UNIVERSITY of ROCHESTER

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OPEN READING FRAME

Department of Biology Newsletter

The Biology Department Congratulates the Class of 2011!

Message from the Chair

Dr. Gloria Culver
Professor and Department Chair

Dear Students, Families, Friends and Colleagues,

It is my great pleasure and privilege to congratulate the Class of 2011 for successfully completing their degrees at the University of Rochester. On behalf of the Department of Biology, I wish you all continued success and happiness in your future studies and careers. This is the time to relish your work as an undergraduate and to remember the stamina, determination, and discipline that were necessary to arrive at today. You should be proud of your accomplishments.

There are 249 accomplished graduates that are earning degrees in areas encompassed in the Program in Biology and Medicine. These include majors earning a B.A. in Biology, or a B.S. in Molecular Genetics, Cellular and Developmental Biology, Ecology and Evolutionary Biology, Microbiology, Neuroscience or Biochemistry. The interest in these areas by undergraduates continues to increase and our majors become more and more popular. Our program has grown not only in majors but in courses and disciplines as well. Details about our research, faculty and courses can be found at the Departmental webpage (http://www.rochester.edu/College/BIO/index.php). At this website, information about our undergraduate student society (SUBS: Society of Undergraduate Biology Students) is also available. Many students and faculty participate in SUBS sponsored events. This year we started a reading day breakfast or lunch, jointly sponsored by the Department and SUBS. These events have offered study breaks and opportunities for students, faculty, and staff to get together in a less formal setting. All

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www.rochester.edu/College/BIO/newsletter.html

indications are that these popular and well-attended events will become a Department tradition.

The interest of students in our majors mirrors our faculty's interest in training undergraduates and instilling a passion for scientific discovery. One aspect of the University of Rochester experience is the access to research opportunities. Our faculty perform research in areas encompassing the range of modern Biology. Our research approaches are broad, covering areas of genetics, ecology, biochemistry, evolutionary, molecular, cell and developmental biology. Our undergraduates have access to research opportunities with all our faculty, and this is one of the things that makes the University of Rochester a remarkable place to study Biology. For this closing academic year, nearly one half of our graduating seniors took part in Independent Research. Given the strength in the Department and the breadth of the research mission, it is not surprising that the Biology Department now has the largest number of declared undergraduate majors in the College.

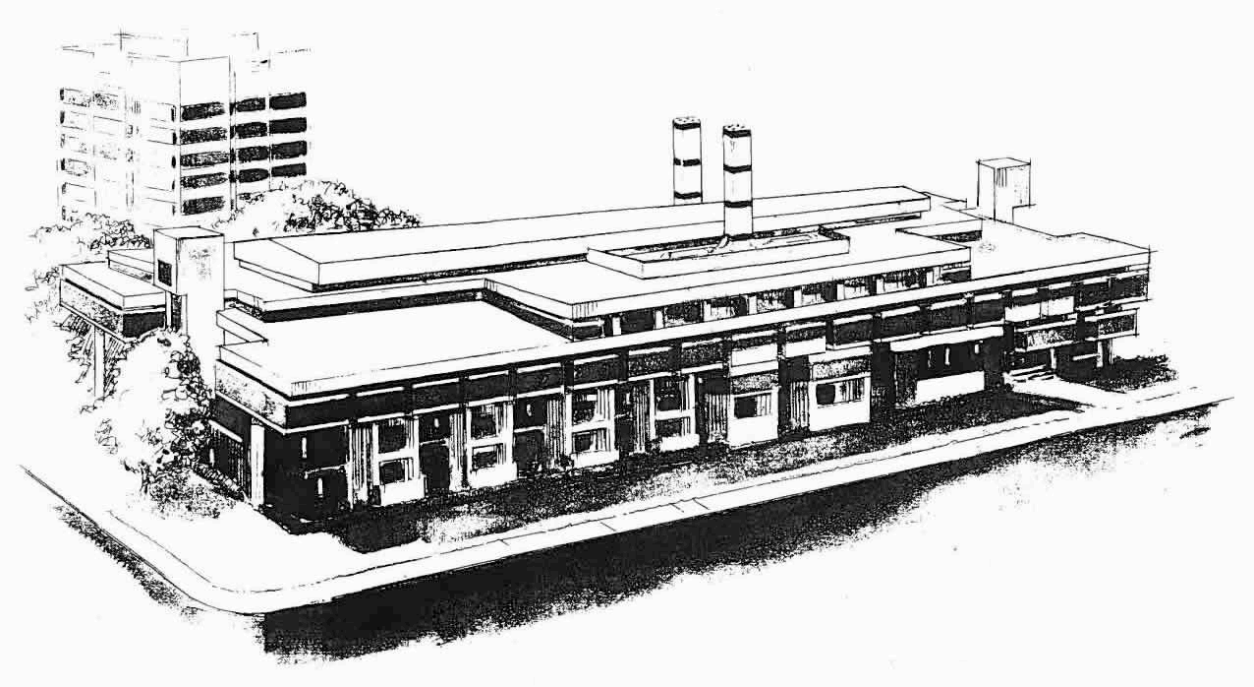
The Biology Department also had significant changes in the last year. After many years at the helm of the Department, Dr. Tom Eickbush stepped down as Departmental Chair. The Department grew significantly under Dr. Eickbush's tutelage. Many of us are members of the faculty thanks to his efforts and skills as a recruiter, advocate, and mentor. On behalf of the faculty, staff, and student body, I would like to thank Tom for the effort and time that he committed to the Department. I would also like to thank the staff and faculty for making my transition to the position of chair as seamless as possible. Also, I would like to acknowledge all the staff for the seemingly endless work they do to make student and faculty life easier.

Another Departmental change in the last year involved the hiring of a new faculty member in the summer of 2010, Dr. Andrei Seluanov. Dr. Seluanov works in the area of longevity and cancer resistance. He moved into newly renovated laboratory space in Hutchison Hall and is rapidly growing his research group. Additionally, Dr. Henri Jasper was promoted from Assistant Professor to Associate Professor with tenure this academic year. The Department and University are thrilled with the groundbreaking work from the Jasper Laboratory and Dr. Jasper's course continues to be highly subscribed. Each of these events further increases the reputation and capabilities of the Biology Department.

As always, when one completes an undertaking such as an undergraduate degree, there is much joy and pride. However, this can be mingled with some sadness and loss. The Department is losing a cohort of its population and while we are proud of each and every one of you, you will be missed.

Keep in touch,

Gloria Culver



One Hundred Thirty Biology Majors Earn Degrees in 2011

The Department of Biology will be holding their 2011 Diploma Ceremony on Sunday, May 15th, 2011 at 1:30 p.m. in the Palestra at the Goergen Athletic Center. Approximately **100** students will be participating in this year's event.

The Biology Department's senior class is made up of 120 students, as well as 10 students enrolled in the U of R's Take-5 and various other fifth-year programs. These students have chosen to major in one of the following biological sciences: B.A. in Biology (BA BIO), B.S. in Biological Sciences: Cell and Developmental Biology (BS BCD), B.S. in Biological Sciences: Evolutionary Biology and Ecology (BS BEB), B.S. in Biological Sciences: Molecular Genetics (BS BMG). This year's senior class consists of 81 women and 49 men. Twenty-three students will earn double majors.

Dr. Gloria Culver, Professor of Biology and Department Chair, will be the Master of Ceremonies by welcoming students and guests.

The ceremony will begin with a student speaker from the class of 2011. The class speaker is chosen by the faculty for excellence in academics, research, and for service to the department. This year's student speaker is Gabriel Perreault (BS BMG), who will be introduced by Dr. Terry Platt.

Dr. Thomas Eickbush will present The Donald R. Charles Memorial Prize. This prize is given annually by the Biology Department to students who show great potential and have exhibited excellence in science. The 2011 Donald R. Charles Award will be received by: Melissa Altemose (BS BCD), Meghan Jacobs (BS BEB), Matthew Kaufmann (BA BIO), Sayyar Khakimov (BA BIO), Zachary Lynch (BS BEB), Gabriel Perreault (BS BMG), and Adam Richman (BA BIO).

Dr. John Jaenike will present the Ayman Amin-Salem Memorial Fund Prize. This is a College-wide award and is given each year to a member of the senior class who best evidences the qualities of good character and good citizenship, such as decency, reliability, responsibility, and congeniality. Ayman was a student in the Class of '87 who died in a car accident. His family established this fund in his memory. This year's recipient is Meghan Jacobs (BS BEB).

Dr. Richard Glor will present the students who have earned degrees with Distinction in Research in the BA BIO, BS BCD, BS BEB, and BS BMG majors. Students who have earned distinction in research this year are: Julia Cosgrove (BS BEB) and Matthew Kaufmann (BA BIO)

Dr. Cheeptip Benyajati will be presenting a special tribute to the undergraduate students who served as undergraduate teaching assistants in Biology Department courses.

The ceremony will culminate in the awarding of diplomas. Personalized messages written by graduates will be announced as the diplomas are distributed by: Dr. Anthony Olek (BA in Biology Majors), Dr. David Lambert (BS in Cell and Developmental Biology Majors), Dr. Jim Fry (BS in Evolutionary Biology & Ecology Majors), and Dr. Cheeptip Benyajati (BS in Molecular Genetics Majors).

A reception will be held immediately following the ceremony in the Field House located in the Goergen Athletic Center.

Graduating Class of the Undergraduate Program in Biology and Medicine (UPBM) 2011

Bachelor of Arts
Biology (BA BIO):
Claire Agrawal ΦBK
Subbumeenakshi Alagappan
Margaret Arbogast
David Bahk
Matthew Bell
Meaghan Bernstein
Monima Bhattacharyya
Steven Bliss
Ryan Boulas
Amanda Brightman
Rochelle Cain
James Caluneo
Maria Campos
Michael Chung
Jean-Gabriel Coignet
Kendall Cunningham
Debarshi Das
Nicole Dodge
Elizabeth Dominic
Sheela Doraiswamy
Kathryn Drinkwater
Cameron Egan

Graduating Class Continued...

Ashley Haluck-Kangas
Chelsea Hawks
Angelica Kanganis
Matthew Kaufmann ΦBK **
Colleen Keller ΦBK
Sayyar Khakimov
Anum Khan
Saira Khan
Jeongeun Kil
Andrew Kim ΦBK
Eun Hea Kim
Hee Hyun Kim
Rosa Koester
Jill Kulla
Anthony La Fache
Kayla Laclair
Rebecca Landzberg
Elizabeth Levy
Jaimee Martin
Michael Muhammad
Diane Nitzberg
Jessica Northrup
Justin Ou
Jennifer Panosian
Jason Park
Oscar Perez
Andrea Rabinowitz
Francisco Ramirez
Ahmad Rehmani
Adam Richman
Pankaj Saha
Michael Storonsky
Mengzhen Sun
Neil Suryadevara
Jocelyn Svengsouk
Nandini Venkateswaran
Lan Wang
Robin Wilson
Michelle Winston
Catherine Yao
Michael Yee
Linda Yu
Margaret Zupa ΦBK

Bachelor of Science Cell and Developmental Biology (BS BCD):
Pamela Agbu
Melissa Altemose ΦBK
Justin Anderson
Kayla Anderson
Kelly Beamish
Daniel Byington
Andrew Cannon
Brittany Davis
Alexander Federation ΦBK
Katarina Gardner
Xiaobo Liang
Shafayat Moin
Anthony Osinski
Erica Parrinello
Tasmia Rezwan
Sebele Sibhat
Han Wool Sung
Savannah Wentz
Roy Zhou

Bachelor of Science Evolutionary Biology and Ecology (BS BEB):
Alexandra Atkinson
Aviv Brokman
Julia Cosgrove **
Alexander D'Auteuil
Emma Dietrich
Kristen Fekete
Kathryn Fitzgerald
Edwin Goncharuk
Emily Gray
Lynna Gu
Megan Hammond
Katherine Higgins
Di Hu
Meghan Jacobs
Zachary Lynch ΦBK
Heather Manly
Sean Nichols
Arielle Ostrager
Laurana Ryback
Katelyn Seliskar
Hannah Stenger
Mary-Jennifer Truini
Emily Pei Tsai
Michele Villa-Castillo ΦBK

Bachelor of Science Molecular Genetics (BS BMG):
Lynn Benson
Kellen Brown
Chris Cho
Christine Cleaver
Katherine Cunico
Elie Farah
Scott Friedland
Jessica Gaboriault
Emily Grzybowski
Emily Hallam
Trevor Miller
Shoham Mookerjee
Gabriel Perreault ΦBK
Justin Rosati
Katharine Schwartz
Jason Solomon
Stephen Supoyo ΦBK **
Rose Tsai
Kaitlin Tyre
Elizabeth Wu
Frank Yeung
Andrew Younger

Bachelor of Science Biochemistry (BBC):
Sarah Ackroyd
Paul Bailey
Sarah Barnett
Brendan Barton
Rachel Boldt
Edward Chi
Alexander Hajduczok
Evan Hass
Andrew Lee
Jaclyn Lerea
Daniel Levine **
Dwain Mccall
Jennifer Mclaughlin
Marc Nuzzo
Ryan Over
Sima Patel
David Phizicky
Jonathan Pinto
Andrea Polanski
Ankur Prasad
Alexander Pratt
Sarah Provazza
Rajesh Ravikumar
Jesse Sengillo **
Yoon Jung Shin
Stefanie Tan Ying-Lin **
Jacob Weaver
Khaled Zia

Bachelor of Science Microbiology (BMB):
John Attanasio
Zachary Brown
Coronado, Christina
Kyle Cron **
Julianna Dainotto
Nitasha Dhiman
Thomas Dieringer
Stephanie Enner
Yaneve Fonge
An-Hoa Giang **
Amanjot Grewal
Lubaba Hasan
Joseph Kim
Yunseop Kim
Christine Kuang
Mirela Kuralic
Eric Lam **
Sue Lee
Ruijing Liang
Craig Maguire
Nasihah Mazalan
Katerina Mlejnkova
Pauline Nemitz
Marika Osterbur **
Cameron Ovandipour
Di Pan
Saikrishna Patibandla
Sumir Shah
Kayla Shirley
Joome Suh ΦBK
Mariana Stone
Sarah Tannery
Elizabeth Terhune
Alexander Vostal
Peter Yen

