COLLEGE OF LIBERAL ARTS & SCIENCES

The Department of

BIOLOGY

www.biology.uiowa.edu Winter 2011

IN THIS ISSUE

THE UNIVERSITY OF IOWA

NEW FACULTY

ANDREW FORBES Why are there so many insects? Insects constitute the vast majority of animal species on Earth, but we still know very little about why they are so abundant. One promising hypothesis is that the interactions that many insects have with other animals and plants are central in driving and maintaining diversity. In other words, for insects, ecology may often guide evolution. We integrate ecology, behavior, population genetics, and evolutionary theory to investigate patterns of diversity and evolution among these highly diverse but under-appreciated animals.

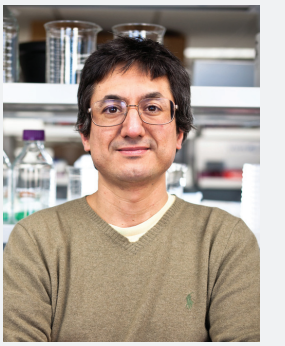
A primary interest of my lab involves understanding how and why parasitic lifestyles can make it easier for one insect species to split into two. Many insects lay their eggs on or into animal or plant hosts and are therefore dependent on these hosts in order to successfully reproduce. When a population of insects begins to use a new host, it is presented with a slew of novel challenges: the new host may live in a different environment, have different defenses against parasitism, be available at a different time during the year, etc. These ecological differences can drive evolutionary change in the insect parasite which may, over time, lead to speciation.

A new focus of the lab is how human-mediated landscape changes influence insect diversity. Using the Iowa City area as one huge study site, we are evaluating how different landscape types predict the number and diversity of fruiting trees, the insects that eat those trees, and the parasitic wasps that attack the insects. In this way, we hope to generate testable hypotheses about how human-dominated landscapes such as cities and farmlands change—though not necessarily reduce—insect diversity.

BRIDGET LEAR Daily (circadian) rhythms of behavior and physiology are prominent among organisms ranging from cyanobacteria to humans. These rhythms are not simply responses to daily environmental cycles, but are driven by internal cellular clocks. In most animals, the circadian clocks that promote daily sleep-wake patterns are located in neurons within the brain. Yet, relatively little is known about how these clocks regulate neuronal activity to promote behavioral rhythms. In humans, defective sleep-wake patterns are often associated with mental health conditions such as seasonal affective disorder and bipolar disorder. Thus, the relationship between circadian clocks and neuronal function may be relevant to understanding the basis for these serious conditions.

Our lab seeks to understand the processes that occur downstream of the circadian clock to promote neuronal function. We study the common fruit fly, *Drosophila melanogaster*, which exhibits robust daily rhythms in several behaviors, including locomotor activity. We have shown that a unique ion channel gene, *narrow abdomen (na)*, is an important component of clock neuron function in *Drosophila*. We are currently using the *Drosophila* system to further characterize the function and regulation of the NA channel within clock neurons. Notably, this research is likely to be important beyond the circadian system, as NA and its mammalian homolog (NALCN) function broadly in the brain. In addition to our work on NA, our lab is also utilizing the molecular and genetic tools of *Drosophila* in order to identify new circadian rhythms genes, with a focus on genes likely to function in clock neuron output.

For more information about the Department of Biology's faculty, please visit our website at *www.biology.uiowa.edu*



ALBERT ERIVES joined our faculty in January 2012. Dr. Erives earned his Ph.D. in Molecular & Cell Biology from the University of California Berkeley and has recently been an Assistant Professor of Biological Sciences at Dartmouth College. His research interests are gene regulation, evolution, and genomics.

ON THE COVER

The parasitic wasp *Eupelmus vesicularis,* which was introduced to North America sometime in the early 17th century. The Forbes lab is studying patterns of recent evolution for this and other insect parasites.

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YEAR IN REVIEW

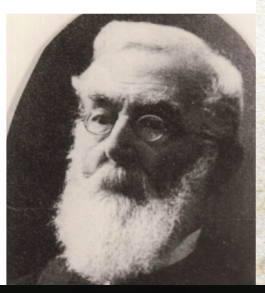
Despite the current economic struggles, 2010-11 turned out to be a good year for hiring faculty (Bridget Lear and Andrew Forbes started in the Fall 2010), searching for new faculty (Albert Erives accepted our offer and began his appointment in January 2012), and curriculum reform (a task force reorganized our Principles of Biology courses). It was also a good year for several young faculty to obtain their first major grant and some senior faculty also received funding. Congratulations to all faculty who now enjoy the success of their endeavors.

We also had a great year for the completion of Ph.D. degrees with a near record number of students graduating. In addition, one of our graduate students, Song Yi, was recognized for his thesis work with the Graduate College Dean's Distinguished Dissertation Award. Two of our graduate students, Erin Bailey and Sarah Derry, also received funding on their own grants. Going from our graduate to undergraduate programs, we had 109 students complete their Bachelor of Science or Bachelor of Arts degree in Biology. One of our undergraduate honors students, Jeff Nirschl, completed his degree with a record winning grade point average of 4.1 and received the Richard G. Kessel Scholarship in Biology. Congratulations to all on their accomplishments.

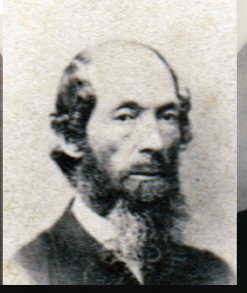
The year also marked the retirement of Dr. John Menninger. In May 2011, friends and colleagues gathered for this notable event in his life. To celebrate his scientific achievements, John had the opportunity to invite a speaker, Dr. Alexander Mankin, who gave an outstanding seminar. We all thank John for his many years of service to the department.

We now all realize that financial problems at major funding agencies will be with us for the next few years and will affect all grant applications. Those who are funded now should count their blessings. We need to come together in these dire times to provide material support to the research of those colleagues who are less fortunate in their quest for funding. I consider it our departmental responsibility to help each other maintain research that can ultimately be funded again in the near future.

