Purpose: To prepare MDTP students for microbiology related careers.

Background. In order to better train MDTP students for microbiology-related professions, the students need a chance to gain knowledge and experience not just in academic research, but also in other fields where their microbiology education may be put to good use. The Delta Program in teaching has been a great asset to MDTP students interested in teaching as a career, allowing students to take classes and gain experience in teaching. Successful students are granted a certificate from the Delta Program, and this achievement and experience likely make the students more attractive for teaching positions.

Professional Development Options. With this plan we are expanding professional development opportunities for MDTP students beyond academic research and teaching. Opportunities for professional development can consist of coursework, an internship, a summer workshop, outreach experiences, or a second teaching practicum experience.

Courses. The Graduate School has agreed to allow MDTP dissertator students to enroll in courses from a limited list of classes appropriate for professional development of MDTP students. Students would take one or two courses in an area of interest after they become dissertators. Additional courses may be added to this list if they are appropriate for MDTP students and are approved for this purpose by the Graduate School.

Teaching practicum. A second semester of teaching practicum may be the most appropriate training for students that seek a career in academic research and teaching. If students do not arrange for other professional development activities, the default professional development training would be a second semester of teaching in a teaching practicum.

Summer courses or workshops. For students most interested in continuing in academic research, one or more summer courses or workshops may be the most appropriate training. Examples of such courses are those that cover research areas or methods or scientific writing or grant preparation.

Internship. As an alternative to class work or a second semester of teaching practicum, MDTP students could participate in an internship with a business or other organization. Students doing internships would have to arrange to be paid through the organization, and they would not be paid by their advisors while away from their research.

Requirement. In order to ensure that MDTP students are allowed to participate in the Professional Development opportunities, their participation will be required. Students will be required to perform a second semester of teaching practicum, carry out an internship for as long as one semester, take at least 2 credits of coursework from the list of approved classes or through the Delta Program, or perform other professional development activities equivalent to 2 semester hours of coursework as judged by the thesis committee. The thesis committee must give approval for the student to participate in the chosen professional development activity. Thesis committees will also determine if each student has met the requirement. Students should complete the professional development requirement by the end of the fourth year. This requirement will go into effect with the MDTP class entering in fall 2011.
List of UW course opportunities. Students could choose one or two courses from this list to fulfill the Professional Development requirement. More details on these courses and on the Delta Program are given on the following pages.

School of Business:
MHR 310 Business Fundamentals for Non-Business Majors I (3 cr).
MHR 311 Business Fundamentals for Non-Business Majors II (3 cr).
MHR 722 Entrepreneurial Management (3 cr).
MHR 765 Economics of Innovation and Technology (1-4 cr).

Law School:
Law 817: Business Organizations (3-4 cr).
Law 848: Introduction to Environmental Law (3 cr).
Law 905: Bioethics and the Law (2-4 cr).
Law 906: Law, Sciences and Biotechnology Seminar (2-4 cr).
Law 916: Food and Drug Law (2-3 cr).
Law 989: Environmental Law and Practice (2-3 cr).

LaFollette School of Public Policy:
Public Affairs 818, Introduction to Qualitative Methods for Public Policy Analysis (3 cr).
Public Affairs 819 Advanced Qualitative Methods for Public Policy Analysis (3 cr).
Public Affairs 864 Health Policy and Policy Design (3 cr).
Public Affairs 874 The Policy Making Process (3 cr).
Public Affairs 866 Global Environmental Governance (3 cr).

School of Medicine and Public Health – Population Health Sciences:
PHS 375 Introduction to Public Health (1 cr).
PHS 640 Foundations in Global Health Practice (1 cr).
PHS 644 Interdisciplinary Perspectives on Global Health and Disease.
PHS 780 Public Health: Principles and Practice (3 cr).
PHS 781: Intro to Public Health Seminar (1 cr).
PHS 785: Health Management Policy (3 cr).