Bachelor of Science Neuroscience (BS BNS):
Joseph Albrecht
Edisa Andelija
Joseph Barone
Kira Carlin
Alexander Dragnich
Shady El Damaty
James Eles ΦBK
Zachary Gray
Brendan Guercio
Suzanna Harmouche
Woong Hwang
Samantha Johnson
Ariee Jung
Stephen Keeley ΦBK
Ryan Kovaleski
Nicholas Kumar
Aaron Levy ΦBK
Joshua Levy
Xi Li ΦBK
Alisa Litan **

Sofia Melgarejo
Jacob Mitchell
Jenny Mosier
Rudolph Napodano
Eric Nielsen **
Adriana Polisano ΦBK
Jennifer Rafferty
Tasha Raman
Lauren Reynolds
Sarah Rudzinskas
Angie Santiago-Zayas
Meredith Schepp
Kevin Schmitt
Kyu Wan Shim
Rachel Sitts
Joseph Thomas
Gregory Tsang
Saleha Vandal
Victor Vuong
Ashley Wilson
Lilly Winfree
Daniel Wong
Jaimie Zaharewicz
Douglas Zeppenfeld

ΦBK Phi Beta Kappa
** Degree with Distinction in Research

Eleven 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 achieve a minimum GPA of 2.7 and 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 twenty-one members of the class of 2011 who have earned the honor of "Distinction in Research" are:

Julia Cosgrove BEB
Mentor: Dr. Justin Ramsey
Disertation: *"Stand Structure and Down Woody Debris in Beech-Maple Old-Growth Forests of the Rochester Area"*

Kyle Cron BMB, CHM
Mentor: Dr. Edith Lord
Disertation: "*The Critical Role of IFN-Gamma's Anti-Tumor Effects after Radiation Treatment"*

An-Hoa Giang BMB
Mentor: Dr. Hani Awad
Disertation: *"Hypoxia Induces Down-Regulation of Oxidative Phosphorylation and is Linked to Increases in Osteosarcoma Cell Metastatic and Invasive Potential"*

Matthew Kaufmann BIO, SP
Mentor: Dr. George Porter
Disertation: *"Mutation of Ryanodine Receptor Type 1 Causes Fetal Heart Failure and Demise"*

Eric Ho Lam BMB
Mentor: Dr. Troy Randall
Disertation: *"The Effects of Non-Structural Protein 1 Immunization in Influenza Infection"*

Daniel Levine BBC
Mentor: Dr. Bob Bambara
Disertation: *"HIV-1 Nucleocapsid Protein is Regulated by Acetylation from Host p300 Histone Acetylransferase"*

Alisa Litan BNS
Mentor: Dr. Charles Duffy
Disertation: *"The Effects of Donepezil on Perceptual Measures of Impairment in Alzheimer's Disease: A Pilot Study"*

Eric Nielsen BNS, CHM
Mentor: Dr. Paul Kammermeier
Disertation: *"Exploring the Selectivity of Small Moeolcules Targeting the GBϒ 'Hotspot' Effects on Ion Channel Modulatory Pathway"*

Marika Osterbur BMB
Mentor: Dr. Stephen Dewhurst
Disertation: *"Investigation of the Rad51 Promoter: Identification of a Cancer-Specific Core Promoter and it's Relationship with p53"*

Jesse Sengillo BBC
Mentor: Dr. Alan Grossfield
Disertation: *"C16-KGGK Lipopeptides Preferentially Bind Bacterial Model Bilayers in Silico"*

Stefanie Tan Ying-Lin BBC
Mentor: Dr. Robert Bambara
Disertation: "*Important Roles for the Primary and Secondary Flap-Processing Pathways in Maintaining DNA Replication Fidelity"*

INDEPENDENT RESEARCH

In addition to being an outstanding undergraduate institution, the University of Rochester is also a major research university. One of the Rochester Advantages is the opportunity for undergraduates to gain hands-on experience doing modern biological research. Research opportunities are made possible by the enthusiasm of faculty for cooperative learning. A student's opportunity to do research is limited only by their talent and persistence to find faculty to sponsor research projects within their area of interest.

One way students may gain research experience is through registering for Independent Research (395) Courses. Independent Research courses allow students in B.A. and B.S. tracks to gain research experience for academic credit. Several members of the 2011 Undergraduate Program in Biology and Medicine graduating class have done one or more semesters of Independent Research for credit.

The following is a list of students and faculty sponsors who have taken one or more semesters of independent research courses:

Sarah Ackroyd BBC, STT (3)
Faculty Sponsor: Dr. Keith Nehrke
Department: Nephrology Unit

Pamela Agbu BCD
Faculty Sponsor: Dr. Dave Lambert
Department: Biology

Kayla Anderson BCD
Faculty Sponsor: Dr. Edward Brown & Dr. Kelley Madden
Department: Biomedical Engineering

Justin Anderson BCD
Faculty Sponsor: Dr. Elaine Sia
Department: Biology

John Attanasio BMB, MTH
Faculty Sponsor: Dr. Brian Ward
Department: Virology/ Microbiology

Sarah Barnett BBC
Faculty Sponsor: Dr. Dirk Bohmann
Department: Biomedical Genetics

Brendan Barton BBC, GER
Faculty Sponsor: Dr. Joshua Munger
Department: Biochemistry

Aviv Brokman BEB, MTH (2)
Faculty Sponsor: Dr. Justin Ramsey
Department: Biology

Zachary Brown BMB (3)
Faculty Sponsor: Dr. Joseph Miano (2) and Dr. Alexandra Livingstone (1)
Department: AAB Cardiovascular Research / Microbiology & Immunology

Maria Campos BIO
Faculty Sponsor: Dr. Hani Awad
Department: Biomedical Engineering

Andrew Cannon BCD
Faculty Sponsor: Dr. David Goldfarb
Department: Biology

Gaoxiang Chen BNS, PSY (2)
Faculty Sponsor: Dr. Bogdan Polevoda (1), Dr. David Pinto (1)
Department: Biochemistry and Biophysics / Neurobiology and Anatomy

Chris Cho BMG (2)
Faculty Sponsor: Dr. Willis Li
Department: Biomedical Genetics

Michael Chung BIO (2)
Faculty Sponsor: Dr. Minsoo Kim
Department: Microbiology and Immunology

Michael Chung BMB (2)
Faculty Sponsor: Dr. Minsoo Kim
Department: Microbiology and Immunology

Christina Coronado BMB, FR
Faculty Sponsor: Dr. Paul Dunman
Department: Microbiology and Immunology

Julia Cosgrove BEB
Faculty Sponsor: Dr. Justin Ramsey
Department: Biology

Kyle Cron BMB, CHM (2)
Faculty Sponsor: Dr. Edith Lord
Department: Microbiology and Immunology

Julianna Dainotto BMB (2)
Faculty Sponsor: Dr. Sanjay Maggirwar
Department: Microbiology and Immunology

Debarshi Das BIO, HLS
Faculty Sponsor: Dr. Mark Noble
Department: Biomedical Genetics

Brittany Davis BCD, ASL (2)
Faculty Sponsor: Dr. James Miller (1) / Dr. Gregory Tall (1)
Department: Microbiology and Immunology / Pharmacology and Physiology

Independent Research Continued....

Nitasha Dhiman BMB (2)
Faculty Sponsor: Dr. Justin Ramsey
Department: Biology

Thomas Dieringer BMB
Faculty Sponsor: Dr. Paul Dunman
Department: Microbiology and Immunology

Shady El Damaty BNS (3)
Faculty Sponsor: Dr. Rudi Fasan
Department: Chemistry

Stephanie Enner BMB (3)
Faculty Sponsor: Dr. Vera Gorbunova
Department: Biology

Elie Farah BMG (2)
Faculty Sponsor: Dr. Mahin Maines
Department: Biochemistry and Biophysics

Alexander Federation BCD, CHM (3)
Faculty Sponsor: Dr. Bradley Nilsson
Department: Chemistry

Yaneve Fonge BMB (2)
Faculty Sponsor: Dr. Edward Schwarz
Department: Center for Musculoskeletal Research

An-Hoa Giang BMB (2)
Faculty Sponsor: Dr. Shu-Yuan Yeh
Department: Urology / Pathology

Emily Gray BEB
Faculty Sponsor: Dr. Justin Ramsey
Department: Biology

Amanjot Grewal BMB, SP
Faculty Sponsor: Dr. Mark Noble
Department: Biomedical Genetics

Jonathan Grima BNS
Faculty Sponsor: Dr. Kim Tieu
Department: Neurology

Emily Grzybowski BMG (3)
Faculty Sponsor: Dr. John Werren (1), Dr. Baek Kim (2)
Department: Biology / Microbiology and Immunology

Alexander Hajduczok BBC (2)
Faculty Sponsor: Dr. Mark Dumont
Department: Biochemistry and Biophysics

Suzanna Harmouche BNS (2)
Faculty Sponsor: Dr. Bogdan Polevoda
Department: Biochemistry and Biophysics

Lubaba Hasan BMB
Faculty Sponsor: Dr. Paige Lawrence
Department: Environmental Medicine

Evan Hass BBC (2)
Faculty Sponsor: Dr. Eric Phizicky
Department: Biochemistry and Biophysics

Peter Hong BMB
Faculty Sponsor: Dr. Minsoo Kim
Department: Microbiology and Immunology

Woong Hwang BNS (2)
Faculty Sponsor: Dr. Gail Johnson
Department: Anesthesiology

Olga Karlinskaya BNS (4)
Faculty Sponsor: Dr. Suzanne Haber
Department: Pharmacology and Physiology

Matthew Kaufmann BIO, SP (2)
Faculty Sponsor: Dr. George Porter
Department: Pediatrics

Sayyar Khakimov BIO, HLS
Faculty Sponsor: Dr. Melanie Wellington
Department: Pediatrics

Saira Khan BIO
Faculty Sponsor: Dr. Patricia White
Department: Neurobiology and Anatomy

Jeongeun Kil BIO (2)
Faculty Sponsor: Dr. Bogdan Polevoda
Department: Biochemistry and Biophysics

Andrew Kim BIO, CHM (3)
Faculty Sponsor: Dr. David Topham
Department: Microbiology and Immunology

Yunseop Kim BMB
Faculty Sponsor: Dr. Dwight Hardy
Department: Microbiology and Immunology

Christine Kuang BMB
Faculty Sponsor: Dr. Baek Kim
Department: Microbiology and Immunology

Jill Kulla BIO, HLS
Faculty Sponsor: Dr. Ian Dickerson
Department: Neurobology and Anatomy

Nicholas Kumar BNS (3)
Faculty Sponsor: Dr. Jessica Cantlon (2) & Dr. Bradford Mahon (1)
Department: Brain and Cognitive Sciences

Mirela Kuralic BMB
Faculty Sponsor: Dr. Hyun Koo
Department: Oral Biology

Eric Lam BMB, BME (2)
Faculty Sponsor: Dr. Troy Randall
Department: Allergy/Immunology/ Rheumatology

Andrew Lee BBC (3)
Faculty Sponsor: Dr. Mesut Muyan
Department: Biochemistry and Biophysics

Sue Lee BMB (2)
Faculty Sponsor: Dr. Paige Lawrence
Department: Environmental Medicine

Independent Research Continued....

Jaclyn Lerea BBC (2)
Faculty Sponsor: Dr. Robert Mooney
Department: Pathology and Laboratory Medicine

Daniel Levine BBC (3)
Faculty Sponsor: Dr. Robert Bambara
Department: Biochemistry and Biophysics

Joshua Levy BNS
Faculty Sponsor: Dr. Mark Noble
Department: Biomedical Genetics

Ruijing Liang BMB
Faculty Sponsor: Dr. Jun Sun
Department: Gastroentrol Division

Xiaobo Liang BCD
Faculty Sponsor: Dr. Andrew Samuelson
Department: Biomedical Genetics

Alisa Litan BNS (2)
Faculty Sponsor: Dr. Robert Freeman (1), Dr. Charles Duffy (1)
Department: Pharmacology and Physiology / Neurology

Zachary Lynch BEB
Faculty Sponsor: Dr. John Jaenike
Department: Biology

Craig Maguire BMB, PSY (2)
Faculty Sponsor: Dr. Kathi Heffner
Department: Microbiology and Immunology / Psychiatric Research

Jennifer Mclaughlin BBC
Faculty Sponsor: Dr. Catherine Ovitt
Department: Oral Biology

Katerina Mlejnkova BMB, CHM
Faculty Sponsor: Dr. Baek Kim
Department: Microbiology and Immunology

Shoham Mookerjee BMG (2)
Faculty Sponsor: Dr. Jacques Robert
Department: Microbiology and Immunology

Eric Nielsen BNS, CHM (2)
Faculty Sponsor: Dr. Paul Kammermeier
Department: Pharmacology and Physiology

Marc Nuzzo BBC (2)
Faculty Sponsor: Dr. Mark Dumont
Department: Biochemistry and Biophysics

Anthony Osinski BCD
Faculty Sponsor: Dr. Philip Davidson
Department: Environmental Medicine

Marika Osterbur BMB (3)
Faculty Sponsor: Dr. Stephen Dewhurst
Department: Microbiology and Immunology

Cameron Ovandipour BMB
Faculty Sponsor: Dr. Luis Martinez-Sobrido
Department: Microbiology and Immunology

Ryan Over BBC
Faculty Sponsor: Dr. Mark Dumont
Department: Biochemistry and Biophysics

Di Pan BMB
Faculty Sponsor: Dr. Xia Jin
Department: Infectious Disease Unit

Jennifer Panosian BIO, PSY
Faculty Sponsor: Dr. Wilfred Pigeon
Department: Psychiatry and Psychology

Erica Parrinello BCD (2)
Faculty Sponsor: Dr. Mark Noble
Department: Biomedical Genetics

Sima Patel BBC (2)
Faculty Sponsor: Dr. Elaine Sia
Department: Biology

Saikrishna Patibandla BMB (2)
Faculty Sponsor: Dr. Brian Ward
Department: Microbiology and Immunology

Gabriel Perreault BMG (2)
Faculty Sponsor: Dr. John Werren
Department: Biology

David Phizicky BBC (2)
Faculty Sponsor: Dr. Gloria Culver
Department: Biology

Ankur Prasad BBC, PHL
Faculty Sponsor: Dr. Todd Krauss
Department: Chemistry

Tasha Raman BNS (2)
Faculty Sponsor: Dr. Rudi Fasan (1), Dr. Mark Noble (1)
Department: Chemistry / Biomedical Genetics

Rajesh Ravikumar BBC (4)
Faculty Sponsor: Dr. Rudi Fasan
Department: Chemistry

Jesse Sengillo BBC (3)
Faculty Sponsor: Dr. Alan Grossfield
Department: Biochemistry and Biophysics

Nandini Seshan BMG (2)
Faculty Sponsor: Dr. Mark Frampton (1), Dr. Steve Georas & Dr. Tirumalai Ranagasamy (1)
Department: Pulmonary and Critical Care Unit

Sumir Shah BMB (2)
Faculty Sponsor: Dr. Brian Ward
Department: Microbiology and Immunology

Kyu Shim BNS (2)
Faculty Sponsor: Dr. Shirley Joseph
Department: Neurosurgery

Mariana Stone BMB
Faculty Sponsor: Dr. Xia Jin
Department: Microbiology and Immunology

Joome Suh BMB (3)
Faculty Sponsor: Dr. James Palis
Department: Pediatrics Hematology/ Oncology

Independent Research Continued....

