JD/MS in Biochemistry Dual Degree Proposal

This document contains a proposal for a dual degree between the Department of Biochemistry (MS degree) and the School of Law (JD degree).

Justification

Intellectual property is an area of tremendous growth and importance for both law and the sciences. For example, a survey of 272 senior executives in the pharmaceutical, biotechnology, and medical product industries found: “the development and protection of intellectual property is seen as the most critical area, as nearly all the senior executives

biology and biochemistry. It is difficult to overstate the importance of intellectual property to biotechnological innovation and to the biotech industry.

With this understanding in mind, the Center for LTA offers numerous courses related to intellectual property and law and technology, including a course devoted solely to the study of biotechnology law and policy. Students pursuing a graduate degree in biology or biochemistry will enrich the Center for LTA experience immensely and, in turn, these students will benefit by having the opportunity to apply their advanced knowledge to some of the most important legal issues facing the intellectual property and biotech communities today.

Students interested in careers in this area need a combination of legal skills and scientific skills. Drafting patent applications for biotechnology innovations, for example, often requires more sophisticated understanding of biology and biochemistry than would be possible for someone with only an undergraduate background in the sciences.

We anticipate that this joint degree program could draw students to both the School of Law and the Department of Biochemistry, especially because to the best of our knowledge, no such programs are currently offered at any of the schools of higher learning in Ohio, and only a handful nationwide.

JD Curriculum and Structure

The School of Law requires 88 credit hours of course work, including 41 hours of required courses and an upper class writing requirement, for the JD degree. All but four of these required courses are completed during the first year of the law program, which currently includes LAWS 104 Civil Procedure (4 cr.); LAWS 103 Constitutional Law (4 cr.); LAWS 123 Contracts (4 cr.); LAWS 131 Criminal Law (4 cr.); LAWS 144 Property (4 cr.); LAWS 8101 Core Lawyering Skills I and II (5 cr.); LAWS 132 Torts (4 cr.); and an elective from an approved list of perspective courses (3 cr.). In addition to the 32 credits of first year courses, JD students must complete Core Lawyering Skills III and IV (4 cr.) an upper class writing requirement (through participation in the Case Western Reserve University Law Review, Health Matrix or Journal of International Law, completion of a supervised research project, or completion of an approved writing requirement course) (at least 2 cr.). They must also complete LAWS 375 Professional Responsibility (3 cr.), typically during their second year of law studies. JD students are allowed, but not required, to take up to 9 credit hours of graduate level electives outside the law school for credit toward the law degree.

Biochemistry Curriculum and Structure

The Master's degree program in Biochemistry requires: 17 credits of BIOC lecture courses + 1 credit of exam. These are: BIOC 407 (4); 408 (4); 434 (3); 412 (3); approved electives (3); 600 (exam)(1). In addition, the MS program requires 18 credits of approved electives in Biomedical Science - related courses, including BIOC 601, Biochemical Research. In the dual degree program, 9 credits of approved LAWS

electives dealing with Law and Science or Medicine (see Appendix A) would be included within th

Year 4	BIOC elec.	(3)	BIOC elec.	(3)

program is up and running, students will be able to submit a joint application to the School of Law, which will forward materials of students who are admissible to that program, to the Department of Biochemistry for their consideration. Students admitted to the program will consult with the Associate Dean for Academic Affairs at the School of Law and the JD/MS Advisor of the Department of Biochemistry to determine their appropriate program of study.

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

Agreement between the Department of Biochemistry in the School of Medicine and the School of Law.

Students who are enrolled in the JD/MS dual degree program receive a Degree of Juris Doctor and a Master's Degree in Biochemistry upon completion of the program. The students in this program will register and pay tuition through the School of Law at that school's current rate. The tuition revenue for these dual degree students will be shared by both schools, as follows:

The number of credit hours being taken at each school will be divided by the total number of credit hours taken to derive the percent of tuition to which each school is entitled. This computation will be done on a per student per semester basis. These percentages will be applied to the net tuition* collected from each dual degree student for the corresponding semester. The School of Law will then transfer the appropriate tuition revenue to the Department of Biochemistry through a journal entry.

