



The Open Reading Frame

University of Rochester
Department of Biology
Newsletter

Message from the Chair

Since the last issue of the departmental newsletter two years ago— when the newsletter was known as *The Nonsense Suppressor*—the Department of Biology has undergone a number of significant changes. Most notably, there is a large cohort of new faculty, including Gloria Culver, Rich Glor, Henri Jasper, Daven Presgraves, Justin Ramsey, and Michael Welte. These folks make up about one-third of our faculty, and the consequent shift to a younger age structure means the department can expect to do well for many years to come. Another benefit will be the addition of new courses that reflect the changing nature of the biological sciences, including Molecular Evolution, Tree of Life, and Molecular Biology of Cell Signaling. Two other significant changes have been made to the curriculum. One is the addition of a new introductory sequence for freshmen (BIO 112 – 113) designed for students who have had AP biology and are interested in research. The other is the introduction of workshops, which involve more active learning than in traditional lectures, into several of our courses. Terry Platt, who was also selected by the undergraduates as the Natural Sciences Professor of the year, has spearheaded this effort. Biology courses as a whole continue to be very popular. Over the last two years, the enrollments in our three required introductory courses have increased an average of 32%. While it is reassuring to see the expanding interest in biology, we are aware that we are approaching carrying capacity in terms of laboratory space.

On the research front, the department is probably doing better than at any time in its history. Success with funding agencies is used as a measure of research accomplishments and potential. In this regard, the department had an extraordinarily successful year, despite the very competitive situation at NIH and NSF, where many programs fund fewer than 10% of submitted proposals. Considering only the grants that started or were approved in the last year, the research funds coming to the department over the duration of these new grants comes to over \$10 million. Contributions from two of our faculty members – Allen Orr (along with graduate student JP Masly) and Daven Presgraves – were listed in *Science* magazine's Top 10 Breakthroughs of the Year for 2006. Daven was also elected by the Genetics Society to be the 2008 recipient of the Balfour Prize, which recognizes contributions to genetics by an outstanding young investigator. Allen Orr was awarded the Shirley Cox Kearns Chair of Biology. All in all, this has been a banner year for the department.

On a personal note, I want to give special thanks to the extraordinary staff members of this department, without whose help my term as Acting Chair this past year would have been much more difficult. Finally, I want to express my thanks to all of the students I have known and taught over the years, because you are the ones who make teaching such a rewarding activity.
–John Jaenike



Editors: Tara & Justin Ramsey
Illustrations: Marianne Arcoraci
Phone: 585/275-3850
Fax: 585/275-2070
e-mail: urbionews@gmail.com

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One Hundred and Five Biology Majors Earn Degrees in 2007



The department of Biology will be awarding one hundred and five diplomas on Sunday, May 20th, 2007, at 11:30 a.m. in the River Road Auditorium. This year's graduating class is made-up of sixty women and forty-five men. The Class of 2007 have satisfactorily completed the requirements for one of the four Biology Department tracks including: B.A. in Biology (BIO), B.S. in Biological Sciences: Cell and Developmental Biology (BCD); B.S. in Biological Sciences: Evolutionary Biology and Ecology (BEB), B.S. in Biological Sciences: Molecular Genetics (BMG).

Dr. John Jaenike, Professor of Biology and Department Chair, will be the Master of Ceremonies by welcoming students and guests in addition to handing each student their diploma.

This year's student speakers are chosen by the faculty for excellence in academics and research and for service to the College, are Joseph Hatem, who will be introduced by Dr. Linn Sajdak, and Elise Peterson, who will be introduced by Dr. Elaine Sia.

Dr. Elaine Sia will present the Janet Howell Clark Prize, a College award given each year to a senior woman who has shown promise in creative work in science and mastery of allied fields. Elise Peterson (BMG), class of 2007, is the recipient. Dr. Linn Sajdak will be presenting the Ayman Amin-Salem Memorial prize to Erin Partington. The fund was established by the family of Ayman, a student in the class of 1987, who died in a automobile accident. The prize is to be awarded to that member of the senior class who best evidences the qualities of good character and good citizenship, such as decency, reliability, responsibility, and congeniality. Dr. David Goldfarb will present The Donald R. Charles Memorial Prize. Given annually by the Biology Department to students who show great potential and have exhibited excellence in science, the 2007 Charles Award will be received by Lara

Abramowitz (BMG), Emileigh Greuber (BMG), Joseph Hatem (BIO), Annie Marie Le (BCD), Elise Peterson (BMG), Erin Partington (BCD), Jillian Warejko (BMG)

The ceremony will culminate in the awarding of diplomas. Dr. Cheeptip Benyajati (BCD) will present the students that have earned degrees with Distinction in Research, Phi Beta Kappa, and Latin Honors. Personalized messages written by graduates will be announced as they receive their diplomas by: Dr. Anthony Olek, Dr. Cheeptip Benyajati, Dr. Jim Fry, and Dr. Elaine Sia.

A reception will be held immediately following the ceremony in the tent on the front lawn.

Graduating Class of 2007

Bachelor of Arts

Biology:

Abdulla N. Almarzouqi
Pradeep M. Ambrose
Sarah A. Baroody
Kyeesha T. Becoats
Leah M. Burn
Christine E. Cho
Abraham B. Chol
Sylvia L. Christie
Ryan W. Circh
Marta Davis-Tetrault
Nicole T. Dibello
Amanda K. Doyle
Sarel Gaur
Sandra C. Georgescu
Heather B. Good
Benjamin P. Griffith
Maya U. Gurme
Joseph Hatem, ΦBK
Wook Soon Jung
Christopher P. Jurgensen
Ruth J. Kang
Dae Joong Kim
Sirish K. Kondabolu
Kevin T. Lai
Christopher K. Lee
Kug-Hwa Lee
Ashley L. Lisiewski
Kathleen K. Lomen
Jane A. Lungershausen
Anthony M. Mark
Dana C. Mueller
Kelly R. Nichols
Patrick M. O'Brien, ΦBK
Karissa M. Page
Chavon J. Phelps
Michelle R. Polley
Zachary C. Riesenberger
Yousef H. Rizvi

Dana R. Sall
Katherine R. Schwartz
Michael J. Shephard
Christine F. Singbusch
Chirag D. Surti
Nadya A. Telt
Dana F. Tievsky
Nicholas J. Tolli
Jessica L. Turner
Mary C. Walsh
Pamela L. Wang
Scott I. Weiner
Dennis J. Weisbrod
Stephanie Yee
Byung Rhae Yoo
Joshua P. Zeidenberg
Lauren A. Zohler

**Bachelor of Science
Cell and Developmental
Biology:**

Amanda R. Avery
Jessica B. Badlam
Andrea M. Beanan
Ashley E. Chiasson
Kelsey J. Croft
Maureen L. Dudiak
Christopher M. Hancock
Arbab Z. Iqbal, ΦBK
William E. Karle
Marianna J. Kuttothara
Annie Marie Le, ★

Crystal A. Lee
Yun Li
Nathan Major
Patrick K. McCarthy
Erin J. Partington, ΦBK
Sanjay S. Patel
Michael J. Peluso
Joanna M. Ramnarine
Arjun V. Sharma
Khetisuda Suvarnasuddhi
Steven Z. Swartz
Mustafa M. Syed
Ian S. Taylor
Ye Wang, ΦBK

**Evolutionary Biology
and Ecology:**

Jomo Omari Edwards
Ann K. Gisinger
Sabrina A. Gmuca
Karen L. Gromer
Kari F. Joyce
Nina S. Kohli
Christine Ling
Jennifer M. Marshall
Iram A. Nadroo
Beixue Shen
Thomas M. Spangenberg

**Bachelor of Science
Molecular Genetics:**

Lara K. Abramowitz, ΦBK ★
Latrice A. Akuamoah
Michael J. Bozzella, ★
Brendan C. Carlin
Stephanie Y. Chiu
Brian M. Clancy
Virginia V. Coleman
Jonathan D. Dashkoff
Justin W. Gorski
Emileigh K. Greuber, ΦBK ★
Amelia W. Hall, ★
Jeffrey A. Hashim
Elise B. Peterson, ΦBK ★
Jonathan C. Schroeder
Jonathan A. Stonham
Keith R. Syverson
Bradley R. Taylor
Jillian K. Warejko, ΦBK

ΦBK: Phi Beta Kapa ★: Degree with Distinction in Research

Research Emphasized as Major Component of Biological Science Education at UR

The Biology Department of the University of Rochester, together with the research departments of the School of Medicine and Dentistry located just a five-minute walk away, offers a diversity of opportunities to its majors for engaging in hands-on modern biomedical research. Those opportunities are limited only by students' talents and by their persistence in searching for faculty with research projects that match their interests. Every year Biology majors engage in laboratory research as volunteers, as student employees, for credit in IND 395, and in the summers as research fellows either at the UR or at other institutions as well as in paying jobs for biotechnology companies.

Independent Research

Several members of the Biology Department graduating class of 2007 have done one or more semesters of Independent Research for credit.

