, e.g., grant writing, so be understanding. If inaccessibility becomes a problem, address the issue with the mentor.

Minor Issues with a Mentor or Faculty Member

It is important to address and resolve minor issues quickly. It is a good idea to discuss them with the following people in the order listed here.

Mentor/Faculty Member

Your first step is to politely inform the mentor of your concerns. If you are not getting satisfactory results from casual discussions, schedule a meeting with the mentor at the earliest possible time. Face-to-face meetings can lead to more satisfactory results than e-mail, as the situation can be more fully discussed in a collaborative manner. In contrast, one's tone and message can be easily misconstrued in electronic communication.

Peers

Other students who have contact with a particular faculty member can tell you if this behavior is typical, and may be able to suggest some possible resolutions. Your peers can also explain the norms in your department regarding the frequency of meetings, turn-around time for feedback, and the general availability of faculty. Your peers might be able to help you create solutions in which you take more initiative to solve your issue independently of your mentor. Consider the possibility to become a GSS Peer Mentor or Mentee.

Graduate Student Senate

The Graduate Student Senate is composed of graduate students with whom you can discuss many issues. Explore GSS.CASE.EDU for more information.

Departmental Staff

Staff (e.g., the administrative assistants) can sometimes clarify departmental expectations and standards and possibly offer suggestions about how to resolve problems. Administrative staff are knowledgeable about other people or offices on campus that can assist you. Also, it is possible that the department administration can provide the function you are seeking from your mentor (Planned Program Of Study approval, career counseling, writing resources, etc.).

Other Mentors

Other mentors can often give you advice on how to deal with problematic issues that arise with one of your mentors. If you have been able to form a mentor team, you should be able to consult another mentor about the issue you are having. If you want someone to intercede on your behalf, senior faculty may be in a much better position to do so than junior faculty. If you have formed a dissertation committee, the Chair of your committee (provided that s/he is not your mentor) can act as an advocate and mediator between you and your mentor. This person is generally quite familiar with your mentor as well as with your thesis work, and can be an excellent resource when attempting to resolve issues

Graduate Chair, Director, or Department Chair

If you are not able to resolve issues with your mentor on your own, you may find it advisable to talk to the Graduate Chair in your department or your Department Chair. Be aware that discussing issues with these people means that you are going above your mentor's head, which may put more strain on the problems you are already having in your relationship. Generally, this should be done only if you are unable to resolve the issue through other means.

School of Graduate Studies

At some point, you may find it helpful to talk things over with staff at the School of Graduate Studies. Please contact Denise Douglas, Associate Dean of Graduate Student Affairs (368-4390) denise.douglas@case.edu for ideas and strategies.

Major Issues with a Mentor or Faculty Member

Major issues, such as a breach of ethical behavior, should be addressed immediately. Even a minor issue that is not addressed can become a major issue, so it is important to address problems that arise as soon as possible. The formal Graduate Student Grievance process can be found at:
http://www.case.edu/gradstudies/downloads/SolvingAcademicandOtherConcerns-GraduateStudents.pdf and
http://www.case.edu/gradstudies/downloads/GraduateStudentHandbook09-10.pdf (p. 20)

, but here is an overview of the steps suggested to resolve an issue.

First, discuss the grievance with the person against whom the complaint is directed. The goal is for the parties to be sure they understand each other before further steps are taken.

When the student does not feel that the issue has been adequately resolved or feels at risk by addressing the issue with the person against whom the complaint is directed, he or she should then discuss the issue with the department Graduate Director or Department Chair. If the complaint involves the Department Chair, the student may bring the matter to the Faculty Dean (e.g., Engineering, Medicine, etc.) to whom the Chair reports.

In the event that a decision still appears unfair to a student or if the student feels that the department's Graduate Director or Department Chair are not independent mediators, the student may bring the matter to the attention of the Dean of Graduate Studies. The Dean may ask the student to put the complaint in writing for clarity and fairness to others involved.

VIII. Changing Advisors

"Changing advisors shouldn't always be associated with a negative stigma. In fact, it was a critical step in my educational career that — in addition to broadening my scientific knowledge, enhancing my technical experience, and complementing my skill set — has made me a more complete scholar in my fields of interest, ultimately making me more marketable (and less dispensable) to prospective employers. Different mentors have different priorities and expectations, and exposing oneself to a more diverse spectrum of such goals can be a real virtue."

- CWRU Graduate Student

In the course of your graduate study, it may become appropriate to change advisors. This process may be more common in some fields of graduate work and less common in others. It can be a difficult process in either case, especially where financial support is involved. Some departments encourage students to work with multiple faculty members, thus making it easier for the students to change advisors. In these instances, changing advisors is often a fluid process and can be viewed positively. For example, some students may begin their graduate work with one advisor who specializes in one field and then complement this work by changing to another advisor who specializes in a different area. In other cases, students may be brought to CWRU to work with one specific faculty member, possibly making it more difficult to change advisors. In order to maintain a smooth transition between advisors, you should remain professional with your previous advisor. Your department may have formal policies and procedures for changing advisors, so it is important to follow the appropriate course of action they suggest. That said, here are some general guidelines.

General Guidelines for Changing Advisors

- Reflect on the pros and cons of changing advisors before you start the process.

- Seek advice from your other faculty mentors to assess your needs and determine if changing advisors is the best course of action. This advice may be especially important if you are attempting to change advisors toward the final phase of your graduate work (see Section VII. What to Do if Problems Arise).

- Try to resolve any differences with your advisor before you make a final decision.

- Approach another faculty member who you feel is the best fit to be your new advisor. Your attitude in this conversation should be positive, outlining new interests, goals and possibilities.

- Be professional. Do not make negative comments about your previous advisor, place blame, or discuss specific difficulties or incidents. It is important to avoid saying anything that could have a detrimental impact on your future.

- Express your decision to change advisors by outlining your reasons for wanting the change in the most diplomatic and sensitive manner possible, especially concerning anything you need to say about your previous advisor and others involved in your graduate work. Try to be general; don't bring up small details or petty incidents.

- Discuss a reasonable timeframe for completing any work you owe your previous advisor.

- Complete your department's requirements for changing advisors. Also, be sure to revise your Planned Program of Study (via SIS) and update your Dissertation Committee with the Dean of Graduate Studies and your department.

IX. How to Transition to Being a Mentor

"Before attending graduate school, I had expected to learn from mentors in my field of study. I had not, however, considered how I would be a mentor to undergraduate students and other graduate students. Being a mentor to others has been a rewarding experience, and has enhanced my leadership abilities."

- CWRU Graduate Student

Thus far, this guidebook has defined what mentoring is and has focused on your role as a mentee in the mentoring relationship. However, in the course of your graduate education and eventually in your professional career, it is likely that you will also serve as a mentor. You will then have opportunities to apply what you learned as a mentee in your role as a mentor to others. The following segments include scenarios in which you might be a mentor while in graduate school.

Mentoring Fellow Classmates

An initial step towards mentoring is fostering relationships with your classmates—both undergraduate and graduate students. This might involve sharing information, explaining ideas, or working collaboratively on group projects. Although some students may view graduate school as a competition, it is also important to consider its cooperative aspects in the increasing interdisciplinary nature of research. Professors may weigh your performance against other undergraduate and graduate students in your courses, but will also evaluate your ability to collaboratively work with others. Being open about information will benefit you—when your classmates in turn share their ideas with you about course material or alert you about resources related to your research interests.

Mentoring as a Teaching Assistant or an Instructor

Your graduate education will likely involve mentoring undergraduate students—whether as fellow students, as mentioned previously, or as their Teaching Assistant or Instructor. Mentoring them on a basic level involves ensuring their comprehension of the material. This may occur by providing them with insightful feedback or meeting with them either after class or during your office hours.

Undergraduate students may, however, ask for direction beyond the classroom. Students might ask for advice about classes or additional information regarding your field of study. Others might become curious about your experience as a graduate student, and how to embark on the graduate school application process. Professors or personnel at offices on campus could also be resources for undergraduate students, but students will likely also appreciate your personal first-hand advice.

Mentoring Other Graduate Students

Incoming graduate students may approach you for guidance. They might ask for your opinion about specific classes or professors. They might also have questions about graduate school in general, university life, your shared field of study, or your experience as a Research Assistant or Teaching Assistant. Because you probably also have been given advice by senior graduate students, it is time to "pay it forward." You should be honest about your experience; while you may have encountered frustrations in the course of your graduate education, consider that incoming graduate students do not need a preconceived negative opinion of your department or the University. For instance, a professor in your department might teach challenging classes. Instead of simply expressing the difficulty of the classes, offer students strategies on how to succeed in such courses. As a senior graduate student, you have a great deal of first-hand knowledge that does not come in any handbook, so communicate what you have learned to junior graduate students: from lab techniques to classes to where to get the best free food to forming a thesis committee to establishing professional relationships with faculty. Senior graduate students can really be the source of a lot of knowledge. You can help familiarize other students with the culture of your department and avoid many common pitfalls of graduate school.

Mentor by Example

Although you might often mentor by offering advice to undergraduate students or other graduate students, it is just as important for your actions to be worthy of emulation, both inside and outside the classroom. Become a leader in the classroom by actively participating in class discussions, contributing to group projects, or giving great presentations. Outside the classroom, participate in departmental activities, attend guest lectures, become involved in campus events, and present at conferences. When you mentor by example, you not only set excellent standards for other students to achieve, but you also develop expertise and leadership experience in your field of study.

Resources in Diverse Communities

I. Common Themes for All Graduate Students

Regardless of their field of study, some or all graduate students often experience the problems and stresses discussed in this section.

Need for Role Models

Mentoring is an important relationship that can help bridge the gap between undergraduate and graduate education; it enables graduate students to grow into professional scholars by fostering an understanding of the practices, knowledge, and expectations of their chosen fields.

Students from groups that are historically underrepresented in academia may have a harder time finding faculty role models who have had experiences similar to their own. As a student you may want to find someone who looks like you, someone who immediately understands your experiences and perspectives. The Office of Multicultural Affairs can provide underrepresented students with additional mentoring that supplements that offered by their thesis advisor.

Questioning the Canons

Students from underrepresented or marginalized groups sometimes find that their perspectives or experiences do not fit into current academic canons; they find that their experiences are missing from current theory and research. Exploring and challenging a discipline's traditional content and boundaries should be an integral part of the study of that discipline. Healthy departments are mindful of the need to create safe environments in which such ideas can be shared freely.

Being Categorized as a "Single-Issue" Scholar

The structure of graduate programs and the need to focus on one topic for the thesis or dissertation can have the effect of producing scholars whose vision and knowledge is quite narrow. This can be advantageous depending on the field. Many graduate students are concerned with being associated with a narrow topic. Initiate an open discussion with your mentors if you have these concerns to explore opportunities to broaden your scope.

Feelings of Isolation

All graduate students probably experience a sense of isolation at times, one that springs from the intense focus of the graduate experience. Students from historically underrepresented groups can feel particularly isolated or alienated from other students in their departments, especially if the composition of a program is highly homogenous. At Case Western Reserve University, students can look for potential mentors outside of their thesis advisors through the Office of Multicultural Affairs. Among other things, this office is dedicated to providing students with positive and professional mentoring. These mentors include University faculty, staff, alumni, and professionals from around the Cleveland area. In addition, they can seek the advice from the Division of Student Affairs.

Seeking Balance

Students observe that professors need to devote large parts of their lives to work to be successful in the academy. Students from all disciplines may feel that faculty members expect them to spend every waking minute of their days on their work. This perception of faculty expectations, accurate or not, is of grave concern to students who wish to have family lives, as well as for those who want to balance their lives with their interests and hobbies. See Part I, Section IV, Clarifying Roles and Responsibilities to address these issues with potential mentors in advance. If your life circumstances change during your career as a graduate student, take time to discuss these changes with your mentors as soon as possible.

Sexual Harassment

Sexual harassment is a serious issue and can happen to any graduate student. The University's Policy on sexual harassment states that "sexual harassment is unacceptable conduct, which will not be tolerated. All members of the University community share responsibility for avoiding, discouraging, and reporting any form of sexual harassment."

Consult the following website for current policies:

http://studentaffairs.case.edu/handbook/policy/sexual/harassment.html

Suggestions

1. Work with faculty mentors to get names of potential mentors in departments, across the university, or at other universities who may have had similar experiences.

2. Remember that very good mentoring can come from faculty members who are of a different gender, race or culture. After all, past generations of minority scholars did just that. As one professor of color pointed out: "It is important to develop ties and networks irrespective of race and gender but based on what people can offer."

3. If the faculty and students in a department or program are largely homogenous, help identify and recruit new faculty and graduate students who represent diverse backgrounds. When such openings arise, give suggestions for qualified job candidates who may also represent diverse backgrounds. Attend the job talks and meet these potential faculty mentors.

4. The Office of Multicultural Affairs operates a list of organizations at CWRU, and the relevant graduate student organizations recognized by the Graduate Student Senate is listed as well (see the Resources section below).

5. Be open to hearing other people's experiences, particularly those people from backgrounds different than yours. For example, the introduction of women's and minorities' perspectives has brought about the development of whole new disciplines, all of which have greatly enriched the University environment and academia in general.

6. Investigate and join organizations within or outside the University that might provide you with a sense of belonging. Some examples are cultural and religious groups, as well as reading groups and professional associations. Some students may find it particularly difficult to take active roles in academic and/or social settings. Do not be afraid to ask mentors or peers to introduce you to other students and faculty with complementary interests.

7. Seek out mentors you view as role models for advice on how mentors attain balance among life aspects such as career, family, and personal aspirations.

8. It is difficult to balance school work with the demands of personal life, and these demands vary depending on the individual students' experiences. Be honest with yourself in deciding which of these arrangements are suitable for you while still demonstrating that you can be focused and productive in your work.

9. Recognize that your undergraduate time management and study strategies may need revising to better meet the demands of graduate level work. Educational Services for Students (ESS) meets individually with students to develop effective time management and study strategies.

10. Participate in Presentation Workshops. Educational Services for Students (ESS) offers a presentation workshop series to enhance your skills as a presenter. Learn ways to organize your work, understand your audience, use appropriate visual aids, and speak with confidence.

Resources

- The Office of Multicultural Affairs

  http://studentaffairs.case.edu/multicultural/

- A list of student organizations at CWRU in which students from historically underrepresented groups can find a sense of community

  http://studentaffairs.case.edu/multicultural/resources/organizations.html

- A list of student organizations recognized by the Graduate Student Senate

  http://gss.case.edu/committee/orgs.php

- Educational Services for Students (ESS)

  http://studentaffairs.case.edu/education

- Case Western Reserve University Career Center

  http://careercenter.case.edu

- How to Complete and Survive a Doctoral Dissertation by David Sternberg, St. Martin's Griffin, 1981

- A Handbook for Women Mentors: Transcending Stereotype, Race, and Ethnicity, Greenwood by Carol Rayborn et al., 2010

- Good Mentoring: Fostering Excellent Practice in Higher Education by Jeanne Nakamura and David Shernhoff, Jossey-Bass, 2009

II. Female Graduate Students

This section discusses issues that are often experienced by some female students, but other students may experience them as well.

Assertiveness

Success in graduate school can, at times, require you to assert yourself in classroom discussions or in conversations while at meetings with your mentor and other collaborators. This means that you may need to interrupt other students, lab members, or collaborators in order to ensure that your voice is heard. Since some women have been socialized to be polite, such assertive actions may be unnatural. Some women may also see interjecting themselves in this manner as being rude and disrespectful. You may wish to observe how female faculty and senior female graduate students in your department handle this issue or consult resources listed. Try to always state your arguments and do not take everything personally.

Competitiveness

Some graduate students may feel alienated by the competitive and critical atmosphere that is pervasive in many graduate programs (Sandler, Silverberg & Hall, 1996). As a graduate student, you are expected to be critical of others' work when you think it is appropriate, and you may often find that the system does not reward one for praising the contributions of other scholars. One way to minimize this overly competitive atmosphere is to work in small collaborative groups. Collaborative work could help you feel more confident when your work is being constructively criticized or when you are giving constructive criticism to someone else. Such small group settings may also foster positive feedback.

Positive Feedback and Confidence

Academia is wrought with negative feedback regarding all types of scholarly work. While the culture of academia may be shifting to include more constructive criticism, graduate students should be aware that typical comments may sway towards negative feedback instead of constructive criticism depending on the mentor. Both male and female students frequently find that they do not receive positive feedback on their work from their mentors, and the absence of positive feedback can lead graduate students to doubt their capabilities (Nerad, 1992). In a 1991 study by Nerad and Stewart, it was found that women graduate students tend to think that any negative experiences they have in graduate school are due to their own personal deficiencies, while men tend to attribute the reasons for negative experiences to others, i.e. to insufficient guidance or problems within the department. In 2007, the NIH reported that the burden of family responsibility and lower confidence in themselves (relative to men) are factors that impede women from pursuing advanced scientific careers. The study revealed that, although men and women rate themselves equally when asked about professional skill, men were significantly more confident that they could obtain full professor status and become tenured.

Suggestions

If you find that you are having a difficult time participating in class discussions or speaking up in meetings with your mentor, consider meeting with your professor or mentor to discuss the issue. Suggest specific ways in which he or she could make it easier for you to participate in class or meetings. For instance, you may find it helpful if the professor or mentor directs a question to you about what you think about a particular topic.

Take advantage of professors' office hours. You might find it easier to talk with them one-on-one. Let them know that, even if you are quiet in class or in meetings, you are still engaged in the subject matter.

Try to not take constructive criticism personally. The majority of mentors want to see their graduate students excel. Pointing out ways that students' writing, laboratory experiments, etc. could be better is one way of helping students succeed in the future.

If you find that a mentor only engages in brief conversations with you, do not jump to the conclusion that this person does not value you as a mentee. Remember that professors are also very busy and may only have limited time to interact with you at a particular meeting.

Make sure to apply for competitive positions to advance your career once you graduate. There are a variety of resources available for women in academia (see resources below).

Resources

- Flora Stone Mather Center for Women

  http://www.case.edu/provost/centerforwomen/index.html

- WISER (Women in Science and Engineering Roundtable)

  http://www.case.edu/provost/centerforwomen/wiser/index.html

- CWRU Career Center (many women specific resources)

  http://careercenter.case.edu

- Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering

  http://www.nap.edu/catalog.php?record_id=11741

- Center for Innovation and Research in Graduate Education (CIRGE)

  http://depts.washington.edu/cirgeweb/c/about/researchers-and-staff/

- Association for Women in Science

  http://www.awis.org/displaycommon.cfm?an=1&subarticlenbr=209

- Mentoring Gap for Women in Science, Inside Higher Ed News

  http://www.insidehighered.com/news/2008/02/28/mentor

- Minority & Women Doctoral Directory

  http://www.mwdd.com

- Academic Careers in Engineering and Science (ACES)

  http://www.case.edu/admin/aces/

  From here, there is a link to the National Science Foundation's ADVANCE program. The website for the ADVANCE program is: http://www.nsf.gov/funding/advance

III. Lesbian, Gay, Bisexual, and Transgendered (LGBT) Graduate Students

Some students do not talk about their sexual orientation or gender identity openly, and it is generally unacceptable to disclose the sexual orientation of another student (known as "outing" them). Mentors have the responsibility, regardless of their own sexual orientation, to ensure that LGBT students feel comfortable in their classrooms and office, so as to maximize students' learning.

Homophobia

Graduate students who are also LGBT sometimes encounter homophobia in the classroom, in the lab, during meetings, or at other university events. Remarks can range from the blatantly offensive to the less obvious (e.g., "that is so gay"). Such remarks should not be tolerated; it is perfectly acceptable to politely challenge the person's statement. You can seek to discuss the matter with senior students or faculty. If the incident was more severe or if there were many incidents, report the person to the Vice President for Inclusion, Diversity, and Equal Opportunity, Marilyn Sanders Mobley. or to the Senior Vice President of Student Affairs, Dean Patterson.

Heterosexism

Students who are also LGBT often hear classroom discussions conducted with the unconscious assumption that everyone is heterosexual. Even faculty and students who have a heightened awareness of sexual orientation issues may have an unconscious tendency to think about the world from an exclusively heterosexual perspective. As a result, students who are also LGBT may feel isolated or find that their experiences are not represented in research or in classroom discussions.

Disclosing

Being "out" as a student (or faculty member) who is an LGBT is not a one-time event; rather, it is a decision that the person experiences each time s/he encounters a new social situation. Students who are also LGBT face the burden associated with having to assess the personal, social, and political ramifications of disclosing their sexual orientation each time they do so. Since heterosexual students do not have to disclose their sexuality, only students who are also LGBT may face these physically and emotionally draining experiences. Although faculty members and students should disregard the sexual orientation of all students in any academic environment, students who are also LGBT should only reveal their orientation if they feel safe and comfortable enough to do so.

Suggestions

1. Students who are also LGBT should assess their department's environment and their own level of comfort with being "out." Decide which of your peers and mentors you trust and

enlist their help in creating suggestions for a department environment that is conducive to everyone's learning and professional needs. For example, you may want to encourage the department to review policies on LGBT concerns periodically or may put LGBT concerns on the agenda for graduate student orientations and training programs for faculty and staff.

2. Be aware of anti-gay comments that may be made. If it is appropriate and if you feel comfortable, speak out or discuss how such comments are inappropriate and potentially offensive to other students. If you feel uncomfortable or unsafe in speaking up, you should speak to a trusted faculty member in private about such incidents.

3. For all students, be aware that the examples being discussed may be based on heterosexual experiences. For example, when talking about families, many professors and students will unconsciously adopt a heterosexual point of view, but not every family is composed of a husband, wife, and children. Simply using phrases like "spouse and partner" instead of just "spouse" can go a long way toward making students of many statuses (e.g., unmarried) feel included.

4. Students should treat sexual orientation as a multidimensional phenomenon in their relationships with their peers and mentors. Homosexuality is only one of several expressions of sexual orientation, and gender identity may not be fixed for everyone.

Resources

- CWRU's LGBT resource and information website

  http://www.case.edu/lgbt/index.html

- CWRU's Committee on LGBT Concerns

  http://www.case.edu/lgbt/committee/

- Spectrum (CWRU's LGBTQQIA student group)

  http://spectrum.case.edu/

- CWRU's LGBT Center at Thwing Center

  http://www.case.edu/lgbt/center/

IV. Racial and Ethnic Minority Graduate Students

This section discusses issues that are often experienced by some students from racial and ethnic minorities, but students with other backgrounds may experience them as well.

Lack of Role Models

As a minority graduate student, you may be concerned that the low number of faculty of color suggest that academia is an unwelcoming environment for those who are not white. Regardless of race, assertively seek to acquire mentors who will help you succeed in graduate school and make sure that you do your part to maintain a good relationship with your mentors (see Part I).

Stereotyping and the Impostor Syndrome

When you start graduate school, you may feel isolated. Feelings of isolation may translate to feelings that you do not belong. These feelings are part of what is known as the "Impostor Syndrome". While many students experience these feelings, minority students can be subject to them more because of the dissimilar community around them. As a minority student, others may express opinions that you were accepted because of affirmative action quotas. The biases of others toward students of minority are baseless opinions, and you should remain focused on progress toward the degree. On the other hand, Asian-American students are burdened by the "model minority" myth, which assumes that they are exemplary students, particularly in math and the sciences. Stereotyping in either direction has negative consequences for all parties involved. If these external biases or isolation are troubling you, seek out the following resources to help you understand why you are a worthy of the graduate student community.

Racism

Racism may be expressed in language, action, and association. Overt instances, such as when a student is denied access to a particular activity because of his/her ethnicity, are perhaps the easiest to recognize. But there are more subtle forms of racism, so called color-blind racism (Bonilla-Silva, 2006), such as when a student is asked to participate in a discussion or serve on a committee simply because of his/her minority status and give, for example, the "Hispanic" or "Native American" perspective. Such requests are based on the generalization that being a member of a given culture makes a person an expert on his/her culture. Although they are not what society thinks of as pre-Civil Rights Jim Crow racism, we understand that situations like these can make you feel quite uncomfortable.

Suggestions

Seek out other mentors on campus (besides your thesis advisors) if you feel that you would like a mentor who is also a racial or ethnic minority. CWRU offers mentors from around the Cleveland area through the Office of Multicultural Affairs (see Resources below).

If you are having feelings of insecurity, it might help to talk to other graduate students. You will likely find that all students, regardless of their ethnicity or race, feel insecure at one time or another in graduate school. It also might help to talk to your mentor or other professionals at the university.

CWRU does not tolerate racism. Make sure that you are aware of the policies in the student handbook in case you ever encounter racism and need to file a formal complaint with the Office of Inclusion, Diversity, and Equal Opportunity or the Division of Student Affairs (see Resources below).

If you are ever asked to give a perspective on behalf of your minority group or otherwise speak for it, it is OK to decline. A respectful reply, such as "I think there is an array of opinions on this subject," could deflect an inappropriate question.

