

Faculty Senate Executive Committee
Wednesday, December 9, 2015
3:00p.m. – 5:00p.m. – Adelbert Hall, Toepfer Room

| | | |
|-----------|--|------------------------------------|
| 3:00 p.m. | Approval of Minutes from the November 16, 2015, Executive Committee Meeting, <i>attachment</i> | Roy Ritzmann |
| 3:05 p.m. | President and Provost's Announcements | Barbara Snyder Bud Baeslack |
| 3:10 p.m. | Chair's Announcements | Roy Ritzmann |
| 3:15 p.m. | Bioethics/Genetic Counseling Dual Degree Program, <i>attachment</i> | Paul MacDonald Aaron Goldenberg |
| 3:25 p.m. | MA in Patent Practice/MS in Biochemistry Dual Degree Program, <i>attachment</i> | Paul MacDonald Bill Merrick |
| 3:35 p.m. | Proposed Revisions to MSASS By-Laws, <i>attachment</i> | Gerald Mahoney |
| 3:45 p.m. | Honorary Degree Nominations, <i>attachment</i> | Bud Baeslack |
| 3:55 p.m. | Results of Committee on Research Survey | Lee Hoffer |
| 4:10 p.m. | Proposed Revision to Research Committee Charge, <i>attachment</i> | Lee Hoffer |
| 4:15 p.m. | Bias Reporting System- Feedback from Senate Standing Committees | Roy Ritzmann |
| 4:25 p.m. | Discussion re Standing Committee Membership Attendance | Roy Ritzmann |
| 4:35 p.m. | Approval of Faculty Senate Agenda, <i>attachment</i> | Roy Ritzmann |

**Faculty Senate Executive Committee
Minutes of the December 9, 2015 Meeting
Adelbert Hall, Toepfer Room**

Committee Members in Attendance

Barbara Snyder, President
Bud Baeslack, Provost
Roy Ritzmann, CAS, Chair
Robert Savinell, CSE, Past Chair
Lisa Lang, SODM
Peter Harte, SOM, Vice Chair
Mary Quinn-Griffin, SON
Horst von Recum, CSE
Gillian Weiss, CAS
Richard Zigmond, SOM
Juscelino Colares, LAW
Gerald Mahoney, MSASS

Others Present

Paul MacDonald
Leena Palomo
Lee Hoffer

Guests:

William Merrick
Aaron Goldenberg

Absent:

Susan Case, WSOM

Call to Order

Professor Roy Ritzmann, chair, Faculty Senate, called the meeting to order at 3:00 p.m.

Approval of Minutes

The minutes of the November 16, 2015 meeting of the Faculty Senate Executive Committee were reviewed and approved. *Attachment*

President and Provost's Announcements

The President and Provost had no announcements.

Chair's Announcements

Prof. Ritzmann reported that the 2016-2017 Faculty Interest Survey was sent out earlier than usual this year so that standing committees can be staffed on a more-timely basis. He urged all committee members to complete the survey and to encourage their colleagues to do the same.

Prof. Ritzmann said that he hadn't received any faculty volunteers for the ad hoc committee to consider HLC guidelines regarding minimum faculty qualifications. He encouraged faculty to contact him if they are interested.

Prof. Ritzmann reported that two irregularities had been identified with respect to the Senate vote on the Tobacco Free Campus policy. First, the proposal stated that 48% of AAU schools had adopted tobacco free campus policies. This percentage reflects the total number of AAU schools that have adopted smoke free or tobacco free policies. The actual percentage of AAU institutions with tobacco free policies is 29%. Secondly, Prof. Ritzmann reported that at both the October and November Faculty Senate meetings there had been an improper quorum. He proposed two possible options to resolve this problem: the Senate can vote again on the issues previously approved, or it can vote to ratify the original votes (as provided in Robert's Rules).

The Committee discussed when a motion to ratify is appropriate. It also discussed whether it should be approving or endorsing policies such as the Tobacco Free Campus policy. President Snyder suggested that an attorney from the Office of General Counsel be consulted and Arlishea Fulton, Senior Counsel, was asked to join the meeting. Ms. Fulton said that a motion to ratify a previous vote is appropriate in emergency situations so the better route in this case is to ask the Senate vote again. With respect to general university policies, Ms. Fulton said that if there is no requirement for Senate approval, that an endorsement would be more appropriate.

The Committee discussed when to hold another vote on the tobacco free campus policy. Attendance at the December meeting may be low because of the holidays. Student senators may not be available either. The Executive Committee voted unanimously to ask the Senate to vote again on the issues approved at the October and November meetings, but to wait until the January meeting to do so.

Bioethics/Genetic Counseling Dual Degree Program

Professor Paul MacDonald, chair of the Committee on Graduate Studies, reported that the Committee on Graduate Studies had approved the proposal for a bioethics/genetic counseling dual degree program with a couple of contingencies. All contingencies were satisfied. Professor Aaron Goldenberg from the Bioethics department presented the program. He said that Northwestern is the only other program like this in the country. The goal is to train genetic counselors who will be able to apply principles of bioethics into their clinical practice and/or research. The students in both degree programs are enthusiastic about combining the degrees. It is anticipated that 2-3 students will enroll in the program at first. The UCITE office provided a grant which helped in the development of the program. The Executive Committee voted unanimously to include the dual degree program on the agenda for the Faculty Senate meeting.

Attachment

MA in Patent Practice/MS in Biochemistry Dual Degree Program

Prof. MacDonald reported that the Committee on Graduate Studies had approved the proposal for an MA in Patent Practice/MS in Biochemistry dual degree program. Professor William Merrick presented the program. Prof. Merrick said that the MA in Patent Practice enrolled its first class of students this year and the program is doing well. They have also had success with the JD/MS in Biochemistry. This new program is designed for biochemistry students who are interested in careers as patent agents but who don't want to invest in a law degree. It is a 45-credit hours program (rather than the 66 credit hours it would require to complete both degrees independently) and can be completed in 18 months. The Executive Committee voted unanimously to include the dual degree program on the agenda for the Faculty Senate meeting. *Attachment*

Proposed Revisions to MSASS By-Laws

Professor Gerald Mahoney, MSASS, presented proposed revisions to the MSASS By-Laws. The first proposed change involves changing the ratio of tenure-track to non-tenure track faculty from 75/25 to 60/40 respectively. MSASS has a greater demand for faculty due to the online MSSA, the intensive weekend program and a larger enrollment of students overall. They have been hiring adjunct instructors to teach classes and they would like to hire more full-time non-tenure track faculty. The second proposed change is to add lecturers to the special faculty category. These faculty would have significant experience in social work practice and would be hired for short-term periods. The Executive Committee voted unanimously to include the By-Laws revisions on the agenda for the Faculty Senate meeting. *Attachment*

Honorary Degree Nominations

The Provost presented two honorary degree nominations. The Executive Committee voted unanimously to approve the nominations and to forward them to the Board of Trustees for approval. Prof. Ritzmann reminded the Committee that the names of the nominees are confidential until approved by the Board. *Attachment*

Results of Committee on Research Survey

Lee Hoffer, chair of the Committee on Research, reported on the results of a survey conducted by the Research Committee last spring. Data from the university's 2010 and 2014 faculty climate survey had indicated overall dissatisfaction with research but did not provide detail on specific areas of dissatisfaction. This survey was intended to identify those areas. The response rate was relatively low (n= 393) most likely because it had been sent out at the end of the spring semester. Also, the survey asked primarily about experiences with grant-funded research activities and some faculty don't engage in this type of research. In response to questions about what CWRU does well, collaboration, departmental research staff, and perceived flexibility were cited most often. With regard to what CWRU doesn't do well, university staff, internal funding, and grant-writing support were cited most often. In the future, Prof. Hoffer plans to improve the design of the survey and to send it out at regular intervals so that responses can be compared over time. The results of this survey can help inform the strategic research implementation committee. A senator commented that surveys

aren't useful unless there is a mechanism to make changes. Prof. Hoffer said that the Senate can make recommendations based on the survey results and that at least this is a start. A suggestion was made that information on improvements made as a result of the survey be communicated to faculty. *Attachment*

Proposed Revision to Research Committee Charge

Prof. Hoffer presented a proposal to amend the Research Committee charge to add an undergraduate student as a voting member of the Committee. The graduate students on the committee are very engaged and with the focus on undergraduate research at CWRU it would be appropriate to add an undergraduate student member. The Executive Committee unanimously approved forwarding the proposal to the By-Laws Committee for consideration. *Attachment*

Bias Reporting System- Feedback from Senate Standing Committees

The Committee reviewed the statements on the bias reporting system from the Senate Committees on Minority Affairs, Faculty Personnel and Women Faculty. The Committee on Women Faculty was generally happy with the changes made to the system but would like to receive annual updates on utilization of the system. The Committee on Minority Affairs made specific recommendations for additional changes to the language used on the system website. The Committee on Faculty Personnel had similar concerns to those articulated by Minority Affairs but without as much detail. Prof. Ritzmann suggested that the chairs of the three committees meet to develop a unified statement that would be presented to the Office of Student Affairs. The Executive Committee agreed with this approach.

Discussion re Standing Committee Membership Attendance

Prof. Ritzmann discussed the lack of attendance at standing committee meetings and proposed adding language to the Senate By-Laws to the effect that if a committee members misses more than 50% of the meetings they can be asked to step down. The Executive Committee voted unanimously to charge the By-Laws Committee with drafting this provision.

Approval of Faculty Senate Meeting Agenda

The Executive Committee approved the agenda for the December 21st Faculty Senate meeting. *Attachment*

The meeting was adjourned at 4:45pm.

Approved by the Faculty Senate Executive Committee



Rebecca Weiss
Secretary of the University Faculty

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

Dean

Senior 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>

November 4, 2015

Roy Ritzmann, PhD
Chair, Faculty Senate
c/o Rebecca Weiss, Secretary of the University Faculty
Adelbert Hall
7001

Dear Dr. Ritzmann:

As noted in the accompanying memo from Dr. Bill Schilling, Chair of the School of Medicine's Faculty Council, the Faculty Council has recommended approval of a Master of Arts in Bioethics and a Master of Science in Genetic Counseling Dual Degree Program.

This program will establish a comprehensive curriculum integrating foundational principles of genetics and ethics through the collaborative efforts between two nationally renowned programs. The departments and faculty have experience with the management and coordination necessary for successful dual degree programs.

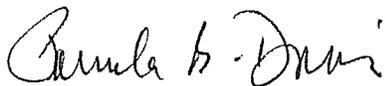
The proposal approval process is outlined in Dr. Schilling's memo. An ad hoc Committee was convened to review this new program and after revisions, the program was approved by the Faculty Council.

I concur with the Faculty of Medicine and recommend approval of this dual degree program.

Please submit the proposed dual degree program to the appropriate committees for their review at their earliest opportunity. I would be pleased to answer any questions that might arise during the review process.

Thank you.

Sincerely,



Pamela B. Davis, MD, PhD

c: Dr. Bill Schilling, Chair, Faculty Council
Nicole Deming, Assistant Dean for Faculty Affairs and Human Resources, SOM

enclosures



SCHOOL OF MEDICINE

CASE WESTERN RESERVE
UNIVERSITY

**Proposal for a Dual Degree between
Bioethics (MA) and the Genetic Counseling Training Program (MS)**

Dual Degree Program Directors: Aaron Goldenberg, PhD & Anne Matthews, PhD

A. Brief Summary

We are proposing the creation of a Dual Degree between the Masters in Bioethics and Genetic Counseling Programs that will establish a comprehensive curriculum integrating foundational principles of genetics and ethics,. The goal of this program would be to train Genetic Counselors who could also apply Bioethics into their clinical practice and/or research.

B. Rationale for a Joint Degree and a New Course in Bioethics and Genetic Counseling

Advances in next generation sequencing technologies, such as whole exome and whole genome sequencing and multiplex testing, have the potential to spur better integration of genetics and genomics into patient care. However, appropriate utilization of these technologies will require the capacity to manage, interpret, and communicate very large amounts of personal genetic information. Moreover, the integration of genomic technology into clinical and research settings raises a number of ethical issues related to privacy of genomic data, the impact of genomic information on families, and utility of genomic information. Additionally, there are a number of important questions regarding equity and access to these new technologies among underserved or uninsured families. This raises questions about the potential negative impact that differential access to these technologies may have on health disparities. Addressing these issues requires comprehensive education and counseling for patients and families going through various forms of genetic screening. Genetic Counselors will need to not only interpret the genetic/genomic findings themselves, but to contextualize those findings within the broader social and ethical impact of these technologies. Nevertheless, there is currently only one academic program in the U.S. that fully integrates training in Genetic Counseling and Bioethics in a dual degree program.

We are very fortunate at Case to have prominent Masters Programs in both Genetic Counseling and Bioethics. The collaborative nature between the two programs is well established. For many years faculty from both programs have taught in each other's courses, been mentors to each other's students, and collaborated in grants and other scholarly activities. In addition, we have had one graduate from our Bioethics Master's Program accepted to the Genetic Counseling Training Program. A number of Genetic Counseling students have chosen to do their thesis/capstone research project on an ethics related topic. However, even with the increasing relevance of Bioethics to the Genetic Counseling curriculum, and strong interest among student from both programs, there is no formal collaborative training program. We are proposing a dual degree program between the MA program in Bioethics and the MS in Genetic Counseling.

While genetic counseling programs all provide some ethics training to their students, the ethics curricula tend to focus on ethical issues that arise in practice and professional life. The dual degree program however, will allow students to pursue a broader exploration into bioethics scholarship, develop methodological empirical ethics skills, and deeply explore topics of genetics and health systems, genomics research, and public health genomics. The dual degree program will allow graduates to engage in both contemplative analysis and application of

knowledge in the counseling of patients, for example, deciding whether to pursue genomic screening with a trained eye for the personal and ethical implications of the results. Graduates will be more prepared to participate in the ongoing national dialogue about the ethical, legal, and social implications of advances in genomic technology. Additionally, many genetic counselors are becoming more involved in research within their home institutions and with other counselors nationwide. This research frequently focuses on patient uptake and perceptions of new genetic testing technology, patient preferences regarding genetic services, and issues related to genetic discrimination, privacy, and the return of genetic and genomic results. All of these topic areas raise unique ethical, legal, and social implications. A Dual Degree in Genetic Counseling and Bioethics would enhance a graduate's ability to engage in these issues and increase the value and skill set they bring to the research team.

The MS GC Degree is a “terminal” degree in the sense that persons with the degree will be able to pursue a variety of career paths. The MA in bioethics is not traditionally a “terminal degree” in that it enhances careers in other fields – e.g. law, medicine, nursing, public health or in this case, genetic counseling. Thus, the dual bioethics-genetic counseling degree would fuel careers in every aspect of genetics, genomics and health, clinical genetics, and health policy.

C. Institutional Partners

This project would be developed within the contexts of two primary institutional and programmatic partners:

1. The Masters in Bioethics Program, Department of Bioethics (Plan B)

The Department of Bioethics Master of Arts program in Bioethics emphasizes the multi- and interdisciplinary nature of the field. The master's degree programs reflect our values: to provide excellent education in bioethics to students and professionals in the School of Medicine and throughout the University; contribute outstanding research and scholarship to the world literature in bioethics; provide local, regional, and national service to health professionals, policy makers, and the public; and to promote international bioethical dialogue through research collaborations, training programs, and institutional partnerships. The program has an excellent track record of training students in Bioethics. Since its inception the program has graduated over 185 students. Many of these students have gone on to PhD programs, medical school, law school, or work in the areas of bioethics research, research oversight, or clinical ethics. Moreover, the Department of Bioethics has a very strong track record regarding dual degree programs and currently offers programs in Medicine, Law, Public Health, Nursing, Social Work, and Genetics. The stand-alone Bioethics MA is 27 credits and includes a Final Project/Paper that allows the student to engage in an in-depth exploration of a bioethics topic of their choosing.

2. The Genetic Counseling Training Program, Department of Genetics and Genome Sciences (Plan B)

The Genetic Counseling Training Program, leading to a Master of Science degree in Genetics, is a two-year academic program comprised of course work, laboratory exposure, extensive clinical training and research experience. The overall objective of the Program is to prepare students with the appropriate knowledge and experiences to function as genetic counselors in a wide range of settings and roles. The Program is accredited by the Accreditation Council for Genetic Counseling and graduates are eligible to sit for the national certification examination

administered by the American Board of Genetic Counseling (ABGC). The Program strives to train students who can interface between patients, clinicians and molecular and human geneticists. The stand-alone Genetic Counseling degree is 40 credits and includes both a written and oral comprehensive exam given in their second year and the completion of a research project. The Program has had an excellent track record: approximately 50-60 applications are received each year; since 2000, 60 students have graduated; there has been a 98% pass rate on the ABGC certification examination; and 90+% are employed as genetic counselors throughout the US and Canada.

D. Dual Degree Program Leadership and Anticipated Participation

The dual Degree in Genetic Counseling and Bioethics will be co-directed by Dr. Anne Matthews, Professor of Genetics and Genome Sciences and Dr. Aaron Goldenberg, Associate Professor of Bioethics. It will utilize the expertise of other genetics and bioethics faculty. We anticipate that we will accept up to two students each year for the Genetic Counseling/Bioethics Dual Degree Program (currently the Genetic Counseling Training Program can accommodate six students). In the future, we may be able to accommodate more students depending on the size of the genetic counseling program (the Genetic Counseling Program is planning on expanding their program to eight students per year within the next two years) and available faculty.

E. Dual Degree Requirements

The curriculum for the Dual Genetic Counseling/Bioethics Degree will consist of 59 credit hours to be completed in 2.5 years (Option 2) *See Appendix A*. This program will allow an enrolled student to finish the program in 5 full time semesters. Students enrolled in the dual degree program will spend their first year taking courses entirely within the Genetic Counseling Program and then will spread out their Bioethics coursework over the next 1.5 years.

The reduction in total credit hours is accounted for through the counting of the BETH 412: Ethical Issues in Genetics and Genomics course (3 credits) and GENE 601 Research Hours (6 credits) towards both degrees. Both of these elements will be key elements of the dual degree program:

1. Core Genomics and Ethics Course

One of the centerpieces of the Joint Degree between Bioethics and the Genetic Counseling Program is the new core course on the Ethical, Legal, and Social issues associated with advancements in Genetics and Genomics. For many years the Department of Bioethics had a Course on Ethical Issues in Genetics (BETH 412). However, with the departure of the course director in 2009, the course had not been taught in over 4 years. With recent advances in genomic technology and the integration of genetics into clinical care, we believed it was vital that the University offer a new course on the Ethical Implications of these advances.

BETH 412, Ethical Issues in Genetics and Genomics, is designed as an interactive seminar with the goal of exposing graduate students to the ethical, legal, and social implications of advances in genomics and genetics. The Course is designed to utilize multimedia, peer led discussions, and presentations from local/national experts. The curriculum focuses on two major areas; 1) *Genomics in Research Settings* and 2) *Genomics*

in Clinical Settings. Topics for the course include the predictive genomic screening, prenatal diagnosis, genetic privacy, implications for incidental findings, human genetic variation research and health disparities, and implications of genetic testing in pediatric settings. It also includes sessions on the history of genetics and ethics, to better contextualize current controversies. BETH 412 has now been taught for two semesters with excellent evaluations/reviews from both bioethics students and genetic counseling students. Students have consistently rated the interactive nature of the course and its focus on both historical and current topics in genetics and ethics very highly.

While the Genomics and Ethics Course is required for students enrolled in the Genetic Counseling Training Program, thus required for those students enrolled in the dual Degree Program, it will also be available to other students in the Bioethics Program, the Genetics Department and other graduate programs across the CWRU campus. To date, students from Bioethics, genetic Counseling, Medical Physiology, and Nursing have enrolled in the course.

2. Genetics-Ethics Research Project

Currently, the Genetic Counseling Program is under Plan B of the School for Graduate Studies. In addition to both a written and oral comprehensive examination, the Program requires a research project be carried out for the completion of the Program. This scholarly project may be literature-based, a clinical or counseling project, or laboratory-based project and must relate to some aspect of genetic counseling. At the completion of the project there is a committee oral defense. The final research project is submitted to the research committee in manuscript format suitable to submit for consideration for publication.

For the dual degree, students will be required to choose a research project that includes ethical, legal, or social issues of genetic counseling practice, clinical genetics or genomics, or genetic research. Students will also be required to include at least one Bioethics Faculty member on their Research Project Committee.

F. Dual Degree Governance

The program will be administered by the Directors of the MA Program in Bioethics (Goldenberg) and the Director of the Genetic Counseling Training Program (Matthews). Drs. Goldenberg and Matthews will act as student advisors for each of the two program individually, but will meet monthly to assess student progress, address any student or faculty concerns, and assure that student progress in each of the programs, and their overlapping components, are being achieved.

G. Admissions

Students who would like to enroll in the dual degree program will apply and be admitted into each program separately. While admissions committees for each program will communicate with each other regarding applicants, each admissions committee will decide independently about the suitability of the applicant to their program. Fulfillment of the requirements for admission to the School of Graduate Studies at Case Western Reserve University must be met as

well as those required by the Genetic Counseling Training and Bioethics Programs. There may also be situations in which a first year genetic counseling student may wish to add the bioethics degree to his or her program. Because the first year of the dual degree consists of only genetic counseling coursework, this would be possible. In these cases, the students would still need to apply to the Bioethics program and be admitted to pursue the dual degree. In addition to applicants who have completed their undergraduate and/or graduate degrees, students in the Integrated Graduate Studies program (IGS) at CWRU would be eligible for consideration for admission into the Genetic Counseling/Bioethics dual degree program.

Admission requirements for the Genetic Counseling Program include successful completion of the following:

- Prerequisite courses: Biology - minimum of one year; Genetics - minimum of one semester; Biochemistry - minimum of one semester; Statistics - minimum of one semester and Psychology - minimum of one semester
- Results of Graduate Record Examination scores on the general examination.
- Advocacy Experiences. Counseling experiences that are relevant to genetics, medical genetics and genetic counseling are highly recommended. Such experiences as counseling with a crisis hot line, Planned Parenthood program, peer/community counseling centers (paid or volunteer), working with individuals with disabilities and shadowing a genetic counselor are examples of experiences that highly desirable. Experience working in a DNA/molecular genetics/cytogenetic laboratory, or teaching assistant positions in biology or genetics courses are also very appropriate. The applicant should strive for experiences that provide for one-on-one interactions with others. Moreover, in the application personal statement, applicants should demonstrate an understanding of the field of genetic counseling, what led to choosing this field as a career and discuss how previous experiences have enriched his or her understanding of the profession of genetic counseling.
- Interview. A personal interview is required. All interviews are by invitation only to assess maturity, written and oral communication skills, an awareness of the professional role of the genetic counselor and the genetic counseling profession.

Admission requirements for the Bioethics Program include successful completion of the following:

- Results of Graduate Record Examination scores on the general examination.
- Interview. A personal interview is required. All interviews are by invitation only to assess maturity, written and oral communication skills, an ability to complete graduate level work.

Program Evaluation and Outcome Assessment

Outcomes data to assess the dual degree Program's efficacy will be evaluated based on graduates' performance on the American Board of Genetic Counseling certification examination and graduates' employment and professional activities following graduation. Graduates will be contacted on a yearly basis and asked to update their contact information and provide a short narrative of their current activities. They will also be queried via an on-line survey approximately two years after graduation and asked to provide information about their employment, the types of positions they hold, their involvement in national organizations, types of research they have participated in and how their ethics training has expanded or promoted their professional roles.

Appendix A: Dual Degree Curriculum

Total Credit Hours = 59

Genetic counseling = 32 hrs; Bioethics = 18; Count for both = 9 (BETH 412 - 3; GENE 601 Research - 6)

| | FALL | | | SPRING | | | SUMMER | |
|--------|-----------|--------------------------------------|-------------------------|----------|------------------------------------|------------|-------------------------------------|------------------------|
| | Course # | Name | Credit Hrs | Course # | Name | Credit Hrs | | |
| YEAR 1 | GENE 524 | AMG: Cyto/Molecular Genetics | 2 | GENE 529 | Psychosocial Genetic Counseling | 3 | GENE 532 Clinical Practicum 3 | |
| | GENE 526 | AMG: Quant/Genomics | 2 | GENE 525 | AMG: Clinical Genetics | 2 | | |
| | GENE 528 | Principles Genetic Counseling | 3 | GENE 531 | Clinical Cancer Genetics | 2 | | |
| | SASS 477 | Practice Foundation Methods & Skills | 3 | GENE 601 | Research – Seminar | 2 | | |
| | | | Total Credit Hours = 10 | | | | Total Credit Hours = 9 | Total Credit Hours = 3 |
| YEAR 2 | GENE 532 | Clinical Practicum | 4 | GENE 532 | Clinical Practicum | 4 | GENE 601 - Research 3 credit hrs | |
| | GENE 527 | AMG: Metabolism | 2 | BETH 412 | Ethical Issues Genetics / Genomics | 3 | | |
| | 2BETH 401 | Foundations in Bioethics I | 6 | BETH 402 | Foundations in Bioethics II | 6 | | |
| | | | Total Credit Hours = 12 | | | | Total Credit Hours = 13 | Total Credit Hours = 3 |
| YEAR 3 | GENE 601 | Research | 3 | | | | | |
| | BETH 405 | Clinical Ethics Rotation I & II | 3 | | | | | |
| | BETH | Elective | 3 | | | | | |
| | | | Total Credit Hours = 9 | | | | | |



SCHOOL OF MEDICINE
CASE WESTERN RESERVE
UNIVERSITY

Michael A. Weiss, MD, PhD, MBA
Chairman
Department of Biochemistry
Distinguished Research Professor of Biochemistry and Medicine

December 16, 2014

Dean Pamela Davis
Case Western Reserve School of Medicine
10900 Euclid Avenue
Cleveland, OH 44106

Cowan-Blum Professor of
Cancer Research
10900 Euclid Avenue
Cleveland, Ohio 44106-4935

Visitors and Deliveries
Wood 437

Phone 216.368.5991

Fax 216.368.3419

Email michael.weiss@case.edu

Re: New dual degree SOM-Law School Master's

Dear Pam:

It is with great enthusiasm that I endorse and recommend the proposal by Prof. William Merrick (Vice Chair for Education) to develop a new Master's Program in Biochemistry in coordination with the graduate curriculum of the CWRU School of Law. The proposed dual MA in Patent Practice/MS in Biochemistry Program would enhance the career opportunities of students keen to engage in intellectual-property and patent-related activities in biotechnology or to have focused roles in law firms.

There are rich educational synergies between respective scientific curricula in Biochemistry and the School of Law. As outlined in Bill's proposal, these include the training of leading lawyers in IP fields with knowledge of biochemical principles and the training of scientists with an understanding of legal principles related to IP and patent law. The rationale for this program reflects a change in student needs. Whereas in past decades recently graduated engineers and scientists often enrolled in law school with the goal of becoming patent lawyers, over the past few years a growing number have become reluctant to invest in a three-year JD program. The proposed *Masters in Patent Practice* thus seeks to provide a viable alternative for these students, with a focus on students with a biochemistry background.

My colleagues and I anticipate that there will be a significant pool of applicants at this interface for whom the existence of a combined degree program will enhance the competitiveness of CWRU relative to peer institutions. The educational approach of the School of Law, with its many small groups, is in general accord with the educational philosophy of the School of Medicine and congruent in particular with how we teach in Biochemistry.

The existence of such an attractive joint-degree program promises to enhance both the educational environment and the tuition revenue of the Department of Biochemistry. Please note that a senior faculty member at the CWRU School of Law, Craig Nard (Galen J. Roush Professor of Law; Director of the Center for Law, Technology and the Arts) contributed to the design of this joint program and shares our enthusiasm.

Thank you for your consideration. With warm regards for the Holiday Season,

A handwritten signature in cursive script that reads "Mike Weiss".

cc. Christopher Masotti (CFO)
Prof. Mark Chance (Vice Dean for Research)



SCHOOL OF LAW

CASE WESTERN RESERVE
UNIVERSITY

Jessica Berg, Co-Dean
Tom J.E. and Bette Lou Walker
Professor of Law

Michael Scharf, Co-Dean
Joseph C. Hostetler-BakerHostetler
Professor of Law

Case Western Reserve University
School of Law
11075 East Boulevard
Cleveland, Ohio 44106
Phone 216-368-3283
E-mail lawdeans@case.edu

November 19, 2015

Paul MacDonald, Ph.D.
Chair, Graduate Education Committee
Case Western Reserve University

Dear Dr. MacDonald:

We are writing to express our strong support for the proposed dual degree — the Master of Science in Biochemistry and Master of Arts in Patent Practice. This dual degree is consistent with the strategic plan of the law school and the interdisciplinary objectives of the Spangenberg Center for Law, Technology & the Arts.

Sincerely yours,

Two handwritten signatures in cursive script. The first signature is for Jessica Berg and the second is for Michael Scharf.

Jessica Berg and Michael Scharf
Co-Deans, School of Law

Memorandum

To: Pamela B. Davis, MD, PhD
Dean, School of Medicine
Case Western Reserve University

From: Mark Aulisio, PhD
Chair, Faculty Council

Re: Dual Degree Program

Date: June 30, 2015

At its June 15, 2015, meeting, the Faculty Council voted to recommend approval of a Master of Public Health/Master of Science in Nutrition Dual Degree Proposal (Plan B, non-thesis requiring). The program is offered by the Department of Epidemiology and Biostatistics and the Department of Nutrition and includes courses from nutrition, biochemistry, and public health.

In accordance with our SOM practices, an ad hoc committee composed of members of the Faculty Council Steering Committee, Graduate Directors, the SOM members of the Faculty Senate's Committee on Graduate Programs, and the Associate Dean for Graduate Education was created to review the program proposal. The ad hoc committee was Chaired by Nicholas Ziats and met with William Merrick, Professor of Biochemistry and Graduate Advisor. The ad hoc committee reviewed the document, discussed the proposal, and engaged with the program presenter. After the meeting was concluded a summary of changes was created. These changes were adopted and the revised proposal was circulated to the ad hoc committee for a vote. The ad hoc committee approved the reviewed proposal and it was sent to the Faculty Council for a vote.