Those students, their faculty sponsors, sponsor's department and number of semesters of research are: Lara Abramowitz, Xin Bi; Latrice Akuamoah (2), David Goldfarb; Cynthia Arvizo, Elaine Sia; Michael Bozzella (2), Vera Gorbunova; Yun Jae Cho, Baek Kim; Maureen Dudiak, Vera Gorbunova; Kiana Frank, Robert Marquis; Daniel Goldstein, Coeli Maria Lopes; Emileigh Greuber, Patricia M. Hinkle; Amelia Weber Hall (2), Vera Gorbunova; Christopher Hancock (2), Henri Jasper; Jeffrey Hashim, Michael A. O'Reilly; Joseph Hatem, Henri Jasper; Scott Hughey, Baek Kim; Christopher Jurgensen, Michael W. Becker; William Karl, Fred K. Hagen; Shweta Krishnan, Elaine Sia; Anita Kulungara (2), Elaine Sia; Annie Marie Le (2), Michael Zuscik; Christopher Lee (2), Ignacio Sanz; Christine Ling, Daven Presgraves; Kelly Querfurth McMahon, J H David Wu; Iram Nadroo, Daven Presgraves; Thomas Pasqualucci,

Robert Minckley; Daniel Quintana, Allen Orr; Linnell Bentley Randall, Elaine Sia; Jonathan Schroeder, Xin Bi; Katherine Schwartz, Brian M. Ward; Anthony Scott, Willis Li; Beixue Shen, Richard Glor; Christine Singbusch, James Palis; Jorawer Singh, Carol L. Miller-Graziano; Anna Sokolov, Vera Gorbonova.

De Kiewiet Fellowship

The Undergraduate Program in Biology and Medicine (UPBM) has been awarding de Kiewiet Summer Research Fellowships since 1983 to UR students majoring in one of the UPBM tracks. Although the number of applicants is small compared to most summer programs, the competition is intense.

Students applying must already have a mentor and must submit a detailed research proposal. The summer fellows work fulltime in a lab for 10 weeks. Class of 2007 graduates who have been de Kiewiet fellows are:

Lara Abramowitz, BS BMG

Title: "Characterization of Macrophages Infected with Frog Virus 3 (FV3) in *Xenopus laevis*"
Mentor: Dr. Jacques Robert
Department of Microbiology & Immunology

Alena Janda, BS BBC

Title: "Activity and Structural Characterization of Human APOBEC3G"
Mentor: Dr. Joseph E. Wedekind
Department of Biochemistry & Biophysics

Shweta Krishnan, BS BMG

Title: "Importance of Protein-protein Interactions for the Function of Mgm101p"
Mentor: Dr. Elaine Sia, Leah Pogorzala
Department of Biology

Erin Noble, BS BMB

Title: "ATP synthase activities of *Streptococcus mutans* in Suspensions and Biofilms"
Mentor: Dr. Robert Marquis
Department of Microbiology and Immunology

Elise Peterson, BS BMG

Title: "Dissecting the Mechanism Underlying HSV/SB Hybrid Vector Neuro-specificity Following In utero Gene Delivery"
Mentor: Dr. William Bowers
Center for Aging and Developmental Biology

Katherine Sharp, BS BBC

Title: "Identifying the Region of CD28 Responsible for Localization to the Immunological Synapse"
Mentor: Dr. Jim Miller
Department of Microbiology and Immunology in the Center for Vaccine Biology Immunology

Aadhavi Sridharan, BS BNS

Title: "Dopamine Modulation of Synaptic Plasticity Related to Avian Vocal Learning"
Mentor: Dr. Kathy Nordeen
Department of Brain and Cognitive Sciences

S. Zachary Swartz, BS BCD

Title: "Expression Pattern of Vasa During *Ilyanassa obsoleta* Development"
Mentor: Dr. Dave Lambert
Department of Biology

UPBM Summer Research

The UPBM offers independent research opportunities to allows students in B.A. and B.S. tracks to gain research experience in the laboratories of Program Faculty during the school year. Students that participated in the UPBM Poster Session during summer 2006 are:

Emileigh Greuber, BS BMG

Title: "TRH Receptor Phosphorylation Sites Involved in Beta-Arrestin Recruitment, Desensitization and Internalization"
Mentor: Dr. Patricia Hinkle
Department of Pharmacology & Physiology

Annie Le, BS BCD

Title: "Mechanisms of Microtubules and Intermediate Filaments in Chondrogenesis of Human Mesenchymal Stem Cells"
Mentors: Dr. Rocky Tuan and Dr. Faye Chen, Dr. Benyajati, UR Faculty Mentor
Cartilage Biology and Orthopedics Branch
National Institute of Arthritis, Musculoskeletal and Skin Diseases, NIH

Ye (Elaine) Wang, BS BCD

Title: "Investigating the Role of microRNA miR34a in Embryonic Skin Development"
Mentor: Dr. Elaine Fuchs, the Rockefeller University, Dr. Cheeptip Benyajati, UR Faculty Mentor
The Rockefeller University

Twelve UPBM Graduates Earn Distinction in Research

The Undergraduate Program in Biology and Medicine (UPBM) provides majors in the B.S. or B.A. tracks the opportunity to graduate with distinction in research. Students must defend their written thesis at a meeting of their advisory committee. Most students seeking a degree with distinction have worked on a research project for a year or more and have achieved significant results. They then immerse themselves in the time-consuming process of writing the thesis. Those who successfully complete their research and then push on to write the required paper are rewarded with the phrase "Distinction in Research" added to their transcripts.

The twelve members of the class of 2007 who have earned the honor of "Distinction in Research" are:

Lara K. Abramowitz, BMG

Title: "Characterization of Macrophages Upon FV3 Infection" Mentor: Dr. Jacques Robert
Mentor: Jacques Robert

Ferhina S. Ali, BNS

Title: "Effects of cortical damage and visual training on adult neurogenesis in the cat brain"
Mentor: Dr. Krystal Huxlin

Michael J. Bozella, BMG

Title: "The efficiency of DSB repair during cell cycle arrest"
Mentor: Dr. Vera Gorbunova

Emileigh K. Greuber, BMG

Title: "Phosphorylation and Dephosphorylation of the Pituitary Thyrotropin-Releasing Hormone Receptor"
Mentor: Dr. Patricia Hinkle

Amelia Weber Hall, BMG

Title: "The Effects of Irradiation Oxidative Damage and Oncogenic-Induced Senescence on DNA Repair Efficiency in Human Dermal Fibroblasts"
Mentor: Dr. Vera Gorbunova

Alena Janda, BBC

Title: "Structural and Nucleic Acid Binding Properties of Human APOBEC3G"
Mentor: Dr. Joseph Wedekind

Annie Marie Le (BCD)

Title: "Inhibition of BMP-2 signaling prevents hypertrophic maturation of murine C3H10T1/2 multipotent mesenchymal cells"
Mentor: Dr. Michael Zuscik

Erin R. Noble, BMB

Title: "ATP Synthase Activities of Oral Streptococci in Suspensions and Biofilms"
Mentor: by Dr. Robert Marquis

Ryan S. O'Dell, BNS

Title: "Operant Conditioning of Neuromuscular Connections in the Primate Motor Hand Representation"
Mentor: Dr. Marc Schieber

Elise B. Peterson, BMG

Title: "Neuronal specificity of HSV/Sleeping Beauty amplicon transduction in utero is driven primarily by tropism and cellular co-factor expression profiles during embryogenesis"
Mentor: Dr. William Bowers

Tracey B. Tucker, BNS

Title: "Intrinsic Inputs to Central Amygdaloid Nucleus Subdivisions – Relationship to Immature Neurons"
Mentor: Dr. Julie Fudge

Vladimir Presnyak, BBC

Title: "Sequence Elements Responsible for Cytoplasmic Retention of A3G"
Mentor: Dr. Harold Smith

ATTENTION

Former students and employees of the UR Biology Department!



We want you!

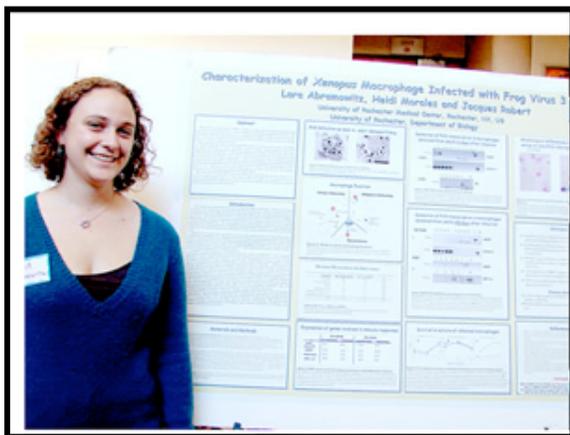
to be included in the alumni section of "The Open Reading Frame."

Let us know where you've been and what you've done since leaving the University of Rochester.

Email us at:
URBioNews@gmail.com.

Life-Shaping Experiences and Future Plans

Lara Abramowitz '07, BMG



Ask most 11 year olds what they want to be when they grow up and they will most likely answer with a super- hero, fireman, doctor, or astronaut. However, if you asked an 11-year-old Lara Abramowitz what she wanted to be, the answer was a geneticist. While most children were out to save the world by helping one person at a time, I wanted to save the world through the use of science. I immediately fell in love with genetics the first time I learned about it in the sixth grade. I also developed an interest for research before entering into college. In high school I interned at Cold Spring Harbor Laboratory's Dolan DNA Learning Center—this is where I fell in love with lab work.