It is always helpful to remember that people of different races and ethnicities face different issues and experiences, and it is important to be respectful of these different experiences. However, don't let race or ethnicity differences become a barrier to communication.

Developing peer networks and peer mentors is an effective strategy that many graduate students of color may find helpful. Students should attend graduate student conferences, workshops, and seminars both to network among themselves and to meet potential mentors in their respective fields.

Resources

- American Psychological Association, Survival Guide for Ethnic Minority Graduate Students

  http://evs.astate.edu/Library/minoritystusurvival.pdf

- University Office of Student Affairs

  http://studentaffairs.case.edu/

- American Indian Graduate Center

  http://www.aigc.com/articles/mentoring-minority-students.asp

- Office of Multicultural Affairs

  http://studentaffairs.case.edu/multicultural/

- Office of Multicultural Programs through the Medical School

  http://casemed.case.edu/omp/

- Minority & Women Doctoral Directory

  http://www.mwdd.com

V. International Graduate Students

International graduate students from many countries enrich the culture of Case Western Reserve University. Here are some topics that may be of concern to them.

Issues of Culture and Language in the Classroom

For most international students, choosing to study in the United States means that they will need to function in a second language and adjust to an entirely new set of cultural and educational norms (Trice, 1999). An important example is the issue of competition. As an international student, you find that American classes are sometimes excessively competitive. In particular, students from Eastern and Southeastern Asia - often trained in educational systems where the student's role is to be passive - are shocked to see American students speaking up without being called upon or challenging the remarks of professors and peers. You may fear that, if you do not exhibit these same behaviors, the faculty will judge you to be less capable and/or less intelligent. Try to use the strategies suggested in Section II, Part Two, of this Handbook.

In addition, as international students, you may be uncertain about academic rules at CWRU. One thing that is clearly unacceptable is plagiarism. Even if you are having difficulty working with the English language, it is not acceptable to copy someone else's words without giving them credit.

Finally, you may find that your classes incorporate few international perspectives and that American faculty and students undervalue or simply do not understand the global experiences you bring to the classroom. Try not to be disappointed by these aspects of your academic experience, and do your best to ameliorate them in appropriate ways.

Social Stresses

While many graduate students experience the stress of having moved away from family and friends, international students may have an even greater sense of displacement. If you have brought your partner and/or children with you, you may also be worried about how well your family is adjusting to American life overall -- and to Cleveland, in particular. In addition, a significant number of international graduate students are plagued by loneliness (because sometimes they are unfamiliar with the ways in which Americans socialize) and find that they are unable to find people patient enough to speak with them (Trice, 1999). For example, in many cultures asking someone "How are you?" signals the start of a conversation, while in American culture, this can be a simple greeting as someone passes you in the hallway. A further complication is that, upon returning home, international graduate students find that because of their different dress, talk, and behavior, they have become "foreigners" in their own countries.

Suggestions

1. If you are having trouble adjusting to American life and culture, consult with a more advanced international student for advice. The Office of International Student Services may be able to help you find other students from your home country. And remember: The first semester is probably the hardest!

2. Talk with your professors about your past educational experiences and point out the new demands you face from the American educational system. Most faculty will be accommodating as you adjust to a new country and culture.

3. If it is hard for you to jump into classroom discussions, ask if professors will help you acclimate by temporarily calling on you for specific responses, or suggest some other strategy.

4. Having someone proofread your assignments can help if you are having difficulty working in the English language. Ask your advisor, other faculty or members of your department, or other graduate students if they wouldn't mind reading over assignments from you. You can also consult CWRU's Writing Resource Center, where consultants will work with you to become a better writer in English.

5. If you are unfamiliar with CWRU's stance on plagiarism, talk to a professor or another graduate student about what plagiarism is and what its consequences are.

6. If you find it difficult to converse over e-mail, let your advisor or other professors know that seeing facial and body expressions helps your understanding. Take advantage of professors' office hours too. Remember that most mentors will be willing to accommodate your needs, but they first must know what those needs are.

7. Although you might feel tempted to spend all of your social time with peers from your home country, seek out as many opportunities as possible to interact with other students as well, for example, at informal lunches. These interactions will help you practice and improve your language skills if you are still learning English.

8. Educational Services for Students hosts a series of lunch time conversation groups to help students practice the English language. Each week a diverse group of students and staff bring their lunch to ESS (Sears 470) to discuss current events and other topics. All students are welcome to participate and should contact the ESS office at 216-368-5230 to find out what day and time the group is being held each semester.

Resources

International Student Services

http://studentaffairs.case.edu/international/

Writing Resource Center

http://www.case.edu/artsci/engl/writing/writingcenter.html

School of Graduate Studies' Academic Integrity Procedures and Rules

http://www.case.edu/gradstudies/downloads/AcadInteg.pdf

Students' Guide to Writing

http://studentaffairs.case.edu/education/resources/sagesguide

VI. Graduate Students with Family Responsibilities

While this section was primarily written about students who have parenting responsibilities, many of the same issues pertain to those who are responsible for the care of their parents or of other family members. Remember that faculty members may themselves face family issues which take time away from their own university commitments. You may find it helpful to talk to your mentor about your specific circumstances – without going into unnecessary detail – so that s/he is aware of your situation. Occasionally family responsibilities may escalate into a situation that requires an extended period of absence; though these instances are rare, extreme accommodations may be necessary. Circumstances such as these are addressed in greater detail in Part I, Section IX.

Dual Commitments

As a student with parenting responsibilities, you are nevertheless as committed to being a successful graduate student as students without these responsibilities. Even though you have other demands on your time, you can be highly successful by being organized and focused during the blocks of time that you carve out for studies, lab work, etc. That said, you may feel that some professors perceive you as having a lack of commitment because of other priorities in your life. This situation is exacerbated when an emergency arises (e.g., an ill child), making it impossible to attend classes or meetings. The intensity of childcare demands does not stop once a child enters school. Like most parents, graduate students who are also parents want the best opportunities for their children. This may involve enrolling your children in a variety of activities inside and outside the classroom that may require parental involvement.

Isolation

Because of family demands, you may not be able to attend some social, academic, and professional functions. This could lead to you feeling isolated from fellow students, colleagues, faculty members, and the department/program as a whole.

Time Constraints

Students with family responsibilities typically need to be home in the evenings to tend to those in their care. If you are participating in group projects, difficulties can emerge since students without such responsibilities often find that evenings are a great time for group meetings. In addition, it is often difficult for students with parenting responsibilities to come back to campus for evening lectures or departmental meetings.

Suggestions

Meet other graduate students who can share the strategies they employ for balancing academic and family demands. They can connect you to a network of other students and point you to helpful resources. Perhaps your mentor might suggest other graduate or professional students who have the same commitments or constraints of family demands. This would be a wonderful way to broaden your social network, find "like-minded" graduate or professional students to socialize with and increase your connection to the university. The feelings of isolation might lessen, overall.

Try to find faculty who have children and are highly involved in their children's lives or faculty who can understand your situation. These faculty members can provide you with advice and support. Often departmental staff will know who these people are.

When working on group projects, suggest that evening meetings take place at your house if that is possible and if that would be easier for you. Or help arrange for the meeting to take place in a location where you can be there via teleconferencing. Also, discuss with your group the possibility of you contributing via e-mail or other internet means. These strategies can also be used for meetings with your advisor or other collaborators.

Talk to your professors about making assignments available in advance, putting class notes on Blackboard, or conducting class opinions with online surveys to help you out if you need to be absent from class.

Consider bringing your children to some departmental social functions and/or into the office. Most likely, you will find that the members of your department will enjoy the opportunity to interact with your children.

Talk to your mentor about your situation so that he or she will understand if you need to be absent from a class or meeting due to your family responsibilities. Take the responsibility for communication regarding the reason for your absence(s) to your mentor. If you do not want to describe the circumstances completely, at least discuss how your mentor's expectations need to change so that everyone is on the same page.

If you carry a cell phone or beeper in case of family emergencies, discuss this with professors prior to classes, meetings, or seminars so they will be aware of possible interruptions that will force you to step out. And make certain that family members know that they should call you at such times only in the case of a true emergency.

Talk to your mentor or other department members about organizing inclusive functions during regular work hours or organizing events that are family-friendly.

If you have relocated to attend Case Western Reserve University, and do not have local social networks (e.g., extended families) to help relieve the strain children can put on graduate work, peruse the resources below to help you build a social network.

Be realistic about how much work you can do, especially during the transition period. The mentor-mentee need to discuss these expectations, just to make sure everyone is in agreement.

Resources

- The Employee Assistance Service (EASE) program (links with options for both child care and elder care near CWRU are provided)

  https://www.case.edu/finadmin/humres/erelations/ease.html

Other Local resources that may be of interest include:

Local libraries, daycare resources, parent groups, and toy co-ops
http://www.heightsparentcenter.org
http://www.heightslibrary.org

http://www.shakerlibrary.org/Kids/links.aspx?Websites+for+Parents

http://cleveland.craigslist.org/kid/

http://cleveland.craigslist.org/bab/

Local Heath Care Education Resources

http://www.rainbowbabies.org

http://drsenders.com/?q=event

http://www.dailydoseofreading.org

Local & Federal Early-Childhood Education and Healthy-Start Links

http://www.ceogc.org

http://www.clevelandakronfamily.com/Cleveland%20Page.htm

Local Play Areas and Parks

http://gocitykids.parentsconnect.com/?area=177

http://www.dnr.state.oh.us/tabid/11875/default.aspx

http://www.clemetparks.com

http://ohio.hometownlocator.com/features/cultural,class,Park,scfips,39035.cfm

VII. Graduate Students Who Have a Disability

In this section, we address issues confronting students who have physical disabilities, learning disabilities (e.g., ADHD and dyslexia), chronic illnesses (e.g., lupus and cystic fibrosis), and/or psychological illnesses (e.g., bi-polar disorder and clinical depression). Students who have a disability have unique needs and concerns.

Reluctance to Ask for Help

Students who have a disability often fear that they may appear to be too dependent—or become too dependent—if they ask for help. In addition, students who have a disability are sometimes afraid of being treated differently by professors.

Disclosing a Disability

Although students at Case Western Reserve University are not required to disclose a disability to anyone, they are urged to disclose to the Office of Disability Resources in Educational Services for Students (ESS) before they wish to receive reasonable accommodations. The Associate Director of Disability Resources and other Disability Resources staff members keep disability information strictly confidential, and the choice of disclosure is left solely to the student. When students wish to notify professors of accommodations or special considerations, Disability Resources (along with the student) will compose a memo to his/her professors that only identifies the approved accommodations for the student and does not indicate the specific disability. The student is then responsible for giving the memo to the professors of the classes in which he or she needs accommodation. This is an opportunity for the student to speak with the professor about his or her needs and work out the logistics of the accommodation(s).

Effort Exerted Just to Keep Up

For those students who have a physical or learning disability, meeting the basic requirements may demand much more time and energy than it does for students without a disability. Some students find they cannot participate in certain professional activities (such as submitting papers for conferences) as much as they would like because they need to devote all their time and energy to meeting the basic requirements of their programs.

Problems that Arise from Last-Minute Changes

Changes in reading assignments can be very difficult for students who are visually impaired, since students who are blind or visually impaired must have their readings converted into alternative formats. Any readings added on at a later date will require them to make special efforts to have these new materials translated in a short period of time. Changes in room locations can also cause difficulty for students with visual or physical disabilities.

Suggestions

1. If you need an accommodation, you should not hesitate to communicate with your professors. This should be done at the beginning of the semester so that proper accommodations can be made.

2. Strive to complete assignments in as timely fashion as much as possible, but on occasion you may need a longer period of time to complete a task. If strict deadlines can't be relaxed, be sure to request feedback you need from your professors as early as possible. However, sometimes you will simply need to have additional time; these instances should be discussed on a case-by-case basis with the professor giving the assignment, and an agreement should be reached that is acceptable to both parties.

3. Students who have a psychological disability should find a trusted professional practitioner with whom to work. For all students, social support is crucial and should be sought in many forms. Resist any urges to isolate yourself, since many of your peers will be experiencing the same or similar anxieties and worries.

4. Be very realistic about how much work you can do. During the first semester, take the lightest course load possible so that there will be time to adapt to the new environment.

5. Many other suggestions can be found at the following website:

http://studentaffairs.case.edu/education/disability

6. Remember in general, however, that simply keeping the lines of communication open with professors or fellow students--and asking them for help when necessary-- will help students who have a disability find graduate school to be less intimidating.

Resources

- Education Services for Students (ESS)
  470 Sears Building
  216-368-5230
  essinfo@case.edu

A list of disability resources operated by ESS

http://studentaffairs.case.edu/education/disability/

- Information for faculty members operated by ESS

http://studentaffairs.case.edu/education/disability/learning.html

Disability Resources also deals with making accommodations for students with temporary disabilities, such as broken or sprained limbs.

Most libraries on campus have large print text materials and CCTVs as well.

VIII. Graduate Students Who Have Different Religious Beliefs

It is important that everyone respect the religious practices that their professors or fellow graduate students choose to follow. It is impossible to reference every practice in every religion in this

Handbook. That said, this section outlines some items university community members may want to be aware of when interacting with students of diverse religious beliefs.

Religious Garb

Different clothing may be an important part of a religious practice. However, certain disciplines may require clothing restrictions for safety and/or other applicable reasons. It is important to discuss potential clothing issues with your department and/or mentor.

Absences

Students who follow specific religious beliefs may need to take days off from school for religious holidays, even though they may not be official university holidays. Examples include Rosh Hashanah for students who follow Jewish beliefs or Good Friday for students who follow Christian beliefs. Thus, students may be absent from class or be away from their thesis work on these holidays. It is important to understand that observing their religious holidays should not result in a penalty. Faculty members should help inform such students on any important information they have missed. That said, students should not expect faculty to provide them with a complete set of lecture notes; those should be obtained from fellow graduate students.

Dietary Customs

Many religions have dietary customs. Some of these customs are practiced only during religious holidays. An example is the holy month of Ramadan for the Muslim faith, during which practicing Muslims do not consume food or drink during daylight hours. Other nutritional practices are in force all the time. For example, beef is not eaten by practicing Hindus.

Suggestions

1. The Inter-Religious Council (IRC) is composed of the staffs of the four campus ministries serving the institutions of higher education in University Circle. For assistance in understanding religious beliefs contact the IRC through the Office of Student Affairs.

2. When you are absent from class to follow the practices of your specific religious beliefs, notify your professors in advance and be responsible for making up the work. You should not be penalized for following your religious beliefs.

3. Some religious practices may require some adjustments or flexibility from professors. Communicate such requests early. For example, a student who fasts during the holy month of Ramadan would like to bring food and drink to a meeting or class scheduled after sun set, should make the request ahead of time so that accommodations can be made.

4. When planning social gatherings, avoid referring to these as parties for specific religious groups. Having a "Holiday Party" instead of a "Christmas Party" will make all students feel welcome, including Jehovah's Witnesses, who do not celebrate many Christian or any civil holidays.

5. In settings where food will be provided, respect the dietary customs that students may follow. Make sure that Kosher options are available for Jewish students who need them (not all will). Vegetarian options will accommodate Muslims, Hindus, and Roman Catholics on Fridays during Lent (as well as students who are vegetarian, independent of their religious beliefs).

6. Finally, remember that not everyone is religious. Some people are agnostics or atheists. In academia, your belief system is considered your personal preference and religious writings cannot be uncritically utilized as the only reference sources in your graded academic work unless you are a graduate student in Religious Studies. .

Resources

CWRU's student organization list includes a sub-heading of religious groups

http://usg.case.edu/student-organizations

IX. Short-term Obstacles to Progress

Situations occasionally arise in which you may be temporarily unable to perform the material duties of your graduate appointment with reasonable continuity. This may come about as a result of sickness, injury, pregnancy, psychological difficulties, or some other unique situation. It is important that you talk to your mentor about this as soon as possible to convey to him/her that it is a temporary situation and to find mutually agreeable solutions to help you meet your goal of earning an advanced degree. You may need additional resources (e.g., counseling) to help you successfully navigate this difficult time. Remember that mentors, departments, and the university have made an investment of time, resources, and money in you as their student. It is important to communicate necessary information about your challenging situation to your mentor or other appropriate university employees to protect this investment.

Understanding Temporary Limitations and Reassessing Expectations

Set up meetings with your mentor to assess the reality of your short-term condition, and discuss your ability to contribute to the team at any level. After further dialogue, it will likely become apparent that you are still able to contribute, but that you simply need to have the work environment and expectations temporarily redefined. Work with your mentor to redefine expectations and create schedules—consistent with university policy and realistic for all parties involved—that take the extenuating circumstances into account. Students should be aware that the University is not obligated to provide accommodations for students with temporary disabilities, but will attempt to do so when feasible. Schedule a timeframe for reassessing the situation as it develops. The School of Graduate Studies Graduate Student Handbook (page 20) outlines a policy for graduate student leaves of absence that may provide a solution to the temporary situation. Individual departmental guidelines may vary, so a discussion of the circumstances with the department chair and/or the Dean of Graduate Studies may also be necessary.

Financial Considerations

Be upfront about the possible financial ramifications of the situation. If you find it necessary to temporarily leave the University or if you can only continue in a reduced capacity, it may not be possible to continue to receive a stipend at the same level.

Suggestions

Always be honest (without going into any personal detail that makes you uncomfortable) with your mentor about a situation that requires a temporary leave of absence or inhibits your ability to do your graduate work. Make sure to discuss new expectations or schedules that could help you still make progress in your work while dealing with your difficult situation.

Explore alternative departmental service activities such as grading exams part-time or from home. Sometimes you will still receive a stipend for this type of work.

If the department allows it, consider developing a reading course for credit where you can read articles pertaining to your research and participate in discussions via email. Some departments may offer independent studies where you can do a variety of computer work (analyzing data, creating digital maps of field sites, performing computer simulations, etc.) for credit.

Resources

- School of Graduate Studies

  http://www.case.edu/provost/gradstudies

- Graduate Student Handbook

  http://www.case.edu/gradstudies/downloads/GraduateStudentHandbook09-10.pdf

- Financial Aid

  http://finaid.case.edu

- University Counseling Services

  https://studentaffairs.case.edu/counseling/

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Additional Reading

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Organization Websites

American Indian Graduate Center

http://www.aigcs.org/

American Psychological Association, A survival guide for ethnic minority graduate students

http://www.apa.org/pi/oema/resources/brochures/surviving.aspx

Commission on Professional in Science and Technology

http://cpst.org/index.cfm

The Leadership Alliance

http://www.theleadershipalliance.org/AboutUs/Mission/tabid/70/Default.asp

Appendix A – *Phases of a Graduate Student's Professional Development*

As mentee becomes:	Senior Learner	Colleague-in-Training	Junior Colleague/ Colleague
Emphasizes mentor's role as	**Manager**	**Educational/Professional Model**	**Colleague/Mentor**
	"Do the task the way I've laid out and check back with me."	"Think about the problem, generate options, then let's talk about potential outcomes/ decisions."	"You make the decision. Let me know how I can help. I'm interested in the outcome."
Views own teaching role as	**Assistant**	**Associate**	**Collaborator**
	Grading papers Holding office hours Planning quizzes Collecting feedback	Writing assignments Generating test questions Doing some teaching, lecturing, or small group discussions	Designing, developing, or revising advanced courses or curriculum; instructor of record or co-teaching
Views research role as	**Assistant**	**Associate**	**Collaborator**
	Performing specific duties under relatively close supervision	Assuming design and implementation responsibility for part of a grant or for own research project	Conducting research project (or own portion of it) with high degree of independence; sees mentor as a resource
Understands practitioner, applied or service roles as	**Assistant**	**Associate**	**Collaborator**
	Learning the ropes; acquiring discrete technical skills	Providing strategic assistance or expertise; ultimately defers to mentor	Co-leading, co-designing, co-facilitating; sharing responsibility equally
Prefers evaluation to be	**Assistant**	**Associate**	**Collaborator**
	Frequent and focused on immediate performance	Systematic and focused on overall development of skills, aptitudes	Collegial, informal, and focused on style, approach, values
Sees mentoring needs as	**Assistant**	**Associate**	**Collaborator**
	Self-assessment; goal assessment; regular meetings	Observations; job shadowing; meetings; attend/present at conferences together; networking	Reflective practicum; retreat; opportunistic meetings; networking; generate new project together; co-stewardship

Adapted from Nyquist, J.D. and Wulff, D.H. (1996). Working effectively with graduate assistants, p. 27. Thousand Oaks, Ca.: Sage. (See Chao [1997] for a four-phase model of graduate student development.)

Appendix B – *A Worksheet for a Mentor's Expectations*

Use this worksheet to develop an understanding of what you, as a faculty mentor, expect to gain from your mentoring relationship. By clarifying your own expectations, you will be able to communicate and work more effectively with your students. Add items you deem important.

The reasons I want to be a mentor are to:

____ Encourage and support a graduate student in my field

____ Establish close, professional relationships

____ Challenge myself to achieve new goals and explore alternatives

____ Pass on knowledge

____ Create a network of talented people

____ Other____

I hope that my student and I will:

____ Tour my workplace, classroom, center, or lab

____ Go to formal mentoring events together

____ Meet over coffee or meals

____ Go to educational events such as lectures, conferences, talks, or other University events together

____ Go to local, regional, and national professional meetings together

____ Other____

The things I feel are off-limits in my mentoring relationship include:

____ Disclosing our conversations to others

____ Using non-public places for meetings

____ Sharing intimate aspects of our lives

____ Meetings behind closed doors

____ Other____

Appendix B *(continued)*

I will help my student with job opportunities by:

____ Finding job or internship possibilities in my department, center, lab, or company

____ Introducing my student to people who might be interested in hiring him/her

____ Helping my student practice for job interviews

____ Suggesting potential work contacts to pursue

____ Teaching him/her about networking

____ Critiquing his/her resume or curriculum vita

____ Other____

The amount of time I will spend with my student will be, on average:

1 2 3 4 hours every: week other week per month (circle one)

Worksheet adapted from: Brainard, S.G., Harkus, D.A., and George, M.R. (1998). *A curriculum for training mentors and mentees: Guide for administrators.* Seattle, WA: Women in Engineering Initiative, WEPAN Western Regional Center, University of Washington.

Appendix C – *A Worksheet for a Student's Expectations*

Use this worksheet to develop an understanding of what you, as a student, expect to gain from your mentoring relationships. By clarifying your own expectations, you will be able to communicate them more effectively to your mentors. Add items you deem important.

The reasons I want a mentor are to:

____ Receive encouragement and support

____ Increase my confidence when dealing with professionals

____ Challenge myself to achieve new goals and explore alternatives

____ Gain a realistic perspective of the workplace

____ Get advice on how to balance work and other responsibilities, and to set priorities

____ Gain knowledge of the "do's and don'ts" in my field of study

____ Learn how to operate in a network of talented peers

____ Other____

I hope that my mentor and I will:

____ Tour my mentor's workplace and explore various teaching or work sites

____ Go to formal mentoring events together

____ Meet over coffee, lunch, or dinner

____ Go to educational events such as lectures, conferences, talks, or other University events together

____ Go to local, regional, and national professional meetings together

____ Other____

I hope that my mentor and I will discuss:

____ Academic subjects that will benefit my future career

____ Career options and job preparation

____ The realities of the workplace

____ My mentor's work

____ Technical and related field issues

Appendix C *(continued)*

____ How to network

____ How to manage work and family life

____ Personal dreams and life circumstances

____ Other____

The things I feel are off-limits in my mentoring relationship include:

____ Disclosing our conversations to others

____ Using non-public places for meetings

____ Sharing intimate aspects of our lives

____ Meeting behind closed doors

____ Other____

I hope that my mentor will help me with job opportunities by:

____ Opening doors for me to job possibilities

____ Introducing me to people who might be interested in hiring me

____ Helping me practice for job interviews

____ Suggesting potential work contacts for me to pursue on my own

____ Teaching me about networking

____ Critiquing my resume or curriculum vita

____ Other____

The amount of time I will spend with my mentor will be, on average:

1 2 3 4 hours every: week other week per month (circle one)

Adapted from: Brainard, S.G., Harkus, D.A., and George, M.R. (1998). *A curriculum for training mentors and mentees: Guide for administrators.* Seattle, WA: Women in Engineering Initiative, WEPAN Western Regional Center, University of Washington.

Appendix D – *Planning for first meetings: A Mentor's Checklist*

Use this checklist to plan initial meetings with your students in light of what you hope to help them achieve over the long term.

____ Arrange first meetings with potential students.

____ Explain the goals for meetings and discuss how confidentiality should be handled.

____ Discuss what each of you perceives as the boundaries of the mentoring relationship.

____ Review the student's current experience and qualifications.

____ Discuss and record the student's immediate and long-term goals; explore useful professional development experiences in light of these goals. Record these on a professional development plan. Discuss strategies and target dates.

____ Discuss and record any issues that may affect the mentoring relationship such as time and financial constraints, lack of confidence, new to the role, etc.