After your review, I hope you will join me in recommending approval of the proposal for a dual degree between the Department of Biochemistry in the School of Medicine (MS in Biochemistry) and the School of Law (MA in Patent Practice) by the Faculty Senate, as required by the Faculty Handbook.

Please let me know if I can provide any additional information.

Thank you for your consideration.

Sincerely,



Mark Aulisio, PhD
Chair, Faculty Council

cc: Nicole Deming

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>

October 19, 2015

Roy Ritzmann, PhD
Chair, Faculty Senate
c/o Rebecca Weiss, Secretary of the University Faculty
Adelbert Hall
7001

Dear Dr. Ritzmann:

As noted in the accompanying memo from Dr. Mark Aulisio, Chair of the School of Medicine's Faculty Council during the 2014-2015 academic year, the Faculty Council has recommended approval of a Master of Patent Practice/Master of Science in Biochemistry Dual Degree Program.

This program will graduate highly trained and competitive public health practitioners who have the skill and ability to develop evidence based policy and programs to address our society's chronic diseases such as cardiovascular disease, diabetes, and obesity. The departments and faculty have experience with the management and coordination necessary for successful dual degree programs.

The proposal approval process is outlined in Dr. Aulisio's memo. An ad hoc Committee was convened to review this new program and after revisions, the program was approved by the Faculty Council.

I concur with the Faculty of Medicine and recommend approval of these amendments.

Please submit the proposed dual degree program to the appropriate committees for their review at their earliest opportunity. I would be pleased to answer any questions that might arise during the review process.

Thank you.

Sincerely,

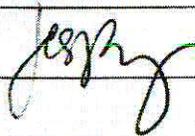


Pamela B. Davis, MD, PhD

c: Dr. Mark Aulisio, Chair, Faculty Council
Nicole Deming, Assistant Dean for Faculty Affairs and Human Resources, SOM

enclosures

VIII. Approval Signatures:

| | | |
|--|---|--|
| Co-Dean, School of Law <i>Michael Scharf or Jessica Berg</i> | X |  |
| Chair, Department of Biochemistry <i>Dr. Michael A. Weiss</i> | X | |
| Dean, School of Medicine <i>Dr. Pamela B. Davis</i> | X | |
| Dean, School of Graduate Studies <i>Dr. Charles Rozek</i> | X | |

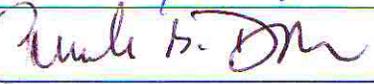
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It is noted that for either the experiential elective or the IP Venture Clinic, the student will have direct exposure to the workings of the patent process. The School of Law will assist in the placement of the student in the relevant environment.

Other appropriate activities for the MA/MS students include attending the weekly seminars, as well as annual named lectureships, participating in annual retreats, and one or more journal clubs (see also casemed.case.edu/gradprog/index.php). Within the Law School, students will be involved with informal networking experiences with potential employers and participate in Law School activities as they choose (see law.case.edu/StudentLife.aspx)

X. Advantages of the Joint Degree Program

There are several advantages to the students in the MA/MS program. The key advantage will be the integration of the two disciplines during the time that the students are receiving their training, thus allowing the students to develop a unique focus on their studies in each of the two disciplines. In addition, the usual Master's of Science in Biochemistry is a two year program but the students in the dual degree program will be able to complete the program requirements in just 12 months beyond the time required for obtaining the MA degree (or sooner if they take the alternate, accelerated track). This is reflected in the credit savings for the two degrees (36 + 30 = 66 hours) vs. the dual degree which requires 45 credit hours. This savings in credit hours is thus seen in both time (18 or 24 months vs. 3 years) and in expense, roughly the cost of an additional semester or two.

| | |
|--|--|
| Chair, Department of Biochemistry <i>Dr. Michael A. Weiss</i> | X  |
| Dean, School of Medicine <i>Dr. Pamela B. Davis</i> | X  |
| Dean, School of Graduate Studies Dr. Charles Rozek | X |

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MA in Patent Practice/MS in Biochemistry (plan B) Dual Degree Proposal

This document contains a proposal for a dual degree between the Department of Biochemistry in the School of Medicine (MS degree, plan B) and the Law School (MA in Patent Practice).

I. Background and Justification

The purpose of the degree program is to prepare a cadre of biochemistry students for successful careers as patent agents. In any given year, recently graduated engineers and scientists enroll in law school with the goal of becoming patent lawyers, but over the past few years, a growing number have become reluctant to invest in a three-year JD program. The proposed *Masters in Patent Practice* seeks to provide a viable alternative for these students, with a focus on students with a biological background. The most likely undergraduates would be science or engineering majors with the likelihood that biology and premed students who failed to enter medical school would predominate (in part based upon the requirements for entry). The one technological area of patent practice where an advanced degree leads to a significant difference in marketability is the life science field.

A career as a patent agent enables engineers and biomedical scientists to stay close to their technological specialty, yet provides a livelihood that has comparative advantages over that of a practicing engineer or bench scientist.¹ Indeed, the patent law landscape over the past 10 years has witnessed the growing importance of patent agents. Most IP boutique firms or IP practice groups within general firms have at least one, and oftentimes several, patent agents; and it is also common for patent agents to work in-house for corporations of all sizes. The *Masters in Patent Practice* will not only prepare the engineer and biomedical scientist to take the patent bar, but will introduce them to the nuances of patent searching, the complexities of patent drafting, and the arcana commonly associated with patent law doctrine and USPTO regulations.

Over the past several years, the United States Patent and Trademark Office has received increasingly more patent applications. In 2013, 571,612 patent applications were filed with the patent office. This compares with 456,321 in 2008 and 342,441 in 2000. Job postings for patent agents in intellectual property law journals and websites reflect these numbers. Anecdotal evidence also suggests a demand for patent agents.

Moreover, in the initial review of the MA in Patent Practice proposal, the Board of Regents review observed that there is a demand for patent agents (i.e. see

¹ For example, according to the American Intellectual Property Lawyers Association's "Report of the Economic Survey 2013," the average salary of a patent agent with fewer than five years of experience at a private law firm is \$92,250, with the first and third quartile range of \$55,500 to \$126,250.

www.intelproplaw.com/JobsAvailable/). For example, the University of Dayton reviewer wrote: "in the forty plus years that this reviewer has been practicing law, there has been a persistent shortage of people qualified and licensed by the United States Patent and Trademark Office to prepare, file and prosecute patent applications. The proposed Masters in Patent Practice will help alleviate that shortage. This program is unique to Ohio." The reviewer from the University of Toledo stated "CWRU has clearly shown that there are jobs for patent agents and that patent applications are increasing and a growth field." It is the intent of this program to provide individuals with a competitive edge to this professional discipline.

The formal acceptance of the stand alone MA in Patent Practice was approved by the Board of Regents in March 2015. This degree is currently advertised within the materials associated with admissions into the Law School.

II. Administration

School of Law Liaison: Craig Nard, Professor of Law, School of Law
Biochemistry Department Liaison: William Merrick, Professor of Biochemistry, Department of Biochemistry.

Professors Nard and Merrick will meet every other month during the initial phases of the program to best address problems these dual degree students might be having beyond those of the stand alone MA in Patent Practice (overseen by Professor Nard) and those in the stand alone or other dual degree programs associated with the MS in Biochemistry (overseen by Professor Merrick). In particular, there is a twelve year history with a similar program, the dual degree JD/ MS in Biochemistry.

III. Program Structure

If one were to acquire the MA and MS degrees independently, it would require the completion of 30 hours for the MA program and 36 hours for the MS program (a total of 66 credit hours). In the dual degree program, cross counting allows for a reduction in the total number of class hours to 45 credit hours for both degrees as described below. The 30 credit hour and 36 credit hour numbers are for the independent programs as accredited through the Board of Regents in Columbus.

The proposed dual degree requires students to complete 45 credit hours. The MS in Biochemistry requires 24 credit hours of coursework for the completion of the MS degree (plan B). The School of Law requires 21 credit hours of coursework for the completion of the MA program as part of the dual degree. To be compliant with the manner in which both degrees are certified by the Board of Regents, students will count 11-12 Law credit hours towards the MS in Biochemistry and count 9 hours of Biochemistry credits toward the MA in Patent Practice. Thus, there is an approximately equal reduction in both programs in accumulating the

total number of credit hours that are required to satisfy the requirements of the stand alone programs as approved by the Board of Regents.

The advantage of this dual degree program over either an MA with certificate in Biochemistry or an MS in Biochemistry with a certificate in Patent Practice is that the student will receive a recognized degree (either MA or MS) rather than a certificate which has no true academic definition (i.e. some CWRU certificate programs are completed with as few as 10 to 12 hours).

It should be noted that the anticipated number of students, perhaps as many as 6 per year, will not add a sufficient burden for the Law School classes (the MA in Patent Practice in particular), the biomedical classes nor the administration such that no additional personnel (faculty or staff) will be required for this program in either the Law School or the School of Medicine.

IV. Dual Degree Curriculum: Examples

Students begin in the School of Law although the fundamental Biochemistry course is also taken (BIOC 407, 408). The anticipation is that the entering student will be practicing in patent law and therefore the primary guidance in terms of job placement will reflect advising from the School of Law. The advisor in Biochemistry will provide insight into the most recent developing areas of research and technology that the student would be likely to encounter in their future employment.

Year 1: First year curriculum.

| Semester 1 | | Semester 2 | |
|---------------------------|-----|----------------------------|-----|
| LAWS IP Survey | (3) | LAWS IP Elective course | (3) |
| LAWS Patent Law | (3) | LAWS Patent Preparation II | (2) |
| LAWS Patent Preparation I | (3) | BIOC elective | (3) |
| BIOC 407 | (4) | BIOC 408 | (4) |

| | | | | |
|---------|---------------|-----|------------------------------|-----|
| Year 2. | BIOC 412 | (3) | LAWS Patent Bar Review | (4) |
| | BIOC elective | (3) | LAWS Experiential Elective** | (3) |
| | BIOC elective | (3) | BIOC elective | (3) |
| | | | EXAM 600 | (1) |

Alternate, 18 month fast track

Year 1: First semester

Semester 2

| | | | |
|---------------------------|-----|----------------------------|-----|
| LAWS IP Survey | (3) | LAWS IP Elective course | (3) |
| LAWS Patent Law | (3) | LAWS Patent Preparation II | (2) |
| LAWS Patent Preparation I | (3) | LAWS Patent Bar Review | (4) |
| BIOC 407 | (4) | BIOC elective | (3) |
| BIOC 412 | (3) | BIOC 408 | (4) |

Year 2: First semester

| | | |
|------------------------------|-------------------------------|-----|
| LAWS Experiential Elective** | (3) or LAWS IP Venture Clinic | (3) |
| BIOC elective | (3) | |
| BIOC elective | (3) | |
| BIOC elective | (3) | |
| EXAM 600 | (1) | |

Biochemistry electives for the first and second year

| | |
|--------------------------|-----------------|
| BIOL 426 (3) | BIOL 424 (3)*** |
| BIOC 420 (3) | BIOL 426 (3) |
| BIOC 430 (1) Comp. Biol. | BIOC 454 (3) |
| NTRN 452 (3) | GENE 531 (2-3) |
| PHRM 409 (3) | BIOC 460 (3) |
| SYBB 411 (1-4) | SYBB 411 (1-4) |
| PHRM 528 (3)*** | SYBB 459 (3) |
| BIOC 601 (1-4) | CLBY 450 (3)*** |
| | PATH 416 (3) |
| | BIOC 601 (1-4) |

**The experiential elective refers to an externship with a corporation (i.e. Parker Hannifin, Cleveland Clinic Innovations, Bridgestone America, etc.) or a law firm.

***recommended by previous JD/MS students as being useful for patent law and also being good classes

A more complete description of the Biochemistry and Law required courses and electives is in the Appendix.

Alternatively, up to 6 credits of BIOC 601 could be taken during the summer after the first year freeing up time during the regular semesters. However, of the total 24 hours required in Biochemistry, 18 hours must be in courses that are letter graded.

Courses to count towards the MS in Biochemistry are Patent Law (3), Patent Preparation I (3), IP Survey (3) and Experiential elective (3) for a total of 12 credit hours.

Courses to count towards the MA in Patent Law would be either BIOC 407, BIOC 408 and one of the technically oriented BIOC electives (credit to be either 3 or 4 hours)

To fulfill the MS degree portion of the dual degree program, students will focus their capstone writing requirement (EXAM 600; see Appendix) on the subject of their work in the Department of Biochemistry. This proposal may reflect either a current research article, material from one of the graduate classes or research the student may have performed as part of BIOC 601 credit. The MS Advisor will serve as a (co-)supervisor of this proposal.

Successful completion of the program would require 45 credits:

| | |
|--|----|
| Total Hours in the School of Law: | 21 |
| Total Hours in the Department of Biochemistry: | 24 |
| Total Hours in the Dual Degree Program: | 45 |

V. Dual Degree Student Advising

Dual degree students will be advised concerning matters related to the MA in Patent Practice degree by Professor Craig Nard, Director of the Spangenberg Center for Law, Technology and the Arts. Dual degree students will be advised concerning matters related to the MS in Biochemistry by the Graduate Program Advisor as designated by the Graduate Education Committee of the Department of Biochemistry (currently Professor William Merrick). At the end of each semester, the student will meet with both the MA advisor and the MS advisor to discuss progress and to select classes for the coming semester.

By regulations of the School of graduate Studies, Master's students are required to maintain a GPA of 2.75 or greater within the School of Graduate Studies; this will be applied to the combined GPA for Biochemistry or approved Biochemistry elective courses. The MA in Patent Practice program requires a GPA of at least 2.75; this will apply to all courses taken towards the MA in Patent Practice degree.

Twice a year, immediately after the beginning of the fall and spring semesters, or more frequently if necessary, the Director of MA Patent Practice and the Graduate Program Advisor of the Department of Biochemistry will meet to discuss the progress of all students in the program.

VI. Admissions

Target enrollment in the program is about six students each year. Students wishing to enroll in the dual degree program apply to and are admitted into the dual degree program directly. As the MA in Patent Practice does not require the LSAT or other standardized exam, the MS in Biochemistry Program will accept either the GRE, MCAT or LSAT as the standardized exam for acceptance into the dual degree program. This is in lieu of the more standard GRE score that is used for admittance into the individual M. S. or Ph. D. programs in Biochemistry. Applications will be jointly reviewed by the directors of the two programs. Once students have been admitted, they will consult with the Department of Biochemistry Department Liaison and Law School Liaison to determine their appropriate course of MA study and the MS Advisor of the Department of Biochemistry to determine their appropriate program of MS study. In order that the admitted student can immediately take graduate courses in the biological sciences, they must have taken a full year course in each of the following: introductory chemistry, organic chemistry and introductory biology. Additional course work such as genetics, physics and calculus would enhance the applicant's portfolio.

Given the nature of this dual degree and the cost savings to the student (the equivalent of 20 credit hours), no financial aid will be offered by either the Law School or the Department of Biochemistry to students in this program.

VII. Tuition Revenue Mechanics:

A written agreement about the management of tuition revenues will exist between the Law School and the Department of Biochemistry. The text of this agreement is shown below:

Graduate student tuition revenues filter back to the student's home school. The MS Biochemistry student's home is based in the School of Medicine. The MA student's home is based within the School of Law. It is anticipated the dual MA/MS students will be home based in the School of Law. Tuitions paid to the School of Law will be fully retained by the Law School. Tuitions paid to the School of Graduate studies will be split 20% to the School of Law and 80% to the School of Medicine. This split reflects the primary advising role played by the School of Law in the final placement of the student into an employment opportunity.

VIII. Approval Signatures:

| | |
|--|---|
| Interim Dean, School of Law <i>Michael Scharf or Jessica Berg</i> | X |
| Chair, Department of Biochemistry <i>Dr. Michael A. Weiss</i> | X |

| | |
|--|---|
| Dean, School of Medicine <i>Dr. Pamela B. Davis</i> | X |
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Appendix – Elective courses

Suggested Biochemistry Elective Courses

Fall Semester

BIOL 426 – Genetics - Transmission genetics, nature of mutation, microbial genetics, somatic cell genetics, recombinant DNA techniques and their application to genetics, human genome mapping, plant breeding, transgenic plants and animals, uniparental inheritance, evolution, and quantitative genetics. Offered as BIOL 326 and BIOL 426.

BIOC 407 – Introduction to Biochemistry: From molecules to medical science. Overview of the macromolecules and small molecules key to all living systems. Topics include: protein structure and function; enzyme mechanisms, kinetics and regulation; membrane structure and function; bioenergetics; hormone action; intermediary metabolism, including pathways and regulation of carbohydrate, lipid, amino acid, and nucleotide biosynthesis and breakdown. The material is presented to build links to human biology and human disease. One semester of biology is recommended. Offered as BIOC 307, BIOC 407, and BIOL 407.

BIOC 408 – Molecular Biology - An examination of the flow of genetic information from DNA to RNA to protein. Topics include: nucleic acid structure; mechanisms and control of DNA, RNA, and protein biosynthesis; recombinant DNA; and mRNA processing and modification. Where possible, eukaryotic and prokaryotic systems are compared. Special topics include yeast as a model organism, molecular biology of cancer, and molecular biology of the cell cycle. Current literature is discussed briefly as an introduction to techniques of genetic engineering. Recommended preparation: BIOC 307/407. Offered as BIOC 308, BIOL 308, BIOC 408, and BIOL 408.

BIOC 412 – Proteins and Enzymes - Aspects of protein and nucleic acid function and interactions are discussed, including binding properties, protein-nucleic acid interactions, kinetics and mechanism of proteins and enzymes, and macromolecular machines. Recommended Preparation: CHEM 301. Offered as BIOC 312 and BIOC 412.

BIOC 420 – Current Topics in Cancer - The concept of cancer hallmarks has provided a useful guiding principle in our understanding of the complexity of cancer. The hallmarks include sustaining proliferative signaling, evading growth suppressors, enabling replicative immortality, activating invasion and metastasis, inducing angiogenesis, resisting cell death, deregulating cellular energetics, avoiding immune destruction, tumor-promoting inflammation, and genome

instability and mutation. The objectives of this course are to (1) examine the principles of some of these hallmarks, and (2) explore potential therapies developed based on these hallmarks of cancer. This is a student-driven and discussion-based graduate course. Students should have had some background on the related subjects and have read scientific papers in their prior coursework. Students will be called on to present and discuss experimental design, data and conclusions from assigned publications. There will be no exams or comprehensive papers but students will submit a one-page critique (strengths and weaknesses) of one of the assigned papers prior to each class meeting. The course will end with a full-day student-run symposium on topics to be decided jointly by students and the course director. Grades will be based on class participation, written critiques, and symposium presentations.

Offered as BIOC 420, MBIO 420, MVIR 420, PATH 422, and PHRM 420.

BIOC 430 – Computational Biology (Shoham module)- The course is designed for graduate students who will be focusing on one or more methods of structural biology in their thesis project. This course is divided into 3-6 sections (depending on demand). The topics offered will include X-ray crystallography, nuclear magnetic resonance spectroscopy, optical spectroscopy, mass spectrometry, cryo-electron microscopy, and computational and design methods. Students can select one or more modules. Modules will be scheduled so that students can take all the offered modules in one semester. Each section is given in 5 weeks and is worth 1 credit. Each section covers one area of structural biology at an advanced level such that the student is prepared for graduate level research in that topic.

Offered as BIOC 430, CHEM 430, PHOL 430, and PHRM 430.

BIOC 601 – Research – permission of the instructor is required (1-6 hours)

EXAM 600 – MS Qualifying exam - The M. S. qualifying exam is one that is based upon the student's generation of a research proposal that will have an Introduction (what is the history behind the proposal), Materials and Methods (an explanation of the techniques to be used in the proposal), Experimental Design (what are the actual experiments to be performed and what are the controls), and Discussion (what will be learned and how does this fit with the literature). This may be based upon the student's own research (taken as BIOC 601) or on a recent research article of the student's interest. The "preliminary data" that would start off the Experimental Design section could either be the student's lab data or the figures from the research article that the student has chosen as the basis for the proposal. For the qualifying exam, the student will prepare a 10 to 20 page document as described above and then defend the proposal to a committee of three faculty. Dr. Merrick will chair the committee and the two other faculty members will be selected based upon the research area of the proposal. In most instances, the defense of the proposal will take about 90 minutes.

NTRN 452 – Nutritional Biochemistry and Metabolism - Mechanisms of

regulation of pathways of intermediary metabolism; amplification of biochemical signals; substrate cycling and use of radioactive and stable isotopes to measure metabolic rates. Recommended preparation: BIOC 307 or equivalent. Offered as BIOC 452 and NTRN 452.

PHRM 409 – Principles of Pharmacology - Principles of Pharmacology introduces the basic principles that underlie all of Pharmacology. The first half of the course introduces, both conceptually and quantitatively, drug absorption, distribution, elimination and metabolism (pharmacokinetics) and general drug receptor theory and mechanism of action (pharmacodynamics). Genetic variation in response to drugs (pharmacogenetics) is integrated into these basic principles. The second half of the course covers selected drug classes chosen to illustrate these principles. Small group/recitation sessions use case histories to reinforce presentation of principles and to discuss public perceptions of therapeutic drug use. Graduate students will be expected to critically evaluate articles from the literature and participate in a separate weekly discussion session. Recommended preparation for PHRM 409: Undergraduate degree in science or permission of instructor. Offered as PHRM 309 and PHRM 409.

PHRM 528 – Contemporary Approaches to Drug Discovery - This course is designed to teach the students how lead compounds are discovered, optimized, and processed through clinical trials for FDA approval. Topics will include: medicinal chemistry, parallel synthesis, drug delivery and devices, drug administration and pharmacokinetics, and clinical trials. A special emphasis will be placed on describing how structural biology is used for in silico screening and lead optimization. This component will include hands-on experience in using sophisticated drug discovery software to conduct in silico screening and the development of drug libraries. Each student will conduct a course project involving in silico screening and lead optimization against known drug targets, followed by the drafting of an inventory disclosure. Another important aspect of this course will be inclusion of guest lectures by industrial leaders who describe examples of success stories of drug development. Offered as BIOC 528, PHOL 528, and PHRM 528.

SYBB 411 A – D – Technologies in Bioinformatics - SYBB 311/411A is a 5-week course that introduces students to the high-throughput technologies used to collect data for bioinformatics research in the fields of genomics, proteomics, and metabolomics. In particular, we will focus on mass spectrometer-based proteomics, DNA and RNA sequencing, genotyping, protein microarrays, and mass spectrometry-based metabolomics. This is a lecture-based course that relies heavily on out-of-class readings. Graduate students will be expected to write a report and give an oral presentation at the end of the course. SYBB 311/411A is part of the SYBB survey series which is composed of the following course sequence: (1) Technologies in Bioinformatics, (2) Data Integration in Bioinformatics, (3) Translational Bioinformatics, and (4) Programming for

Bioinformatics. Each standalone section of this course series introduces students to an aspect of a bioinformatics project - from data collection (SYBB 311/411A), to data integration (SYBB 311/411B), to research applications (SYBB 311/411C), with a fourth module (SYBB 311/411D) introducing basic programming skills.

Graduate students have the option of enrolling in all four courses or choosing the individual modules most relevant to their background and goals with the exception of SYBB411D, which must be taken with SYBB411A.

Offered as SYBB 311A, BIOL 311A and SYBB 411A.

Spring Semester

BIOL 424 – Introduction to Stem Cell Biology –This discussion-based course will introduce students to the exciting field of stem cell research. Students will first analyze basic concepts of stem cell biology, including stem cell niche, cell quiescence, asymmetric cell division, cell proliferation and differentiation, and signaling pathways involved in these processes. This first part of the course will focus on invertebrate genetic models for the study of stem cells. In the second part of the course, students will search for primary research papers on vertebrate and human stem cells, and application of stem cell research in regenerative medicine and cancer. Finally, students will have the opportunity to discuss about ethical controversies in the field. Students will rotate in weekly presentations, and will write two papers during the semester. Students will improve skills on searching and reading primary research papers, gain presentation skills, and further their knowledge in related subjects in the fields of cell biology, genetics and developmental biology. This course may be used as a cell/molecular subject area elective for the B.A. and B.S. Biology degrees.

Offered as BIOL 324 and BIOL 424.

BIOL 426 - Genetics - Transmission genetics, nature of mutation, microbial genetics, somatic cell genetics, recombinant DNA techniques and their application to genetics, human genome mapping, plant breeding, transgenic plants and animals, uniparental inheritance, evolution, and quantitative genetics.

Offered as BIOL 326 and BIOL 426.

BIOC 454 – Biochemistry and Biology of RNA - Systematic overview of RNA biochemistry and biology. Course provides solid foundation for understanding processes of post-transcriptional regulation of gene expression. Topics include: RNA structure, RNA types, RNA-protein interactions, eukaryotic RNA metabolism including mRNA processing, ribosome biogenesis, tRNA metabolism, miRNA processing and function, bacterial RNA metabolism, transcriptomics. BIOC 454 requires an additional research proposal. Recommended preparation for BIOC 354: Undergraduate Biology (1 semester minimum), equivalents of CHEM 301, BIOC 307 or 308, CHEM 223, CHEM 224.

Offered as BIOC 354 and BIOC 454.

BIOC 460 – Introduction to Microarrays - Microarray technology is an exciting

new technique that is used to analyze gene expression in a wide variety of organisms. The goal of this course is to give participants a hands-on introduction to this technology. The course is intended for individuals who are preparing to use this technique, including students, fellows, and other investigators. This is a hands-on computer-based course, which will enable participants to conduct meaningful analyses of microarray data. Participants will gain an understanding of the principles underlying microarray technologies, including: theory of sample preparation, sample processing on microarrays, familiarity with the use of Affymetrix Microarray Suite software and generation of data sets. Transferring data among software packages to manipulate data will also be discussed. Importation of data into other software (GeneSpring and DecisionSite) will enable participants to mine the data for higher-order patterns. Participants will learn about the rationale behind the choice of normalization and data filtering strategies, distance metrics, use of appropriate clustering choices such as K-means, Hierarchical, and Self Organizing Maps.

Course Offered as BIOC 460, PATH 460, CNCR 460.

BIOC 601 – Research – permission of instructor required

CLBY 450 – Cells and Pathogens - Modern molecular cell biology owes a great debt to viral and bacterial pathogens as model systems. In some instances pathogens operate by faithful mimicry of host proteins, and other cases represent the result of extensive molecular tinkering and convergent evolution. This course will also explore numerous mechanisms utilized by pathogens to subvert the host and enhance their own survival. Topics covered include nuclear regulatory mechanisms, protein synthesis and stability, membrane-bound organelles, endocytosis and phagocytosis, and factors that influence cell behavior such as cytoskeleton rearrangements, cell-cell interactions, and cell migration. Additional topics include cell signaling and co-evolution of pathogens and host cell functions. Students are expected to come to class prepared to discuss pre-assigned readings consisting of brief reviews and seminal papers from the literature. Student assessment will be based on effective class participation (approximately 80%) and successful presentation of an independent research topic (approximately 20%).

Offered as CLBY 450, MBIO 450, and MVIR 450.

GENE 531 – Cancer Genetics - This seminar will discuss basic concepts in cancer epidemiology, principles of cancer genetics, inherited cancer syndromes, cytogenetics of cancers, pedigree analysis for familial cancer risk and approaches to the differential diagnosis of inherited and familial cancers. Additionally, topics of risk assessment, genetic testing, screening, management and psychosocial issues in providing genetic counseling to patients with familial and inherited cancers will be discussed.

PATH 416 – Fundamental Immunology - Introductory immunology providing an overview of the immune system, including activation, effector mechanisms, and

regulation. Topics include antigen-antibody reactions, immunologically important cell surface receptors, cell-cell interactions, cell-mediated immunity, innate versus adaptive immunity, cytokines, and basic molecular biology and signal transduction in B and T lymphocytes, and immunopathology. Three weekly lectures emphasize experimental findings leading to the concepts of modern immunology. An additional recitation hour is required to integrate the core material with experimental data and known immune mediated diseases. Five mandatory 90 minute group problem sets per semester will be administered outside of lecture and recitation meeting times. Graduate students will be graded separately from undergraduates, and 22 percent of the grade will be based on a critical analysis of a recently published, landmark scientific article.

Offered as BIOL 316, BIOL 416, CLBY 416, and PATH 416.

SYBB 411 A – D – Technologies in Bioinformatics - SYBB 311/411A is a 5-week course that introduces students to the high-throughput technologies used to collect data for bioinformatics research in the fields of genomics, proteomics, and metabolomics. In particular, we will focus on mass spectrometer-based proteomics, DNA and RNA sequencing, genotyping, protein microarrays, and mass spectrometry-based metabolomics. This is a lecture-based course that relies heavily on out-of-class readings. Graduate students will be expected to write a report and give an oral presentation at the end of the course.

SYBB 311/411A is part of the SYBB survey series which is composed of the following course sequence: (1) Technologies in Bioinformatics, (2) Data Integration in Bioinformatics, (3) Translational Bioinformatics, and (4) Programming for Bioinformatics. Each standalone section of this course series introduces students to an aspect of a bioinformatics project - from data collection (SYBB 311/411A), to data integration (SYBB 311/411B), to research applications (SYBB 311/411C), with a fourth module (SYBB 311/411D) introducing basic programming skills.

Graduate students have the option of enrolling in all four courses or choosing the individual modules most relevant to their background and goals with the exception of SYBB411D, which must be taken with SYBB411A.

Offered as SYBB 311A, BIOL 311A and SYBB 411A.