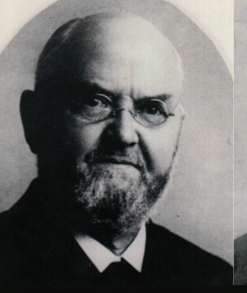
Bernd Fritzsch, Ph.D.
Professor and Chair



James Hall
1855 – 1857



Theodore S. Parvin
1859– 1870



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Thomas Macbride
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Gilbert L. Houser
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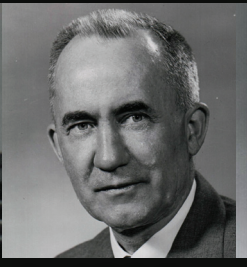
Charles C. Nutting
1889-1926

Wilbur W. Swingle
1926-1929



Joseph H. Bodine
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Jerry Kollros
1954-1977

Eugene Spaziani
1977-1980

George Cain 1980-1984,
1991-1994, 1999-2000**

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Gary Gussin
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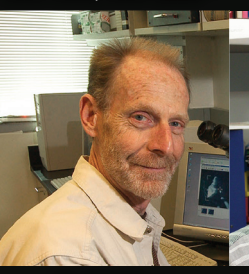

Jack Lilien
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Stephen Hendrix
2008**

Bernd Fritzsch
2008-present

The History of the DEPARTMENT OF BIOLOGY

By Dr. Eugene Spaziani

The Department of Biology at the University of Iowa enjoys a rich history of accomplishment and discovery. That information is presently being captured in a book. The book will place into perspective the importance of the department's contributions to the university as a whole, the State of Iowa, and the international scientific community. The history is tentatively organized into five chapters. Each chapter will include biographical sketches of faculty members from each historical period in chronological order of appointment. For purposes of this article, a synopsis of each chapter is presented for the reader to get a sense of the contents of the book.

Chapter I: The Early History (1855-1950)

This chapter concentrates on the origins of the natural sciences at the UI from the start in 1855 through the latter half of the 19th century and continues to 1950. The original Department of Natural History under Samuel Calvin and his student, Thomas Macbride, was responsible for botanical research and teaching of botany, animal sciences, and geology, until a burgeoning student enrollment forced reorganizations. By 1905, two departments emerged—Zoology under Gilbert Houser and Charles Nutting—and Botany, led by Macbride. The focus in both remained essentially natural history, featuring taxonomy of specimens in large collections, comparative anatomy, geographic distribution, and an emergence of ecology. The period was marked by creation of the Iowa Lakeside Laboratory by Macbride, and large collecting expeditions to exotic parts of the world, which contributed to putting UI science on the map.

References: Stromsten, F. A. (1950). The History of the Department of Zoology of the State University of Iowa, *BIOS 21* (1), 9-30.

Chapter II: The Department under Wilbur Willis Swingle (1926-1929) and Joseph Hall Bodine (1929-1954): Ontogeny of the Modern Department

Wilbur Willis Swingle succeeded Nutting as Zoology Head in 1926. He was an internationally known mammalian physiologist, who immediately changed the nature and direction of the department from one of natural history to experimental biology. For example, he removed the Natural History Museum to separate administration, and recruited experimentalists, most notably Emil Witschi. Professor Witschi landed the department's first national research

grant, in support of his groundbreaking work in developmental biology. Swingle headed for Princeton in 1929 after a mere three years, but the department had published over 75 papers on sex differentiation and endocrinology. Among other recognition, he and Witschi were awarded the Koch Medal of the Endocrine Society in 1959 and 1960, respectively.

Joseph H. Bodine became the Department of Zoology Head in 1929 and was perfectly suited to continue and broaden what Swingle had started. A prolific researcher, he and his students studied cellular metabolism during development, employing inhibitors, and biophysical techniques such as the Warburg apparatus. With the help of Witschi, he recruited other research stars such as Eleanor Slifer, Harold Beams, and Theodore ("Ted") Jahn. Bodine served as Department Head until his untimely death in 1954, shortly after he was elected to the National Academy of Science. Meanwhile, the department, having moved into the space on the east campus vacated by the School of Medicine, was better able to offer a rich array of courses to a mushrooming student body, and to expand research.

References: Stromsten, F. A. (1950). The History of the Department of Zoology of the State University of Iowa, *BIOS 21* (1), 9-30.

Chapter III: The Kollros Era (1955-1977)

The Department of Zoology entered its greatest expansion in faculty, physical plant, and grant income during the 22-year chairmanship of Jerry J. Kollros. Born in Austria and raised in the Chicago suburbs, he trained at the University of Chicago with the influential developmentalist, Paul Weiss. Recognizing his scientific promise and leadership qualities, the UI administration appointed him, while an Associate Professor, to chair the department upon Bodine's death. With focused determination, he oversaw the destruction of Victorian buildings along Dubuque St. and the construction of four successive storey wings with elegant classrooms and modern research space, funded by the state and grants from the National Institutes of Health (NIH) and the National Science Foundation (NSF). Kollros seized the opportunity of the new NSF, post-sputnik, Centers of Excellence program to create, with pre-clinical medical school departments, interdisciplinary programs in genetics, development, and endocrinology. The resulting expanded faculty brought in such future research stars as David R. Soll, Michael Solursh, Stephen P. Hubbell, Stanley B. Kater, Barbara A. Stay, Jim (Jung-Ching) Lin, and Chun-Fang Wu.

Chapter IV: The Botany Department History and Reunification with Zoology/Biology

Botany, as a separate department, rose out of an interdisciplinary faculty early in the 20th century. Its distinguished teachers included a President of the American Association for the Advancement of Science (AAAS) and a pioneering member of the National Academy of Science. In 1992, a majority of the faculty in Biology decided that advances in evolution, biochemistry, genetics, and cell and molecular biology made separation of plant and animal science teaching obsolete, which stifled research creativity and collaboration. Accordingly, the two disciplines reunited to become the Department of Biological Sciences. The merger was not universally accepted and the chapter describes the strong resistance at the prospect by some. It also includes the history of Botany's extensive campus west of the river, now gone, and an accounting of the struggle to retain the venerable Herbarium.

Chapter V: The Modern Era into the 21st Century

During this era, all of the Department's buildings were remodeled, including the original medical school on Jefferson St., allowing Botany and Zoology colleagues to be housed together. The old Anatomy Annex became the beautiful, integrated Biology Library. The planning and construction of the Biology Building East (BBE) across Dubuque St. is described, connected to the Biology Building (BB) by a stunningly designed skywalk. BBE includes a rooftop greenhouse and the J.J. Kollros Auditorium.