EXAMPLE

	Law School	Biochemistry Department	Total
John Doe - Credit Hours	5	7.5	12.5
- % of Revenue	40%	60%	100%
- Distribution of Tuition	$4,410	$6,616	$11,026

Note: Tuition used in the example is the going rate for a law student in Fall 2004 semester.
($14,100 gross tuition - $2,820 (20% of $14,100) - $254 university skim = $11,026 tuition to be distributed)

*Net tuition = gross tuition less scholarship rate (20% of gross) less university "skim".

Approval Signatures:

Dean, School of Law *Gerald Korngold*	X

Chair, Department of Biochemistry

Michael A. Weiss	X
Dean, Graduate Studies *Lenore A. Kola*	X

Student Activities: Both the Dean for Academic Affairs of the School of Law and the JD/MS advisor of the Department of Biochemistry will regularly contact students in the program by e-mail with information about activities and to verify proper progress.

Students are encouraged to participate in regular School of Law and Department of Biochemistry activities as well as those targeted to them. Under direction of the Associate Dean for Academic Affairs of the School of Law, all JD students enrolled in dual degree programs (except for the JD/MBA program which will be treated separately) will meet bi-annually in a colloquium retreat (approximately one-half day in length). The purposes of the retreat are (1) to ensure the programs are meeting the expectations of the students and the faculty in charge, (2) to capture the benefits of the interdisciplinary experience, (3) to socialize the dual degree students as a group, instead of small groups of isolated students, and (4) to explore the intellectual and professional challenges of doing interdisciplinary work.

In addition, prior to registration, the Associate Dean of the School of Law meets with each dual degree student to review their schedule and to explore any other issues on which they need guidance and advice. All new students will be partnered with an experienced student to address questions the students may have about the program and life as a graduate student at Case. These students will initially be drawn from the ranks of School of Law and Biochemistry students, but when the program is up and running, from advanced JD/MS Biochemistry students. A get-acquainted dinner will be organized during registration week in the fall to facilitate this process.

To fulfill the J.D. degree portion of the dual degree program, students will focus their capstone writing requirement on the subject of their work in the Department of Biochemistry. The JD/MS Advisor from that department will serve as a co-supervisor of this research.

For the Department of Biochemistry, bimonthly luncheon discussions and seminars will be scheduled and moderated by the JD/MS Advisor to discuss papers from the current literature that focus on recent breakthroughs in biotechnology as well as other topics, as requested by the students. Other appropriate activities include attending the weekly Departmental Seminar and Student Seminars, as well as annual named lectureships, participating in annual retreats, and one or more journal clubs. Additional events include general Department of Biochemistry picnics and the Annual Holiday Party in December.

Advantages of the Joint Degree Program

There are several advantages to the students in the JD/MS program. The key advantage will be the integration of the two disciplines during the time of the students receive their training, thus allowing the students to develop a unique focus on their studies in each of

Appendix A

School of Law courses and electives for JD/MS program.
Please note that this list is not all-inclusive.

L0430 Biotechnology Law & Policy (Spring) (2-credits) (Pre-req: Patent Law)
Profs: Jones, Kovach & Szczepaniak

This course is designed to expose the law student and graduate student in science or business to the legal, business, and policy issues relevant to the biotechnology industry. We will cover issues related to patents, corporate organization and financing (particularly venture capital as it relates to the Start-Up Biotech Company), licensing and other transactions, regulatory issues relevant to the Food and Drug Administration, university technology transfer, and academic conflicts of interest.

L3900 Intellectual Property Survey (Spring First-Year Elective) (3-credits)
Prof: Nard

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

licensees. As part of the course, we, as a class, will do such things as select a company name and protect it, draft and negotiate agreements, and hold a mock negotiation at the end of the semester.

L5610 International Intellectual Property (Spring) (3-credits)
Prof: Gerhart

This course considers the evolving system by which international intellectual property laws are structured, with an emphasis on the role of intellectual property in development

L0330 Intellectual Property & Indigenous Peoples (Fall) (3-credits) (IP Survey or Patent Law or Copyright Law) (Seminar)
Prof: Arewa

This course will explore the current mechanisms for protecting intellectual property and an examination of how such mechanisms apply with respect to traditional and indigenous knowledge, including knowledge associated with cultural expression, indigenous flora and fauna, genetic resources, and medicines. We will also discuss explicit and implicit conceptions of authorship and ownership that are embodied in intellectual property rules as well as issues associated with "biopiracy" and the need for a formalized compensatory mechanism related to the foreign commercial exploitation of indigenous peoples' knowledge.