SYBB 459 – Bioinformatics for Systems Biology - Description of omic data (biological sequences, gene expression, protein-protein interactions, protein-DNA interactions, protein expression, metabolomics, biological ontologies), regulatory network inference, topology of regulatory networks, computational inference of protein-protein interactions, protein interaction databases, topology of protein interaction networks, module and protein complex discovery, network alignment and mining, computational models for network evolution, network-based functional inference, metabolic pathway databases, topology of metabolic pathways, flux models for analysis of metabolic networks, network integration, inference of domain-domain interactions, signaling pathway inference from protein interaction networks, network models and algorithms for disease gene identification, identification of dysregulated subnetworks network-based disease classification.

Offered as EECS 459 and SYBB 459.

Required Law School Courses

LAWS 4300 – Intellectual Property Survey - This course is designed to provide students with an overview of several areas of law traditionally associated with intellectual property or IP, including copyright law, which pertains to the protection of literary, musical, and artistic creations and has issues replete with First Amendment implications; patent law and trade secret law, which focus on the protection of technological works ranging from chemical formulae, to software, to biotechnology; and trademark law, which relates to the goodwill associated with corporate identity and product recognition. We will also devote time to the study of the philosophy and economics of intellectual property keeping in mind, throughout the course, the need to strike an optimal balance between incentives to create and commercialize intellectual creations on the one hand and public access to these creations on the other hand.

LAWS 4302 – Patent Law - Basic concepts of patent law as property considered primarily in its substantive aspects, including the relationship to other forms of protection and intellectual property, infringement, and statutory requirements for patents.

LAWS 4311 - Patent Preparation and Drafting I: Patent preparation, drafting, and filing of a patent application are the fundamental aspects of patent practice. Students will learn how to conduct a client-inventor interview, what questions to ask the client-inventor and what information is most important to obtain prior to commencing the patent drafting process. Technical aspects of patentability searching will also be explored. In addition, the student will learn the various parts of the patent application and best practices associated with drafting each part. Emphasis will be placed on specification drafting and claim drafting, and how to claim around prior art. *Significant emphasis will be placed on USPTO Rules of Professional Conduct* – see www.uspto.gov/learning-and-resources/ip-policy/current-practitioners/uspto-rules-professional-conduct

LAWS 4312 - Patent Preparation and Drafting II: The course builds on *Patent Drafting and Prosecution I* and will focus on aspects of patent prosecution post-filing. In particular, students will learn how to respond to an Office Action rejecting the patent application as is typically encountered during the practice before the US Patent and Trademark Office. The student's response will take the form of an Amendment that will reflect changes made to the claims and arguments relating to patentability. The course will also cover the appeals process. *Significant emphasis will be placed on USPTO Rules of Professional Conduct* – see www.uspto.gov/learning-and-resources/ip-policy/current-practitioners/uspto-rules-professional-conduct.

LAWS 4820 - Bar Review: Passing the patent bar is a requirement for practicing before the U.S. Patent & Trademark Office (“USPTO”). This course will introduce

students to 35 U.S.C. (the United States “patent laws”) and 37 C.F.R. (Code of Federal Regulations encompassing the “patent rules”), followed by an in-depth study of the M.P.E.P. (Manual of Patent Examining Procedure), which is the Patent Office’s rule book that covers all the patent laws and rules as interpreted by the USPTO. In addition, the course will cover the particulars of the patent bar exam, including questions from prior exams; essential materials the students need to master to pass the exam, and provide students with several opportunities to hone their bar taking skills.

Suggested Law School Elective Courses

Fall Semester

LAWS 5341 – Commercialization and Intellectual Property Management - This interdisciplinary course covers a variety of topics, including principles of intellectual property and intellectual property management, business strategies and modeling relevant to the creation of start-up companies and exploitation of IP rights as they relate to biomedical-related inventions. The goal of this course is to address issues relating to the commercialization of biomedical-related inventions by exposing law students, MBA students, and Ph.D. candidates (in genetics and proteomics) to the challenges and opportunities encountered when attempting to develop biomedical intellectual property from the point of early discovery to the clinic and market. Specifically, this course seeks to provide students with the ability to value a given technological advance or invention holistically, focusing on issues that extend beyond scientific efficacy and include patient and practitioner value propositions, legal and intellectual property protection, business modeling, potential market impacts, market competition, and ethical, social, and healthcare practitioner acceptance. During this course, law students, MBA students, and Ph.D. candidates in genomics and proteomics will work in teams of five (two laws students, two MBA students and one Ph.D. candidate), focusing on issues of commercialization and IP management of biomedical-related inventions. The instructors will be drawn from the law school, business school, and technology-transfer office. Please visit the following website for more information: fusioninnovate.com.

Spring Semester

LAWS 4315 - Claim Drafting Lab - The patent claim is the most important part of the patent application, because it is the claim that represents the metes and bounds of inventor’s property right. This Lab is devoted to drafting claims, understanding the different types of claims, and how claims differ depending on the nature of the technology. A particular emphasis will be placed on computer-implemented (e.g., software) and biomedical-related inventions (e.g., life science and biomedical devices)

LAWS 5323 - IP Strategy - Intellectual property rights are legally created business assets used by companies to provide a competitive advantage in the marketplace. Companies use intellectual property differently depending on many factors, such as industry, business strategy, culture and maturity. Intellectual property attorneys are considered valuable members of business teams, contributing to business strategy, business planning and other executive level business decisions. Indeed, IP is a boardroom issue.

This class will study the ways intellectual property is used by different companies and how the intellectual property laws impact not only the intellectual property assets, but also the business strategy and business planning. In addition to learning how intellectual property is being used by major corporations, universities, and entrepreneurs/start-ups, the students will pick one company and study how that company manages its intellectual property.

LAWS 6401 - Experiential Elective (IP Venture Clinic): In the IP Venture Clinic ("IPVC"), students, working under the supervision of faculty, represent start-up companies and entrepreneurs from the Blackstone LaunchPad initiative in Northeast Ohio. Students in the Masters of Patent Practice program will work up a general IP protection strategy, working with supervising practitioners to design and implement that strategy. Students will perform prior art searches, drafting claims and participating in the application and prosecution process with the U.S. Patent and Trademark Office (USPTO) and other patent offices worldwide. Importantly, the USPTO has selected Case Western Reserve University School of Law to participate in the Patent Law School Clinic Certification Program, which provides law students the opportunity to represent clients before the USPTO.

MA in Patent Practice/MS in Biochemistry (plan B) Dual Degree Proposal

This document contains a proposal for a dual degree between the Department of Biochemistry in the School of Medicine (MS degree, plan B) and the Law School (MA in Patent Practice).

I. Background and Justification

The purpose of the degree program is to prepare a cadre of biochemistry students for successful careers as patent agents. In any given year, recently graduated engineers and scientists enroll in law school with the goal of becoming patent lawyers, but over the past few years, a growing number have become reluctant to invest in a three-year JD program. The proposed *Masters in Patent Practice* seeks to provide a viable alternative for these students, with a focus on students with a biological background. The most likely undergraduates would be science or engineering majors with the likelihood that biology and premed students who failed to enter medical school would predominate (in part based upon the requirements for entry). The one technological area of patent practice where an advanced degree leads to a significant difference in marketability is the life science field.

A career as a patent agent enables engineers and biomedical scientists to stay close to their technological specialty, yet provides a livelihood that has comparative advantages over that of a practicing engineer or bench scientist.¹ Indeed, the patent law landscape over the past 10 years has witnessed the growing importance of patent agents. Most IP boutique firms or IP practice groups within general firms have at least one, and oftentimes several, patent agents; and it is also common for patent agents to work in-house for corporations of all sizes. The *Masters in Patent Practice* will not only prepare the engineer and biomedical scientist to take the patent bar, but will introduce them to the nuances of patent searching, the complexities of patent drafting, and the arcana commonly associated with patent law doctrine and USPTO regulations.

Over the past several years, the United States Patent and Trademark Office has received increasingly more patent applications. In 2013, 571,612 patent applications were filed with the patent office. This compares with 456,321 in 2008 and 342,441 in 2000. Job postings for patent agents in intellectual property law journals and websites reflect these numbers. Anecdotal evidence also suggests a demand for patent agents.

Moreover, in the initial review of the MA in Patent Practice proposal, the Board of Regents review observed that there is a demand for patent agents (i.e. see

¹ For example, according to the American Intellectual Property Lawyers Association's "Report of the Economic Survey 2013," the average salary of a patent agent with fewer than five years of experience at a private law firm is \$92,250, with the first and third quartile range of \$55,500 to \$126,250.

www.intelproplaw.com/JobsAvailable/). For example, the University of Dayton reviewer wrote: "in the forty plus years that this reviewer has been practicing law, there has been a persistent shortage of people qualified and licensed by the United States Patent and Trademark Office to prepare, file and prosecute patent applications. The proposed Masters in Patent Practice will help alleviate that shortage. This program is unique to Ohio." The reviewer from the University of Toledo stated "CWRU has clearly shown that there are jobs for patent agents and that patent applications are increasing and a growth field." It is the intent of this program to provide individuals with a competitive edge to this professional discipline.

The formal acceptance of the stand alone MA in Patent Practice was approved by the Board of Regents in March 2015. This degree is currently advertised within the materials associated with admissions into the Law School.

II. Administration

School of Law Liaison: Craig Nard, Professor of Law, School of Law
Biochemistry Department Liaison: William Merrick, Professor of Biochemistry, Department of Biochemistry.

Professors Nard and Merrick will meet every other month during the initial phases of the program to best address problems these dual degree students might be having beyond those of the stand alone MA in Patent Practice (overseen by Professor Nard) and those in the stand alone or other dual degree programs associated with the MS in Biochemistry (overseen by Professor Merrick). In particular, there is a twelve year history with a similar program, the dual degree JD/ MS in Biochemistry.

III. Program Structure

If one were to acquire the MA and MS degrees independently, it would require the completion of 30 hours for the MA program and 36 hours for the MS program (a total of 66 credit hours). In the dual degree program, cross counting allows for a reduction in the total number of class hours to 45 credit hours for both degrees as described below. The 30 credit hour and 36 credit hour numbers are for the independent programs as accredited through the Board of Regents in Columbus.

The proposed dual degree requires students to complete 45 credit hours. The MS in Biochemistry requires 24 credit hours of coursework for the completion of the MS degree (plan B). The School of Law requires 21 credit hours of coursework for the completion of the MA program as part of the dual degree. To be compliant with the manner in which both degrees are certified by the Board of Regents, students will count 11-12 Law credit hours towards the MS in Biochemistry and count 9 hours of Biochemistry credits toward the MA in Patent Practice. Thus, there is an approximately equal reduction in both programs in accumulating the

total number of credit hours that are required to satisfy the requirements of the stand alone programs as approved by the Board of Regents.

The advantage of this dual degree program over either an MA with certificate in Biochemistry or an MS in Biochemistry with a certificate in Patent Practice is that the student will receive a recognized degree (either MA or MS) rather than a certificate which has no true academic definition (i.e. some CWRU certificate programs are completed with as few as 10 to 12 hours).

It should be noted that the anticipated number of students, perhaps as many as 6 per year, will not add a sufficient burden for the Law School classes (the MA in Patent Practice in particular), the biomedical classes nor the administration such that no additional personnel (faculty or staff) will be required for this program in either the Law School or the School of Medicine.

IV. Dual Degree Curriculum: Examples

Students begin in the School of Law although the fundamental Biochemistry course is also taken (BIOC 407, 408). The anticipation is that the entering student will be practicing in patent law and therefore the primary guidance in terms of job placement will reflect advising from the School of Law. The advisor in Biochemistry will provide insight into the most recent developing areas of research and technology that the student would be likely to encounter in their future employment.

Year 1: First year curriculum.

| Semester 1 | | Semester 2 | |
|---------------------------|-----|----------------------------|-----|
| LAWS IP Survey | (3) | LAWS IP Elective course | (3) |
| LAWS Patent Law | (3) | LAWS Patent Preparation II | (2) |
| LAWS Patent Preparation I | (3) | BIOC elective | (3) |
| BIOC 407 | (4) | BIOC 408 | (4) |

| | | | | |
|---------|---------------|-----|------------------------------|-----|
| Year 2. | BIOC 412 | (3) | LAWS Patent Bar Review | (4) |
| | BIOC elective | (3) | LAWS Experiential Elective** | (3) |
| | BIOC elective | (3) | BIOC elective | (3) |
| | | | EXAM 600 | (1) |

Alternate, 18 month fast track

Year 1: First semester

Semester 2

| | | | |
|---------------------------|-----|----------------------------|-----|
| LAWS IP Survey | (3) | LAWS IP Elective course | (3) |
| LAWS Patent Law | (3) | LAWS Patent Preparation II | (2) |
| LAWS Patent Preparation I | (3) | LAWS Patent Bar Review | (4) |
| BIOC 407 | (4) | BIOC elective | (3) |
| BIOC 412 | (3) | BIOC 408 | (4) |

Year 2: First semester

| | | |
|------------------------------|-------------------------------|-----|
| LAWS Experiential Elective** | (3) or LAWS IP Venture Clinic | (3) |
| BIOC elective | (3) | |
| BIOC elective | (3) | |
| BIOC elective | (3) | |
| EXAM 600 | (1) | |

Biochemistry electives for the first and second year

| | |
|--------------------------|-----------------|
| BIOL 426 (3) | BIOL 424 (3)*** |
| BIOC 420 (3) | BIOL 426 (3) |
| BIOC 430 (1) Comp. Biol. | BIOC 454 (3) |
| NTRN 452 (3) | GENE 531 (2-3) |
| PHRM 409 (3) | BIOC 460 (3) |
| SYBB 411 (1-4) | SYBB 411 (1-4) |
| PHRM 528 (3)*** | SYBB 459 (3) |
| BIOC 601 (1-4) | CLBY 450 (3)*** |
| | PATH 416 (3) |
| | BIOC 601 (1-4) |

**The experiential elective refers to an externship with a corporation (i.e. Parker Hannifin, Cleveland Clinic Innovations, Bridgestone America, etc.) or a law firm.

***recommended by previous JD/MS students as being useful for patent law and also being good classes

A more complete description of the Biochemistry and Law required courses and electives is in the Appendix.

Alternatively, up to 6 credits of BIOC 601 could be taken during the summer after the first year freeing up time during the regular semesters. However, of the total 24 hours required in Biochemistry, 18 hours must be in courses that are letter graded.

Courses to count towards the MS in Biochemistry are Patent Law (3), Patent Preparation I (3), IP Survey (3) and Experiential elective (3) for a total of 12 credit hours.

Courses to count towards the MA in Patent Law would be either BIOC 407, BIOC 408 and one of the technically oriented BIOC electives (credit to be either 3 or 4 hours)

To fulfill the MS degree portion of the dual degree program, students will focus their capstone writing requirement (EXAM 600; see Appendix) on the subject of their work in the Department of Biochemistry. This proposal may reflect either a current research article, material from one of the graduate classes or research the student may have performed as part of BIOC 601 credit. The MS Advisor will serve as a (co-)supervisor of this proposal.

Successful completion of the program would require 45 credits:

| | |
|--|----|
| Total Hours in the School of Law: | 21 |
| Total Hours in the Department of Biochemistry: | 24 |
| Total Hours in the Dual Degree Program: | 45 |

V. Dual Degree Student Advising

Dual degree students will be advised concerning matters related to the MA in Patent Practice degree by Professor Craig Nard, Director of the Spangenberg Center for Law, Technology and the Arts. Dual degree students will be advised concerning matters related to the MS in Biochemistry by the Graduate Program Advisor as designated by the Graduate Education Committee of the Department of Biochemistry (currently Professor William Merrick). At the end of each semester, the student will meet with both the MA advisor and the MS advisor to discuss progress and to select classes for the coming semester.

By regulations of the School of graduate Studies, Master's students are required to maintain a GPA of 2.75 or greater within the School of Graduate Studies; this will be applied to the combined GPA for Biochemistry or approved Biochemistry elective courses. The MA in Patent Practice program requires a GPA of at least 2.75; this will apply to all courses taken towards the MA in Patent Practice degree.

Twice a year, immediately after the beginning of the fall and spring semesters, or more frequently if necessary, the Director of MA Patent Practice and the Graduate Program Advisor of the Department of Biochemistry will meet to discuss the progress of all students in the program.

VI. Admissions

Target enrollment in the program is about six students each year. Students wishing to enroll in the dual degree program apply to and are admitted into the dual degree program directly. As the MA in Patent Practice does not require the LSAT or other standardized exam, the MS in Biochemistry Program will accept either the GRE, MCAT or LSAT as the standardized exam for acceptance into the dual degree program. This is in lieu of the more standard GRE score that is used for admittance into the individual M. S. or Ph. D. programs in Biochemistry. Applications will be jointly reviewed by the directors of the two programs. Once students have been admitted, they will consult with the Department of Biochemistry Department Liaison and Law School Liaison to determine their appropriate course of MA study and the MS Advisor of the Department of Biochemistry to determine their appropriate program of MS study. In order that the admitted student can immediately take graduate courses in the biological sciences, they must have taken a full year course in each of the following: introductory chemistry, organic chemistry and introductory biology. Additional course work such as genetics, physics and calculus would enhance the applicant's portfolio.

Given the nature of this dual degree and the cost savings to the student (the equivalent of 20 credit hours), no financial aid will be offered by either the Law School or the Department of Biochemistry to students in this program.

VII. Tuition Revenue Mechanics:

A written agreement about the management of tuition revenues will exist between the Law School and the Department of Biochemistry. The text of this agreement is shown below:

Graduate student tuition revenues filter back to the student's home school. The MS Biochemistry student's home is based in the School of Medicine. The MA student's home is based within the School of Law. It is anticipated the dual MA/MS students will be home based in the School of Law. Tuitions paid to the School of Law will be fully retained by the Law School. Tuitions paid to the School of Graduate studies will be split 30% to the School of Law and 70% to the School of Medicine. This split reflects the primary advising role played by the School of Law in the final placement of the student into an employment opportunity.

VIII. Approval Signatures:

| | |
|--|---|
| Interim Dean, School of Law <i>Michael Scharf or Jessica Berg</i> | X |
| Chair, Department of Biochemistry | X |

| | |
|--|---|
| <i>Dr. Michael A. Weiss</i> | |
| Dean, School of Medicine <i>Dr. Pamela B. Davis</i> | X |
| Dean, School of Graduate Studies Dr. Charles Rozek | X |

IX. Student Activities:

It is noted that for either the experiential elective or the IP Venture Clinic, the student will have direct exposure to the workings of the patent process. The School of Law will assist in the placement of the student in the relevant environment.

Other appropriate activities for the MA/MS students include attending the weekly seminars, as well as annual named lectureships, participating in annual retreats, and one or more journal clubs (see also casemed.case.edu/gradprog/index.php). Within the Law School, students will be involved with informal networking experiences with potential employers and participate in Law School activities as they choose (see law.case.edu/StudentLife.aspx)

X. Advantages of the Joint Degree Program

There are several advantages to the students in the MA/MS program. The key advantage will be the integration of the two disciplines during the time that the students are receiving their training, thus allowing the students to develop a unique focus on their studies in each of the two disciplines. In addition, the usual Master's of Science in Biochemistry is a two year program but the students in the dual degree program will be able to complete the program requirements in just 12 months beyond the time required for obtaining the MA degree (or sooner if they take the alternate, accelerated track). This is reflected in the credit savings for the two degrees (36 + 30 = 66 hours) vs. the dual degree which requires 45 credit hours. This savings in credit hours is thus seen in both time (18 or 24 months vs. 3 years) and in expense, roughly the cost of an additional semester or two.

Appendix – Elective courses

Suggested Biochemistry Elective Courses

Fall Semester

BIOL 426 – Genetics - Transmission genetics, nature of mutation, microbial genetics, somatic cell genetics, recombinant DNA techniques and their application to genetics, human genome mapping, plant breeding, transgenic plants and animals, uniparental inheritance, evolution, and quantitative genetics. Offered as BIOL 326 and BIOL 426.

BIOC 407 – Introduction to Biochemistry: From molecules to medical science. Overview of the macromolecules and small molecules key to all living systems. Topics include: protein structure and function; enzyme mechanisms, kinetics and regulation; membrane structure and function; bioenergetics; hormone action; intermediary metabolism, including pathways and regulation of carbohydrate, lipid, amino acid, and nucleotide biosynthesis and breakdown. The material is presented to build links to human biology and human disease. One semester of biology is recommended. Offered as BIOC 307, BIOC 407, and BIOL 407.

BIOC 408 – Molecular Biology - An examination of the flow of genetic information from DNA to RNA to protein. Topics include: nucleic acid structure; mechanisms and control of DNA, RNA, and protein biosynthesis; recombinant DNA; and mRNA processing and modification. Where possible, eukaryotic and prokaryotic systems are compared. Special topics include yeast as a model organism, molecular biology of cancer, and molecular biology of the cell cycle. Current literature is discussed briefly as an introduction to techniques of genetic engineering. Recommended preparation: BIOC 307/407. Offered as BIOC 308, BIOL 308, BIOC 408, and BIOL 408.

BIOC 412 – Proteins and Enzymes - Aspects of protein and nucleic acid function and interactions are discussed, including binding properties, protein-nucleic acid interactions, kinetics and mechanism of proteins and enzymes, and macromolecular machines. Recommended Preparation: CHEM 301. Offered as BIOC 312 and BIOC 412.

BIOC 420 – Current Topics in Cancer - The concept of cancer hallmarks has provided a useful guiding principle in our understanding of the complexity of cancer. The hallmarks include sustaining proliferative signaling, evading growth suppressors, enabling replicative immortality, activating invasion and metastasis, inducing angiogenesis, resisting cell death, deregulating cellular energetics, avoiding immune destruction, tumor-promoting inflammation, and genome

instability and mutation. The objectives of this course are to (1) examine the principles of some of these hallmarks, and (2) explore potential therapies developed based on these hallmarks of cancer. This is a student-driven and discussion-based graduate course. Students should have had some background on the related subjects and have read scientific papers in their prior coursework. Students will be called on to present and discuss experimental design, data and conclusions from assigned publications. There will be no exams or comprehensive papers but students will submit a one-page critique (strengths and weaknesses) of one of the assigned papers prior to each class meeting. The course will end with a full-day student-run symposium on topics to be decided jointly by students and the course director. Grades will be based on class participation, written critiques, and symposium presentations.

Offered as BIOC 420, MBI 420, MVIR 420, PATH 422, and PHRM 420.

BIOC 430 – Computational Biology (Shoham module)- The course is designed for graduate students who will be focusing on one or more methods of structural biology in their thesis project. This course is divided into 3-6 sections (depending on demand). The topics offered will include X-ray crystallography, nuclear magnetic resonance spectroscopy, optical spectroscopy, mass spectrometry, cryo-electron microscopy, and computational and design methods. Students can select one or more modules. Modules will be scheduled so that students can take all the offered modules in one semester. Each section is given in 5 weeks and is worth 1 credit. Each section covers one area of structural biology at an advanced level such that the student is prepared for graduate level research in that topic.

Offered as BIOC 430, CHEM 430, PHOL 430, and PHRM 430.

BIOC 601 – Research – permission of the instructor is required (1-6 hours)

EXAM 600 – MS Qualifying exam - The M. S. qualifying exam is one that is based upon the student's generation of a research proposal that will have an Introduction (what is the history behind the proposal), Materials and Methods (an explanation of the techniques to be used in the proposal), Experimental Design (what are the actual experiments to be performed and what are the controls), and Discussion (what will be learned and how does this fit with the literature). This may be based upon the student's own research (taken as BIOC 601) or on a recent research article of the student's interest. The "preliminary data" that would start off the Experimental Design section could either be the student's lab data or the figures from the research article that the student has chosen as the basis for the proposal. For the qualifying exam, the student will prepare a 10 to 20 page document as described above and then defend the proposal to a committee of three faculty. Dr. Merrick will chair the committee and the two other faculty members will be selected based upon the research area of the proposal. In most instances, the defense of the proposal will take about 90 minutes.

NTRN 452 – Nutritional Biochemistry and Metabolism - Mechanisms of

regulation of pathways of intermediary metabolism; amplification of biochemical signals; substrate cycling and use of radioactive and stable isotopes to measure metabolic rates. Recommended preparation: BIOC 307 or equivalent. Offered as BIOC 452 and NTRN 452.

PHRM 409 – Principles of Pharmacology - Principles of Pharmacology introduces the basic principles that underlie all of Pharmacology. The first half of the course introduces, both conceptually and quantitatively, drug absorption, distribution, elimination and metabolism (pharmacokinetics) and general drug receptor theory and mechanism of action (pharmacodynamics). Genetic variation in response to drugs (pharmacogenetics) is integrated into these basic principles. The second half of the course covers selected drug classes chosen to illustrate these principles. Small group/recitation sessions use case histories to reinforce presentation of principles and to discuss public perceptions of therapeutic drug use. Graduate students will be expected to critically evaluate articles from the literature and participate in a separate weekly discussion session. Recommended preparation for PHRM 409: Undergraduate degree in science or permission of instructor. Offered as PHRM 309 and PHRM 409.

PHRM 528 – Contemporary Approaches to Drug Discovery - This course is designed to teach the students how lead compounds are discovered, optimized, and processed through clinical trials for FDA approval. Topics will include: medicinal chemistry, parallel synthesis, drug delivery and devices, drug administration and pharmacokinetics, and clinical trials. A special emphasis will be placed on describing how structural biology is used for in silico screening and lead optimization. This component will include hands-on experience in using sophisticated drug discovery software to conduct in silico screening and the development of drug libraries. Each student will conduct a course project involving in silico screening and lead optimization against known drug targets, followed by the drafting of an inventory disclosure. Another important aspect of this course will be inclusion of guest lectures by industrial leaders who describe examples of success stories of drug development. Offered as BIOC 528, PHOL 528, and PHRM 528.

SYBB 411 A – D – Technologies in Bioinformatics - SYBB 311/411A is a 5-week course that introduces students to the high-throughput technologies used to collect data for bioinformatics research in the fields of genomics, proteomics, and metabolomics. In particular, we will focus on mass spectrometer-based proteomics, DNA and RNA sequencing, genotyping, protein microarrays, and mass spectrometry-based metabolomics. This is a lecture-based course that relies heavily on out-of-class readings. Graduate students will be expected to write a report and give an oral presentation at the end of the course. SYBB 311/411A is part of the SYBB survey series which is composed of the following course sequence: (1) Technologies in Bioinformatics, (2) Data Integration in Bioinformatics, (3) Translational Bioinformatics, and (4) Programming for

Bioinformatics. Each standalone section of this course series introduces students to an aspect of a bioinformatics project - from data collection (SYBB 311/411A), to data integration (SYBB 311/411B), to research applications (SYBB 311/411C), with a fourth module (SYBB 311/411D) introducing basic programming skills.

Graduate students have the option of enrolling in all four courses or choosing the individual modules most relevant to their background and goals with the exception of SYBB411D, which must be taken with SYBB411A.

Offered as SYBB 311A, BIOL 311A and SYBB 411A.

Spring Semester

BIOL 424 – Introduction to Stem Cell Biology –This discussion-based course will introduce students to the exciting field of stem cell research. Students will first analyze basic concepts of stem cell biology, including stem cell niche, cell quiescence, asymmetric cell division, cell proliferation and differentiation, and signaling pathways involved in these processes. This first part of the course will focus on invertebrate genetic models for the study of stem cells. In the second part of the course, students will search for primary research papers on vertebrate and human stem cells, and application of stem cell research in regenerative medicine and cancer. Finally, students will have the opportunity to discuss about ethical controversies in the field. Students will rotate in weekly presentations, and will write two papers during the semester. Students will improve skills on searching and reading primary research papers, gain presentation skills, and further their knowledge in related subjects in the fields of cell biology, genetics and developmental biology. This course may be used as a cell/molecular subject area elective for the B.A. and B.S. Biology degrees.

Offered as BIOL 324 and BIOL 424.

BIOL 426 - Genetics - Transmission genetics, nature of mutation, microbial genetics, somatic cell genetics, recombinant DNA techniques and their application to genetics, human genome mapping, plant breeding, transgenic plants and animals, uniparental inheritance, evolution, and quantitative genetics.

Offered as BIOL 326 and BIOL 426.

BIOC 454 – Biochemistry and Biology of RNA - Systematic overview of RNA biochemistry and biology. Course provides solid foundation for understanding processes of post-transcriptional regulation of gene expression. Topics include: RNA structure, RNA types, RNA-protein interactions, eukaryotic RNA metabolism including mRNA processing, ribosome biogenesis, tRNA metabolism, miRNA processing and function, bacterial RNA metabolism, transcriptomics. BIOC 454 requires an additional research proposal. Recommended preparation for BIOC 354: Undergraduate Biology (1 semester minimum), equivalents of CHEM 301, BIOC 307 or 308, CHEM 223, CHEM 224.

Offered as BIOC 354 and BIOC 454.

BIOC 460 – Introduction to Microarrays - Microarray technology is an exciting

new technique that is used to analyze gene expression in a wide variety of organisms. The goal of this course is to give participants a hands-on introduction to this technology. The course is intended for individuals who are preparing to use this technique, including students, fellows, and other investigators. This is a hands-on computer-based course, which will enable participants to conduct meaningful analyses of microarray data. Participants will gain an understanding of the principles underlying microarray technologies, including: theory of sample preparation, sample processing on microarrays, familiarity with the use of Affymetrix Microarray Suite software and generation of data sets. Transferring data among software packages to manipulate data will also be discussed. Importation of data into other software (GeneSpring and DecisionSite) will enable participants to mine the data for higher-order patterns. Participants will learn about the rationale behind the choice of normalization and data filtering strategies, distance metrics, use of appropriate clustering choices such as K-means, Hierarchical, and Self Organizing Maps.

Course Offered as BIOC 460, PATH 460, CNCR 460.