I entered the University of Rochester with the intention of taking advantage of the university's many offerings of classes and research. I pursued my long-standing interest in genetics and also discovered a new passion for evolutionary biology. I have been working for the past two years in the lab of Dr. Jacques Robert, characterizing *Xenopus* macrophages upon infection of Frog Virus 3 (FV3). I spent the summer of 2006 continuing this project with a DeKiewiet Fellowship provided by the Biology Department. This was also the same research that comprised my senior thesis.

I plan to enroll at the University of Pennsylvania this fall in pursuit of a PhD. I will be in the Cellular and Molecular Biology department's Genetic and Gene Regulation program. With my PhD, I hope to one day become a faculty researcher at a university.

Latrice Akuamoah 07, BMG



I entered the University of Rochester knowing that I wanted to major in molecular genetics. I was not exactly sure where I was headed with this degree so I figured I would take the few extra classes that would also qualify me as a pre-medical student. After speaking with numerous premed students that were convinced that none of us would be accepted into medical school without having research experience, I emailed every professor that had a lab job opening. And that is how I found the Goldfarb lab.

I started as a dishwasher, at first looking for a resume-building experience. Now that I have moved on to actual research and have more responsibility, I love working in the lab. All of the people that I work with are friendly and motivated. Professor Goldfarb is a great person to work with because he is open to the ideas of students and, moreover, encourages individual development inside and outside of the laboratory. With his help, I was able to co-write and receive a grant from the National Institute of Health to fund the research that I conducted this year.

Although I thoroughly enjoyed my experiences in basic research, I have decided to pursue my interests in medicine. With the encouragement and support from my mom, dad, sisters, Uncle Larry, Aunt Pat, Uncle Jeff, and Venita, I successfully completed my educational experience at the University of Rochester as well as the medical school application process. I have not yet decided where I will attend medical school but will begin classes this fall.

Shane Campbell-Staton '08, BS BEB



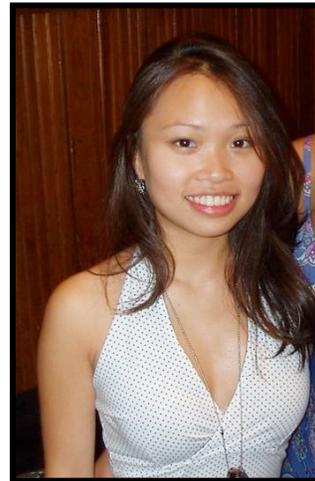
My interest in the biological sciences was sparked during my junior year of high school. This is when I began exploring animal conservation and herpetology (the study of reptiles and amphibians) as potential career goals. My senior year I embarked on a yearlong project in which I kept, cared for and studied the natural history of several reptile species. After the conclusion of my senior year, I knew I wanted to be a biologist.

As an undergraduate in the biology department at the University of Rochester, I have found that my interest and appreciation for the sciences have grown with every semester. The courses offered have taught me a lot about what I will need to do and the type of person it takes in order to become a successful biologist. I have found the faculty in the biology department as helpful as the courses themselves in providing me with tools and advice.

Working with Professor Bob Minckley—an entomologist in the department—in Mexico last summer gave me critical insight on how to put together a large project and what it takes to conduct fieldwork. Although Professor Minckley does not work in the research area I am pursuing, I have found that the tools I gained working with him are applicable to other areas of the biological sciences. I am now working with Professor Richard Glor, a herpetologist. With his help I hope to gain knowledge of the herpetological field that will help further my education and passion for the science.

As I approach my last semesters, I am in the process of looking for PhD programs at other research universities, including the University of Florida, UC Davis, and the National University of Australia. I would eventually like to become a professor and research scientist. It is my hope to make whatever contributions I can to the biological community animal conservation efforts worldwide.

Annie Le '07, BCD



As a high school senior, I was accepted into the NIH Undergraduate Scholarship Program, an academic program for students dedicated to careers in biomedical research. As I matured as a student and scientist, I gained a deeper appreciation of the gift I had been given. It is the program's hope that my fellow scholars

and I will take up the cause of the NIH and study "science in pursuit of fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to extend healthy life and reduce the burdens of illness and disability."

This emphasis on ameliorating the suffering of others was first made apparent to me during an unusual experience in the pathology laboratory at the hospital where I volunteered during high school. One morning, I entered the lab to find Dr. Claiche, the resident pathologist, helping a surgical nurse squeeze a severed leg through his drive-thru style window—which had gotten stuck again. Exasperated, he motioned for her to go back down the corridor and enter through the main door. The three-legged nurse finally arrived and set the specimen down on the examination table. When Dr. Claiche completed the examination, he gave the leg a loud slap and cracked, "Better luck next time, Bub!" Dr. Claiche always tried to lighten the mood with his jokes, but this time a slight strain in his voice made me realize that the glove layer between Bub and Dr. Claiche was not enough protection from the highly contagious human compassion that drives scientific inquiry. To me, human compassion is the condition without which we may not aspire to

improve medicine. In fact, I too had contracted that human compassion from my prolonged exposure. I went home that night with a feeling of accomplishment; I knew what I wanted to do with the rest of my life.

My research career unfolded in college. I entertained my interests in evolution in Professor Jack Werren's lab, where I studied the genetics of *Nasonia*. The UGSP then sponsored my first biomedical research experience at the NIH. My research experience in Dr. Rocky Tuan's lab introduced me to the world of stem cell research and its potential to cure diseases. For the past three summers, Dr. Tuan and Dr. Faye Chen have mentored me in scientific thinking and helped me to see how basic science contributes to improving the quality of life. During the school year, I conduct research under Dr. Michael Zuscik at the University of Rochester Medical Center. With my background at the NIH, I was entrusted with mapping out and running my own experiments. Dr. Zuscik inspired me to pursue a senior thesis investigating the effect of *Smurf1* on chondrogenic differentiation and its relevance to osteoarthritis.

My studies in anthropology have highlighted issues of health disparities in our communities. We often forget that those who seemingly lack the ability to make important decisions on healthcare are simply not provided with the proper tools to do so. My grandmother is a personal example. She is a mother of seventeen and frequently changes her mind regarding the number of grandchildren she has. Although we greatly outnumber our matriarch, we are not enough to convince her that her doctors are not trying to scam her. She continues to accuse them of performing unnecessary procedures and believes that she is the expert on the correct combinations and dosage of medications that make her feel better. My grandmother simply does not accept that her actions are detrimental to her health. My experience with her has taught me that cultural and language barriers can impede medical treatments. It is important that the work I do translates well to elderly, underprivileged, or culturally diverse patients. With this and my research interests in mind, I will begin my PhD research in Molecular Pharmacology at Yale University this coming fall.

The University of Rochester offers excellent teaching opportunities and training with formal studies of

pedagogy, which I have actively participated in because I would like to become a professor. This career goal stems from the fact that an important part of my development has been my excellent mentors. My personal goal is to become a good mentor as well, because I believe that mentorship is imperative to the continuation of science and is conducive to advances in medicine.

During my development as a young scientist, I recall once feeling ashamed that I was not pursuing science "for the sake of science itself," but now I assuredly subscribe to science for the sake of others.

Elise Peterson '07, BMG



I have been a stereotypical biology nerd since I was eleven years old. That was the year I joined the Science Olympiad team and first discovered Mendelian ratios and Punnett

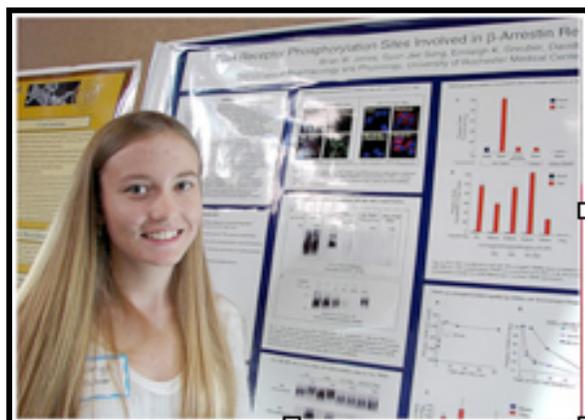
Squares. I came to U of R in part because of this experience—I wanted to be genetics major, and this school was one of the few places I found that would allow me to specialize in this way. I have never regretted it, not even during the marathon study sessions for Professor Stan Hattman's Bio 115, or the all-nighters that I went through trying to format images in my laboratory in molecular genetics reports. It might sound strange but I even enjoyed those times when I was trying to remember how chromatin acetylation affected gene transcription on a test or trying to reach a reasonable conclusion from of a half-melted DNA gel. I will miss those classes and those professors who pushed all of their students to work hard and be better but who were always around to answer emails or step out of their labs to help you.

I have been a TA several times over, and I think that has been the most rewarding experience of all. My fellow TAs even made grading fun—though we were locked in a windowless room in Hutch,

surrounded by stacks of papers and red pens—we still laughed more than we probably should have. I was lucky to be able to talk to so many amazing students, who asked questions I never even thought of and forced me to learn more about my chosen field than I had ever thought to learn on my own. I have gotten to work closely with some of the best researchers and professors I will probably ever meet, who always encouraged me to pursue whatever interests I had, even if it meant double majoring, writing two honors theses and applying to MD/PhD programs.