Appendix B

Department of Biochemistry courses and electives for JD/MS program.
Please note: that this list is not all-inclusive.

resonance, absorption, fluorescence and circular dichroism spectroscopies, Raman and infrared spectroscopies and methods used in modeling.

BIOC 431: Advanced Methods in Structural Biology II (3 credits): This course provides an introduction to biophysical techniques for graduate students who are interested in structural biology and biophysical chemistry. Offered with BIOC 430, "Advanced Structural Biology I" in alternate years. Advanced Methods I (430) focuses on NMR and optical spectroscopies. Advanced Methods II deals with protein hydrodynamics and thermodynamics, crystallography, and mass spectrometry.

BI C 452. B (3): 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.

BIOC 620: Transcription and Gene Regulation (3 credits): Topics will include Structure of bacterial and eukaryotic RNA polymerases; regulation of transcription initiation; gene-specific eukaryotic transcription factors; promoter clearance; the role of the RNA polymerase II CTD; transcription elongation: pausing and arrest; transcription control in HIV; coupling of transcription and RNA processing.

BIOL 401: Biotechnology Laboratory: Genes and Genetic Engineering (3 credits): Laboratory training in recombinant DNA techniques. Basic microbiology, growth, and manipulation of bacteriophage, bacteria, and yeast. Students isolate and characterize DNA, construct recombinant DNA molecules, and reintroduce them into eukaryotic cells (yeast, plant, animal) to assess their viability and function.

BIOL 402: Principles of Neural Science (3 credits): Lecture/discussion course covering concepts in cell and molecular neuroscience, principles of systems neuroscience as demonstrated in the somatosensory system, and fundamentals of the development of the nervous system. This course will prepare students for upper level Neuroscience courses and is also suitable for students in other programs who desire an understanding of neurosciences.

BIOL 416: Fundamental Immunology (3 credits): Introductory immunology providing

processes. The course is divided into four major areas: bacteria, viruses, medical microbiology, and environmental and applied microbiology.

BI L 473. I (3 credits)**:** How nervous systems control behavior. Biophysical, biochemical, and molecular biological properties of nerve cells, their organization into circuitry, and their function within networks. Emphasis on quantitative methods for modeling neurons and networks, and on critical analysis of the contemporary technical literature in the neurosciences.

E BI 408. A (3 credits): Overview of aging and the aged. Concepts in the study of public policy. Policies on aging and conditions that they address. The politics of policies on aging. Emergent trends and issues.

E BI 431. I (3 credits): Application of statistical techniques with particular emphasis on problems in the biomedical sciences. Basic probability theory, random variables, and distribution functions. Point and interval estimation, regression, and correlation. Problems whose solution involves using packaged statistical programs.

E BI 432. II (3 credits): Methods of analysis of variance, regression and analysis of quantitative data. Emphasis on computer solution of problems drawn from the biomedical sciences. Design of experiments, power of tests, and adequacy of models.

NTRN 410. History of Food and Nutrition (3 credits)**:** Investigations of the development of nutrition as a science and interactions with medicine, agriculture, public health and dietetics. Food and technological effects on health.

NTRN 433. Advanced Human Nutrition I (4 credits)**:** Emphasis on reading original research literature in energy, protein and minerals with development of critical evaluation and thinking skills. Prereq: NTRN 201 and CHEM 223 and BIOL 348 or equivalent.

NTRN 434. Advanced Human Nutrition II (3 credits)**:** Emphasis on reading original research literature on vitamins with development of critical evaluation and thinking skills. Prereq: NTRN 433 or consent.

H 413. G (3 credits)**:** The primary goal of this seminar style course is the development of a critical approach to the evaluation and design of research in the broad context of the interaction of receptors with endogenous ligands and with drugs and the determination of the polygenetic basis of disease states and interindividual variation in responsiveness to drugs. Lectures and/or journal article presentation will illustrate the application of fundamental principles of chemistry, biochemistry, thermodynamics, genomics, and pharmacology to experimental problem solving. Students and faculty participate as discussion leaders.