Mengzhen Sun BIO, MTH
Faculty Sponsor: Dr. Daniel Garrigan
Department: Biology

Han Sung BCD (2)
Faculty Sponsor: Dr. Fred Sherman
Department: Biochemistry and Biophysics

Stephen Supoyo BMG
Faculty Sponsor: Dr. Heinrich Jasper
Department: Biology

Stefanie Ying-Lin Tan BBC (3)
Faculty Sponsor: Dr. Robert Bambara
Department: Biochemistry and Biophysics

Elizabeth Terhune BMB
Faculty Sponsor: Dr. Martin Pavelka
Department: Microbiology and Immunology

Kaitlin Tyre BMG (2)
Faculty Sponsor: Dr. James Palis
Department: Pediatrics Hematology/Oncology

Nandini Venkateswaran BIO, HLS
Faculty Sponsor: Dr. Brian Blyth
Department: Emergency Medicine

Alexander Vostal BMB
Faculty Sponsor: Dr. Stephen Dewhurst
Department: Microbiology and Immunology

Jacob Weaver BBC (2)
Faculty Sponsor: Dr. Harold Smith
Department: Biochemistry and Biophysics

Savannah Wentz BCD
Faculty Sponsor: Dr. Anna Majewska
Department: Neurobiology and Anatomy

Ashley Wilson BNS
Faculty Sponsor: Dr. Suzanne Haber
Department: Pharmacology and Physiology

Michelle Winston BIO
Faculty Sponsor: Dr. Douglas Portman
Department: Biomedical Genetics

Daniel Wong BNS
Faculty Sponsor: Dr. Kim Tieu
Department: Neurology

Elizabeth Wu BMG, JPN
Faculty Sponsor: Dr. Xin Bi
Department: Biology

Peter Yen BMB
Faculty Sponsor: Dr. Jacques Robert
Department: Microbiology and Immunology

Frank Yeung BMG, BME (2)
Faculty Sponsor: Dr. David Goldfarb
Department: Biology

Andrew Younger BMG (2)
Faculty Sponsor: Dr. Craig Jordan
Department: Hematology/Oncology

Linda Yu BIO
Faculty Sponsor: Dr. Bogdan Polevoda
Department: Biochemistry and Biophysics

De Kiewiet Summer Research 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 Faculty Sponsor and must submit a detailed research proposal. The summer fellows work full time in a lab for 10 weeks. Class of 2011 graduates who have been de Kiewiet fellows are:

Kathryn Cooper '11, BNS
Title: "*Quantifying the Effect of Eye Position on the Localization of Sounds*"
Faculty Sponsor:
Dr. William O'Neill Ph.D.

Alexander Federation '11, BCD CHM
Title: "*An Oligomer Specific Amyloid β Binding Peptide Derived from the Human Prion Protein*"
Faculty Sponsor:
Dr. Bradley Nilsson Ph.D.

Alexander Hajduczok '11, BBC
Title: "*Mapping Antagonist Contact Points on the Ste2 G-Protein Coupled Receptor in Saccharomyces Cerevisiae*"
Faculty Sponsor:
Dr. Mark Dumont Ph.D.

Evan Hass '11, BBC
Title: *"In Vivo Specificty of Yeast Trm7"*
Faculty Sponsor:
Dr. Eric Phizicky Ph.D.

David Phizicky '11, BBC
Title: "*Identification and Characterization of Novel Ribosome Biogenesis Factors*"
Faculty Sponsor:
Dr. Gloria Culver Ph.D.

Joome Suh '11, BMB
Title: "*Timing and Dosage of G-CSF Required to Counteract Effects of Radiation on Neutrophils*"
Faculty Sponsor:
Dr. James Palis Ph.D.

Stefanie Tan Ying-Lin '11, BBC
Title: *"Role of The Helicase Pif1 in Improving Eukaryotic DNA Replication Fidelity"*
Faculty Sponsor: Dr. Robert Bambara Ph.D.

National Honors & Awards 2011

DAAD - RISE SCHOLARSHIP PROGRAM SUMMER SCHOLAR (German Academic Exchange Service - Research Internships in Science & Engineering)
Ashley Haluck-Kangas, '12

AMERICAN SCANDINAVIAN FOUNDATION FELLOWSHIP CANDIDATE
Gabriel Perreault, '11 BMG

FULBRIGHT U.S. STUDENT PROGRAM

Scholars	Finalists	Nominees
David Liebers, '09 BS BEB	Yaneve Fonge, '11 BS BMB	Stephen Keeley, '11 BNS
Rachel Sitts, '11 BS BNS	Gabriel Perreault, '11 BS BMG	

GATES CAMBRIDGE SCHOLARSHIP
David Liebers, '09 BEB
Emilia Sola Gracia, '12 BEB

HERTZ FOUNDATION GRADUATE FELLOWSHIP
Finalist-Alexander Federation, '11 BCD

RHODES SCHOLARSHIP
Finalist-Yaneve Fonge, '11 BMB

NATIONAL SCIENCE FOUNDATION GRADUATE RESEARCH FELLOWSHIP COMPETITION

Undergraduate Fellow	Alexander Federation, **'11**, BCD, CHM		
Recent Alumni Fellows In Graduate School Elsewhere	Benjamin Sabari, **'10**, BMG *Rockefeller*	Joseph Bedont, **'09** BNS *Johns Hopkins*	Katherine Sharp, **'07** BBC *Stanford*
Recent Alumni Honorable Mentions in Graduate School Elsewhere	Kathleen Mulvaney, **'10** BMG *Chapel Hill*	Kristine Wadosky, **'09** BMG *Chapel Hill*	Samantha Falk, **'08** BMG *University of Pennsylvania*

Alumni Updates

Jarrod Bogue (BMG 2010) I am thoroughly enjoying my first year of medical school. My education on the River Campus has proved invaluable in helping me succeed and excel in medical school. I will be working with Dr. Arthur Moss in the new CTSI at URMC this summer on a project relating to a genetic study of Long QT Syndrome.

Jenie George (BIO 2009) I am currently a second-year medical student at the University of Rochester School of Medicine and Dentistry. Last summer I was an OME Summer Basic Science or Clinical Research Award Recipient and worked with Dr. Arthur Moss, Professor of Medicine (Cardiology). Recently, I gave a poster presentation entitled: "Effectiveness of Cardiac Resynchronization Therapy in Diabetic Patients with Ischemic and Non-Ischemic Cardiomyopathy" at the American College of Cardiology Conference.

Meryl Gold (BIO 2010) I graduated from the University of Rochester a semester early, in December of 2009. For the next six months I worked with Susan Friedman, M.D. at Highland Hospital on a research study that investigated the chronic co-morbidity factors in older adult patients. Presently, I am about to finish up my first year of a two-year commitment at Children's Hospital, Boston, where I am a data coordinator for the Orthopaedic spine team. Being in a clinical setting through these work experiences has solidified my desire to become a doctor while reinforcing the rightness of my decision to defer applying to medical school, my ultimate goal, for a couple of years.

David T. Liebers (BEB, HIS 2009) I wrapped up my internship at the NIH, and the manuscript I helped work on is now being prepared for publication. I went to Poland on a Humanity in Action fellowship, came back, and applied for Gates Cambridge, Marshall and Fulbright fellowships. I was lucky enough to get both the Fulbright and Gates, and decided to go with the Gates so I'll be at Cambridge next year studying History and Philosophy of science. Then maybe law school. We'll see what happens. I'm trying to get a couple of businesses off the ground, too. We'll see what happens. I miss UR!

Alumni updates continued...

I've been living in Poland since October doing a project on ethnic minority groups, sponsored by the U.S. Embassy in Warsaw. It's pretty cool since I've been able to see a lot of Poland's natural beauty at the same time. The Carpathian Mountains are absolutely breathtaking. And Białowieża, Europe's last old-growth forest, packed full of owls, woodpeckers, and songbirds, is a real treasure. The last of the European Bison (Żubr in Polish) live there. I've done some traveling around Eastern Europe, have picked up some Polish, and plan on taking the transiberian railroad to Lake Baikał this summer to commune with the inland seal population. I live on what I consider to be the most beautiful street in Warsaw, ul. Chmielna, spend weekends traveling to forgotten corners of the country to hike and conduct interviews, and during the week mainly study, read, and work as an intern for the Freedom and Democracy Foundation which works on human rights issues in Belarus. Life is good. Anyone that wants to come through, I have an extra bed, and I'll hook you up with good food.

Caitlin McIntyre (BMG 2009) I worked in the PACU at Memorial Sloan-Kettering Cancer Center in Manhattan the year after graduation. I am currently in my first year of medical school at Jefferson Medical College in Philadelphia. This summer, I will be conducting research on pancreatic cancer in the Department of Surgery at Jefferson.

David Nissan (BBC, HIS 2008) and Moriah (Heller) Nissan (BBC 2008) We met our freshman year in Bio 113, which was at that time taught by Professor Platt. Four-and-a-half years later in the summer of 2009 we were married! We are currently living in New York City and are both in our third year of our graduate programs. David is studying medicine at Weill Cornell Medical College and will soon be applying for a residency in general surgery. Moriah is studying cancer biology at the Gerstner Sloan-Kettering Graduate School and is studying the signaling pathways in melanoma as her thesis topic. We are both so happy and we are looking forward to our next adventures!

David Nissan & Moriah (Heller) Nissan

Harshika Satyarthi (BNS, HIS 2009) As I pursue my degree in health policy at Columbia University, the analytical and critical thinking skills I acquired while studying neuroscience and history at the University of Rochester have been invaluable. Directly following graduation, I was in Kenya for two months conducting public health research pertaining to clean drinking water through NIH's Minority Health Research Training Program. The program allowed me to learn about a different culture and gain first-hand knowledge about the public health concerns in developing countries. Meeting the indigenous tribe and going on a three day safari was a life-changing experience.

I worked for a year as a clinical assistant for a neuro-ophthalmologist, Dr. David Smith, based in Rochester, NY, after graduation from UR and before starting at Columbia. My experience working with Dr. Smith enhanced my knowledge not only in clinical medicine but also in health care policy making. This opportunity allowed me to better understand the obstacles involved in providing care and the needs and complaints of health care beneficiaries in regards to health insurance, medications, and other factors. I was able to utilize this knowledge in my current health policy and related courses at Columbia. However, I believe the skills I gained at the University of Rochester via classes and research was instrumental in furthering my abilities to see the big picture as well as the details in both my studies and work.

Laney Widener (BEB 2010). I currently have an internship with the Chicago Botanical Gardens Conservation and Land Management Program (CLM) in the Mojave Desert. When I first got to Needles, CA, I thought, "What the heck am I doing here? I am in the middle of the desert!" I suggest that everyone should go somewhere "foreign" sometime in their lives so you will know what I mean by this. It was surreal being in the desert after growing up on a lush western New York farm and then being in snowy Montana for a few months. However, this internship is just what I needed. I am collecting native plant seed for the Seeds of Success program, and I am learning a great deal about the flora and fauna of an extreme environment and the fascinating adaptations they have developed living here. I think that every biologist, or aspiring biologist, should experience the desert.

Having research experience in the Ramsey lab has provided the necessary background for this internship, and I think this will open a lot of doors and opportunities in the future. I eventually plan to go to graduate school, but right now I want some life experience and the freedom to travel before I decide to settle into school again.

Life-Shaping Experiences and Future Plans

Hannah Cavallo (BS, BMG, '12)

I came to the University absolutely positive that I wanted to do research, particularly research in genetic disease, but having no idea what being a researcher actually entailed. I started off right; I got a job in a research lab, that of Bob Minckley, as soon as I could freshman year and I even spent the summer working full time in the Werren Lab. My sophomore year I began TAing on top of working for Bob, the ultimate hero of this story. At the end of fall semester, Bob asked me to TA Bio 111 Lab for him, mostly because he didn't want to have to interview anyone else. Despite myself, I absolutely loved TAing and over the next year began slowly to understand that something had been missing from my education.

I have never been one to ask questions in class, or really to be able to think of good questions at all, which unfortunately is the basis of research and, as I learned, the reason why I am not well suited to do it. I am, however, fairly good at answering questions and at guiding others towards being able to answer questions themselves. After spending a semester "playing with rats" at a lab in the Medical Center, I finally gave up on the idea that I could force myself into the mold of a dedicated researcher. I was asked to TA Genetics Lab, and that was the end of it, I was hooked. Since then I have enrolled in a course at the Warner School of Education, a three-hour class I find myself excited to attend every Monday night and have begun looking at Masters programs in Education. I love biology, and I love helping others love biology, and without the opportunities given to me by the Biology Department, I would never have found what I really want to do with the rest of my life. Bob probably doesn't want to hear it, but without him giving me the Bio 111 job, I never would have come to this realization and would most likely still be begrudgingly on the path towards a life in a lab. He has been a true friend and mentor and helped make the biology department feel like a second home for me. Next year I will continue to TA Chemistry 131, Genetics Lab Bio 198P and Introductory Biology Bio 113 lab and to take classes towards my Master's degree at the Warner School, as well as being a member of the Eboard of the Society of Undergraduate Biology Students as the Senior Representative.