School of Agriculture and Life Sciences – Biology outreach:
Biol 375: Special Topics, Engage Children in Science (1-5 cr).
School of Business

Entrepreneurial Management at Wisconsin
Contact: Dan Olszewski, Director, Weinert Center for Entrepreneurship, 5-3959, dolszewski@bus.wisc.edu

Http://www.bus.wisc.edu/weinertcenter/mba/mba2.asp

General Course suggestions

General Business 310 and 311 Business Fundamentals for Non-Business Majors I

Course Description: Part of a two course sequence introducing non-business students to basic concepts, practices and analytical methods that are part of the market enterprise system. This course is a basic overview on: accounting, finance, and business law.

Graduate Coursework in Entrepreneurship

http://www.bus.wisc.edu/weinertcenter/students/GraduateCourseworkinEntrepreneurship.asp

Specific Course Suggestions for MDTP Students:
MHR 722 Entrepreneurial Management
The goals of this course are to identify the role of entrepreneurial ventures in the US economy; identify the processes involved in starting a new venture, identify the processes involved in funding and investing in a new or growing entrepreneurial venture; understand methods of organizing and managing an entrepreneurial ventures understand methods for advising owners/managers of entrepreneurial ventures; and suggest small business ownership, advising or financing as a possible career course.

MHR 765 Economics of Innovation and Technology
Ideas and innovation have become the most important resource in today’s economy. Successful managers should know how to recognize, manage and generate technological innovation for sustained competitive advantage. This course uses economic concepts to illustrate the nature of technological innovation and how it transforms competition between firms and generates economic growth. Topics will include: historical and conceptual background of technology and innovation; economics of the intellectual property (IP) protection system; IP licensing, enforcement and litigation; the relationship between market structure and innovation; the diffusion of technological innovations; interaction between public and private sector innovation; current policy issues regarding the conflicts between IP rights, antitrust regulation, and consumer welfare; and globalization.

Wisconsin Entrepreneurial Bootcamp (WEB)
http://www.bus.wisc.edu/WEB/default.asp
This one-week summer program has been designed to provide graduate Physical/Life Science, Engineering or Law students with an introduction to entrepreneurship and the tools, skills and issues faced in technology entrepreneurship.

The program develops the student’s ability to use practical tools, deepen the student’s conceptual ability to explore fundamental links between tech and business and broaden the student’s factual knowledge about technology strategy and entrepreneurship.
Law School

Contact: Kevin Kelly, Assistant Dean for Curriculum Affairs, 2-4041, kevinkelly@wisc.edu. You will need to contact Dean Kelly to request registration in law school courses.

Specific Course Suggestions for MDTP Students:
http://www.law.wisc.edu/academics/courses/descriptions.php

Law 817: Business Organizations
This is an introductory course that covers basic issues relating to the law of principals and agents and surveys state laws governing the formation and operation of closely held business associations, including partnerships, limited liability companies, and closely held corporations. The course deals with choice of business entity, forming and financing business enterprises, and management rights within such enterprises.

Law 848: Introduction to Environmental Law
This course provides an overview of the major federal environmental statutes, regulations and cases, and their implementation by regulatory agencies, as well as currently applicable common-law doctrine. It surveys environmental impact analysis, water and ground water, solid and hazardous waste, hazardous substance management and remediation, clean air act, common law remedies, enforcement and administrative process. It will focus not only with litigation strategies, but also with the compliance and planning strategies involved with much of environmental law practice.

Law 905: Bioethics and the Law
This course is an introduction to the legal, ethical and public policy dimensions of modern medicine and biomedical research. The course deals with informed consent, human experimentation, death and dying, organ transplantation, and allocation of scarce resources.

Law 906: Law, Sciences and Biotechnology Seminar
This course will examine how law shapes the development and introduction of new biomedical technologies, and how complex social forces shape the law with respect to new technologies. We will study several new and emerging technologies including stem cells, gene therapy, genetic testing and new reproductive technologies. Several course sessions will focus on the regulation of human subjects research, and the evolution of this body of law in response to the changing nature of biomedical research. You do not need a science background to understand the material or to excel in the course.