____ Arrange a meeting schedule (try to meet at least once a quarter). Record topics discussed and feedback given at each meeting. Ensure that all meeting records are kept confidential and in a safe place.

____ Discuss the following activities that can form part of your mentoring relationship:

- Giving advice on strategies for improving teaching.
- Organizing observation(s) of teaching and providing constructive feedback.
- Organizing a session of work shadowing.
- Consulting on issues or concerns the student has with colleagues or study and research groups.
- Providing feedback from other sources (students, faculty, administrators, and other mentors in or outside the University).

____ Create a mentoring action plan that reflects different professional development needs at different stages of the student's graduate program.

____ Encourage your student to reflect regularly on his or her goals, achievements, and areas for improvement. Ask the mentee to compose a brief reflection essay (e.g., 1/2 page) prior to each meeting.

____ Amend the mentoring action plan as needed by focusing on the student's developing needs.

Adapted from: *Mentoring towards excellence*: Section 4: Handbook and guidelines for mentors and mentees. Association of Colleges and the Further Education National Training Organization, Learning and Skills Council: Coventry, England.

Appendix E – *Planning for first meetings: A Student's Checklist*

Use this checklist to plan initial meetings with your mentors in light of what you hope to achieve over the long term.

____ Arrange first meetings with a prospective mentor.

____ Explain your goals for meetings, and ask how confidentiality should be handled.

____ Discuss what each of you perceives as the boundaries of the mentoring relationship.

____ Review the current experience and qualifications.

____ Discuss and record your immediate and long-term goals. Explore useful professional development experiences in light of these goals. Record these on a professional development plan. Discuss options, strategies, and target dates.

____ Discuss and record any issues that may affect the mentoring relationship such as time and financial constraints, lack of confidence, being new to the role, etc.

____ Arrange a meeting schedule with your mentor (try to meet at least once a quarter). Record topics discussed and feedback given at each meeting. Request that all meeting records are kept confidential and in a safe place.

____ Discuss with your mentor the following activities that can form part of your mentoring relationship:

- Getting advice on strategies for improving teaching or research.
- Organizing observation(s) of teaching and providing constructive feedback.
- Organizing a session of work shadowing.
- Getting advice on issues or concerns with colleagues in study and research groups.
- Providing feedback from other sources (students, faculty, administrators, and other mentors in or outside the University).

____ Create a mentoring action plan that reflects different professional development needs at different stages of your graduate program.

____ Encourage your mentor to reflect regularly with you on your goals, achievements, and areas for improvement. Compose a brief reflection essay (e.g., 1/2 page) prior to each meeting.

____ Amend your mentoring action plan as needed by focusing on your developing needs.

Adapted from: *Mentoring towards excellence: Section 4: Handbook and guidelines for mentors and mentees*. Association of Colleges and the Further Education National Training Organization, Learning and Skills Council: Coventry, England.

Appendix F – *Sample Mentor and Student Agreement*

Consider using this agreement, or another one that you and your student(s) create together, if you believe the mentoring relationship will be strengthened by formalizing a mutual agreement of roles, responsibilities, and expectations.

We are voluntarily entering into a mentoring relationship from which we both expect to benefit. We want this to be a rich, rewarding experience with most of our time together spent in professional development activities. To this end, we have mutually agreed upon the terms and conditions of our relationship as outlined in this agreement.

Objectives

We hope to achieve:

1.

2.

3.

4.

To accomplish this we will:

1.

2.

3.

4.

Confidentiality

Any sensitive issues that we discuss will be held in confidence. Issues that are off-limits in this relationship include:

Appendix F *(continued)*

Frequency of Meetings

We will attempt to meet at least _____ time(s) each month. If we cannot attend a scheduled meeting, we agree to notify one another in advance.

Duration

We have determined that our mentoring relationship will continue as long as we both feel comfortable or until:

No-Fault Termination

We are committed to open and honest communication in our relationship. We will discuss and attempt to resolve any conflicts as they arise. If, however, one of us needs to terminate the relationship for any reason, we agree to abide by one another's decision.

______________________________	______________________________
Mentor	Student
______________________________	______________________________
Date	Date

Agreement adapted from: Brainard, S.G., Harkus, D.A., and George, M.R. (1998). *A curriculum for training mentors and mentees: Guide for administrators.* Seattle, WA: Women in Engineering Initiative, WEPAN Western Regional Center, University of Washington.

FSCIR mission charge 4/19/10

The Faculty Senate Committee on Information and Communication Technology (FSCICT) shall advise the Vice President for Information Technology Services and the Executive Technology Steering Committee on policies, strategies and practices that promote the effective use and management of information and communication technologies (ICT) to support the University's academic and administrative missions.

The committee shall:

1) Establish priorities related to ICT policies and strategies on the campus;
2) Review and provide input annually on the operations and budget of Information Technology Services;
3) Advise, consult and help develop guidelines and policies on how to organize and govern information and communication-related services, and how to develop, select and budget for ICT within University Information Technology Services and other technology organizations within the university.

The Committee shall review the information technology and telecommunications infrastructures for teaching, research, and service; collaboration technologies; and administrative systems, especially those related to the academic advising and research administration.

CASE WESTERN RESERVE
UNIVERSITY
SCHOOL OF MEDICINE

Pamela B. Davis, M.D., Ph.D.
Dean
Vice President for Medical Affairs

Office of the Dean
10900 Euclid Avenue
Cleveland, Ohio 44106-4915

Visitors and Deliveries
Biomedical Research Bldg. - Rm. 113

Phone 216.368.2825
Fax 216.368.2820

http://casemed.case.edu

February 22, 2010

Mark Chance, Ph.D.
Director, Center for Proteomics and Bioinformatics
Case Western Reserve University
School of Medicine
10900 Euclid Ave.
Cleveland, OH 44106-4988

Dear Mark,

I am most impressed with the work you and your colleagues have done to create the new graduate program proposal for Systems Biology. This is a critical area in biomedicine today and one in which there are too few training programs nationwide. With our strength at CWRU in proteomics, genetics, bioinformatics, and other key disciplines, we have the opportunity to emerge as a leading training site in this area.

The program you have outlined is thoughtful, thorough, and collaborative across the campus. The enthusiasm you and your colleagues bring to this program is also a key ingredient that bodes well for its success.

I strongly endorse this program and hope that it can be approved expeditiously so that you can get started!

Sincerely,

Pam

Pamela B. Davis, M.D., Ph.D.

Ph.D. and M.S. Program in Systems Biology and Bioinformatics

Introduction & Summary

Systems Biology represents a new scientific concept of increasing importance to Biology and Medicine. As opposed to the reductionist approach that in the past 50 years has defined the individual pieces of biological systems, this new science attempts to understand the integration of these pieces into networks, complexes and the biological organizations critical to cellular and organism function and development, both normal and in disease. Bioinformatics represents a set of computational approaches to data analysis; the marriage of computational and quantitative thinking in the context of biological integration is a foundational principle of this program.

Case Western Reserve University (CWRU) is uniquely positioned to accomplish the goal of establishing the first **Systems Biology and Bioinformatics Graduate** program in Ohio leading to the Ph.D. CWRU has a long history of excellence in Systems Engineering within the Case School of Engineering, and in the College of Arts and Sciences there are close relationships between the Departments of Biology and Mathematics, all these disciplines are essential components for developing Systems Biology. CWRU also has a remarkable history of education reforms in medical and graduate education that were adopted nationally. **This proposal outlines an integrated plan to form an Systems Biology and Bioinformatics Graduate program, which includes faculty from multiple departments and schools across the university and where the students in the program will combine training in experimental and computational sciences.**

Few institutions have the record of innovative educational programs, an existing faculty with balanced expertise and accomplishments in genetic and quantitative biology and medicine and the right combination of biomedical engineering and biomedical computer sciences to propose this program. CWRU has a well-known culture of collaborative research and a strong commitment from institutional leadership in interdisciplinary programs. Indeed, CWRU hosted one of the first systems biology conferences (1968) and established in 1969 one of the first inter-school departments (Biomedical Engineering, School of Medicine and School of Engineering).

The participating departments and schools have for many years been building research strength in medicine, genetics, genomics, engineering, epidemiology, biostatistics, and quantitative sciences, with a culture and vision that integration will revolutionize the study of biology and understanding health and disease. This includes strengthening core programs in cellular imaging, genomics, and proteomics facilities and faculty.

Over the last several years, the University has expanded its research programs in the diverse areas that provide a foundation for a nationally competitive program in the area of Systems Biology and Bioinformatics.

- The Biomedical Engineering Department and the Radiology Department have invested nearly $15 million in faculty recruitment and advanced imaging facilities that provide enviable research capabilities for exploring molecular, cellular and

organ structure and function at high resolution and in quantitative terms.
- The Genetics department in the School of Medicine (SOM) has invested several million dollars in bioinformatics and quantitative genetics programs.
- The Biology department has established a Systems Biology undergraduate program and targeted recruitment in faculty with strong quantitative interests, while the Electrical Engineering and Computer Science and Mathematics departments have targeted recruitment in faculty with strong biological interests.
- In 2005, the School of Medicine committed $15 million towards a Proteomics and Bioinformatics Center that has focused on quantitative technologies; faculty recruitments to this program have substantially expanded our capabilities in systems-level biology. This program has leveraged existing programs in Metabolomics, where analysis of small molecule metabolites can provide additional important information in defining and modeling biological systems.
- Lastly, investments in Genetic Epidemiology and biostatistics have enhanced our ability to connect Clinical phenotypes with molecular data, provide an additional basis to developing systems analysis of disease.

These programs and their allied department have attracted over $100 million in peer-reviewed funding in terms of both individual grants and large center grants over the lats five years. Many of the involved faculty began meeting on a regular basis to enhance collaboration efforts across the University and to begin the process of organizing a training program in Systems Biology and Bioinformatics to facilitate the research and training of students in this discipline.

This group is proposing a new CWRU Ph.D. and M.S. program in Systems Biology and Bioinformatics, based in the School of Medicine, with the Center for Proteomics and Bioinformatics as its administrative home. The faculty cohort will include faculty from multiple departments and schools, and the fundamental core competencies for this program will include: genes and proteins; bioinformatics; and quantitative analysis and modeling. Scientists trained in the fundamental competencies of this program and guided in an integrative research path will be equipped for challenges ahead in the biological sciences and be the leaders of tomorrow.

This Steering Committee for the proposed program is Chaired by Mark Chance, Professor of Physiology & Biophysics and Director, Center for Proteomics & Bioinformatics and includes as Steering Committee members Joseph Nadeau, Professor and Chair of Genetics, Rob Ewing, Assistant Professor of Proteomics & Bioinformatics (Primary) and Genetics (Secondary), Mehmet Koyuturk, Assistant Professor of Electrical Engineering and Computer Science (Primary) and Proteomics & Bioinformatics (Secondary) and Jill-Barnholtz-Sloan, Assistant Professor, Cancer Center (Primary) and Proteomics & Bioinformatics (Secondary). Many additional faculty, from twelve departments and four schools across the University, have made significant contributions to the proposal and will serve as founding trainers in the program.

1A. Intellectual Rationale

Systems Biology is the science of understanding the resultant behaviors and functions when the individual components of biological systems interact. The past 50 years have seen a triumph of reductionism where the individual components of biological systems have been characterized to a staggering degree of detail. However, progress in understanding normal and disease biology over the next 50 years will require new scientific approaches, where the focus is on understanding the interactions and resultant behaviors of the components.

This new science is key to understanding the function of complex biological systems, to understand their normal development, to understand their transition to abnormal or disease states, and to discover innovative modalities for treating and preventing disease. Progress depends on understanding biological integration in normal organisms and healthy individuals and the ways in these normal organisms develop and age and the ways in which dysfunctions in these complex systems lead to disease. In the future it is likely that treatments will be based on a molecular diagnosis of the individual, leading to a new frontier of personalized medicine. As these challenges in medicine are becoming understood, there has been a parallel explosion in data available from all living organisms, not only sequence but related functional information on phenotypes and protein interactions. Our ability to generate these data far exceeds our ability to organize and understand them. Computational approaches are struggling to deal with the complexity inherent in these data sets, however systems based approaches are well suited to handling these levels of complexity.

To gain an understanding of these –omics data relevant to the normal and abnormal biology of living systems, a transformation based on interdisciplinary research is needed. Systems Biology and Bioinformatics research requires new kinds of scientists who are both familiar with multiple disciplines and adept at forming collaborations with scientists who are uni-disciplinary. Their training requires a specialized and innovative new program. This new scientific approach has spawned new journals like *Molecular Systems Biology* (a joint venture of EMBO and Nature Publishing group) and has induced existing journals to develop specific topic areas, such as the systems biology and emerging technologies topic invited by the journal *Cancer Research* as well as the open access journal *BMC Systems Biology*. Conferences and societies concerning Systems Biology have sprung up, including the International Society of Systems Biology. These journals and professional societies demonstrate the emergence of a new discipline that is attracting students for training.

An important feature of the training in this program is that all students will be required to combine both experimental and computational or mathematical disciplines in their coursework and in the development and execution of their research plan. This distinguishes this program from other graduate programs, where the course of study and research may be wholly experimental, or graduate programs that may be wholly computational. The students who complete this training will be trained to generate and analyze experimental data for biomedical research and will be also trained to develop physical or computational models of the molecular components that drive the behavior of the biological system.

1B. Description of Proposed Ph.D. and M.S. Curriculum

Program Competencies. All Ph.D. students in Systems Biology and Bioinformatics will fulfill the overall academic requirements for Ph.D. study at Case Western Reserve University, including the requirement for a minimum of 24 graded credits of coursework for the PhD, 36 total credits (including 601 research credits), the candidacy examination, and the required numbers of earned 701 credits (at least 18 research credits). Candidates for M.S. will complete 30 total credits, will fulfill the overall academic requirements for M.S. study at Case Western Reserve University, and compete a course of study with thesis (Plan A) or without thesis (Plan B).

The specific academic requirements of the discipline are intended to provide students with a core curriculum in Systems Biology and a set of electives designed both to assure minimum competencies in three major academic areas (genes and proteins, bioinformatics, and quantitative analysis & modeling) and equip them for their particular thesis research area where indicated.

The general framework for fulfilling these competencies, and an example course of study for the Ph.D. is provided in Appendices 1 and 2. Details of the M.S. curriculum are provided in Appendix 3. Competencies in the three major areas are to be demonstrated by satisfactory completion of appropriate CWRU courses or satisfied by equivalent training elsewhere as determined by the program faculty and steering committee after petition by the student of their proposed course of study. This overall study plan approval must be completed by the end of the first semester for M.S. students and by the end of the first year for Ph.D. students. These competencies are intended to drive a novel training program where the student combines experimental and theoretical or mathematical work in their Thesis research (for Ph.D. or M.S. Plan A students) or in their curriculum (M.S., Plan B).

Summary of Curriculum. The Systems Biology program differs from current CWRU programs in the comprehensive requirement for an understanding of biological systems, bioinformatics, and quantitative analysis & modeling. In addition to a set of core courses and electives, a monthly journal club meeting for students and faculty with the designation **SYBB 501 and 502** will be developed; the activities of this session will include, Journal club, Works in progress, team-building activities. Students will be required to participate in this session throughout their graduate career.

Summary of Requirements for Ph.D. program. The Systems Biology and Bioinformatics Ph.D. will include a set of required core courses including Bioinformatics for Systems Biology (EECS 459) and Current Proteomics (PHRM 555), a Systems Biology Journal Club (SYBB 501, 502), at least four additional courses as outlined by the student's advisory committee (for at least 12 additional credits), a course in the Responsible Conduct of research (IBMS 500), a qualifier exam, a Ph.D. Thesis, and oral defense consistent with CWRU requirements.

Entering students will be assigned a mentoring committee (by the steering committee) of two faculty to guide the first year and this mentoring committee will recommend a course of study to be approved by the steering committee. This committee will guide the coursework choices of the student such that they have completed training in the three major areas required for the thesis research. After admission to candidacy, the student will form a thesis committee that will include faculty that have expertise in experimental work (for example –omics or imaging) and computational or mathematical analysis to guide the Thesis research plan such that it includes a combination of these disciplines.

Two or three, three-month rotations will be typical and will approximately occur from August to April in the student's first year (The rotation expectations for MSTP or BSTP students will conform to the expectations of that program, see below). A student may request to be admitted to a laboratory at any time after matriculation. The student, the mentor, the mentor's Department Chair, and the steering committee must approve the laboratory selection in writing, after review and evaluation of the student's proposed academic record and proposed/completed curriculum by the steering committee. This approval will include the designation of a specific committee to evaluate the qualifying exam and who will function to review student progress every six months until graduation (see below).

Students, by the middle of the second year, will generate and defend an NIH or NSF style proposal based on their proposed thesis research in the qualifier exam; successful oral defense of this proposal and completion of core requirements will result in recommendation for formal Ph.D. candidacy. Candidates not successful at this stage may have a second opportunity to defend only at the discretion of the steering committee.

1C. Administrative Arrangements for the Program

The Systems Biology and Bioinformatics program will reside in the School of Medicine and be administered by the Center for Proteomics and Bioinformatics. The Center will provide support in terms of a graduate coordinator who will, in collaboration with program faculty, track student performance, schedule program events, and maintain appropriate admission and financial records. The Steering Committee, Program Director, and a list of possible faculty are listed in Appendix 2. Thereafter, affiliated faculty will be reviewed periodically and re-appointed by majority vote of the Steering Committee and will consist of all faculty involved in courses, training, and common research programs who are active participants. The criteria for trainers will be those typically employed by NIH study sections in the review of NIH funded training programs. Important elements typically include previous training track record, funding, and relevance to the discipline in terms of publications and grants. Junior faculty may not have track records in these cases and may be on startup-funds. In these cases relevance to the discipline is the most important factor. All individuals with a primary or adjunct appointment to the faculty of Case Western Reserve University are eligible to be considered for the training faculty. The Program Director will serve at the pleasure of the Dean of the School of Medicine and will recommend, on a yearly basis, the composition of the Steering Committee for the Dean's approval. The Steering Committee will typically include four members plus the Program Director, for voting purposes.

The program will be administered by the Director, the Steering Committee, and a Program Coordinator. This committee is responsible for oversight of all admissions, academic and curricular issues including the addition of new trainers and shall be empowered to form subcommittees to support these functions. Under the auspices of the Office of Graduate Studies, the affiliated faculty will further develop and regularly review and update program requirements, conduct of qualifying examinations, and administer the final Dissertation Examination as per the rules of the University.

As the program has developed, many individual faculty members and Departments have offered their comments and support. Appendix 4 lists support letters from the Chairs of Genetics, Pharmacology, Epidemiology & Biostatistics, Biomedical Engineering, and the Directors of the Center for Proteomics and Bioinformatics, Center for Imaging Research, and the MSTP program. These Chairs indicate the interest of their participating faculty in contributing to the program's success.

1D. Examples of Student Curricula and Background

The program is intended to be suitable for students with varying backgrounds but with a focus on students who have had strong quantitative training including some computer science background. Minimum requirements for admission include a bachelors or masters degree in the Natural Sciences (Biology, Chemistry, Physics) Computer Science, Engineering, Mathematics, or other fields with strong quantitative skills. Appendix 1 lists the courses that form the core curriculum. The above majors are generally expected to have the relevant background for such courses, have completed such courses, or commit to pursue relevant remedial work prior to enrollment or in selected cases after enrollment. Appendix 1 lists the general credit hours that fulfill a five year Ph.D. program. Appendix 3 lists the M.S. requirements.

2. Evidence of Need

The need for scientists trained in the field of Systems Biology and Bioinformatics is clearly evident upon review of the current National Science Foundation funding opportunities and programs, National Institutes of Health Roadmap initiatives, and a report published by the World Technology Evaluation Center entitled "Assessment of International Research and Development in Systems Biology". This report, which was commissioned by a wide range of funding agencies including NSF, DARPA, NASA, NCI, NIBIB, etc., had a goal to gather information about worldwide status and trends in biological systems - "Network Behavior in Biological Systems" - and to disseminate it among government decision makers and the research community. This report underscored the significant current and future growth expected for this field and the need for specialized training initiatives in this area. Multiple NIH Roadmap initiatives are directly related to systems biology: Interdisciplinary Research Centers, Interdisciplinary Research Training Initiative, Removing Structural Barriers to Interdisciplinary Research and Translational Research. A review of scientific journals also illustrates the need for additional scientists trained in Systems Biology. There are several scientific journals now solely devoted to Systems Biology or systems biology. A graduate program focused on Systems Biology and bioinformatics will likely be in considerable demand. A scan of job advertisements in Science and Nature, reveals many research opportunities for well-trained individuals in this area. Additionally many academic and commercial institutions (particularly pharmaceutical companies) have established research centers focused on Systems Biology.

Relevance to Ohio. In Ohio, Bioinformatics and Systems Biology programs at the undergraduate level are growing rapidly. Statewide standards for Bioinformatics curricula have been developed by the Ohio Bioinformatics consortium (http://www.ohiobioinformaticsconsortium.org/curriculum.shtml) and both public and private colleges and universities across the state are launching and expanding program offerings. There is an equivalent need to launch and expand graduate offerings to attract out of state students to Ohio as well as provide opportunities for the growing pool of in-state students. Currently there are several programs in Ohio that are similar. Ohio State University has an excellent program in Bioinformatics within its Integrated Biomedical Science Graduate Program. The OSU program (http://www.biomed.osu.edu/ibgp/emphasis/bioinformatics/?ref=flashnavis) is focused on large-scale data management, processing, and visualization of biomedical data. The Department of Biomedical Engineering at the University of Cincinnati has an excellent Bioinformatics curriculum within the Biomedical Engineering Ph.D. (http://www.eng.uc.edu/dept_biomed/pdf/bioinformatics.pdf). These programs fulfill critical needs in Ohio but taken together do not have the capacity to respond to the existing needs and projected growth and have a different emphasis than the program proposed here. The CWRU program has an experimental and computational theme with an emphasis on genomics, proteomics, metabolomics, imaging, and biological mechanisms of disease and is well situated to deliver training in this focused area, as it is located in the leading Medical School in the state of Ohio. Although the OSU program is also based in its School of Medicine, it is has greater expertise in clinical data analysis and management. On the other hand, the UC program is an Engineering Degree, and has 57 course credits required minimum (19 class equivalents) while the program proposed here, as is typical in a Medical School environment, has fewer required coursed and a larger research component Also, neither of these programs will award a specific Ph.D. in the discipline, as the curricula are tracks in an existing Ph.D. program and it is expected that the program proposed here will have a high national visibility for students who have a strong interest in biology and medicine.

Other National and International Programs

In the last few years many Systems Biology, Bioinformatics, and Programs and courses have been established around the world. Notable programs include:

- Computational and Systems Biology graduate program, Massachusetts Institute of Technology. (http://csbi.mit.edu/)
- Systems Biology Ph.D. Program, Harvard University (http://sysbio.med.harvard.edu/)
- Mathematical, Computational and Systems Biology Program, University of California at Irvine (http://mcsb.bio.uci.edu/)
- Computational and Systems Biology Program, Washington University in St. Louis (http://dbbs.wustl.edu/programs/compbio)
- Integrative Program in Complex Biological Systems, University of California San Francisco (http://www.pqb.ucsf.edu/)
- Institute for Theoretical Biology, Humboldt University, Berlin (http://itb.biologie.hu-berlin.de/)
- Systems Biology, Oxford, Great Britain (http://www.ox.ac.uk/admissions/postgraduate_courses/course_guide/systems_biology.html)

The program at Harvard University, which is based in the Department of Systems Biology has 13 faculty and fuses basic biological science questions with mathematics and engineering approaches. The MIT program (CSBI) includes about eighty faculty members from over ten academic units across MIT's Schools of Science, Engineering, and the Whitehead Institute for Biomedical Research. The program at CWRU will be similar in that it will cut across different schools of the University. This will provide a breadth to the program that is competitive compared to the international peer group above. Also, the CWRU program will have a strong biomedical and molecular systems biology focus, providing us with a competitive edge for many students.

Prospective Enrollment and Access and Retention of Underrepresented Groups. The Systems Biology and Bioinformatics Program will be initially be composed of graduate students at CWRU to provide an initial cohort on which to build. Examination of student backgrounds and interests in some of the relevant departments indicate that the current cohort numbers ~5-8 students. These students are in various stages of their graduate careers, such that some may be only suitable for participating in seminar programs and journal clubs, while others are likely to take core courses or electives available in the program.

Students may enter the program through the “umbrella” admissions program of the medical school (the Biomedical Sciences Training Program or BSTP) or through direct admission or through the Medical Sciences Training Program (MSTP). Thus, the program will likely increase overall enrollment in graduate classes across the campus.

For students in the Ph.D. program, we plan for the enrollment of the first direct admit students in the fall of 2011. In the fall of 2011 we expect to have 2 direct admit students plus 2 students from the BSTP path and 1 student from the MSTP path or 5 in the first year. Continued enrollment at this level would provide a total cohort of ~25 students by 2016, and a steady state of ~25 students assuming a time to degree of 5 years and stable matriculation.