BIOC 601 – Research – permission of instructor required

CLBY 450 – Cells and Pathogens - Modern molecular cell biology owes a great debt to viral and bacterial pathogens as model systems. In some instances pathogens operate by faithful mimicry of host proteins, and other cases represent the result of extensive molecular tinkering and convergent evolution. This course will also explore numerous mechanisms utilized by pathogens to subvert the host and enhance their own survival. Topics covered include nuclear regulatory mechanisms, protein synthesis and stability, membrane-bound organelles, endocytosis and phagocytosis, and factors that influence cell behavior such as cytoskeleton rearrangements, cell-cell interactions, and cell migration. Additional topics include cell signaling and co-evolution of pathogens and host cell functions. Students are expected to come to class prepared to discuss pre-assigned readings consisting of brief reviews and seminal papers from the literature. Student assessment will be based on effective class participation (approximately 80%) and successful presentation of an independent research topic (approximately 20%).

Offered as CLBY 450, MBIO 450, and MVIR 450.

GENE 531 – Cancer Genetics - This seminar will discuss basic concepts in cancer epidemiology, principles of cancer genetics, inherited cancer syndromes, cytogenetics of cancers, pedigree analysis for familial cancer risk and approaches to the differential diagnosis of inherited and familial cancers. Additionally, topics of risk assessment, genetic testing, screening, management and psychosocial issues in providing genetic counseling to patients with familial and inherited cancers will be discussed.

PATH 416 – Fundamental Immunology - Introductory immunology providing an overview of the immune system, including activation, effector mechanisms, and

regulation. Topics include antigen-antibody reactions, immunologically important cell surface receptors, cell-cell interactions, cell-mediated immunity, innate versus adaptive immunity, cytokines, and basic molecular biology and signal transduction in B and T lymphocytes, and immunopathology. Three weekly lectures emphasize experimental findings leading to the concepts of modern immunology. An additional recitation hour is required to integrate the core material with experimental data and known immune mediated diseases. Five mandatory 90 minute group problem sets per semester will be administered outside of lecture and recitation meeting times. Graduate students will be graded separately from undergraduates, and 22 percent of the grade will be based on a critical analysis of a recently published, landmark scientific article.

Offered as BIOL 316, BIOL 416, CLBY 416, and PATH 416.

SYBB 411 A – D – Technologies in Bioinformatics - SYBB 311/411A is a 5-week course that introduces students to the high-throughput technologies used to collect data for bioinformatics research in the fields of genomics, proteomics, and metabolomics. In particular, we will focus on mass spectrometer-based proteomics, DNA and RNA sequencing, genotyping, protein microarrays, and mass spectrometry-based metabolomics. This is a lecture-based course that relies heavily on out-of-class readings. Graduate students will be expected to write a report and give an oral presentation at the end of the course.

SYBB 311/411A is part of the SYBB survey series which is composed of the following course sequence: (1) Technologies in Bioinformatics, (2) Data Integration in Bioinformatics, (3) Translational Bioinformatics, and (4) Programming for Bioinformatics. Each standalone section of this course series introduces students to an aspect of a bioinformatics project - from data collection (SYBB 311/411A), to data integration (SYBB 311/411B), to research applications (SYBB 311/411C), with a fourth module (SYBB 311/411D) introducing basic programming skills.

Graduate students have the option of enrolling in all four courses or choosing the individual modules most relevant to their background and goals with the exception of SYBB411D, which must be taken with SYBB411A.

Offered as SYBB 311A, BIOL 311A and SYBB 411A.

SYBB 459 – Bioinformatics for Systems Biology - Description of omic data (biological sequences, gene expression, protein-protein interactions, protein-DNA interactions, protein expression, metabolomics, biological ontologies), regulatory network inference, topology of regulatory networks, computational inference of protein-protein interactions, protein interaction databases, topology of protein interaction networks, module and protein complex discovery, network alignment and mining, computational models for network evolution, network-based functional inference, metabolic pathway databases, topology of metabolic pathways, flux models for analysis of metabolic networks, network integration, inference of domain-domain interactions, signaling pathway inference from protein interaction networks, network models and algorithms for disease gene identification, identification of dysregulated subnetworks network-based disease classification.

Offered as EECS 459 and SYBB 459.

Required Law School Courses

LAWS 4300 – Intellectual Property Survey - This course is designed to provide students with an overview of several areas of law traditionally associated with intellectual property or IP, including copyright law, which pertains to the protection of literary, musical, and artistic creations and has issues replete with First Amendment implications; patent law and trade secret law, which focus on the protection of technological works ranging from chemical formulae, to software, to biotechnology; and trademark law, which relates to the goodwill associated with corporate identity and product recognition. We will also devote time to the study of the philosophy and economics of intellectual property keeping in mind, throughout the course, the need to strike an optimal balance between incentives to create and commercialize intellectual creations on the one hand and public access to these creations on the other hand.

LAWS 4302 – Patent Law - Basic concepts of patent law as property considered primarily in its substantive aspects, including the relationship to other forms of protection and intellectual property, infringement, and statutory requirements for patents.

LAWS 4311 - Patent Preparation and Drafting I: Patent preparation, drafting, and filing of a patent application are the fundamental aspects of patent practice. Students will learn how to conduct a client-inventor interview, what questions to ask the client-inventor and what information is most important to obtain prior to commencing the patent drafting process. Technical aspects of patentability searching will also be explored. In addition, the student will learn the various parts of the patent application and best practices associated with drafting each part. Emphasis will be placed on specification drafting and claim drafting, and how to claim around prior art. *Significant emphasis will be placed on USPTO Rules of Professional Conduct* – see www.uspto.gov/learning-and-resources/ip-policy/current-practitioners/uspto-rules-professional-conduct

LAWS 4312 - Patent Preparation and Drafting II: The course builds on *Patent Drafting and Prosecution I* and will focus on aspects of patent prosecution post-filing. In particular, students will learn how to respond to an Office Action rejecting the patent application as is typically encountered during the practice before the US Patent and Trademark Office. The student's response will take the form of an Amendment that will reflect changes made to the claims and arguments relating to patentability. The course will also cover the appeals process. *Significant emphasis will be placed on USPTO Rules of Professional Conduct* – see www.uspto.gov/learning-and-resources/ip-policy/current-practitioners/uspto-rules-professional-conduct.

LAWS 4820 - Bar Review: Passing the patent bar is a requirement for practicing before the U.S. Patent & Trademark Office (“USPTO”). This course will introduce

students to 35 U.S.C. (the United States “patent laws”) and 37 C.F.R. (Code of Federal Regulations encompassing the “patent rules”), followed by an in-depth study of the M.P.E.P. (Manual of Patent Examining Procedure), which is the Patent Office’s rule book that covers all the patent laws and rules as interpreted by the USPTO. In addition, the course will cover the particulars of the patent bar exam, including questions from prior exams; essential materials the students need to master to pass the exam, and provide students with several opportunities to hone their bar taking skills.

Suggested Law School Elective Courses

Fall Semester

LAWS 5341 – Commercialization and Intellectual Property Management - This interdisciplinary course covers a variety of topics, including principles of intellectual property and intellectual property management, business strategies and modeling relevant to the creation of start-up companies and exploitation of IP rights as they relate to biomedical-related inventions. The goal of this course is to address issues relating to the commercialization of biomedical-related inventions by exposing law students, MBA students, and Ph.D. candidates (in genetics and proteomics) to the challenges and opportunities encountered when attempting to develop biomedical intellectual property from the point of early discovery to the clinic and market. Specifically, this course seeks to provide students with the ability to value a given technological advance or invention holistically, focusing on issues that extend beyond scientific efficacy and include patient and practitioner value propositions, legal and intellectual property protection, business modeling, potential market impacts, market competition, and ethical, social, and healthcare practitioner acceptance. During this course, law students, MBA students, and Ph.D. candidates in genomics and proteomics will work in teams of five (two laws students, two MBA students and one Ph.D. candidate), focusing on issues of commercialization and IP management of biomedical-related inventions. The instructors will be drawn from the law school, business school, and technology-transfer office. Please visit the following website for more information: fusioninnovate.com.

Spring Semester

LAWS 4315 - Claim Drafting Lab - The patent claim is the most important part of the patent application, because it is the claim that represents the metes and bounds of inventor’s property right. This Lab is devoted to drafting claims, understanding the different types of claims, and how claims differ depending on the nature of the technology. A particular emphasis will be placed on computer-implemented (e.g., software) and biomedical-related inventions (e.g., life science and biomedical devices)

LAWS 5323 - IP Strategy - Intellectual property rights are legally created business assets used by companies to provide a competitive advantage in the marketplace. Companies use intellectual property differently depending on many factors, such as industry, business strategy, culture and maturity. Intellectual property attorneys are considered valuable members of business teams, contributing to business strategy, business planning and other executive level business decisions. Indeed, IP is a boardroom issue.

This class will study the ways intellectual property is used by different companies and how the intellectual property laws impact not only the intellectual property assets, but also the business strategy and business planning. In addition to learning how intellectual property is being used by major corporations, universities, and entrepreneurs/start-ups, the students will pick one company and study how that company manages its intellectual property.

LAWS 6401 - Experiential Elective (IP Venture Clinic): In the IP Venture Clinic ("IPVC"), students, working under the supervision of faculty, represent start-up companies and entrepreneurs from the Blackstone LaunchPad initiative in Northeast Ohio. Students in the Masters of Patent Practice program will work up a general IP protection strategy, working with supervising practitioners to design and implement that strategy. Students will perform prior art searches, drafting claims and participating in the application and prosecution process with the U.S. Patent and Trademark Office (USPTO) and other patent offices worldwide. Importantly, the USPTO has selected Case Western Reserve University School of Law to participate in the Patent Law School Clinic Certification Program, which provides law students the opportunity to represent clients before the USPTO.

MA in Patent Practice/MS in Biochemistry (plan B) Dual Degree Proposal

This document contains a proposal for a dual degree between the Department of Biochemistry in the School of Medicine (MS degree, plan B) and the Law School (MA in Patent Practice).

I. Background and Justification

The purpose of the degree program is to prepare a cadre of biochemistry students for successful careers as patent agents. In any given year, recently graduated engineers and scientists enroll in law school with the goal of becoming patent lawyers, but over the past few years, a growing number have become reluctant to invest in a three-year JD program. The proposed *Masters in Patent Practice* seeks to provide a viable alternative for these students, with a focus on students with a biological background. The most likely undergraduates would be science or engineering majors with the likelihood that biology and premed students who failed to enter medical school would predominate (in part based upon the requirements for entry). The one technological area of patent practice where an advanced degree leads to a significant difference in marketability is the life science field.

A career as a patent agent enables engineers and biomedical scientists to stay close to their technological specialty, yet provides a livelihood that has comparative advantages over that of a practicing engineer or bench scientist.¹ Indeed, the patent law landscape over the past 10 years has witnessed the growing importance of patent agents. Most IP boutique firms or IP practice groups within general firms have at least one, and oftentimes several, patent agents; and it is also common for patent agents to work in-house for corporations of all sizes. The *Masters in Patent Practice* will not only prepare the engineer and biomedical scientist to take the patent bar, but will introduce them to the nuances of patent searching, the complexities of patent drafting, and the arcana commonly associated with patent law doctrine and USPTO regulations.

Over the past several years, the United States Patent and Trademark Office has received increasingly more patent applications. In 2013, 571,612 patent applications were filed with the patent office. This compares with 456,321 in 2008 and 342,441 in 2000. Job postings for patent agents in intellectual property law journals and websites reflect these numbers. Anecdotal evidence also suggests a demand for patent agents.

Moreover, in the initial review of the MA in Patent Practice proposal, the Board of Regents review observed that there is a demand for patent agents (i.e. see

¹ For example, according to the American Intellectual Property Lawyers Association's "Report of the Economic Survey 2013," the average salary of a patent agent with fewer than five years of experience at a private law firm is \$92,250, with the first and third quartile range of \$55,500 to \$126,250.

www.intelproplaw.com/JobsAvailable/). For example, the University of Dayton reviewer wrote: “in the forty plus years that this reviewer has been practicing law, there has been a persistent shortage of people qualified and licensed by the United States Patent and Trademark Office to prepare, file and prosecute patent applications. The proposed Masters in Patent Practice will help alleviate that shortage. This program is unique to Ohio.” The reviewer from the University of Toledo stated “CWRU has clearly shown that there are jobs for patent agents and that patent applications are increasing and a growth field.” It is the intent of this program to provide individuals with a competitive edge to this professional discipline.

The formal acceptance of the stand alone MA in Patent Practice was approved by the Board of Regents in March 2015. This degree is currently advertised within the materials associated with admissions into the Law School.

II. Administration

School of Law Liaison: Craig Nard, Professor of Law, School of Law
Biochemistry Department Liaison: William Merrick, Professor of Biochemistry, Department of Biochemistry.

Professors Nard and Merrick will meet every other month during the initial phases of the program to best address problems these dual degree students might be having beyond those of the stand alone MA in Patent Practice (overseen by Professor Nard) and those in the stand alone or other dual degree programs associated with the MS in Biochemistry (overseen by Professor Merrick). In particular, there is a twelve year history with a similar program, the dual degree JD/ MS in Biochemistry.

III. Program Structure

If one were to acquire the MA and MS degrees independently, it would require the completion of 30 hours for the MA program and 36 hours for the MS program (a total of 66 credit hours). In the dual degree program, cross counting allows for a reduction in the total number of class hours to 45 credit hours for both degrees as described below. The 30 credit hour and 36 credit hour numbers are for the independent programs as accredited through the Board of Regents in Columbus.

The proposed dual degree requires students to complete 45 credit hours. The MS in Biochemistry requires 24 credit hours of coursework for the completion of the MS degree (plan B). The School of Law requires 21 credit hours of coursework for the completion of the MA program as part of the dual degree. To be compliant with the manner in which both degrees are certified by the Board of Regents, students will count 12 Law credit hours towards the MS in Biochemistry to reach a cumulative total of 36 credit hours and count 9 hours of Biochemistry credits toward the MA in Patent Practice. Thus, there is an approximately equal reduction in both

programs in accumulating the total number of credit hours that are required to satisfy the requirements of the stand alone programs as approved by the Board of Regents.

The advantage of this dual degree program over either an MA with certificate in Biochemistry or an MS in Biochemistry with a certificate in Patent Practice is that the student will receive a recognized degree (either MA or MS) rather than a certificate which has no true academic definition (i.e. some CWRU certificate programs are completed with as few as 10 to 12 hours).

It should be noted that the anticipated number of students, perhaps as many as 6 per year, will not add a sufficient burden for the Law School classes (the MA in Patent Practice in particular), the biomedical classes nor the administration such that no additional personnel (faculty or staff) will be required for this program in either the Law School or the School of Medicine.

IV. Dual Degree Curriculum: Examples

Students begin in the School of Law although the fundamental Biochemistry course is also taken (BIOC 407, 408). The anticipation is that the entering student will be practicing in patent law and therefore the primary guidance in terms of job placement will reflect advising from the School of Law. The advisor in Biochemistry will provide insight into the most recent developing areas of research and technology that the student would be likely to encounter in their future employment.

Year 1: First year curriculum.

| Semester 1 | | Semester 2 | |
|---------------------------|-----|----------------------------|-----|
| LAWS IP Survey | (3) | LAWS IP Elective course | (3) |
| LAWS Patent Law | (3) | LAWS Patent Preparation II | (2) |
| LAWS Patent Preparation I | (3) | BIOC elective | (3) |
| BIOC 407 | (4) | BIOC 408 | (4) |

| | | | | |
|---------|---------------|-----|------------------------------|-----|
| Year 2. | BIOC 412 | (3) | LAWS Patent Bar Review | (4) |
| | BIOC elective | (3) | LAWS Experiential Elective** | (3) |
| | BIOC elective | (3) | BIOC elective | (3) |
| | | | EXAM 600 | (1) |

Alternate, 18 month fast track

Year 1: First semester

Semester 2

| | | | |
|---------------------------|-----|----------------------------|-----|
| LAWS IP Survey | (3) | LAWS IP Elective course | (3) |
| LAWS Patent Law | (3) | LAWS Patent Preparation II | (2) |
| LAWS Patent Preparation I | (3) | LAWS Patent Bar Review | (4) |
| BIOC 407 | (4) | BIOC elective | (3) |
| BIOC 412 | (3) | BIOC 408 | (4) |

Year 2: First semester

| | | |
|------------------------------|-------------------------------|-----|
| LAWS Experiential Elective** | (3) or LAWS IP Venture Clinic | (3) |
| BIOC elective | (3) | |
| BIOC elective | (3) | |
| BIOC elective | (3) | |
| EXAM 600 | (1) | |

Biochemistry electives for the first and second year

| | |
|--------------------------|-----------------|
| BIOC 420 (3) | BIOC 601 (1-4) |
| BIOC 430 (1) Comp. Biol. | BIOC 454 (3) |
| NTRN 452 (3) | GENE 531 (2-3) |
| PHRM 409 (3) | BIOC 460 (3) |
| SYBB 411 (1-4) | SYBB 411 (1-4) |
| PHRM 528 (3)*** | SYBB 459 (3) |
| BIOC 601 (1-4) | CLBY 450 (3)*** |
| | PATH 416 (3) |
| | GENE 500 |

**The experiential elective refers to an externship with a corporation (i.e. Parker Hannifin, Cleveland Clinic Innovations, Bridgestone America, etc.) or a law firm.

***recommended by previous JD/MS students as being useful for patent law and also being good classes

A more complete description of the Biochemistry and Law required courses and electives is in the Appendix.

Alternatively, up to 6 credits of BIOC 601 could be taken during the summer after the first year freeing up time during the regular semesters. However, of the total 24 hours required in Biochemistry, 18 hours must be in courses that are letter graded.

Courses to count towards the MS in Biochemistry are Patent Law (3), Patent Preparation I (3), IP Survey (3) and Experiential elective (3) for a total of 12 credit hours.

Courses to count towards the MA in Patent Law would be either BIOC 407, BIOC 408 and one of the technically oriented BIOC electives (credit to be either 3 or 4 hours)

To fulfill the MS degree portion of the dual degree program, students will focus their capstone writing requirement (EXAM 600; see Appendix) on the subject of their work in the Department of Biochemistry. This proposal may reflect either a current research article, material from one of the graduate classes or research the student may have performed as part of BIOC 601 credit. The MS Advisor will serve as a (co-)supervisor of this proposal.

Successful completion of the program would require 45 credits:

| | |
|--|----|
| Total Hours in the School of Law: | 21 |
| Total Hours in the Department of Biochemistry: | 24 |
| Total Hours in the Dual Degree Program: | 45 |

V. Dual Degree Student Advising

Dual degree students will be advised concerning matters related to the MA in Patent Practice degree by Professor Craig Nard, Director of the Spangenberg Center for Law, Technology and the Arts. Dual degree students will be advised concerning matters related to the MS in Biochemistry by the Graduate Program Advisor as designated by the Graduate Education Committee of the Department of Biochemistry (currently Professor William Merrick). At the end of each semester, the student will meet with both the MA advisor and the MS advisor to discuss progress and to select classes for the coming semester.

By regulations of the School of graduate Studies, Master's students are required to maintain a GPA of 2.75 or greater within the School of Graduate Studies; this will apply to all courses taken towards the MS in Biochemistry degree. The MA in Patent Practice program requires a GPA of at least 2.75; this will apply to all courses taken towards the MA in Patent Practice degree.

Twice a year, immediately after the beginning of the fall and spring semesters, or more frequently if necessary, the Director of MA Patent Practice and the Graduate Program Advisor of the Department of Biochemistry will meet to discuss the progress of all students in the program.

VI. Admissions

Target enrollment in the program is about six students each year. Students wishing to enroll in the dual degree program apply to and are admitted into the dual degree program directly. As the MA in Patent Practice does not require the LSAT or other standardized exam, the MS in Biochemistry Program will accept either the GRE, MCAT or LSAT as the standardized exam for acceptance into the dual degree program. This is in lieu of the more standard GRE score that is used for admittance into the individual M. S. or Ph. D. programs in Biochemistry. Applications will be jointly reviewed by the directors of the two programs. Once students have been admitted, they will consult with the Department of Biochemistry Department Liaison and Law School Liaison to determine their appropriate course of MA study and the MS Advisor of the Department of Biochemistry to determine their appropriate program of MS study. In order that the admitted student can immediately take graduate courses in the biological sciences, they must have taken a full year course in each of the following: introductory chemistry, organic chemistry and introductory biology. Additional course work such as genetics, physics and calculus would enhance the applicant's portfolio.

Given the nature of this dual degree and the cost savings to the student (the equivalent of 20 credit hours), no financial aid will be offered by either the Law School or the Department of Biochemistry to students in this program.

VII. Tuition Revenue Mechanics:

A written agreement about the management of tuition revenues will exist between the Law School and the Department of Biochemistry. The text of this agreement is shown below:

Graduate student tuition revenues filter back to the student's home school. The MS Biochemistry student's home is based in the School of Medicine. The MA student's home is based within the School of Law. It is anticipated the dual MA/MS students will be home based in the School of Law. Tuitions paid to the School of Law will be fully retained by the Law School. Tuitions paid to the School of Medicine will be split 30% to the School of Law and 70% to the School of Medicine. This split reflects the primary advising role played by the School of Law in the final placement of the student into an employment opportunity.

VIII. Approval Signatures:

| | |
|--|---|
| Interim Dean, School of Law <i>Michael Scharf or Jessica Berg</i> | X |
| Chair, Department of Biochemistry <i>Dr. Michael A. Weiss</i> | X |
| Dean, School of Medicine <i>Dr. Pamela B. Davis</i> | X |
| Dean, School of Graduate Studies <i>Dr. Charles Rozek</i> | X |

IX. Student Activities:

It is noted that for either the experiential elective or the IP Venture Clinic, the student will have direct exposure to the workings of the patent process. The School of Law will assist in the placement of the student in the relevant environment.

Other appropriate activities for the MA/MS students include attending the weekly seminars, as well as annual named lectureships, participating in annual retreats, and one or more journal clubs (see also casemed.case.edu/gradprog/index.php). Within the Law School, students will be involved with informal networking experiences with potential employers and participate in Law School activities as they choose (see law.case.edu/StudentLife.aspx)

X. Advantages of the Joint Degree Program

There are several advantages to the students in the MA/MS program. The key advantage will be the integration of the two disciplines during the time that the students are receiving their training, thus allowing the students to develop a unique focus on their studies in each of the two disciplines. In addition, the usual Master's of Science in Biochemistry is a two year program but the students in the dual degree program will be able to complete the program requirements in just 12 months beyond the time required for obtaining the MA degree (or sooner if they take the alternate, accelerated track). This is reflected in the credit savings for the two degrees (36 + 30 = 66 hours) vs. the dual degree which requires 45 credit hours. This savings in credit hours is thus seen in both time (18 or 24 months vs. 3 years) and in expense, roughly the cost of an additional semester or two.

Appendix – Elective courses

Suggested Biochemistry Elective Courses

Fall Semester

BIOC 407 – Introduction to Biochemistry: From molecules to medical science. Overview of the macromolecules and small molecules key to all living systems. Topics include: protein structure and function; enzyme mechanisms, kinetics and regulation; membrane structure and function; bioenergetics; hormone action; intermediary metabolism, including pathways and regulation of carbohydrate, lipid, amino acid, and nucleotide biosynthesis and breakdown. The material is presented to build links to human biology and human disease. One semester of biology is recommended.

Offered as BIOC 307, BIOC 407, and BIOL 407.

BIOC 408 – Molecular Biology - An examination of the flow of genetic information from DNA to RNA to protein. Topics include: nucleic acid structure; mechanisms and control of DNA, RNA, and protein biosynthesis; recombinant DNA; and mRNA processing and modification. Where possible, eukaryotic and prokaryotic systems are compared. Special topics include yeast as a model organism, molecular biology of cancer, and molecular biology of the cell cycle. Current literature is discussed briefly as an introduction to techniques of genetic engineering. Recommended preparation: BIOC 307/407.

Offered as BIOC 308, BIOL 308, BIOC 408, and BIOL 408.

BIOC 412 – Proteins and Enzymes - Aspects of protein and nucleic acid function and interactions are discussed, including binding properties, protein-nucleic acid interactions, kinetics and mechanism of proteins and enzymes, and macromolecular machines.

Recommended Preparation: CHEM 301.

Offered as BIOC 312 and BIOC 412.

BIOC 420 – Current Topics in Cancer - The concept of cancer hallmarks has provided a useful guiding principle in our understanding of the complexity of cancer. The hallmarks include sustaining proliferative signaling, evading growth suppressors, enabling replicative immortality, activating invasion and metastasis, inducing angiogenesis, resisting cell death, deregulating cellular energetics, avoiding immune destruction, tumor-promoting inflammation, and genome instability and mutation. The objectives of this course are to (1) examine the principles of some of these hallmarks, and (2) explore potential therapies developed based on these hallmarks of cancer. This is a student-driven and discussion-based graduate course. Students should have had some background on the related subjects and have read scientific papers in their prior coursework. Students will be called on to present and discuss experimental design, data and

conclusions from assigned publications. There will be no exams or comprehensive papers but students will submit a one-page critique (strengths and weaknesses) of one of the assigned papers prior to each class meeting. The course will end with a full-day student-run symposium on topics to be decided jointly by students and the course director. Grades will be based on class participation, written critiques, and symposium presentations.

Offered as BIOC 420, MBIO 420, MVIR 420, PATH 422, and PHRM 420.

BIOC 430 – Computational Biology (Shoham module)- The course is designed for graduate students who will be focusing on one or more methods of structural biology in their thesis project. This course is divided into 3-6 sections (depending on demand). The topics offered will include X-ray crystallography, nuclear magnetic resonance spectroscopy, optical spectroscopy, mass spectrometry, cryo-electron microscopy, and computational and design methods. Students can select one or more modules. Modules will be scheduled so that students can take all the offered modules in one semester. Each section is given in 5 weeks and is worth 1 credit. Each section covers one area of structural biology at an advanced level such that the student is prepared for graduate level research in that topic.

Offered as BIOC 430, CHEM 430, PHOL 430, and PHRM 430.

BIOC 601 – Research – permission of the instructor is required (1-6 hours)

EXAM 600 – MS Qualifying exam - The M. S. qualifying exam is one that is based upon the student's generation of a research proposal that will have an Introduction (what is the history behind the proposal), Materials and Methods (an explanation of the techniques to be used in the proposal), Experimental Design (what are the actual experiments to be performed and what are the controls), and Discussion (what will be learned and how does this fit with the literature). This may be based upon the student's own research (taken as BIOC 601) or on a recent research article of the student's interest. The "preliminary data" that would start off the Experimental Design section could either be the student's lab data or the figures from the research article that the student has chosen as the basis for the proposal. For the qualifying exam, the student will prepare a 10 to 20 page document as described above and then defend the proposal to a committee of three faculty. Dr. Merrick will chair the committee and the two other faculty members will be selected based upon the research area of the proposal. In most instances, the defense of the proposal will take about 90 minutes.

NTRN 452 – Nutritional Biochemistry and Metabolism - Mechanisms of regulation of pathways of intermediary metabolism; amplification of biochemical signals; substrate cycling and use of radioactive and stable isotopes to measure metabolic rates. Recommended preparation: BIOC 307 or equivalent.

Offered as BIOC 452 and NTRN 452.

PHRM 409 – Principles of Pharmacology - Principles of Pharmacology

introduces the basic principles that underlie all of Pharmacology. The first half of the course introduces, both conceptually and quantitatively, drug absorption, distribution, elimination and metabolism (pharmacokinetics) and general drug receptor theory and mechanism of action (pharmacodynamics). Genetic variation in response to drugs (pharmacogenetics) is integrated into these basic principles. The second half of the course covers selected drug classes chosen to illustrate these principles. Small group/recitation sessions use case histories to reinforce presentation of principles and to discuss public perceptions of therapeutic drug use. Graduate students will be expected to critically evaluate articles from the literature and participate in a separate weekly discussion session. Recommended preparation for PHRM 409: Undergraduate degree in science or permission of instructor.
Offered as PHRM 309 and PHRM 409.

PHRM 528 – Contemporary Approaches to Drug Discovery - This course is designed to teach the students how lead compounds are discovered, optimized, and processed through clinical trials for FDA approval. Topics will include: medicinal chemistry, parallel synthesis, drug delivery and devices, drug administration and pharmacokinetics, and clinical trials. A special emphasis will be placed on describing how structural biology is used for in silico screening and lead optimization. This component will include hands-on experience in using sophisticated drug discovery software to conduct in silico screening and the development of drug libraries. Each student will conduct a course project involving in silico screening and lead optimization against known drug targets, followed by the drafting of an inventory disclosure. Another important aspect of this course will be inclusion of guest lectures by industrial leaders who describe examples of success stories of drug development.
Offered as BIOC 528, PHOL 528, and PHRM 528.

SYBB 411 A – D – Technologies in Bioinformatics - SYBB 311/411A is a 5-week course that introduces students to the high-throughput technologies used to collect data for bioinformatics research in the fields of genomics, proteomics, and metabolomics. In particular, we will focus on mass spectrometer-based proteomics, DNA and RNA sequencing, genotyping, protein microarrays, and mass spectrometry-based metabolomics. This is a lecture-based course that relies heavily on out-of-class readings. Graduate students will be expected to write a report and give an oral presentation at the end of the course.
SYBB 311/411A is part of the SYBB survey series which is composed of the following course sequence: (1) Technologies in Bioinformatics, (2) Data Integration in Bioinformatics, (3) Translational Bioinformatics, and (4) Programming for Bioinformatics. Each standalone section of this course series introduces students to an aspect of a bioinformatics project - from data collection (SYBB 311/411A), to data integration (SYBB 311/411B), to research applications (SYBB 311/411C), with a fourth module (SYBB 311/411D) introducing basic programming skills. Graduate students have the option of enrolling in all four courses or choosing the individual modules most relevant to their background and goals with the exception

of SYBB411D, which must be taken with SYBB411A.
Offered as SYBB 311A, BIOL 311A and SYBB 411A.

