



# Biochemistry & Molecular Biology

Vol. 19.1 Fall 2009

## UNDERGRADUATE NEWSLETTER



### Dr. Scott Selleck is New BMB Department Head

BMB has a new Department Head! We welcome Dr. Scott B. Selleck to Penn State and to the Eberly College of Science. Dr. Selleck comes to Penn State from the University of Minnesota where he held the Martin Lenz Harrison Land Grant Chair in Pediatrics. He also served as Director for two programs: The Developmental Biology Center and The University of Minnesota Autism Initiative. Dr. Selleck earned his BA degree from the University of Washington, Seattle, and his MD and PhD (in Molecular Biology) degrees from Washington University School of Medicine. Prior to assuming his position at Minnesota, Dr. Selleck was a member of the faculty in the Department of Molecular and Cellular Biology at the University of Arizona. We hope Dr. Selleck will quickly feel at home in the BMB Department.



### Interview with Teh-hui Kao

Continuing the series of interviews with faculty in the BMB Department (previous interviews can be found at <http://www.bmb.psu.edu/undergrad/newsletter/index.html>), the **BMB Undergraduate Newsletter** is pleased to feature Dr. Teh-hui Kao in this issue. Dr. Kao's research interests are in the biochemical and molecular bases of self/non-self recognition during plant reproduction. (A detailed description of Dr. Kao's research can be found at <http://bmb.psu.edu/faculty/kao/kao.html>)

#### UN: What is the immediate goal of the research being conducted in your laboratory?

My lab is using *Petunia inflata* (a wild relative of garden petunia) as a model to study self-incompatibility, a self/non-self recognition system in flowering plants. Most flowering plants produce bi-sexual flowers with the male (anther) and female (pistil) reproductive organs located in close proximity, and would be prone to self-fertilization. Self-incompatibility allows the pistil to distinguish between self (genetically related) and non-self (genetically unrelated) pollen; self-pollen is rejected to prevent deleterious inbreeding, whereas non-self pollen is accepted to promote outcrosses. My lab has identified two highly polymorphic genes, one controlling the male and the other controlling the female specificity in the self/non-self recognition. Our immediate goal is to understand how the allelic variants of the female gene product (a ribonuclease) and male gene product (an F-box protein involved in ubiquitin-mediated protein degradation) interact inside the pollen tube to specifically inhibit the growth of self pollen tubes in the pistil.

#### UN: What are the possible larger implications/ applications for the findings of your research?

Self-incompatibility provides a model for studying molecular and biochemical bases of self/non-self recognition and for studying how the genes involved in self/non-self recognition co-evolve. Since the self-incompatibility system we are studying involves an F-box protein, our research will also contribute to the understanding of ubiquitin-mediated protein degradation, an important regulatory mechanism controlling growth and development in eukaryotes. From a practical point of view, self-incompatibility could be used to facilitate hybrid-seed production. Since most crop species are self-compatible, production of hybrid seed is labor intensive, costly and inefficient. Understanding the mechanism of self-incompatibility will help design strategies for restoring this trait back to crop species. See **INTERVIEW**, Page 2 ~

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*INTERVIEW, continued from page 1*

**UN: Why did you choose to pursue a career in academic research and why in your particular field?**

I had the good fortune of working with wonderful professors during my undergraduate, graduate, and postdoctoral research, and I was inspired and encouraged by them to pursue an academic research career.

Moreover, I felt that the reward from teaching and mentoring undergraduate and graduate students is more long lasting and more meaningful than the reward from working in other sectors. I have settled in my current field of research after a rather circuitous route. I started out as a chemistry major in college, but did my senior research in biochemistry. I then switched to research in biophysics (ever heard of temperature-jump relaxation kinetics?) during my doctoral research. For my postdoctoral training, I made another switch to molecular biology at the time that the technology of recombinant DNA was still in its infancy but its potential was clearly recognized. It was during my postdoctoral research that I started to work on the self-incompatibility system through a collaborative project. Looking back, I feel that having broad training has been a plus in my independent research career.

**UN: What do you look for in selecting an undergraduate student to do research in your lab?**

I look for students who have a strong interest in research and are willing to put in time and effort to work in the lab. For me, having top grades is not important. In fact, I take more pride in helping students with average grades improve their academic performance through their research experience. I believe that what the students learn in research can reinforce what they have learned in the classroom and help them better understand the significance of the information.