Direct admission to the program will be through the CWRU online application. Prospective students will complete Part A and Part B of the existing Graduate Application. Admission to the Graduate School will follow the guidelines denoted in the General Bulletin of CWRU, and the admissions committee will be comprised of the program steering committee or its designate. Candidates will be evaluated based on overall GPA and science GPA, GRE scores and performance on advanced tests (if available). Very important criteria also include the student essay, 3 letters of reference, prior research experience, and on campus interviews. The TOEFL examination will be required for international students. We will follow the General Bulletin guidelines regarding the demonstration of the necessary command of English for foreign students.

Students in this Program will be expected to have an undergraduate or masters degree in one of the component disciplines of the program as detailed above. The following undergraduate courses are strongly encouraged: Introductory Biology (2 semesters), Introductory Chemistry (2 semesters), Biochemistry, Introductory Physics (2 semesters), Calculus through differential equations, Linear Algebra, Introductory Computer Science, and Introductory Statistics. The background of all students who are offered admission to and are admitted to the program will be evaluated for suitability. Remedial work to cover any deficiencies in background may be recommended as a condition of matriculation.

Recruitment efforts will be collaborative with those already established and ongoing within the MSTP, BSTP, and other programs at CWRU. Special efforts will be made to enroll minority students as part of the CWRU commitment to bringing more minorities and women into advanced fields of study. In the field of Basic and Translational Biomedical Research women are not underrepresented at the student and junior faculty levels, although we recognize that women are underrepresented at the Professor and Department Chair levels. Thus, every effort will be made to foster a supportive environment in order to successfully mentor and retain minority and female Ph.D. candidates and guide these students into leadership roles in this new field.

Financial Issues and Support for the Program. An important issue relates to financial support of students for this program. The Center for Proteomics and Bioinformatics and the School of Medicine will provide the overall support for the program. However, the typical arrangements that exist at the School of Medicine include support for students from individual faculty grants and training grants, when available. The expectation is that for “direct admit” students to the program, the program will make sure the student is provided with tuition, stipend and health insurance and fee support from the point of matriculation into the program up to the point they choose a laboratory mentor. Subsequent to that time, the mentor and the mentor’s primary department/management unit will assume financial responsibility for the student consistent with SOM policies.

For students who enroll via the BSTP of the School of Medicine, there is a clear policy of rotations and tuition and stipend “return” subsequent to students selecting a laboratory. For students who enter via the MSTP route, procedures are also in place for financial support up to the time a student selects a mentor. Thus, any financial oversight for these students does not accrue to the program until these students select a laboratory. At this point the program will assure that financial responsibility is appropriately established. The program can easily and seamlessly accommodate these students.

Special Efforts to Recruit Under-Represented Minority Students

Institutional History and Achievements. CWRU has well-established efforts to recruit and retain under-represented minority students to our graduate and medical schools. In 1971, the Office of Multicultural Programs was established to help and encourage minority students enter careers in medicine and biomedical research. Graduate programs across the campus have been successful in matriculating minority students. In 2007, of 823 domestic applicants, 192 matriculated and 46 were minorities (24%). To ensure that matriculated minority students are supported and are part of a community a Minority Graduate Student Organization (MGSO) was formed. Participation is voluntary, but strongly encouraged, to foster a student group identity and shared values. MGSO meeting topics are varied and cover many issues, including the experiences of the students in research.

The success of the medical and graduate minority recruitment efforts at CWRU can also be attributed to our institutional presence at various historically African American colleges and universities and at scientific conferences organized by under-represented minority groups. The Systems Biology Program will be represented at these ongoing recruitment efforts. In addition, we plan to send a representative of the Program to the national meeting of the Society for Advancement of Chicanos/Latinos and Native Americans in Science, the Annual Biomedical Research Conference for Minority Students, and the Natural Sciences Career Fair at the University of Miami.

Summer Programs for Undergraduates and High School Outreach Programs.

Program faculty have been very active in mentoring and providing research opportunities in the summer for college students and high school students. These include the SURP program and other opportunities. In particular, we anticipate providing opportunities to Systems Biology undergraduates at Case; these summer programs are a proven method for generating high quality applicants.

4. Faculty and facilities available for the program and their adequacy. The criteria for trainers will be those typically employed by NIH study sections in the review of NIH funded training programs. Important elements typically include previous training track record, funding, and relevance to the discipline in terms of publications and grants. Junior faculty may not have track records in these cases or may be on startup-funds without their first grant. In these cases relevance to the discipline is the most important factor. This potential training group (Appendix 2) has many years of training experience in biological science, engineering, and medicine. Their funding and facilities are at the forefront of biology and medicine today.

5. Projected financial needs to support program and adequacy of expected financial support

Ph.D. program. The anticipated enrollment for the program is 5 students per year, with two projected students admitted directly to the program and 3 from existing graduate program pipelines (BSTP and MSTP sources). The Center for Proteomics and Bioinformatics will fund 1 student per year in the first year (average 9-10 months of support) for 5 years for a total estimated cost of $100,000-$120,000. The Department of Genetics will fund 1 student per year for the first year (average 9-10 months of support) for 5 years for a total estimated cost of $100,000-$120,000. The other three students per year will be funded through the above indicated admissions routes which have precedented mechanisms of first year support. After the first year, faculty grant support will provide funding for the students. If a student cannot find a mentor willing to take them, they must leave the program. If the student joins a laboratory and support is lost, the mentor's home department will be financially responsible for the student. This support is assured by a required signoff from the mentor's Department Chair. Additional funds to add to these resources are being sought from the strategic plan funding, foundation and philanthropic support. Administrative support for the program will be provided by the Center for Proteomics and Bioinformatics within its existing funds including support for a graduate coordinator (20% time, Department Assistant II, $8-10K per year plus $4-5K per year will be allocated to recruitment, special events, and advertising for a total of $60-75K over the first 5 years). Additional expenses may include Ph.D. tuition expenses depending on policies in place while revenue may include fundraising, University Alliance funding, tuition from M.S. students, or training grants.

M.S. Program. Masters students will not receive a stipend and will pay tuition according to current CWRU rates. Many may be CWRU employees who wish to expand their knowledge within an approved degree program and who have tuition available as a part of their defined benefit package. We expect 2 such students per year.

6. Support letters from Chairs and Program Directors.

The Chairs of Pharmacology, Biomedical Engineering, and Genetics have written letters of support for the program. Also, the Directors of the Centers for Proteomics and Bioinformatics, the Center for Imaging Research, and the MSTP program have written letters of support (See Appendix 4).

Appendix 1
Major Course Descriptions

PHOL 432 CELL STRUCTURE AND FUNCTION, Instructor: Nosek. This course provides knowledge regarding cell structure and function, chiefly in mammalian cells but also in relevant model systems. The basic structure of the cell is discussed, as are various systems that regulate this structure. Topics to be covered include DNA transcription, translation and protein synthesis, intracellular transport, cell interaction with the external environment, cell cycle regulation, cell death and differentiation, signal transduction, and cell specialization and organization into tissues. The course emphasizes lectures and problem-based discussions with an emphasis on faulty-directed student self-learning. The major goals of this course are to provide students with a working knowledge of the cell to facilitate understanding of the scientific literature, and to familiarize students with current techniques in cell biology. (3 credits - twice weekly - 1.5 hr/session). Fall, capacity 12; no pre-req

PHOL 456 PROTEINS AND NUCLEIC ACIDS; Instructor: Wintrode. The goal of this course is to provide a basic working knowledge of protein structure/function and molecular biology. The course begins with a discussion of protein structure and enzyme catalysis followed by protein purification and characterization. The course then addresses concepts relating to the application of modern molecular biology techniques. Students are taught how to clone genes and use these clones in animals-and cell-based studies. The overall goal is to provide students with an understanding of proteins and genetic approaches that can be used in experimental work and to facilitate comprehension of the scientific literature. (3 credits - twice weekly- 1.5 h/lecture) Fall, capacity 12; department consent

PHOL 475 PROTEIN BIOPHYSICS; Instructor, Buck. This course focuses on in-depth understanding of the molecular biophysics of proteins. Structural, thermodynamic and kinetic aspects of protein function and structure-function relationships will considered at the advanced conceptual level. The application of these theoretical frameworks will be illustrated with examples from the literature and integration of biophysical knowledge with description at the cellular and systems level. The format consists of lectures, problems sets, and student presentations. A special emphasis will be placed on discussion of original publications. (3 credits - twice weekly). Spring, no pre-req, limit 10

BIOL 419 APPLIED PROBABILITY AND STOCHASTIC PROCESSES FOR BIOLOGY; Instructor, Thomas. Applications of probability and stochastic processes to biological systems. Mathematical topics will include: introduction to discrete and continuous probability spaces (including numerical generation of psuedo random samples from specificied probability distributions), Markov processes in discrete and continuous time with discrete and continuous sample spaces, point processes including homogeneous and inhomogeneous Poisson processes and Markov chains on graphs, and diffusion processes including Brownian motion and the Ornstein-Uhlenbeck process. Likely topics include: stochastic ion channels, molecular motors and stochastic ratchets, actin and tubulin polymerization, random walk models for neural spike trains, baceterial chemotaxis, signaling and genetic regulatory networks, and stochastic predator-prey dynamics. The emphasis will be on practical stimulation and analysis of stochastic phenomena in biological systems. Numerical methods will be developed using both MATLAB and the R statistical package. Student projects will comprise a major part of hte course. Offered as BIOL 419, EBME 419, PHOL 419 for graduate credit.

EPBI/MPHP 431 Statistical Methods I; **Instructor; O'Brien**Application of statistical techniques with particular emphasis on problems in the biomedical sciences. Basic probability theory, random variables, and distribution functions. Point and interval estimation, regression, and correlation. Problems whose solution involves using packaged statistical programs. First part of year-long sequence . Fall Semester. 3 credits. Fall, consent of instructor

EPBI/MPHP 432 Statistical Methods II; Instructor; O'Brien. Methods of analysis of variance, regression and analysis of quantitative data. Emphasis on computer solution of problems drawn from the biomedical sciences. Design of experiments, power of tests, and adequacy of models. Prerequisite: EPBI 431 or Equivalent. Spring Semester. Capacity 25

PHRM 555 /SYBB 555 Current Proteomics, Instructor: Miyagi. This course is designed for graduate students across the university who wish to acquire a better understanding of fundamental concepts of proteomics and hands-on experience with techniques used in current proteomics. Lectures will cover protein/peptide separation techniques, protein mass spectrometry, bioinformatics tools, and biological applications which include quantitative proteomics, protein modification proteomics, interaction proteomics, structural genomics and structural proteomics. Laboratory portion will involve practice two-dimensional gel electrophoresis, molecular weight measurement of proteins by mass spectrometry, peptide structural characterization by tandem mass spectrometry and protein identification using computational tools. Spring Semester 3 credits**.** Recommended preparation: CBIO 453 and CBIO 455 or equivalent.

EECS 458 Introduction to Bioinformatics; Instructor, Koyuturk. Fundamental algorithmic methods in computational molecular biology and bioinformatics discussed. Sequence analysis, pairwise and multiple alignment, probabilistic models, phylogenetic analysis, folding and structure prediction emphasized. Fall; Recommended preparation EECS 340, EECS 233.

EECS 459/SYBB 549 Bioinformatics for Systems Biology; Instructor, Koyuturk, (new). Modeling of –omics data using computational and mathematics formulations. Pre-requisite: EECS 458 or equivalent.

SYBB 501/502 (new). Once weekly meeting for all program students and faculty. This will include journal club presentations for first and second year students, works in progress presentations for third and fourth year students, team-building exercises and rotations. No credit.

SYBB 601 (new), Research in Systems Biology, includes rotations and thesis research. Variable credit.

SYBB 701 (new), Dissertation PhD research. Prereq: Pre-doctoral research consent or advanced to Ph.D. candidacy milestone. Variable credit.

An example of a year-by-year outline of study for the Ph.D.; Required Courses in Bold, possible electives also listed.

Semester 1	**Courses**	**Title**	**Credits**	**Graded or P/F**
	PHOL 432	Cell Structure and Function*	3	Graded
	PHOL 456	Proteins and Nucleic Acids*	3	Graded
	EECS 458	Introduction to Bioinformatics*	3	Graded
	SYBB 501	**Systems Biology Journal Club**	0	P/F
	SYBB 601	**Systems Biology Research (Rotation)**	0	P/F
Total			**9**	
	EECS 459	**Bioinformatics for Systems Biology**	3	Graded
	PHRM 555	**Current Proteomics**	3	Graded
	SYBB 502	**Systems Biology Journal Club**	0	P/F
	SYBB 601/651	**Systems Biology Research (Rotation or M.S. Thesis)**	3	P/F
Total			**9**	
Semester 3	EPBI 431	Statistical Methods I*	3	Graded
	BIOL 419	Applied Probability and Stochastic Processes for Biology*	3	Graded
	SYBB 501	**Systems Biology Journal Club**	0	P/F
	SYBB 601/651	**Systems Biology Research (Pre-Ph.D. Dissertation Research or M.S. Thesis)**	3	P/F
Total			**9**	
Semester 4	EPBI 432	Statistical Methods II*	3	Graded
	SYBB 502	**Systems Biology Journal Club**	0	P/F
	SYBB 600/651	**Systems Biology Research (Pre-Ph.D. Dissertation Research or M.S. Thesis)**	3	P/F
Total			**9**	
First two year total			**36**	**24 Graded/ 12 P/F**
Semester 5	SYBB 701	Systems Biology Ph.D. Dissertation Research	**9**	P/F

Semester 6	SYBB 701	Systems Biology Ph.D. Dissertation Research	**9**	P/F
First 3 year total			**54**	
Semester 6	SYBB 701	Systems Biology Ph.D. Dissertation Research	**1**	P/F
Semester 7	SYBB 701	Systems Biology Ph.D. Dissertation Research	**1**	P/F
Semester 8	SYBB 701	Systems Biology Ph.D. Dissertation Research	**1**	P/F
Semester 9	SYBB 701	Systems Biology Ph.D. Dissertation Research	**1**	P/F
5-year total			**58**	

*-Notes: Courses required for the Ph.D. program and M.S. Plan A are listed in Bold. Other courses indicate a potential curriculum that fleshes out all core competencies and electives. PHOL 432 and PHOL 456 satisfies the general requirement that the student have appropriate background in cell and molecular biology at the graduate level. The Cellular and Molecular Biology sequence (CBIO 453 and CBIO 455) also is appropriate as is the CWRU M.D., cell and molecular biology curriculum. Also, equivalent preparation at another University can fulfill the requirement. EECS 458, although not specifically required, provides an example that can help fulfill the core competency in Bioinformatics. EPBI 431/431 provides an example that fulfills the core competency in quantitative methods. BIOL 419 provides an example of a class that fulfills the core competency in quantitative modeling; PHOL 475 would also serve this purpose well. A student's specific plan of study must be approved by the program steering committee such that these competencies are fulfilled.

Appendix 2
Systems Biology and Bioinformatics: Potential Faculty Cohort.

Program Director
Mark Chance, Ph.D., Director, Center for Proteomics & Bioinformatics

Steering Committee Members
Joseph Nadeau, Ph.D., Department Chair/Professor, Genetics
Mehmet Koyuturk, Assistant Professor, EECS
Jill Barnholtz-Sloan, Assistant Professor, Cancer Center
Rob Ewing, Assistant Professor, Proteomics and Bioinformatics

Other potential faculty trainers
Jim Basilion, Associate Professor, Biomedical Engineering
Suda Iyengar, Professor, Epidemiology & Biostatistics
Robert Elston, Professor, Epidemiology & Biostatistics
Chris Dealwis, Associate Professor, Pharmacology,
Patrick Wintrode, Assistant Professor, Physiology & Biophysics
Peter Thomas Ph.D., Assistant Professor, Mathematics
Masaru Miyagi, Assistant Professor, Proteomics and Bioinformatics
Mark Adams, Associate Professor, Genetics
Thomas La Framboise, Associate Professor, Genetics
Jing Li, Associate Professor, EECS
GQ Zhang, Professor, EECS
Aaron Weinberg, Professor, Dental Biological Sciences
Tom McCormick, Assistant Professor, Dermatology
Kevin Cooper, Chair and Professor, Dermatology

Appendix 3

Academic Requirements for Masters Degree in Systems Biology and Bioinformatics. These requirements correspond to the requirements of the CWRU General Bulletin in effect in 2010-11. The requirements are typically possible for a full time student to complete in 24 months for Plan A and 18-24 months for Plan B depending on course work already completed, see Table below).

Plan A

M.S. with a thesis based on individual research and a final oral examination.

Plan B

M.S. requiring a written comprehensive examination or major project (no thesis).

The Master's Thesis (Plan A)

The minimum requirements for the master's degree under Plan A are 21 semester hours of course work plus a thesis equivalent to at least 9 semester hours of registration for 30 hours total. These must include EECS 459, PHRM 555, and SYBB 501, SYBB 502, and a minimum of 9 hours of SYBB 651. The curriculum plan must be approved by the program steering committee and include appropriate coverage of the core competencies in genes and proteins, bioinformatics, and quantitative modeling and analysis. Sample course schedules are provided in Appendix 2. At least 18 semester hours of course work, in addition to thesis hours, must be at the 400-level or higher. Each student must prepare an individual thesis that must conform to regulations concerning format, quality, and time of submission as established by the dean of graduate studies. For completion of master's degrees under Plan A, an oral examination (defense) of the master's thesis is required, where the examination is conducted by a committee of at least three members of the university faculty.

The Master's Comprehensive (Plan B)

The minimum requirements for the master's degree under Plan B are 30 semester hours of course work (with at least 18 semester hours of course work at the 400 level or higher) and a written comprehensive examination or major project with report to be administered and evaluated by the program steering committee. The coursework must include EECS 459, PHRM 555, SYBB 501 and SYBB 502. The curriculum plan must be approved by the program steering committee and include appropriate coverage of the core competencies in genes and proteins, bioinformatics, and quantitative modeling and analysis.

An example of a year-by-year outline of study for the M.S. Plans A and B (30 semester hours); Required Courses in Bold, possible electives also listed.

Semester 1	**Courses**	**Title**	**Credits**	**Graded or P/F**
	PHOL 432	Cell Structure and Function*	3	Graded
	PHOL 456	Proteins and Nucleic Acids*	3	Graded
	EECS 458	Introduction to Bioinformatics*	3	Graded
	SYBB 501	**Systems Biology Journal Club**	0	P/F
	SYBB 601	**Systems Biology Research (Rotation for Plan A students)**	0	P/F
Total			**9**	
	EECS 459	**Bioinformatics for Systems Biology**	3	Graded
	PHRM 555	**Current Proteomics**	3	Graded
	SYBB 502	**Systems Biology Journal Club**	0	P/F
	SYBB 601/651	**Systems Biology Research (Plan B students, M.S. Thesis research, Plan A students course elective for 3 credits)**	3	P/F
Total			**9**	
Semester 3	EPBI 431	Statistical Methods I*	3	Graded
	BIOL 419	Applied Probability and Stochastic Processes for Biology*	3	Graded
	SYBB 501	**Systems Biology Journal Club**	0	P/F
	SYBB 601/651	**Systems Biology Research (Plan B students, M.S. Thesis research, Plan A students course elective for 3 credits)**	3	P/F
Total			**9**	
Semester 4				
	SYBB 502	**Systems Biology Journal Club**	0	P/F
	SYBB 600/651	**Systems Biology Research (Plan B students, M.S. Thesis research, Plan A students course elective for 3 credits)**	3	P/F
Total			**3**	
Two year total			**30**	

*-Notes: Courses required for the M.S. are listed in Bold. Other courses indicate a potential curriculum that fleshes out all core competencies and electives. See also Appendix 1.

Appendix 4

Letters of Support:

Director, Center for Proteomics and Bioinformatics
Chair, Department of Genetics
Chair, Department of Pharmacology
Chair, Department of Biomedical Engineering
Chair, Department of Epidemiology & Biostatistics
Director, MSTP Program

Center for Proteomics and Bioinformatics

The Cleveland Foundation Center for Proteomics

9th Floor, BRB
10900 Euclid Avenue
Cleveland, Ohio 44106-4988

Phone 216.368.1490
Fax 216.368.6846

http://proteomics.case.edu/

Pamela Davis, M.D. Ph.D.
Dean, School of Medicine
Case Western Reserve University

Dear Pam,

Enclosed is a proposed graduate program in Systems Biology and Bioinformatics. I request that the appropriate committees of the School of Medicine provide the appropriate evaluation as rapidly as possible.

The faculty of the Center, both Primary and Secondary, are quite enthusiastic about the proposed program and look forward to productive interactions as the program becomes a reality. Already students from Genetics, Epi/Bio, and Pharmacology are catalyzing interactions across our faculty through new collaborations in this growing field of Systems Biology. We are especially encouraged by the enthusiasm and support of our colleagues in Departments such as Genetics, BME, Pharmacology, Epidemiology & Biostatistics, and within the MSTP program and I include several letters detailing this support.

As outlined in the proposal, the Center for Proteomics and Bioinformatics will be the management center responsible for administering the program and will provide support in terms of a part-time graduate coordinator who will, in collaboration with program faculty, track student performance, schedule program events, and maintain appropriate admission and financial records. We will also support any Direct admits in their first year and will facilitate the flow of MSTP and BSTP students into the program, as appropriate.

As the program grows and matures, we expect that we will be in a position to submit a competitive T32 application to the NIH. In addition, novel programs of this kind will be helpful in attracting faculty applicants to join the School of Medicine and will raise the visibility of all our research and training programs.

Sincerely,

Mark Chance, Ph.D.
Director, Center for Proteomics and Bioinformatics
Professor, Department of Physiology and Biophysics
Director, Center for Synchrotron Biosciences

CASE WESTERN RESERVE
UNIVERSITY
SCHOOL OF MEDICINE

Joseph H. Nadeau, Ph.D., Chair
James H. Jewel Professor of Genetics

Department of Genetics

10900 Euclid Avenue
Cleveland, Ohio 44106-4955

Phone 216.368.0581
Fax 216.368.3832
E-mail jhn4@case.edu

http://genetics.case.edu

10 February 2010

Dr. Mark Chance
Director, Center for Proteomics and Bioinformatics
Case Western Reserve University School of Medicine
Cleveland

Dear Mark,

Thank you for visiting with our faculty recently to review the proposed PhD program in Systems biology and Bioinformatics. We are enthusiastic about the proposed program and look forward to productive interactions between your faculty and those in our Department. We expect students in our PhD programs to have an interest in courses and journal club activities of the Systems Biology program and we look forward to your students taking relevant classes in our Department. We expect our faculty to have an interest in joining your program as approved trainers as well.

As the Systems Biology program grows and matures, we expect that you will be in a position to submit a competitive T32 application to the NIH and we will support you in this endeavor. In addition, novel programs of this kind will be helpful in attracting faculty applicants to join the School of Medicine and will raise the visibility of our research and training programs.

Sincerely,

Joe Nadeau

Chair, Department of Genetics
James H. Jewel Professor Genetics

Dr. Krzysztof Palczewski, Ph.D.
John H. Hord Professor and Chair

Department of Pharmacology

Case Western Reserve University
10900 Euclid Avenue
Cleveland, Ohio 44106-4965

Visitors and Deliveries
School of Medicine W321A

Phone 216.368-4631
Fax 216-368-1300
E-mail kxp65@case.edu
http//pharmacology.case.ed0

February 15, 2010

Mark R. Chance, Ph.D
Director, Center for Proteomics and Bioinformatics

Dear Mark,

Thank you sharing with me the proposed Ph.D. program in Systems Biology and Bioinformatics. We are quite enthusiastic about the proposed program and look forward to productive interactions between your faculty and those in our Department. We expect students in our Ph.D. programs to have an interest in courses and journal club activities of the Systems Biology program and we look forward to your students taking relevant classes in our Department. We expect our faculty to have an interest in joining your program as approved trainers as well.

As the program grows and matures, we expect that you will be in a position to submit a competitive T32 application to the NIH and we will support you in this endeavor. In addition, novel programs of this kind will be helpful in attracting faculty applicants to join the School of Medicine and will raise the visibility of all our research and training programs.