Law 916: Food and Drug Law
This course will emphasize research, development, approval, marketing and surveillance of new drugs, devices and biologics. Topics include the history of food and drug regulation; regulations governing new drug development; scientific, legal and ethical issues in the design of clinical trials; interplay with patent law in the development of business strategies; post-approval marketing and product liability issues; and proposals for legislative reform. The course will not cover nutritional supplements or food safety except by way of contrast with the drug/device/biologics regulatory system, although some attention will be paid to nutriceuticals. Students will write a research paper in lieu of a final examination.

Law 989: Environmental Law and Practice
This course presents environmental statutes, cases and regulations, and discusses their implementation. The focus of the course will be both law and practice. It will provide a survey of substantive environmental law and their application in permitting, commercial transactions and enforcement.

Law School courses are graded differently from the standard A-F scale. Law School students will be graded differently than graduate students enrolling in law school courses. They will be graded on an A-F scale.
Law School Minor

Ph.D. Minor
Work in the Law School may be offered as a minor toward the Ph.D. degree. For a minor in law, Ph.D. candidates must complete 10 credits. The minimum grade requirement is a weighted average of 77. The same grading standards will be applied. Requests for applications for the Ph.D., indicating a major in another department and a minor in law, should be made to the Graduate School. For more information: Law School Admissions, 6222 Law Building, 975 Bascom Mall, Madison, WI 53706; 608/262-0050; www.law.wisc.edu/academics/courses/.

LaFollette School of Public Policy

Contact: Mary Treleven (mtreleven@lafollette.wisc.edu) (608) 262-3582, (800) 462-7403
You will need to contact individual professors to seek permission to register for the courses offered by the LaFollette School of Public Policy. There may be other courses that are of interest to you as well. We encourage you to peruse the website: http://www.lafollette.wisc.edu/policyfields.html

Domestic Focus Fields

Public/Nonprofit Management and Administration

Specific courses that may be of interest to MDTP students:

Public Affairs 818, Introduction to Qualitative Methods for Public Policy Analysis
http://www.ssc.wisc.edu/%7Egwalla/PA_818/pa_818.htm

Public Affairs 819 Advanced Qualitative Methods for Public Policy Analysis
http://www.lafollette.wisc.edu/Courses/PA819/PA819-syllabus-sp10.pdf

Public Affairs 864 Health Policy and Policy Design
PA 864 Health Policy and Policy Design

Health Policy and Management

Public Affairs 873 Introduction to Public Policy
http://www.lafollette.wisc.edu/degreeprograms/courses.html#873

Public Affairs 874 The Policy Making Process

Energy and Environmental Policy

Public Affairs 866 Global Environmental Governance
http://www.lafollette.wisc.edu/Courses/PA866/PA866-sp10.pdf
Public Health and Public Policy

Population Health Sciences Courses
375 Introduction to Public Health. 1 cr. Introduces concepts and methods of epidemiology, health services research, health policy and financing, disease prevention, and public health. Intended as an overview for undergraduates of all disciplines and who might consider graduate work in population health science. Prerequisite: Junior status or cons inst. syllabus

640 Foundations in Global Health Practice. 1 cr. Interdisciplinary course designed to prepare graduate students in the health sciences and related fields, as well as health professionals who are special students, for specific global health field experiences. Prerequisite: Graduate or health professional students; Junior or Senior status, or cons inst. syllabus

644 Interdisciplinary Perspectives on Global Health and Disease. These courses will address topics related to maternal and child health, nutrition, infectious disease, chronic illness, environmental health, and the human-animal link in health and disease. Each section will provide a historical and cultural overview and include consideration of cultural competence and cultural humility as well as engage students in learning about country-specific health data and descriptive information about the health system.