This chapter also describes the contributions of a succession of department chairs, elected from the faculty upon Kollros' retirement in 1977. Under the direction of Jack Lilien (Department Chair 2000 - 2007), the Roy J. Carver Center for Genomics (CCG)—formerly known as the Carver Center for Comparative Genomics—was created as a specialized service center. The organizational and intellectual contributions of Bernd Fritzsch, the current Department Chair (2008 - present), are also detailed. The chapter concludes with a description of the impact the department has had on the university, state, and community.

Photos on left: A History of the Department of Biology* Heads/Chairs with dates of service in that position. Photos with dates of 1855-1977 provided by the Frederick W. Kent Collection of Photographs, Special Collections & University Archives Department, The University of Iowa Libraries, Iowa City, IA.

*The Department of Biology has undergone several name changes and mergers throughout its history.

** Interim Chair

THINKING OF TOMORROW

By Jane Van Voorhis

There's no doubt that these are unsettling economic times for us all. An unpredictable economy can make private giving more difficult for alumni, yet the department needs your support more than ever as today's students struggle financially to attend college—and today's universities are challenged to continue to provide a high-quality experience. These are times when the foresight of others can be a saving grace.

Regardless of economic realities, it is never a bad time to give serious consideration to where we ultimately want our hard-earned resources to go. Estate gifts are a good option because they allow donors to support the department in a significant way tomorrow, without taking away from discretionary income today.

If you wish to make an estate gift to the Department of Biology, there are several ways we can help you plan such a gift—while ensuring you achieve your personal financial goals and maximize your tax benefits. Among other options, you may:

- Establish a charitable bequest in your will or trust;
- Designate the Department of Biology as a beneficiary of your qualified retirement plan;
- Establish a charitable gift annuity that allows you to receive guaranteed payments at stable, attractive rates.

As always, gifts of all types and sizes to the department are greatly appreciated. We are grateful to those of you who continue to give annually—your constancy and continuing dedication have a considerable impact on every aspect of our programming from year to year. Thank you!

For more information on creating a legacy to benefit the Department of Biology, please contact Jane Van Voorhis at the UI Foundation at jane-van-voorhis@uiowa.edu, or 319-467-3765. You can also learn more about giving to the Department of Biology at *www.biology.uiowa.edu/alumni_giving.php*

NEW LEADERSHIP FOR GRADUATE PROGRAM

By Dr. Joshua Weiner

As many of you know, I assumed the role of Associate Chair for Graduate Education beginning this past fall semester. I would like to thank the outgoing Associate Chair, Dr. Chi-Lien Cheng, for her excellent work over the past several years and for helping me with the transition.

The constrained economic climate is making the recruitment, matriculation, and training of graduate students—never easy in the best of times—more difficult. The end of the block allocation from the Graduate College and yearly reductions from the UI Graduate College Strategic Investment Fund (SIF) Program have, in recent years, required us to recruit a smaller number of students than we might like. Our graduate students are truly the lifeblood of our department's research and teaching mission, and nothing is more important for the scientific enterprise than providing the next generation with the training they need to be successful.

My primary goal over the next year will be to develop a plan for revamping and revitalizing our graduate program's initiatives to recruit and retain the most motivated and talented students. In the face of cutbacks, the department has remained strong by keeping our grant portfolios up, hiring excellent new faculty each year, and obtaining new tools through the Carver Center for Genomics (CCG) and Carver Center for Imaging (CCI) that enhance the research environment for our students. We need to let the world know about this more effectively by using 21st century communication tools and focusing on what distinguishes our program from the many others on campus.

To do this properly, we'll have to make changes—some of them big—but I think this is necessary to ensure the excellence of our graduate program. I look forward to working with faculty, staff, students, and all of you on the challenge of making our program a top choice for the best students in the Midwest and elsewhere.

Dr. Qiong Wang, Associate Research Scientist in Dr. Green's lab, prepares a tissue culture consisting of auditory sensory cells and their associated nerve cells for experimental analysis of damage to auditory nerve cells.

GRANT HIGHLIGHTS: FISCAL YEAR 2011

(JULY 1, 2010 – JUNE 30, 2011)

The Iowa Center for Molecular Auditory Neuroscience (ICMAN) was established with a five-year, $2.1 million Center Core Grant (called a "P30" Grant) from the National Institute on Deafness and Other Communication Diseases (NIDCD). The ICMAN was created to enhance productivity, innovation, and collaboration among auditory researchers in five UI departments including Otolaryngology, Biology, Biochemistry, Physiology, and Communication Sciences and Disorders. The areas of research conducted within the ICMAN are fundamental to the prevention and treatment of deafness. This is the first time a P30 Grant has been administered through a department in the College of Liberal Arts and Sciences (CLAS). For more information, please visit the ICMAN website at *www.biology.uiowa.edu/icman*

Other Fiscal Year 2011 Grants Awarded

Steven Green, Professor of Biology, was awarded a new five-year, $1,874,188 grant from the National Institutes of Health (NIH). The research focuses on mechanisms of recovery from damage to auditory nerve cells of the inner ear and is directed toward preventing delayed hearing loss caused by exposure to noise.

John Manak, Assistant Professor of Biology, was awarded a five-year, $4.8 million NIH grant that will focus on identifying the genes associated with the birth defect, cleft lip and palate.

Dr. Manak and Patrick Brophy, Associate Professor of Pediatrics, were awarded a subcontract in the amount of $595,530 on a three-year, $1.5 million National Institutes of Health (NIH) grant through the Research Institute Nationwide Children's Hospital. Their research will focus on what causes Vesicoureteral reflux (VUR) nephropathy, a condition in which the kidneys are damaged caused by backward flow of urine into the kidney. This is the 4th leading cause of end stage renal disease in children.

Dr. Manak also received a $50,000 pilot grant from the Institute for Clinical and Translational Science (ICTS) to partner with his departmental colleague, **Associate Professor of Biology, Josep Comeron.** They are developing a one-of-a-kind microarray technological tool called MENA (Mismatch EndoNuclease microarray) that is designed to both ease and accelerate the identification of disease-causing genetic mutations in humans.