Spring Semester

BIOC 454 – Biochemistry and Biology of RNA - Systematic overview of RNA biochemistry and biology. Course provides solid foundation for understanding processes of post-transcriptional regulation of gene expression. Topics include: RNA structure, RNA types, RNA-protein interactions, eukaryotic RNA metabolism including mRNA processing, ribosome biogenesis, tRNA metabolism, miRNA processing and function, bacterial RNA metabolism, transcriptomics. BIOC 454 requires an additional research proposal. Recommended preparation for BIOC 354: Undergraduate Biology (1 semester minimum), equivalents of CHEM 301, BIOC 307 or 308, CHEM 223, CHEM 224.
Offered as BIOC 354 and BIOC 454.

BIOC 460 – Introduction to Microarrays - Microarray technology is an exciting new technique that is used to analyze gene expression in a wide variety of organisms. The goal of this course is to give participants a hands-on introduction to this technology. The course is intended for individuals who are preparing to use this technique, including students, fellows, and other investigators. This is a hands-on computer-based course, which will enable participants to conduct meaningful analyses of microarray data. Participants will gain an understanding of the principles underlying microarray technologies, including: theory of sample preparation, sample processing on microarrays, familiarity with the use of Affymetrix Microarray Suite software and generation of data sets. Transferring data among software packages to manipulate data will also be discussed. Importation of data into other software (GeneSpring and DecisionSite) will enable participants to mine the data for higher-order patterns. Participants will learn about the rationale behind the choice of normalization and data filtering strategies, distance metrics, use of appropriate clustering choices such as K-means, Hierarchical, and Self Organizing Maps.
Course Offered as BIOC 460, PATH 460, CNCR 460.

BIOC 601 – Research – permission of instructor required

CLBY 450 – Cells and Pathogens - Modern molecular cell biology owes a great debt to viral and bacterial pathogens as model systems. In some instances pathogens operate by faithful mimicry of host proteins, and other cases represent the result of extensive molecular tinkering and convergent evolution. This course will also explore numerous mechanisms utilized by pathogens to subvert the host and enhance their own survival. Topics covered include nuclear regulatory mechanisms, protein synthesis and stability, membrane-bound organelles, endocytosis and phagocytosis, and factors that influence cell behavior such as cytoskeleton rearrangements, cell-cell interactions, and cell migration. Additional topics include cell signaling and co-evolution of pathogens and host cell

functions. Students are expected to come to class prepared to discuss pre-assigned readings consisting of brief reviews and seminal papers from the literature. Student assessment will be based on effective class participation (approximately 80%) and successful presentation of an independent research topic (approximately 20%).

Offered as CLBY 450, MBI0 450, and MVIR 450.

EXAM 600 – MS Qualifying exam - The M. S. qualifying exam is one that is based upon the student's generation of a research proposal that will have an Introduction (what is the history behind the proposal), Materials and Methods (an explanation of the techniques to be used in the proposal), Experimental Design (what are the actual experiments to be performed and what are the controls), and Discussion (what will be learned and how does this fit with the literature). This may be based upon the student's own research (taken as BIOC 601) or on a recent research article of the student's interest. The "preliminary data" that would start off the Experimental Design section could either be the student's lab data or the figures from the research article that the student has chosen as the basis for the proposal. For the qualifying exam, the student will prepare a 10 to 20 page document as described above and then defend the proposal to a committee of three faculty. Dr. Merrick will chair the committee and the two other faculty members will be selected based upon the research area of the proposal. In most instances, the defense of the proposal will take about 90 minutes.

GENE 500 – Advanced Eukaryotic Genetics I - Fundamental principles of modern genetics; transmission, recombination, structure and function of the genetic material in eukaryotes, dosage compensation, behavior and consequences of chromosomal abnormalities, mapping and isolation of mutations, gene complementation and genetic interactions. Recommended preparation: BIOL 362.

GENE 531 – Cancer Genetics - This seminar will discuss basic concepts in cancer epidemiology, principles of cancer genetics, inherited cancer syndromes, cytogenetics of cancers, pedigree analysis for familial cancer risk and approaches to the differential diagnosis of inherited and familial cancers. Additionally, topics of risk assessment, genetic testing, screening, management and psychosocial issues in providing genetic counseling to patients with familial and inherited cancers will be discussed.

PATH 416 – Fundamental Immunology - Introductory immunology providing an overview of the immune system, including activation, effector mechanisms, and regulation. Topics include antigen-antibody reactions, immunologically important cell surface receptors, cell-cell interactions, cell-mediated immunity, innate versus adaptive immunity, cytokines, and basic molecular biology and signal transduction in B and T lymphocytes, and immunopathology. Three weekly lectures emphasize experimental findings leading to the concepts of modern immunology. An additional recitation hour is required to integrate the core material with

experimental data and known immune mediated diseases. Five mandatory 90 minute group problem sets per semester will be administered outside of lecture and recitation meeting times. Graduate students will be graded separately from undergraduates, and 22 percent of the grade will be based on a critical analysis of a recently published, landmark scientific article.
Offered as BIOL 316, BIOL 416, CLBY 416, and PATH 416.

SYBB 411 A – D – Technologies in Bioinformatics - SYBB 311/411A is a 5-week course that introduces students to the high-throughput technologies used to collect data for bioinformatics research in the fields of genomics, proteomics, and metabolomics. In particular, we will focus on mass spectrometer-based proteomics, DNA and RNA sequencing, genotyping, protein microarrays, and mass spectrometry-based metabolomics. This is a lecture-based course that relies heavily on out-of-class readings. Graduate students will be expected to write a report and give an oral presentation at the end of the course.

SYBB 311/411A is part of the SYBB survey series which is composed of the following course sequence: (1) Technologies in Bioinformatics, (2) Data Integration in Bioinformatics, (3) Translational Bioinformatics, and (4) Programming for Bioinformatics. Each standalone section of this course series introduces students to an aspect of a bioinformatics project - from data collection (SYBB 311/411A), to data integration (SYBB 311/411B), to research applications (SYBB 311/411C), with a fourth module (SYBB 311/411D) introducing basic programming skills.

Graduate students have the option of enrolling in all four courses or choosing the individual modules most relevant to their background and goals with the exception of SYBB411D, which must be taken with SYBB411A.

Offered as SYBB 311A, BIOL 311A and SYBB 411A.

SYBB 459 – Bioinformatics for Systems Biology - Description of omic data (biological sequences, gene expression, protein-protein interactions, protein-DNA interactions, protein expression, metabolomics, biological ontologies), regulatory network inference, topology of regulatory networks, computational inference of protein-protein interactions, protein interaction databases, topology of protein interaction networks, module and protein complex discovery, network alignment and mining, computational models for network evolution, network-based functional inference, metabolic pathway databases, topology of metabolic pathways, flux models for analysis of metabolic networks, network integration, inference of domain-domain interactions, signaling pathway inference from protein interaction networks, network models and algorithms for disease gene identification, identification of dysregulated subnetworks network-based disease classification.
Offered as EECS 459 and SYBB 459.

Required Law School Courses

LAWS 4300 – Intellectual Property Survey - This course is designed to provide students with an overview of several areas of law traditionally associated with intellectual property or IP, including copyright law, which pertains to the protection of literary, musical, and artistic creations and has issues replete with First Amendment implications; patent law and trade secret law, which focus on the protection of technological works ranging from chemical formulae, to software, to biotechnology; and trademark law, which relates to the goodwill associated with corporate identity and product recognition. We will also devote time to the study of the philosophy and economics of intellectual property keeping in mind, throughout the course, the need to strike an optimal balance between incentives to create and commercialize intellectual creations on the one hand and public access to these creations on the other hand.

LAWS 4302 – Patent Law - Basic concepts of patent law as property considered primarily in its substantive aspects, including the relationship to other forms of protection and intellectual property, infringement, and statutory requirements for patents.

LAWS 4311 - Patent Preparation and Drafting I: Patent preparation, drafting, and filing of a patent application are the fundamental aspects of patent practice. Students will learn how to conduct a client-inventor interview, what questions to ask the client-inventor and what information is most important to obtain prior to commencing the patent drafting process. Technical aspects of patentability searching will also be explored. In addition, the student will learn the various parts of the patent application and best practices associated with drafting each part. Emphasis will be placed on specification drafting and claim drafting, and how to claim around prior art. *Significant emphasis will be placed on USPTO Rules of Professional Conduct* – see www.uspto.gov/learning-and-resources/ip-policy/current-practitioners/uspto-rules-professional-conduct

LAWS 4312 - Patent Preparation and Drafting II: The course builds on *Patent Drafting and Prosecution I* and will focus on aspects of patent prosecution post-filing. In particular, students will learn how to respond to an Office Action rejecting the patent application as is typically encountered during the practice before the US Patent and Trademark Office. The student's response will take the form of an Amendment that will reflect changes made to the claims and arguments relating to patentability. The course will also cover the appeals process. *Significant emphasis will be placed on USPTO Rules of Professional Conduct* – see www.uspto.gov/learning-and-resources/ip-policy/current-practitioners/uspto-rules-professional-conduct.

LAWS 4820 - Bar Review: Passing the patent bar is a requirement for practicing before the U.S. Patent & Trademark Office (“USPTO”). This course will introduce students to 35 U.S.C. (the United States “patent laws”) and 37 C.F.R. (Code of

Federal Regulations encompassing the “patent rules”), followed by an in-depth study of the M.P.E.P. (Manual of Patent Examining Procedure), which is the Patent Office’s rule book that covers all the patent laws and rules as interpreted by the USPTO. In addition, the course will cover the particulars of the patent bar exam, including questions from prior exams; essential materials the students need to master to pass the exam, and provide students with several opportunities to hone their bar taking skills.

Suggested Law School Elective Courses

Fall Semester

LAWS 5341 – Commercialization and Intellectual Property Management - This interdisciplinary course covers a variety of topics, including principles of intellectual property and intellectual property management, business strategies and modeling relevant to the creation of start-up companies and exploitation of IP rights as they relate to biomedical-related inventions. The goal of this course is to address issues relating to the commercialization of biomedical-related inventions by exposing law students, MBA students, and Ph.D. candidates (in genetics and proteomics) to the challenges and opportunities encountered when attempting to develop biomedical intellectual property from the point of early discovery to the clinic and market. Specifically, this course seeks to provide students with the ability to value a given technological advance or invention holistically, focusing on issues that extend beyond scientific efficacy and include patient and practitioner value propositions, legal and intellectual property protection, business modeling, potential market impacts, market competition, and ethical, social, and healthcare practitioner acceptance. During this course, law students, MBA students, and Ph.D. candidates in genomics and proteomics will work in teams of five (two laws students, two MBA students and one Ph.D. candidate), focusing on issues of commercialization and IP management of biomedical-related inventions. The instructors will be drawn from the law school, business school, and technology-transfer office. Please visit the following website for more information: fusioninnovate.com.

Spring Semester

LAWS 4315 - Claim Drafting Lab - The patent claim is the most important part of the patent application, because it is the claim that represents the metes and bounds of inventor’s property right. This Lab is devoted to drafting claims, understanding the different types of claims, and how claims differ depending on the nature of the technology. A particular emphasis will be placed on computer-implemented (e.g., software) and biomedical-related inventions (e.g., life science and biomedical devices)

LAWS 5323 - IP Strategy - Intellectual property rights are legally created business

assets used by companies to provide a competitive advantage in the marketplace. Companies use intellectual property differently depending on many factors, such as industry, business strategy, culture and maturity. Intellectual property attorneys are considered valuable members of business teams, contributing to business strategy, business planning and other executive level business decisions. Indeed, IP is a boardroom issue.

This class will study the ways intellectual property is used by different companies and how the intellectual property laws impact not only the intellectual property assets, but also the business strategy and business planning. In addition to learning how intellectual property is being used by major corporations, universities, and entrepreneurs/start-ups, the students will pick one company and study how that company manages its intellectual property.

LAWS 6401 - Experiential Elective (IP Venture Clinic): In the IP Venture Clinic ("IPVC"), students, working under the supervision of faculty, represent start-up companies and entrepreneurs from the Blackstone LaunchPad initiative in Northeast Ohio. Students in the Masters of Patent Practice program will work up a general IP protection strategy, working with supervising practitioners to design and implement that strategy. Students will perform prior art searches, drafting claims and participating in the application and prosecution process with the U.S. Patent and Trademark Office (USPTO) and other patent offices worldwide. Importantly, the USPTO has selected Case Western Reserve University School of Law to participate in the Patent Law School Clinic Certification Program, which provides law students the opportunity to represent clients before the USPTO.

**MANDEL SCHOOL OF APPLIED SOCIAL SCIENCES
CASE WESTERN RESERVE UNIVERSITY**

Revised by MSASS Faculty – 9/20/2004
Ratified by Faculty Senate – 10/27/2004
Approved in Principle by the Faculty Senate 10/27/2004
Approved in Principle by the Faculty Senate 09/24/2008
Revised by MSASS Faculty – 5/11/2015

**STANDARDS FOR APPOINTMENT, REAPPOINTMENT, PROMOTION AND TENURE
FOR TENURED, TENURE TRACK, NON-TENURE TRACK AND SPECIAL FACULTY**

I. Faculty Titles and Definitions

Members of the faculty shall be all persons holding full-time tenured or tenure track, non-tenure track and full- or part-time special faculty appointments. MSASS faculty titles and ranks are described in the MSASS by laws (1:2:1) and are summarized in Table 1. Table 1 is consistent with provisions of the CWRU Faculty Handbook (Summer 2003) and MSASS by laws (approved 1/26/2004).

- Per faculty resolution of May 11, 2015, the ratio of tenured/tenure track faculty to non-tenure track faculty must meet or exceed 60:40 at all times (i.e., 60% must be tenured/tenure track).
- ~~Per faculty resolution of April 14, 2003, the ratio of tenured/tenure track faculty to non-tenure track faculty must meet or exceed 75:25 at all times (i.e., 75% must be tenured/tenure track).~~
- Voting faculty is defined as the tenured/tenure track and the non-tenure track. These two groups of faculty have voting privileges as stated in the CWRU Faculty Handbook. Special faculty members have no vote on matters coming before the MSASS faculty, unless specifically asked to vote on a particular issue by the voting faculty.

II. Qualifications and Standards

MSASS criteria for consideration of promotion and tenure are organized into four areas drawn from the CWRU Faculty Handbook. These are as follows:

1. Expert knowledge of their academic field and a commitment to continuing development of this competence
2. Effectiveness in facilitating learning
3. Implementation of a continuing program of research and scholarship

4. Assuming a fair share of school/university service and administrative tasks, including contributing to community and professional service

These criteria are applicable to each faculty member, but the emphasis and the types of evidence required to support achievement of each criterion depends on the nature and type of the initial faculty appointment (tenure track, non-tenure track, special). In accordance with the Faculty Handbook (Chapter 3, Part One, I, A.3), at the time of the initial appointment, the faculty member shall be provided with a general written description of 1) the criteria by which his/her performance will be judged, and 2) the teaching, research and scholarship, and service required to maintain faculty status and for renewal of appointment, promotion, and/or tenure, as applicable.

III. Promotion and Tenure

Table 2 illustrates the criteria, evidence, and sources as applied for appointment, reappointment, promotion, and consideration for tenure. The criteria, general evidence, and sources of evidence listed have sufficient detail to be applicable to all faculty. Table 2 also demonstrates how quality and excellence are maintained, while providing opportunities for advancement and career development for all types of faculty.

1. The first criterion, “expert knowledge of academic field and a commitment to continuing development of this competence,” applies to all MSASS faculty: tenure track, non-tenure track, and special.
2. Tenure track faculty should provide evidence that they can and will continue to satisfy all of the other three criteria (#s 2, 3, and 4).
3. Non-tenure track faculty should provide evidence that they can and will continue to satisfy at least two of the remaining three criteria (#s 2, 3, and/or 4), depending on their initial appointment.
4. Special faculty should provide evidence that they can and will continue to satisfy at least one of the other three criteria (#s 2, 3, and 4), depending on their initial appointment.
5. The criteria for promotion to associate professor are the same for all faculty types (tenure track, non-tenure track, and special), except that time limits do not apply to non-tenure and special tracks, and the focus of the initial appointment (teaching, research and/or service) may be different. MSASS provides an appropriate allocation of resources and time (taking into account rank and type of appointment) for scholarly growth, academic achievement and professional development.
6. Faculty hired in the tenure track must remain in the tenure track. Faculty in the non-tenure track can apply for an open tenure track position, but if they move into a tenure track position, they cannot move back to a non-tenure track status.

The provost's office must approve a transfer into the tenure track. MSASS policy of 2/2000 and approved by the CWRU Faculty Senate states: "Although a one time, one way movement from a non-tenure track to a tenure track position is possible, it is not allowable (a) to move back and forth between tenure track and non tenure track positions..... Someone appointed to a non-tenure track position may later be appointed to a tenure track position but then cannot move back to a non-tenure track position. Likewise, someone appointed to a tenure track position cannot move to a non-tenure track position and back to the tenure track".

7. MSASS by-laws (Section 4:3:2) state: "MSASS faculty members who have been denied tenure by the university may be given renewable term appointments not leading to tenure consideration contingent upon full financial support from non-university resources. Such faculty members would be in the special faculty category."
8. Faculty in the tenure track who have served six (6) years in the school without being granted tenure should be offered a terminal appointment (except as indicated in point 7 above).
9. Tenure should be granted only at the levels of associate and full professor.

Table 3 summarizes procedures for faculty review of tenured, tenure track, non-tenure track and special faculty who seek a promotion in rank and/or tenure. The chart also shows ways in which a faculty member may receive guidance and feedback on job performance, including annual reviews, formation of advisory committees (Faculty Development Committees), and in the case of tenure track faculty in the pre-tenure period, 3rd year reviews.

1. All faculty members, with the exception of part-time faculty, receive an annual review, as required by the CWRU Faculty Handbook.
2. A Faculty Development Committee offers career guidance to each tenure track faculty member during the pre-tenure period. The option of forming an advisory committee for the purpose of career guidance and development shall be available to tenured faculty seeking promotion, non-tenure track faculty, and special research, adjunct, and clinical faculty as well.
3. On recommendations involving promotion, only faculty of rank equal or superior to that being considered shall be eligible to vote. On recommendations involving tenure, only faculty with tenure shall vote.
4. Promotion considerations to the rank of assistant level and higher require external evaluations.

5. Procedures for initial appointments and renewals of secondary appointments are summarized, following the policy statement on secondary appointments approved by the MSASS faculty April 14, 2003 and listed later in this document.

IV. Procedures for Review for Promotion and/or Tenure Considerations

A. Review Committees

All candidates for promotion and/or tenure will be reviewed by all faculty who are eligible to vote at the rank being considered. On recommendations involving promotion of tenured or tenure track faculty, only tenured and/or tenure track faculty of rank equal or superior to the rank being considered shall be eligible to vote. On recommendations involving promotion of non-tenure track and special faculty, all voting faculty (tenured, tenure track, and non-tenure track) of rank equal or superior to the rank being considered shall be eligible to vote. On recommendations involving tenure of tenure-track faculty, only faculty with tenure shall vote. These faculty shall consider all promotions and awards of tenure to insure the application of equitable standards for assessing credentials and to insure compliance with the personnel policy guidelines established by the Faculty Senate. These faculty shall review candidates in accordance with the criteria for promotion and tenure and the procedures for promotion and tenure review established by the MSASS Faculty and the guidelines established by the Faculty Senate.

The faculty committee shall be chaired by the dean and shall make formal recommendations to the dean and the university administration. The dean's position should not be included in the vote of the faculty, but should be transmitted to the university in a separate report accompanying the formal recommendations submitted by the committees.

B. Review of Tenure Track, Pre-Tenure Faculty

There shall be a yearly review by the dean of all tenure track faculty during the pre-tenure period which will be reported to the university. At the end of the first three years of the faculty appointment, there shall be a review conducted by the tenured faculty, which will assess the progress of the faculty member toward meeting the criteria for tenure and indicate areas of strength and concern. This report will be given to the candidate. The review report will be sent to the provost's office.

The intent of the yearly reviews and the three-year review is to keep the faculty member informed as to his/her progress in meeting the criteria for tenure, offer suggestions related to areas of concern, and provide the faculty member an early evaluation so as to enable the faculty member to consider options prior to the end of six-year pre-tenure period.

C. Preliminary Procedures

1. At the time of the appointment, incoming faculty will receive a copy of the procedures and criteria for promotion and tenure.
2. A formal consideration for promotion and/or tenure will ordinarily occur at the time of the faculty member's automatic review date but, if circumstances warrant, may be initiated earlier. Consideration may be initiated at the request of either the faculty member or the dean. Faculty members whose automatic review dates for promotion or tenure occur within a particular year shall be notified by the dean. If warranted by special circumstances, individual extensions of the pre-tenure period may be made as described in the university's Faculty Handbook, subject to the provost's approval.
3. The list of candidates will be made known by the dean to all faculty by September 1 of each year in which there will be candidates. Colleagues may submit material regarding the performance of any person on the list to the dean by October 1. Submitted information will be included in the candidates' promotion and tenure materials in accordance with guidelines provided by the provost's office.
4. At no time shall an individual be considered for review without his/her knowledge.
5. Candidates may consult with members of review committees for guidance and advice regarding preparation of material prior to a scheduled review.
6. Candidates will receive both the MSASS criteria for promotion and tenure and the guidelines provided by the provost's office.

D. Material to be Reviewed

1. Candidates shall submit the following materials to the Dean:
 - a. A current and complete *vitae*;
 - b. written statements of self-evaluation covering the criteria for promotion and tenure;
 - c. a selection of publication reprints or manuscript copies that the candidate considers representative of his/her strengths and contributions plus any reviews or commentaries on the work;
 - d. a list of persons from whom the dean can request references. These should be persons who can comment knowledgeably about the capabilities and contributions of the candidate. Table 3 indicates the numbers of external letters required of promotion and/or tenure candidates; and
 - e. other material that the candidate believes will serve as evidence.

2. The dean's office shall submit the following material to the faculty eligible to review the candidate's promotion and/or tenure request:
 - a. The material submitted by the candidate;
 - b. if applicable, letters submitted by colleagues (internal and/or external to the school) solicited by the dean in consultation with the candidate and other colleagues;
 - c. evaluations requested from outside referees. The dean is responsible for the solicitation of letters or reference from outside referees. He/she assumes final responsibility for the content of the letters and for determining the referees that shall be solicited. Names of persons submitted by the candidate will be used selectively and will be supplemented by names submitted by members of the Faculty Committees for Promotion and Tenure;
 - d. the most recent three years of student ratings and written evaluations of the candidate's classroom and/or field teaching;
 - e. the responses from a random sample of current and former students who have taken courses from the candidate;
 - f. written review of the dean.
 - g. written third year review of the Faculty Committees for Promotion and Tenure.

The candidate may review submitted material with the exception of confidential evaluations from outside referees, colleague letters, and letters from students solicited by the school. He/She may provide a written rebuttal but cannot remove any material with which he/she disagrees.

V. Procedures for Secondary Appointments

Definition

The CWRU Faculty Handbook (Summer 2003) states that in cases where an appointment applies to more than one constituent faculty or department, or to an administrative office as well as academic unit, one constituent faculty or department shall be identified as that of the primary appointment, and the other as secondary. Secondary faculty appointments are designed for persons who hold primary appointments in other schools/departments within the university. Such appointments will range in title from instructor through professor. Secondary appointments are important for establishing working relationships with other schools or departments and conducting interdisciplinary studies.

Terms and Procedures for Appointment

1. No faculty member shall hold a secondary appointment at a rank higher than the rank held in his/her primary department or school.
2. Secondary appointments are made as special faculty appointments as described in Tables 1 and 3.
3. Persons holding secondary appointments will receive no individual financial compensation or office space as a function of the secondary appointment.
4. Those holding secondary appointments in MSASS only will not be voting members of the MSASS faculty.
5. Faculty members may nominate individual faculty members for a secondary appointment in writing for the dean's consideration. The dean may bring recommendations for initial secondary appointments to the faculty for their consideration. Faculty of the same or higher rank will review the candidate's credentials (which would ordinarily include a CV, statement of rationale for secondary appointment, and a copy of one recent published paper) and submit their recommendation to the dean. Initial appointments will be for one academic year. Re-appointments (renewals) may be made by the dean.
6. As expressed in the CWRU Faculty Handbook, the primary department or school continues to be responsible for the initiation of consideration of reappointment, promotion, tenure or termination.

Table 1: Categories and Titles of MSASS Faculty

| Type | Modifier | Ranks | Appointment | Vote | Comments |
|--------------------------|--------------------|---|---|---|---|
| TENURE TRACK/ TENURED | None | Assistant Professor Associate Professor Professor | Full time, Finite Full time, Indefinite | CWRU- yes MSASS- yes | No changes in procedure from our current policy. Criteria and standards for promotion have been developed for each rank. |
| NON-TENURE TRACK | None | Instructor Sr. Instructor Assistant Professor Associate Professor Professor | Full time, Finite | CWRU- yes MSASS- yes | Establishes a non-tenure career track. |
| SPECIAL | Visiting | Instructor Sr. Instructor Assistant Professor Associate Professor Professor | Full or part time—short term/ limited | CWRU-no MSASS- no, unless asked to vote | Appointment is at same rank as previous institution. If not from academia, title is Visiting Faculty; the modifier Distinguished Visiting may be used in special circumstances. |
| | Research | Assistant Professor Associate Professor Professor | Full or part time—Finite, dependent on research funding | CWRU-no MSASS- no, unless asked to vote | These individuals are established researchers who direct funded research and provide experiences for students. |
| | Adjunct | Instructor Sr. Instructor | Part time or full time with limited duties--Finite | CWRU-no MSASS- no, unless asked to vote | Perform limited educational duties such as teaching specified courses, seminars, or advising (field, academic, ABLE), etc. Typically primary appointment is elsewhere. |
| | Field Education | Instructor | Agency based | CWRU-no MSASS- no, unless asked to vote | Educate students in field placements. Employed by agencies, not CWRU. |
| | <u>Lecturer</u> | <u>N/A</u> | | <u>Full or part time</u> | <u>CWRU- no MSASS- no</u> |

| Type | Modifier | Ranks | Appointment | Vote | Comments |
|-----------|--|---|--------------------------|--|---|
| | Named Professor, according to the terms of the professorship | | Full time-finite | CWRU-no MSASS-no, unless asked to vote | Perform specified limited duties of named chair |
| | Clinical | Instructor, Sr. Instructor, Assistant Professor, Associate Professor, Professor | Full or part time-finite | CWRU-no MSASS-no, unless asked to vote | Established practitioners or administrators who direct projects and provide educational experiences for students. |
| SECONDARY | None | Instructor Sr. Instructor Assistant Professor Associate Professor Professor | Secondary, finite | CWRU-depends on primary apt. MSASS-no | Rank is not to exceed rank in primary department. |

**Mandel School of Applied Social Sciences
Case Western Reserve University**

TABLE 2

**STANDARDS FOR APPOINTMENT, REAPPOINTMENT, PROMOTION AND TENURE
FOR TENURED, TENURE TRACK, NON-TENURE TRACK AND SPECIAL FACULTY**

(Numbers in parentheses refer to criteria area. Criteria 1 and 4 apply to all faculty.)