Kathryn Cooper (BS BNS)

When I came to the U of R as a freshman, I was just a teenager with the vague goal of being "pre-med," so I signed up for the standard battery of intro courses. When it came time to choose majors, I knew I wanted to do something related to biology and chose neuroscience on kind of a whim because the course descriptions looked the most interesting to me. When I took the intro neurobiology course at the beginning of my sophomore year, I knew I had made a good choice, and it was so refreshing to go to class every day and be genuinely interested in what I was learning. The following semester I took the neurobiology lab course where, as a final project, we did an experiment looking at the effects of brain lesions in rats. I could not believe how much I had learned in just a year and was amazed at the fact that I had performed my first brain surgery as a sophomore in college.

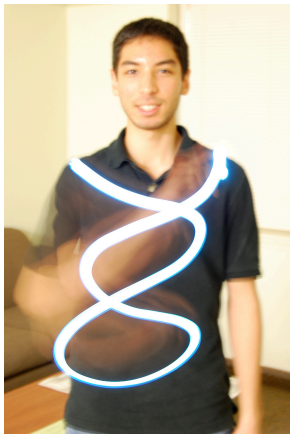
Around this same time, I started working in a lab at the Medical Center doing research with human subjects, looking at how eye position is related to the perception of auditory space. Trying to understand how the senses interact to help us navigate our environment is fascinating to me, and the experience has added a unique component to my education here. It has given me the opportunity to understand what it is to be a scientist and has allowed me to carry out experiments from start to finish. I have also had the opportunity to present my research nationally at the National Conference on Undergraduate Research in Missoula, MT and the Association for Research in Otolaryngology Midwinter Meeting in Baltimore, MD.

This year I was accepted to the Take Five Scholars Program and I have started taking courses in Health and Society, History, and Anthropology. I ultimately want to gain an understanding of how societal values affect the way different cultures approach health care. I will also be spending the summer in Richmond at the Virginia Commonwealth University School of Medicine participating in their summer research program for microbiology, infectious diseases, and public health. When I apply to medical schools this year, I believe that I will be prepared with an excellent knowledge of biological systems as well as an understanding of social determinants of health. I do not believe I could have received such a rich and diverse education anywhere else, and I am so thankful to my parents for making it possible for me to be here.

Elie Farah (BS BMG)

A Slippery Start: The start of my college career may best be described as a foot race down an icy slope—to see how many lecture sessions I could miss while still passing the course. With 2.0's in "Biochemistry" and 'Perspectives in Biology II" to prove that I was everything hardcore, it was time for a change. I took stock of what I wanted, what I was good at, and where I wanted to be after college. Since my answers to these questions were typical of a college student—i.e. "heck if I know"—I decided to work harder at my current major instead of switching to something new. Yet the gum chewing, ass-kicking bio juggernaut I have become would be the result of a miracle.

Jesus of Thailand: My miracle was Tip—aka Professor Benyajati—who admittedly bore a closer resemblance to a teddy bear than Jesus or the Buddha. Yet this walking encyclopedia of biological knowledge so finely crafted her exams that she made even the gods among us mere mortals, unable to walk and questioning the seeming immortality of youth. If knowledge is power, then you needed enough to drop a bomb on these exams! Having somehow survived as a student in Tip's course, I agreed to TA for a laboratory class that she taught. Doing the prep work whenever I had free time (read: there was no free time), the hours on my time sheet accumulated fast and hard. In the end, it was so, so worth it—doing research in the lab, helping students to understand challenging concepts, and videotaping Tip bartend for the first time at a SUBS event (!) contributed to my rich experience here at the University. As my college career draws to a close, I confidently say that though I have walked through the valley of the shadow of death, I shall fear no evil (well, maybe taxes).



Emily Gray (BS BEB)

I have always had an inordinate fondness for nature. I am fascinated by bugs, birds, and beasts and their natural habitats. As a child, during my brief stint as a t-ball player, I was more interested in the earthworms that populated the field than in the ball that was heading straight in my direction. In elementary school, I volunteered to hold the tarantula during a class field trip to the Philadelphia Insectarium. That passion for nature continued as I grew older, and it was what led me to pursue a degree in Ecology and Evolutionary Biology at the University of Rochester.

Fortunately, I found two individuals at Rochester who were willing to let me play in the mud and count bugs to my heart's content. The spring semester of my junior year, I performed independent research under Drs. Justin and Tara Ramsey. My research involved examining the physical aquatic properties and aquatic macroinvertebrate populations of Red Creek in Brighton, NY and in a series of vernal pools that occur throughout a section of woodlands owned by the University of Rochester. Every week I went out to either the creek or the vernal pools and took temperature and dissolved oxygen readings, collected plankton specimens and examined the macroinvertebrate populations. What struck me most about my research was the sheer amount of life that teemed in these habitats.

This research facilitated my acceptance into an internship at the Stroud Water Research Center in Avondale, PA during the summer of 2010. While at this internship, I assisted with research in aquatic biogeochemistry, microbial and watershed ecology, and nutrient cycling as well as studying the physical, chemical, and biological processes of streams and rivers. My time at Stroud, as well as my involvement with the Ecology and Evolutionary Biology program at UR, helped me to focus my research interests and decide to pursue a graduate degree in the aquatic sciences. Upon my return to UR for my senior year, I was a teaching assistant for an ecology lab course. During this course, I applied methods learned at Stroud to add an aquatic ecology component to the curriculum.

I am grateful that my education at the University of Rochester has helped me turn my overarching passion for the natural world into a focused research and career plan. Thank you to Dr. Fry for his patience, to Drs. Justin and Tara Ramsey for being wonderful mentors and for helping me to pursue my passions, to my family for their boundless love and support, and to my friends for making my undergraduate experience so memorable. Though I am sad to leave Rochester and the natural surroundings that I have become so familiar with over the past four years, I am excited for the future and what it will bring. This fall, I will be attending the University of North Carolina at Chapel Hill to begin my graduate studies and to pursue a degree in marine and aquatic sciences. I am looking forward to continuing my education and discovering more about the natural world around me.

Amanjot K. Grewal (BS BMB)

One of the things that makes Rochester so unique and well known is the openness of the curriculum. During my time here as a student I was able to explore my interests in depth. During my four years here I took classes in Spanish, Leadership Theory, Economics, and Microbiology. I chose to pursue microbiology in particular because of my experiences shadowing physicians who worked in infectious disease and because of the research I had done in high school.

The moment that I realized that biology was indeed something I was interested in pursuing and that I had made the right decision, was the summer after sophomore year. I went to the Northeast Regional Yeast Meeting (NERY), which was being held at Cornell University that year. At the second day of the conference, I presented a poster about the research I was working on. I had two members of the University of Rochester's Medical School faculty approach me and we began to discuss my project. The confidence that that experience gave me was astounding! Here I was, an undergraduate with a minimal understanding of the project, talking to people who were well known in the field. Though there were moments where I couldn't even pretend to follow along, there were even more moments where concepts that I had learned in Bio 198 with Professor Sia or Bio 112 with Professor Platt made what they were saying comprehensible. This experience, as well as my research with parasites, made microbiology the best choice of major and my professors and classmates were what kept me engaged!

I have been intrigued by many classes and in the future I would like to explore public health more. I have been interested in traveling and particularly in Spanish culture. Ultimately, I will be pursuing a career in medicine and would like to practice in Spain for a few years.

Emily Grzybowski (BS BMG)

I am an artist and a scientist. Like art, science is a creative discipline. It requires intellectual curiosity, rigor, and immense ingenuity. As scientists, our charge is to bring something new into the world, to constantly do something no one has done before, and then prove our findings to those around us.

This spring, I will receive a B.A. in Studio Arts and a B.S. in Molecular Biology. During my time at Rochester I've had the freedom to take any class I want (within reason) and to pursue all of my passions equally. I spent countless hours in the laboratory and the rest of my time in the art studio. In short, I've had the freedom to try new things while receiving a substantial scientific education.

This fall, I will begin my graduate studies at Rockefeller University. Looking back at my experience at Rochester I can see things that could have been better; things that I took for granted as constants that could be changed. However, I maintain that Rochester is one of the only universities that inherently fosters the independent, creative nature that is so important to good science. The flexibility of our curriculum, the optional but abundantly available nature of lab experiences, and the focus on undergraduates at this campus helped me prepare myself for my next step--not someone else's.

Today, I remain an artist and a scientist and I could not have done this anywhere else.

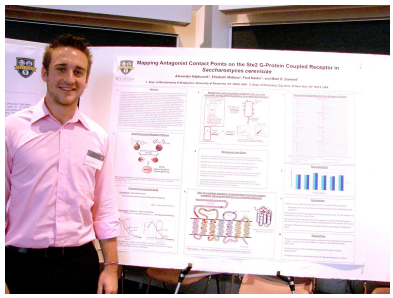
Alexander Hajduczok (BS BBC)

I first stepped into Baush & Lomb 109 in early September of 2007 as your standard Biology major, not realizing what I was getting myself into. What I also didn't know was how instrumental that class that I was sitting in, Bio 112 with Dr. Terry Platt, would be in molding the path I would take through college.

I would be lying if I said that it was all downhill from there. A Biochemistry & Biophysics faculty member once started a lecture on enzyme kinetics by saying that "Life is the control of reaction rates." And just like there is an activation energy barrier in any chemical reaction, on day one of Bio 112 I met my first major obstacle. Dr. Platt began the biology lecture with fundamental chemistry, which soon progressed into biochemistry. I remember asking the Teaching Assistant "why are we doing chemistry in a biology class?" After struggling for the first few weeks, I soon began embracing the material as the chemistry lessons on approximating pH for H^+ values became directly applicable to the biological principles that I fell in love with in high school.

Fast forward a full year to the beginning of sophomore year. I was chosen to serve as one of eight Workshop Leaders for Bio 112, a role that I was very excited to have. I enjoyed all aspects of the responsibilities as a Workshop Leader—from leading the two-hour workshops biweekly,

to the associated workshop leader course where we learned neat teaching tricks, to (believe it or not!) the grading of exams and papers. After such a positive experience with Dr. Platt, I began to make it a habit to seek out TA positions in addition to the course load for a B.S. Biochemistry major. Now, as I am about to graduate, I look back on these experiences and realize that they have brought about some of my brightest college memories. Having the opportunity to lead workshops, recitations, and labs for a multitude of courses has given me an extremely unique undergraduate experience; in fact, some of the most interesting concepts and idea that I have come across have been through these teaching experiences.



Bio 112 not only guided me in the direction of a teaching career, but also gave me invaluable early exposure to basic science research. Reading primary literature inspired me to seek out a research experience of my own – which I was fortunate enough to find through the DAAD (German Exchange Program) by being awarded a RISE scholarship to complete a summer internship in Halle, Germany the summer after my sophomore year. This unique opportunity led me to search for additional research experience upon my return to Rochester, where I found my home in the laboratory of Dr. Mark Dumont.

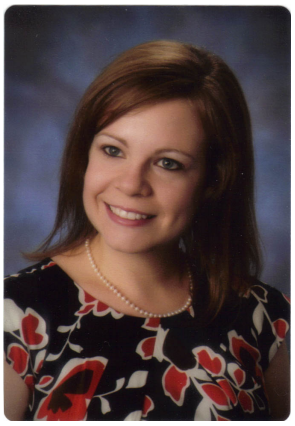
Many of the reasons why I have chosen to enroll in an MD/PhD program upon graduation, with the hopes of staying in academic medicine, are deeply rooted in the opportunities I was presented with during my first semester of college, in Bio 112: Perspectives in Biology I.

Meghan Jacobs (BS BEB)

My experience as a biology student at U of R has been both challenging and rewarding. I had the opportunity to start working in Dr. Jaenike's research lab my first week on campus. I started small and worked my way up, taking on more and more responsibilities. It was my work in the lab that influenced my decision to become an ecology and evolutionary biology major. I have learned so much from this hands-on experience and will take the molecular tools with me as I continue my career in science. I also met some great friends during my four years in the lab and cherish the way they made me feel right at home. I am very grateful for the time spent in Dr. Jaenike's lab and would specifically like to acknowledge Dr. John Jaenike, Dr. Rob Unckless, Lisa Boelio, Dr. Tammy Haselkorn, Deby Philbrick, and Tom Brekke.

In addition to having a great deal of research experience, I also had the opportunity to be a teaching assistant for two classes. The first one was a large lecture class in which I learned how to hold a workshop, grade, and proctor exams. It was interesting and fun to work with so many different students, as well as to enjoy the camaraderie that developed between the workshop leaders. I was able to continue as a leader in this class for three years and enjoyed becoming a senior leader, mentoring the new leaders as they joined us each year. The second class was a totally different experience because it was a teaching lab. I enjoyed working with students and helping them obtain a deeper understanding of molecular techniques. I would like to thank all the professors I served under as a teaching assistant, but would like to send a special thank you to Dr. Bob Minckley for his mentoring through the years.

I think what I have enjoyed the most throughout my time at U of R is all the connections I have made in the Biology Department. The friendships will never be forgotten and it was a wonderful journey. As I move on to medical school, I am well prepared for what is to come because of the education I have behind me. Lastly, I would like to thank my family and friends for all the wonderful support you have given me throughout the years. I know I would not be here today without you.



Matthew Kaufmann (BS BBC)

When my high school AP Biology teacher nominated me for Rochester's Bausch & Lomb science scholarship at the end of my junior year, I didn't know much about the college. Though my newfound interest in biology told me to apply to competitive science schools, I wasn't exactly sure where I wanted to matriculate. After learning more about the university, I immediately knew I had found the right place for me and applied as Early Decision. It was one of the smartest choices I have ever made.

As a freshman, I had the pleasure of enrolling in what became my favorite biology course of my undergraduate career, Bio 112, taught by none other than Dr. Platt. After the first day of class, I was immediately attracted to the fascinating curriculum, which involved teaching basic biological concepts, writing skills, research studies, and even time management – the latter of which was incredibly helpful while adjusting to college life. In short, Bio 112 provided me with a life-changing experience to not only grow as an intellectual, but as a person. Though the biochemistry-focused material did ignite my interest in

mitochondrial biology (my current area of research), I was even more impressed with the life lessons Dr. Platt taught us.