Bryan Phillips, Assistant Professor of Biology, received a two-year, $150,000 March of Dimes Basil O'Connor Research Scholar Award. His research focuses on Wnt signaling pathways that utilize beta-catenin to specify cell fate. Wnt signaling has been linked to a host of developmental defects, including neural tube mispatterning and tetra-amelia syndrome (absence of all four limbs).

Jim Lin, Professor of Biology, was awarded a four-year, $1,501,628 National Institutes of Health (NIH) grant to advance the knowledge in the disease processes of arrhythmias (a disorder of your heart rate or rhythm) and heart failure and help identify novel, effective therapeutic targets.

DISCOVERY OF TWO BIOFILMS COULD LEAD TO NEW THERAPIES

By Dr. David Soll

Many medical devices, ranging from artificial hip joints to dentures and catheters, become sites for unwelcome guests—complex communities of microbial pathogens called biofilms that are resistant to the human immune system and antibiotics, thus proving a serious threat to human health.

Researchers previously believed that each pathogen formed one kind of biofilm, but members of my laboratory discovered that the fungal pathogen *Candida albicans* makes two kinds of biofilms—a traditional pathogenic one and a second sexual one.

Members of my laboratory showed for the first time that the majority—about 90 percent—of strains colonizing humans make a pathogenic biofilm that cannot be penetrated by antifungal agents, antibodies, or white blood cells. These majority strains are sexually incompetent. However, they found that a minority—about 10 percent—of strains, which are sexually competent, form highly permeable and penetrable biofilms and act as a supportive environment for mating.

They demonstrate that although pathogenic and sexual biofilms appear macroscopically similar, they are regulated by entirely different signaling pathways. This discovery provides new and profound insights into developing new therapies that target pathogenic biofilms for disruption.

In this image, needles are being transferred to a chip robot that will be used to identify the genes involved in generating the alternative *Candida albicans* biofilms.

KEY MECHANISM FOUND IN EARLY EMBRYO DEVELOPMENT

By James Devitt, New York University and University of Iowa News Services

New York University and University of Iowa biologists have identified a key mechanism controlling early embryonic development that is critical in determining how structures such as appendages—arms and legs in humans—grow in the right place at the right time.

In a paper published in the journal, *PLoS Genetics*, John Manak, an Assistant Professor in the UI Department of Biology, and Chris Rushlow, a Professor in NYU's Department of Biology, write that much research has focused on the spatial regulatory networks that control early developmental processes. Less attention, they note, has been paid to how such networks can be precisely coordinated over time.

Rushlow and Manak found a protein, called Zelda, that turns on groups of genes essential to development in an exquisitely coordinated fashion.

The research showed that when Zelda was absent, activation of genes was delayed, thus interfering with the proper order of gene interactions. This ultimately disrupts gene expression patterns and causes severe consequences for the embryo, including many tissues and organs not forming properly, if at all.

For more information, please visit *www.eurekalert.org/pub_releases/2011-10/nyu-uoi102011.php*

Photo on left: Rachael Payne, an undergraduate student in Dr. Manak's lab, is performing genetic crosses with fruit flies, an organism which has helped unlock the mysteries underlying human development and disease.

THE ROY J. CARVER CENTER FOR GENOMICS (CCG): 10 YEARS LATER

By Harsha Doddapaneni, Director of the Roy J. Carver Center for Genomics

The Roy J. Carver Center for Genomics (CCG) is in its 10th year of operation, and we continue to promote genomics research and support undergraduate and graduate education in the department as intended a decade ago. There are a total of 173 registered CCG UI users which includes 33 faculty, 56 graduate students, 13 undergraduate students, and 71 research staff comprising of postdoctoral and research associates across 8 departments on campus with a major presence from the Department of Biology.

Since September 2010, the CCG is participating as one of the research cores in the Iowa Center for Molecular and Auditory Neuroscience (ICMAN). The overall goal of this core, called the Genomics Core, is to support the genomic and molecular biology research needs of researchers at the University of Iowa. For more information on the ICMAN, please visit their website at *www.biology.uiowa.edu/icman*

The CCG has reached another milestone in July 2011 when it became the first academic genomics center in the U.S. to qualify as a Certified Service Provider (CSP) for Roche NimbleGen microarrays. Through this program, Roche NimbleGen will introduce the CCG to their clientele for the NimbleGen microarray products. This will not only enhance the CCG's stature as a premier genomics center, but it also has the potential to support salaries and create additional employment opportunities.

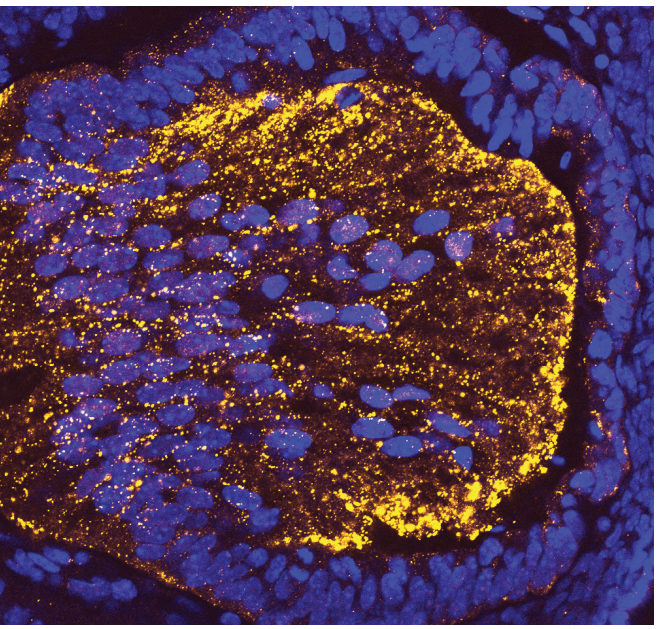
The CCG has purchased two new instruments—the Illumina Genome Analyzer IIx, which is a next generation sequencer that can produce 640 million templates per flow cell, and a top-of-the-line NimbleGen MS 200 Microarray Scanner—in addition to adding a new microarray facility to strengthen its operational capabilities. This year, we plan to add more microarray services and actively pursue further development of new genomics protocols.

In the last two years, the CCG has strategically expanded its outreach program while keeping the original objectives of educational and genomics support intact. In addition to providing financial stability, such an initiative has prepared staff to provide industry level service to researchers at academic prices.
For more information about the CCG, please visit our website at *www.biology.uiowa.edu/ccg*

A close-up view of a DNA sequencer in the CCG.