Now that I am about to head back to Missouri to pursue my combined MD/PhD at Washington University in St. Louis, I'm starting to realize how much I will miss everything and everyone here. This school became my family in a way I never expected, and sometimes I think I'm not ready to leave. I'm not sure I will miss the April snow showers but I cannot imagine not being able to walk down the halls in Hutchison and stop and talk to Professors Benyajati, Sia and Platt, to ask advice and feel encouraged. And I will miss all of my amazing friends, in and outside of the Biology department, who may have called me crazy for all the work I did, but who really kept me sane anyway. My life here was hectic and stressful but also so much fun. I think I got the most out of my time here that I could have, and I can leave feeling like I accomplished something significant in the last four years. Class of 2007, good luck in everything. We finally made it!

Emileigh Greuber '07, BMG



I came to the University of Rochester with the intention of studying molecular biology. I have been fascinated by biology since high school, and when I came to Rochester, I found there was much to learn. My first classes at Rochester reinforced my

desire to study biology but it was not until I took upper-level coursework that focused on how and why particular experiments were done that I became convinced I had made the right decision. Professor Elaine Sia's molecular biology class emphasized the experimental aspects of the science and gave me an appreciation for how many of the mysteries of molecular biology were solved. I learned how to think as a scientist – to propose hypotheses, to test them, and to interpret the results.

My first independent research project began in the summer of 2005 when I participated in the Graduate Education in Biological Sciences (GEBS) Summer Scholar Program, a ten week summer internship at the University of Rochester Medical Center. I worked with Professor Patricia Hinkle in the Department of Pharmacology and Physiology. It was there that I developed an interest in signal transduction and receptor biology. My work focused on the thyrotropin releasing-hormone (TRH) receptor, a G protein-coupled receptor (GPCR) in the pituitary gland that is responsible for thyroid stimulating hormone secretion. GPCRs are the largest class of integral membrane proteins in the human genome and they regulate many physiological functions including vision, taste, smell, hormone secretion, neurotransmission, and cardiovascular function. I studied how phosphorylation and dephosphorylation of the TRH receptor tail regulates its ability to transduce downstream signals. Phosphorylation of the cytoplasmic tail of the TRH receptor causes cytosolic proteins known as arrestins to bind to the receptor and to inhibit receptor interactions with the G protein as well as to promote receptor internalization. This process of shutting off signaling is known as desensitization. My work focused on what regions of the receptor tail become phosphorylated in response to agonist and where in the cell dephosphorylation can occur. I found that dephosphorylation can occur in multiple subcellular locations, implicating a dynamic way to regulate receptor responsiveness.

I stayed in the Hinkle lab for two semesters of independent research, and I studied how receptor signaling also influences receptor dephosphorylation. My work showed that protein kinase C (PKC), a kinase activated TRH signaling receptor, does not play a major role in phosphorylating the receptor but does play a role in stabilizing the phosphorylated

state of the receptor. This may have important physiological consequences as activation of PKC will actually promote receptor desensitization and prevent overstimulation.

In the summer of 2006 I was awarded the Endocrine Society Summer Fellowship to study the kinases responsible for TRH receptor phosphorylation. Using an RNAi based approach, I have implicated G protein-coupled receptor kinase 2 (GRK2) as being the physiologically relevant kinase. This work was recently published in the Journal of Biological Chemistry.

My experience in the Hinkle lab has helped me develop as a scientist and as a student. It has also reaffirmed my goal to become a scientist and pursue research in the future. I would like to thank Dr. Hinkle for her support, wisdom and guidance; Brian Jones, a graduate student in the Hinkle lab, for his support and friendship; Professors Sia and Platt for their encouragement as well as the Department of Biology for offering so many wonderful courses. I will be joining the Department of Pharmacology and Cancer Biology at Duke University this fall to pursue my PhD.

Amelia Hall, '07 BMG



My parents encouraged me to do what I loved, and this is why I am here today. I have pretty much always been interested in biology. Nature fascinated me, and I did a lot of scientific exploration on my own. I walked a lot in the woods; I would bring pond water home and look at it under this old microscope from my grandfather's medical school days. Seeing the little protists in the water just floored me.... I had never thought of water as alive

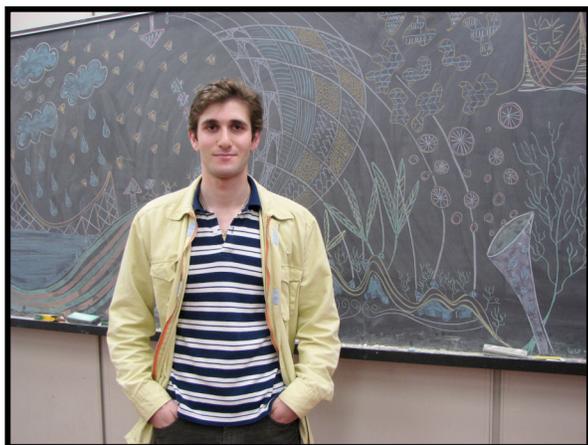
before. I did not become involved with biology because of external influences – I was simply drawn to it. Studying biology was a natural progression from playing with a microscope as a child.

In high school, my interests became more refined from general biology to genetics. When I went to Rochester, I knew I was a molecular genetics major. There was never any real question in my mind at all. It has been a long road from freshman year to now, but with the end in sight, I am confident that everything that has happened over the past four years has had a purpose. Currently, I am studying DNA repair with Professor Gorbunova and Professor Seluanov, and have recently finalized my senior thesis on this work. The research I have done the past year has been life changing – it solidified my interest in molecular biology, and more specifically, cancer and aging biology. I cannot thank Vera Gorbunova and Andrei Seluanov enough for allowing me to work in their lab.

I am also a Religion Minor, and taking religion classes has changed the way I look at my research and the biology classes I take. Enrolling in the Theories of Religion course last semester changed me the most. That class drew parallels between religion and biology I might have vehemently opposed before. I view my classes as a sort of "learning worship" but instead of searching for the Divine or a Reason to exist, I am looking for answers to how the world works. For me, molecular biology proposes many possible ways in which the world works and this is why I love to keep learning about it.

I would like to enter a doctoral program in the next few years. I hope to work as a lab technician or research assistant before then, to make sure I really love the process and procedures of research before dedicating myself to it. In the end, I want to be sure whatever I do has the end goal of helping people in some way, no matter how small.

Joseph Hatem '07, BIO



The biology department is a place where one truly experiences what it means to be a student. We have been given enormous flexibility in how we went about earning our degrees. Almost four years ago, in the fall of our freshman year, we all filled the lecture halls, each of us with different backgrounds, expectations, and uncertainties. Later, we decided upon individual interests and entered more specific fields. From department to sub-departments, our class settled into shape, not through division but rather expansions into every possible field.

We each have our way of living in both the sub-department and the department, with individual interests and with the biology community. There are those that will spend time in research and present to us at poster sessions. Others play an important part in the organization of department activities via SUBS (Society of Undergraduate Biology students). Some help the library staff or prepare for laboratory courses. Myself, I have invested three years in the teaching assistant program, focusing specifically on first-year courses. Having greatly benefited in my first year from the instruction and guidance of senior peers, I consider it an honor to take part in such a uniquely strong program that, in a sense, completes the link between freshman and upperclassmen, adding yet more to the already rich community atmosphere in our department.

Deby Philbrick '08, BIO



Science always seemed to be natural course of action for my life because I was one of those little kids who always asked "why?" but was never satisfied with an answer until I figured it out myself. I ultimately hope to obtain an MD in pediatric otolaryngology and am currently struggling between declaring a major in Ecology and Evolutionary Biology or Molecular Genetics. Since my freshman year, I have worked in the Jaenike Lab and look forward to pursuing my own research this summer in cold tolerance of tropical and North American species of *Drosophila*.

Katie Sharp '07, BBC



Since my elementary school science fairs, I have had an interest in science. I started to focus on biology in my second year of high school biology class, taught by Mr. Polansky. In his class we learned about genetics first hand by breeding fruit flies and corn, both to the second generation. Second semester, we learned about microbiology by separating a mixed culture of two bacterial species and identifying them. I was hooked. I loved being able to answer questions about things you could not see by performing relatively simple tests such as running a gel or growing bacteria under specific conditions.

During my first years at the University of Rochester, I really enjoyed my organic chemistry classes with Professors Dinnocenzo and Frontier. This is what initially inspired me to investigate biochemistry major—it seemed like a great way to combine my interests. Professor Eickbush's eukaryotic genomes

course was another one of my favorites. He taught me how to read scientific papers so that I actually understood them and could question the results they presented. I also enjoyed Professor Orr's course on evolution and Professor Nilsson's bioorganic chemistry class. Evolution is the basis for understanding biology, and Professor Orr made the topic accessible and interesting. In Dr. Nilsson's class I was able to understand the chemistry underlying techniques I used in the lab everyday, such as how short sequences of DNA can be synthesized accurately. He also gave challenging assignments that allowed me to learn in depth about the emerging field of RNAi while also challenging me to improve my skills as a scientific writer.