As a result, I became a Bio 112 Workshop Leader. This wonderful experience strengthened my passion for the Bio 112 curriculum, as well as sparked my interest in teaching. As a Workshop Leader, I found that a great way to motivate students is to discuss material in new, interesting ways while working in small groups. I truly identified with this collaborative approach, and thus continued as a Workshop Leader and Teaching Assistant in the Biology, Chemistry, and Math Departments.

I've also conducted research in cardiac mitochondrial biology since my sophomore year with Pediatric Cardiologist Dr. George Porter. With Dr. Porter's encouragement I made great progress in my work, resulting in the inclusion of my name on a paper recently submitted for publication by Dr. Porter. Further, I was the only undergraduate to present at the Eastern Society for Pediatric Research Conference held in March 2011. Ultimately, my experience in the Porter Lab taught me a great deal about professional scientific collaboration.

As my time at Rochester is coming to an end, I'd like to thank my family and friends for their love and support, as well as our amazing Biology Department for providing me with a world-class education. As for the future, I anticipate entering medical school in 2012 with the hopes of becoming a cardiothoracic surgeon. During my gap year, I hope to pursue cancer/aging research in Madrid, Spain and work as a ski instructor on the west coast.

Ryan Over (BS BBC)

My parents love to tell me that I could name many dinosaurs as a 4-year old, and as I grew my interest in animals did as well. When I was looking at colleges, I was pretty sure that I wanted to pursue biology, but not really sure where in the vast field my niche would be. So, when I found out Rochester had six biology majors I was pretty excited. By the end of the first semester of my sophomore year, I decided on Biochemistry.

Some of my favorite classes were Advanced Biochemistry and Advanced Cell Biology, and Classical Greek with Prof. G. There have been many moments during my biology classes where I would learn a new thing and just marvel. The dizzying array of things that a cell carries out at one time is just astonishing. One of those times was when I learned that mitochondria are not just static organelles. In reality, they grow, shrink, fuse, split in two--they are dynamic! I know I learned a lot in high school, but the amount of stuff that I have learned about the world through classes and my experience here is astounding. I have enjoyed the flexibility of the Rochester curriculum, which has allowed me to pursue a minor in History and to have time on the side to read other books.

Throughout my years here I have been involved in Campus for Christ, Intramural Frisbee and Volleyball, spent a semester doing independent research in Mark Dumont's lab, was a Bio TA, tutored students in Genetics and Organic Chemistry, and have played tuba in the Wind Symphony. There are a lot of people that I am going to miss seeing when I leave Rochester this May. I also want to add a special thank you to my roommate David, who has been an amazing friend to me here; encouraging, challenging, and just a great guy to hang out with.

After graduation, I am going to be taking a gap year as a Christian Missionary to Europe before I head off graduate school to pursue a Ph. D. in Biochemistry.

Eric Phamdo (BA Psy, Bio minor)

Sometimes I question my love of biology; when my house in the Galapagos was overrun by cockroaches and ants would be one example. Or that time in Tanzania when the jellyfish stings were so bad I seriously reconsidered the purpose of my coral reef study. Or when nearly breaking my ankle in Rwanda made me wonder if seeing Mountain Gorillas was really worth it.

Fortunately, those moments were few and far between and entirely worth it. From the Andes Mountains to the rainforests of India, my study abroad experiences have taken me around the world and back again. Now looking back, four years and 13 countries later, I can definitively say that the UR has helped to give me the world.

Having pursued only a biology *minor*, it may seem odd that studying ecology has guided my abroad experiences. But when coupled with a psychology major, that combination allowed me opportunities I would not have gotten otherwise.

My friends often ask me if I even liked going to the U of

R, given all the time I spent abroad. My response to them is that I am indebted to my time here. Without the knowledge of ecology and the basic understanding of scientific processes, I would have never succeeded in the pursuit of my interests. With the guidance of Drs. Tara and Justin Ramsey and my first research experience in the UR Woodlands, I gained a solid base of skills and knowledge – allowing me to adventure away from the classroom to directly apply concepts and have real field-experience in some of the most biologically diverse places on earth.

To anyone considering study abroad, I will be your biggest advocate. Do it! You won't regret it.

To the Ramseys, thank you for all the lessons you taught me– both on and off the tests – and for your admirable and inspiring dedication to undergraduate research. Also thanks to Marianne Arcoraci for helping me juggle all that paperwork!

As for my post-graduation plans, I intend to meld the fields of psychology and ecology and pursue my true interest in environmental conservation and sustainability —applying my knowledge of human behavior to inspire change.

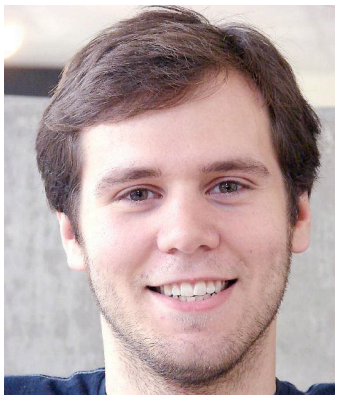
David Phizicky (BS BBC)

When I first came to the University of Rochester, I had absolutely no idea what I wanted to do. I bounced between Psychology, Neuroscience, Earth and Environmental Science, and several other possible majors. But it was not until I took Introduction to Biochemistry with Dr. Culver that I knew what I wanted to study. For the first time, I was fascinated by the material I was learning, to the extent that I wanted to spend my time studying in the library.

What I did not realize at the time was that I had barely scraped the surface of what Biochemistry had to offer. If Introduction to Biochemistry was the course that sparked my interest in the biological sciences, Molecular Biology with Dr. Benyajati was the course that made me certain of my choice. For the first time, we were expected to come up with experiments that could answer specific questions that a scientist might ask. Throughout my junior and senior years, I continued to take courses that pushed me further academically than I ever thought I could go.

While I was captivated by my coursework, my desire to go into research stems from the time I spent in the Culver Lab. I had always thought that the most interesting part of my classes was trying to come up with questions that a scientist might ask, but *nothing* could have prepared me for the sheer exhilaration of doing an experiment myself and getting a result that had never been seen before. And by working side-by-side with people who are interested in talking about science, I realized that the process of getting to that result can be just as much fun as the result itself.

The classes I have taken and the research I have done at the University of Rochester have led me to realize that the process of discovery is the most enjoyable aspect of Biology. It is for this reason that I want to continue doing research. After graduation, I will be going to MIT to pursue a Ph.D. in Biology. I would like to thank Dr. Dumont, Dr. Benyajati, and Dr. Culver, all of whom were willing to talk to me whenever I had a question about science, graduate school, or anything else. They each taught me much more than the material I learned from their classes, and I am extremely grateful for having had the opportunity to get to know them on a more personal level. I would also like to thank the entire Culver Lab for their patience with me and for their willingness to teach me how to approach a scientific experiment. Lastly, I would like to thank my family, who pushed me only to find something I was passionate about, and then to pursue it to the best of my abilities.



Adriana Polisano (BS BNS)

Looking back on my decision to attend the University of Rochester, I never imagined I would develop such a strong passion for the field of neuroscience. After leaving high school with an interest in psychology, I envisioned myself working in a mental health clinic in the future. Even though I always enjoyed science, I did not expect to incorporate these two fields.

My first exposure to neuroscience occurred when I enrolled in BCS 110 freshman year. This overview course of the connection between neuroscience and psychology opened my eyes to a whole new area of interest. Although it was extremely challenging, I was immediately drawn to the idea that changes on the molecular level can cause drastic alterations in behavior. I have further explored the neural mechanisms that lead to mental health through other courses including the biology of mental health and neurochemistry. These courses have allowed me to

examine current theories of mental disorder development and illustrated the intricate overlap between biology and behavior.

During high school I was confident that I wanted to work in a clinical setting and honestly never considered research as an option. However, I thought that since I was attending a university well known for research I should at least "give it a try." During my sophomore year, I joined the lab of Drs. Kathy and Ernest Nordeen, studying neural plasticity and learning. Although I was a little nervous, this decision was probably one of the best choices I have made while studying in Rochester. Working with the Nordeens has taught me research techniques I know I will use in the future, but more importantly, how to think critically and analyze research to further examine the questions that remain within neuroscience.

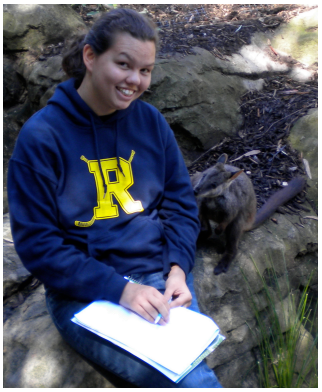
Through a combination of coursework and research experience, my outlook on my career has drastically changed. After graduation I will spend a few years working in research centered on mental health and neurochemistry before ultimately attending medical school. My overall goal is to combine my passion for psychology and neuroscience into the clinical and research aspects of psychiatric treatment. As my last year in Rochester is coming to a close, I realize how thankful I am for the opportunities that I have been given. This experience would have not been nearly as successful if it wasn't for the professors within the neuroscience department, to whom I am very grateful.

Laurana Ryback (BS BEB)

Attending the University of Rochester has presented me with many opportunities that I would not have had at a larger school with less emphasis on research and technology. As a freshman, I selected my Biology major because of my future career goal of veterinarian. Bio 113, taught by Dr. Jaenike second semester freshman year, and its accompanying lab component, really sparked my interest in Ecology and Evolutionary Biology and made it easy to pick a concentration within my Bachelor of Science in Biology. Bio 113 also introduced me to *Nasonia* wasps, my new love.

My sophomore year, I was hired as a research assistant in the Werren lab. I am grateful that they took a chance on me, a timid underclassman. They saw potential in me, and I hope to have made them proud after working there for 3 years. People often think the work I do in lab is strange and they're mostly right because often I am mating, or at least trying to mate, *Nasonia* wasps and observing the wasps' behavior to see if the female accepts the male. Working in the Werren lab has provided me with the opportunity to perform independent research as well as learn to be part of a team.

Labs have been my favorite part of my education: I love the hands on experience. The highlight of my major requirements has to be Bio 225 – "Lab in Ecology and Evolutionary Biology." This 4-credit lab was taught by my favorite professors, Bob Minckley and Tara Ramsey with the help of a TA – Rob Laport (affectionately nicknamed Lab Report). This lab was so enjoyable that I didn't mind its 4 hour length, so long as I had a field snack. Labs in America were cool, but honestly labs in Australia were even cooler! I had the privilege to study abroad in Sydney, Australia. I loved my classes, or units, as the Aussies call them. I took Animal Behaviour, Biology of Australasian Vertebrates, and Ecological Humanities. In my labs I studied the rock wallaby (pictured, although it also studied me), emu, kangaroo and Asian dhole. My time spent in the Taronga zoo reaffirmed my love for animals and specifically exotic, wild animals. One day, I hope to be a zoo veterinarian.

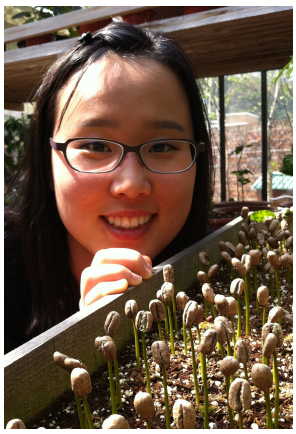


I want to thank my professors and TA's for all they have taught me, my parents for ensuring I have the best in life especially with regards to my education, and also thanks to my friends who have kept me sane in the library at crazy hours.

Joome Suh (BS BMB)

If someone were to ask me today, "What was your most memorable course at UR?" I would answer, "Microbiology Lab" with a wide grin. This was the class that taught me the thrill and the excitement of conducting research. I vividly remember one experiment in particular when we were learning about the normal bacterial flora that reside in our bodies. Professor Courtney (MAC) handed us two cotton swabs—one to obtain a sample from the throat and one for the other end of the digestive tube. As I tried to obtain my own samples in a toilet stall, I could hear the gagging sounds of a few eager classmates who had unfortunately pushed their swabs too far into their throats. I remember walking back to the lab with my swabs in hand, giggling a little whenever I met my fellow classmates' eyes. A few days later, we were able to observe our own bacteria, which had grown into little dots of

Another experiment that left a lasting impression was my individual project at the end of the semester, for which I had to isolate a thermophile, or a bacteria that thrives at high temperatures. After drawing my topic from a hat, I thought to myself, "Where am I going to find a thermophile in the middle of winter in Rochester?!?" As expected, it wasn't easy—this was probably the first time in my life I've ever crossed my fingers for bacterial growth and not the opposite. The exhilaration I felt when I finally obtained my thermophiles on my 50°C plate is indescribable.



Through our projects, my classmates and I learned that research, or "re-search" as we later agreed, requires a little luck, good procedures, and equally important, a good amount of perseverance. These experiences and the annual microbiology potluck dinner at MAC's house will certainly be remembered for years to come.

I would like to express my thanks to my professors and mentors for helping me to develop as an individual and think like a scientist. I am also thankful to my family for their never-ending support and encouragement.

Kaitlin Tyre (BS BMG)

When people ask me what my major is, I always have to take a second and prepare for the look that I am about to receive. When I finally utter the words "molecular genetics," I am usually met with the blank stare that I was expecting. Often times I find myself looking back with that same blank stare because I cannot even believe what I have studied during my time here. How did I stumble across this amazing opportunity to study something as mysterious and complex as genes? Better yet, how did a Southern Californian like me end up in Rochester, New York in the first place? It goes without saying that my education here at this university has been quite an adventure.

While I really enjoyed biology in high school, when I came to U of R I wanted to take advantage of the liberal arts scene instead of diving right into biology. During my first couple of years here I took political science, environmental science, history, philosophy, brain and cognitive science, and math courses on top of my pre-med courses, trying to figure out which field would grant me a satisfying undergraduate academic career. None of them measured up, and I knew my heart was set on biology. As the date to declare our majors neared, I had this revelation that molecular genetics may be exactly what I am looking to study, and it was.

One of my favorite classes was Development Biology taught by Professor David Lambert. It was so incredible to me how a clump of cells could follow an internal genetic blueprint to become a large complex organism. This deep interest helped guide me to the independent research I have done this past year at the medical center. I have had the opportunity to research embryonic erythropoiesis in the Palis lab under the guidance of Jeffrey Malik. It has been so exhilarating to see science and research in action. The pure brilliance, technology, time, and effort that drive every scientific investigation are truly inspiring and humbling.