The Undergraduate Newsletter thanks Dr. Kao for his interview.

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## Heads-Up on Scheduling for SP10

For students entering their junior or senior year, please note that the BMB Department will **not** be offering BMB 437, *Physiological Biochemistry*, in Spring semester 2010. We expect that this will be a one-time gap in offering this course and that it will be back on the Schedule of Classes for Spring 2011.

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## We're Moving Back!

It seems much longer than 20 months since the renovations in North Frear began with a between-semester move of all equipment, operations, and personnel into temporary quarters in Davey Lab

and, in the case of Biotc labs, the Forest Resources Lab off University Drive. Although timing of the move before the start of classes is very tight, and though some modifications may need to be made to early experiments, BMB is moving back to North Frear for Fall semester classes.

Students will first note the expanded and brighter lobby area between North and South Frear and, perhaps, the outside entrance to the second floor that has been re-opened on the north side of North Frear. Another exterior modification is the new plaza facing Mueller Lab that has benches and tables surrounded by the newly landscaped courtyard. Also in the courtyard between North & South Frear is a new, one-story structure that holds the BMB instrumentation lab and some office space for instructors. Inside the newly renovated North Frear, students will be treated to labs that are brand new, highly flexible, well-lighted and furnished with entirely new lab furniture. When you have some time, take a walk down the first floor corridor and catch a glimpse of these new facilities. Students taking Biotc lab courses will have to wait one more semester before they will benefit from the new facilities. Biotc labs are scheduled to be moved later this year between Fall and Spring semesters. **Enjoy!**

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## Kudos to Dr. Kao

The BMB Department is honored to have Dr. Teh-hui Kao selected as the recipient of the University's **Excellence in Honors Teaching Award**. Dr. Kao has taught BMB 402H, General

Biochemistry II, for more than 20 years. In 1998, Dr. Kao was also recognized for his outstanding teaching skills with the Eberly College of Science's *Paul M. Althouse Outstanding Teaching Award*. Dr. Kao received his BS in Chemistry from National Taiwan University, and his Ph.D. in Chemistry/Physical Biochemistry from Yale University. After receiving his Ph.D., Dr. Kao conducted research at the Roche Institute for Molecular Biology and at Cornell University before coming to Penn State. See the *Undergraduate Newsletter's* interview (above) with Dr. Kao for a description of his research. **Congratulations, Dr. Kao!!**

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## BMB Adds a New Instructor

The BMB Department is pleased to announce that Ms. Anjali Datta has joined the faculty as a Level I Instructor. Ms. Datta actually assumed her duties in the Department last January. She has already taught BMB 001, *Understanding the Bases of Human Disease*, and Bi Sc 001, *Structure & Function of Organisms*, in SP09, and BMB 211, *Elementary Biochemistry*, in the second summer session. She will be teaching BMB 001, 211 and PSU 016, *First Year Seminar*, this Fall Semester. Ms. Datta is also assuming advising duties for some First Year students.

Ms. Datta received her BS in Microbiology from Texas A&M University and her MS in Biomedical Sciences from the University of North Texas Health Science Center in Fort Worth. The BMB Department is delighted to have the very energetic Ms. Datta as a member of the faculty.

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## Dr. Grove Leaves the BMB Department

Dr. Greg Grove, long-time Instructor and Senior Lecturer II in BMB, stepped down from his position on June 30. Dr. Grove is well-known by the vast majority of BMB, Micrb, and Biotc students, almost all of whom have had him as their instructor for one or more of the BMB laboratory courses he has taught over almost two decades. Dr. Grove is an alumnus of Penn State (Biology, 1975) and received his Ph.D. in Biochemistry from Ohio State University. He was a postdoctoral associate first at the Fox Chase Cancer Institute in Philadelphia and then here in the Department before assuming his recent position. In addition to BMB lab courses, Dr. Grove has taught BMB 211, *Elementary Biochemistry*, for about 10 years, and at one time or another he has taught Micrb and BiSc lecture courses as well. His dedication to advising undergraduate BMB majors and his skill in teaching, earned him the Paul M. Althouse Outstanding Instructor Teaching Award in 2002. Undergraduates within as well as outside the Department's majors have long appreciated him. In case you see Dr. Grove walking across campus, your eyes will not be deceiving you because he has accepted a position in the Nucleic Acid Facility in the Huck Institutes of the Life Sciences. Best Wishes, Dr. Grove, and thanks for all your service to the BMB Department!!