780 Public Health: Principles and Practice. 3 cr. An interdisciplinary graduate-level course addressing population-based approaches to community health improvement, and features problem-based learning. A focus on contemporary issues; opportunities to work with a public health mentor and lectures by local, state and national figures. Prerequisite: MPH student, graduate student, or cons inst. syllabus

781: Intro to Public Health Seminar. 1 cr. The purpose of this seminar is to introduce MPH students to various aspects in the field of public health. Students, Faculty, Staff, and Public Health specialists will contribute to the seminar through presentations, workshops, and discussion sessions. These seminars will serve to familiarize MPH students to the various opportunities the program provides and to facilitate frequent conversation and dialogue between faculty, staff, and students. In addition, various public health speakers will be invited to discuss their areas of expertise and to describe potential field placement sites. Prerequisite: MPH students. syllabus

785: Health Management Policy. (Cross-listed with Physical Therapy)3 cr. This course will cover topics including healthcare system structure, health policy, management and organization, and healthcare reform. syllabus
Outreach
Biology 375: Special Topics, Engage Children in Science – Lead After-School Science Clubs

Overview
UW Madison undergraduate and graduate students in the sciences have interest, enthusiasm and expertise in many diverse areas of science, from biology to engineering. Many of them have a sincere interest in sharing their enthusiasm and knowledge with younger students but do not have the tools to do so. Though they have adequate scientific background, they need to learn about the learning process, the needs and learning styles of children, techniques for engaging young people in the process of science, means of evaluating informal learning experiences and techniques for reflecting on their own learning from community service experiences. This course would provide them content information, hands-on experiences and opportunities for dialogue and reflective experiences directly connected to their experience in leading an After School Science Club.

Course Objectives
• Expand students’ knowledge and appreciation of science, particularly the impact of science on our daily lives
• Provide experiences for community engagement that directly apply learning from UW science courses and research labs
• Reinforce science content knowledge through use of that knowledge in teaching
• Provide an effective conduit for science researchers to share their work with the community
• Provide examples and experiences to illustrate the Wisconsin Idea to undergraduate and graduate students
• Provide a model and experiences with development of mutually beneficial community partnerships
• Expand cultural literacy through opportunities to work with underserved groups
• Explore mentoring as a part of the scientific process

Background
The Center for Biology Education (CBE) has worked in partnership with schools and community organizations for over 15 years to enhance K-12 science education in the Madison area. The last two years, in partnership with Dane County 4H, the City of Madison and the Boys and Girls Club we developed After School Science Clubs. Over 20 schools and community centers have offered 8 week science clubs to 3rd-5th graders, co-led by site staff and UW students. CBE staff and partners have developed activity plans and provided training for staff (from schools and community centers) and UW students.

We have learned:
• There is a great need in the community for science activities in after school settings
• UW students have a great interest in community engagement in these settings
• UW students can be effective in this role and are excellent role models for children at this age
• UW students could be more effective in their role and learn a great deal more from this experience in the context of a course designed to help them share their knowledge of science in an effective and meaningful way.
• UW students could benefit from sharing their scientific experience with the broader community and it could enhance their leadership skills, their conception of what scientists can do, and prepare them to address the broader impact of their interest and work in science

Student Learning Objectives
Students will:
• apply science content in informal science teaching
• understand basic cognitive developmental levels of young children as applied in informal science learning
• understand basic principles of learning and teaching in informal settings
• apply the above to development and implementation of hands-on science activities
• understand inquiry based science teaching and use it effectively with children
• use a variety of techniques for engaging children in the process of science
• distinguish between goals and appropriate methodology for use in informal settings vs. formal classroom settings
• use strategies appropriate for meeting learning needs of underserved groups
• evaluate student learning from science activities in informal settings
• assess the techniques they use with children and their effectiveness
• assess their own learning from their informal teaching experiences
• Learn and practice effective mentoring skills
• Develop a familiarity with and working knowledge of state science standards as they apply to K12 instruction

Format
This is a year long course offering 2 credits per semester. Each semester, students will lead an After School Science Club in the community. The first semester, they would work in teams using materials already developed. The second semester they could work in teams or individually and will develop some of their own activities based on their particular area of interest. Teaching faculty and staff would include UW faculty and staff as well as representatives of partner organizations and other community organizations.