Sincerely,

K. Palczewski

CASE WESTERN RESERVE UNIVERSITY EST. 1826

Department of Biomedical Engineering
A Joint Department of the CWRU School of Medicine and Engineering

Jeffrey L. Duerk, Ph.D., Chairman
Department of Biomedical Engineering
Allen H. and Constance T. Ford Professor
Director, Case Center for Imaging Research

February 10, 2010

Mark Chance
Director, Center for Proteomics and Bioinformatics

RE: Systems Biology and Bioinformatics Ph.D. Program

Dear Mark,

I am writing to you today both as the Director of the Case Center for Imaging Research and also the Chairman of the CWRU Department of Biomedical Engineering. Specifically, I am writing to thank you for sharing with me the proposed PhD program in Systems Biology and Bioinformatics. This program has unique opportunities to positively impact the research programs in both CCIR and BME. Currently, as you and others are aware, imaging is undergoing the transition from morphologic change detection to detecting functional changes in tissues well in advance of any macroscopic structure manifestations. To lead this future vision, we have recruited faculty (e.g., Basilion, Exner, Karathanasis, and a future P30-ARRA funded position) specifically developing imaging compounds that serve as detectable beacons of genetic or functional change in the tissue. Within BME, research over the past decades has moved from devices (e.g., pacemaker, hearing aids), to tissues and tissue interactions (e.g., neural engineering, biomaterials), and now to new horizons in which engineering is considered at the cellular level (e.g., tissue engineering and drug delivery). The pace of our creative thoughts must be matched to educational programs that interact across disciplines. Currently, many of our BME and CCIR faculty struggle in recruiting qualified students as our educational programs have lagged our research pursuits. It is for this reason that I am particularly enthusiastic about the proposed program and look forward to productive interactions between your faculty and those in our Department and Center. We expect students in our PhD programs to have an interest in courses and journal club activities of the Systems Biology program and we look forward to your students taking relevant classes in our Department; this will meet a currently unmet need for a number of our faculty. We expect our faculty to have an interest in joining your program as approved trainers as well. In fact, currently, elements of our Graduate Education Committee are designing a Ph.D. track that greatly intersects with the SYBB program and provides additional training in biomedical engineering and imaging. We hope to be the first engineering department to officially embrace the SYBB vision and have a complementary (not competing, not comparable, but truly complementary) engineering program, to the SOM SYBB offering.

Hence, as these programs grow and mature, we expect that you will be in a position to submit a competitive T32 application to the NIH and we will support you in this endeavor. I cannot adequately express our enthusiasm for your efforts. In addition, novel programs of this kind will be helpful in attracting faculty applicants to join the School of Medicine and will raise the visibility of all our research and training programs.

Sincerely,

Jeffrey L. Duerk

Jeffrey L. Duerk, Ph.D., Chairman
Department of Biomedical Engineering
Allen H. and Constance T. Ford Professor
Director, Case Center for Imaging Research

Case School of Engineering and School of Medicine, 10900 Euclid Avenue, Cleveland, Ohio 44106-7207
Visitors and Deliveries: Wickenden Building – Room 309F
Phone 216.368.6047 Fax 216.368.4969 E-mail duerk@case.edu
http://bme.case.edu

CASE WESTERN RESERVE
UNIVERSITY
SCHOOL OF MEDICINE

Department of Epidemiology and Biostatistics
Case Western Reserve University

10900 Euclid Avenue
Cleveland, Ohio 44106-4945

Phone 216.368.3197
Fax 216.368.3970

http://epbiwww.case.edu

February 18, 2010

Mark Chance, Ph.D., Director
Center for Proteomics and Bioinformatics
Case Western Reserve University
School of Medicine
Biomedical Research Building, Room 930
Location Code: 4988

Dear Mark,

Thank you for visiting with our faculty recently to review the proposed Ph.D. program in Systems Biology and Bioinformatics. We are quite enthusiastic about the proposed program and look forward to productive interactions between your faculty and those in our Department. We expect students in our Ph.D. programs to have an interest in courses and journal club activities of the Systems Biology program, and we look forward to your students taking relevant classes and attending seminars in our Department. Because of areas of overlapping interest, we expect many of our faculty will have an interest in joining your program as approved trainers as well, leading to enrichment of both our Ph.D. programs. As you know, our own Ph.D. program in Biostatistics and Epidemiology is distinct in its particular focus, but would be greatly enriched if our students could take advantage of training in the complementary areas that will be the focus of your proposed Ph.D. program.

As your program grows and matures, we expect that you will be in a position to submit a competitive T32 application to the NIH, and we will certainly support you in this endeavor, offering all the advantages that come from broad cross-disciplinary training. Novel programs of this kind, bringing to the study of basic biological processes a strong computational element, together with the possibility of adding an epidemiological dimension, will not only strengthen basic research, but will also be helpful in attracting new faculty applicants to join the School of Medicine, and so will raise the visibility of all our research and training programs.

Sincerely,

Robert.

Robert Elston, Ph.D.
Professor and Chair

CASE WESTERN RESERVE
UNIVERSITY
SCHOOL OF MEDICINE

Department of Pathology
10900 Euclid Avenue
Cleveland, Ohio 44106-7288

February 10, 2010

Mark Chance
Director, Center for Proteomics and Bioinformatics

Dear Mark,

Thank you sharing with me the proposed PhD program in Systems Biology and Bioinformatics. I am quite enthusiastic about the proposed program and consider it to be an excellent program for MSTP student training. It also fits with the goals for training indicated in our CTSA education module.

The program appears to have the requisite flexibility for rotations needed for MSTP students and nicely leverages their Year 1 and Year 2 coursework to fulfill many of the required "core competencies" that the students will need to be successful.

Overall, I am enthusiastic about the program in terms of relevance, need and what it will add to our graduate training at Case.

As you know, programmatic changes such as addition of a graduate program to the set of MSTP-affiliated graduate programs require assessment through the MSTP Steering Committee, but I am very confident that this program will be received enthusiastically by the committee and meet with swift approval for participation with the MSTP. It certainly has my full and enthusiastic support in this regard.

Please keep me posted as this program moves through the approval process.

Sincerely,

Cliff

Clifford V. Harding, MD, PhD
Professor and Interim Chair of Pathology
Director, CWRU Medical Scientist Training Program

CASE WESTERN RESERVE UNIVERSITY
CASE SCHOOL OF ENGINEERING

Electrical Engineering & Computer Science

10900 Euclid Avenue
Glennan Building 321
Cleveland, Ohio 44106-7071

Phone 216.368.2800
Fax 216.368.6888

www.eecs.case.edu

September 21, 2010

Dr. Mark Chance
Director, Center for Proteomics and Bioinformatics
Case Western Reserve University
Cleveland, OH 44106

Dear Dr. Chance,

I am writing to express my enthusiastic support for the proposed Ph.D. Program in Systems Biology and Bioinformatics. I have examined the materials you sent regarding the program. I would like to congratulate you and the Steering Committee for the hard work that has gone into developing a strong program in this exciting area. In particular, I know that Dr. Mehmet Koyuturk (one of our talented junior faculty members in EECS) has been instrumental in developing the program. He will also be crucially involved in its delivery via the course EECS 459 (Bioinformatics for Systems Biology), and the more fundamental course EECS 458 (Introduction to Bioinformatics). Professor Koyuturk is currently teaching EECS 458 this Fall for the second time; he is scheduled to teach EECS 459 this coming Spring, based upon a special topics course he has offered twice before. Therefore, these courses will be well-developed for inclusion into your program. Going forward, I also see the opportunity for others in our department with strong backgrounds and research in the area to be involved, particularly Dr. Jing Li and Dr. GQ Zhang on the bioinformatics side, but also possibly including other faculty on the systems biology side.

I am also happy to hear that you intend to pursue an NIH T32 training grant for the program as it matures. I support and encourage this effort as it would permit the program to make an even deeper impact and provide great visibility to the teaching and research strengths we have in systems biology and bioinformatics at CWRU, the Medical School, the Case School of Engineering, and our own EECS Department.

Sincerely yours,

Michael S. Branicky

Michael S. Branicky, Sc.D., P.E.
Professor and Chair
Department of Electrical Engineering and Computer Science
Case Western Reserve University
+1-216-368-2802
mb@case.edu

CASE WESTERN RESERVE
UNIVERSITY
SCHOOL OF MEDICINE

Pamela B. Davis, M.D., Ph.D.
Dean
Vice President for Medical Affairs

Office of the Dean

10900 Euclid Avenue
Cleveland, Ohio 44106-4915

Visitors and Deliveries
Biomedical Research Bldg. - Rm. 113

Phone 216.368.2825
Fax 216.368.2820

http://casemed.case.edu

Memorandum

To: Carol Musil, Ph.D.
Chair, Faculty Senate
c/o Liz Woyczynski
Secretary of the Faculty Senate

From: Pamela B. Davis, M.D., Ph.D. Pamela B Davis
Dean, School of Medicine

Date: April 13, 2010

Re: Proposed Ph.D. and M.S. Program in Systems Biology and Bioinformatics

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Dr. Joseph Carter, Chair of the Faculty Council, has informed me (in the memo attached) on behalf of the Council that it has recommended approval of a proposed new degree program leading to Ph.D. and M.S. degrees in Systems Biology and Bioinformatics.

I strongly support approval of the program as proposed in the attached document.

Please let me know if I can provide additional information. Thank you.

c: Dr. Joseph Carter, Chair, Faculty Council
Dr. Mark Chance
Dan Anker
Preston Pugh

enclosure

CASE WESTERN RESERVE
UNIVERSITY
SCHOOL OF MEDICINE

Office of Faculty Affairs and Human Resources
10900 Euclid Avenue
Cleveland, Ohio 44106-4915
Phone 216.368.3870
Fax 216.368.3013
http://mediswww.meds.case.edu

Memorandum

To: Pamela B. Davis, M.D., Ph.D.
Dean, School of Medicine

From: Joseph Carter, M.D.
Chair, Faculty Council 2009-2010

Date: April 13, 2010

Re: Proposed Ph.D. and M.S. Program in Systems Biology and Bioinformatics

At its meeting on April 12, 2010, Faculty Council reviewed the proposed Ph.D. and M.S. program in Systems Biology and Bioinformatics.

The program proposal had been previously reviewed, following the usual School of Medicine process, by an ad hoc committee composed of graduate program directors, members of the Faculty Senate Graduate Studies Committee, and the Faculty Council Steering Committee.

The Faculty Council finds the program satisfactory and voted unanimously to recommend approval of the program. We hope you will agree and forward the proposal to the University Faculty Senate for further review.

Thank you.

Joe Carter

CASE WESTERN RESERVE

Pamela B. Davis, M.D., Ph.D.
Dean
Vice President for Medical Affairs

Office of the Dean

February 22, 2010

Mark Chance, Ph.D.
Director, Center for Proteomics and Bioinformatics
Case Western Reserve University
School of Medicine
10900 Euclid Ave.
Cleveland, OH 44106-4988

Dear Mark,

I am most impressed with the work you and your colleagues have done to create the new graduate program proposal for Systems Biology. This is a critical area in biomedicine today and one in which there are too few training programs nationwide. With our strength at CWRU in proteomics, genetics, bioinformatics, and other key disciplines, we have the opportunity to emerge as a leading training site in this area.

The program you have outlined is thoughtful, thorough, and collaborative across the campus. The enthusiasm you and your colleagues bring to this program is also a key ingredient that bodes well for its success.

I strongly endorse this program and hope that it can be approved expeditiously so that you can get started!

Sincerely,

Pam

Pamela B. Davis, M.D., Ph.D.

Ph.D. and M.S. Program in Systems Biology and Bioinformatics

Introduction & Summary

Systems Biology represents a new scientific concept of increasing importance to Biology and Medicine. As opposed to the reductionist approach that in the past 50 years has defined the individual pieces of biological systems, this new science attempts to understand the integration of these pieces into networks, complexes and the biological organizations critical to cellular and organism function and development, both normal and in disease. Bioinformatics represents a set of computational approaches to data analysis; the marriage of computational and quantitative thinking in the context of biological integration is a foundational principle of this program.

Case Western Reserve University (CWRU) is uniquely positioned to accomplish the goal of establishing the first **Systems Biology and Bioinformatics Graduate** program in Ohio leading to the Ph.D. CWRU has a long history of excellence in Systems Engineering within the Case School of Engineering, and in the College of Arts and Sciences there are close relationships between the Departments of Biology and Mathematics, all these disciplines are essential components for developing Systems Biology. CWRU also has a remarkable history of education reforms in medical and graduate education that were adopted nationally. **This proposal outlines an integrated plan to form an Systems Biology and Bioinformatics Graduate program, which includes faculty from multiple departments and schools across the university and where the students in the program will combine training in experimental and computational sciences.**

Few institutions have the record of innovative educational programs, an existing faculty with balanced expertise and accomplishments in genetic and quantitative biology and medicine and the right combination of biomedical engineering and biomedical computer sciences to propose this program. CWRU has a well-known culture of collaborative research and a strong commitment from institutional leadership in interdisciplinary programs. Indeed, CWRU hosted one of the first systems biology conferences (1968) and established in 1969 one of the first inter-school departments (Biomedical Engineering, School of Medicine and School of Engineering).

The participating departments and schools have for many years been building research strength in medicine, genetics, genomics, engineering, epidemiology, biostatistics, and quantitative sciences, with a culture and vision that integration will revolutionize the study of biology and understanding health and disease. This includes strengthening core programs in cellular imaging, genomics, and proteomics facilities and faculty.

Over the last several years, the University has expanded its research programs in the diverse areas that provide a foundation for a nationally competitive program in the area of Systems Biology and Bioinformatics.

- The Biomedical Engineering Department and the Radiology Department have invested nearly $15 million in faculty recruitment and advanced imaging facilities that provide enviable research capabilities for exploring molecular, cellular and organ structure and function at high resolution and in quantitative terms.

- The Genetics department in the School of Medicine (SOM) has invested several million dollars in bioinformatics and quantitative genetics programs.
- The Biology department has established a Systems Biology undergraduate program and targeted recruitment in faculty with strong quantitative interests, while the Electrical Engineering and Computer Science and Mathematics departments have targeted recruitment in faculty with strong biological interests.
- In 2005, the School of Medicine committed $15 million towards a Proteomics and Bioinformatics Center that has focused on quantitative technologies; faculty recruitments to this program have substantially expanded our capabilities in systems-level biology. This program has leveraged existing programs in Metabolomics, where analysis of small molecule metabolites can provide additional important information in defining and modeling biological systems.
- Lastly, investments in Genetic Epidemiology and biostatistics have enhanced our ability to connect Clinical phenotypes with molecular data, provide an additional basis to developing systems analysis of disease.

These programs and their allied department have attracted over $100 million in peer-reviewed funding in terms of both individual grants and large center grants over the lats five years. Many of the involved faculty began meeting on a regular basis to enhance collaboration efforts across the University and to begin the process of organizing a training program in Systems Biology and Bioinformatics to facilitate the research and training of students in this discipline.

This group is proposing a new CWRU Ph.D. and M.S. program in Systems Biology and Bioinformatics, based in the School of Medicine, with the Center for Proteomics and Bioinformatics as its administrative home. The faculty cohort will include faculty from multiple departments and schools, and the fundamental core competencies for this program will include: genes and proteins; bioinformatics; and quantitative analysis and modeling. Scientists trained in the fundamental competencies of this program and guided in an integrative research path will be equipped for challenges ahead in the biological sciences and be the leaders of tomorrow.

This Steering Committee for the proposed program is Chaired by Mark Chance, Professor of Physiology & Biophysics and Director, Center for Proteomics & Bioinformatics and includes as Steering Committee members Joseph Nadeau, Professor and Chair of Genetics, Rob Ewing, Assistant Professor of Proteomics & Bioinformatics (Primary) and Genetics (Secondary), Mehmet Koyuturk, Assistant Professor of Electrical Engineering and Computer Science (Primary) and Proteomics & Bioinformatics (Secondary) and Jill-Barnholtz-Sloan, Assistant Professor, Cancer Center (Primary) and Proteomics & Bioinformatics (Secondary). Many additional faculty, from twelve departments and four schools across the University, have made significant contributions to the proposal and will serve as founding trainers in the program.

1A. Intellectual Rationale

Systems Biology is the science of understanding the resultant behaviors and functions when the individual components of biological systems interact. The past 50 years have seen a triumph of reductionism where the individual components of biological systems have been characterized to a staggering degree of detail. However, progress in understanding normal and disease biology over the next 50 years will require new scientific approaches, where the focus is on understanding the interactions and resultant behaviors of the components.

This new science is key to understanding the function of complex biological systems, to understand their normal development, to understand their transition to abnormal or disease states, and to discover innovative modalities for treating and preventing disease. Progress depends on understanding biological integration in normal organisms and healthy individuals and the ways in these normal organisms develop and age and the ways in which dysfunctions in these complex systems lead to disease. In the future it is likely that treatments will be based on a molecular diagnosis of the individual, leading to a new frontier of personalized medicine. As these challenges in medicine are becoming understood, there has been a parallel explosion in data available from all living organisms, not only sequence but related functional information on phenotypes and protein interactions. Our ability to generate these data far exceeds our ability to organize and understand them. Computational approaches are struggling to deal with the complexity inherent in these data sets, however systems based approaches are well suited to handling these levels of complexity.

To gain an understanding of these –omics data relevant to the normal and abnormal biology of living systems, a transformation based on interdisciplinary research is needed. Systems Biology and Bioinformatics research requires new kinds of scientists who are both familiar with multiple disciplines and adept at forming collaborations with scientists who are uni-disciplinary. Their training requires a specialized and innovative new program. This new scientific approach has spawned new journals like *Molecular Systems Biology* (a joint venture of EMBO and Nature Publishing group) and has induced existing journals to develop specific topic areas, such as the systems biology and emerging technologies topic invited by the journal *Cancer Research* as well as the open access journal *BMC Systems Biology*. Conferences and societies concerning Systems Biology have sprung up, including the International Society of Systems Biology. These journals and professional societies demonstrate the emergence of a new discipline that is attracting students for training.

An important feature of the training in this program is that all students will be required to combine both experimental and computational or mathematical disciplines in their coursework and in the development and execution of their research plan. This distinguishes this program from other graduate programs, where the course of study and research may be wholly experimental, or graduate programs that may be wholly computational. The students who complete this training will be trained to generate and analyze experimental data for biomedical research and will be also trained to develop physical or computational models of the molecular components that drive the behavior of the biological system.

1B. Description of Proposed Ph.D. and M.S. Curriculum

Program Competencies. All Ph.D. students in Systems Biology and Bioinformatics will fulfill the overall academic requirements for Ph.D. study at Case Western Reserve University, including the requirement for a minimum of 24 graded credits of coursework for the PhD, 36 total credits (including 601 research credits), the candidacy examination, and the required numbers of earned 701 credits (at least 18 research credits). Candidates for M.S. will complete 30 total credits, will fulfill the overall academic requirements for M.S. study at Case Western Reserve University, and compete a course of study with thesis (Plan A) or without thesis (Plan B).

The specific academic requirements of the discipline are intended to provide students with a core curriculum in Systems Biology and a set of electives designed both to assure minimum competencies in three major academic areas (genes and proteins, bioinformatics, and quantitative analysis & modeling) and equip them for their particular thesis research area where indicated.

The general framework for fulfilling these competencies, and an example course of study for the Ph.D. is provided in Appendices 1 and 2. Details of the M.S. curriculum are provided in Appendix 3. Competencies in the three major areas are to be demonstrated by satisfactory completion of appropriate CWRU courses or satisfied by equivalent training elsewhere as determined by the program faculty and steering committee after petition by the student of their proposed course of study. This overall study plan approval must be completed by the end of the first semester for M.S. students and by the end of the first year for Ph.D. students. These competencies are intended to drive a novel training program where the student combines experimental and theoretical or mathematical work in their Thesis research (for Ph.D. or M.S. Plan A students) or in their curriculum (M.S., Plan B).

Summary of Curriculum. The Systems Biology program differs from current CWRU programs in the comprehensive requirement for an understanding of biological systems, bioinformatics, and quantitative analysis & modeling. In addition to a set of core courses and electives, a monthly journal club meeting for students and faculty with the designation **SYBB 501 and 502** will be developed; the activities of this session will include, Journal club, Works in progress, team-building activities. Students will be required to participate in this session throughout their graduate career.

Summary of Requirements for Ph.D. program. The Systems Biology and Bioinformatics Ph.D. will include a set of required core courses including Bioinformatics for Systems Biology (EECS 459) and Current Proteomics (PHRM 555), a Systems Biology Journal Club (SYBB 501, 502), at least four additional courses as outlined by the student's advisory committee (for at least 12 additional credits), a course in the Responsible Conduct of research (IBMS 500), a qualifier exam, a Ph.D. Thesis, and oral defense consistent with CWRU requirements.

Entering students will be assigned a mentoring committee (by the steering committee) of two faculty to guide the first year and this mentoring committee will recommend a course of study to be approved by the steering committee. This committee will guide the coursework choices of the student such that they have completed training in the three major areas required for the thesis research. After admission to candidacy, the student will form a thesis committee that will include faculty that have expertise in experimental work (for example –omics or imaging) and computational or mathematical analysis to guide the Thesis research plan such that it includes a combination of these disciplines.

Two or three, three-month rotations will be typical and will approximately occur from August to April in the student's first year (The rotation expectations for MSTP or BSTP students will conform to the expectations of that program, see below). A student may request to be admitted to a laboratory at any time after matriculation. The student, the mentor, the mentor's Department Chair, and the steering committee must approve the laboratory selection in writing, after review and evaluation of the student's proposed academic record and proposed/completed curriculum by the steering committee. This approval will include the designation of a specific committee to evaluate the qualifying exam and who will function to review student progress every six months until graduation (see below).

Students, by the middle of the second year, will generate and defend an NIH or NSF style proposal based on their proposed thesis research in the qualifier exam; successful oral defense of this proposal and completion of core requirements will result in recommendation for formal Ph.D. candidacy. Candidates not successful at this stage may be asked to leave the program.

1C. Administrative Arrangements for the Program

The Systems Biology and Bioinformatics program will reside in the School of Medicine and be administered by the Center for Proteomics and Bioinformatics. The Center will provide support in terms of a graduate coordinator who will, in collaboration with program faculty, track student performance, schedule program events, and maintain appropriate admission and financial records. The Steering Committee, Program Director, and a list of possible faculty are listed in Appendix 2. Thereafter, affiliated faculty will be reviewed periodically and re-appointed by majority vote of the Steering Committee and will consist of all faculty involved in courses, training, and common research programs who are active participants. The criteria for trainers will be those typically employed by NIH study sections in the review of NIH funded training programs. Important elements typically include previous training track record, funding, and relevance to the discipline in terms of publications and grants. Junior faculty may not have track records in these cases and may be on startup-funds. In these cases relevance to the discipline is the most important factor. All individuals with a primary or adjunct appointment to the faculty of Case Western Reserve University are eligible to be considered for the training faculty. The Program Director will serve at the pleasure of the Dean of the School of Medicine and will recommend, on a yearly basis, the composition of the Steering Committee for the Dean's approval. The Steering Committee will typically include four members plus the Program Director, for voting purposes.

The program will be administered by the Director, the Steering Committee, and a Program Coordinator. This committee is responsible for oversight of all admissions, academic and curricular issues including the addition of new trainers and shall be empowered to form subcommittees to support these functions. Under the auspices of the Office of Graduate Studies, the affiliated faculty will further develop and regularly review and update program requirements, conduct of qualifying examinations, and administer the final Dissertation Examination as per the rules of the University.

As the program has developed, many individual faculty members and Departments have offered their comments and support. Appendix 4 lists support letters from the Chairs of Genetics, Pharmacology, Epidemiology & Biostatistics, Biomedical Engineering, and the Directors of the Center for Proteomics and Bioinformatics, Center for Imaging Research, and the MSTP program. These Chairs indicate the interest of their participating faculty in contributing to the program's success.

1D. Examples of Student Curricula and Background

The program is intended to be suitable for students with varying backgrounds but with a focus on students who have had strong quantitative training including some computer science background. Minimum requirements for admission include a bachelors or masters degree in the Natural Sciences (Biology, Chemistry, Physics) Computer Science, Engineering, Mathematics, or other fields with strong quantitative skills. Appendix 1 lists the courses that form the core curriculum. The above majors are generally expected to have the relevant background for such courses, have completed such courses, or commit to pursue relevant remedial work prior to enrollment or in selected cases after enrollment. Appendix 1 lists the general credit hours that fulfill a five year Ph.D. program. Appendix 3 lists the M.S. requirements.

2. Evidence of Need

The need for scientists trained in the field of Systems Biology and Bioinformatics is clearly evident upon review of the current National Science Foundation funding opportunities and programs, National Institutes of Health Roadmap initiatives, and a report published by the World Technology Evaluation Center entitled "Assessment of International Research and Development in Systems Biology". This report, which was commissioned by a wide range of funding agencies including NSF, DARPA, NASA, NCI, NIBIB, etc., had a goal to gather information about worldwide status and trends in biological systems - "Network Behavior in Biological Systems" - and to disseminate it among government decision makers and the research community. This report underscored the significant current and future growth expected for this field and the need for specialized training initiatives in this area. Multiple NIH Roadmap initiatives are directly related to systems biology: Interdisciplinary Research Centers, Interdisciplinary Research Training Initiative, Removing Structural Barriers to Interdisciplinary Research and Translational Research. A review of scientific journals also illustrates the need for additional scientists trained in Systems Biology. There are several scientific journals now solely devoted to Systems Biology or systems biology. A graduate program focused on Systems Biology and bioinformatics will likely be in considerable demand. A scan of job advertisements in Science and Nature, reveals many research opportunities for well-trained individuals in this area. Additionally many academic and commercial institutions (particularly pharmaceutical companies) have established research centers focused on Systems Biology.