Alumni Spotlight: Salil Lachke

UNDERSTANDING EYE DEVELOPMENT AND DISEASE



Above image: Expression of the gene TDRD7, mutations in which are known to cause cataract and glaucoma in humans, is highly enriched and restricted to fiber cells in the developing mouse lens.

When asked which medical conditions we fear the most, polling data indicates that second only to mental illnesses, we largely fear losing our sense of sight (Horowitz et al. 1997). Loss of vision can result from a functional compromise of various components of the eye. However, opacification of the transparent lens (clinically termed cataract), remains the leading cause of blindness and affects over 77 million individuals worldwide. Surgery remains the only treatment, carrying with it the risk of secondary cataract formation—an undesirable complication—especially in the elderly. Salil Lachke, Ph.D. '03, is an Assistant Professor in the Department of Biological Sciences at the University of Delaware. His research focuses on understanding mammalian eye development to prevent or delay the onset of cataract and other eye diseases. Salil has developed a bioinformatics-based approach called "integrated Systems Tool for Eye gene discovery" (iSyTE) that has been successfully used to identify novel genes associated with human cataract and predict several uncharacterized genes with potential function in lens development. His research led to the discovery of a new gene associated with childhood cataracts and glaucoma and was published in the March 25, 2011, issue of *Science* magazine, "Mutations in the RNA Granule Component TDRD7 Cause Cataract and Glaucoma." Salil hopes the insights gained from this research can potentially unveil basic regulatory principles relevant to understanding the development and maintenance of other cell and tissue types. Salil was the 2005 D.C. Spriestersbach Dissertation Prize winner and was a member of the Soll Lab.

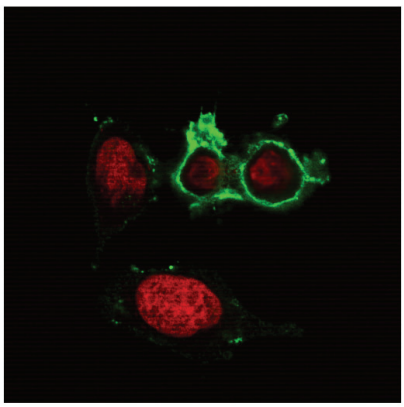
References: Horowitz, A., Reinhardt, J. P., Brennan, M., & Cantor, M. (1997). *Aging and vision loss: Experiences, attitudes and knowledge of older Americans.* New York: Arlene R. Gordon Research Institute, The Lighthouse Inc.

The Developmental Studies Hybridoma Bank (DSHB):

SUPPORTING CANCER RESEARCH

By Dr. David Soll

The Developmental Studies Hybridoma Bank (DSHB), a National Institutes of Health (NIH) National Resource, which I direct and is housed in the Biology Building East (BBE), distributed over 55,000 samples of antibodies (a protein produced by the body's immune system when it detects harmful substances such as bacteria, fungi, viruses, etc.) and hybridomas (a hybrid cell formed by the fusion of a cancer cell and an antibody-producing cell) last year. The DSHB is the largest nonprofit hybridoma bank in the world with a rapidly growing collection of over 1500 hybridomas. In 2011, it helped found the Foundation for Monoclonal Antibody Research in Des Moines and the Monoclonal Antibody Research Institute in the Department of Biology, which I also direct. The Foundation and Institute are dedicated to the use of monoclonal antibodies to 1) kill cancer stem cells using monoclonal antibodies, 2) identify the subgroups of the major cancers using monoclonal antibody chips and 3) block metastasis (the spread of cancer to other parts of the body). The Foundation hopes to raise $15 million in the endeavor. For more information about the Foundation and the DSHB, please visit the following websites: *www.antibodyfoundation.org* and *dshb.biology.uiowa.edu*



Above image: Cancer stem cells are a subpopulation in a tumor that can potentially be killed by monoclonal antibodies. In this image, breast cancer stem cells have been stained green by a stem cell-specific antibody in a highly metastatic breast cancer cell line.

To receive future Biology newsletters through e-mail, please visit **www.biology.uiowa.edu/news_emaillist.php** and click on the link to subscribe.

ACCOLADES

FACULTY AWARDS AND HONORS

Josep Comeron, Ph.D. – Career Development Award (Fall 2010)

Andrew Forbes, Ph.D. – Old Gold Summer Fellowship (2011)

Mark Holbrook, Ph.D. – National Academies Education Fellow in the Life Sciences (2011-2012)

Bridget Lear, Ph.D. – Old Gold Summer Fellowship (2011)

Brenda Leicht, Ph.D. – National Academies Education Fellow in the Life Sciences (2010-2011)

John Logsdon, Ph.D. – Interim Director, Pentacrest Museums (2011)

Bryant McAllister, Ph.D. – National Academies Education Fellow in the Life Sciences (2010-2011), Fulbright Scholar Award (Fall 2011), Career Development Award (Spring 2012), Obermann Fellow in Residence (Spring 2012)

Bryan Phillips, Ph.D. – National Academies Education Fellow in the Life Sciences (2011-2012)

Joshua Weiner, Ph.D. – promoted to Associate Professor (2011)

Chun-Fang Wu, Ph.D. – Tunghai University Distinguished Alumnus Award (2010), Purdue University Distinguished Science Alumni Award (2011)

Symposium in Celebration of Professor Lin

Above photo: Professor Lin (front row, fifth from right) and his former students gather together with his colleagues and current Biology students for a group photo in August 2011 to celebrate his 27 years at the University of Iowa.

Dr. Jim Lin's impact in research and education has not gone unnoticed by his colleagues and students. In August 2011, former students of Professor Lin planned and hosted a symposium titled, "Contractility and Motility: Molecular Mechanisms in Health and Diseases," to celebrate his 27 years of achievements at the University of Iowa. An illustrious group of speakers participated in the event, including the keynote lecture by Dr. Peter Rubenstein from the University of Iowa, as well as our own Dr. David Soll. We all want to thank and congratulate Dr. Lin on his continued efforts and contributions!