MSASS criteria for consideration of promotion and tenure are organized into four areas drawn from the CWRU Faculty Handbook, and one additional area pertinent to the social work profession. These are as follows:

1. Expert knowledge of their academic field and a commitment to continuing development of this competence
2. Effectiveness in facilitating learning
3. Implementation of a continuing program of research and scholarship
4. Assuming a fair share of school/university service and administrative tasks, including contributing to community and professional service

| Tenured & Tenure Track (Criteria 1-4 apply for tenured and tenure track) | Non-Tenure Track & Special (where rank is applicable) (Criteria 1 applies to all. At least two of criteria 2, 3 & 4 apply to non-tenure track; at least one of criteria 2, 3 & 4 applies to special) |
|---|--|
| <u>INSTRUCTOR</u> This rank not applicable | <u>INSTRUCTOR</u> <ul style="list-style-type: none"> • Master’s degree in social work or related field. (1) • Evidence of professional expertise and excellence in an area of social welfare. (3) • Evidence of pedagogical abilities relevant to social work education. (2) • Willingness to participate in school service and administrative tasks. (4) • Community social welfare service orientation as evidenced by participation in local activities. (4) |
| <u>SR. INSTRUCTOR</u> This rank not applicable | <u>SR. INSTRUCTOR</u> <ul style="list-style-type: none"> • Master’s degree in social work or related field. (1) |

| | |
|--|--|
| <p align="center">Tenured & Tenure Track (Criteria 1-4 apply for tenured and tenure track)</p> | <p align="center">Non-Tenure Track & Special (where rank is applicable) (Criteria 1 applies to all. At least two of criteria 2, 3 & 4 apply to non-tenure track; at least one of criteria 2, 3 & 4 applies to special)</p> |
| | <ul style="list-style-type: none"> • Recognition of area of expertise by local/community professionals as evidenced by honors, publications, and/or presentations. (1) • Competence in pedagogical abilities relevant to social work education as evidenced by courses developed, new courses taken on, range of courses taught, teaching evaluations, etc. (2) • Contributions to development of social work education as evidenced by ABLE participation, continuing education, guest lectures for other courses, etc. (2) • Evidence of teaching competence over time as measured by attainment of performance goals set for teaching. (2) • Scholarly productivity as evidenced by local, state, and/or national presentations. (3) • Participation within the school in administrative and membership roles in committees, programs, and school initiatives. (4) <p>Participation in professional/community organizations and undertakings. (4)</p> |
| <p align="center"><u>ASSISTANT PROFESSOR</u></p> <ul style="list-style-type: none"> • Earned doctorate. • Developing knowledge in one or more areas of knowledge, practice, research and/or education. (1) • Capacity for scholarly productivity as evidenced by research, demonstration or practice projects, professional presentations, teaching materials or other media, monographs, reports, papers, articles, book chapters or books. (3) • Service commitment as evidenced by school/ professional community membership, state and local activities. (4) • Excellence in teaching as evidenced by teaching evaluations, courses taught, etc. (2) | <p align="center"><u>ASSISTANT PROFESSOR</u></p> <ul style="list-style-type: none"> • Earned doctorate. • Developing knowledge in one or more areas of knowledge, practice, research and/or education. (1) • Capacity for scholarly productivity as evidenced by research, demonstration or practice projects, professional presentations, teaching materials or other media, monographs, reports, papers, articles, book chapters or books. (3) • Service commitment as evidenced by school/ professional community membership, state and local activities. (4) • Participation within the school and university by assuming administrative and other roles in key committees, |

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| <p style="text-align: center;">Tenured & Tenure Track (Criteria 1-4 apply for tenured and tenure track)</p> | <p style="text-align: center;">Non-Tenure Track & Special (where rank is applicable) (Criteria 1 applies to all. At least two of criteria 2, 3 & 4 apply to non-tenure track; at least one of criteria 2, 3 & 4 applies to special)</p> |
| <ul style="list-style-type: none"> • A research area of expertise is evident. • Ability to attract funding for research. (3) | <ul style="list-style-type: none"> programs, and initiatives. (4) • Excellence in teaching and/or practice. (2) • Development of area of teaching focus. (2) |
| <p style="text-align: center;"><u>ASSOCIATE PROFESSOR</u></p> <p>Achieving this rank requires continued fulfillment of all criteria at the assistant professor level, with the addition of the following:</p> <ul style="list-style-type: none"> • Achieved recognition as a scholar or expert in one or more areas of knowledge, practice, research, and education as evidenced by evaluation of external authorities and colleagues in the area of research practice or knowledge. (1) • Clear and explicit formulations of theoretical and value content bearing on a component of social work knowledge or practice as evidenced by research, demonstration or practice projects, professional presentations, teaching materials or other media, monographs, reports, papers, articles, book chapters or books, activities in workshops, continuing education, institutes, seminars, visiting professorships, advisory panels, etc. (1) • Mastery of pedagogical abilities relevant to social work education including development of teaching content and objectives in a clear and consistent fashion, coherent organization of content and effective presentation of classroom or field instruction content, responsiveness to learning needs and styles of students, and provision of opportunities for students' integration of knowledge, practice and values as evidenced by written self-evaluation (including such issues as philosophy/principles of education, assessment of teaching role and competence, aims and objectives, relationship with students, particular skills or mastery of content), student | <p style="text-align: center;"><u>ASSOCIATE PROFESSOR</u></p> <p>(Note: the relevant criteria apply to non-tenure track & special faculty titles with this rank).</p> <p>Achieving this rank requires continued fulfillment of all criteria at the assistant professor level, with the addition of the following:</p> <ul style="list-style-type: none"> • Achieved recognition as a scholar or expert in one or more areas of knowledge, practice, research, and education as evidenced by evaluation of external authorities and colleagues in the area of research practice or knowledge. (1) • Clear and explicit formulations of theoretical and value content bearing on a component of social work knowledge or practice as evidenced by research, demonstration or practice projects, professional presentations, teaching materials or other media, monographs, reports, papers, articles, book chapters or books, activities in workshops, continuing education, institutes, seminars, visiting professorships, advisory panels, etc. (1) • Mastery of pedagogical abilities relevant to social work education including development of teaching content and objectives in a clear and consistent fashion, coherent organization of content and effective presentation of classroom or field instruction content, responsiveness to learning needs and styles of students, and provision of opportunities for students' integration of knowledge, practice and values as evidenced by written self-evaluation (including such issues as philosophy/principles of education, |

| <p style="text-align: center;">Tenured & Tenure Track (Criteria 1-4 apply for tenured and tenure track)</p> | <p style="text-align: center;">Non-Tenure Track & Special (where rank is applicable) (Criteria 1 applies to all. At least two of criteria 2, 3 & 4 apply to non-tenure track; at least one of criteria 2, 3 & 4 applies to special)</p> |
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| <p>evaluation ratings and all written comments, responses from a random sample of current and former students who have taken courses from the candidate whose responses have been solicited by the dean, evaluations by colleagues such as specialization and/or concentration chairperson, team teachers, and others cognizant of the candidate's performance. (2)</p> <ul style="list-style-type: none"> • Contributions to education with regard to social work education field, in general, curriculum development, development of innovative approaches, extensions of teaching skill/knowledge to continuing education, workshops, seminars, lectures, etc. as evidenced by self-report of such activities, published articles, reports, monographs, course syllabi, and evaluations by colleagues and consumers, etc (2) • Participation in community welfare activities as evidenced by serving on boards and committees, giving speeches and workshops, providing consultation, serving on advisory panels. (4) • Assuming leadership roles in professional organizations and undertakings as evidenced by holding leadership positions in organizations and networks concerned with social welfare and social work. (4) • Scholarly work represents a significant contribution to the field of social work and social welfare as evidenced by articles published in refereed journals, books and book chapters, monographs, reports and papers, juried and invited presentations at professional meetings, external support for research and scholarship, evaluation of research and scholarships by external referees. (3) • Scholarly work demonstrates excellence, an ability to conduct independent scholarship, and a sustained focus that is | <p>assessment of teaching role and competence, aims and objectives, relationship with students, particular skills or mastery of content), student evaluation ratings and all written comments, responses from a random sample of current and former students who have taken courses from the candidate whose responses have been solicited by the dean, evaluations by colleagues such as specialization and/or concentration chairperson, team teachers, and others cognizant of the candidate's performance. (2)</p> <ul style="list-style-type: none"> • Contributions to education with regard to social work education field, in general, curriculum development, development of innovative approaches, extensions of teaching skill/knowledge to continuing education, workshops, seminars, lectures, etc. as evidenced by self-report of such activities, published articles, reports, monographs, course syllabi, and evaluations by colleagues and consumers, etc (2) • Participation in community welfare activities as evidenced by serving on boards and committees, giving speeches and workshops, providing consultation, serving on advisory panels. (4) • Assuming leadership roles in professional organizations and undertakings as evidenced by holding leadership positions in organizations and networks concerned with social welfare and social work. (4) • Scholarly work represents a significant contribution to the field of social work and social welfare as evidenced by articles published in refereed journals, books and book chapters, monographs, reports and papers, juried and invited presentations at professional meetings, external support for research and scholarship, evaluation of research and scholarships by external |

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| <p style="text-align: center;">Tenured & Tenure Track (Criteria 1-4 apply for tenured and tenure track)</p> | <p style="text-align: center;">Non-Tenure Track & Special (where rank is applicable) (Criteria 1 applies to all. At least two of criteria 2, 3 & 4 apply to non-tenure track; at least one of criteria 2, 3 & 4 applies to special)</p> |
| <p>likely to continue as evidenced by research and scholarly activities currently underway. (3)</p> <ul style="list-style-type: none"> • Participation in school service and administrative roles as evidenced by committee membership, leadership activities, proposals developed, administrative accomplishments and related documents. (4) • Participation in university service and administrative tasks as evidenced by committee service, leadership activities and administrative tasks. (4) | <p>referees. (3)</p> <ul style="list-style-type: none"> • Scholarly work demonstrates excellence, an ability to conduct independent scholarship, and a sustained focus that is likely to continue as evidenced by research and scholarly activities currently underway. (3) • Participation in school service and administrative roles as evidenced by committee membership, leadership activities, proposals developed, administrative accomplishments and related documents. (4) • Participation in university service and administrative tasks as evidenced by committee service, leadership activities and administrative tasks. (4) |
| <p style="text-align: center;"><u>PROFESSOR</u></p> <p>Relevant criteria apply to all faculty titles with this rank.</p> <p>Achieving this rank requires continued fulfillment of all criteria at the Associate Professor level, with the addition of the following:</p> <ul style="list-style-type: none"> • Highly significant and sustained knowledge development and contributions in a specified area or areas bearing on a component of social welfare knowledge, practice, research and/or education as evidenced by evaluation of external authorities and colleagues. Quality and quantity of publications with an emphasis on sole and first authorship in top tier refereed journals will have the most weight. Collaborations with students are considered to be clear indications of the faculty member’s work. (1) • National and/or international recognition as a scholar. (1) • Significant contributions to education | <p style="text-align: center;"><u>PROFESSOR</u></p> <p>Relevant criteria apply to all faculty titles with this rank.</p> <p>Achieving this rank requires continued fulfillment of all criteria at the Associate Professor level, with the addition of the following:</p> <ul style="list-style-type: none"> • Highly significant and sustained knowledge development and contributions in a specified area or areas bearing on a component of social welfare knowledge, practice, research and/or education as evidenced by evaluation of external authorities and colleagues. Quality and quantity of publications with an emphasis on sole and first authorship in top tier refereed journals will have the most weight. Collaborations with students are considered to be clear indications of the faculty member’s work. (1) • National and/or international recognition as a scholar. (1) • Significant contributions to education with |

| <p style="text-align: center;">Tenured & Tenure Track (Criteria 1-4 apply for tenured and tenure track)</p> | <p style="text-align: center;">Non-Tenure Track & Special (where rank is applicable) (Criteria 1 applies to all. At least two of criteria 2, 3 & 4 apply to non-tenure track; at least one of criteria 2, 3 & 4 applies to special)</p> |
|--|---|
| <p>with regard to social work education as evidenced by curriculum development, development of innovative approaches, extension of teaching skills/knowledge, dissertations chaired, national recognition as a teacher, national and or international influence with respect to social work education and profession. (2)</p> <ul style="list-style-type: none"> • Sustained and significant substantive scholarly contributions recognized nationally and/or internationally as evidenced by publications in refereed journals, consultations, honors, elections to scientific bodies, principal investigator of funded grants, authorship of a textbook. (3) • Excellence demonstrated by outstanding achievement and evidence that this level of excellence will be sustained. (1) • Influence on policy or practice at a national/ international level in one or more areas of knowledge, practice, research, or education. (4) • Major role and recognized leadership in key school, university, and professional committees/initiatives, as evidenced by assuming the role of chair, elected positions with the university, preparation of concept or position papers, administrative leadership activities and accomplishments. (4) • Evidence of influence on professional organizations, research, policy, or practice at the national and/or international level as evidenced by serving on national boards, being a consultant to government or scientific bodies, holding office in professional/scientific organizations, memberships on editorial boards or editorships. (4) • Assuming leadership roles in national and/or international professional organizations and undertakings. (4) | <p>regard to social work education as evidenced by curriculum development, development of innovative approaches, extension of teaching skills/knowledge, dissertations chaired, national recognition as a teacher, national and or international influence with respect to social work education and profession. (2)</p> <ul style="list-style-type: none"> • Sustained and significant substantive scholarly contributions recognized nationally and/or internationally as evidenced by publications in refereed journals, consultations, honors, elections to scientific bodies, principal investigator of funded grants, authorship of a textbook. (3) • Excellence demonstrated by outstanding achievement and evidence that this level of excellence will be sustained. (1) • Influence on policy or practice at a national/ international level in one or more areas of knowledge, practice, research, or education. (4) • Major role and recognized leadership in key school, university, and professional committees/initiatives, as evidenced by assuming the role of chair, elected positions with the university, preparation of concept or position papers, administrative leadership activities and accomplishments. (4) • Evidence of influence on professional organizations, research, policy, or practice at the national and/or international level as evidenced by serving on national boards, being a consultant to government or scientific bodies, holding office in professional/scientific organizations, memberships on editorial boards or editorships. (4) • Assuming leadership roles in national and/or international professional organizations and undertakings. (4) |

Table 3
Procedures for Faculty Review and Promotion/Tenure Considerations¹

✓ = applies

| Faculty Category | Advisory Committee | Annual Review by Dean | 3 Year Review | Submit Documents for Promotion | Which Faculty Review ² | External Evaluation Required ³ | Provost Approval ⁴ |
|--|-----------------------------|--------------------------------------|---------------|--------------------------------|---|--|-------------------------------|
| Pre-tenure Period for tenure track faculty | Required | Includes review by Committee as well | ✓ | ✓ | Vote for promotion by faculty (tenured, and tenure track) at rank equal to or superior to that being considered. Vote for tenure by tenured faculty only. | ✓ 3 letters for assistant professor 8 letters for associate professor 10 letters for full professor | ✓ |
| Tenured | Optional at associate level | ✓ | NA | ✓ | Vote for promotion by faculty (tenured and tenure track) of rank equal to or superior to that being considered | ✓ 3 letters for assistant professor 8 letters for associate professor 10 letters for full professor | ✓ |
| Non-Tenure track | Optional | ✓ | NA | ✓ | Vote by faculty (tenured, tenure track & non-tenure track) of rank equal to or superior to that being considered | ✓ 2 letters required for promotion to senior instructor (need not be external) 3 letters for assistant professor 8 letters for associate professor 10 letters for full professor | ✓ |
| Special: Visiting | NA | NA | NA | NA | NA | NA | NA |
| Special: Research | Optional | ✓ | NA | ✓ | Vote by tenured, tenure track, and non-tenure track faculty of rank equal to or superior to that being considered | ✓ 3 letters for assistant professor 8 letters for associate professor 10 letters for full professor | NA |
| Special: Adjunct | Optional | Associate Dean | NA | ✓ | Vote by tenured, tenure track, and non- | NA | NA |

| Faculty Category | Advisory Committee | Annual Review by Dean | 3 Year Review | Submit Documents for Promotion | Which Faculty Review ² | External Evaluation Required ³ | Provost Approval ⁴ |
|--------------------------------------|--------------------|--|---------------|--------------------------------|--|--|--------------------------------------|
| | | Field Director for adjunct instructors who serve as field advisors | | | tenure track faculty of rank equal to or superior to that being considered | | |
| Special: Field Education Instructors | NA | Field Office | NA | NA | NA Review of field education instructors is carried out via annual student evaluations and field advisor's agency assessments | NA | NA |
| Named Professors | NA | ✓ | NA | NA | NA | NA | ✓ |
| Clinical Special Faculty | Optional | ✓ | NA | ✓ | ✓ Vote by tenured, tenure track and non-tenure track faculty of rank equal or superior to that being considered | ✓ 2 letters required for promotion to senior instructor (need not be external) 3 letters for assistant professor 8 letters for associate professor 10 letters for full professor | NA |
| Secondary | NA | ✓ | NA | For initial appointments only | Vote by tenured, tenure track, and non-tenure track faculty of rank equal to or superior to that being considered for the initial appointment. Decisions of promotion and tenure rest with primary appointment. ⁵ | Letter of approval required from chair or dean where candidate holds primary appointment | For initial appointment and renewals |

1. This chart applies to promotions from one rank to the next higher rank, not necessarily initial appointments, except in the case of secondary appointments.

2. This column indicates which faculty vote on promotion for each category of faculty listed in the rows. MSASS bylaws state that promotion decisions are made by the faculty eligible to vote for the rank being considered. Tenure decisions are made by faculty with tenure.
3. These refer to evaluations by external authorities for the purpose of promotion/tenure considerations. Two letters **are** required for initial appointments of instructors and senior instructors, but these need not be external. To be hired at or promoted to the rank of assistant professor a national search is required, unless a waiver has been granted.
4. CWRU Faculty Handbook (Chapter 3, Part One, I) states that, with the exception of special faculty, all appointments, promotions, and tenure, and tenure transfer recommendations require approval by the Board of Trustees.
5. Faculty with secondary appointments may request consideration of promotion in the secondary department after a promotion has been granted in their primary department.

Approved by MSASS faculty

Revised September 20, 2004

Ratified by Faculty Senate

October 27, 2004

Approved in Principle by the Faculty Senate – 04/26/06

Approved in Principle by the Faculty Senate – 09/24/08



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10900 Euclid Avenue
Cleveland, Ohio 44106-7001

Visitors and Deliveries
Adelbert Hall, Room 216

Phone 216.368.4346
Fax 216.368.4325
E-mail Baeslack@case.edu

www.case.edu

To: Roy Ritzmann
Chair, Faculty Senate
Executive Committee

From: W.A. "Bud" Baeslack III
Chair, Honorary Degree Committee

Date: December 1, 2015

The honorary degree committee met on October 7 to review recommendations for honorary degrees that were submitted by the university community this term. After careful consideration, the committee voted to recommend that the following people be awarded honorary degrees in recognition of prominent achievements in areas of endeavor that relate to goals and strategic thrusts of Case Western Reserve University's mission:

- Richard Garwin, pioneering nuclear scientist and Case Institute alumnus whose career focus on arms control includes advising the government on topics that include nuclear and other weaponry, satellites, intelligence, reactors, missiles, and missile treaties
- Rosemary McCarney, Canada's Ambassador to the United Nations, humanitarian and expert in international economic development whose international career encompasses law, business, and the not-for-profit sector. She earned an MBA at the Weatherhead School of Management.

Nominating letters and biographical information on these accomplished individuals are attached.

I hereby submit these recommendations for review by the Faculty Senate executive committee. If your committee approves them on behalf of the University Faculty, they will be conveyed to the president for her consideration for subsequent recommendation to the Board of Trustees.

The names of those approved to receive honorary degrees are announced shortly before the commencement at which they will be awarded, typically a year or more after trustee approval. Therefore, in order to preserve the confidentiality of the process, we ask that the names of the nominees not be listed in meeting minutes or otherwise made public.

C: Rebecca Weiss, Secretary, Faculty Senate
Members of the Honorary Degree Committee



Department of Physics
Case Western Reserve University
Cleveland, Ohio 44106-7079

September 21, 2015

Dear Selection Committee,

We are writing to nominate Richard Garwin for an honorary degree. This is an easy case to present so we can keep the letter brief. Richard Garwin is an individual of the extraordinary eminence and accomplishments that our honorary degree is meant to recognize. Moreover he is a Case alum (BS Physics 1947) and a Cleveland native. His presence at Commencement will be an inspiration to students, faculty and the community at large.

No less a person than Enrico Fermi once described Garwin as the only true genius he'd met. Together with Edward Teller and Stanislaw Ulam, Garwin is the inventor of the Hydrogen bomb. The single biggest focus of his career has been arms control. He has shaped all nuclear weapons treaties since the first talks in 1958. Garwin has served as consultant and advisor to every administration from Eisenhower to Obama. For more than half a century Garwin has worked against proliferation and for reduction of existing weapons stockpiles. Most recently he was one of the key authors of an influential letter from nuclear scientists to President Obama on the Iran nuclear deal.

Monumental though his work on weapons and arms control has been, for Garwin this is but the tip of the iceberg. For the bulk of his professional career Garwin worked for IBM at their Thomas J Watson Research Center (at various times as an IBM fellow, as the Director of Applied Research and as Director of the Watson Research Center). Garwin consulted for the government for one-third of his hours and it is during this time that he advised



on nuclear weapons, satellites, intelligence, reactors, conventional weaponry, missiles and missile treaties and many other matters. The remaining two-thirds of his time was devoted to his extraordinary career in fundamental and applied science. Garwin has a genius for moonlighting—even the hydrogen bomb work was done as a part time consultant at Los Alamos while he held down a day job as an instructor of Physics at the University of Chicago.

For reasons of space only a few examples of Garwin’s accomplishments in pure and applied science will have to suffice. In 1957 Garwin performed a seminal study of parity violation in elementary particle physics (Garwin, Lederman, Weinrich, *Physical Review* 1957). In his 1988 Nobel lecture, collaborator Leon Lederman recalls “. . . enlisting Richard Garwin, an expert on spin precession experiments (as well as on almost everything else), we began Friday night activities which culminated, Tuesday morning, in a 50 standard deviation parity violating asymmetry . . . Not bad for a long weekend of work.” Lederman writes that this experiment kept physicists busy for decades and set the stage for his own Nobel prize winning work. From 1960-72 Garwin worked on the first US satellite reconnaissance program CORONA. For this work he was recognized by the National Reconnaissance Office as one of the ten founders of National Reconnaissance. In 1969 Garwin invented tensioned cables to hold a floating airport steady; the technology was later applied to oil-drilling platforms. In 1981 Garwin pioneered touch screen technology, now ubiquitous. Other contributions to computing include research on superconducting computers in the 1950s and a key role in the invention of the Fast Fourier transform in 1963. Since 1968 Garwin has presciently written about handling data in health care. In 2010 and 2011 he served as consultant to Secretary of Energy, Steven Chu, on the BP Oil Spill and on the U.S. response to Fukushima. Garwin has over 500 publications and 47 U.S. Patents.

Garwin’s diverse accomplishments have been recognized by election to all three United States National Academies, the National Academy of Sciences, the National Academy of Engineering and the Institute of Medicine. He



is one of only a dozen individuals in the world to achieve this remarkable distinction.

In 2002 Garwin received the National Medal of Science. His citation reads “In recognition of his research and discoveries in physics and related fields, and of his longstanding service to the Nation by providing valuable scientific advice on important questions of national security over a half a century . . .”

The attached CV was compiled by us from public sources. If additional information is needed we would be pleased to provide it.

Sincerely,

A handwritten signature in blue ink that reads "Philip L. Taylor".

Philip Taylor
Distinguished University Professor,
Perkins Professor of Physics, and
Professor of Macromolecular Science
and Engineering
Phone: 368-4044
Email: plt@case.edu

A handwritten signature in black ink that reads "harshmathur".

Harsh Mathur
Associate Professor of Physics
Phone: 368-4009
Email: hxm7@case.edu

RICHARD LAWRENCE GARWIN

Curriculum Vitae

Born: April 19, 1928. Cleveland, Ohio.

email: RLG2@us.ibm.com

Education

B.S. Physics, Case Institute of Technology (1947).

Ph.D. Physics, University of Chicago (1949). PhD Advisor: Enrico Fermi.

Academic Appointments

1949 - 52 Instructor, University of Chicago.

1952 - 93 IBM Thomas J. Watson Research Center.

1997 - 2004 Philip D. Reed Senior Fellow for Science and Technology,
Council on Foreign Relations, New York.

Other Concurrent Appointments: IBM Fellow; Director of the IBM Watson Laboratory; Director of Applied Research at the IBM Watson Research Laboratory; and Professor of Public Policy at Kennedy School of Government, Harvard University.

Major Honors and Awards

National Medal of Science 2002.

Member of the National Academy of Sciences.

Member of the National Academy of Engineering.

Member of the Institute of Medicine.

Gold Medal of Case Alumni Association 2002

Areas of Significant Scientific and Technological Contributions.

Design of nuclear weapons including first hydrogen bomb.

Instruments and electronics for nuclear and low temperature systems

Studies of parity non-conservation in elementary particle physics.

Superconducting devices and solid and liquid helium.

Detection of gravitational radiation.

Military technology, including pioneering work on satellite reconnaissance.

Computer technology, including pioneering work on touch screens.

Publications and patents.

More than 500 papers and 47 U.S. Patents.

Notable books:

Nuclear Weapons and World Politics (1977).

Nuclear Power Issues and Choices (1977).

Energy: The Next Twenty Years (1979).

Science Advice to the President (1980).

Managing the Plutonium Surplus: Applications and Technical Options (1994).

Megawatts and Megatons: A Turning Point in the Nuclear Age?
(with Georges Charpak, 2001).

De Tchernobyl en tchernobyls (with Georges Charpak and Venance Journe, 2005).

Service

Richard Garwin has served as consultant and advisor to every administration from Eisenhower to Obama, consulted for the military and intelligence, and testified before both houses of Congress on matters ranging from national security, technology, arms control and nuclear power. A partial list follows.

1950-53 Consultant, Los Alamos National Lab. Developed Hydrogen Bomb.

1953-54 Consultant to White House President's Science Advisory Committee on air defense of the United States and Canada.

1953-68 Chaired panels on air defense, antisubmarine warfare and naval warfare for the President's Science Advisory Commice (PSAC). Also served as member of the Strategic Military Panel and Defense Science Board (1966-69).

1966-present Member of JASON, elite group of consultants to the U.S. government on nuclear weapons, national security, missile defense and intelligence.

1998 Commissioner on the "Rumsfeld Commission" to assess the ballistic missile threat to the United States.

1993-2001 Chair, Arms Control and Non-proliferation Advisory Board of the State Department.

2010 Consultant to Secretary of Energy on Deep Water Horizon (BP) Oil Spill.

2011 Consultant to Secretary of Energy on U.S. response to reactor damage at Fukushima.

The Garwin Archive

[2010-](#) | [2000-09](#) | [1990-99](#) | [1980-89](#) | [1970-79](#) | [1960-69](#) | [1950-59](#) | [1947-49](#)



Richard L. Garwin was born in Cleveland, Ohio, in 1928. He received the B.S. in Physics from Case Institute of Technology, Cleveland, in 1947, and the Ph.D. in Physics from the University of Chicago in 1949.

He is IBM Fellow Emeritus at the Thomas J. Watson Research Center, Yorktown Heights, New York. After three years on the faculty of the University of Chicago, he joined IBM Corporation in 1952, and was until June 1993 IBM Fellow at the Thomas J. Watson Research Center, Yorktown Heights, New York. In addition, he is a consultant to the U.S. government on matters of military technology, arms control, etc. He has been Director of the IBM Watson Laboratory, Director of Applied Research at the IBM Thomas J. Watson Research Center, a member of the IBM Corporate Technical Committee, Adjunct Research Fellow in the Kennedy School of Government, Harvard University; and Adjunct Professor of Physics at Columbia University. He has also been Professor of Public Policy in the Kennedy School of Government, Harvard University. From 1997 to 2004 he was Philip D. Reed Senior Fellow for Science and Technology at the Council on Foreign Relations, New York.

He has made contributions in the design of nuclear weapons, in instruments and electronics for research in nuclear and low-temperature physics, in the establishment of the nonconservation of parity and the demonstration of some of its striking consequences, in computer elements and systems, including superconducting devices, in communication systems, in the behavior of solid helium, in the detection of gravitational radiation, and in military technology. He has published more than 500 papers and been granted 47 U.S. patents. He has testified to many Congressional committees on matters involving national security, transportation, energy policy and technology, and the like. He is coauthor of many books, among them Nuclear Weapons and World Politics (1977), Nuclear Power Issues and Choices (1977), Energy: The Next Twenty Years (1979), Science Advice to the President (1980),

Managing the Plutonium Surplus: Applications and Technical Options (1994), Feux Follets et Champignons Nucleaires (1997) (in French with Georges Charpak), Megawatts and Megatons: A Turning Point in the Nuclear Age? (2001) (with Georges Charpak), and "De Tchernobyl en tchernobyls," (with Georges Charpak and Venance Journe) (2005).

He was a member of the President's Science Advisory Committee 1962-65 and 1969-72, and of the Defense Science Board 1966-69. He is a Fellow of the American Physical Society, of the IEEE, and of the American Academy of Arts and Sciences; and a member of the National Academy of Sciences, the Institute of Medicine, the National Academy of Engineering, the Council on Foreign Relations, and the American Philosophical Society. He served on the Council of the National Academy of Sciences 1983-1986 and 2002-2005.

The citation accompanying his 1978 election to the U.S. National Academy of Engineering reads "Contributions applying the latest scientific discoveries to innovative practical engineering applications contributing to national security and economic growth." He received the 1983 Wright Prize for interdisciplinary scientific achievement, the 1988 AAAS Scientific Freedom and Responsibility Award, the 1991 Erice "Science for Peace" Prize, from the U.S. Government the 1996 R.V. Jones Foreign Intelligence Award and the 1996 Enrico Fermi Award, the Federation of American Scientists: Public Service Award 1971 and 1997, University of Chicago Enrico Fermi Institute and Departments of Physics and Astronomy: Public Service Medal (2002), Case Alumni Association: Gold Medal (2002), Academie des Sciences (France): La Grande Medaille de l'Academie des Sciences-2002, and Fellow of the IEEE (November 2003) "for contributions to the application of engineering to national defense." In 2003 he received from the President the National Medal of Science.

From 1977 to 1985 he was on the Council of the Institute for Strategic Studies (London), and during 1978 he chaired the Panel on Public Affairs of the American Physical Society. He is a long-time member of Pugwash and has served on the Pugwash Council.

His work for the government has included studies on antisubmarine warfare, new technologies in health care, sensor systems, military and civil aircraft, and satellite and strategic systems, from the point of view of improving such systems as well as assessing existing capabilities. For example, he contributed to the first U.S. photographic reconnaissance satellite program, CORONA, that returned 3 million feet of film from more than 100 successful flights 1960-1972. He contributed also to the current electro-optical imaging systems and various electronic intelligence satellite systems deployed by the U.S. government.

He has been a member of the Scientific Advisory Group to the Joint Strategic Target Planning Staff and was in 1998 a Commissioner on the 9-person "Rumsfeld" Commission to Assess the Ballistic Missile Threat to the United States. From 1993 to August 2001, he chaired the Arms Control and Nonproliferation Advisory Board of the Department of State. On the 40th anniversary of the founding of the National Reconnaissance Office (NRO) he was recognized as one of the ten Founders of National Reconnaissance.

Since 2009 he has been a consultant to the Office of Science and Technology Policy in the Executive Offices of the President. In 2010 he was a consultant to Secretary of Energy Steve Chu on the Deep Water Horizon (BP) oil spill, and in 2011 he supported Secretary Chu again on the U.S. response to the damaged reactors at Fukushima Dai-ichi.

(Biography current as of 08/13/12)

<http://www.fas.org/rlg/>

[Federation of American Scientists](#) | [Nuclear Resources](#)

INVITATION TO NOMINATE FOR HONORARY DEGREE

The university community is invited to submit nominations, preferably by e-mail, to the office of the provost, c/o Lois Langell (lois.langell@case.edu) or to any committee member by September 21, 2015, for consideration during the fall semester. **Nominees should not be informed of the nomination.**

For full review, please include the information listed below. Incomplete nominations cannot be considered.