Another one of my favorite classes was Molecular Biology taught by Professor Tip Benyajati. That class was by far the most challenging class I have ever taken, but also one of the most intellectually rewarding. I just remember Tip's advice for that class: Link and Think. As we would be sitting there at the end of her lectures with our jaws dropped and minds blown by the overwhelming details of the genetic processes we were learning, she would always remind us to link and think. In other words, we should think about the big picture and let the details fall into place. It is so easy to get lost in the details, so a reminder here and there to look at the grand scheme of things, whether in a cellular process or in life in general, is really helpful. (Thank you, Tip).

It has been an incredible journey here at U of R, and I cannot wait to take what I have learned here out into the "real world." I owe so many thanks to the inspiring and brilliant professors here. A special shout out goes to Jenn Baylark who keeps the biology department running so smoothly. I have to thank Dr. Palis, Jeff, and everyone in the Palis lab for creating such a wonderful environment in which to learn and do research. I thank my friends and peers for all the great times we have had here. Above all, I thank my family whose love and support have given me the confidence to pursue my dreams. Thank you.

Michele Villa-Castillo (BS BEB)

Before coming to the University of Rochester, I had never been exposed to the theories of evolution. But once I had my first taste of Bio 111 my freshman year, I was hooked. I remember sitting in the front row, stunned at the definition of evolution plastered on the board and thinking, that's it? Of course by "that's it" I didn't mean to

undermine years of revolutionary thinking by great minds such as Charles Darwin. What shocked me was the clear-cut, beautiful explanation of how life came to be, and how people still argue about it and dismiss the idea completely.

It was then I knew I wanted to major in Ecology and Evolutionary Biology and delve deeper into this realm of science because as Theodosius Dobzhansky put it, "Nothing in biology makes sense except in the light of evolution." I feel honored to be able to study such a vast, rapidly growing, and elegant branch of biology. I think that while many other areas in biology tackle the question of how things work, evolution gets at the question of why things work which I think is especially important for fields such as medicine. Although an evolutionary approach is not a replacement for current medical techniques, it can serve as a supplement for understanding why certain sicknesses occur. I will be starting medical school at the University of Rochester School of Medicine and Dentistry this fall, and I will take with me what I have learned about evolution, a great complement to my future study in medicine.

Yet evolution was not the only thing that impacted me. A whole new experience came about senior year when I took the lab in Ecology and Evolutionary Biology. The first part of the course focused on the ecology side, specifically experiences in fieldwork. Never before had I been outdoors collecting samples and data. It was a very interesting experience, and very different from working in an indoor lab because of the unpredictability of it all—the weather, the bees, admiring and identifying every tree along the way, witnessing predators in their hunt, feeling a cool breeze while finding magnetic north, etc. All of this made data collecting much more challenging but by far much more enjoyable. I also had the opportunity to carry out an independent research project as part of the course and studied galls on grape leaves made by a tiny insect called phylloxera. Planning this project was easy compared to actually having to go outside and collect grape leaves. Finding leaves really wasn't a problem. It was finding leaves with galls that proved difficult. Not only that, it rained any time I planned to go outside. And anytime I thought I found a patch with galls, it wasn't enough for my study. I realized how tough it was to do studies like these, because nature always wins, and you must accommodate yourself to this "laboratory of life." Going into this study I was certainly out of my comfort zone, but I think that's what made the project so successful—I approached it with an open mind and was willing to make mistakes, learn, and evolve along the way. Coincidentally, this also happens to describe my journey in Ecology and Evolutionary Biology, which has shaped me into the student I am today and has prepared me for the professional I will become tomorrow.

Julia Cosgrove (BS BEB)

On hikes with my family growing up, it was common for my Dad, siblings, and I to reach the summit and realize that my mom was way behind due to her discovery of some flower, bird, or tree that she was eagerly keying out in her field guide. Years later when my tramping (NZ-speak for "hiking") buddies laughed as I pulled a "New Zealand Flora" field guide out of my pack while we rested on one of our many trips – I knew it was official - I had caught the biology bug.

I came to UR knowing I had an interest in biology and research, but not quite sure about the specifics. After having a great time at a summer research experience studying benthic foraminifera from the Connecticut River and Long Island Sound, I returned to school with an interest in Ecology and Evolutionary Biology. I continued to seek opportunities to supplement my Rochester coursework including another summer research experience studying stream salamanders in the Southern Appalachian Mountains at Coweeta Long-Term Ecological Research site and a semester abroad studying marine science and organismal biology at the University of Otago in Dunedin, New Zealand.

My undergraduate career would not have been the same without the help of Professors Justin and Tara Ramsey and their graduate students. Their incredible support, encouragement, and example as caring, enthusiastic, and effective teachers have been invaluable. Thanks to the small size of the Ecology and Evolutionary Biology department and the Ramseys' tireless work to enrich the Rochester experience for these students, I have been given numerous opportunities. In addition to my participation in their lab as an undergraduate research assistant, teaching assistant, and journal club member, Justin served as my senior thesis advisor for my study of stand structure and coarse woody debris of remnant old-growth beech-maple forests.

The more I learn about the natural world and particularly the living organisms that inhabit it, the more questions I have. I am excited to broaden my knowledge and focus

my interests as a technician in an Ecosystem Ecology and Biogeochemistry laboratory at the University of California at Berkeley in the coming year.

Congratulations to the following students for defending their PhD theses this past year!

Rhitoban Ray Choudhury (Advisor Jack Werren):
The evolutionary genetics of the parasitic wasp *Nasonia*.

Lidza Kalifa (Advisor Elaine Sia):
DNA damage tolerance and repair pathways in the mitochondrial compartment.

Keith Connolly (Advisor Gloria Culver):
Quality control and organization of small ribosomal subunit biogenesis.

Chris Hine (Advisor Vera Gorbunova):
Defying and Defeating Cancer: Hyaluronic Acid and the Rad51 Promoter

Jeremy Rabinowitz (Advisor David Lambert):
Centrosome-mediated RNA segregation: a novel patterning mechanism in *Ilyanassa*.

Robert Unckless (Co-advisors John Jaenike and Allen Orr):
Parasitic elements, extinction and adaptation: theoretical and empirical investigations.

Zhili Xu (Advisor Gloria Culver):
Dissecting the relationships between RNA structure and function in *E. coli* small ribosomal subunits.

Science in Action: Graduate Student and Postdoctoral Research

Adam Green (Grad Student-Ramsey Lab):

Science is awesome. Science gives us a framework to explore and challenge the world around us. There is a freedom and sort of purity in that, which I find really attractive. Clearly, I love being a graduate student in biology since I've been doing it for so long. But my affinity for nature and science started a long time ago, growing up in the suburbs of Chicago. My mom was always an educator, whether tutoring kids at our kitchen table or teaching at our local grade-school, she instilled in me a respect for education that continues to thrive to this day. My dad worked long hours during the week, but weekends were reserved for projects around the house. I remember him building radios and televisions and later, when I got older, we would build remote control cars and model rockets together. These projects inspired a curiosity within me that would serve me well as I became interested in science. As a family, we would go canoeing and camping throughout the summer and occasionally go on more adventurous trips that I hope I'm brave enough to bring my kids on, once I have some. From this young age, my parents fostered my love of the outdoors and my curiosity about how things worked. They tolerated messy 'science projects' and have always been supportive in my academic decisions. Throughout high school my time was split between the biology classroom (and the discovery channel) and my school's theater. My interest in theater waned when I enrolled at the U of R as an undergraduate, and biology won out as I graduated with a major in molecular genetics.

My time as a graduate student at the U of R has not only allowed me to explore many different areas in biology, but has also shown me the satisfaction that can come from teaching and mentoring students. This, combined with my love of adventure, sent me into the Peace Corps after earning my Master's degree working with DNA methyltransferases with Stan Hattman. My two years in Cameroon, West Africa was a life-changing experience that solidified my interest in teaching while strengthening my commitment to conservation biology. I returned to the U.S. and, while traveling across the country on my motorcycle, I met Justin Ramsey. At the time, he was just starting out as a new professor in the biology department. After a few conversations, we decided we could work well together and I joined his lab.

In the Ramsey lab I use the evergreen vine, ivy (*Hedera* spp., Araliaceae) to investigate questions involving speciation and biological invasion. Ivy is actually a group of about 13 species which are found naturally across much of Asia, Europe, Northern Africa, and several Atlantic islands. Some species have become aggressive invaders in several places throughout the world, including both the Pacific and Atlantic coasts of North America. Much of my work has focused on collecting invasive plants from these habitats and identifying them (as well as untangling the evolutionary relationships amongst all the species of ivy) using molecular techniques. Because only some species seem to have the ability to successfully invade, this group is a nearly ideal system to study why some species become invasive while others do not. To this end, I have conducted common garden experiments, growing all known species of ivy, as well as those collected from

invasive populations, to measure traits and the growth performance of these plants as they grow under identical conditions. This work will hopefully expand our understanding of biological invasions and help to identify future invaders before they can establish a foothold in sensitive environments.

After I graduate this coming fall, I will pursue my two loves: travel and teaching. First, I will embark on a two-month trip through Southern Africa and India. Then, if all goes well, I will join the faculty of a small liberal arts college where I will both teach and continue my research in invasion biology.

Rob Unckless (Postdoc-Jaenike/Orr Labs):

I came to the University of Rochester circuitously. After growing up in Rochester, I attended Cornell University. While in college, I planned to teach high school social studies, but took an evolutionary biology course that changed my mind. After graduating, I taught high school science for seven years. During that time I completed a masters degree in aquatic ecology at SUNY Brockport, which motivated me to work toward a Ph.D. I enrolled at the University of Rochester in the Fall of 2006.

My research at Rochester involved both theoretical population genetics and evolutionary ecology. My theoretical work, with Allen Orr, focused on adaptation and speciation. The evolutionary ecology work, with John Jaenike, involved host-parasite interactions between *Drosophila* (fruit flies) and nematodes, bacteria and viruses. Two highlights of this work were our discovery that a bacteria protects flies against nematode infections, and the discovery and characterization of a DNA virus.

When I'm not in the lab, I'm spending time with my wife, Heather, and almost four-year-old son, Miles. In June we will welcome another child. We enjoy travel and spending time with cousins and grandparents. At the end of the summer I will start a postdoctoral fellowship at Cornell University with Brian Lazzaro and Andy Clark.

Symposium Celebrating Martin A. Gorovsky: A Legacy of Excellence

By Tom Eickbush

On August 6, 2010, a symposium was held to recognize the impact of Professor Gorovsky's research career. This event brought together former students, post-docs, colleagues, and friends to celebrate Dr. Gorovsky's legacy.

Professor Martin "Marty" Gorovsky accepted a faculty position at the University of Rochester in 1970 and rapidly progressed through the ranks of Assistant and Associate Professor. He was promoted to Full Professor in 1980. Within two years he was selected to be the chair of the department, a position he held for the next 12 years. Marty led the Biology Department into the modern age of recombinant DNA technology and the application of genetics to the field of cell and developmental biology.

Professor Gorovsky is a cell biologist whose research has focused on the same model organism, the ciliated protozoan *Tetrahymena*, throughout his career. Marty's early research efforts were focused on the ribosomal RNA genes of this organism. However, with the advent of recombinant DNA technology, Marty's laboratory shifted its focus to two other multigene systems: histone genes and tubulin genes. He also played an important role in the recent sequencing of the *Tetrahymena* genome. Through his long career, Marty has published over 140 peer reviewed articles.

Professor Gorovsky has been very successful as teacher and mentor. Marty has to date trained 22 postdoctoral-fellows and 26 Ph.D. students, including many leaders in the field of molecular genetics and two inductees to the U.S. National Academy of Sciences. In 2003, Professor Gorovsky was recognized for his outstanding mentoring efforts by receiving the University Award for Excellence in Graduate Teaching.

Symposium speakers

Joseph Gall, PhD, Staff Member, Carnegie Institution & Adjunct Professor, Johns Hopkins University, Member of National Academy of Science: *How I learned to love ciliates*

Jacek Gaertig, PhD (1990-1994), Associate Pressor, Department of Cell Biology, University of Georgia: *Enzymes that modify the outer and luminal surface of microtubules*

Alan R. Kimmel, PhD (1971-1977), Chief, Laboratory of Cellular & Developmental Biology, NIDDK, NIH: *Crawling toward cell biology: regulation of cell polarization and chemotaxis in dictyostelium*

Meng-Chao Yao, PhD (1971-1975), Member, Hutchison Cancer Institute & Director, Institute of Molecular Biology, Taiwan: *Studies of Tetrahymena DNA rearrangements—36 years later*

Kazufumi Mochizuki, PhD (2002-2006), Investigator, IMBAS, Austria: *How Tetrahyemena dump junk DNA? Organisms do not necessarily always choose energy-efficient strategies to solve biological problems*