WARF Ambassador Program
The Wisconsin Alumni Research Foundation (WARF) Ambassador Program enhances the vital connection between research on campus and technology transfer. Engaging students to serve as WARF ambassadors augments WARF’s visibility and presence among researchers on campus.

WARF is seeking up to 15 graduate students or post-docs to assist with the following key objectives:

- Aid in the development, planning, and execution of the annual WARF Discovery Challenge
- Increase understanding and awareness of WARF’s role across campus
- Help WARF become more proactive in anticipating and identifying innovative research and potential inventions
- Enhance WARF’s engagement in the scientific enterprise on campus

Qualified applicants will be students who:

- Are graduate students or post-docs in scientific or technical disciplines
- Have substantially completed their coursework, ideally having achieved dissertator status or equivalent
- Obtain approval from their supervisor or major professor to participate in the program
- Are able to commit between 5-10 hours/month to the program
- Are able to participate in the 10 hour student ambassador training (to be held during the week of October 14, 2013)

Particularly strong applicants are energetic, effective at networking with students, faculty and staff on campus and have an interest in the process of moving discoveries from early concept to the marketplace. Learn more about the current WARF Ambassadors.

WARF Ambassadors will receive a monthly stipend for each month of active service as well as semester-end bonuses in the form of travel allowances related to their graduate studies/post-doctoral work.

Apply online at the WARF Career Portal

Click on “view all open job positions” and once an online profile has been created, you will receive a survey application to complete.

Additional Outreach Opportunities

Many outreach opportunities are available through the UW Biotechnology Center and through the Center for Biology Education. These may involve participation in ongoing outreach activities or part-time internship. Contact Dr. Tom Zinnen, Biotechnology Policy & Outreach, The Biotechnology Center (265 2420).

Pre-Faculty Development for Scientific Teaching in Microbiology
The department of Bacteriology and the Howard Hughes Medical Institute (HHMI) Teaching Fellows Program of the Institute for Biology Education (IBE) offer a teaching experience in the Pre-Faculty Development for Scientific Teaching in Microbiology.

Call for Applications for the “Pre-Faculty Development for Scientific Teaching in Microbiology”

Contacts:
Regarding Micro 305 Instruction Materials and Teaching: Professor Jae-Hyuk Yu jyu1@wisc.edu, 608-262-4696
Regarding HHMI Teaching Fellows Program: Kristin Jenkins, PhD. kpjenkins@wisc.edu, 608-265-0850

Application Due Date: December 15, 2012
On-line Application link: https://uwmadison.qualtrics.com/SE/?SID=SV_b8fFa87UA0N46cl

Announcement
The Department of Bacteriology and the Howard Hughes Medical Institute (HHMI) Teaching Fellows Program of the Institute for Biology Education (IBE) are happy to announce a call for applications for the “Pre-Faculty Development for Scientific Teaching in Microbiology”. We are inviting applications from postdocs and senior (3rd year or later) graduate students in life sciences including, but not limited to, microbiology, molecular biology, biochemistry, genetics, and virology.

Through the HHMI Teaching Fellows Program, postdocs and senior graduate students will develop and acquire innovative and effective ways to teach microbiology and molecular biology.

Microbiology Teaching Fellows (MTFs) will work with Pre-Faculty Programs Coordinator Kristin Jenkins (kpjenkins@wisc.edu or 608-265-0850) and Professor Jae-Hyuk Yu (jyu1@wisc.edu, 608-262-4696) typically for two academic semesters.