Relevance to Ohio. In Ohio, Bioinformatics and Systems Biology programs at the undergraduate level are growing rapidly. Statewide standards for Bioinformatics curricula have been developed by the Ohio Bioinformatics consortium (http://www.ohiobioinformaticsconsortium.org/curriculum.shtml) and both public and private colleges and universities across the state are launching and expanding program offerings. There is an equivalent need to launch and expand graduate offerings to attract out of state students to Ohio as well as provide opportunities for the growing pool of in-state students. Currently there are several programs in Ohio that are similar. Ohio State University has an excellent program in Bioinformatics within its Integrated Biomedical Science Graduate Program. The OSU program (http://www.biomed.osu.edu/ibgp/emphasis/bioinformatics/?ref=flashnavis) is focused on large-scale data management, processing, and visualization of biomedical data. The Department of Biomedical Engineering at the University of Cincinnati has an excellent Bioinformatics curriculum within the Biomedical Engineering Ph.D. (http://www.eng.uc.edu/dept_biomed/pdf/bioinformatics.pdf). These programs fulfill critical needs in Ohio but taken together do not have the capacity to respond to the existing needs and projected growth and have a different emphasis than the program proposed here. The CWRU program has an experimental and computational theme with an emphasis on genomics, proteomics, metabolomics, imaging, and biological mechanisms of disease and is well situated to deliver training in this focused area, as it is located in the leading Medical School in the state of Ohio. Although the OSU program is also based in its School of Medicine, it is has greater expertise in clinical data analysis and management. On the other hand, the UC program is an Engineering Degree, and has 57 course credits required minimum (19 class equivalents) while the program proposed here, as is typical in a Medical School environment, has fewer required coursed and a larger research component Also, neither of these programs will award a specific Ph.D. in the discipline, as the curricula are tracks in an existing Ph.D. program and it is expected that the program proposed here will have a high national visibility for students who have a strong interest in biology and medicine.

Other National and International Programs

In the last few years many Systems Biology, Bioinformatics, and Programs and courses have been established around the world. Notable programs include:

- Computational and Systems Biology graduate program, Massachusetts Institute of Technology. (http://csbi.mit.edu/)
- Systems Biology Ph.D. Program, Harvard University (http://sysbio.med.harvard.edu/)
- Mathematical, Computational and Systems Biology Program, University of California at Irvine (http://mcsb.bio.uci.edu/)
- Computational and Systems Biology Program, Washington University in St. Louis (http://dbbs.wustl.edu/programs/compbio)
- Integrative Program in Complex Biological Systems, University of California San Francisco (http://www.pqb.ucsf.edu/)
- Institute for Theoretical Biology, Humboldt University, Berlin (http://itb.biologie.hu-berlin.de/)
- Systems Biology, Oxford, Great Britain (http://www.ox.ac.uk/admissions/postgraduate_courses/course_guide/systems_biology.html)

The program at Harvard University, which is based in the Department of Systems Biology has 13 faculty and fuses basic biological science questions with mathematics and engineering approaches. The MIT program (CSBI) includes about eighty faculty members from over ten academic units across MIT's Schools of Science, Engineering, and the Whitehead Institute for Biomedical Research. The program at CWRU will be similar in that it will cut across different schools of the University. This will provide a breadth to the program that is competitive compared to the international peer group above. Also, the CWRU program will have a strong biomedical and molecular systems biology focus, providing us with a competitive edge for many students.

Prospective Enrollment and Access and Retention of Underrepresented Groups. The Systems Biology and Bioinformatics Program will be initially be composed of graduate students at CWRU to provide an initial cohort on which to build. Examination of student backgrounds and interests in some of the relevant departments indicate that the current cohort numbers ~5-8 students. These students are in various stages of their graduate careers, such that some may be only suitable for participating in seminar programs and journal clubs, while others are likely to take core courses or electives available in the program.

Students may enter the program through the "umbrella" admissions program of the medical school (the Biomedical Sciences Training Program or BSTP) or through direct admission or through the Medical Sciences Training Program (MSTP). Thus, the program will likely increase overall enrollment in graduate classes across the campus.

For students in the Ph.D. program, we plan for the enrollment of the first direct admit students in the fall of 2011. In the fall of 2011 we expect to have 2 direct admit students plus 2 students from the BSTP path and 1 student from the MSTP path or 5 in the first year. Continued enrollment at this level would provide a total cohort of ~25 students by 2016, and a steady state of ~25 students assuming a time to degree of 5 years and stable matriculation.

Direct admission to the program will be through the CWRU online application. Prospective students will complete Part A and Part B of the existing Graduate Application. Admission to the Graduate School will follow the guidelines denoted in the General Bulletin of CWRU, and the admissions committee will be comprised of the program steering committee or its designate. Candidates will be evaluated based on overall GPA and science GPA, GRE scores and performance on advanced tests (if available). Very important criteria also include the student essay, 3 letters of reference, prior research experience, and on campus interviews. The TOEFL examination will be required for international students. We will follow the General Bulletin guidelines regarding the demonstration of the necessary command of English for foreign students.

Students in this Program will be expected to have an undergraduate or masters degree in one of the component disciplines of the program as detailed above. The following undergraduate courses are strongly encouraged: Introductory Biology (2 semesters), Introductory Chemistry (2 semesters), Biochemistry, Introductory Physics (2 semesters), Calculus through differential equations, Linear Algebra, Introductory Computer Science, and Introductory Statistics. The background of all students who are offered admission to and are admitted to the program will be evaluated for suitability. Remedial work to cover any deficiencies in background may be recommended as a condition of matriculation.

Recruitment efforts will be collaborative with those already established and ongoing within the MSTP, BSTP, and other programs at CWRU. Special efforts will be made to enroll minority students as part of the CWRU commitment to bringing more minorities and women into advanced fields of study. In the field of Basic and Translational Biomedical Research women are not underrepresented at the student and junior faculty levels, although we recognize that women are underrepresented at the Professor and Department Chair levels. Thus, every effort will be made to foster a supportive environment in order to successfully mentor and retain minority and female Ph.D. candidates and guide these students into leadership roles in this new field.

Financial Issues and Support for the Program. An important issue relates to financial support of students for this program. The Center for Proteomics and Bioinformatics and the School of Medicine will provide the overall support for the program. However, the typical arrangements that exist at the School of Medicine include support for students from individual faculty grants and training grants, when available. The expectation is that for "direct admit" students to the program, the program will make sure the student is provided with tuition, stipend and health insurance and fee support from the point of matriculation into the program up to the point they choose a laboratory mentor. Subsequent to that time, the mentor and the mentor's primary department/management unit will assume financial responsibility for the student consistent with SOM policies.

For students who enroll via the BSTP of the School of Medicine, there is a clear policy of rotations and tuition and stipend "return" subsequent to students selecting a laboratory. For students who enter via the MSTP route, procedures are also in place for financial support up to the time a student selects a mentor. Thus, any financial oversight for these students does not accrue to the program until these students select a laboratory. At this point the program will assure that financial responsibility is appropriately established. The program can easily and seamlessly accommodate these students.

Special Efforts to Recruit Under-Represented Minority Students

Institutional History and Achievements. CWRU has well-established efforts to recruit and retain under-represented minority students to our graduate and medical schools. In 1971, the Office of Multicultural Programs was established to help and encourage minority students enter careers in medicine and biomedical research. Graduate programs across the campus have been successful in matriculating minority students. In 2007, of 823 domestic applicants, 192 matriculated and 46 were minorities (24%). To ensure that matriculated minority students are supported and are part of a community a Minority Graduate Student Organization (MGSO) was formed. Participation is voluntary, but strongly encouraged, to foster a student group identity and shared values. MGSO meeting topics are varied and cover many issues, including the experiences of the students in research.

The success of the medical and graduate minority recruitment efforts at CWRU can also be attributed to our institutional presence at various historically African American colleges and universities and at scientific conferences organized by under-represented minority groups. The Systems Biology Program will be represented at these ongoing recruitment efforts. In addition, we plan to send a representative of the Program to the national meeting of the Society for Advancement of Chicanos/Latinos and Native Americans in Science, the Annual Biomedical Research Conference for Minority Students, and the Natural Sciences Career Fair at the University of Miami.

Summer Programs for Undergraduates and High School Outreach Programs.

Program faculty have been very active in mentoring and providing research opportunities in the summer for college students and high school students. These include the SURP program and other opportunities. In particular, we anticipate providing opportunities to Systems Biology undergraduates at Case; these summer programs are a proven method for generating high quality applicants.

4. Faculty and facilities available for the program and their adequacy. The criteria for trainers will be those typically employed by NIH study sections in the review of NIH funded training programs. Important elements typically include previous training track record, funding, and relevance to the discipline in terms of publications and grants. Junior faculty may not have track records in these cases or may be on startup-funds without their first grant. In these cases relevance to the discipline is the most important factor. This potential training group (Appendix 2) has many years of training experience in biological science, engineering, and medicine. Their funding and facilities are at the forefront of biology and medicine today.

5. Projected financial needs to support program and adequacy of expected financial support

Ph.D. program. The anticipated enrollment for the program is 5 students per year, with two projected students admitted directly to the program and 3 from existing graduate program pipelines (BSTP and MSTP sources). The Center for Proteomics and Bioinformatics will fund 1 student per year in the first year (average 9-10 months of support) for 5 years for a total estimated cost of $100,000-$120,000. The Department of Genetics will fund 1 student per year for the first year (average 9-10 months of support) for 5 years for a total estimated cost of $100,000-$120,000. The other three students per year will be funded through the above indicated admissions routes which have precedented mechanisms of first year support. After the first year, faculty grant support will provide funding for the students. If a student cannot find a mentor willing to take them, they must leave the program. If the student joins a laboratory and support is lost, the mentor's home department will be financially responsible for the student. This support is assured by a required signoff from the mentor's Department Chair. Additional funds to add to these resources are being sought from the strategic plan funding, foundation and philanthropic support. Administrative support for the program will be provided by the Center for Proteomics and Bioinformatics within its existing funds including support for a graduate coordinator (20% time, Department Assistant II, $8-10K per year plus $4-5K per year will be allocated to recruitment, special events, and advertising for a total of $60-75K over the first 5 years). Additional expenses may include Ph.D. tuition expenses depending on policies in place while revenue may include fundraising, University Alliance funding, tuition from M.S. students, or training grants.

M.S. Program. Masters students will not receive a stipend and will pay tuition according to current CWRU rates. Many may be CWRU employees who wish to expand their knowledge within an approved degree program and who have tuition available as a part of their defined benefit package. We expect 2 such students per year.

6. Support letters from Chairs and Program Directors.

The Chairs of Pharmacology, Biomedical Engineering, and Genetics have written letters of support for the program. Also, the Directors of the Centers for Proteomics and Bioinformatics, the Center for Imaging Research, and the MSTP program have written letters of support (See Appendix 4).

Appendix 1
Major Course Descriptions

PHOL 432 CELL STRUCTURE AND FUNCTION, Instructor: Nosek. This course provides knowledge regarding cell structure and function, chiefly in mammalian cells but also in relevant model systems. The basic structure of the cell is discussed, as are various systems that regulate this structure. Topics to be covered include DNA transcription, translation and protein synthesis, intracellular transport, cell interaction with the external environment, cell cycle regulation, cell death and differentiation, signal transduction, and cell specialization and organization into tissues. The course emphasizes lectures and problem-based discussions with an emphasis on faulty-directed student self-learning. The major goals of this course are to provide students with a working knowledge of the cell to facilitate understanding of the scientific literature, and to familiarize students with current techniques in cell biology. (3 credits - twice weekly - 1.5 hr/session). Fall, capacity 12; no pre-req

PHOL 456 PROTEINS AND NUCLEIC ACIDS; Instructor: Wintrode. The goal of this course is to provide a basic working knowledge of protein structure/function and molecular biology. The course begins with a discussion of protein structure and enzyme catalysis followed by protein purification and characterization. The course then addresses concepts relating to the application of modern molecular biology techniques. Students are taught how to clone genes and use these clones in animals-and cell-based studies. The overall goal is to provide students with an understanding of proteins and genetic approaches that can be used in experimental work and to facilitate comprehension of the scientific literature. (3 credits - twice weekly- 1.5 h/lecture) Fall, capacity 12; department consent

PHOL 475 PROTEIN BIOPHYSICS; Instructor, Buck. This course focuses on in-depth understanding of the molecular biophysics of proteins. Structural, thermodynamic and kinetic aspects of protein function and structure-function relationships will considered at the advanced conceptual level. The application of these theoretical frameworks will be illustrated with examples from the literature and integration of biophysical knowledge with description at the cellular and systems level. The format consists of lectures, problems sets, and student presentations. A special emphasis will be placed on discussion of original publications. (3 credits - twice weekly). Spring, no pre-req, limit 10

BIOL 419 APPLIED PROBABILITY AND STOCHASTIC PROCESSES FOR BIOLOGY; Instructor, Thomas. Applications of probability and stochastic processes to biological systems. Mathematical topics will include: introduction to discrete and continuous probability spaces (including numerical generation of psuedo random samples from specificied probability distributions), Markov processes in discrete and continuous time with discrete and continuous sample spaces, point processes including homogeneous and inhomogeneous Poisson processes and Markov chains on graphs, and diffusion processes including Brownian motion and the Ornstein-Uhlenbeck process. Likely topics include: stochastic ion channels, molecular motors and stochastic ratchets, actin and tubulin polymerization, random walk models for neural spike trains, baceterial chemotaxis, signaling and genetic regulatory networks, and stochastic predator-prey dynamics. The emphasis will be on practical stimulation and analysis of stochastic phenomena in biological systems. Numerical methods will be developed using both MATLAB and the R statistical package. Student projects will comprise a major part of hte course. Offered as BIOL 419, EBME 419, PHOL 419 for graduate credit.

EPBI/MPHP 431 Statistical Methods I; Instructor; O'Brien Application of statistical techniques with particular emphasis on problems in the biomedical sciences. Basic probability theory, random variables, and distribution functions. Point and interval estimation, regression, and correlation. Problems whose solution involves using packaged statistical programs. First part of year-long sequence . Fall Semester. 3 credits. Fall, consent of instructor

EPBI/MPHP 432 Statistical Methods II; Instructor; O'Brien. Methods of analysis of variance, regression and analysis of quantitative data. Emphasis on computer solution of problems drawn from the biomedical sciences. Design of experiments, power of tests, and adequacy of models. Prerequisite: EPBI 431 or Equivalent. Spring Semester. Capacity 25

PHRM 555 /SYBB 555 Current Proteomics, Instructor: Miyagi. This course is designed for graduate students across the university who wish to acquire a better understanding of fundamental concepts of proteomics and hands-on experience with techniques used in current proteomics. Lectures will cover protein/peptide separation techniques, protein mass spectrometry, bioinformatics tools, and biological applications which include quantitative proteomics, protein modification proteomics, interaction proteomics, structural genomics and structural proteomics. Laboratory portion will involve practice two-dimensional gel electrophoresis, molecular weight measurement of proteins by mass spectrometry, peptide structural characterization by tandem mass spectrometry and protein identification using computational tools. Spring Semester 3 credits. Recommended preparation: CBIO 453 and CBIO 455 or equivalent.

EECS 458 Introduction to Bioinformatics; Instructor, Koyuturk. Fundamental algorithmic methods in computational molecular biology and bioinformatics discussed. Sequence analysis, pairwise and multiple alignment, probabilistic models, phylogenetic analysis, folding and structure prediction emphasized. Fall; Recommended preparation EECS 340, EECS 233.

EECS 459/SYBB 549 Bioinformatics for Systems Biology; Instructor, Koyuturk, (new). Modeling of –omics data using computational and mathematics formulations. Pre-requisite: EECS 458 or equivalent.

SYBB 501/502 (new). Once weekly meeting for all program students and faculty. This will include journal club presentations for first and second year students, works in progress presentations for third and fourth year students, team-building exercises and rotations. No credit.

SYBB 601 (new), Research in Systems Biology, includes rotations and thesis research. Variable credit.

SYBB 701 (new), Dissertation PhD research. Prereq: Pre-doctoral research consent or advanced to Ph.D. candidacy milestone. Variable credit.

An example of a year-by-year outline of study; Required Courses in Bold, possible electives also listed.

Semester 1	**Courses**	**Title**	**Credits**	**Graded or P/F**
	PHOL 432	Cell Structure and Function*	3	Graded
	PHOL 456	Proteins and Nucleic Acids*	3	Graded
	EECS 458	Introduction to Bioinformatics*	3	Graded
	SYBB 501	**Systems Biology Journal Club**	0	P/F
	SYBB 601	**Systems Biology Research (Rotation)**	0	P/F
Total			**9**	
	EECS 459	**Bioinformatics for Systems Biology**	3	Graded
	PHRM 555	**Current Proteomics**	3	Graded
	SYBB 502	**Systems Biology Journal Club**	0	P/F
	SYBB 601/651	**Systems Biology Research (Rotation or M.S. Thesis)**	3	P/F
Total			**9**	
Semester 3	EPBI 431	Statistical Methods I*	3	Graded
	BIOL 419	Applied Probability and Stochastic Processes for Biology*	3	Graded
	SYBB 501	**Systems Biology Journal Club**	0	P/F
	SYBB 601/651	**Systems Biology Research (Pre-Ph.D. Dissertation Research or M.S. Thesis)**	3	P/F
Total			**9**	
Semester 4	EPBI 432	Statistical Methods II*	3	Graded
	SYBB 502	**Systems Biology Journal Club**	0	P/F
	SYBB 600/651	**Systems Biology Research (Pre-Ph.D. Dissertation Research or M.S. Thesis)**	3	P/F
Total			**9**	
First two year total			**36**	**24 Graded/ 12 P/F**
Semester 5	SYBB 701	Systems Biology Ph.D. Dissertation Research	**9**	P/F

Semester 6	SYBB 701	Systems Biology Ph.D. Dissertation Research	**9**	P/F
First 3 year total			**54**	
Semester 6	SYBB 701	Systems Biology Ph.D. Dissertation Research	**1**	P/F
Semester 7	SYBB 701	Systems Biology Ph.D. Dissertation Research	**1**	P/F
Semester 8	SYBB 701	Systems Biology Ph.D. Dissertation Research	**1**	P/F
Semester 9	SYBB 701	Systems Biology Ph.D. Dissertation Research	**1**	P/F
5-year total			**58**	

*Notes: Courses required for the Ph.D. program and M.S. Plan A are listed in Bold. Other courses indicate a potential curriculum that fleshes out all core competencies and electives. PHOL 432 and PHOL 456 satisfies the general requirement that the student have appropriate background in cell and molecular biology at the graduate level. The Cellular and Molecular Biology sequence (CBIO 453 and CBIO 455) also is appropriate as is the CWRU M.D., cell and molecular biology curriculum. Also, equivalent preparation at another University can fulfill the requirement. EECS 458, although not specifically required, provides an example that can help fulfill the core competency in Bioinformatics. EPBI 431/431 provides an example that fulfills the core competency in quantitative methods. BIOL 419 provides an example of a class that fulfills the core competency in quantitative modeling; PHOL 475 would also serve this purpose well. A student's specific plan of study must be approved by the program steering committee such that these competencies are fulfilled.

Appendix 2
Systems Biology and Bioinformatics: Potential Faculty Cohort.

Program Director
Mark Chance, Ph.D., Director, Center for Proteomics & Bioinformatics

Steering Committee Members
Joseph Nadeau, Ph.D., Department Chair/Professor, Genetics
Mehmet Koyuturk, Assistant Professor, EECS
Jill Barnholtz-Sloan, Assistant Professor, Cancer Center
Rob Ewing, Assistant Professor, Proteomics and Bioinformatics

Other potential faculty trainers
Jim Basilion, Associate Professor, Biomedical Engineering
Suda Iyengar, Professor, Epidemiology & Biostatistics
Robert Elston, Professor, Epidemiology & Biostatistics
Chris Dealwis, Associate Professor, Pharmacology,
Patrick Wintrode, Assistant Professor, Physiology & Biophysics
Peter Thomas Ph.D., Assistant Professor, Mathematics
Masaru Miyagi, Assistant Professor, Proteomics and Bioinformatics
Mark Adams, Associate Professor, Genetics
Thomas La Framboise, Associate Professor, Genetics
Jing Li, Associate Professor, EECS
GQ Zhang, Professor, EECS
Aaron Weinberg, Professor, Dental Biological Sciences
Tom McCormick, Assistant Professor, Dermatology
Kevin Cooper, Chair and Professor, Dermatology

Appendix 3

Academic Requirements for Masters Degree in Systems Biology and Bioinformatics. These requirements correspond to the requirements of the CWRU General Bulletin in effect in 2010-11. The requirements are typically possible for a full time student to complete in 24 months for Plan A and 18 months for Plan B (see Appendix 2).

Plan A
M.S. with a thesis based on individual research and a final oral examination.

Plan B
M.S. requiring a written comprehensive examination or major project (no thesis).

The Master's Thesis (Plan A)
The minimum requirements for the master's degree under Plan A are 21 semester hours of course work plus a thesis equivalent to at least 9 semester hours of registration for 30 hours total. These must include EECS 459, PHRM 555, and SYBB 501, SYBB 502, and a minimum of 9 hours of SYBB 651. The curriculum plan must be approved by the program steering committee and include appropriate coverage of the core competencies in genes and proteins, bioinformatics, and quantitative modeling and analysis. Sample course schedules are provided in Appendix 2. At least 18 semester hours of course work, in addition to thesis hours, must be at the 400-level or higher. Each student must prepare an individual thesis that must conform to regulations concerning format, quality, and time of submission as established by the dean of graduate studies. For completion of master's degrees under Plan A, an oral examination (defense) of the master's thesis is required, where the examination is conducted by a committee of at least three members of the university faculty.

The Master's Comprehensive (Plan B)
The minimum requirements for the master's degree under Plan B are 30 semester hours of course work (with at least 18 semester hours of course work at the 400 level or higher) and a written comprehensive examination or major project with report to be administered and evaluated by the program steering committee. The coursework must include EECS 459, PHRM 555, SYBB 501 and SYBB 502. The curriculum plan must be approved by the program steering committee and include appropriate coverage of the core competencies in genes and proteins, bioinformatics, and quantitative modeling and analysis.

Appendix 4

Letters of Support:

Director, Center for Proteomics and Bioinformatics
Chair, Department of Genetics
Chair, Department of Pharmacology
Chair, Department of Biomedical Engineering
Chair, Department of Epidemiology & Biostatistics
Director, MSTP Program

Case Western Reserve University

Cleveland Foundation

Center for Proteomics and Bioinformatics

The Cleveland Foundation Center for Proteomics

9th Floor, BRB
10900 Euclid Avenue
Cleveland, Ohio 44106-4988

Phone 216.368.1490
Fax 216.368.6846

http://proteomics.case.edu/

Pamela Davis, M.D. Ph.D.
Dean, School of Medicine
Case Western Reserve University

Dear Pam,

Enclosed is a proposed graduate program in Systems Biology and Bioinformatics. I request that the appropriate committees of the School of Medicine provide the appropriate evaluation as rapidly as possible.

The faculty of the Center, both Primary and Secondary, are quite enthusiastic about the proposed program and look forward to productive interactions as the program becomes a reality. Already students from Genetics, Epi/Bio, and Pharmacology are catalyzing interactions across our faculty through new collaborations in this growing field of Systems Biology. We are especially encouraged by the enthusiasm and support of our colleagues in Departments such as Genetics, BME, Pharmacology, Epidemiology & Biostatistics, and within the MSTP program and I include several letters detailing this support.

As outlined in the proposal, the Center for Proteomics and Bioinformatics will be the management center responsible for administering the program and will provide support in terms of a part-time graduate coordinator who will, in collaboration with program faculty, track student performance, schedule program events, and maintain appropriate admission and financial records. We will also support any Direct admits in their first year and will facilitate the flow of MSTP and BSTP students into the program, as appropriate.

As the program grows and matures, we expect that we will be in a position to submit a competitive T32 application to the NIH. In addition, novel programs of this kind will be helpful in attracting faculty applicants to join the School of Medicine and will raise the visibility of all our research and training programs.

Sincerely,

Mark Chance, Ph.D.
Director, Center for Proteomics and Bioinformatics
Professor, Department of Physiology and Biophysics
Director, Center for Synchrotron Biosciences

CASE WESTERN RESERVE

Joseph H. Nadeau, Ph.D., Chair
James H. Jewel Professor of Genetics

Department of Genetics

10 February 2010

Dr. Mark Chance
Director, Center for Proteomics and Bioinformatics
Case Western Reserve University School of Medicine
Cleveland

Dear Mark,

Thank you for visiting with our faculty recently to review the proposed PhD program in Systems biology and Bioinformatics. We are enthusiastic about the proposed program and look forward to productive interactions between your faculty and those in our Department. We expect students in our PhD programs to have an interest in courses and journal club activities of the Systems Biology program and we look forward to your students taking relevant classes in our Department. We expect our faculty to have an interest in joining your program as approved trainers as well.