RECOMMENDATION FOR AWARD OF AN HONORARY DEGREE

**Submit by September 21, 2015, for review in the fall term.
Please do not inform the nominee of his or her nomination**

Nominee:Ambassador Rosemary McCarney

Attachments:

Nominating letter

Nominee's vita or biography

Maximum of five letters of support (optional)

Other materials (optional).

Include nominator's name, contact information, and status (e.g., faculty, staff, student, alumna/alumnus).

**Nominated by Michael Scharf, Co-Dean, Case Western Reserve University
School of Law.**

Mps17@case.edu

(216) 534-7796

TO: The CWRU Honorary Degree Committee
FR: Michael Scharf, Co-Dean, School of Law
RE: Nomination of Rosemary McCarney for an Honorary Degree
DATE: September 13, 2015

I write to enthusiastically nominate Rosemary McCarney for an Honorary Degree. Rosemary, who was recently appointed Canada's Ambassador to the United Nations, was CWRU School of Law's first foreign exchange student in 1977. She earned her law degree from Western Ontario School of Law, which co-hosts the Canada-U.S. Law Institute with CWRU School of Law. She subsequently received her MBA from Case Western's Weatherhead School of management in 1982.

As described below, Ambassador McCarney is one of our University's most distinguished graduates and accomplished humanitarians, and would make an ideal recipient of our Honorary Degree, as well as a terrific graduation speaker.

Ambassador McCarney has taught both international and constitutional law. She has worked in international economic development with the World Bank, the International Finance Corporation, USAID and CIDA, as well as other governments and UN bodies.

Ambassador McCarney is an award-winning humanitarian and business leader, a recognized public speaker and author and an expert on international economic development. She most recently served as the President and Chief Executive Officer of Plan International Canada Inc. (Plan Canada), one of the oldest and largest charities in Canada and a member of the global Plan Federation.

Ambassador McCarney has been a member of the Board of Directors of numerous private sector, not-for-profit, and community organizations, including serving as the Vice-Chair of The Humanitarian Coalition; Co-Chair of the Canadian Network on Maternal, Newborn, and Child Health, and serves on the Advisory Board of the Canada-United States Law Institute, as well as on the Public Policy Committee of Imagine Canada.

Ambassador McCarney has had an extensive international career in law, business and the not-for-profit sector, having worked in more than 100 countries. Prior to joining Plan Canada she was the Executive Director of Street Kids International. She is the recipient of numerous awards and honors. Rosemary has written for several publications, including as a frequent guest writer for Huffington Post. She has appeared regularly on national and international radio and television programs.

In the spring of 2014 she launched a series of children's books on social and rights issues affecting children in Canada and around the world with Second Story Press. She is the author of *Every Day is Malala Day* (2014), *Because I am a Girl, I Can Change the World* (2014), *Tilt Your Head, Rosie the Red* (2015), and *The Way to School* (2015).

In 2013 she was awarded the Diamond Jubilee Medal by Queen Elizabeth. In 2012, she was named one of the top most influential lawyers in Canada by *Canadian Lawyer Magazine*.

Ambassador McCarney is an excellent public speaker (see e.g., her Ted talk, at: <http://youtu.be/fdu5IMNS4v4>)



Photograph of Amb. Rosemary McCarney

Biography

Development agency head appointed as Canada's next ambassador to the UN

[Kim Mackrael](#)

OTTAWA — *The Globe and Mail*

Published Friday, Jun. 05, 2015 8:13PM EDT

The Conservative government is appointing the head of development agency Plan Canada as the next ambassador to the United Nations in Geneva, securing a place at the international body for a longtime ally on maternal and child health.

Rosemary McCarney, Plan Canada's president and chief executive officer, has worked closely with Prime Minister Stephen Harper on the government's efforts to improve maternal and child health in poor countries. Mr. Harper made the issue a central focus for Canada's international development efforts in 2010 and has personally championed the cause at international gatherings.

The appointment is not the first time the Conservative government has looked outside the ranks of Canada's foreign service to choose a new ambassador. Last year, it named lawyer and newspaper columnist Vivian Bercovici as Canada's ambassador to Israel. Ms. Bercovici is a staunch supporter of Israel whose views on the region are closely aligned with the Conservative government's.

Over the past year, Mr. Harper repeatedly called for the UN to keep the health of mothers and children as a core priority in its global development agenda. Making the UN appointment now means Ms. McCarney will likely remain in a position to advocate for the issue beyond the next federal election.

Ms. McCarney became the head of the Canadian arm of Plan International in 2005. The charitable organization is focused on social justice for children in low-income countries and has placed a particular emphasis in recent years on promoting gender equality and girls' rights.

She is also a member of the steering committee for the Canadian Network for Maternal, Newborn and Child Health, which receives funding from the government. Last year, Ms.

McCarney interviewed Mr. Harper on stage during an international summit on maternal and child health in Toronto.

Ms. McCarney will replace Elissa Golberg, a career foreign service officer who was appointed to the position in 2011, as Canada's ambassador and permanent representative to the UN in Geneva and to the UN Conference on Disarmament.

Ms. Golberg is a former director-general for Canada's stabilization and reconstruction task force, which responds to humanitarian crises, conflicts and natural disasters abroad. She also served as a representative to Kandahar, Afghanistan, from February, 2008, to January, 2009, and was executive director of the Independent Panel on Canada's Future Role in Afghanistan.

Canada's mission to the United Nations in Geneva is responsible for relations with a number of major UN offices, including the World Health Organization, the International Labour Organization, the High Commissioner for Refugees and the High Commissioner for Human Rights.

Prior to taking the helm at Plan Canada, Ms. McCarney co-owned a private consulting company and held a senior position at Nortel Networks Corporation. She was also chief executive officer for Street Kids International, a charitable organization focused on vulnerable youth. She recently published a children's book about Malala Yousafzai, the teenager from Pakistan who shared the 2014 Nobel Peace Prize for championing girls' rights to education.

The Faculty Senate Committee on Research: 2015 Faculty Research Survey

December 9, 2015

Lee D. Hoffer
Chair, Faculty Senate Committee on Research



COLLEGE OF
ARTS AND SCIENCES

CASE WESTERN RESERVE
UNIVERSITY

Background

- Based on data from CWRU 2010 & 2014 Faculty Climate Surveys:
 1. Satisfaction about “research” was low among faculty, lower than parking
 1. More dissatisfaction about research support compared to peer institutions

Background

- “FSRC Faculty Research Survey” – partnership: Faculty Senate, Faculty Senate Committee on Research, & Office of Research Administration
 - Special Thanks to: Josh Terchek (Associate Director, Institutional Research Office) Julia Knopes (Graduate Student / Anthropology)
- Methods:
 - Email announcement sent to all faculty w/ link to on-line survey April 30, 2015. (Survey closed May 21, 2015.)
 - N=393
 - Low “response rate” 11% (N=3384)
 - Potential selection bias (faculty doing more research)
 - The survey primarily asked about grant funded research processes / services

2015 Faculty Research Survey

Quantitative Data

Sample:

Primary faculty appointment at CWRU

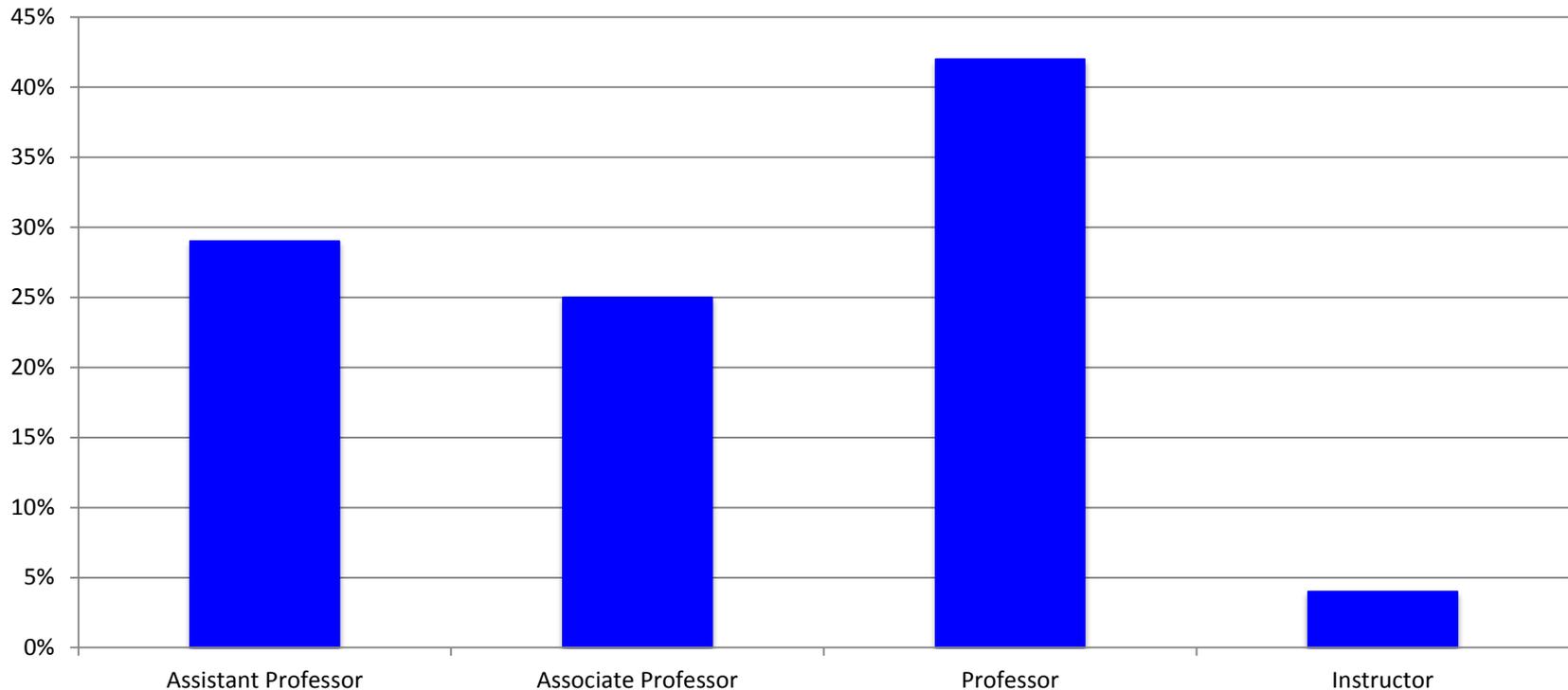
| | N | % |
|---|----------|----------|
| Case School of Engineering | 28 | 7 |
| College of Arts and Sciences* | 105 | 27 |
| Frances Payne Bolton School of Nursing | 23 | 6 |
| Jack, Joseph, and Morton Mandel School of Applied Social Sciences | 10 | 3 |
| School of Dental Medicine | 15 | 4 |
| School of Law | 7 | 2 |
| School of Medicine** | 172 | 45 |
| Weatherhead School of Management | 17 | 5 |
| Total | N=377 | |

* CAS divided by Social Sciences, Arts & Humanities, & Physics / Natural Sciences

** SOM divided by Basic Science & Clinical Medicine

Sample:

Faculty rank/position

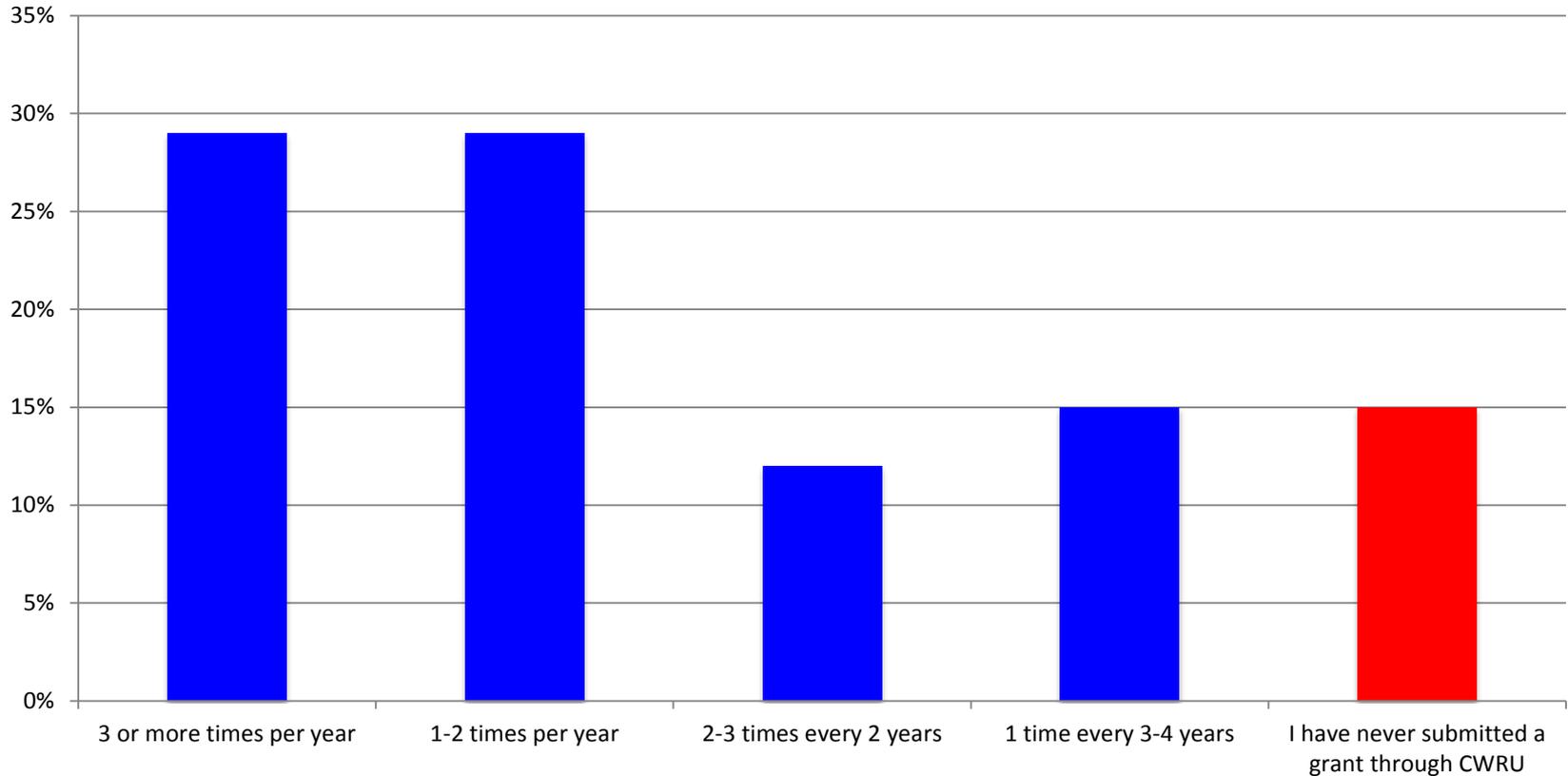


- 54% Tenured
- 23% “Clinical faculty”
- 91% Main campus

N=375

Sample:

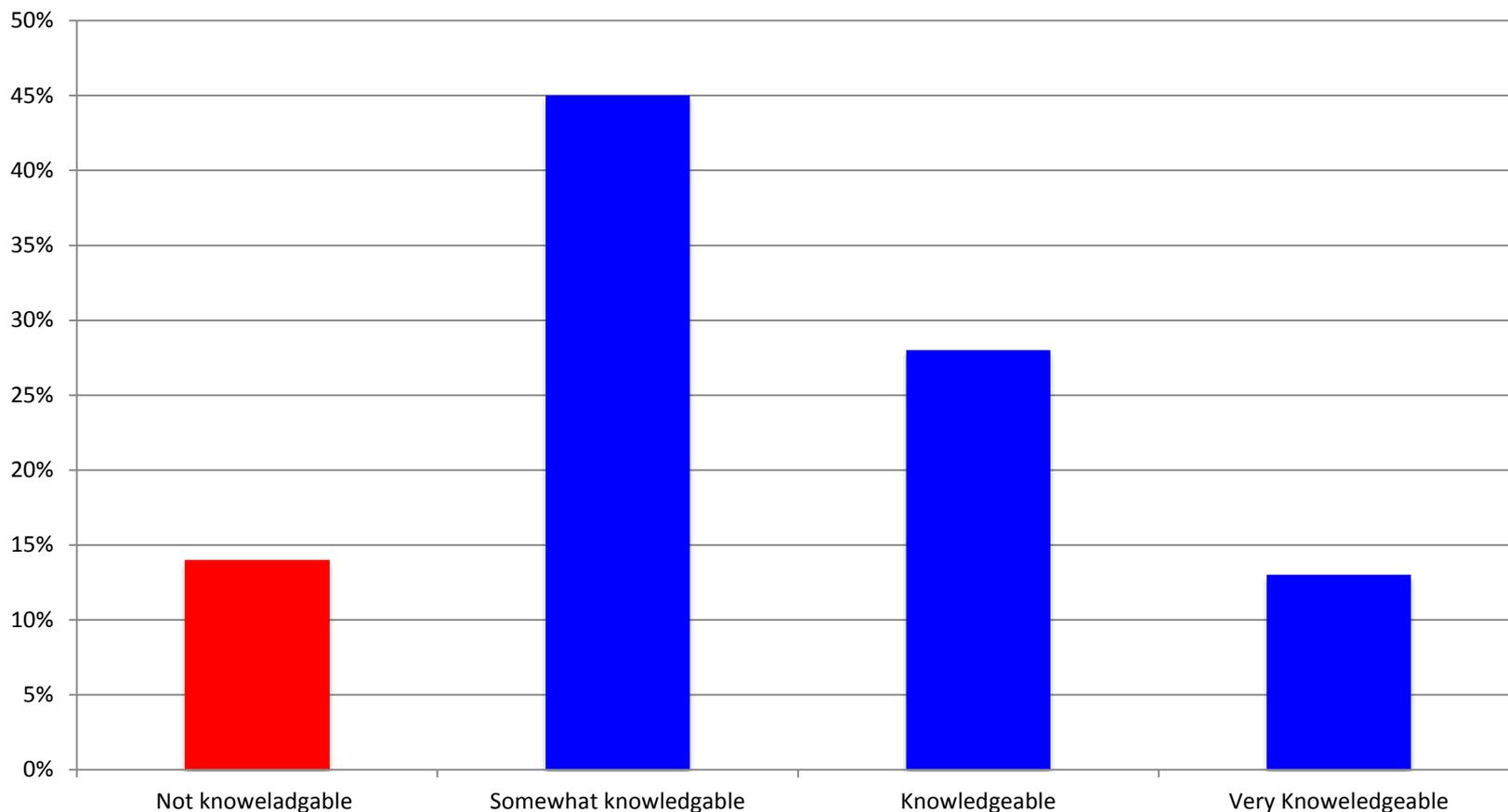
How Frequently do you submit grants?



N=373

Sample:

How would you rate your knowledge about services?



N=351

How satisfied are you with assistance for pre-award activities

| Question | Dissatisfied | Satisfied | Not important / NA |
|---|--------------|-----------|--------------------|
| → Identifying Federal/State grant opportunities | 30.32% | 52.91% | 16.77% |
| Identifying foundation support opportunities | 43.22% | 42.58% | 14.19% |
| Identifying industry support opportunities | 47.25% | 19.74% | 33.01% |
| → Understanding sponsor / agency guidelines | 28.89% | 52.27% | 17.90% |
| IRB submission / review processes | 32.69% | 35.60% | 31.71 |
| Negotiating contracts | 34.09% | 22.08% | 43.83% |
| Proposal writing | 42.37% | 31.72% | 25.89% |
| Preparing proposal budgets | 37.42% | 46.45% | 16.13% |
| → Submitting proposals | 33.87% | 52.58% | 13.55% |
| → Keeping up-to-date on research news and sponsor guidelines / policies | 24.19% | 59.47% | 16.34% |

N=310-306

→ = More satisfied (+10%)

How satisfied are you with assistance for pre-award activities

| Question | Dissatisfied | Satisfied | Not important / NA |
|---|--------------|-----------|--------------------|
| Identifying Federal/State grant opportunities | 30.32% | 52.91% | 16.77% |
| Identifying foundation support opportunities | 43.22% | 42.58% | 14.19% |
| → Identifying industry support opportunities | 47.25% | 19.74% | 33.01% |
| Understanding sponsor / agency guidelines | 28.89% | 52.27% | 17.90% |
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| Submitting proposals | 33.87% | 52.58% | 13.55% |
| Keeping up-to-date on research news and sponsor guidelines / policies | 24.19% | 59.47% | 16.34% |

N=310-306

→ = More dissatisfied (+10%)

How satisfied are you with assistance for pre-award activities

Sorted by “satisfied”

More Satisfied

| Item | Dissatisfied | Satisfied | Not important / NA |
|---|--------------|-----------|--------------------|
| Keeping up-to-date on research news and sponsor guidelines / policies | 24.19% | 59.47% | 16.34% |
| Identifying Federal/State grant opportunities | 30.32% | 52.91% | 16.77% |
| Submitting proposals | 33.87% | 52.58% | 13.55% |
| Understanding sponsor / agency guidelines | 28.89% | 52.27% | 17.90% |
| Preparing proposal budgets | 37.42% | 46.45% | 16.13% |

| | | | |
|-----------------------------------|--------|--------|-------|
| IRB submission / review processes | 32.69% | 35.60% | 31.71 |
|-----------------------------------|--------|--------|-------|

More Dissatisfied

| | | | |
|--|--------|--------|--------|
| Identifying foundation support opportunities | 43.22% | 42.58% | 14.19% |
| Proposal writing | 42.37% | 31.72% | 25.89% |
| Negotiating contracts | 34.09% | 22.08% | 43.83% |
| Identifying industry support opportunities | 47.25% | 19.74% | 33.01% |

N=310-306

How satisfied are you with assistance for pre-award activities

Sorted by “dissatisfied”

Most
Dissatisfied

| Item | Dissatisfied | Satisfied | Not important / NA |
|---|--------------|-----------|--------------------|
| Identifying industry support opportunities | 47.25% | 19.74% | 33.01% |
| Identifying foundation support opportunities* | 43.22% | 42.58% | 14.19% |
| Proposal writing | 42.37% | 31.72% | 25.89% |
| Preparing proposal budgets** | 37.42% | 46.45% | 16.13% |
| Negotiating contracts | 34.09% | 22.08% | 43.83% |

| | | | |
|---|--------|--------|--------|
| Submitting proposals | 33.87% | 52.58% | 13.55% |
| IRB submission / review processes | 32.69% | 35.60% | 31.71 |
| Identifying Federal/State grant opportunities | 30.32% | 52.91% | 16.77% |
| Understanding sponsor / agency guidelines | 28.89% | 52.27% | 17.90% |
| Keeping up-to-date on research news and sponsor guidelines / policies | 24.19% | 59.47% | 16.34% |

N=310-306

Which 3 pre-award activities if improved would most benefit your research agenda?

Item

Number of mentions

| Item | Number of mentions |
|---|--------------------|
| Identifying foundation support opportunities | 128 |
| Proposal writing | 105 |
| Submitting proposals | 88 |
| Preparing proposal budgets | 82 |
| Identifying Federal/State grant opportunities | 81 |
| Identifying industry support opportunities | 72 |
| IRB submission / review processes | 57 |
| Negotiating contracts | 49 |
| Keeping up-to-date on research news and sponsor guidelines / policies | 38 |
| Understanding sponsor / agency guidelines | 37 |

How satisfied are you with assistance for post-award activities

| Question | Dissatisfied | Satisfied | Not important / NA |
|--|--------------|-----------|--------------------|
| → Setting up research account(s) (a.k.a. "speedtypes") | 21.83% | 54.93% | 23.24% |
| IRB submission / review processes | 27.04% | 31.32% | 41.63% |
| IACUC submission/review processes | 13.26% | 17.57% | 69.18% |
| IBC submission/review processes | 8.36% | 17.09% | 74.55% |
| Monitoring research accounts | 42.30% | 34.41% | 23.30% |
| Hiring research staff | 38.16% | 26.50% | 35.33% |
| → Evaluating research staff | 25.45% | 35.13% | 39.43% |
| Payment and invoicing issues | 40.78% | 34.76% | 24.46% |
| Establishing and managing sub-awards | 23.74% | 29.14% | 47.12% |
| Purchasing research equipment | 30.00% | 36.79% | 33.22% |
| Setting up/managing IT services for research | 29.43% | 31.92% | 38.65% |
| → Project reporting | 23.14% | 50.89% | 25.98% |
| → Project closeout activities | 20.51% | 47.48% | 32.02% |

N=275-280

→ = More satisfied (+10%)

How satisfied are you with assistance for post-award activities

| Question | Dissatisfied | Satisfied | Not important / NA |
|--|--------------|-----------|--------------------|
| Setting up research account(s) (a.k.a. "speedtypes") | 21.83% | 54.93% | 23.24% |
| IRB submission / review processes | 27.04% | 31.32% | 41.63% |
| IACUC submission/review processes | 13.26% | 17.57% | 69.18% |
| IBC submission/review processes | 8.36% | 17.09% | 74.55% |
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| Setting up/managing IT services for research | 29.43% | 31.92% | 38.65% |
| Project reporting | 23.14% | 50.89% | 25.98% |
| Project closeout activities | 20.51% | 47.48% | 32.02% |

N=275-280

→ = More dissatisfied (+10%)

How satisfied are you with assistance for post-award activities

Sorted by “satisfied”

Most Satisfied

| Question | Dissatisfied | Satisfied | Not important / NA |
|--|--------------|-----------|--------------------|
| Setting up research account(s) (a.k.a. "speedtypes") | 21.83% | 54.93% | 23.24% |
| Project reporting | 23.14% | 50.89% | 25.98% |
| Project closeout activities | 20.51% | 47.48% | 32.02% |
| Purchasing research equipment | 30.00% | 36.79% | 33.22% |
| Evaluating research staff | 25.45% | 35.13% | 39.43% |
| Payment and invoicing issues | 40.78% | 34.76% | 24.46% |
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| IRB submission / review processes | 27.04% | 31.32% | 41.63% |
| Establishing and managing sub-awards | 23.74% | 29.14% | 47.12% |
| Hiring research staff | 38.16% | 26.50% | 35.33% |
| IACUC submission/review processes | 13.26% | 17.57% | 69.18% |
| IBC submission/review processes | 8.36% | 17.09% | 74.55% |

N=275-280

How satisfied are you with assistance for post-award activities

Sorted by “dissatisfied”

Most
Dissatisfied

| Question | Dissatisfied | Satisfied | Not important / NA |
|--|--------------|-----------|--------------------|
| Monitoring research accounts | 42.30% | 34.41% | 23.30% |
| Payment and invoicing issues | 40.78% | 34.76% | 24.46% |
| Hiring research staff | 38.16% | 26.50% | 35.33% |
| Purchasing research equipment | 30.00% | 36.79% | 33.22% |
| Setting up/managing IT services for research | 29.43% | 31.92% | 38.65% |
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| Evaluating research staff | 25.45% | 35.13% | 39.43% |
| Establishing and managing sub-awards | 23.74% | 29.14% | 47.12% |
| Project reporting | 23.14% | 50.89% | 25.98% |
| Setting up research account(s) (a.k.a. "speedtypes") | 21.83% | 54.93% | 23.24% |
| Project closeout activities | 20.51% | 47.48% | 32.02% |
| IACUC submission/review processes | 13.26% | 17.57% | 69.18% |
| IBC submission/review processes | 8.36% | 17.09% | 74.55% |

N=275-280

Which 3 post-award activities if improved would most benefit your research agenda?

| Item | Number of mentions |
|--|--------------------|
| Monitoring research accounts | 102 |
| Hiring research staff | 85 |
| Payment and invoicing issues | 71 |
| IRB submission / review processes | 53 |
| Project reporting | 52 |
| Setting up/managing IT services for research | 41 |
| Setting up research account(s) (a.k.a. "speedtypes") | 40 |
| Purchasing research equipment | 37 |
| Establishing and managing sub-awards | 24 |
| Project closeout activities | 23 |
| Evaluating research staff | 18 |
| IACUC submission/review processes | 16 |
| IBC submission/review processes | 6 |

In general, how satisfied are you with assistance provided by the university in the following

| Question | Dissatisfied | Satisfied |
|--|--------------|-----------|
| Help finding funding opportunities | 54.58% | 45.42% |
| Training on how to write a grant | 52.21% | 47.79% |
| Grant writing support | 70.00% | 30.00% |
| Regulatory Committee support (IRB, IACUC, IBC, etc.) | 50.84% | 49.15% |
| Financial Accounting / Budget support | 60.32% | 39.68% |
| Human Resources (for research) | 57.38% | 42.62% |
| Purchasing/Procurement | 51.44% | 48.56% |
| → Lab/research space | 36.40% | 63.59% |
| → Mentorship from senior faculty | 40.08% | 59.92% |
| Bridge funding | 70.09% | 29.92% |
| Startup, seed, or pilot project funding | 64.23% | 35.78% |

N=262-224

→ = More satisfied (+10%)

In general, how satisfied are you with assistance provided by the university in the following

| | Question | Dissatisfied | Satisfied |
|---|--|--------------|-----------|
| ➡ | Help finding funding opportunities | 54.58% | 45.42% |
| | Training on how to write a grant | 52.21% | 47.79% |
| ➡ | Grant writing support | 70.00% | 30.00% |
| | Regulatory Committee support (IRB, IACUC, IBC, etc.) | 50.84% | 49.15% |
| ➡ | Financial Accounting / Budget support | 60.32% | 39.68% |
| ➡ | Human Resources (for research) | 57.38% | 42.62% |
| | Purchasing/Procurement | 51.44% | 48.56% |
| | Lab/research space | 36.40% | 63.59% |
| | Mentorship from senior faculty | 40.08% | 59.92% |
| ➡ | Bridge funding | 70.09% | 29.92% |
| ➡ | Startup, seed, or pilot project funding | 64.23% | 35.78% |

N=262-224

➡ = More dissatisfied (+10%)

In general, how satisfied are you with assistance provided by the university in the following

Sorted, >50%

| Question | Dissatisfied |
|---|---------------------|
| Bridge funding | 70.09% |
| Grant writing support | 70.00% |
| Startup, seed, or pilot project funding | 64.23% |
| Financial Accounting / Budget support | 60.32% |
| Human Resources (for research) | 57.38% |
| Help finding funding opportunities | 54.58% |
| Training on how to write a grant | 52.21% |
| Purchasing/Procurement | 51.44% |

How satisfied are you with the current assistance you receive in...

| Question | Dissatisfied | Satisfied | |
|---|--------------|-----------|-----|
| <i>Pre-award</i> support from your department | 41.45% | 58.55% | 17% |
| <i>Post-award</i> support from your department | 39.54% | 60.46% | 21% |
| <i>Pre-award</i> support from School / Management center / College | 53.55% | 46.46% | 7% |
| <i>Post-award</i> support from School / Management Center / College | 53.06% | 46.94% | 6% |
| <i>Pre-award</i> support from Central / SOM | 58.85% | 41.15% | 17% |
| <i>Post-award</i> support from Central / SOM | 58.72% | 41.28% | 17% |

N=263-235

2015 Faculty Research Survey

Qualitative Data

Summary

- The Faculty Research Survey asked two open-ended questions...

