



Preparing People to Lead Extraordinary Lives

LOYOLA
UNIVERSITY
CHICAGO

DEPARTMENT
OF BIOLOGY

NEWSLETTER

**No. 6: January/February
2006**

**Attack of the Not-So-Killer
Leeches!**
Biology Gets Slimy



IN THIS ISSUE

A Note from the Chair

Evolution vs. Intelligent Design:
Community Dialogue

Upcoming Events Off Lakeshore
Campus

View from the 5th Floor

Biology Gets Slimy

Boussy Grant Project

Junior Science and Humanities
Symposium

Talk

Of Interest: Mad Science

Profiles: Bill Wasserman

A Note from the Chair

Dear Friends,

The new semester once again brought a host of activities to the department. Our new facilities continue to be developed for both research and teaching, and our long-awaited artificial stream facility is at last complete. You'll find some nice views of it in this issue. Faculty and students are busy with professional activities both on and off campus, constantly contributing to the level of excitement in our midst.

As usual, this issue also reports the continued outstanding research productivity of our faculty, and the recognitions they receive for it. Some of our latest teaching endeavors are also featured. I am always impressed by the breadth of activities of members of this department; it makes it a wonderful place to work.

Thank you all for responding to the special requests for help that I have made. I very much appreciate your dedicated service to students and the department as a whole. Best wishes for a productive and enjoyable rest of the semester.

Jeff Doering



Jeffrey Doering, PhD.
Professor and Chair
O: 773-508-3620

Evolution vs. Intelligent Design: A Community Dialogue

On February 21, the Departments of Biology, Theology, Philosophy, and Anthropology along with many other Loyola University Chicago departments and programs sponsored a dialogue on the stakes of the evolution – intelligent debate. The event was conceived and organized by Dr. Aana Vigen of Theology and a panel of LUC faculty consisted of Dr. Howard Laten, Biology; Dr. James Calcagno, Anthropology; Dr. Paul Mueller, SJ, Philosophy; and Dr. Pauline Viviano, Theology. The Life Science Auditorium was packed far beyond its 200-seat capacity with students filling nearly every square foot of available space. An equal number of students had to be turned away.

Drs. Laten and Calcagno focused their 15-minute presentations on the fundamentals of scientific investigation, the paramount importance of evolutionary science to the understanding the natural world: to human biology, human health, human history, and the guardianship of life on earth.

Dr. Laten employed a wide ranging collection of political cartoons and Far Side comic images to illustrate his points. He quoted frequently from the text of the recent Dover, Pennsylvania court decision overturning rules requiring school teachers to question the validity of evolution in class, and explained how our present understanding of evolutionary change undermines intelligent design's flawed argument for irreducible complexity.

Dr. Mueller discussed the importance of carefully separating the kinds of questions that science can answer, including the underlying processes of evolution and the determination of human ancestry, from those it cannot, the kinds of questions better suited to the arena of philosophy. He affirmed that intelligent design is religious philosophy, not science. Dr. Viviano concluded the presentations with a succinct discussion relating the constructive evolution of religious thought in conjunction with our growing understanding of the natural world. She not only agreed that the present manifestation of intelligent design was not science, she offered the suggestion that it imposed ill conceived restrictions on our perceptions of a Creator.

Few attendees left immediately following the presentations. Instead a vigorous and enlightening 45-minute audience discussion ensued.

What is at Stake in the Evolution-Intelligent Design Debate?
A Community Dialogue with Responses by Four Loyola University Faculty

Tuesday, February 21st, 2006 4:00-6:00 PM
Quinlan Life Science Center Auditorium

Panelists:
Howard Laten, Ph.D., Biology
James Calcagno, Ph.D., Anthropology
Pauline Viviano, Ph.D., Theology
Paul Mueller, S.J., Philosophy

Admission is Free to Loyola Students, Staff, and Faculty

The purpose of this event is to foster dialogue and greater understanding among the Loyola University of Chicago community. Following four brief responses to the above question, there will be ample time for discussion.