In the first semester, MTFs will focus on learning “scientific teaching” through the IBE HHMI teaching fellows program. During this semester, under the guidance of Professor Yu, MTFs will develop curriculum and assessment materials for a 1 credit course, including activities, discussions, and mini-lectures to engage students in active learning in microbiology, and evaluation tools to determine whether students have achieved the specific outcomes. The teaching materials incorporate the essential elements of sound teaching practices, including multiple activities to engage students, ongoing and rigorous assessment, and attention to diversity. The four MTFs per semester will form a team that can work together as they develop instruction materials. Graduates students should register for the 1 credit IBE course (TBA).

In the second semester, MTFs will apply their curriculum while teaching one of four sections of Microbiology 305 “Critical analyses in Microbiology, 1 credit”. This valuable opportunity allows fellows to engage in and practice real classroom instruction. There are a maximum of 15 students per section, enabling highly active discussion in the class. Micro 305 students consistently report substantial gains in their understanding of the relevance of microbes to humans and real world, as well as increased confidence in reading and interpreting scientific literature and data. Graduate students should register for the 1 credit course Microbiology 875 “Scientific Teaching in Microbiology”.

Benefits for you!!
MTFs acquire useful skills and the practical teaching experience that they will need in their future faculty positions, and that will improve their competitiveness for such positions. The latter is exemplified by the fact that almost all former post-doctoral MTFs have obtained faculty (or teaching) positions (see below). These new faculty members have brought with them all the 305 instruction materials, and continue to teach these innovative classes in their new institutions. In addition, former 305 fellow graduate students have indicated gaining significantly enhanced teaching abilities that helped prepare them for their future careers.

Information about Microbiology 305
Course Goals:
The goals of Micro 305 are to foster an appreciation for the field of microbiology, gain a deeper understanding of the nature of science and the scientific method, and develop critical thinking and problem solving skills through an exploration of seminal papers and cutting-edge research in the field of microbiology. Because the publication of papers in scientific journals is the primary route by which scientists share their work with the scientific community, students need to learn to read scientific papers and think critically about the data being presented. The articles for this course have been selected to highlight the diversity of research areas and approaches within the field of microbiology.

Specific Outcomes:
By the end of the semester, students will be able to critically read a scientific paper and communicate their ideas to others. Student will be able to identify the hypotheses being tested, determine whether the data supports the initial hypothesis, and propose future experiments or directions for a particular study.
Microbiology 305 students are expected to:
1. Understand how microbes affect humans and the environment
2. Understand important techniques used to study microbiology/molecular biology
3. Dissect the hypothesis of primary research papers, critically analyze the data, and evaluate the conclusions.
Several innovative educational and training methods are employed: lectures, discussions, assigned readings (reviews and research articles), and problem solving. Micro 305 students consistently report substantial gains in their understanding of the relevance of microbes to humans and real world, as well as increased confidence in reading and interpreting scientific literature and data.

Delta Program

Delta Program Mission and Ideas
The Delta Program is founded on 3 interrelated core ideas. The Teaching-as-Research approach is explored via learning community opportunities that are based on learning-through-diversity.

Teaching-as-Research
By applying research methods - idea, experiment, observation, analysis, improvement - to the challenge of teaching, Delta:
• brings the skills of research faculty to the ongoing investigation of student learning
• promotes innovation in teaching and measurement of student learning
• advances the role of instructors in the ongoing improvement of teaching practices

Learning Community
Through collaborative activities and programs Delta will create a community of graduate students, post-docs, and faculty that will:
• support and validate growth in teaching and learning
• create a foundation for institutional change

Learning-through-Diversity
Recognizing the common challenges in teaching and learning and the strength in bringing together diverse views, Delta is:
• Interdisciplinary - serving all science, engineering, and mathematics departments
• Cross-generational - bringing together graduate students, post-docs, and both new and experienced faculty
• Comprehensive - providing knowledge, practice, and community
• Responsive - reflecting the broad range of responsibilities that face today's faculty
• Inclusive - welcoming for a multifaceted and diverse group of people

