A Note from the Chair…

IS GRADUATE SCHOOL FOR YOU?

Some of you reading this may be coming toward the latter stages of your undergraduate education; others may be thinking further ahead toward that time. What comes after graduation? Medical school? A job? One of the options that you may well consider is graduate school. Professional advancement in many, perhaps most, careers in science these days requires training beyond the undergraduate degree. For some professions that training is offered in one of the schools that offer professional degrees: medical, dental, veterinary, pharmacy, public health, etc. For many other careers, though, ranging from college teacher to environmental scientist and from laboratory researcher to park naturalist, advanced training comes from graduate programs leading to the Master’s (M.S.) or doctoral (Ph.D.) degree.

What do these degree programs entail?

In the U.S., most universities (including Wright State) offer undergraduates a “liberal education,” in which some depth of training in a particular field (your major) is combined with a breadth of exposure to other fields (the distribution, or General Education, requirements). The idea is to produce the broadly educated citizens necessary for an informed and vibrant democracy. What might be viewed as the down side of this curricular design is that the depth of training in your major is somewhat limited (even if it seems like those Bio courses go on forever!) Graduate degrees—Master’s or Ph.D.—provide the opportunity for enhancing that depth.

Master’s degree programs typically are designed for completion in about two years. An M.S. program usually includes some amount of coursework, and it is even possible that an M.S. degree can be based largely on coursework (we have such an option at Wright State). However, for many students the greatest benefit from a Master’s program will derive from completion of an independent research project. The scope of a Master’s project is often something like what would be described in a single scientific journal article. In the process of completing this work, the Master’s student learns a variety of skills, including experimental techniques, how to analyze and present data, how to relate those results to previously published research, and how to write scientifically. The end result is a document—the thesis—describing the project. If you are interested to see what an MS thesis looks like, come by the Bio Sci office some time, you can see many examples of theses completed over the years in Biology at Wright State.

continued on page 2…..

Wheatley Receives Grant to Support Initiatives for Bio Students

Dr. Michele Wheatly, Dean of the College of Science and Math, spearheaded a grant proposal that has been awarded $2 million from the National Science Foundation’s STEM Talent Enhancement Program (STEP). The grant will support initiatives focused on improving success and retention of entering students in STEM (Science, Technology, Engineering, and Math) disciplines, including Biology. Activities related to this grant will be moving forward in the upcoming year.
Bio Sci Building III to be Completed in the New Year

The new Biological Sciences building is under way! Started in 2006, this projected $15 million building is expected to be completed in the fall of 2007. The Biological Sciences III building will house research labs for some faculty in the Biology and Biochemistry Departments. To view more pictures on the progress of the new building, visit Wright State's website at:
http://www.wright.edu/admin/facilities/

Chair’s Note, continued…..

A Ph.D. program, not surprisingly, is more substantial than a Master’s program, and is typically designed for completion in about 5 years—clearly a big commitment. Usually included are some number of advanced courses and one or more exams or projects that mark advancement toward the degree. The major element of any Ph.D. program is a substantial research project culminating in a written report, the dissertation. The objective of a Ph.D. program is to produce graduates who can work as independent scientists. Thus, a Ph.D. student is expected to learn many of the tools of science: to formulate problems, to master techniques, to apply for funds in support of research. Although it may be helpful to complete a Master’s degree before entering a Ph.D. program, thereby gaining various skills and confirming one’s interest in committing to a longer graduate program, it is not necessary to do so. For Wright State’s two Ph.D. programs in Biology (The Biomedical Sciences and the Environmental Sciences programs), something like half of entering students have already completed a Master’s degree, and half have not.

Costs and benefits

The costs and benefits of choosing to attend graduate school can be balanced in terms of two main currencies. The first is actual dollars. Of course, to continue your schooling means to postpone entry into the work force. However, graduate school may well not cost you money. Many graduate programs provide mechanisms to cover the costs of tuition and living, whether through fellowships, teaching assistantships, or support from faculty research grants. The bottom line is that most PhD students and many Master’s students, at least in the sciences, have their tuition paid for and receive an income as well—though probably significantly lower than what the workplace might offer. The return on these years of reduced income is that your salary upon graduation should be significantly enhanced over what you would earn with only a B.S. degree, and in the long run the economic investment is more than paid back.

The second currency is opportunity. In other words, many jobs in the sciences are simply not available except to those with graduate degrees. There is no question that jobs exist for graduates with bachelor’s degrees in biology and other sciences. However, the range of those jobs, as well as the salaries and possibilities for advancement, are greatly enhanced by a graduate degree. For example, a biotech company might hire BS graduates to work as laboratory workers, carrying out the routine components of labwork like preparing solutions and running analytical machines. MS graduates in the same company might be responsible for more complex procedures and more demanding technical skills. Ph.D.s would actually design the experiments and determine from on-going results what directions the work should take. Thus, with the advanced degree comes more responsibility, more pay, and also more of what most scientists would consider the fun part of science—that is, creative control.