Reception and Refreshments to Follow

For More Information, Contact:
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avigen@luc.edu
Ext. 8-2342

Event Sponsored By:
Bioethics Minor
Bioinformatics Program
Department of Anthropology
Department of Biology
Department of Philosophy
Department of Theology
Environmental Studies/Science Program
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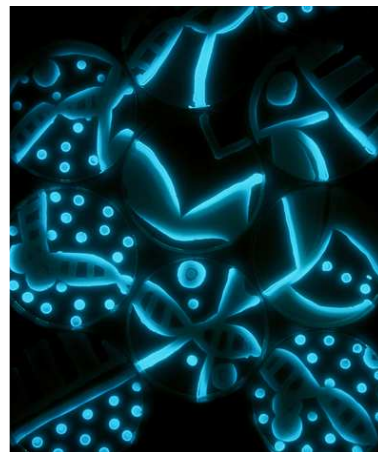
Upcoming Events Off Lakeshore Campus

Be sure to mark your calendars for these upcoming Biology events going on beyond the Life Science Building.

Living Drawings: Recent Works by Hunter O'Reilly Loyola University Museum of Art (LUMA) March 12 - June 4, 2006

Hunter O'Reilly creates controlled line drawings using bioluminescent bacteria. The bacteria then grow in the host environment. Bacteria become collaborators in the art as it grows. First appearing with bright light, bacteria in the drawing are photographed as it uses up available nutrients, gradually dying-off over a two-week period.

Interpreting Science as Art: Bioart and Living Drawings
Gallery Talk by Hunter O'Reilly
Sunday, April 2, 3-4pm at the LUMA Auditorium
820 North Michigan Avenue / Chicago, IL 60611
312-915-7600
<http://www.livingdrawings.com>



CAURS Chicago Cultural Center Saturday, April 1st, 2006

A collaboration between Loyola and six other area universities, this symposium allows hundreds of undergraduates from the participating institutions to present their research results in a professional setting.

Submission of application and abstracts are open to all undergraduate science or engineering students who have conducted research, allowing students to learn about the research of their peers, speak to and receive feedback from university faculty and guests and to interact with industry representatives. Members of the larger Chicago scientific research community are invited to attend as well.

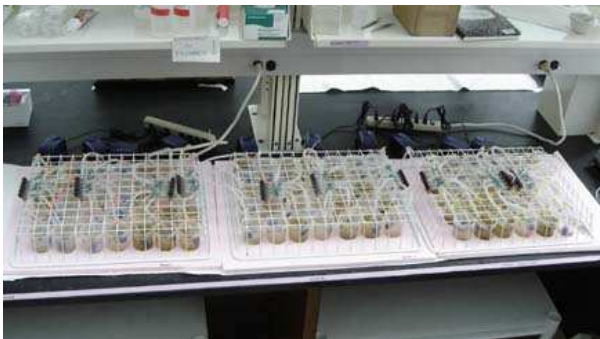
Students will show their work in either a poster or oral presentation, with posters on display throughout the day. The symposium has also accepted research proposal submissions and exhibits of science-related artwork, though the focus remains on presenting research

Awards will be presented for top abstract, talks and posters. One student will also be presented with a research grant for work to be presented at next year's symposium, and the contributions in support of undergraduate research will be recognized for a faculty member from each university.

Dr. Hunter O'Reilly of Loyola will give the keynote speech. For more information, visit www.caurs.com or e-mail caurs2006@gmail.com

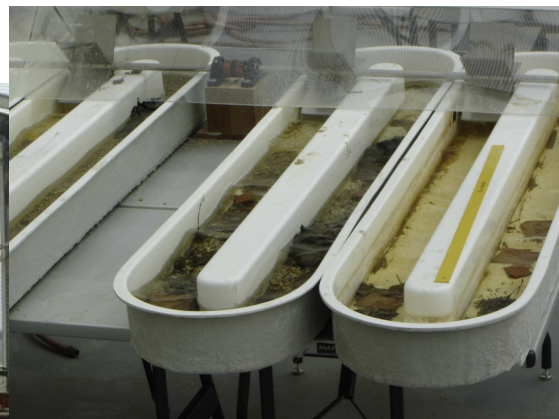
View from the 5th Floor

What's really going on up in the penthouse? The stream facility offers us a glimpse. Photos by Paul Hoppe, courtesy of the Rosi-Marshall Lab.



These pictures include a look at the 48 recirculating artificial streams and 7 artificial ponds currently set up. The streams and ponds have been inoculated with bugs, leaves and algae and should be running within the next few weeks.