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## A Reminder about the Required Course in Genetics

Because the Biology Department now offers two basic courses in genetics, and because the BMB, Biotc, & Micrb majors now require the newer course, there has been some confusion among undergraduates as to which course they should take. The two courses in question are Biol 222, *Genetics*, and Biol 322, *Genetic Analysis*. Biol 222 had been the long-standing requirement, but as of 2005, the new course, **Biol 322**, is required. ALL first- and second-year students, in particular, should be aware of this requirement. Biol 222 is NOT considered an equivalent substitute for Biol 322. It should also be noted that Biol 322 is a **Spring semester-only** course offering, so students should take this fact into account when planning their academic schedules.

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## BMB 497A to be Offered Again in SP10

The BMB Department is pleased to offer the Special Topics course, **BMB 497A, Practical Applications of Enzymology**, again in SP10. This is a 1-credit course described as follows: The course focuses on how to understand enzymes and enzyme activity to deal with their use in real-world situations. It includes the design of enzyme assays, use of coupled reactions for activity measurements, why enzymes and their kinetics appear so different from regular reaction kinetics, and how to determine kinetic constants for enzymes as well as the value of knowing them. The course will have a computer exercise that allows each student to design and perform rather sophisticated kinetic experiments using varied substrate concentrations and inhibitor concentrations to reveal interesting properties of an enzyme, including some mechanistic detail. The class will also have a writing exercise to help each person improve their writing skills for clear scientific communication. The course will be offered on Monday at 10:10-11:00 and has the prerequisite of BMB 401 or BMB 211 or equivalent biochemistry experience.

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### Dates to Remember

File Intent to Graduate	Aug 17 – Sept 7
Club Involvement Fair 11 am – 4 pm HUB	Aug 25
University Recreation Kick Off 7 pm – 11 pm <i>White Building</i>	Aug 26
Drop/Add Period	Aug 24 – Sept 2
Late Drop Begins	Sept 3
Labor Day Holiday <i>No Classes</i>	Sept 7
Fall Career Days Bryce Jordan Center	Sept 15 - 17
Jr. Standing CLS Option Mtg. 7:00 pm 101 South Frear	Sept 16
BMB Department Honor Students Rough Draft Due Department Office 108 Althouse by 4:00 pm	Nov 9
 Thanksgiving Holiday <i>No Classes</i>	Nov 23 – 29
BMB Department Honor Students FINAL Thesis Due Department Office 108 Althouse by 4:00 pm	Nov 30
BMB Department Honor Students FINAL Thesis Due Honors College C-4 Atherton Hall by 4:00 pm	Dec. 7
Last Day Classes	Dec 11
Final Exam Week	Dec 14 – 18
 Schreyer Honors College Medal Ceremony 5:00 pm Penn Stater Conference Cen.	Dec 18
 ECOS Commencement 12:30 pm Bryce Jordan Center	Dec 19

## ATTENTION Junior CLS Students!

A **mandatory** meeting for all students having 5<sup>th</sup> semester standing or higher in the CLS Option of the Biotechnology major will be held at 7 p.m. on Wednesday, September 16, in Room 101 S. Frear. Information regarding the profession of the clinical laboratory scientist, the Penn State program, the application process, the practicum, affiliated hospital schools, and career opportunities will be presented. Get all your questions answered at this meeting. If you are interested in applying for the clinical practicum but cannot attend the meeting, contact Dr. Mohr as soon as possible but not later than September 16.



## Students Take Advantage of Co-ops and Study Abroad

Each semester, students in the BMB, Biotc and Micro majors take advantage of opportunities beyond the classroom/lab that can be part of the undergraduate experience. This past Spring semester, 5 students participated in Study Abroad. These students studied in the U.K. (Leeds, Bath), Ireland (Dublin), Italy (Rome) and Spain (Salamanca). In addition, another 10 students undertook a co-operative education experience with McNeil Consumer Healthcare (4), Bristol-Myers Squibb Company (1), Walter Reed Army Institute of Research (3), Morphotek, Inc. (1) and the City of Reading (1). These are fantastic opportunities to expand your undergraduate education. If you are interested in either of these programs, visit the Career and International Education program office in 108 Whitmore or go online to <http://cie.science.psu.edu/> Information on externships and internships is also available at this site.



**This publication is available in alternative media on request.**

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