Sophomore year, I began working in Dr. Jim Miller's lab in the immunology department where we study T-cell activation. I liked being in the lab atmosphere and learning new techniques, but I struggled to find time during the semester to get started on my own research project. That is why I decided to apply for a DeKiewiet Fellowship that would enable me to stay in Rochester and work on a project during the summer. I received the fellowship and spent the summer between my junior and senior years doing research. This time confirmed for me that I want to go to graduate school to pursue a PhD in biochemistry. Next year I am planning to move to France to explore and cement my skills in the language. Because I really enjoy the research process, my long-term goal is to make it my career.

Johanna Smith '07, GEO, BI



Two things have influenced my course of study: my love of the outdoors and my fascination with understanding how it came to be. Being a geology major and biology minor has been a perfect combination because I have studied the evolution of

the Earth and life, and how the two have influenced each other. For example, it is impossible to study the evolution of humans without understanding the paleoenvironmental conditions that drove natural selection. Likewise, a study of geology is not complete without the knowledge of the biological factors that influenced it, such as the type of plant biomass's effect on the carbon isotope composition of carbonate nodules in soils.

One of the reasons I decided to focus on geology is due to the fieldwork opportunities that allow me to be outdoors. During the summer of 2006, I spent a month in northeast Tibet with Professor Carmala Garzione and graduate student Brian Hough of the Earth & Environmental Science department. We collected data about environments of deposition, collected samples for stable isotope analysis, and spent a week camping, which was in fact my first camping experience outside of a state park. This winter break I attended the MIT Structural Geology field camp, spending a month with other undergraduates while mapping the Arizona desert. My expectations of Arizona were completely dashed when I realized just how cold it could get in the winter; one morning the milk actually started to freeze in my cereal bowl as I was eating it! Despite the cold, this trip really solidified my love for camping and hiking and I am excited about the prospect of having a research career that includes them!

This coming May I will be traveling with Professor Garzione for a two week trip to Bolivia to sample a stratigraphic section for stable isotope analysis and, thereby, infer the uplift history of the Bolivian Altiplano. I hope to be able to continue research in Bolivia for a master's thesis under the supervision of Professor Garzione, who has mentored me, given me many opportunities and actively nurtured my interests in both geology and biology. In the future, I would like to study more about the interactions of paleoenvironments and paleoecology to further satisfy my questions about evolution.

Daniel Quintana '08, BEB



I am a junior at the University of Rochester working on my B.S. in Ecology and Evolutionary Biology. I am also a member of the University of Rochester Men's Varsity Swimming Team, Junior Representative for the Society of Undergraduate Biology Students

(SUBS), and a Brother of Sigma Beta Rho Fraternity, Incorporated. Currently I am planning on either attending graduate school to obtain a PhD in Evolutionary Biology or attending Dental School to become an orthodontist.

My interest in Evolutionary Biology was first sparked by my high school Biology teacher. That interest grew more as I began taking courses in Biology here at the University of Rochester. However, my interest in research began when I took a Genetics laboratory course my sophomore year and concurrently worked as a technical assistant in Professor Rita Miller's laboratory. I have worked for the past year and a half in Professor Miller's laboratory of yeast cell biology and molecular genetics, and learned to prepare DNA mini preps, bacteria transformations, and yeast transformations as well as prepare media using sterile techniques from the very talented graduated students, Nida Meednu and Sonia D'Silva.

Although I enjoy doing lab work with Nida and Sonia, my scientific interests are in the genetics of speciation. This semester I was given an opportunity to pursue my scientific interests and conduct research in Professor Allen Orr's laboratory of evolutionary genetics. My current project is on the genetics of hybrid sterility and meiotic drive in *Drosophila*. Working on this project alongside Nitin Phadnis, my supervising graduate student, has been an exciting learning experience. He has taught me so much in such a short period of time and has done so with genuine interest and much patience. Nitin also encourages me to ask questions and inspires me to work hard for my goals. Thanks to his help,

as well as Professor Orr's, Sonia's, and Professor Miller's, I received an internship to conduct research this summer with Dr. Eric Nagy at the University of Virginia Mountain Lake Biological Station. I look forward to working with Dr. Nagy whose work explores the evolutionary dynamics of natural hybrid plant populations.

I would like to thank Jeremy Rabinowitz, my TA for Biology 111 Lab and Genetics Lab, who initially got me interested in research; Professor Rita Miller for employing me in her lab and for her recommendations; Sonia and Nida for all their advice, interesting topics of conversation, and good lunch food (especially dessert); Professor Elaine Sia and the entire Sia laboratory for adopting me as one of their own; Professor Allen Orr for giving me the opportunity to work in his lab, for his advice, and his great recommendations; Nitin for allowing me to work with him and teaching me the skills to be a master fly pusher; and last but not least, the entire Orr Lab for being very welcoming and showing me the ropes of the lab. Without these people I would not be where I would be today and I am grateful.

Jill Warejko '07, BS BMG



A lot of people say that the teenage years are the most confusing years of your life. This is a lie—college is clearly much more confusing and formative than adolescence ever was. Sure, being a teenager is awkward, but college? College is scary. Or it was, until I discovered how much I loved

biology.

I knew I wanted to go to medical school but was fuzzy on the details beyond that. Then fate, or as we call it at the university, the Biology Department, intervened. As a first semester freshman, I took Professor Stan Hattman's Bio 115 course and immediately fell in love with the subject of genetics. At last! I had the first piece to my puzzle of a life—a major. Now, how would I make that major applicable for my future medical career? It was a

combination of Biology courses 202, 250, and 268, and the unwavering guidance of Professors Sia, Platt and Hinkle that inspired me to do research and elucidated my career path. Through their attentiveness to the education of their students, they showed me that I could think like a researcher, something that I initially did not think was possible. Last summer I did research in chronic lymphocytic leukemia, an experience that has inspired me to pursue some form of research during medical school.

As a senior more and more pieces have fit together, as Professors Sia and Platt provided the opportunity to TA for their courses. I would now definitely consider teaching as a career path though I know this would probably be somewhere down the line. Still, my puzzle was not complete. The biology department—having supplied me with both education and guidance—also has given me with the final pieces to complete my college puzzle. The last puzzle piece was not in any course selection catalogue or research lab but it certainly was provided from going to classes!

A biology degree from the U of R is not something that one can face alone and so it comes as no surprise that I picked up many good friends during my four years. Without them, I do not think I could have survived the many late nights, mid-term exams and lab practicals. It will be difficult not seeing the same happy faces next year when I am enrolled in the U of R medical school. To steal from the Motion City Soundtrack, "the future freaks me out." However, I'm pretty sure that between my education, the confidence my teachers have given me, and my friends, I'll be able to figure out any future puzzles that come my way. I wish all of my classmates (especially my fellow genetics majors that toughed things out with me) the best in their future endeavors. I will probably see you in 30 years during Meliora weekend and not recognize you, so I apologize in advance.

Christina Wong '08, BS BEB



My interest in Biology developed from a series of events. I actually started my undergraduate career as an Engineer at the University of Michigan. During my time at the U of M, I realized that I wanted to attend a smaller school. I participated in several programs at the University of Rochester in high school—including PREP (Pre-College Experience in Physics) and YEA! (The Young Entrepreneur's

Academy)—so I was aware of the opportunities and resources available at U of R. After careful consideration, I knew that the University of Rochester was the perfect place to transfer.

Little did I realize the full potential of the opportunities and resources I was about to embark upon! I started my first semester taking courses I was excited for rather than classes that were simply required. As a result, my interest in biology flourished. Both of my biology instructors thus far—Dr. Olek and Dr. Sajdak—have been more than willing to help with questions regarding class content and advice about career goals. In addition, my experience working with Lisa Boelio in Professor Jaenike's laboratory has been incredibly rewarding. Through this experience, I am able to apply class content on a whole new level of thinking.

Outside of academics, I have engaged in other campus activities that have sparked my interest. For example, I am a member of Delta Gamma Sorority, I will be a Residential Advisor next year, and I am part of the David T. Kearns Center. This summer, I plan to enroll in a genetics course and have been offered an exciting internship. While I am still exploring my future plans, I am thrilled that the University of Rochester provides me with the opportunities and resources to do so.

ATTENTION

Former students and employees of the UR
Biology Department!



We want you!

to be included in the alumni section of "The Open Reading Frame."

Let us know where you've been and what you've done since leaving the University of Rochester.

Email us at: URBioNews@gmail.com.

Hellos and Goodbyes

Marianne Arcoraci, UPBM Administrator



Marianne tells us about her career with the University and background:

"I have been employed with the University since 1990. In my 17-year career with the University I have worked for the Laboratory

for Laser Energetics for four years, William E. Simon Graduate School of Business Administration for twelve years, and the Department of Biology for one year.

As a veteran of the institution I have interfaced with students, faculty, and staff for over a decade. During the first year of my appointment with the department of Biology my experiences have been positive and have often noted how the students are so passionate and dedicated to their work.

I have been married for 10 years, have the best 8 year-old son in the world, and will be completing my bachelor of science in organizational management this summer.

It has been a pleasure working with Biology majors and feel they are exemplary of the University's Motto, "Meliora" (Latin for: *the pursuit of the better.*)"

Mary Fredendall, UPBM Course Coordinator



Mary tells us a little about her life and background:

"I moved to Victor about a year ago and I have been working here in the Biology Department since

August of 2006.