Also pictured (at left) is an experiment in corn pollen.



Biology Gets Slimy

Excitement was in the air this semester as leeches joined the Biology Department. Leech Curator Mary Ann Glogowski tells us a bit more about our blood-sucking friends and their purpose here in our department.

The major goal of the leech endeavor here at Loyola is to maintain a breeding program and to improve the reproductive potential of aquaculture-bred *H. medicinalis* for medicinal use by careful selection in breeding. We are also interested in studying the obligatory symbiotic bacteria which are necessary to maintain and improve medicinal leech aquaculture.



The use of leeches has entered the mainstream of modern medical practice today. Leeches are commonly used by hospitals worldwide for restoring venous circulation in reconstructive, cosmetic, and plastic surgery.

Due to environmental pollution, the medical use of leeches collected in the wild is considered dangerous. Medicinal leeches (hirudinization) are bred under aquaculture conditions today in captivity.

Hirudo medicinalis are maintained here at Loyola in a compartmentalized 10 gallon aquarium containing approximately 4 gallons of spring water. Half of the water is replaced in the aquarium with fresh sterile spring water on a bi-monthly basis. Rocks, gravel and coarse sand are provided in each compartment as leech natural habitat and the temperature is held at 20°C with a 12:12 hr light: dark regime and a flow-through filtration system to remove solid waste and nitrogenous compounds.



It is important to maintain the obligatory symbiotic bacteria in the leech habitat, especially *Aeromonas hydrophila*, which inhabits the intestine of *Hirudo* and produces an antibiotic that prevents the growth of other bacteria that would otherwise prevent the long term storage of blood and cause the blood to internally decompose.

Aeromonas also assists in digestion of the blood and provides vitamins and other certain compounds necessary for the leech

Natural reservoirs of medicinal leeches are considerably exhausted. Currently an endangered species, they live in freshwater lakes and ponds. Their resting posture is to characteristically lie under or on top of rocks at the shoreline partially out of the water which enhances gas exchange along the leech's general body surface.

Leeches are fed every 21 days. Commercial pig gut casings (sausage skins) are soaked for 48 hr in distilled water to remove excess salts. Sections about 20 cm long are knotted at one end and filled with porcine blood and closed off at the other end by knotting, hence making a 'blood sausage'. The blood sausage is attached vertically to the inner wall of an aquarium containing a single leech which is allowed to feed for ~1½ hr. If the leech attaches and feeds through the upper half of the blood sausage, the sausage is inverted to ensure a continuous blood supply during the feeding.

Boussy Grant Project

Dr. Boussy tells us more about his recent project proposal.

I have just submitted a grant proposal to the Vector Biology study section of the National Institute of Allergy and infectious Disease of the National Institutes of Health (NIH). The title of the proposal is "Development of an 'invasion vector' for manipulating insect pest populations." The proposed research is a collaborative project with my colleague, Dr. David Lampe of Duquesne University (Pittsburgh); I am the principal Investigator. Since the project is a new direction for both of us, we are applying for an NIH Exploratory/Developmental Research Grant Award (R21). These are awards of up to two years' funding.

Our goal is to develop DNA vectors that can spread throughout insect populations ("invasion vectors"), based on natural DNA transposable elements that do spread this way. Such a vector could be used to spread an engineered gene into and throughout a species, as it spreads from chromosome to chromosome. A potential target is malaria-transmitting mosquitoes, and the genes to be driven into the mosquito populations are genes that render the mosquitoes unable to transmit the malaria parasites to humans. Other laboratories are developing such genes. We hope to develop vectors that could autonomously spread such genes throughout mosquito populations.

I will test a series of vector constructs made by Dr. Lampe, based on a natural DNA transposable element called *mariner*. We will insert them into the DNA of *Drosophila melanogaster*, the laboratory fruit fly. *Drosophila* offers a very tractable model system in which we can study the properties of the constructs before we attempt to develop them for mosquito use. The constructs will carry a fluorescent pigment gene as a "reporter," so that the proportions of flies with the construct in the laboratory populations can be quickly and easily scored. Illuminating the flies with the light of a certain wavelength will cause fluorescence, so, if the invasion vector constructs are spreading in a population, the proportion of "glowing" flies will increase. Dr. Lampe has generated mariner mutants that should have greatly enhanced invasion ability, and we hypothesize that these will be useful as invasion vectors.