Q.17 What does CWRU do well?

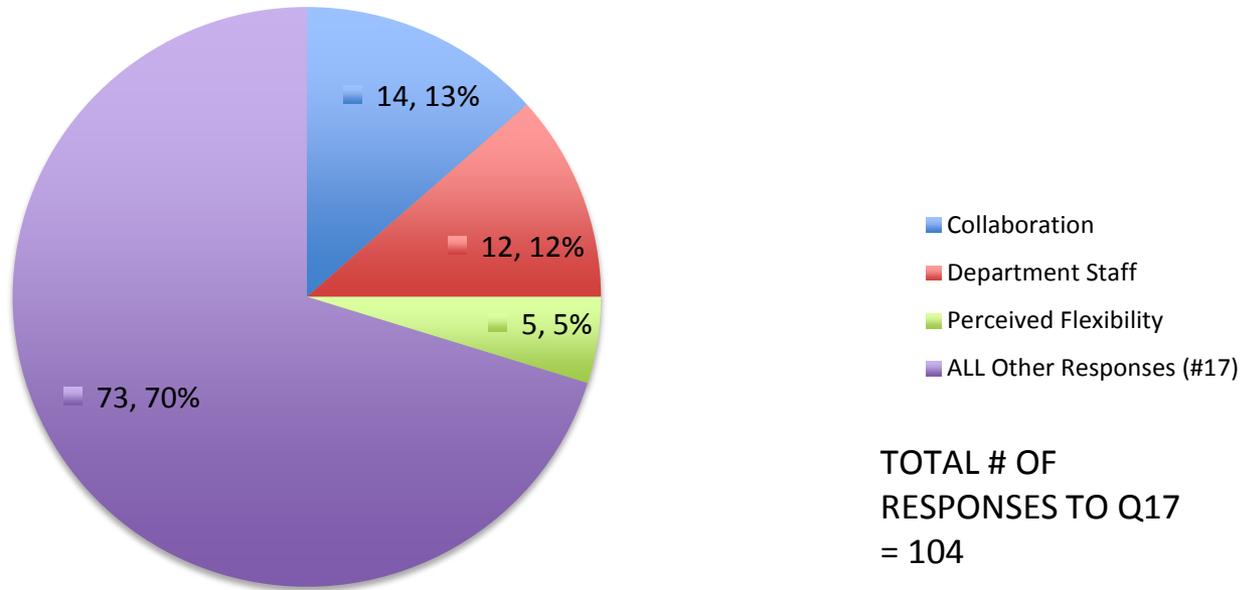
Q.18 What can CWRU improve?

Summary

- Data was thematically coded and numerically accounted using NVivo software
- Responses are listed in three categories:
 - What CWRU Does Well (Presently)
 - Points Without a (Single) Consensus
 - What CWRU Can Improve

What CWRU Does Well

What CWRU Does Well:
Overall Breakdown of (Positive) Responses: Q #17



What CWRU Does Well: *Collaboration*

- “CWRU is a very collaborative environment.”
- “Good academic environment with wonderful colleagues.”
- “There are many capable scientists at the university for me to collaborate with.”

What CWRU Does Well: *Department Staff*

- “Departmental support for creating budgets and submitting proposals is fantastic.”
- “Friendly and overall efficient staff in our department.”
- “The people in my department are very good but extraordinarily overworked and overwhelmed.”

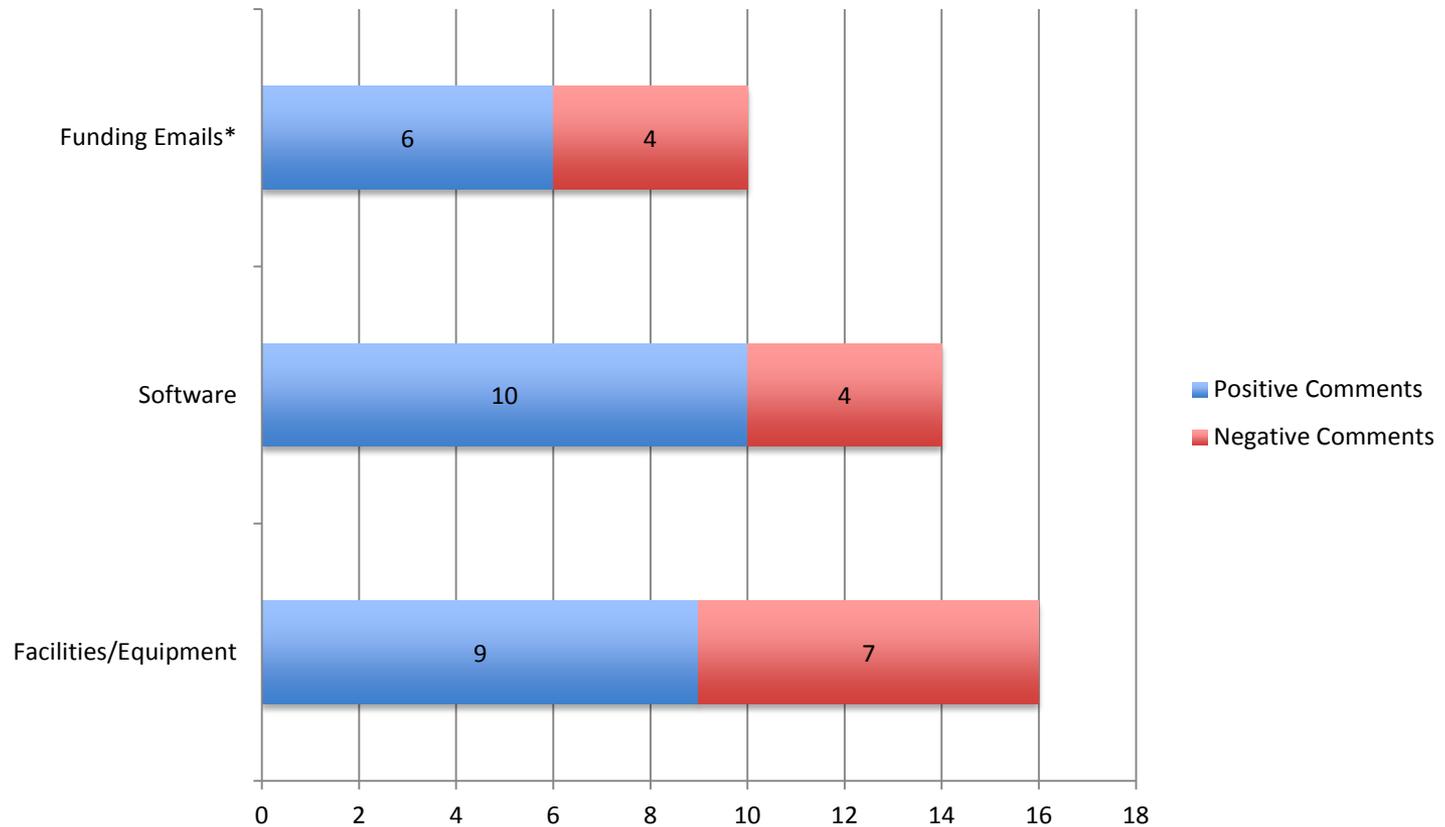
What CWRU Does Well:

Perceived Flexibility

- “Allows me to determine my own budgets for research travel and book purchases.”
- “You have freedom.”

Points Without Consensus

Points With No Single Consensus



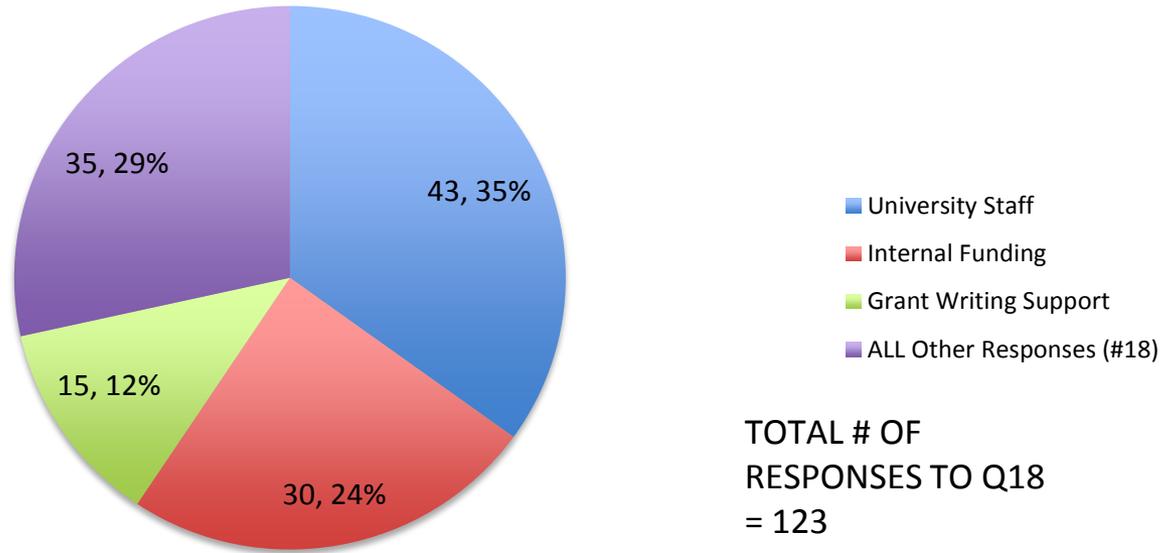
Points Without Consensus:

Response Examples

- “Emails about funding are good, although very generalized.”
- “SPARTA...should be tested by investigators who actually have extensive experience submitting grants.”
- “Without continual reinvestment, CWRU will rapidly fall behind the leading research institutions...”

What CWRU Can Improve

What CWRU Can Improve On:
Overall Breakdown of (Negative) Responses: Q #18



What CWRU Can Improve: *University Staff*

- “The business administration NEEDS to work with PIs as a team, and not as an outsider.”
- “The IRB turnaround time has been much slower recently.”
- “It seems there is a high amount of duplication and redoing work that takes time away from getting proposals out the door.”

What CWRU Can Improve:

Internal Funding

- “There is little in the way of seed money [or] summer research support.”
- “\$5,000 a year for each faculty member would make a huge difference in research productivity and publications for faculty.”
- “[We need] research funds for buying books, traveling to archives and conferences. I have paid a portion out of pocket almost every year I’ve been at CWRU.”

What CWRU Can Improve: *Grant Writing Support*

- “It would be great to have a professional editing/writing service for grant proposals.”
- “Establish a system for faculty mentorship on grant writing.”
- “The lack of a proactive infrastructure that facilitates grant development and submission in the social/behavioral sciences is a factor in losing quality faculty to other institutions.”

Conclusions

Pre-award

- Dissatisfaction:
 1. Grant writing support
 2. Identifying foundation support opportunities
- For improvement:
 1. Identifying foundation support opportunities
 2. Proposal writing
 3. Submitting proposals

Post-award

- Dissatisfaction:
 1. Monitoring accounts
 2. Payment & invoicing
- For improvement:
 1. Monitoring research accounts
 2. Hiring research staff
 3. Payment & invoicing

In general

- Dissatisfaction:
 1. Bridge funding
 2. Grant writing support
 3. Startup, seed, or pilot project funding

What CWRU **does well**:

1. Collaboration
2. Department staff
3. Flexibility

What can CWRU **improve**:

1. University staff
2. Internal funding
3. Grant writing support

Future

- **Improve survey** (e.g., stratified sampling, improve response rate, ask better questions, etc.)
- Use data to evaluate faculty perceptions of CWRUs research resources over time

**2015 CWRU Faculty Research Survey
(Draft)**

Open-ended Question Response Summary

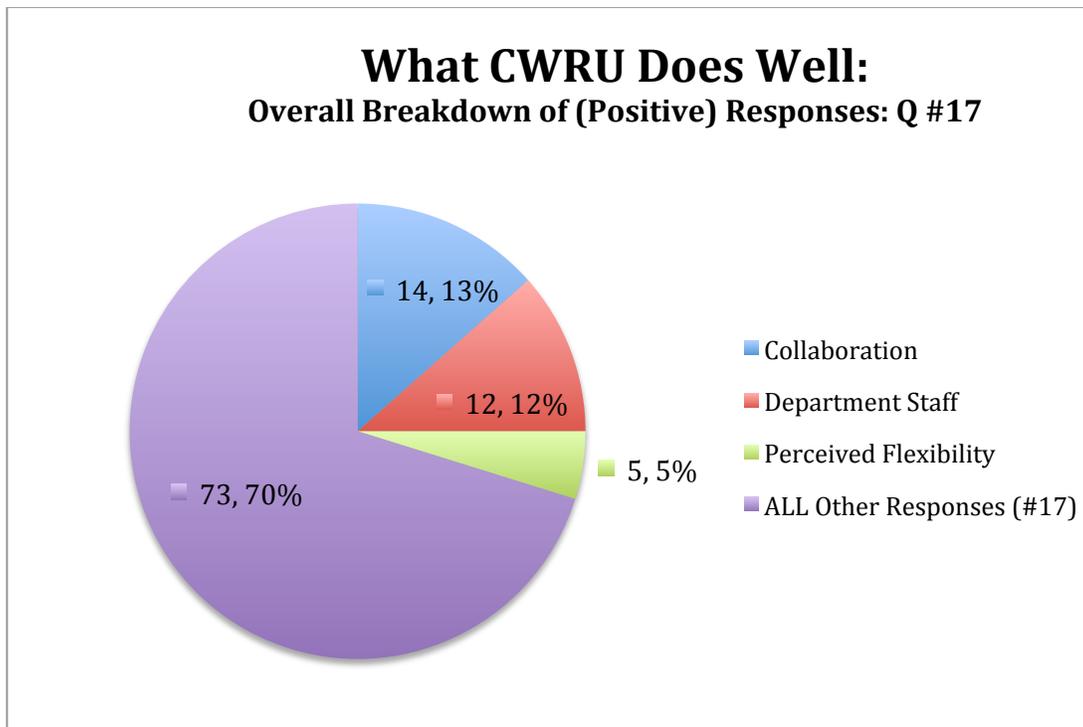
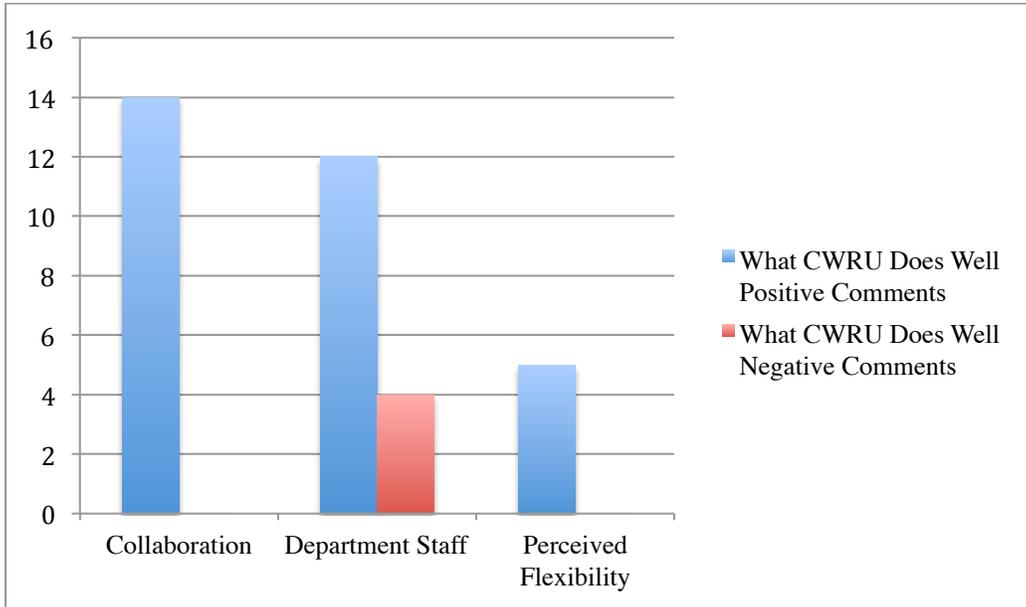
The CWRU Research survey included two open-ended questions: 1) Q17 what does CWRU do well and 2) Q18 what can CWRU improve? This summary highlights the issues faculty described in questions 17 and 18, with numerical breakdowns of the number of responses in each category that received positive and/or negative comments. The data are grouped by topic into three categories: (1) what survey respondents believe CWRU currently does well, (2) issues that respondents did not come to a strong consensus on, but which appeared throughout the responses, and (3) what respondents believe CWRU can improve upon (i.e. concerns, suggestions for improvement, or predominantly negative comments about the existing research environment.) All topics under each heading are rated from most number of responses to the least number of responses.

The full report of the survey results describes participants' responses in further detail beyond the positive/negative axis as presented here: however, this summary utilizes a simple positive/negative response grouping to more easily account for the amount of individual respondents who expressed comments or concerns in each topic. This enabled each subcategory to be chronologically ranked in terms of the number of positive or negative responses that each topic received in the survey.

What CWRU Does Well (Presently)

1. **Collaboration:** The respondent's belief that CWRU sustains a highly collaborative research environment that encourages interdepartmental or cross-departmental research with colleagues at the institution. There were 14 positive comments and 0 negative comments regarding collaboration.
2. **Department Staff:** Respondent's discussion of the quality of assistance in research administration and related tasks by staff working at the department level or more locally within the college in which a department is situated. There were 12 positive comments and 4 negative comments.
3. **Perceived Flexibility:** The extent to which respondents cited "flexibility" or "freedom" to carry out research at the university. There were 5 positive comments and 0 negative comments.

| What CWRU Does Well | | |
|-----------------------|-------------------|-------------------|
| | Positive Comments | Negative Comments |
| Collaboration | 14 | 0 |
| Department Staff | 12 | 4 |
| Perceived Flexibility | 5 | 0 |



Points Without Single Consensus

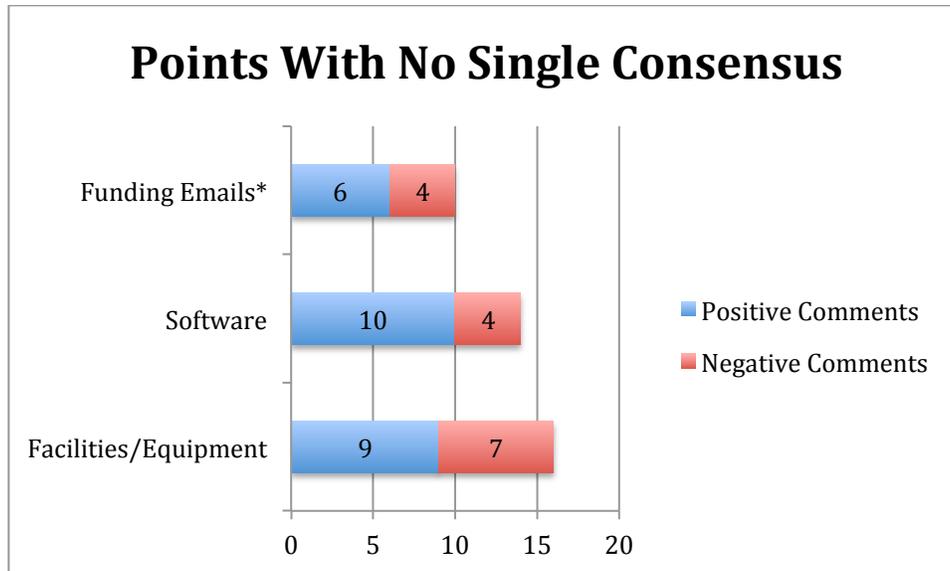
1. **Facilities/Equipment:** Respondent's discussion of existing facilities, research spaces, or research equipment available, accessible, and maintained at the university. There were 9 positive and 7 negative comments on facilities/equipment.

2. **Software:** Respondent’s comments on the quality, ease of use, or accessibility of software and online programs at the university that support research activities and administration. There were 10 positive comments and 4 negative comments.

3. **Funding Emails:** Comments made by respondents about funding emails and communications disseminated through the university for researchers, faculty, and graduate students. There were 6 positive and 4 negative comments: however, see the footnote for details about this numerical breakdown.

| Points with No Single Consensus | | |
|---------------------------------|-------------------|-------------------|
| | Positive Comments | Negative Comments |
| Facilities/Equipment | 9 | 7 |
| Software | 10 | 4 |
| Funding Emails* | 6 | 4 |

** There were 10 comments total on funding emails. All 10 were positive and said the regularity of emails was helpful: however, 4 also noted the funding reported was too focused on STEM opportunities or were irrelevant to non-"hard" science fields.*

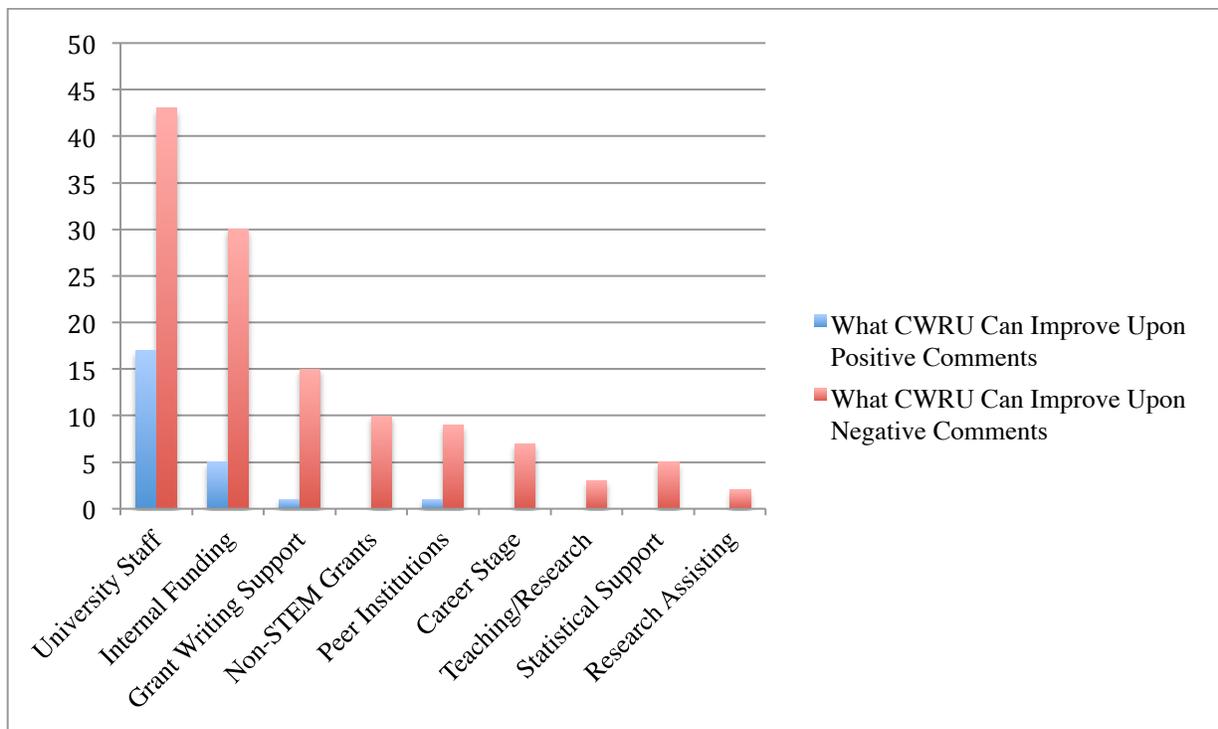


What CWRU Can Improve Upon

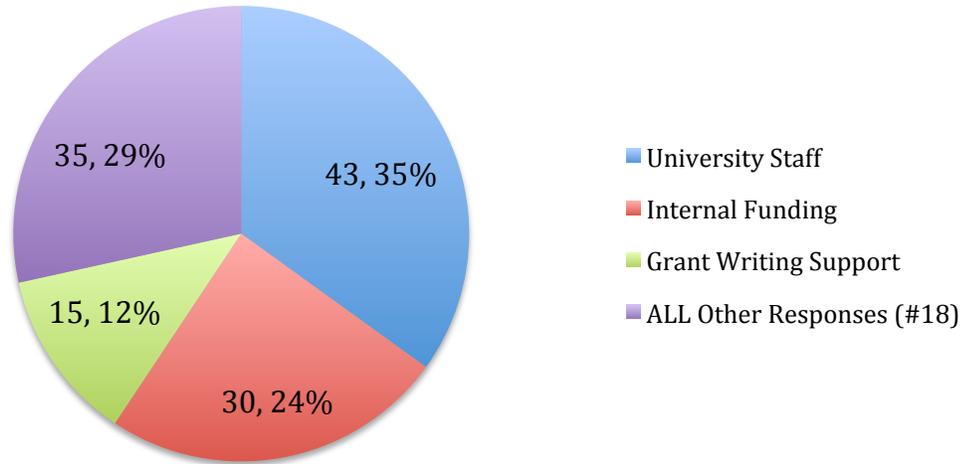
1. **University Staff:** Respondent’s discussion of the quality and nature of support from university-level staff. In some cases, respondents aligned college-level research offices with university-level administration; in others, these mid-level offices were classed as “departmental.” There were 43 negative and 17 positive comments regarding university staff.

2. **Internal Funding:** Descriptions by respondents about the nature and amount of internal grants or small internal funding available to faculty and researchers at the university. This included seed, pilot, and bridge grants as well as other forms of support for conference travel, research assisting, and books related to research activities. There were 30 negative and 5 positive comments about internal funding.
3. **Grant Writing Support:** The respondents' descriptions of existing grant writing support or proposed new programs that would assist faculty and researchers in grant proposal development, writing, and submission. There were 15 negative comments and 1 positive comment about grant writing support at CWRU.
4. **Non-STEM Grants:** Respondents' description of the availability of grants for non-STEM fields: either involving improved reporting of these opportunities, lack of availability for grants in the arts, social sciences, and humanities, or suggestions for improving access to non-STEM funding. There were 10 negative and 0 positive comments about non-STEM grants.
5. **Peer Institutions:** Respondents' discussion of the research environment at CWRU in comparison to other university intuitions: either specifically named, or more generally cited. There were 9 negative comments and 1 positive comment about CWRU's reputation for research in comparison to other institutions.
6. **Career/Career Stage:** The extent to which respondents held that career stage (typically early or mid career, pre-tenure or newly tenured) is related to one's ability to carry out research, or recommended programs that would support research specific to researchers' level of seniority at the university. There were 7 negative and 0 positive comments about career stage.
7. **Teaching/Research:** Under the umbrella of *career/career stage*, there were 3 negative comments and 0 positive comments about researchers' ability to evenly balance teaching loads with research, grant proposal writing, and related activities.
8. **Statistical Support:** Respondents' discussion of a lack of statistical support or statistical analytic resources for carrying out research in both clinical and social science settings. There were 5 negative comments and 0 positive comments about existing statistical support at the university.
9. **Research Assisting:** Comments about the nature and availability of research assistance at the university currently. There were 2 negative comments and 0 positive comments on this topic.

| What CWRU Can Improve Upon | | |
|----------------------------|-------------------|-------------------|
| | Positive Comments | Negative Comments |
| University Staff | 17 | 43 |
| Internal Funding | 5 | 30 |
| Grant Writing Support | 1 | 15 |
| Non-STEM Grants | 0 | 10 |
| Peer Institutions | 1 | 9 |
| Career/ Career Stage | 0 | 7 |
| Teaching/Research | 0 | 3 |
| Statistical Support | 0 | 5 |
| Research Assisting | 0 | 2 |



What CWRU Can Improve On:
Overall Breakdown of (Negative) Responses: Q #18



Item f. Committee on Research.

1. The Committee on Research shall consist of the Dean of the School of Graduate Studies, *ex officio*, the Associate Vice President for Research, *ex officio*, nine voting members of the University Faculty elected by the Faculty Senate, one undergraduate student member elected by the Undergraduate Student Government, three student members elected by the Graduate Student Senate, and one postdoctoral scholar/fellow elected by the Post Doctoral Researchers Association. The term of membership on the Committee on Research shall be three years for faculty members and one year for student and postdoctoral scholar/fellow members. Each elected faculty member shall be eligible for re-election only after the lapse of at least one year following the expiration of two consecutive three year terms of membership. The terms of student and postdoctoral scholar/fellow members shall begin immediately upon their election to the Committee at the first regular meeting of the Faculty Senate subsequent to Commencement each year. Student and postdoctoral scholar/fellow members shall be eligible for re-election annually.