While I was born and raised in Madison, Wisconsin, my husband and I have lived in several different locations including Raleigh, North Carolina, West Palm Beach, Florida and most recently, East Aurora, NY. We moved to Victor to begin the long road to retirement, purchasing a home in a very quiet retirement community. My husband still has a few years before he reaches retirement age, so we have been planning and preparing for that glorious day. We even purchased an RV and are looking forward to a summer of camping and traveling.

My past work history is administrative, most notably I was Executive Assistant to Glenn Blackwood, former Miami Dolphin's defensive back, for two years before we left Florida for New York. I also worked at the world-famous Breaker's resort in Palm Beach, FL in their convention services department—an experience that provided me the opportunity to rub elbows with the rich and famous!

Now that I work in the Biology Department, though, the stars I encounter are the students and I am always amazed with their level of maturity and dedication to their academic work. With my experience as a mother of a 21-year-old daughter, I can appreciate the challenges facing young adults and have a tremendous amount of respect for the Biology students that pass through our office.

Other than work, I love to spend time knitting and reading historical novels. I also love to travel and am looking forward to a long awaited trip to Boston this summer.

It has been a joy to work here at the University of Rochester and the Biology Department is blessed with an incredibly amiable staff and talented faculty. What an tremendous opportunity it has been to work here and I offer my best wishes to the Class of 2007!"

Barbara Yunker, Administrative Assistant



Barb writes of her impending retirement from the University of Rochester:

"Although it is with mixed emotions, I am anxiously looking forward to my retirement this summer. I have been with the Biology Department for the past six years and will take with me many good memories. My immediate plans are to do more traveling with my husband and spend more quality time with my six grandchildren (Lindsay, Taylor, Kaitlyn, Brittany, Ryan and Michael). Oh, the fun we will have ...

I came to the UR in September 2001 and was immediately welcomed as a member of the "Biology family." I had worked at Greece Athena High School for sixteen years prior to this, so coming here was a breath of fresh air. I quickly learned the difference between CDMs and EEBs, what *Drosophila*, *Wolbachia* and *Tetrahymena* were, DNA, RNAi, and a whole array of other biological terms. Imagine how I will impress my fellow retirees at the Senior Center.

In August, my husband and I are going to the Grand Canyon, Sedona, and Flagstaff, a trip that we are very excited about. It is a part of the United States we have always wanted to see. Next winter, we plan to spend the month of January in warmer climates. I will think of you all with a smile on my face as I watch the Weather Channel.

What I will take with me are memories of what makes this department so unique. Despite each lab working on different research projects, the faculty and staff have evolved into an extraordinarily close-knit group of colleagues, who are there for each other to share triumphs and sadness. We've seen faculty retire and move on, only to be followed by new junior faculty without missing a beat. This we owe to the acceptance and respect of all members of this department. I have thoroughly enjoyed working with faculty, staff and students and will treasure all the good times we've had. For this I thank you."

The Department of Biology wishes Barb Yunker the best in the coming years. We will miss her very much.

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Alumni Update

Max Banko (BS Molecular Genetics 2005) conducted undergraduate research in Elaine Sia's lab. He is currently attending graduate school in the Department of Genetics at Stanford University. He passed his qualifying exam in February and is now conducting PhD research in the lab of Dr. Anne Brunet. The Brunet lab studies the molecular basis of aging using a variety of model organisms and human tissue culture. The lab specifically focuses on the Foxo family of proteins, which have been shown to be involved in regulating longevity. Max's project involves investigating the role of various post-translational modifications of Foxo and determining how these modifications function to affect longevity.

Andrea Betancourt (PhD 2006) was a member of Allen Orr's lab and studied experimental evolution in bacteriophage for her doctoral research. She is currently working as a postdoctoral researcher in Brian Charlesworth's lab at the University of Edinburgh, UK, with funding from a Royal Society fellowship.

Erin Bressler (BS 2005 Cell and Developmental Biology) conducted undergraduate research in the lab of Dr. Mark Davies, studying the role of PKC signaling in amino-terminal fragment induced cell migration and proliferation as it pertains to uPA and pathophysiology. In July 2005, she moved to Washington, D.C., for a research fellowship focusing on cancer-related cell signaling and chromatin

remodeling at the NIH. This summer she will be entering medical school in pursuit of an M.D. and possible MPH—location TBA!

Rosemary Clyne (BA Biology 1991) conducted a senior-year research project in the UR Cancer Center with Dr. Dietmar Siemann, investigating mechanisms of drug resistance in cancer cells. She received a PhD in Molecular Biology and Genetics from John Hopkins University School of Medicine in 1998, and is currently a career track investigator at the UCD Conway Institute of Biomolecular and Biomedical Research, University College, Dublin. Rosemary's website is: http://www.ucd.ie/conway/cv_447.html.

Prabhjot "Jot" Singh Dhadialla (BS Cell and Developmental Biology, BA History 2003) conducted undergraduate research with John Huelsenbeck as well as Robert and Lynne Angerer. He is in the middle of his MD (Cornell)/PhD (with Sid Strickland at Rockefeller) and is enjoying the process. The first part of his PhD has been experimental (neurobiology, stem cell biology) but current work is more computationally/mathematically oriented (neurobiology related). In addition, he works on the UN Millennium Village Project with Jeff and Sonia Sachs as a member of the Earth Institute/Columbia University staff and serves as a some-time technical advisor for the International Rescue Committee. These experiences have been a good way to meld his interests in the social sciences with his science background. He is still involved in teaching when possible and teaches a global health practice course to medical/graduate students/faculty, as well as mentoring the college summer physician-scientist training program (Gateways to the Laboratory). Prabhjot adores New York City and says "the sprawling metropolis is finally home after an otherwise itinerant life." He has been able to travel internationally, and looks forward to leaving school and working abroad for a time before coming back to medical school.

Andrew Hollinger (BS Cell and Developmental Biology 2006) has moved to Cambridge, MA, and is employed at the Broad Institute at MIT conducting high-throughput genome sequencing.

Yuseob Kim (PhD 2002) studied population genetics in Wolfgang Stephan's lab. Yuseob has two sons, Jayhan and Jaysung, and is an assistant professor at Arizona State University. Yuseob says that Arizona is nice but that he really misses

Rochester summers!

Stephanie McGarry (BA Biology, BA Psychology 2005) was a teaching assistant in Bio 111L, 112, & 113 while a UR undergraduate. She received an MPH in Epidemiology from Rollins School of Public Health, Emory University, in December 2006. She currently works as an epidemiologist at the Centers for Disease Control and Prevention in Atlanta, GA.

Dennis Minchella (BA Biology, BA Geology 1975) is Professor and Associate Head of the Department of Biological Sciences at Purdue University in West Lafayette, IN. Dennis has received numerous teaching awards, including being selected as one of the best teachers in the history of the university—he was included in the 1999 "Purdue University Book of Great Teachers." His lab uses both molecular and experimental field approaches to study the population biology, evolution, and genetics of host-parasite interactions. Dennis and his wife Lindsey Wilson Minchella (UR Nursing 1975) were married in 1976. They have two sons, Peter, 21, who currently attends Colgate University, and Daniel, 24.

Shona Mookerjee (PhD 2005) was a student in Elaine Sia's lab and studied DNA repair mechanisms in the mitochondrial genome using the budding yeast, *S. cerevisiae*. Her primary focus was the mismatch repair homolog, Msh1p, and its role in suppressing mitochondrial DNA mutation. In May, 2006, Shona married Matthew (Strine) Mookerjee (PhD Geology 2005) and relocated to Sonoma County, CA. She is now a postdoc at the Buck Institute for Age Research in Novato, CA, and focuses on the molecular mechanisms of polyglutamine disease pathogenesis, including Huntington's disease and other neurodegenerative disorders. In 2007, she also started as part-time faculty member at Sonoma State University, teaching Molecular Genetics.

Megan Petteys (BA Biology 2006) participated in an international health care internship in Thailand for two months after graduating from the University of Rochester. She will be enrolled in Northeastern's Graduate Entry Pharm.D. program in fall 2007.

Faculty Speak

Daven Presgraves Joins Biology Department (Again)

By Allen Orr



Daven Presgraves, an Assistant Professor, joined the Department of Biology in July 2005. An evolutionary geneticist, Presgraves's research focuses on three topics: speciation (how one species splits into two); the evolution of selfish genetic elements (e.g., meiotic drive mutations, which distort normal Mendelian ratios to their own advantage); and molecular population genetics, especially the effects of recombination on adaptation.

Daven's work in the genetics of speciation has been widely recognized and the reason is not hard to find: he is one of the few evolutionary biologists who have been able to push our understanding of speciation from the level of classical genetics to the level of molecules. "Performing genetic studies of speciation is difficult because species are entities that don't exchange genes. So doing the genetics of speciation is, almost by definition, trying to do genetics where it can't be done. But by taking advantage of the many tools and tricks provided by the fruitfly, *Drosophila melanogaster*, we've finally been able to get our hands on some of the actual DNA sequences involved in the origin of species." In perhaps his best known work—which appeared as a major article in *Nature* in 2003—Daven showed that the inviability of certain hybrids between *D. melanogaster* and its close relative *D. simulans* involves the gene *Nup96*, which encodes part of the nuclear pore complex. More important, Daven was able to show that the rapid evolution of *Nup96* between these two species was driven by adaptive evolution. "This result, and similar ones from a few other labs, strongly suggest that natural selection often drives the origin of new species, just as Darwin argued over a century ago."