Once the feasibility of using *mariner*-based invasion vectors is demonstrated in *Drosophila* flies, we will try the most active ones in mosquitoes. Our first efforts will involve *Anopheles stephensi*, which is a relatively minor carrier of malaria in the wild, but is an easier laboratory species than *A. gambiae*, the deadliest insect in the world. My colleague, Dr. Kim Williamson, maintains colonies of *A. stephensi* in the Life Sciences Building for her work on antimalarial vaccines, and she will help me with mosquito-rearing. Eventually, I hope that this project will develop into collaborations with laboratories developing tools to block malarial parasite transmission, and that our invasion vectors will prove useful in the real world.

The development of invasion vectors is potentially of huge significance for the control of arthropod-borne diseases. No invasion vector is currently available for use in any pest species, although several vectors made from transposable elements are used in mosquitoes to carry a gene into a genome (to make transgenic mosquitoes). From the point-of-view of population invasion, *mariner*-based vectors may be especially useful, as *mariner*-family elements are known to occur in a huge diversity of eukaryotes, and thus vectors based on them are likely to be successful invaders of many target species.

Junior Science and Humanities Symposium

The 31st Annual Chicago Region Junior Science and Humanities Symposium took place in the Quinlan Life Sciences Building on Saturday, March 4, 2006 with Dr. William Kroll once again serving as director.



The 31st Annual Chicago Region Junior Science and Humanities Symposium took place in the Quinlan Life Sciences Building on Saturday, March 4, 2006. The event, sponsored by the Department of Biology in cooperation with the United States Army, Navy and Air Force, is designed to promote research and experimentation in the sciences, as well as mathematics and engineering. Through the event, students learn to recognize the significance of research in human affairs and the importance of ethical principles in the application of research results.

The program aims to search out talented youth and their teachers, recognize their accomplishments at symposia and encourage their continued interest and participation in the fields of science, mathematics and engineering. At the same time, the program aims to expand the horizons of research-oriented students by exposing them to opportunities in the academic, industrial and governmental communities. This in turn increases the number of future adults capable of conducting research and development.

A panel of readers consisting of Loyola University faculty reviewed the submissions and selected papers for presentation, divided into three categories. Two presenters selected by a panel of judges from each morning session competed in the afternoon sessions, the six participants each receiving an all-expense paid trip to the National Junior Science and Humanities Symposium in Albuquerque, New Mexico. Scholarships were awarded to first, second and third place winners, with first and second place eligible to compete in Albuquerque. The third place winner serves as an alternate should one of the first and second place finishers be unable to attend the National.



First place this year was awarded to Letian Zhang, of Illinois Mathematics and Science Academy, for the project entitled "GLY Conjecture on Upper Estimate Points in Real Tetrahedron." Second place went to Daniel A. Blumenthal of Jones College Prep for his project "Use of GFP to Analyze *Pseudomonas Syringae* pv. Phaseolicola 1448A Effectors in Plant Cells." Third place went to Robert Schick of Evanston Township High School for his project "Investigating the Applicability of Cellular Automata in Cryptosystems."



In addition to the scholarship money awarded at the Chicago Area Symposium, Zhang and Blumenthal will be competing for up to \$16,000 in additional scholarship award at the National Symposium and a trip to the International Youth Science Forum this summer in London.

Pictured, left to right: Dr. William Kroll, Letian Zhang, Daniel A. Blumenthal and Robert Schick.

Talk

Announcements, greetings and miscellaneous news bits

Publication Award, Grant Achievements and Research

Dr. John New was recently awarded the William J. Pierce Prize from the National Council of Commissioners on Uniform State Laws for an article he wrote concerning reproductive technologies and their associate legal issues. The article, entitled "'Aren't You Lucky To Have Two Mamas?': Redefining Parenthood in Light of Evolving Reproductive Technologies and Social Change" was published in the Chicago-Kent Law Review.

Dr. Howard Laten is the Principal Investigator on a new NSF grant for Research Experiences for Undergraduates in Bioinformatics.

Loyola University Chicago has given **Dr. Louis Lucas** a Summer Research Award.