YEARS OF SERVICE IN THE DEPARTMENT OF BIOLOGY

35 YEARS

Steve Hendrix
Professor

25 YEARS

Robert Malone
Professor

Shelley Plattner
Facilities Specialist

Bruce Ritchie
Facility Coordinator

Deb Wessels
Associate Research Scientist (Soll Lab)

20 YEARS

Chi-Lien Cheng
Associate Professor

Karla Daniels
Associate Research Scientist (Soll Lab)

Erin Irish
Associate Professor

Alan Kay
Professor

Michelle Worrell
Senior Accountant

15 YEARS

Becky Birch
Assistant to the Departmental Executive Officer

Michael Dailey
Associate Professor

Brenda Leicht
Instructional Services Specialist

10 YEARS

Leah Fuller
Research Associate (Dailey Lab)

Julie Jacobs
Research Associate (Eberl Lab)

Elena Sivan-Loukianova
Assistant Research Scientist (Eberl Lab)

Ray Tallent
Assistant in Instruction

5 YEARS

Cindy Brochu
Research Associate (Logsdon Lab)

Michelle Johnston
Administrative Services Coordinator (DSHB)

Tom Koeppel
Department Administrator

Spencer Kuhl
Application Developer (Soll Lab)

Daniel Lusche
Assistant Research Scientist (Soll Lab)

Misty Lyon
Academic Services Coordinator

This list of employees covers years of service for 2010 and 2011.

UNDERGRADUATE AWARDS

UNDERGRADUATE SCHOLARSHIPS

Clifford W. Hesseltine Awards in Biology
The Clifford W. Hesseltine Awards in Biology ($300) are given annually to two Biology undergraduates in recognition of their excellence in formal coursework and research. *2011 Recipients: Senuri Jayatilleka (Dailey Lab) and Amelia Hurst (Cheng Lab)*

Richard G. Kessel Scholarship in Biology
The Richard G. Kessel Scholarship in Biology ($750) is given to an outstanding senior Biology major who has performed noteworthy research and/or is intending to pursue graduate work in cell and/or developmental biology. *2011 Recipient: Jeffrey Nirschl (Wu Lab)*

Lowden Prize in Biology
The Lowden Prize in Biology ($400) is awarded each May to the undergraduate student who achieves the highest standing in the 002:134 Ecology course from the previous fall semester. *2011 Recipient: Matthew Martini*

Robbie Prize
The Robbie Prize ($300) is awarded to an undergraduate senior Biology major who has demonstrated excellence in both coursework and research and is preparing for a career in science. *2011 Recipient: Maxwell Turner (Kay Lab)*

Evelyn Hart Watson Undergraduate Scholarship
The Evelyn Hart Watson Undergraduate Scholarship ($250) is awarded each year to a Biology undergraduate who has shown outstanding performance during his/her freshman year. *2011 Recipient: Jonathan Birdsall*

For more information about these scholarships, please visit *www.biology.uiowa.edu/undergraduate_honors.php*

2011-2012 COLLEGE OF LIBERAL ARTS & SCIENCES SCHOLARSHIPS

Bill and John Fenton Scholarship *Recipient: Kirsten Carew*

Ralph K. and Maxine J. Hibbs Scholarship *Recipient: Simone Renault*

Ernest R. Johnson Memorial Prizes The Ernest R. Johnson Memorial Prizes are presented each year to the graduating students with the highest and second highest academic standing in the College of Liberal Arts & Sciences. *May 2011 Recipient: Jeffrey Nirschl (Wu Lab) received the first place Ernest R. Johnson Memorial Prize with a University of Iowa grade point average of 4.17 and total cumulative grade point average of 4.02.*

William and Effa McMeans Scholarship *Recipient: Jared Holzhauser*

George S. Schaeffer Scholarship in Science *Recipient: Gerri Jaeschke*

Esther Walls Scholarship *Recipient: Michelle Redinbaugh*

For information about these scholarships, please visit *clas.uiowa.edu/students/scholarships*

BIOLOGY HONORS PROGRAM

Learn about the Biology Honors program and experiences of three recent graduates at *www.biology.uiowa.edu/undergraduate_honors.php*

For more information, please contact Dr. Lori Adams at lori-adams@uiowa.edu, or 319-335-1322.

SCHOLARSHIPS

Collegiate Scholars
Recipients: Amanda Nelson (2010) and Courtney Tuegel (2010)

Rhodes Dunlap Second-Year Scholars *Recipient: Dylan Todd (2011)*

Rhodes Dunlap Collegiate Scholars
Recipients: Amelia Hurst (2011) and Jeffrey Nirschl (2010)

For information about these scholarships, please visit *honors.uiowa.edu/people/fame/scholars/honors*

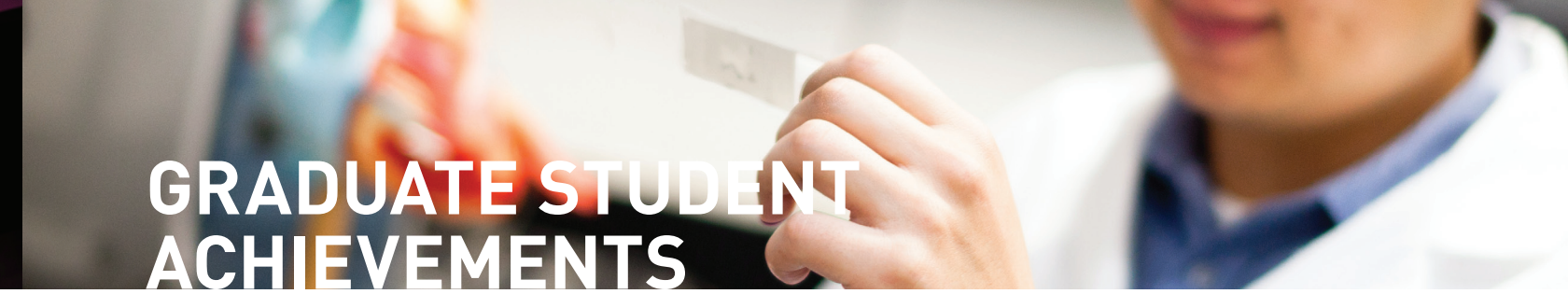
GRADUATES

December 2010

Aaron Thompson (Llopart Lab)
I-Chi Liang (Green Lab)
Michael Molumby (Smolikove Lab)