As the Systems Biology program grows and matures, we expect that you will be in a position to submit a competitive T32 application to the NIH and we will support you in this endeavor. In addition, novel programs of this kind will be helpful in attracting faculty applicants to join the School of Medicine and will raise the visibility of our research and training programs.

Sincerely,

Joe Nadeau

Chair, Department of Genetics
James H. Jewel Professor Genetics

CASE WESTERN RESERVE
UNIVERSITY
SCHOOL OF MEDICINE

Dr. Krzysztof Palczewski, Ph.D.
John H. Hord Professor and Chair

Department of Pharmacology

Case Western Reserve University
10900 Euclid Avenue
Cleveland, Ohio 44106-4965

Visitors and Deliveries
School of Medicine W321A

Phone 216.368-4631
Fax 216-368-1300
E-mail kxp65@case.edu
http://pharmacology.case.ed0

February 15, 2010

Mark R. Chance, Ph.D
Director, Center for Proteomics and Bioinformatics

Dear Mark,

Thank you sharing with me the proposed Ph.D. program in Systems Biology and Bioinformatics. We are quite enthusiastic about the proposed program and look forward to productive interactions between your faculty and those in our Department. We expect students in our Ph.D. programs to have an interest in courses and journal club activities of the Systems Biology program and we look forward to your students taking relevant classes in our Department. We expect our faculty to have an interest in joining your program as approved trainers as well.

As the program grows and matures, we expect that you will be in a position to submit a competitive T32 application to the NIH and we will support you in this endeavor. In addition, novel programs of this kind will be helpful in attracting faculty applicants to join the School of Medicine and will raise the visibility of all our research and training programs.

Sincerely,

K. Palczewski

CASE WESTERN RESERVE
UNIVERSITY EST. 1826
Department of Biomedical Engineering
A Joint Department of the CWRU School of Medicine and Engineering

Jeffrey L. Duerk, Ph.D., Chairman
Department of Biomedical Engineering
Allen H. and Constance T. Ford Professor
Director, Case Center for Imaging Research

February 10, 2010

Mark Chance
Director, Center for Proteomics and Bioinformatics

RE: Systems Biology and Bioinformatics Ph.D. Program

Dear Mark,

I am writing to you today both as the Director of the Case Center for Imaging Research and also the Chairman of the CWRU Department of Biomedical Engineering. Specifically, I am writing to thank you for sharing with me the proposed PhD program in Systems Biology and Bioinformatics. This program has unique opportunities to positively impact the research programs in both CCIR and BME. Currently, as you and others are aware, imaging is undergoing the transition from morphologic change detection to detecting functional changes in tissues well in advance of any macroscopic structure manifestations. To lead this future vision, we have recruited faculty (e.g., Basilion, Exner, Karathanasis, and a future P30-ARRA funded position) specifically developing imaging compounds that serve as detectable beacons of genetic or functional change in the tissue. Within BME, research over the past decades has moved from devices (e.g., pacemaker, hearing aids), to tissues and tissue interactions (e.g., neural engineering, biomaterials), and now to new horizons in which engineering is considered at the cellular level (e.g., tissue engineering and drug delivery). The pace of our creative thoughts must be matched to educational programs that interact across disciplines. Currently, many of our BME and CCIR faculty struggle in recruiting qualified students as our educational programs have lagged our research pursuits. It is for this reason that I am particularly enthusiastic about the proposed program and look forward to productive interactions between your faculty and those in our Department and Center. We expect students in our PhD programs to have an interest in courses and journal club activities of the Systems Biology program and we look forward to your students taking relevant classes in our Department; this will meet a currently unmet need for a number of our faculty. We expect our faculty to have an interest in joining your program as approved trainers as well. In fact, currently, elements of our Graduate Education Committee are designing a Ph.D. track that greatly intersects with the SYBB program and provides additional training in biomedical engineering and imaging. We hope to be the first engineering department to officially embrace the SYBB vision and have a complementary (not competing, not comparable, but truly complementary) engineering program, to the SOM SYBB offering.

Hence, as these programs grow and mature, we expect that you will be in a position to submit a competitive T32 application to the NIH and we will support you in this endeavor. I cannot adequately express our enthusiasm for your efforts. In addition, novel programs of this kind will be helpful in attracting faculty applicants to join the School of Medicine and will raise the visibility of all our research and training programs.

Sincerely,

Jeffrey L. Duerk

Jeffrey L. Duerk, Ph.D., Chairman
Department of Biomedical Engineering
Allen H. and Constance T. Ford Professor
Director, Case Center for Imaging Research

Case School of Engineering and School of Medicine, 10900 Euclid Avenue, Cleveland, Ohio 44106-7207
Visitors and Deliveries: Wickenden Building – Room 309F
Phone 216.368.6047 Fax 216.368.4969 E-mail duerk@case.edu
http://bme.case.edu

CASE WESTERN RESERVE
UNIVERSITY
SCHOOL OF MEDICINE

Department of Epidemiology and Biostatistics
Case Western Reserve University

10900 Euclid Avenue
Cleveland, Ohio 44106-4945

Phone 216.368.3197
Fax 216.368.3970

http://epbiwww.case.edu

February 18, 2010

Mark Chance, Ph.D., Director
Center for Proteomics and Bioinformatics
Case Western Reserve University
School of Medicine
Biomedical Research Building, Room 930
Location Code: 4988

Dear Mark,

Thank you for visiting with our faculty recently to review the proposed Ph.D. program in Systems Biology and Bioinformatics. We are quite enthusiastic about the proposed program and look forward to productive interactions between your faculty and those in our Department. We expect students in our Ph.D. programs to have an interest in courses and journal club activities of the Systems Biology program, and we look forward to your students taking relevant classes and attending seminars in our Department. Because of areas of overlapping interest, we expect many of our faculty will have an interest in joining your program as approved trainers as well, leading to enrichment of both our Ph.D. programs. As you know, our own Ph.D. program in Biostatistics and Epidemiology is distinct in its particular focus, but would be greatly enriched if our students could take advantage of training in the complementary areas that will be the focus of your proposed Ph.D. program.

As your program grows and matures, we expect that you will be in a position to submit a competitive T32 application to the NIH, and we will certainly support you in this endeavor, offering all the advantages that come from broad cross-disciplinary training. Novel programs of this kind, bringing to the study of basic biological processes a strong computational element, together with the possibility of adding an epidemiological dimension, will not only strengthen basic research, but will also be helpful in attracting new faculty applicants to join the School of Medicine, and so will raise the visibility of all our research and training programs.

Sincerely,

Robert.

Robert Elston, Ph.D.
Professor and Chair

CASE WESTERN RESERVE
UNIVERSITY

Department of Pathology
10900 Euclid Avenue
Cleveland, Ohio 44106-7288

February 10, 2010

Mark Chance
Director, Center for Proteomics and Bioinformatics

Dear Mark,

Thank you sharing with me the proposed PhD program in Systems Biology and Bioinformatics. I am quite enthusiastic about the proposed program and consider it to be an excellent program for MSTP student training. It also fits with the goals for training indicated in our CTSA education module.

The program appears to have the requisite flexibility for rotations needed for MSTP students and nicely leverages their Year 1 and Year 2 coursework to fulfill many of the required "core competencies" that the students will need to be successful.

Overall, I am enthusiastic about the program in terms of relevance, need and what it will add to our graduate training at Case.

As you know, programmatic changes such as addition of a graduate program to the set of MSTP-affiliated graduate programs require assessment through the MSTP Steering Committee, but I am very confident that this program will be received enthusiastically by the committee and meet with swift approval for participation with the MSTP. It certainly has my full and enthusiastic support in this regard.

Please keep me posted as this program moves through the approval process.

Sincerely,

Cliff

Clifford V. Harding, MD, PhD
Professor and Interim Chair of Pathology
Director, CWRU Medical Scientist Training Program

CASE WESTERN RESERVE UNIVERSITY
SCHOOL OF MEDICINE

Walter F. Boron, M.D., Ph.D.
The David N. and Inez Myers/
Antonio Scarpa, M.D., Ph.D. Professor

Chairman, Department of Physiology & Biophysics

10900 Euclid Avenue
Cleveland, Ohio 44106-4970

Visitors and Deliveries
2109 Adelbert Road

Phone 216.368.5298
Fax 216.368.5586
E-mail walter.boron@case.edu

http://physiology.cwru.edu

September 22, 2010

Alan Levine, Ph.D.
Chairman, Faculty Senate
Case Western Reserve University
Biomedical Research Building, 4th Floor

Dear Dr. Levine:

Thank you for considering our proposal for a Master's Degree Program in Medical Physiology. As detailed in the documents before you, Professor Nosek and his committee have designed a unique program that should be of considerable value to the Northeastern Ohio region, to the School of Medicine, and to our Department. To the region, we offer not only a convenient and high-quality opportunity for the advanced education of our citizens but also the promise of enhancing the pool of skilled personnel who might support developing biotechnology enterprises. To the School and Department we offer the hope of a successful program that will bring honor, a sense of accomplishment, and a degree of financial stability.

I conceived of this program as I moved three years ago from Yale to CWRU, and have worked closely with Prof. Nosek as he and his colleagues have moved the program forward. This initiative has my full and enthusiastic support. It also leverages two strengths of the Department. First, this is one of the stronger physiology departments in the country, and will eventually earn the reputation—we hope—of being an elite department. Second, one of the world's leading and most popular textbooks of physiology comes from our Department and, indeed, will be at the core of the new curriculum. I am hopeful that these strengths will help propel our fledgling program to great heights.

Finally, I might add that our proposed program will not measurably interfere with the Department's central mission of research and the education of M.D. and Ph.D. candidates.

Again, I thank you for your consideration of our proposal. I look forward to a positive outcome as we complete the University's vetting process and move on to the Ohio Board of Regents.

Best regards,

Walter F. Boron

Walter F. Boron

CASE WESTERN RESERVE UNIVERSITY
SCHOOL OF MEDICINE

Pamela B. Davis, M.D., Ph.D.
Dean
Vice President for Medical Affairs

Office of the Dean

10900 Euclid Avenue
Cleveland, Ohio 44106-4915

Visitors and Deliveries
Biomedical Research Bldg. - Rm. 113

Phone 216.368.2825
Fax 216.368.2820

http://casemed.case.edu

September 22, 2010

Alan Levine, PhD
Chairman, Faculty Senate
Case Western Reserve University
Biomedical Research Building, 4th Floor

Dear Dr. Levine,

I have discussed with Dr. Walter Boron, the proposal that eminated from his Department of Physiology and Biophysics, to establish a Master's Degree Program in Medical Physiology. This Type B Master's is a post-baccalaureate program designed to serve the needs of aspirants for admission to professional medical programs (schools of medicine, dentistry, etc.) who require additional basic science training to strengthen their applications. It should also be attractive to undergraduates pursuing a combined BS/MS degree and medical students seeking a combined MD/MS degree. Also, students who seek a career in industry research and administration should find this program attractive.

This is a vigorous program consistent with the high quality research programs that distinguish the Department of Physiology and Biophysics and the School of Medicine. The curriculum is flexible enough to accommodate the needs of a wide range of students. It will be taught by research faculty and will focus on the translational application of this basic science. At the heart of the program are 4 new courses (Medical Physiology I and II- 6 credit hours each - and Translational Physiology I and II – 2 credit hours each) and an existing seminar course. These required courses in the Department of Physiology and Biophysics are worth a total of 18 credit hours out of a total of 30 required by the program. The remaining hours will be made up of electives taken from the wide variety of graduate courses taught on campus, tailored to the specific needs and interests of the students.

I have discussed the financial implications of this new program with Dr. Boron and we have come to an agreement as to how the tuition dollars will be allocated as the program develops. I think his goal of attracting at least 5 students to the program the first year of its existence, with an eventual matriculation of 20/year, is realistic.

I fully support the development of the Master's in Medical Physiology program by the Department of Physiology and Biophysics. It is consistent with the mission of the School of Medicine and will fill a niche for post-baccalaureate education in Medical Physiology that does not currently exist in this region.

Sincerely,

Pamela B. Davis

Pamela B. Davis, MD, PhD

Final Revised September 17, 2010

Proposed Program: Masters of Science in Medical Physiology
Program Development Plan

1. <u>Academic Rationale and Purpose:</u>

The Master's Program in Medical Physiology is designed for students with a bachelor's degree who are seeking advanced training in the physiological sciences, typically in preparation for admission to a professional medical program (e.g. Medical School, Dental School). Medical students in both the University and College programs who are interested in the combined MD/MS degrees, are encouraged to consider making this the basic science component of that program. Students who want a career in industry research or administration of biomedical technology companies also should consider this degree program. The program is flexible in duration. It can take as little as 1 year (2 semesters, 9 months) to complete the required 30 credit hours of course work. However, students who wish to decompress the program can take 14 months or more to complete the requirements. Core courses and flexible electives allow students to focus their work in key areas of medical physiology, including Anatomy, Biochemistry, or Pharmacology. Graduates of the Medical Physiology Master's Program also can pursue careers in basic and clinical research, research administration, teaching or management in academia, the pharmaceutical and biotechnology industries, private research institutions, government science or regulatory agencies, or medicine and health care. Thus, in addition, to providing a pathway to medical and dental school, the proposed program would offer an important economic advantage for Northeast Ohio by training a pool of individuals constituting a highly educated work force, which in turn would retain and attract biomedical industry.

Students will earn a plan B type MS from Case Western Reserve University. The core of this degree is 18 hours of course work in the Department of Physiology and Biophysics: 2, 6 hour courses in **Medical Physiology** (PHOL 481 & 482), 2, 2 hour courses in **Translational Physiology** (PHOL 483 & 484), and 2, 1 hour **Physiology Seminar** (PHOL 498) courses. The Medical Physiology courses will be conducted as lecture courses. The Translational Physiology course will be conducted as a combination of both lectures and clinical paper discussions. The Physiology Seminar will require students to attend the weekly physiology seminar followed by a discussion session where a recent paper by the seminar speaker will be discussed. The remaining hours required for graduation are flexible, taking into account each student's unique background and career plans. Laboratory research experience may be included as an elective. To successfully complete the program, students must have a final grade point average of better than 3.0 and pass a comprehensive examination after all coursework has been successfully completed for a Plan B type master's degree. The comprehensive examination will be in the form of a written paper (at least 10 – 20 pages long) where the student will be given the opportunity to display their understanding of physiology and other biophysical sciences that they have studied during the program. This program will complement the plan A type MS that the department currently offers for students preparing for a career in laboratory research. The MS in Medical Physiology may be a terminal degree or may lead to admission to medical, dental, or Ph.D. programs.

2. **Description of proposed curriculum:**

An Overview of the Program is described here. The template of the proposed degree is constituted by core courses in physiology, elective coursework in various related areas, participation in a seminar series, scientific integrity training, a final comprehensive examination, and completion of a total of 30 graduate credit hours. Several new courses are proposed for this degree, and course action forms and associated syllabi outlines have been submitted for approval.

The core of the curriculum is a total of 18 hours of basic physiology. The sequential Medical Physiology I and II courses begin with the study of the physiology of cells and molecules. The courses then go into a detailed analysis of the various organ systems: the nervous system, the cardiovascular system, the respiratory system, the urinary system, the gastrointestinal system, the endocrine system, followed by the reproductive system. The last part of this course sequence is dedicated to applying the principles learned in the study of the physiological systems to the physiology of everyday life: metabolism, regulation of body temperature, exercise physiology and sports science, environmental physiology, and the physiology of aging. Thomas M. Nosek, Ph.D. will be the initial course director for these two courses.

Concurrent with the two Medical Physiology courses, two Translational Physiology courses will explore examples of how the latest basic research in physiology and biophysics is being applied to the treatment of human disease. For example, while the students are studying the basic principles of cardiovascular physiology, they will also be investigating how these principles are being applied to treat/cure human cardiovascular disorders such as congestive heart failure, coronary artery disease, high blood pressure, etc. These courses are designed to increase the awareness of the students of the importance of understanding the physiology of an organ system in enough detail to be able to correct problems with the functioning of the system when they arise. Walter F. Boron, MD, Ph.D. will be the initial course director for these two courses.

Each Monday afternoon, the department sponsors a seminar series. The Physiology Seminar course that each student takes each term requires that they attend this seminar weekly and a discussion session following each seminar where a recent paper by the seminar speaker will be discussed by the students.

The required and recommended elective courses for this program are detailed here. Appendixes A- D contain sample curricula for students desiring to complete the program in four different time frames.

Summer Semester #1

Select 0 – 3 credits of elective courses:

PHOL 601	-Research	3 Credits
ANAT	-Histology for Physiologists (Dr. H-L. Kaung)	3 Credits

Fall Semester

Required courses for the Fall semesters:

PHOL 481	- Medical Physiology I*	6 Credits
PHOL 483	- Translational Physiology I*	2 Credit
PHOL 498	- Physiology seminar	1 Credit

Select of 0 - 6 hours of courses at the 400 level or above from the School of Medicine Graduate School Bulletin. The following are most highly recommended for the Fall semesters:

ANAT 412	- Histology & Ultrastructure	4 Credits
ANAT 413	- Histology & Ultrastructure Lab	2 Credits
ANAT 431	- Statistical Methods I	3 Credits
BIOC 407	- General Biochemistry	4 Credits
BIOC 434	- Structural Biology	3 Credits
BETH 401	- Foundations of Bioethics I	6 Credits
EPBI 414	- Introduction to Statistical Computing	3 Credits
GENE 451	- Principles of Genetic Epidemiology	3 Credits
MBIO 420	- Molecular Genetics of Cancer	3 Credits

Spring Semester

Required courses for the Spring semesters:

PHOL 482	- Medical Physiology II*	6 Credits
PHOL 484	- Translational Physiology II*	2 Credit
PHOL 498	- Physiology Seminar	1 Credit
IBMS 500	- Ethics and Biomedical Research	0 Credits

Select of 0 - 6 hours of courses at the 400 level or above from the School of Medicine Graduate School Bulletin. The following are most highly recommended for the Spring semesters:

PHOL466	- Cell Signaling	3 Credits
PHOL514	- Cardiovascular Physiology	3 Credits
PHOL519	- Cardio-Respiratory Physiology	3 Credits
PHOL530	- Technology in Physiological Sciences	3 Credits
BIOC408	- Molecular Biology	4 Credits
BIOC 412	- Proteins and Enzymes	3 Credits
BETH 402	- Foundations of Bioethics II	6 Credits
EVHS 429	- Introduction to Environmental Health	3 Credits
INTH 401	- Fundamentals of Global Health	3 Credits
GENE 500	- Advanced Eukaryotic Genetics	3 Credits
PHRM 401	- Principles of Pharmacology I	3 Credits
PHRM 402	- Principles of Pharmacology II	3 Credits

Summer Semester #2

Select 0 – 3 credits of elective courses:

PHOL 601	-Research	3 Credits
ANAT	-Histology for Physiologists (Dr. H-L. Kaung)	3 Credits

Comprehensive Examination (Pass/Fail)

Total 30 Credits

*Textbook for these courses is: ***Medical Physiology: A Cellular and Molecular Approach*** by Walter F. Boron and Emile L. Boulpaep

Appendixes A – D contains sample curricula for 4 different students completing the curriculum in 4 different time frames.

Dr. Boron is Chair of the Department of Physiology and Biophysics. He will teach the Respiratory System section of the Medical Physiology course and direct the Translational Physiology course. His active participation is both these courses is seen as a draw for students seeking programs such as this to improve their academic credentials.

The Medical Physiology courses are scheduled from 10:00 AM – 12:00 noon on Monday, Tuesday, and Thursday of each week in E-501 and will be presented in a lecture format by basic science faculty who are experts in the field. The Translational Physiology courses will be scheduled from 10:00 – 12:00 noon on Friday of each week in E-501 and presented in a lecture format by a clinical faculty member with expertise in the field. Clinical research papers will also be discussed by the students. Grades in these courses (A, B, C, etc.) will be determined by performance on Essay/Multiple Choice exams administered at the end of each of the blocks of the courses (there are a total of 9 blocks for each pair of courses over the two terms).

The Physiology seminar course is scheduled from 4:00 – 5:00 each Monday throughout the academic year. Students are required to attend this weekly seminar and the post-seminar discussion session. The Physiology seminar is graded pass/fail with a pass score determined by attendance at 75% or more of the weekly seminars and active participation in the post-seminar discussions scheduled during the course of a term.

Admissions to the program will be through the established application process for all graduate programs within the Department of Physiology and Biophysics. Students will be required to submit their scores on either the MCAT or GRE exams. No absolute criteria for performance on these standardized exams or undergraduate grade point average will be established because each student will be evaluated on the merits of their total record; their scores on a standardized exam (MCAT or GRE), undergraduate and graduate grade point average, letters of recommendation (3), application essay describing their interest in the program and career plans, and personal interview (either in person, on our Departmental site on the secure Case Nebraska server of Second Life, or in Skype). The department will cover the costs of a personal interview when that is requested. We expect successful applicants to have MCAT scores totaling at least 30, GRE scores of Verbal >400, Quantitative>500, and Analytical>2.5, and accumulated undergraduate grade point average of at least 3.0. Applications to the program will be accepted throughout the year with qualified applicants being accepted into the program as soon as they are identified. The final application deadline for this program will be June 1st of each year with final admission decisions made by July 1st.

No financial aid will be provided for the program. Tuition is $1,375/credit hour. Because there is a12 credit hour maximum for tuition computation, tuition will be $16,500/term or $33,000 for the program for students who complete the program in 2 semesters (9 months). For those students who decompress the program and take longer to complete the requirements, they will be charged each term for the credit hours they are taking up to a maximum of 12 credit hours.

3. **<u>Administrative arrangements for program; academic units involved:</u>**

Dr. Thomas M. Nosek, director of Graduate Education for the department, will be the director of the program. Administrative support will be provided by Jean Davis who is currently the Coordinator of all Departmental Educational Programs. All other necessary staff support for the program will be coordinated by Morley Schwebel, Business Manager for the Department. The Admissions subcommittee of the departmental Graduate Education Committee will be responsible for recruiting students and admitting them to the program. This committee is made up of the director of admissions (currently Dr. Andrea Romani), the director of graduate education (currently Dr. Thomas M. Nosek), and the three track directors (currently Dr. William Schilling, Dr. Withold Surewicz, and Dr. Corey Smith). A new subcommittee of the departmental

Graduate Education Committee will be constituted (called the MS in Medical Physiology Advisory Committee) to oversee this program. A member of this committee will be assigned to each student to advise them regarding which elective courses to take, to follow their progress in the courses (helping students identify remediation activities should they perform below passing in any of the examinations in the Medical Physiology and Translational Physiology courses), to help them prepare the written paper which constitutes the comprehensive exam for the program, and their application materials for medical/dental school. This committee will grade the comprehensive examination to be given at the end of the student's last term. Students are required to pass the compreshensive examination in order to graduate. If the quality of the first submission of the paper is not satisfactory, students may be given the opportunity to rewrite the paper once at the discretion of the committee. The committee will also provide an evaluation of each student's academic performance at the end of the program that can be used as part of their medical school admissions materials. Students must successfully pass the comprehensive examination in order to successfully complete the program. One, two hour advisory/Q&A session with the Associate Dean and Director of Admissions to the Case Western Reserve School of Medicine will be held each year to help the students prepare their medical/dental school admissions materials.

4. Evidence of need

For the 2007/2008 entering class, US medicals schools received applications from a total of 42,315 students. Of these, 31,946 were first time applicants and 10,369 were re-applying. The total number of students entering US medical schools was 17,759 for the 2007/2008 medical class. It is assumed that the 10,369 students who reapplied for admission took some remedial action to improve their academic record after being rejected for admission. Also, some first time applicants entered programs such as our MS in Medical Physiology program before applying to medical school for the first time. Therefore, these numbers suggest that approximately 10,000 or more students across the country might be interested in improving their credentials by enrolling in a program like our MS in Medical Physiology Program.

Many schools across the country are providing programs to students who are not yet ready to apply for medical school academically or who have applied and been turned down. The Association of American Medical Colleges (AAMC) lists on their website 119 such programs. Currently there are 4 programs in Ohio:

1. The Master of Science in Physiology program at the University of Cincinnati. This is a special master's degree-granting program that takes 1-2 years to complete. It does not require a thesis. Students take courses alongside medical students in three medical school classes (medical physiology, medical biochemistry, and medical histology and cell biology). Students also take classes in clinical embryology, health professions, molecular physiology, statistical methods in physiology, neurophysiology, and literature review or lab research) within the department of Molecular and Cellular Physiology. This program graduated 20 students in 2009.

Their individual profiles can be found at http://www.med.uc.edu/physiology/MS-2009.htm.