In more recent work, Daven has grown interested in the idea that selfish genetic elements like those that cause meiotic drive may be involved in speciation. "While we now know that speciation involves natural selection, most of us have assumed that this selection involved adaptation to the external ecological environment. But some of our newest results suggest that this selection instead may have involved conflict between different parts of the genome. It might turn out that these sorts of internal genetic conflicts drive the rapid evolution of many of the genes that end up causing problems like inviability and sterility in species hybrids."

Daven grew up in Hampton, Virginia, and earned his bachelors and masters degrees in biology from the University of Maryland, College Park. During that period, he performed research on both the behavioral ecology of bower birds and the evolution of sex-ratio distortion in stalk-eyed flies. Deciding that his interests were more genetical than behavioral, he entered the PhD program in biology at the University of Rochester, working on the genetics of speciation in Prof. Allen Orr's laboratory. Upon graduation in 2003, Daven headed off to Munich, Germany, where he held the position of Alexander von Humboldt Postdoctoral Fellow in Prof. Wolfgang Stephan's laboratory (Stephan is a former faculty member at Rochester). There, Daven's work shifted somewhat from benchtop *Drosophila* genetics to molecular evolution. This trend continued after he won a Ruth L. Kirschstein NRSA Postdoctoral Fellowship to work at Cornell University with Prof. Andy Clark, a leading figure in the study of evolutionary genomics. Attracted by the University of Rochester's plans to expand its group in evolutionary biology and ecology, Daven decided to return to Rochester as an Assistant Professor in 2005. "There are plenty of universities who perform research in evolutionary biology," he explains, "but few that do it as well as Rochester. It was great to be able to join the group and to help it grow further. It's no exaggeration to say that Rochester boasts a world-class program in both evolution and ecology. But what really attracted me was the focus on evolutionary genetics."

As might be expected given his many accomplishments, Daven's research has been recognized by a number of prizes and awards. A Messersmith Fellow while a graduate student at Rochester, in 2003 Daven's dissertation work earned

him the Dobzhansky Prize from the Society for the Study of Evolution, awarded annually to a recent graduate for outstanding work in evolutionary biology. In 2005, Daven also won the John Maynard Smith Prize from the European Society for Evolutionary Biology, which recognizes the accomplishments of an outstanding young evolutionist. And most recently, Daven learned that he has been selected to receive the Balfour Prize from the Genetics Society of the United Kingdom "to mark the contributions to genetics of an outstanding young investigator." Perhaps best of all, Daven recently received word that his research in the genetics of speciation will be funded by the NIH.

Since joining the Department, Daven has been active in teaching both graduate and undergraduate students. This semester he offered a new undergraduate course, Molecular Evolution, to a group of juniors, seniors and grad students. He has also been busy setting up his new laboratory (in Hutchison Hall 480) and training his new lab members, including graduate students Shanwu Tang and Victoria Cattani; postdoc, Pierre Gerard; and lab technicians, Seema Thomas and Molly Saweikis.

In the little spare time he has, Daven enjoys attending the Boston Derby Dames roller derby bouts— with the blessing and company of his girlfriend, Danielle.

The Glor-ification of Hutchison Hall

By Robert Minckley



Richard Glor, one of our most recent faculty additions to the department, arrived in July 2006. His area of interest concerns the ecological and underlying genetic mechanisms that promote rapid species formation (in biological jargon, "adaptive radiations"). His favorite group is anole lizards, the lizards common on

fences and plants seen by most visitors to Florida. However, for Rich, it is the anoles that have colonized the islands in the Caribbean that are his natural laboratory. After different islands have been

colonized by these lizards, their body shapes evolve in characteristic ways to reflect where they live. For example, those that live and hunt in trees tend to have shorter limbs than those that hunt insects on or near the ground. These differences in where they live are also often associated with characteristic differences in their foraging and courtship behaviors. Rich and his colleagues take advantage of the large number of islands and the fact that the patterns are repeated independently multiple times. He claims that some of his study sites are not on beaches, for those of you who came to this same thought. Several of the faculties are eager to visually confirm this as yet unsubstantiated claim.

Rich Glor is a product of northern New York, having grown up in Buffalo. After starting at Cornell University, intending to be a veterinarian, he shifted departments to focus on ecology and evolution. From Cornell, Rich headed south and west, first to Washington University in St. Louis, Missouri, where he received his PhD, and then to the University of California-Davis for a post-doctoral position. We were very encouraged that he might accept our job offer when, during each evening of his interview in February 2005, he went out to dinner donned only in a light sweater and hat, in stark contrast to everyone else who was in full winter coats. Often job candidates from more southern climes balk at the average temperature of Rochester that time of the year. Rich, however, seemed impervious to the cold and actually enjoyed it.

At Rochester, Rich will maintain stocks of different species of live anoles in his laboratory, much to the chagrin of the janitorial staff. In addition, he will continue his fieldwork collecting anoles for his studies of relationships among them using molecular techniques. He has already attracted several students to his lab: Julienne Ng (first-year graduate student and native of Australia) officially joined the Glor lab in May while incoming student Dan Scantlebury will be rotating during the 2007-2008 academic year. Rich's area of study represents a new field of emphasis in the Department of Biology and everyone is looking forward to seeing what his future research reveals.

Ramsey Lab "Lights Up" Campus

By John Jaenike



University residents have no doubt noticed something different on the south side of campus—the soft glow of 400W sodium-vapor lighting fixtures

emanating from the Hutchison Hall greenhouse. Following a long hiatus, botanical research has returned to the Biology Department, and for the first time ever the greenhouse is being used as a research facility! These changes are the result of the recent hiring of Justin Ramsey (assistant professor) and Tara Ramsey (research associate), who started at UR in January 2006.

Justin grew up in arid regions of the western U.S.—western Colorado, southeast Idaho and southern Arizona. He completed his PhD in Botany at the University of Washington (2003) and was an NSF postdoctoral fellow at the University of Guelph (2004-2005). Tara is a native of northern Minnesota. She completed her graduate studies in Botany at Miami University (MSc, 1999) and the University of Washington (PhD, 2005). Justin and Tara first met in the early 1990's while working at a field station in Michigan. However, she re-buffed his romantic overtures at the time, and it was nearly ten years later when Justin had another opportunity to ask Tara out. The couple was married in 2004 and is now proud parents of Frances (a parti-colored female pomeranian) and Clausen (a flame-point traditional siamese). The Ramseys co-teach the department's courses in Ecology and Botany.

The Ramsey lab has grown quickly following its establishment and is now home to three graduate students and several undergraduates. The lab supports a diversity of research projects in plant ecology and evolutionary biology. Justin Ramsey's research is focused on local adaptation within the North American *Achillea millefolium* (the common yarrow), a complex of closely related but ecologically distinctive races. Tara Ramsey studies the invasion dynamics of English ivy (*Hedera* spp.), a widely cultivated woody vine that has become a pernicious weed in some coastal regions of the U.S. and Canada. Molly Gildea studies the molecular systematics of "pondweeds" (*Potamogeton* spp.), a

morphologically complex group of aquatic monocots. Adam Green investigates the phylogeography and population structure of both Old- and New World populations of ivy. Rob Laport studies cryptic species of creosote bush (*Larrea*), a long-lived shrub that dominates desert regions of the American Southwest. Erin Fox, an undergraduate, examines hybridization and interspecific gene flow between Red and Silver Maples in western New York state.

Although molecular techniques like DNA sequencing and flow cytometry certainly play a role in the Ramsey's research, don't be surprised to see lab members carrying plant presses, plastic bags, meter tapes and shovels to their cars in the Hutchison Hall parking lot—field observations and experiments are also critical components to most projects in the Ramsey lab. In the past year, lab members have braved lightning storms, torrential downpours, water moccasins, alligators, car thieves, poison oak and hillbillies (who else posts signs threatening that "trespassers will be violated"?!). It's been years since the last period of active plant research at the University of Rochester, and the department is looking forward to seeing what future research in the Ramsey lab reveals.

Henri Jasper's high "fly" act arrives

By David Goldfarb

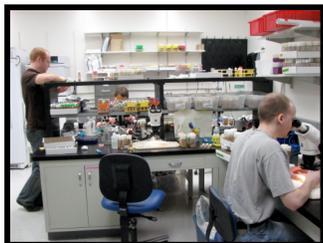


Henri donned the long black gown and checked his figure in the mirror as he reviewed his opening lines as the female lead in Garcia Lorca's "Bernarda Alba."

Acting was a welcome respite from his rigorous undergraduate coursework in Biochemistry at the University of Tübingen in Germany. The Spanish dialog came naturally. A few years earlier Henri was attending high school in Lima, Peru, and before that, between the ages of 6 months to 7 years, elementary school in Guayaquil, Ecuador. Although most of his childhood was spent in South America, Henri was born of German parents in Stadtlohn near the border with Holland, and German was spoken at home. But Spanish was spoken elsewhere and soon became a seamless second language. The family first left Germany when Dad accepted the position of Latin American representative for the electronic

parts manufacturer Bosch. He eventually became the head of John Deere (tractors) representatives in Ecuador. Henri's mother had a movable career as an elementary teacher, and she enjoyed the travel. His parents are now retired to a small town near Stadtlöhn.