May 2011

Samuel Bailin (Comeron Lab)
Alain Cagaanan (Green Lab)
Lauren Claeys (Murray Lab)
Alexander D'Angelo (Fritzsch Lab)
Michael Harvey (Green Lab)
Wesley Hottel (Phillips Lab)
Sara Miller (Logsdon Lab)
Alec Modrick (Llopart Lab)
Jessica Nicoll (Malone Lab)
Jeffrey Nirschl (Wu Lab)
Kristen Olney (Dailey Lab)
Michelle Reisselman (Slusarski Lab)
Yihan Sun (Stipp Lab)
Maxwell Turner (Kay Lab)
Andrew Weber (Manak Lab)
Zhanran Zhao (Wu Lab)



GRADUATE STUDENT ACHIEVEMENTS

Erin Bailey (Green Lab) received a Ruth L. Kirschstein National Research Service Award (NRSA) in the amount of $74,700 for her research on determining why spiral ganglion neurons (SGNs) degenerate and developing therapies to prevent it. SGN degeneration resulting from hearing loss reduces the efficacy of cochlear implants used as a therapy.

Linh Thuy Bui (Cheng Lab) was awarded a 2011 Graduate College Summer Fellowship. This fellowship is intended to provide summer funding to students who are working to complete their doctoral dissertations and is awarded based on selected criteria.

Angela Cordle (Cheng Lab) was awarded an Avis Cone Summer Fellowship (2010 and 2011), which supports students undertaking research in labs that focus on organisms exhibiting chlorophyll-based metabolic processes (i.e. plants, photosynthetic bacteria).

Sarah Derry (Slusarski Lab) received a two-year, $52,000 Predoctoral Fellowship from the American Heart Association for her research on Wnt regulators and their role in left-right patterning and proper organ formation. Deviations in left-right patterning can lead to a myriad of malformations, including congenital heart defects.

Jeremy Duncan (Fritzsch Lab) received a scholarship from the Howard Hughes Medical Institute (HHMI) and the National Institute on Deafness and Other Communication Disorders (NIDCD) to attend "The Mouse as an Instrument for Ear Research IV" at The Jackson Laboratory, September 19–23, 2010, in Bar Harbor, Maine.

Jeremy also received travel awards from the NIDCD and the University of Iowa's Executive Council of Graduate & Professional Students (ECGPS) to attend The Association for Research in Otolaryngology (ARO) Thirty-Fourth Annual MidWinter Research Meeting held February 19–23, 2011, in Baltimore, Maryland. Jeremy has been a member of ARO since 2009.

Jeremy was also elected representative of the Department of Biology's Graduate Student Steering Committee (GSSC).

In addition, he was one of twenty graduate students selected to present at the European Molecular Biology Organization (EMBO) Workshop, "Frontiers in Sensory Development," held from May 3–6, 2011, in Barcelona, Spain.

Ukpong Eyo (Dailey Lab) received the Best Poster Award at the *Great Lakes Glia 2011* meeting held September 24–26, 2011, at the Grand Traverse Resort in Acme, Michigan. Ukpong's research focuses on microglial cells and their activity during stroke.

Karry Jannie (Weiner Lab) received the Obermann Graduate Fellow for being selected to the 2011 Obermann Graduate Institute on Engagement and the Academy.

Benjamin Kopecky (Fritzsch Lab) received the Hugh Vollrath Ross Summer Tuition Scholarship for Summer 2011. To be eligible, a nominee must have served as a teaching or research assistant at the UI during the academic year immediately preceding the summer award and have a grade point average of 3.50 or above for their graduate work at Iowa.

MAKING AN IMPRESSION: GRADUATE STUDENT PUBLICATIONS

Graduate students in the Department of Biology have had several articles published in 2010 and 2011. Among those are **Jeremy Duncan, Benjamin Kopecky,** and **Karen Thompson (Elliott),** all from the **Fritzsch Lab.**

Jeremy and Professor/Department Chair, Bernd Fritzsch, are the authors of a chapter in the book, *Sensing in Nature (Advances in Experimental Medicine and Biology)*, that has a publication date of January 23, 2012. Jeremy was also first author on three different articles published in scientific journals. Benjamin is first author on two separate articles that appeared in the June 2011 issue of *Developmental Dynamics* and *Pharmaceuticals* (Volume 4, Issue No. 6). Karen is the first author of an article that was published in the *International Journal of Developmental Biology* (Volume 54, Issue No. 10).

Linh Bui and **Angela Cordle** from the **Cheng Lab**, along with Associate Professors of Biology, Erin Irish and Chi-Lien Cheng, are the authors in Chapter 3 of the book, *Working with Ferns,* published in 2010.

Qinchuan Wang (Lin Lab) is the first author on an article in the May 14, 2010 issue of *Circulation Research.*

For the complete list of graduate student publications in 2010 and 2011, please visit *www.biology.uiowa.edu/graduate_publications.php*

GRADUATES OF BIOLOGY

Doctor of Philosophy (Ph.D.) in Biology

December 2010

Shengda Lin (Slusarski Lab)
Thesis Title: "Wnt5b Signaling in Zebrafish Development and Disease"

May 2011

Arthur Pightling (Logsdon Lab)
Thesis Title: "The Evolutionary History of Meiotic Genes: Early Origins by Duplication and Subsequent Losses"

Shannin C. Zevian (Stipp Lab)
Thesis Title: "Structure-Function Analysis of Tetraspanin CD151"

Summer 2011

Fu-Chiun Hsu (Shih Lab)
Thesis Title: "Construction of Transcriptional Regulatory Pathways Associated with Hypoxia in Arabidopsis"

Master of Science (M.S.) in Biology

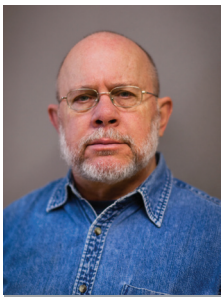
May 2011

Francesca Baglivi (Neiman Lab)

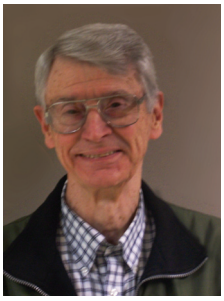
Sarah Bergbower (Eberl Lab)

Stephen Butcher (Manak Lab)
Thesis Title: "The Hidden Transcriptome: Discovery of Novel, Stress-responsive Transcription in Daphnia pulex"

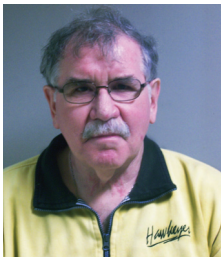
CELEBRATING RETIREMENT



DEAN ABEL retired in July 2011 after 24 years of service as an Electron Microscopy Technician and Assistant in Instruction. Dean's skill in electron microscopy, dedication to maintaining impeccable records, and patience with faculty and students are invaluable assets that he brought to the department. Dean also made a lasting impression with his expertise in mycology and wild flowers. His passion for mushrooms has resulted in several awards, including the President's Award for Service to the North American Mycology Association. A gifted photographer and educator, Dean was truly dedicated to his work and student success. We wish Dean the best in his retirement.