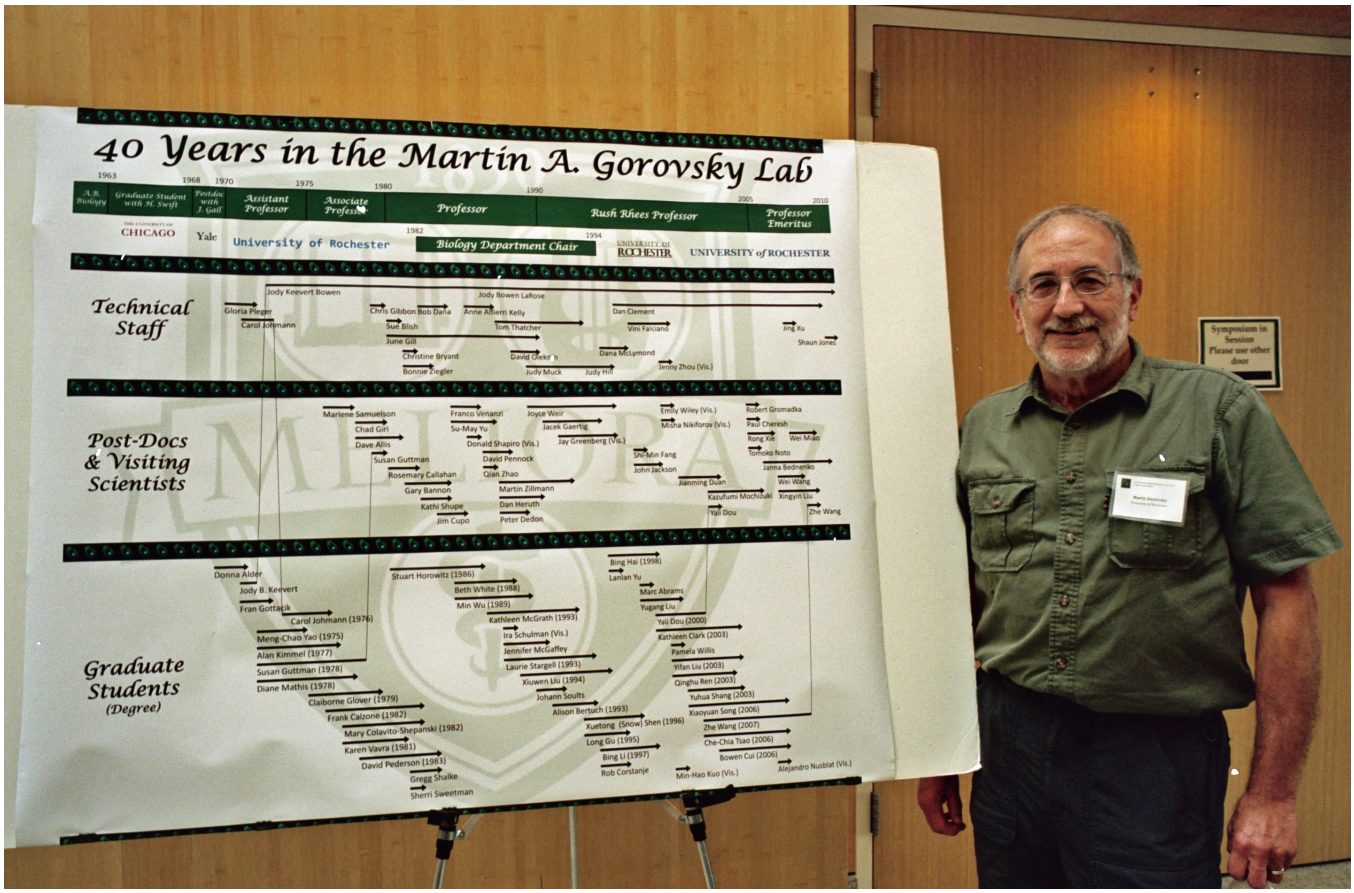
Xuetong (Snow) Shen, PhD (1991-1996), Associate Professor, Department of Carcinogenesis, University of Texas M.D. Anderson Cancer Center: *Chromatin responses to DNA damage*

Yali Dou, PhD (1996-2002), Assistant Professor, Department of Pathology & Department of Biochemistry, University of Michigan: *Many facets of histone acetyltransferase MOF*

C.David Allis (1978-1981), Joy & Jack Fishman Professor, The Rockefeller University, Member of National Academy of Sciences: *Lessons learned from M&Ms: long-lasting, far-reaching and they don't melt in your hands*

Diane J. Mathis, PhD (1973-1977), Professor of Medicine, William Young Chair in Diabetes Research, Harvard Medical School, Member of National Academy of Sciences: *I can't escape from histone acetylation*

Reflections: Martin A. Gorovsky



When I interviewed at Rochester, it struck me as if it would be a nice place to grow up as a scientist and as an academic. It had high standards, but little pretension (no "coastal" arrogance). I was made to feel that, although I was an untenured assistant professor, I would have a say in a projected expansion into more modern eukaryotic biology. In fact, I chaired a search committee as an assistant professor. We made some good hires in both MCDB and in EEB that made the Biology Department a place where I was very happy to spend my professional career. I was blessed with a number of outstanding graduate students, many of whom were smarter than I was, so we taught each other. Although it was less easy to attract postdocs to Rochester (thought by some to be a cold and forbidding place), I did luck out with a few great ones.

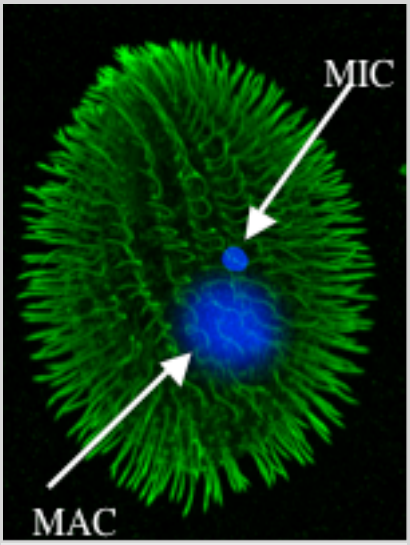
I became Chair in the early 80's because I had become dependent on a steady supply of good graduate students and felt that the previous few Chairs had let our graduate program slip. Also, the faculty promised me they would do whatever was necessary to help. They made good on their promise and, with a lot of help from Karl Drlca, Bob Angerer, Lasse Lindahl, Tom Eickbush, and Joanna Olmsted, and with a new agreement with the Dean that, as grants grew, so would our graduate budget, we rebuilt the graduate program. I was lucky that my lab and others in the *Tetrahymena* field developed mass, DNA-mediated transformation, and *Tetrahymena* obliged by being a machine for homologous recombination, enabling facile gene knockout and replacement. Things in my lab got so exciting that I had a great excuse to go back to science, just before being Chair became an irreversible step in my academic pathway.

I am grateful to the University of Rochester and to the Biology Department for being the kind of places whose "down-to-earthness" made me so comfortable being there. Most of the faculty and (believe it or not) almost all of the college and university administrators I had to deal with were hard working, non-egotistical, fair minded individuals. Their commitments to high quality science and education were really quite remarkable. Even more remarkable was the Biology Department staff, whose good natures, work ethic, and dedication to the department exceeded those of the faculty. Finally, I am especially grateful to Jody Bowen LaRose, without whom there would never have been a Gorovsky lab.

Tetrahymena thermophila

• *Tetrahymena* is a unicellular, ciliated eukaryote that naturally lives in temperate freshwater environments. It makes an ideal laboratory organism for cellular and molecular studies because it is a large cell (easy to study under the microscope), is easy to culture, divides rapidly and can be frozen (and survive!) for long-term storage. It also contains all of the basic cellular structures (organelles) found in cells of multicellular organisms.

• Each individual has a micronucleus (the germline) and macronucleus (somatic). These distinct nuclei occur together in the same cell and respond differently during sexual reproduction.



A *Tetrahymena* cell stained to show the nuclei and cilia

• *Tetrahymena* reproduces asexually when food is plentiful, and sexually when food is scarce. In nature, sexual reproduction provides the genetic variation that allows species to adapt to changing environments. However, when conditions are stable, it is faster and safer to reproduce asexually. In the lab, both modes of reproduction are useful—sexual reproduction provides variation, while asexual reproduction leads to duplication. Researchers can control the mode of reproduction with the feeding regime.

• *Tetrahymena* is genetically tractable: mutations can be easily created, selected, transmitted, and recombined. Genes can be disrupted or replaced by DNA-mediated transformation in either or both nuclei.

• The Gorovsky lab has used *Tetrahymena* to study histones, tubulin, and RNAi. Gorovsky was originally attracted to working on this cell because both nuclei contain the same genetic information (like the different cell types in humans) but differentiate by that information differently: genes are expressed in the macronucleus but not the micronucleus. Biochemical analyses of the two nuclei have revealed many differences that are also associated with gene activity in human cells. He later became interested in the genes encoding tubulin, the basic building block of microtubule-containing structures, like cilia. The studies on RNAi grew out of studies on the two nuclei and were named as contributors to Science Magazines 2002 "Breakthrough of the Year" describing a new role for RNAi in controlling gene function.

Jody Bowen: a 40 Year Retrospective of Life in the Biology Department

By Tara Ramsey

When Jody Bowen entered Notre Dame de Namur University in Belmont, California in 1966, her academic advisor asked what her major would be. She had good grades in many subjects in high school, so she really didn't know. She thought, "Well, I like nature, trees, and walking in the forest, so maybe I should major in Biology."

Notre Dame was a small college with few research opportunities. In the summer between her junior and senior years of college, Jody participated in an undergraduate research program at Cold Spring Harbor, where she studied bacteriophage-- although at that time she barely knew what a bacteriophage was. The Cold Spring Harbor program was an intense experience and Jody was surrounded by students and researchers from Yale, Harvard, and other top-tier research institutions. The stress nearly gave her an ulcer! However, the experience sparked a life-long love of scientific research and molecular biology and enforced her belief that she needed more education beyond a BS degree.

Jody graduated from Notre Dame de Namur a semester early and moved to Rochester to join her fiancé, who was starting a position at Kodak. In 1970, after a short time as a research technician at Strong Hospital, she started in the UR Biology Department PhD program with the understanding that she may choose to leave with an MSc. She was the third graduate student in the newly formed Gorovsky lab, housed under the eaves on the 4th floor of Dewey Hall, where the Biology Department was originally located. The next couple years were very busy with classes and research. In order to move onto the PhD program, students needed to pass a rigorous, written comprehensive exam. Jody passed her exam, earned her MSc degree, and decided to take a leave of absence rather than continuing directly to the PhD program. Fortuitously, the technician in Marty's lab was leaving, and Jody persuaded Marty to hire her as the new technician. She realized that she loved research and teaching, but noticed that, at the time, professors were in their labs from 7 a.m. to 7 p.m. or later and weekends --that schedule did not appeal to her. As a research technician, she was able to do the work she loved, but still have a life outside the lab.

This partnership between Marty Gorovsky and Jody worked well—so well, in fact, that Jody stayed in the lab for forty more years, progressing from lab technician to her present position as Senior Technical Associate. Only Stan Hattman, Tom Bannister, and Marty Gorovsky have been in the department longer than Jody Bowen—and they are retired.

In her position, Jody watched the discipline of molecular biology come of age. In the early years, she ran column gels, in which acrylamide was poured in glass tubes. To read the gel, the glass had to be broken, or the gel column slid out without mangling it. Years later, horizontal gel rigs would arrive—and ultimately, the capillary technology that powers most current-generation DNA sequencing.

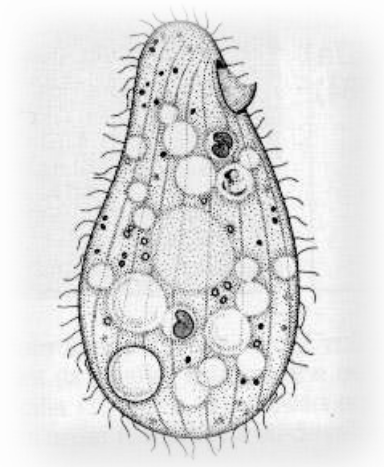
Over the years, Jody mentored most of Marty Gorovsky's grad students, introducing them to the interesting biology of *Tetrahymena*, teaching lab techniques, motivating them when they were unproductive, and encouraging them when life got rough. Occasionally, she lost Marty graduate students when she encouraged them to pursue what they really loved in life—and those students realized they didn't love biological research. Jody said her role as "Lab Mother" was one of the most satisfying of her life.

Jody leads a busy life outside of Hutchison Hall where she is known as Jody LaRose, wife of Paul LaRose for almost 25 years. For over two decades she has been active in Altrusa International, a volunteer organization that works on local community issues such as literacy, and she and Paul help run a local food cupboard. Jody is an avid photographer, and her love of travel and her Shetland Sheepdog, Sunshine, provide many opportunities for great pictures. A few years ago, Jody and Louise Vanni (Business Department, retired 2007) traveled to Egypt for two weeks. This spring, she traveled to Hawaii and now urges everyone to go—but not to spend all their time on Waikiki in Honolulu. The volcanoes, lava fields, forests, and remote beaches are much more impressive, she says. Jody and Sunshine have competed in dog sports since

2002, earning titles in Agility, Rally, and Obedience. As older dog and older trainer, they are still learning new tricks and are competing at the highest level of Obedience, trying to earn the AKC Utility title.

Jody now faces the daunting task of shutting down a lab that has been active for decades. Last April, she packed up the essential equipment from the original Gorovsky lab and moved to a smaller lab space. In this new space, Jody is preparing for the final shut down. She is running final experiments for remaining projects and helping revise lingering papers. In the midst of active research, she is also preparing to deposit years of *Tetrahymena* stocks in permanent archives at Cornell University. At some point, she will need to complete a particularly difficult task—discarding the hundreds of lab notebooks that currently line her office. As she sadly explains, "Nobody will need these any more."

On October 31, the final Gorovsky grant will expire and Jody will end her career as a technical associate in the Biology Department. She isn't sure what she will do next in her professional life. She has a few years before she had originally planned to retire and thus may search for other positions within the university. While looking for job opportunities, she has plenty of hobbies and interests to keep her busy. Upon reflection, Jody thinks that the decision to leave her graduate program with an MSc degree was well made. Not only was she able to pursue high-level scientific research without the constant stress of obtaining grants, but she also could engage in an assortment of non-scientific interests. Jody feels she was blessed with a great job and with Marty as the best possible boss and friend; and that her motto "Life is Short, Use it Well" is a good one. As things wind down, she will miss her many friends in Hutchison Hall, and hopes to maintain contact for years to come.



University Mourns Loss of Beloved Oak Tree

By Tara and Justin Ramsey

This year thousands of students, alums, and Rochester citizens traveled to Genesee Valley Park—the county park immediately adjacent to UR's River Campus—to pay their respects to a fallen icon: the Tree of Life. An enormous oak with broad, outstretched limbs, the Tree of Life was a popular destination for students to chat with friends, unwind after exams, smooch their sweethearts, and contemplate their futures. Just weeks before, *The Rochester Review* had listed climbing this tree as number 6 on the list of "101 Things to do Before You Graduate."

People were almost always in this tree, even as it started to fall. July 4th fireworks and festivities were over, and Erin Fox (BEB '08) and a group of friends were sitting in The Tree of Life enjoying the warm summer evening. Suddenly, Erin heard popping noises. "I just thought that one of my friends was throwing firecrackers, and like an idiot, didn't pay attention. The guys jumped out and told the girls to do the same, but we thought everything was fine and didn't jump down until the sounds got really loud. Katie Gelinas (BCD '08) was the last one out, about 5 or 10 seconds before tree came down. It happened really suddenly—we were still standing underneath and the branches just started to crack and then collapse. I have a distinct memory of running as fast as I could as massive branches were bearing down. It was pretty crazy, and we couldn't stop laughing, which I think was mostly a nervous response. We looked at the fallen tree for a few minutes, and then a passerby started yelling at us, insisting we were responsible. I don't think so—I mean, everyone's sat in the tree at some point or another!"