How are these core ideas relevant to my teaching?
Activities hosted by the Delta Program addresses the questions that graduate students, post-docs, and faculty ask as they strive to become excellent professors.
• I hope to teach for many years. Will I make a difference? Will my thousands of students/participants learn what I think is important?
• Will I be a strong candidate for faculty jobs and NSF CAREER awards?
• Why are there so few women and people of color in my classes/opportunities? Am I serving all of my students/participants well?
• My funding agency is requiring broader impact of my research program. How can I respond successfully to these new demands?
• Will my investments in technology increase student/participant learning?
• I support the idea of outreach, but how can I do it well?
• How can I balance my desire to be a better teacher with so many other demands on my time?
Summer Courses and Workshops
(These lists are meant to serve as examples. Many other workshops would also be appropriate.)

From Woods Hole Marine Biological Laboratory
( http://www.mbl.edu/education/courses/summer/ )
Biology of Parasitism: Modern Approaches
Directors: Daniel Goldberg and Boris Striepen
A unique course for advanced graduate students, postdocs, and independent investigators, who are seeking thorough training in modern approaches to the study of protozoan and helminthic parasites.

Microbial Diversity
Directors: Daniel Buckley, and Stephen Zinder
An intensive 6.5 week course for graduate or postdoctoral students, as well as established investigators, who want to become competent in microbiological techniques for working with a broad range of microbes, and in approaches for recognizing the metabolic, phylogenetic, and genomic diversity of cultivated and as yet uncultivated bacteria.

Physiology: Modern Cell Biology Using Microscopic, Biochemical and Computational Approaches
Directors: Dyche Mullins, and Clare Waterman
An intensive laboratory course that provides a unique interdisciplinary training environment at the interface between cellular and computational biology. Students with backgrounds in both the biological and physical/computational sciences are encouraged to apply.

Special Topics Courses
These intensive educational programs, one to four weeks long, provide experience in specialized research techniques. Lecture and laboratory courses in topics of current interest are also available.

Cold Spring Harbor Courses (http://meetings.cshl.edu/courses.html)

Protein Purification & Characterization
This course is for scientists who are not familiar with techniques of protein isolation and characterization. It is a rigorous program that includes laboratory work all day and a lecture with discussion session every evening. Each student will become familiar with each of the major techniques in protein purification by actually performing four separate isolations.

Advanced Bacterial Genetics
The Advanced Bacterial Genetics course presents logic and methods used in the genetic dissection of complex biological processes in diverse bacteria. Key components of the course will be the use of sophisticated genetic methods in the analysis of model bacteria (including E. coli, Salmonella, Bacillus subtilis, and Myxococcus xanthus), and the use of the wealth of new genomic sequence information to motivate these methods.

Proteomics
This intensive laboratory and lecture course will focus on cutting-edge proteomic approaches and technologies. Students will gain practical experience purifying and identifying protein complexes and posttranslational modifications. In a section focused on quantitative whole proteome analyses or top-down proteomics, students will gain hands-on experience using two-dimensional gel electrophoresis and mass spectrometry analysis. Students will use differential in-gel electrophoresis (DIGE) for gel-based protein quantification.

Computational Cell Biology
Computational cell biology is the field of study that applies the mathematics of dynamical systems together with computer simulation techniques to the study of cellular processes. The field encompasses several topics that have been studied long enough to be well established in their own right such as calcium signaling, molecular motors and cell motility, the cell cycle, and gene expression during development.
**Eukaryotic Gene Expression**
The Eukaryotic Gene Expression Course is designed for students, postdocs, and principal investigators who have recently ventured into the exciting area of gene regulation. The course will focus on state-of-the-art strategies and techniques employed in the field. Emphasis will be placed both on in vitro and in vivo protein-DNA interactions and on novel methodologies to study gene regulation.