2. The MEDPATH program at The Ohio State University. This is a non-degree, 4 quarter program designed to help students with a bachelor's degree prepare for medical school. The program takes 11-25 students/year.
3. The MSBS in Medical Sciences at the University of Toledo. This is a special master's degree program that takes 1-2 years to complete and requires no thesis. There are 26-50 students enrolled in the program.
4. The Post-Baccalaureate Program at Cleveland State University. This is a non-degree granting program of individualized/unstructured study designed for students who have received their bachelor's degree. It enrolls 11-25 students/year.

There is actually a 5th program currently in the state, the MS in Applied Anatomy at Case Western Reserve University. This is a two year program that focuses on the anatomical sciences; human gross anatomy, histology, neuroanatomy, and embryology. This program currently has approximately 45 students, about 20 of whom are enrolled to prepare for admission to medical school.

Our MS program would be only the second in the state in the discipline of physiology. The existing physiology program is in Cincinnati, which is approximately 200 miles distant.

In the states geographically surrounding Ohio, there are 2 programs in Indiana, 0 in Michigan, 13 in Pennsylvania, 1 in Kentucky, and 0 in West Virginia designed to help students prepare for medical school.

5. Prospective enrollment:

In the first year of the program (2011/2012 academic year), the department expects to matriculate 5 students. In subsequent years, we expect the enrollment to increase by 5 a year up to a maximum of 25-30 per year.

6. Faculty and facilities available for the program and their adequacy

The primary and secondary faculty of the Department of Physiology and Biophysics will be responsible for teaching the new courses (Medical Physiology I and II PHOL 481 & 482 and Translational Physiology I and II PHOL 483 & 484) and for administration of the program. The classrooms in the Department of Physiology and Biophysics will be used for this instruction, primarily E-501. The additional 2 courses (8 hours/semester) will be taught by faculty throughout the School of Medicine. While a limited number of elective courses are highly recommended, students will be able to fulfill these course requirements by selecting as many as 2 courses/semester at the 400 level or above from the medical school graduate courses listed in the graduate school bulletin. All elective courses must be approval of the student's advisor.

7. Need for additional facilities and staff, and plans for meeting these requirements

No additional facilities or staff are required to implement this program.

8. **Projected financial needs to support program and adequacy of expected financial support**

It is estimated that the direct costs of the director of the program (25%) would be $64,250/year, of faculty teaching in the program (35% effort, $67,463/year), and of the administrative costs $30,000/year for a total yearly costs of $161,713. If all students take 9 months to complete the program, each student would bring in tuition dollars of $17,260/semester ($34,320/year) to the university. Therefore, enrolling 5 students (total tuition of $171,600) will approximately cover the cost of administering the program.

9. **Copies of reports from consultants or advisory committees used in the planning process**

This program was proposed to the Departmental Graduate Education Program by Dr. Walter Boron. Dr. Thomas Nosek, as Director of the Departmental Graduate Program, consulted with Dr. Carole Lietdke, chair of the admissions committee for the Case School of Medicine. From her experience interviewing students for medical school, she indicated that there are a number who, because of their background deficiencies, would need to successfully complete a program such as the MS in Medical Physiology to gain admission to medical school. Dr. Nosek also consulted with Dr. Lina Mehta, Associate Dean for Admissions, and Christian Essman, Director of Admissions at the Case Western Reserve University School of Medicine. Both indicated that during the course of counseling approximately 100 students/year, they identify approximately 10/year (because of basic science deficiencies) who they would recommend enroll in and successfully complete a program such as this to compete for a place in the medical class at Case or any other medical school. Drs. Nosek and Boron also talked with Dr. Alison Hall, Director of Graduate Education in the School of Medicine, who indicated that she sees a number of students each year during the course of her interviewing process who would benefit from an MS program in systems physiology as they try to improve their basic science credentials for admission to medical school. At this time, she knows of three students who might be interested in this program. Based on this information and a survey of competing programs, the Graduate Education Committee for the Department of Physiology and Biophysics endorsed development of the details of such a program and implementation of it for the fall of 2011.

10. **Letters of support from the Dean or other directors of appropriate university cost centers.**

Besides the 18 hours of courses in Physiology and Biophysics that the students will take in the program, they will also take 12 credit hours of elective courses. Some of these elective courses could be taken within the Department of Physiology and Biophysics. The two major departments that would be impacted by students taking electives outside the department are Anatomy and Biochemistry. Therefore, Dr. Boron has met with both Drs. Ornt and Weiss and their letters of support of the program are attached. Letters of support from Dr. Alison Hall, Director of Graduate Education in the School of Medicine and Dr. Davis, Dean of the School of Medicine, are also attached.

There are many combinations of courses/term that a student can make to graduate with 30 credits in as few as 2 terms (9 months). However, the curriculum can be decompressed over a longer time frame. Four examples of specific curricula for 4 sample students are provided in Appendixes A – D.

Appendix A

Student #1
Completing the curriculum in 9 months (2 terms, Fall and Spring)

Fall

PHOL 481	- Medical Physiology I	6 Credits
PHOL 481	- Translational Physiology I	2 Credit
PHOL 498	- Physiology seminar	1 Credit
ANAT 412	- Histology & Ultrastructure	4 Credits
ANAT 413	- Histology & Ultrastructure Lab	2 Credits

Spring

PHOL 482	- Medical Physiology II	6 Credits
PHOL 484	- Translational Physiology II	2 Credit
PHOL 498	- Physiology Seminar	1 Credit
IBMS 500	- Ethics and Biomedical Research	0 Credits
GENE 500	- Advanced Eukaryotic Genetics	3 Credits
PHRM 401	- Principles of Pharmacology I	3 Credits

Comprehensive Examination (Pass/Fail)

Total 30 Credits

Appendix B

Student #2
Completing the curriculum in 14 months (4 terms; Summer #1, Fall, Spring, and Summer #2)

Summer #1

ANAT	-Histology for Physiologists (Dr. H-L. Kaung)	3 Credits

Fall

PHOL 481	- Medical Physiology I	6 Credits
PHOL 483	- Translational Physiology	2 Credit
PHOL 498	- Physiology seminar	1 Credit
BIOC 435	- Structural Biology	3 Credits

Spring

PHOL 482	- Medical Physiology II	6 Credits
PHOL 484	- Translational Physiology II	2 Credit
PHOL 498	- Physiology Seminar	1 Credit
IBMS 500	- Ethics and Biomedical Research	0 Credits
GENE 500	- Advanced Eukaryotic Genetics	3 Credits

Summer #2

PHOL 601	-Research	3 Credits

Comprehensive Examination (Pass/Fail)

Total 30 Credits

Appendix C

Student #3
Completing the curriculum in 2 years (4 terms, 2 Fall and 2 Spring terms)

Fall #1

PHOL 481	- Medical Physiology I	6 Credits
PHOL 483	- Translational Physiology	2 Credit
PHOL 498	- Physiology seminar	1 Credit

Spring #1

PHOL 482	- Medical Physiology II	6 Credits
PHOL 484	- Translational Physiology II	2 Credit
PHOL 498	- Physiology Seminar	1 Credit
IBMS 500	- Ethics and Biomedical Research	0 Credits

Fall #2

ANAT 412	- Histology & Ultrastructure	4 Credits
ANAT 413	- Histology & Ultrastructure Lab	2 Credits

Spring #2

GENE 500	- Advanced Eukaryotic Genetics	3 Credits
PHRM 401	- Principles of Pharmacology I	3 Credits

Comprehensive Examination (Pass/Fail)

Total 30 Credits

Appendix D

Student #4
A CWRU laboratory technician who is limited to taking 6 credit hours during the Fall and Spring terms. This program of study would take a minimum of 5 terms over 2 ½ years.

Fall #1

PHOL 481	- Medical Physiology I	6 Credits

Spring #1

PHOL 482	- Medical Physiology II	6 Credits

Fall #2

PHOL 483	- Translational Physiology I	2 Credit
PHOL 498	- Physiology seminar	1 Credit
BIOC 435	- Structural Biology	3 Credits

Spring #2

PHOL 484	- Translational Physiology II	2 Credit
PHOL 498	- Physiology seminar	1 Credit
GENE 500	- Advanced Eukaryotic Genetics	3 Credits
IBMS 500	- Ethics and Biomedical Research	0 Credits

Fall #3

ANAT 431	- Statistical Methods I	3 Credits
MBIO 420	- Molecular Genetics of Cancer	3 Credits

Comprehensive Examination (Pass/Fail)

Total 30 Credits

Faculty Diversity Report

Faculty Senate

September 23, 2010

Presented by
Dr. Marilyn S. Mobley
and
Dr. John M. Clochesy

CASE WESTERN RESERVE UNIVERSITY EST. 1826
think beyond the possible℠

Forward Thinking (Strategic Plan)

GOAL II – Develop a strong, vibrant and diverse University community.

2. Promote diversity
   Enfranchise underrepresented groups, maximizing the richness of culture, and perspectives within the campus community.

   Sustain and broaden the ADVANCE Institutional Transformation Program, with its emphasis on women and minority faculty.

Office of Inclusion, Diversity and Equal Opportunity

Adelbert Hall, Room 315

www.case.edu/diversity

Marilyn S. Mobley, PhD, Vice-President
Robynn K. Strong, Executive Aide to Dr. Mobley
Melissa K. Burrows, PhD, EEO & Diversity Specialist
John M. Clochesy, PhD, Faculty Diversity Officer
Tenille N. Kaus, JD, Mgr of Faculty Diversity & Development
*Liz Roccoforte, MA, Diversity Program Manager**
*Kyle Znamenak, CDP, Diversity Program Specialist**

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mindful learning and transformative dialogue

OIDEO Pillars of Strategic Leadership

- Research and Climate Assessment
- Communication and Education
- Programming and Resource Development
- Compliance
- Community Engagement and Outreach

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University Committees and Councils

Faculty Senate Committee on Women Faculty
Faculty Senate Committee on Minority Affairs

President's Advisory Council on Women (PACOW)
President's Advisory Council on Minorities (PACM)

Supplier Diversity Initiative Council
Diversity Leadership Council

Diversity Leadership Council Membership

Sarah Andrews	Sane Loue
Deborah Bibb	Dorothy Miller
Cathy Carlin	Dean Patterson
Denise Douglas	Deborale Richardson-Bouie
Jonathan Entin	Charles Rozek
Karen Farrell	Lynn Singer
Kurt Fretthold	Colleen Treml
Dario Gasparini	Elfreda Walter
James Harris	Kristin Williams
Stephen Haynesworth	Rhonda Williams
Sonya Pryor-Jones	

Promoting diversity through inclusive thinking,
mindful learning and transformative dialogue

Representing 50 states and 87 countries

DEMOGRAPHIC SNAPSHOT OF CWRU*

The OIDEO gratefully acknowledges the Office of Institutional Research for compiling the demographic data for this report. The current data will serve as a baseline from which the OIDEO will continue to monitor the progress of the University in the area of diversity and inclusion for faculty, staff, undergraduate, graduate and professional students. This data will also continue to guide strategic planning and programming efforts.

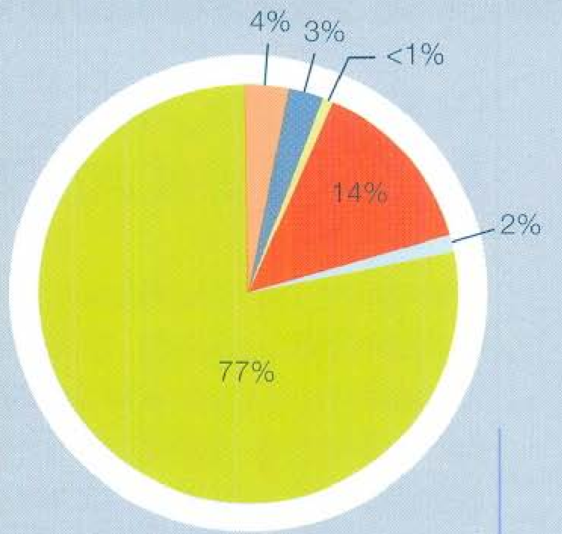
* Sources: Faculty Database, Office of the Provost; Human Resources; Registrar. Percentages may not sum to 100 due to rounding.

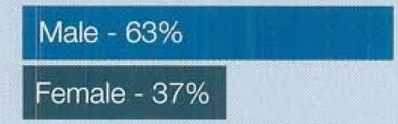
KEY TO CHARTS ON RACE/ETHNICITY

- International
- African American
- American Indian
- Asian/Pacific Islander
- Hispanic
- White
- Unknown/Other

FACULTY +

Total - 1,244





Faculty and Staff data is current as of Nov. 2009

+ Data reflects only those faculty who are University employees

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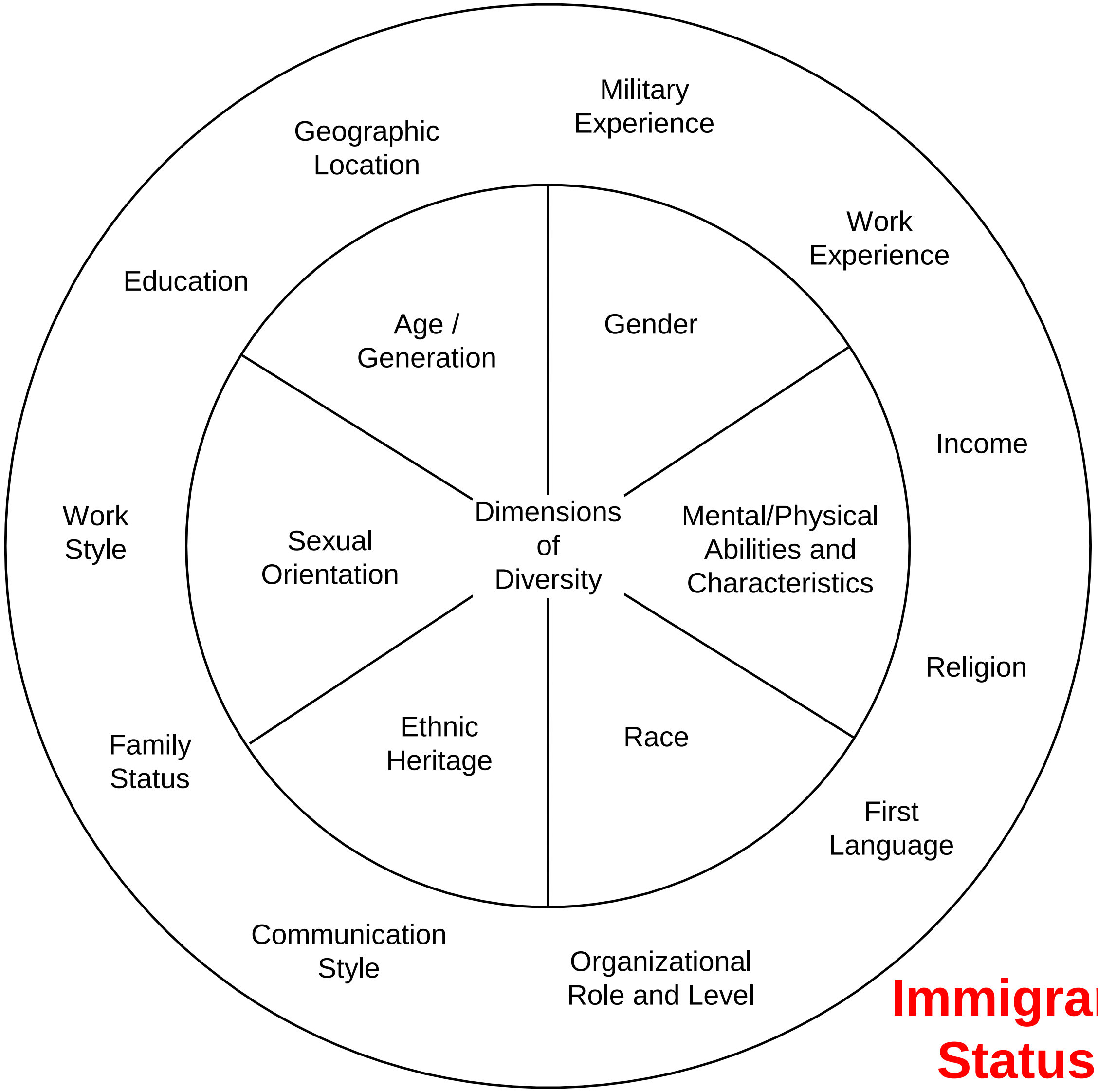
	Tenured			Tenure Track			Non-Tenure Track			Not Applicable			Grand Total		
	W	M	Total	W	M	Total	W	M	Total	W	M	Total	W	M	Total
Non-Res Alien	1	4	5	10	17	27	1	7	8	3	7	10	15	35	50
African Amer	5	9	14	8	4	12	6	0	6	5	2	7	24	15	39
Native Amer	0	2	2	0	1	1	0	0	0	0	0	0	0	3	3
Asian	15	44	59	12	42	54	14	24	38	9	9	18	50	119	169
Hisp / Latino	3	1	4	3	8	11	2	2	4	0	1	1	8	12	20
White	116	367	483	71	79	150	101	119	220	75	35	110	363	600	963
Unk/Not Self-Id	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	**140**	**427**	**567**	**104**	**151**	**255**	**124**	**152**	**276**	**92**	**54**	**146**	**460**	**784**	**1,244**

School	Non-Resident Alien	African American	Asian	Hispanic Latino	White	Total Minority	Grand Total
Applied Social Sciences	0	4	0	0	21	4	25 (.160)
Arts and Sciences	12	8	15	4	202	27	241 (.112)
Dental Medicine	2	5	10	3	50	18	70 (.257)
Engineering	10	1	23	1	71	26	107 (.243)
Law	0	1	1	0	45	2	47 (.043)
Management	4	1	10	1	43	12	59 (.203)
Medicine	22	8	109	10	427	129	578 (.223)
Nursing	0	10	1	1	80	12	92 (.130)
Physical Education	0	1	0	0	24	1	25 (.040)
Total	50	39	169	20	963	231	1244
	0.040	0.031	0.136	0.016	0.774	0.186	

Dimensions of Human Difference (Loden)



Immigrant Status

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Retention and Recruitment Issues

- Overexposure/hypervisibility
- Micro-inequities
- Subtle and unconscious bias
- Critical mass

Subtle and Unconscious Bias

- Searches
- Classroom
- Committees
- Meetings

- http://www.cookross.com/docs/UnconsciousBias.pdf

The Search and Affirmative Action Process

Informational Presentation

Consultation

Search Committee Training

(similar to Carnegie Mellon)

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Ways that OIDEO can partner with your search committee

- Review potential advertisements
- Recommend sources to identify potential applicants
- Meet with those invited to campus for interview (~30 minutes)

Promising Practices

Projecting a Welcoming & Inclusive Environment

We need to be mindful & intentional.

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Building Relationships and Selling Cleveland and NE Ohio

- Personal contacts!
- Invite graduate students, post-doctoral trainees, young faculty to campus to present seminars.
- Summer opportunities on campus to engage is scholarship.
- Conference on campus.

Building Relationships and Selling Cleveland and NE Ohio

- Best Practice (reported by faculty hire)

  - *Invited not as faculty applicant to visit*
  - *Met with lots of <u>enthusiastic</u> faculty at all ranks, possible collaborators*
  - *Host knew everything about me, he knew I was a dog person, so he introduced me to his dog too*

Other Examples

- Washington University in St. Louis
  - *Diversity and Inclusion Grants*
- New York University
  - *Postdoctoral and Transition Program for Academic Diversity Fellowship*
- Preparing Future Faculty
- Inclusive Teaching Strategies
  - *Impacts overall climate*

Washington University in St. Louis Diversity and Inclusion Grants

- Since 2005
- 13 grants last year
- $250,000 in 2009

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NYU Postdoctoral and Transition Program for Academic Diversity Fellowship

- Five positions
- Two year appointment (Asst Prof/Faculty Fellow)
- Completed dissertation within 3 years

- Dance, Film, Finance, History, Literature, Management, Marketing, Music, Psychology, Sociology(2)

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Preparing Future Faculty

- Howard University
- University of Texas, Austin

Inclusive Teaching Strategies

- University of Michigan
- UNC Chapel Hill
- Vanderbilt University

Upcoming Events

Friday, September 24th

"Sit in at the Five and Dime"

A concert reading by Margorie Duffield & Janice Lowe

Sponsored by the President's Advisory Council on Minorities

6:00 pm, Harkness Chapel

Thursday, October 14th

"Why Diversity Matters in the Obama Era"

A lecture by Charles J. Ogletree, Jr.

OIDEO Power of Diversity Lecture Series

4:30 pm, Inamori Center for Ethics and Excellence

Promoting diversity through inclusive thinking, mindful learning and transformative dialogue

Contact Us

www.case.edu/diversity

facultydiversity@case.edu

(216) 368-8877

Total Faculty by School/College

Faculty Comparison	2005/06 Faculty	2006/07 Faculty	2007/08 Faculty	2008/09 Faculty	2009/10 Faculty
Arts and Sciences	220	219	222	229	241
Dental Medicine	66	68	71	73	70
Engineering	117	115	110	108	107
Law	48	51	51	49	47
Management	74	60	61	58	59
Medicine	748	756	621	585	578
MSASS	25	26	27	26	25
Nursing	59	71	75	81	92
Total Faculty	**1,357**	**1,366**	**1,238**	**1,209**	**1,219**

All numbers are for Board-approved, Case-paid faculty only at the rank of instructor and above.

For the School of Medicine, this number changed after the affiliation agreement went into effect during 2006.

Faculty by Gender and School/College

Faculty Comparison	2005/06 Women	2006/07 Women	2007/08 Women	2008/09 Women	2009/10 Women
Arts and Sciences	73	81	84	85	96
Dental Medicine	17	18	21	23	23
Engineering	12	13	12	14	13
Law	12	16	18	19	19
Management	16	14	13	11	11
Medicine	259	265	209	187	190
MSASS	13	13	13	13	13
Nursing	54	66	70	77	87
Total Faculty	**456**	**486**	**440**	**429**	**452**

All numbers are for Board-approved, Case-paid faculty only at the rank of instructor and above.

For the School of Medicine, this number changed after the affiliation agreement went into effect during 2006.

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Total Minority Faculty by School/College

Faculty Comparison	2005/06 Minority	2006/07 Minority	2007/08 Minority	2008/09 Minority	2009/10 Minority
Arts and Sciences	25	25	25	26	30
Dental Medicine	17	19	19	20	20
Engineering	30	32	31	33	35
Law	5	4	4	3	2
Management	16	10	11	13	14
Medicine	137	152	142	143	143
MSASS	3	4	4	4	4
Nursing	5	7	10	9	12
Total Minority Faculty	**238**	**246**	**246**	**251**	**260**
Underrepresented Minority Total *	**70**	**72**	**65**	**64**	**70**

* African Americans, Hispanic Americans, Native Americans, Alaska Natives, Hawaiian Natives, and natives of the U.S. Pacific Islands. Women are considered an underrepresented group in the STEM fields.

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African American Faculty by School/College

Faculty Comparison	2005/06 Af-Amer	2006/07 Af-Amer	2007/08 Af-Amer	2008/09 Af-Amer	2009/10 Af-Amer
Arts and Sciences	7	7	6	7	8
Dental Medicine	7	6	6	5	5
Engineering	1	1	2	1	1
Law	4	3	3	2	1
Management	2	0	0	1	1
Medicine	13	17	16	12	9
MSASS	3	4	4	4	4
Nursing	4	6	8	7	10
Total Faculty	**41**	**44**	**45**	**39**	**39**

Asian Faculty by School/College

Faculty Comparison	2005/06 Asian	2006/07 Asian	2007/08 Asian	2008/09 Asian	2009/10 Asian
Arts and Sciences	14	15	15	15	17
Dental Medicine	8	11	11	12	12
Engineering	26	28	26	29	30
Law	1	1	1	1	1
Management	12	9	10	11	12
Medicine	106	116	117	118	117
MSASS	0	0	0	0	0
Nursing	1	1	1	1	1
Total Faculty	**168**	**181**	**181**	**187**	**190**

Hispanic Faculty by School/College

Faculty Comparison	2005/06 Hispanic	2006/07 Hispanic	2007/08 Hispanic	2008/09 Hispanic	2009/10 Hispanic
Arts and Sciences	4	3	4	4	5
Dental Medicine	2	2	2	3	3
Engineering	2	2	2	2	3
Law	0	0	0	0	0
Management	2	1	1	1	1
Medicine	16	16	7	11	15
MSASS	0	0	0	0	0
Nursing	0	0	1	1	1
Total Faculty	**26**	**24**	**17**	**22**	**28**

Native American Faculty by School/College

Faculty Comparison	2005/06 Nat Amer	2006/07 Nat Amer	2007/08 Nat Amer	2008/09 Nat Amer	2009/10 Nat Amer
Arts and Sciences	0	0	0	0	0
Dental Medicine	0	0	0	0	0
Engineering	1	1	1	1	1
Law	0	0	0	0	0
Management	0	0	0	0	0
Medicine	2	3	2	2	2
MSASS	0	0	0	0	0
Nursing	0	0	0	0	0
Total Faculty	**3**	**4**	**3**	**3**	**3**