In a forthcoming column I will describe some of the things you can do to prepare for and choose a graduate program. In the mean time, the teaching assistants in your laboratory courses are either Master’s or Ph.D. students in one of Wright State’s graduate programs. Talk to them about their decision and their program.

david.goldstein@wright.edu
Nobel Peace Prize Winner (and Biologist) visits WSU, 1/30

Dr. Wangari Maathai, winner of the 2004 Nobel Peace Prize and in 2005 named by *Time* magazine as one of the 100 most influential people in the world, has been invited by the University Honors Program to give a presentation on “Poverty and Society”. Dr. Maathai developed a broad-based, grassroots organization in Kenya known as the Green Belt Movement. The organization’s main focus is helping women’s groups plant trees to conserve the environment and improve quality of life. To date, she has worked with local communities to establish over 6,000 tree nurseries and plant more than 30 million trees.

Dr. Maathai was born in Nyeri, Kenya. She obtained her BS, MS, and PhD in Biological Sciences. She rose to be chair of the Dept. of Veterinary Anatomy at University of Nairobi and is now Kenya’s Assistant Minister for the Environment. Her presentation is scheduled for 7:00 pm, Jan. 30th, in the Student Union. For more information on Dr. Maathai and the Honors Institute, visit: [http://www.wright.edu/honorsinstitute/2007/](http://www.wright.edu/honorsinstitute/2007/).

Biology Professor Seeks Ways to Control Insect Pest

Don Cipollini, associate professor in Bio Sci, is investigating ways to control the Emerald Ash Borer (EAB) that is destroying forests in the Midwest, costing Ohioans billions over the next decade. If ignored, the bark-feeding pest could potentially decimate ash trees throughout eastern North America. He presented his research during a public program at WSU on Nov. 30th.

Dr. Cipollini studies the insect as part of his research on plant stress interactions and invasive species. He studies EAB in collaboration with two Ohio State faculty members with whom he acquired research funding from the Ohio Plant Biotechnology Consortium and the U.S. Department of Agriculture’s Animal and Plant Health Inspection Service. They are investigating why the EAB is such an aggressive killer of North American ash trees. In the end, they hope to develop a way to enhance resistance of ash trees to EAB through either cultural practices or breeding for resistance.

Wright State officials are particularly concerned because there are thousands of ash trees growing naturally on the campus and probably a hundred or more planted around buildings and along walkways. EAB came to this country from Asia in the early 1990s and was first detected in the Detroit area in 2002. Research shows that the Manchurian ash in China is more resistant to the insect than North American ash.

Dr. Cipollini explains that unlike North American ash species, only stressed and weakened Manchurian ash trees succumb to EAB attacks. Dr. Cipollini is trying to determine if this is due to any specific physical and/or biochemical defenses developed over its evolutionary history with EAB. Resistance traits identified in Manchurian ash could ultimately lead to breeding North American trees resistant to the EAB.

For more information on Dr. Cipollini’s research, visit [www.wright.edu/biology](http://www.wright.edu/biology).

Kenyon Receives Grant

Dr. Lisa Kenyon received word that the NSF grant of which she is a part will be funded from NSF’s Instructional Materials Development (IMD) - Applied Research program. The award, entitled "A Learning Progression for Scientific Modeling," is in collaboration with colleagues at Northwestern, U. Michigan, Michigan State, U. Illinois, and AAAS, and seeks to develop, implement, and test the effectiveness of a curriculum to teach scientific modeling at the upper elementary and middle school levels. Dr. Kenyon’s component of the grant will focus on implementation of the modeling practices unit in elementary grades (4th-5th), preservice teacher learning about modeling (Biology 345, Science Ed methods) and investigating how effective is the curriculum at fostering an understanding of the nature of scientific inquiry. If you are interested in knowing more: see Dr. Kenyon in 219 BH.

Congratulations to the following Biology faculty and staff for their 2006 Employee Recognition Awards:

- Wayne Carmichael 30 years
- Diann Vyszenski-Moher 25 years
- Beverly Schieltz 20 years
- David Goldstein 20 years
Gretchen Rocks!

Gretchen Baumle is a recent addition to the Biology Department office staff. Gretchen was hired in July 2006 as the Administrative Specialist for the Biology office. She earned her bachelor's degree from WSU in the spring of 2005 and is currently a graduate student majoring in education. Her husband is a firefighter for the city of Huber Heights. They are both avid Michigan fans (Go Blue!) (Editors note: she’ll be a Buckeye fan soon!). She loves animals and supports the Humane Society. Welcome to Biology, Gretch!

In the Media...

Dr. Tom Rooney recently signed a contract with The University of Chicago Press for his forthcoming book, The Vanishing Present: Wisconsin's changing lands, waters, and wildlife. The book is co-edited by Don Waller. Rooney's book is scheduled to be released in December 2007!