Congratulations

ACF Technician **Jerome Lucas** recently received certification to teach Exercise for Shallow and Deep Water Activity through WaterArt, an aquatic fitness and therapy program. Water fitness is a low-impact aquatic therapy that benefits, among other groups, geriatric populations and those with arthritis and Parkinson's Disease.

Graduate student **Jillian Pokelsek** has received a Simpson Fund Award from the North American Benthological Society for research she conducted last summer in the lab of **Dr. Emma Rosi-Marshall**. The award will help support Jillian's travel to the meeting in Alaska in June to present her research. NABS endowment awards recognize excellence among student members. These awards are based on merit and are highly competitive, with just five being awarded each year.

Dr. William Wasserman and **Dr. Emma Rosi-Marshall** have been nominated for Special Recognition in Excellence in Graduate Education. Graduate faculty and student nominees will be honored in a ceremony during Graduate Education Week.

Loyola University Chicago Service Awardees

The following members of the Biology department will receive recognition of their years of service from the University this year:

Beata Czesny	Research Technician	5 Years of Service
Diane Jokinen	Teaching Associate	15 Years of Service
Roberta Lammers-Campbell	Teaching Associate	15 Years of Service
Diane Suter	Associate Professor	20 Years of Service
Warren Jones	Associate Professor	25 Years of Service
William Kroll	Teaching Associate	25 Years of Service
Howard Laten	Professor	25 Years of Service
Al Rotermond	Professor	35 Years of Service
Ray Ulbrich	Teaching Associate	40 Years of Service

Sujack Award Nominees

Nominees in Biology for Outstanding Teaching this year are: **Emma Rosi-Marshall, John Kelly, John New, Jutta Heller** and **Andrea Holgado**.

Special Thanks

To the following faculty who participated in the Faculty Phone-a-thon for Admissions: **Bob Morgan, Bob Hamilton, Gina Zainelli, John Kelly** and **Peter Breslin**.

Of Interest: Mad Science

Biology instructor Diane Jokinen tells us about her new venture into getting kids excited about science.



When I leave Loyola, I will become a part owner of a Mad Science franchise. Mad Science is a science education/entertainment company based in Montreal. It has been in business for over ten years with franchises all over the world (but mostly in the U.S. and Canada). Buying a franchise gives you rights to work a defined territory and there have been franchises in Lake and Du Page counties almost from the beginning. We are the first franchise to venture into a big city.

Mad Science provides science programming to elementary-age children along an "education – entertainment continuum", doing in-school workshops, after-school programs, summer day camps, birthday parties and special events. We can bring trained instructors and physical resources into schools that might not otherwise have them. Our goal is not only to provide science content to schools and families, but to also show kids just how much fun science can be. Who doesn't like shooting rockets, making slime and playing with Van de Graaff generators?



I will be joining two friends as business partners at Mad Science of Chicago. We all met through our volunteer work at the Museum of Science and Industry. Between the three of us, we have over 35 years of experience doing children's programming for MSI. It's a little scary to start a small business, but my partners are both engineers with MBAs. I'm confident that between the three of us we can make it work. Things have been going well so far, so if you know of any children or schools within the city of Chicago that want to do some fun science, give us a call!

Profiles: Bill Wasserman

Dr. Bill Wasserman, well-known as both instructor and webmaster in the Biology Department celebrates 15 years at Loyola this year.

How did you come to Loyola?

My Developmental Biology career actually started by serendipity way back in 1966--yes, I said 1966. I was a Freshman at the University of Toronto with no idea what to do that summer. I was having lunch with a friend and he told me about a new Biology Professor who was looking for help setting-up his lab. I went to talk to him and after an hour he offered me the position. I started off moving equipment, unpacking new glassware and then making culture medium. By the end of that summer I was adding frog sperm to frog eggs *in vitro*. To make a long story shorter, I stayed in his lab as an undergrad doing research and then I completed my M.S. then my Ph.D. in 1976 in his lab.

In 1976, I finally "flew the coop" and I went to Purdue University in West Lafayette. What a culture shock, from the bustling metropolis of Toronto to the flat corn fields of Indiana. I was a Post-doc. for 2 years and then a Research Associate for 2 more years at Purdue. In 1980, I landed my first Biology Faculty position at the University of Rochester in upstate New York. I was there for eleven years. In 1991, I applied to Loyola and voila!