**Yeast Genetics & Genomics**
The Yeast Genetics & Genomics course is a modern, state of the art laboratory course designed to teach the students the full repertoire of genetic approaches needed to dissect complex problems in the yeast Saccharomyces cerevisiae. Combinations of classical genetic approaches are emphasized, including the isolation and characterization of mutants, tetrad analysis, complementation, and mitotic recombination. Molecular genetic techniques, including various types of yeast transformation, gene replacement with plasmids and PCR, construction and analysis of gene fusions, and generation of mutations in cloned genes, will also be emphasized.

**Statistical Analysis of Genomic Data**
High-throughput genomics assays have become pervasive in modern biological research. To properly interpret these data, experimental and computational biologists need to have a firm grasp of statistical methodology. This course is designed to build competence in quantitative methods for the analysis of high-throughput molecular biology data.

**X-Ray Methods in Structural Biology**
Crystallography and X-ray diffraction yield a wealth of structural information unobtainable through other methods. This intensified laboratory/computational course focuses on the major techniques used to determine the three-dimensional structures of macromolecules. It is designed for scientists with a working knowledge of protein structure and function, but who are new to macromolecular crystallography.

**Programming for Biology**
A computer is already an indispensable tool for database searches, but the use of web-based tools alone is not enough for today’s biologist who needs to access and work with data from myriad sources in disparate formats. This need will become ever more important as new technologies increase the already exponential rate at which biological data is generated. Designed for students and researchers with little or no prior programming experience, the two-week Programming for Biology course will give biologists the bioinformatics skills necessary to exploit this abundance of biological data.

**Immunocytochemistry, In Situ Hybridization & Live Cell Imaging**
This course focused on specialized techniques in microscopy, in-situ hybridization, immunocytochemistry, and live cell imaging related to localizing DNA, RNA, and proteins in fixed cells as well as protein and RNA dynamics in living cells. The course emphasized the use of the latest equipment and techniques in fluorescence microscopy, including: confocal laser scanning microscopy; deconvolution methods; several super-resolution methods including structured illumination, STORM, and PALM; digital image processing, and timelapse imaging of living specimens.

**Advanced Sequencing Technologies & Applications**
This intensive 2 week course will explore applications of next generation sequencing technologies, with a focus on commercially available methods. Students will be instructed in the detailed operation of several revolutionary sequencing platforms, including sample preparation procedures, general data handling through pipelines, and in-depth data analysis. A diverse range of biological questions will be explored including DNA re-sequencing of human genomic regions, de novo DNA sequencing of bacterial genomes, and the use of these technologies in studying small RNAs, among others.

**Computational & Comparative Genomics**
This course presents a comprehensive overview of the theory and practice of computational methods for the identification and characterization of functional elements from DNA sequence data.
ASM Institutes (http://www.asmgap.org/index.html)

ASM Kadner Institute
The goal of the Institute is to provide intensive and closely guided experience in five key topics important for choosing and succeeding in a microbiology career. These topics include:

- Opportunities and preparation for diverse careers in microbiology
- Preparations, review and critique of research proposals
- Scientific presentations and communication
- Effective teaching methods
- Development of professional standards in microbiology

Participants will have a unique opportunity to enhance their skills in various areas of grantwriting and scientific communication, to learn about the rewards and preparation for various careers in microbiology, to help their professional development as microbiologists, and to participate in a demanding and intensive, yet enjoyable and constructive experience with both peers and senior microbiologists from around the country.

ASM Scientific Writing and Publishing Institute
Institute Overview
The ASM seeks applications from senior-level graduate students and early-career postdoctoral scientists for the ASM Scientific Writing and Publishing Institute.

Format
The Institute will provide four days of hands-on intensive training in scientific writing and publishing under mentorship of ASM Journal editors and reviewers. Groups of four to six participants will be paired with one experienced mentor from their field to provide individual critique and resources. The Institute is limited to 24 participants.