When Henri was seven, political unrest drove the family out of Ecuador and back to Germany. Five years later they again went south to Peru where Henri's interest in acting, along with his other passions, soccer and playing the classical trumpet, were kindled. Henri also ran track, ultimately winning a silver medal in the 4 x 400 meter relay at the Peruvian National High School Track Meet.



Henri's personal best for the 400 meters is a brisk 52 seconds, and he has cleared over six feet in the high jump.

Henri was accepted into the competitive program at Tübingen after he scored well on an SAT-like test administered at his German school in Lima. Ever curious about the outdoors, Henri's eye had been increasingly drawn towards biology. In Peru his parents subscribed to various German magazines for kids, and in one of them he read an article heralding molecular biology and biochemistry as "the next big thing." Another article in *Scientific American* by Robert Tjian on the regulation of transcription also captured his imagination. Coincidentally, the Tjian article was penned about the time that Dirk Bohmann was a postdoc in the Tjian lab at UC Berkeley. Henri ultimately did his graduate work with Dirk.

As an undergraduate, Henri worked as a technician at the nearby Max Planck Institute in a lab studying muscle development in *Xenopus*. Henri then won a lottery to participate in a yearlong rotation at the Max Planck Institute in Munich. This experience cemented his interest in developmental biology. Henri met his future wife Fanny at an academic retreat for promising students while at Tübingen. At the time Fanny was studying English and French literature, and she eventually trained to be a high school teacher. Fanny has been busy of late raising a family that now includes, Luis (5 1/2 yrs), Isabel (3 1/2 yrs) and little Carl, who was just born on March 2nd of this year.

After earning his degree in 1999, Henri joined Dirk Bohman at the European Molecular Biology Laboratory in Heidelberg for his doctoral work, and then traveled with Dirk to the Department of Biomedical Genetics here at the UR when the lab moved in 1999. In Dirk's lab, Henri studied the regulation of morphogenetic processes in *Drosophila*, with a focus on the JNK signal transduction pathway. He also applied genomic techniques to characterize how cells in the developing *Drosophila* eye undergo differentiation to become photoreceptors. Henri earned his PhD in 2002 from the University of Heidelberg and was immediately hired as a Research Assistant Professor in the Department of Biomedical Genetics. In his new position Henri embarked on a study in *Drosophila* that would ultimately yield profound insights into mechanisms of stress tolerance and how these pathways affect lifespan in animals.

Happily for us, Henri and Fanny decided to remain in Rochester, and he joined the Biology Department as an Assistant Professor in July 2005. Henri is continuing his work on aging flies. His aim is to understand how cellular responses to stress and nutritional cues are controlled and integrated by the remarkably complex network of signaling pathways to produce a coordinated response throughout all the organ systems of the animal.

ATTENTION

Former students and employees of the UR
Biology Department!



We want you!

to be included in the alumni section of "The Open Reading Frame."

Let us know where you've been and what you've done since leaving the University of Rochester.

Email us at: URBioNews@gmail.com

Achievements and Milestones



Karin Averbeck and husband Bruno Averbeck celebrated the birth of their baby boy, Theodore Averbeck, in February 2007. Theodore was 7.5 pounds and 21" long. Karin and Bruno are currently living in London, UK. They arrived with enough time to settle into a little flat by Hampstead Heath before Theo

arrived. Karin reports that Theo is a happy baby that loves to "talk" and smile and sit up – and that they will be practicing pipetting soon!"

Jody Bowen celebrates her 35th year working in Marty Gorovosky's laboratory. Jody earned her MSc with Marty in 1972. She subsequently started work in the Gorovosky lab, first as technician and then moved up to her current position as senior technical associate. Jody says that she never would have imagined that she would work in the U of R Department of Biology for so many years but also that she has been very happy here— otherwise she "never would have lasted that long!"

Molly (Cobleigh) Gildea married Dan Gildea (assistant professor in the UR Department of Computer Science) in January 2006. Molly and Dan celebrated the birth of their daughter, Tuolumne Faye Gildea, in November. Molly reports that Tuolumne enjoys attending occasional biology and computer science lectures and consuming body temperature milk, as well as



grabbing anything within reach and putting it in her mouth. Tuolumne screams during car rides due to concern for global warming but thinks that flying to see new places is worth the emissions.

Vera Gorbunova and **Andrei Seluanov** celebrated the birth of their baby boy Aron Seluanov in January 2006. Aron joins his older siblings Michael and Moshe in the Gorbunova-Seluanov home.



Adam Green returned to the Department of Biology in January 2006 following his service as a U.S. Peace Corps Volunteer in Cameroon, West Africa. Adam taught biology to high school students and developed pedagogic approaches to computer science for the Cameroonian government. Adam is now studying invasive plant species in the Ramsey lab.

Stan Hattman is enjoying semi-retirement in some unconventional ways. Stan is drummer-at-large for UR African dance classes and also volunteers as a tutor of 8th grade algebra classes at East High School. Stan and his wife Rosemarie recently completed a tour of Sicily and will be visiting Turkey over the summer.

Henri Jasper and wife Fanny announced the birth of their baby boy Carl in March 2007. Carl joins his older brother Luis (5 years old) and Isabel (3 years old).



John Jaenike was elected as Fellow to the American Association for the Advancement of Science in 2006. Perhaps coincidentally, he also competed in the pole vault event in the Empire State Games the same year.

Dan McNabney was awarded the Edward Peck Curtis Award for Excellence in Teaching by a Graduate Student for his efforts in 2006-2007. Dan is also a recipient of a Department of Biology Teaching Award for the 2005-2006 academic year.

Jonathan Millen presented a poster at the American Society for Cell Biology national conference in San Diego. The poster was entitled "Targeting of Yeast Nvj1p to the Outer Nuclear Membrane (ONM)."

Allen Orr was named Shirley Cox Kearns Professor by the University of Rochester. This endowed chair position was created by David Kearns, former CEO of Xerox, to honor his wife, Shirley Kearns.

Nitin Phadnis won a travel award from the American Genetics Association to attend the

"Mechanisms of Genome Evolution" symposium at Indiana University.

Terry Platt was named the UR Undergraduate Natural Science Professor of the Year for 2006-2007. Terry submitted invited papers and presentations to the Annual Conference on Case Study Teaching in Science (Buffalo, NY) and the Institute for Transforming Undergraduate Education (Newark, DE), and is one of the senior personnel on an NSF award investigating interactive case-study teaching approaches. Terry's son Dana and daughter Tammela enrolled at Harvard University and Oberlin College, respectively, in the fall. In his spare time, Terry has been busy setting age-group records for U.S. Masters Swimming in the NY Niagara district.

Linn Sajdak celebrates the "growing up" of her children, Eric and Karl, and the recent arrival of grandchildren. Eric Barton is a design engineer for Honeywell in Minneapolis, MN, and proud father of Elizabeth Grace Barton (who will be one this coming June) and Andrew Barton (three years old in March). Karl Barton graduated in May from the University of Colorado, Denver, with a Masters in Urban Planning. Karl's first job as an Urban Planner is in Loveland, CO.

Jack Werren spent March in India, where he gave a series of lectures on symbiotic bacteria in insects, developed collaborations with Indian scientists, and explored.

Name Change



This spring, the Biology Department voted to rename the newsletter.

Congratulations to the Sia lab for nominating the prize-winning name—"The Open Reading Frame." For their efforts, they claimed the grand prize of licorice!



The Winners.....Sia Lab

Elaine couldn't be prouder BUT was disappointed that the prize wasn't tickets to *They Might Be Giants*.

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Let us know where you've been and what you've done since leaving the University of Rochester.

Email us at: URBioNews@gmail.com.

Recent Department Publications

Bi lab publications

- Zou, Y., Q. Yu, and X. Bi. 2006. Asymmetric positioning of nucleosomes and directional establishment of transcriptionally silent chromatin by *Saccharomyces cerevisiae* silencers. *Mol. Cell Biol.* 26:7806-7819.
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Eickbush lab publications

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- Averbeck, K.T., and T.H. Eickbush. 2005. Monitoring the mode and tempo of concerted evolution in the *Drosophila melanogaster* rDNA locus. *Genetics* 171:1837-1846.

Zhang, X., and T.H. Eickbush. 2005. Characterization of active R2 retrotransposition in the rDNA locus of *Drosophila simulans*. *Genetics* 170:195-205.

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Christensen, S.M., J. Ye and T.H. Eickbush. 2006. RNA from the 5' end of the R2 retrotransposon controls R2 protein binding to and cleavage of its DNA target site. *Proc. Natl. Acad. Sc. USA.* In press.

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Glor lab publications

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- Shi, X., A. Seluanov, and V. Gorbunova. Cell divisions are required for L1 retrotransposition. 2007. *Mol. Cell Biol.* 27:1264-70.

Gorovsky lab publications

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- Mochizuki, K., and M.A. Gorovsky. 2005. A Dicer-like protein in *Tetrahymena* has distinct functions in genome rearrangement, chromosome segregation, and meiotic prophase. *Genes Dev.* 19:77-89.

Hatman lab publications

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Jaenike lab publications

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Miller lab publications

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