Soon, my next stop will be a Condo in Boca Raton. I will be eating the early bird special with a friend telling him that I don't know what to do for the summer. Maybe another part of my life will start again by serendipity.

Tell us a bit about what your research and teaching.

My research program here at Loyola was going along pretty good. I had 7 Loyola graduate students defend their M.S. thesis. Then fate raised its ugly head, I was in two car accidents. I have nerve damage in both hands that doesn't allow me to have good feedback of finger pressure. I can still hunt and peck with two fingers on a computer keyboard, but I can't do animal surgery, work a Pipetman nor do micro-dissections. I tried to demonstrate these techniques to a new graduate student and to two undergrads. with no success. I was frustrated and the students were very frustrated. Again, to make a long story shorter, I changed my emphasis from research to teaching. The only problem I have now is holding onto a piece of chalk. When I dropped the chalk 5 times in one lecture the students started to stare at me and wondered what is wrong with this guy?

Concentrating on teaching has allowed me time to develop course materials such as student CDROMs for Bio. 251 and 304 and creating extensive websites for Bio. 101, 251, 304 and 410. The students love the CDROMS, websites and animations I created and they nominated me for the Sujack award in 2004, which I won.

What do you enjoy most about teaching?

First, I show the students a static labeled diagram from their textbook, I give them a detailed explanation and all I see are puzzled looks on their faces. Then I show them an animation of that diagram (that took me until 2 a.m. to create) and seeing a smile, a head nod and an expression of understanding on their faces. I realized very early back in 1996 that PowerPoint slides were OK, but computer animations and computer videos are the way to connect with these students. They have been raised their entire lives with video games. Static pictures do not activate their brain centers, they need to see the biological concept in motion and in virtual-3D in order to "get it".

You're an old-school webbie. How did you first get interested/involved in web design and the Internet?

When I came to Loyola in 1991, the state-of-the-art for classroom presentations were static overhead projector diagrams. In 1993, I switched to static PowerPoint 35mm. slides and slide projector. In 1994, I came across a new computer program called Mosaic, the first web browser made at the University of Illinois, even before Bill Gates' Internet Explorer! There were many static pictures on the web, but there were a few animations. The bulb turned on in my head and in 1995 I looked at the HTML code for those web pages and started to create my own web pages. I wrote the HTML code in Windows Notepad and had my first web page for Bio. 304 made in 1996. Unfortunately, the students had to go to the Library to view the material, there were no e-classrooms back then. In 1998, I lugged a computer with HTML files, video, animations and a huge computer projector into the classroom and there has been no looking back since.

Web page design became an obsession. Before the car accidents I designed web sites for several groups and individuals outside of Loyola. Now I restrict my web work to my Biology courses and for the Biology Department. Currently, I have over 5,400 HTML, picture, movie and animation files on Loyola's web servers.

Tell us one thing no one would ever guess about you?

I actually turn off my computer at home before going to bed.



Submission Guidelines

- The newsletter will be used to promote and be devoted to covering the activities, seminars and events; initiatives and developments; faculty, student and staff awards. Creative works by our Departmental members, announcements and profiles will be covered.
- **The newsletter is circulated within the department and will be made available on the Internet via the Biology website. Our goal is to publish online on a bimonthly basis throughout the year.**
- Authors/contributors should keep in mind that readers may not specialize in their particular area of work.
- Articles vary in length between about 50 and 600 words.
- We welcome photographs and images to accompany articles; please provide captions when submitting the photographs/images. Either hard copy or digital formats of the images are acceptable.
- Articles may be submitted by any method; however, the preferred transmittal is electronic format via e-mail.

Questions? Contact Us.

Should you have any questions, please do not hesitate to contact us at biologydept@luc.edu .

The Department of Biology newsletter is prepared and edited by Audrey Berry, Pam Bradley, Nancy McVittie and Jeff Doering.

Hard copies of articles, images, etc. may be forwarded to us at LSC, LSB, Rm. 317, Attn: Newsletter.

**Submittal Deadline for
Newsletter No. 7:**

Friday, 04/21/06

**E-mail:
Biologydept@luc.edu**