JOHN MENNINGER began his career at the University of Iowa in December 1972 as an Associate Professor in the Department of Zoology and retired with the Department of Biology in May 2011. John's record of service to the Department of Biology, the College of Liberal Arts and Sciences (CLAS), and the University of Iowa is astounding and too numerous to list them all here. Within the department, he held many positions including Associate Chair and Director of Graduate Studies (September 2000 – August 2003), Chair (August 1984 – August 1991), and Professor (August 1978 – May 2011). John also assumed his assignments in the CLAS with the same vigor as he did in the department. Most notable was John's service on the Faculty Assembly and the Educational Policy Committee (EPC), a highly active committee that sets and reviews policy for the CLAS. John was also deeply involved with graduate education, and in 1975, wrote the original application for the T32 National Institutes of Health (NIH) Training Grant in Cell and Molecular Biology and was the program's director for 16 years. He was a member of the American Society of Biochemistry and Molecular Biology and American Association for the Advancement of Science and the recipient of several honors and awards. John's service contributions and achievements are nothing short of exceptional, and we wish him a happy retirement.



LESLIE JENKINS started in the Department of Biology in 1972 and retired in August 2010. His first research position was with Dr. Joseph Frankel for 22 years. For the past 15 years, Les has been a researcher in the Developmental Studies Hybridoma Bank (DSHB) in the laboratory of Dr. David Soll. He has been a valuable member of the DSHB production facility with a strong work ethic and dedication to the success of the DSHB. Les is enjoying his retirement with his wife, Bonnie, and he continues to work for the DSHB on a part-time basis.

To receive future Biology newsletters through e-mail, please visit **www.biology.uiowa.edu/news_emaillist.php** and click on the link to subscribe.

IN REMEMBRANCE

OBITUARIES

(Birth names in parentheses)

Closson, Julia A. (Travis), B.A. Zoology, '27.
June 11, 2010

Foulkes, Robert H., Ph.D. Zoology, '51.
May 22, 2010

Issidorides, Constantine, B.A. Zoology, '47.
November 13, 2010

Johns, Dwight L., M.S. Zoology, '51.
April 8, 2011

Kiyuna, Harold S., M.S. Zoology, '44.
August 2, 2010

Kratoska, Mary K., B.A. Zoology, '73.
September 25, 2010

Marsh, Sandra, B.A. Botany, '58.
November 27, 2009

Nelson, Kathryn A., M.S. Botany, '74.
May 11, 2011

Pascuzzi, Robert D., M.S. Zoology, '51.
June 11, 2006

Pfeifer, Howard W., B.A. Botany, '58.
April 2, 2009

Powers, Jack R., M.S. Zoology, '58.
December 13, 2008

Price, Jerry L., M.S. Botany, '62.
August 2, 2010

Rogers, Rodney A., Ph.D. Zoology, '55.
August 12, 2010

Travis (see Closson)

Vernon, Marian E., B.A. Zoology, '41.
September 12, 2010

Weinstein, Howard, Ph.D. Zoology, '57.
September 10, 2011

Winternheimer, Paul L., M.S. Botany, '55.
April 14, 2011

Source: The University of Iowa Foundation

WE REMEMBER

ROGER DAWSON MILKMAN (1930 – 2011), professor, population geneticist, and polyglot, died from a stroke and complications of Alzheimer's disease on January 5, 2011, in Washington, D.C. He was 80.

Dr. Milkman received his Ph.D. degree at Harvard under R.P. Levine, did postdoctoral work in Paris with Boris Ephrussi, and held professorships at the University of Michigan, Syracuse University, and the University of Iowa.

Milkman's research interests were broad and interdisciplinary, embracing important issues in population genetics, evolution, embryology, and physiology. As a scientist, he will be most remembered for his contributions to the selectionist vs. neutralist debate, for his 1978 *GENETICS* article (volume 88, pp. 391-403) titled "Selection differentials and selection coefficients" that unified two conceptualizations of selection, and for his development and application of a "clonal frames" theory accounting for the structure of genomic diversity in *E. coli*.

Roger Milkman was an extraordinary teacher and mentor. He had a passion for teaching, frequently using metaphor, song, and limerick to explain and clarify complex topics in genetics in a lucid and often humorous way. His students had to re-enact the dance of chromosomes as they learned about cell division. He enjoyed working with students, teaching them the methods and joys of research, while demanding very high standards.

Professor Milkman will be remembered for his vigorous engagement of people and ideas. He observed with sharp eyes, ready tongue, and keen wit. He loved his teaching, science, life, classical music, good food, fine wine, chocolate, languages, instant repartee, and humor. He is survived by his wife of 52 years, Marianne; four children, Ruth, Louise, Janet, and Paul; and six grandchildren.

Source: Obituary provided by the family of Roger Milkman.

ALUMNI
TELL US ABOUT YOURSELF

We look forward to keeping in touch with alumni! **Please visit the Alumni page of our website at *www.biology.uiowa.edu/alumni.php* and send us your news and updated information by completing the "Keep-In-Touch Form"** or contact us by any of the following methods:

E-mail: biology@uiowa.edu

Mail: Department of Biology
143 Biology Building
Iowa City, IA 52242-1324

Phone: 319-335-1050

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To receive notifications about Biology seminars and events, please visit *www.biology.uiowa.edu/seminars.php* and click on the link to subscribe to the Biology Seminars e-mail list.

Image of skywalk that connects Biology Building East (BBE) to the Biology Building (BB)

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