New Ecologist Joins Faculty

The Department of Biological Sciences’ newest faculty member, Dr. Michael Blum, has recently arrived on campus. He is coming to Wright State from just down the road, having just finished a postdoctoral fellowship at the US Environmental Protection Agency in Cincinnati. Mike has been a resident of the area for almost four years, and has spent much of this time living on an historic farm in Northern Kentucky. When he isn't renovating buildings and keeping his cattle dog from running after feral goats, Mike spends much of his time working on his two main areas of research- the ecological genetics of stream fishes and salt marsh plants. On the local scene, Mike has been working with colleagues at the EPA on a decade-long study of stream fish populations within tributaries of Mill Creek, a watershed encompassed by the city of Cincinnati that is considered one of the most endangered river basins in the country. His other work takes him farther afield- to Georgia to work on the spread of non-native stream fishes, to the Chesapeake Bay to examine whether salt marsh plants can adapt to global warming, and to the Lesser Antilles where he is working with colleagues on the biogeography of predatory killifish. If you are interested in learning more about this research, or just simply want to help out around the farm, stop by Mike's office for a chat!

Pre-Vet Club Info

The first meeting will be held on Wednesday, Jan. 10th from 6:00-7:00 pm in room 204 BH. Students interested in participating in the pre-vet club must fill out an application and pay membership dues ($10/qtr). We will be handing out applications and going over the agenda for winter quarter. See you then!

Biology Club Info

First meeting for Winter quarter is Tuesday, Jan. 16th in room 204 BH from 4:30-5:30 pm. Our guest speakers will be giving presentations on the application process for the M.S. graduate program, facts and statistics, research examples, etc. If you are thinking of going for your masters degree, don’t miss this meeting!

Krane as Expert Witness for Ireland Bombing Trial

Dr. Dan Krane and PhD student Jason Gilder spent almost two weeks in Northern Ireland for an IRA bombing trial that began in 1998, known as the Omagh Bombing. They testified as expert witnesses about a DNA profiling technique that was used. The case, R. vs. Sean Hoey, has received a great deal of media attention in Europe. You can find more information by searching for the defendant's name on the web.
Undergrad Receives NSF REU Stipend...and you could, too!

Jim McCormick (senior in biology) received a summer REU (Research Experience for Undergraduates) stipend to work in the Vadeboncoeur lab in the summer and fall of 2006. The National Science Foundation REU funds independent research projects by undergraduate students. Jim’s experiment took him up to the north woods of Wisconsin for ten weeks during the summer, and he spent much of that time SCUBA diving in various lakes at the North Temperate Lakes Long Term Ecological Research Site. Jim worked with Environmental Sciences Ph.D. student Shawn Devlin and two other WSU undergraduates Maria Leiter and Mary Eaton to collect ecological data on several lakes, but Jim also had his own independent research project.

Many lakes in northern Wisconsin do not have streams that either feed or drain them. Rather, groundwater flows into the lake through the lake sediments. Jim swam along the bottom of Sparkling Lake until he felt cold springs of ground water upwelling through the bottom of the lake. He also found areas where the lake water drained back into the ground water, again traveling through the sediments. Ground water brings important nutrients such as nitrogen and phosphorus into the lake, and these nutrients are taken up by photosynthetic algae. To determine how these nutrients affected algal growth on the sediments and if those algae used all the nutrients before they could get to algae floating in the water, Jim conducted what is called a ‘reciprocal transplant experiment’. He exchanged sediments between sites and three weeks later measured algal growth on the sediments. Jim found that groundwater nutrients did increase algal growth, but that the type of sediment on which the algae were growing also had a strong effect. These areas of ground water input may be ‘hot spots’ of algal productivity and this may be important for the organisms all the way up the lake’s food web. Jim will present a poster on his work entitled Effects of Groundwater Flow and Substrate on Periphyton Productivity and Biomass in an Oligotrophic Seepage Lake at the American Society for Limnology and Oceanography meeting in Santa Fe, New Mexico in February 2007. He also received a travel award from the society to defray the costs of attending the meeting.

Independent projects like this in which students design, conduct, and present their own research are a critical component of getting into the graduate school of your choice. Plus, spending the summer SCUBA diving is just a lot of fun! Jim was paid to do this research, but students can also set up independent research projects for credit (BIO 199 and 499) with many faculty in the Biology department.

Mark Your Calendars!

Winter 2007 Schedule:

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Congratulations
Fall 2006 Graduates

UNDERGRADUATE
- Saima Khan
- Timothy Freeman
- Jason Ison
- Eli Schlater

GRADUATE
- Damali A. Gaskin
- Vickie Streng
- Christopher Salyer
- Kruthi Murthy

Applications for June graduation are due March 1st. Make sure to see the advisor for approval.

Need Advising?

If you need to schedule an appointment with an advisor, please call 775-4226 or email bioadvising@wright.edu. Make sure to include the name of the advisor you wish to meet with, along with your availability.

Undergraduate Degrees:
- Jacqui Neal

Graduate Degree:
- Laura Buerschen

Clinical Lab Sciences:
- Bev Schieltz

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