According to Margaret Ball (ANT, '11), signs that the tree was in trouble were evident the day before. "On July 3rd, a friend and I climbed and sat in the Tree of Life for most of the afternoon. We noticed a crack about 1/2 inch wide running across the broad sitting-place, but otherwise the trunk appeared sturdy and healthy. Just two days later, I was riding my bike past and stopped in shock. The trunk had torn free from its roots and split cleanly in two, the giant elbows of the branches rested on the ground. I stayed for several hours as people young and old stopped to witness and remember. This tree held so many stories! I took a piece of wood from the trunk and later carved it in the shape of an oak leaf."

The unusual growth form of The Tree of Life arose from a long-ago injury that stopped growth of the main trunk. Thus, rather than having a tall vertical trunk, it had multiple trunk-size horizontal branches that made it perfect for climbing and sitting. Of course, we will never know how an unremarkable oak sapling—just one of thousands planted in the park—obtained the injury that would lead it to become a beloved tree with a name. Mark Quinn, horticulturalist for Monroe County Parks, has seen an old photo that shows the tree was damaged before 1910. Dan Schied, manager of campus horticulture and grounds, recalls the folklore associated with the Tree of Life. According to legend, a drunken West Brighton resident was returning by horse-drawn carriage from the bars and brothels on Front Street, when he fell asleep. His horse continued on but took a detour, running over the young oak tree and permanently damaging its main stem.

The Tree of Life is reported to be burr oak, *Quercus macrocarpa*, a species belonging to the North American white oak lineage. We are a little uncertain of this identification, as the leaves don't exactly match those typical of natural burr oak populations—perhaps the specimen is a hybrid or a cultivar. Historical photographs suggest the tree was planted during the initial development of Genesee Valley Park by esteemed landscape architect, Frederick Law Olmsted. The 800-acre park harbors numerous ballfields, picnic shelters, old-growth forest remnants, and a golf course. The Tree of Life stood at the park's north entrance, directly across from the UR River Campus.

Whatever its taxonomic affinity and the circumstances of its original injury, the Tree of Life was a magnificent specimen. On warm spring or brilliant fall days, people posed for pictures—fraternities, sororities, wedding parties, little kids in dresses and suits. During Meliora weekend, former students brought their own children to visit the tree. It isn't an exaggeration to say that the loss of the tree was felt around the country. When the local newspaper, "Democrat and Chronicle," ran a story on the tree's death, comments poured in from around the country. The University of Rochester solicited photos for a tribute page (http://www.rochester.edu/news/photos/tree-of-life/), and a Tree of Life memorial Facebook page was started.

In the days following the collapse of the Tree of Life, flocks of people brought bouquets of flowers to its base and mourned. The mood was somber and many tears fell. It may seem odd to memorialize a tree, but for generations of UR students, the Tree of Life wasn't "just a tree." Rather, it was as important to their college experience as the Campus Quad, the Rush Rhees library, or

their dormitory home.

The remains of the Tree of Life are now scattered. Its small branches were quickly turned to mulch, and many people collected small pieces of wood for memorabilia. Margaret Ball carved an oak leaf out of a fragment and wears it as a necklace. The Ramsey lab (Department of Biology) collected foliage to create permanent herbarium sheets. At least two of the Tree of Life's acorns were successfully germinated, and these offspring will be planted back into the park. The larger branches were initially intended to be used as cage logs at Seneca Park zoo, and the main tree carcass shipped to a children's playground in Abraham Lincoln Park in nearby Irondequoit. However, due to overwhelming response from the UR community and nearby residents, Mark Quinn reports that the remains of the tree will be used to create a memorial in Genesee Valley Park. Sometime this summer, a crane will move the massive trunk and branches to level ground at the base of the shallow hill where it stood. Large branches that have been in storage will be returned to the site as well. Even in death, the tree will remain a climbing paradise for years to come.

The Tree of Life through the seasons. Clockwise from upper left. Students welcome spring by visiting the tree; students pose by Tree of Life in winter; undergraduate Laney Widener ('10) sits on tree branches on a summer day; the day after "The Fall"-- July 5, 2010. Photo credits: Liz Riedman '13; UR Communication Office; Tara Ramsey.

Faculty Highlights

Cheeptip Benyajati is part of a multidisciplinary university effort to develop undergraduate stem cell curriculum, recently funded by NYSTEM. The curriculum will provide undergraduates with a survey of stem cell biology as well as opportunities to evaluate social, legal, and ethical issues associated with stem cell technology and medicine. Resulting materials will be shared with other academic institutions for use in their own curriculum development. As part of this project, Cheeptip is working with **Dina Markowitz**, Director of the University Center for Science Education & Outreach, **Richard Dees**, Professor of Philosophy and Medical Humanities, and several other university faculty and researchers.

Gloria Culver and her lab published three important papers in the recent academic year, two of them appearing in the highly cited journal, RNA. Two graduate students from the Culver lab, **Zhili Xu** and **Keith Connolly**, defended their Ph.D. work and are in route to post-doctoral positions at Indiana University and Harvard University. **Keith Connolly's** work was awarded the American Chemical Society Chemical Biology Poster Prize For "Innovative use of chemical biology applied to the study of RNA" at the 16th Annual Meeting of the RNA Society.

Tom Eickbush and his lab published several papers investigating the biochemistry and evolution of tranposons. Tom traveled to the Sackler Colloquia of the National Academy of Sciences (Irving, CA, USA) and the Meetings of the Genetic Society (Edinburgh, Scotland) to present his research findings, and became a co-editor of a new scientific journal ("Mobile DNA"). Tom is pleased to have stepped-down from his position as department chair, and is enjoying teaching a new course, BIO 190, "Genetics and the Human Genome."

Jim Fry gave an invited research talk at the Ninth International Congress of Neuroethology in Salamanca, Spain, entitled "Variation in ethanol resistance among natural populations of *Drosophila melanogaster*: genetic basis and adaptive significance." Jim and his wife Silvia welcomed "Cuddles", a miniature poodle, into their household, and son Tobias started kindergarten at Urban Choice Charter School in Rochester, where his favorite subjects are music and dance.

David Goldfarb founded Calorics Pharmaceuticals, Inc. The company obtained venture financing in December 2010. The project is based on basic research funded by the NIH to discover small molecule probes that affect aging and lifespan in yeast. Some of the molecules have potent anti-inflammatory activity in rodents, and the hope is that they will be effective against age-related diseases in humans. Calorics is now focused on discovering their lead molecules' cellular targets and mechanisms of action. David continues to co-organize Rochester's Science Cafe with **Joshua Faber** (RIT) at the Pittsford Barnes & Noble. Science Cafés are live events that involve face-to-face conversations with scientists about current science topics. Science Cafés are open to the public, and conducted in plain language to create a comfortable atmosphere for people without a science background. Topics range across the sciences, and some cafés explore connections with other disciplines, such as the arts. Recent presentations included **Todd Krause** (Chemistry Department), "Nanoscience and nanotechnology: Why size matters;" **Daphne Bavelier** (Brain and Cognitive Science), "Action video games as exemplary learning tools;" and **Steven Manly** (Physics Department), "Visions of the multiverse." Science Cafes are funded by a grant from NASA to J.F. See the website (http://sciencecaferochester.blogspot.com/) or the Pittsford Barnes & Noble calendar for upcoming cafés.

Vera Gorbunova received an unsolicited award from the Glenn Foundation for research on the Biological Mechanisms of Aging, and an award from the Wymann Potter Foundation. Vera renewed her NIH R01 grant that studies age-related changes in DNA repair, and was invited to become a permanent member of the NIH CMAD study section. Vera gave seven invited talks in the past year. Vera's graduate students **Zhiyong Mao** and **Chris Hine** defended their theses. Both **Zhiyong** and **Chris** were awarded Messersmith fellowships for their research. The Gorbunova and **Seluanov** labs discovered a component secreted by naked mole rat cells that makes these animals resistant to cancer. Research from the Gorbunova and **Seluanov** labs was featured in several media outlets this year, including the Associated Press and Washington Post.

John Jaenike and his lab group continued their studies of the evolutionary ecology of endosymbiotic bacteria residing within *Drosophila*. John and his lab published several papers on their findings, including one in the journal Science. John gave nine invited talks at meetings and other universities. In addition to funding from the National Science Foundation, John received a grant from the Gates Foundation to explore the possibility of using endosymbionts to control the spread of disease-causing nematodes. **Rob Unckless** defended his PhD thesis in March, and will be moving on to a postdoctoral position at Cornell University in summer 2011.

Henri Jasper received an award from the Glenn Foundation for research on the biological mechanisms of aging. Henri's lab published several papers on the regulation of stem cell function in the aging organism in PLoS Genetics, Cell Stem Cell, Developmental Cell, Cell Metabolism and Development. Henri was awarded renewed NIH funding for his work on the systemic regulation of insulin signaling in flies, and was an invited speaker at the Annual Scientific Meeting of the Gerontological Society of America in New Orleans; the International Symposium on Signaling Pathways in Stem Cell Biology in Germany; the Department of Molecular and Computational Biology of the University of Southern California; the Buck Institute for Research on Aging; the Colloquium on the Biology of Human Aging at Brown University; and the Basic Biology of Aging Seminar Series of the University of Washington.

Bob Minckley has had a heavy lecture load (three courses) and lab responsibilities (two lab series) recently, and less time than normal for his studies of bee biogeography and systematics. Bob traveled to a remote area of the Sierra Madre Occidental in Sonora, Mexico, in August 2010, however, and plans to travel to the Sierra del Carmen in Coahuila, Mexico, in summer 2011. These regions are in the process of becoming conservation properties, and are essentially unexplored for bee diversity and abundance. Last summer, with some undergraduate students working in the **Ramsey** lab, Bob surveyed bee communities in meadow habitats on the University of Rochester's South Campus. Surprisingly, pollinators of western New York are poorly studied compared to other areas of the U.S. Determining what bee species occur here, and the seasons when the bees are active, is valuable baseline data that may support other projects in the future.

Terry Platt's leadership in workshop education was recognized by Provost Ralph Kuncl at the January 2011 State of the University Address, "The Teaching Enterprise at a Great Research University." Terry and Dean **Vicki Roth** are co-directors of the Center for

Workshop Education (http://www.rochester.edu/college/CWE/). Terry also helped develop a new program, the "Provost's Teaching Fellowship," which supports faculty efforts to improve knowledge of, and ability to apply, new concepts of learning and teaching. Additional information about the UR's workshop programs and the Provost's Teaching Fellowship is available from Terry, and will be featured in an article ("Teaching Centered") in the May-June issue of the Rochester Review. Other activities include the "Future Faculty Workshop on Mentoring" he presented as part of the Future Faculty series for current U of R graduate students. On the national scene, Terry is one of 30 faculty members from different institutions participating in a 5 year NSF-funded effort to define "Core Concepts in Biochemistry and Molecular Biology" sponsored by the ASBMB. Terry will be presenting a 3 hour session on "Workshops in Laboratories: Challenges and Rewards" at the Univ. of Delaware's annual Institute for Transforming Undergraduate Education conference in June (http://www.udel.edu/inst/), which focuses on the development of creative investigative activities for STEM classrooms and laboratories with particular emphasis on interdisciplinary ventures.

Doug Portman's lab continues its NIH- and NSF-funded research on sex differences in neurobiology and behavior, focusing on a simple but powerful model organism, the nematode *C. elegans*. Doug gave an invited lecture at the biannual *C. elegans* Neuroscience Meeting last summer and gave seminars at the University of Massachusetts Medical School, New York University, and UMass Amherst. **Bill Mowrey**, a neuroscience graduate student in Doug's lab, defended his Ph.D. thesis and is headed to a postdoc position at the prestigious HHMI Janelia Farm research institute. **Renee Miller**, a research assistant professor in Doug's lab, will soon take an instructor-level faculty position in the Department of Brain and Cognitive Sciences.

Daven Presgraves was invited to speak about his lab's work on speciation genetics at Harvard Medical School; the University of Arizona; the Institute for Science & Technology Austria and the Institute for Population Genetics at the University of Veterinary Medicine in Vienna; and at the Keystone Symposium on Evolutionary Developmental Biology in Tahoe City, California. Daven had to rush home from the Keystone meeting for the surprise early arrival on March 9th of new daughter, Violet Marion, with his wife, Danielle.

Justin Ramsey and his lab published several studies of polyploid speciation in plants, including papers in the Proceedings of the National Academy of Sciences USA and Systematic Botany. The Ramsey lab has ongoing conservation and research activities in Rochester forests, funded by an NSF CAREER award, and in summer 2010 surveyed canopy composition and ground flora at 20 old-growth sites. The Ramsey lab gives best wishes to its undergraduates who have or are moving to new positions, including **Justin Budnik** (medical student, URMC), **Julia Cosgrove** (research technician, Dept. of Environmental Science, UC-Berkeley); **Emily Gray** (graduate student, Dept. of Marine Sciences, Univ. of North Carolina); **Emily Reiss** (graduate student, Dept. of Horticulture, Cornell), **Maria Strangas** (research technician, Dept. of Biology, City College), and **Laney Widener** (CLM Intern and field assistant, Mojave Desert). Remaining lab members look forward to continuing field and garden projects in the warming spring weather.

Andrei Seluanov was an invited speaker at Duke University, Boston University, University of Florida, and University of California at San Francisco. Andrei was interviewed by TV Animal's Farm in Seoul Broadcasting System, South Korea, about his work with naked mole rats. Andrei and **Vera Gorbunova** were invited to join an inter-University program on the Center for Evolution and Cancer at UCSF as outside faculty.

Elaine Sia was funded by the National Science Foundation to study the repair of double-strand breaks in mitochondrial DNA. This research was presented at a Gordon Conference on Mutagenesis, held at Colby College (Waterville, Maine) in summer 2010. Much of this work was performed by graduate student, **Lidza Kalifa**, who recently defended her thesis (April 2011).

Michael Welte's laboratory continues to study the regulation of intracellular transport, in fruit fly embryos and ovaries, as well as the function of lipid droplets, the sites where cells store fat. This research is funded by the National Institutes of Health. Michael was a session chair at the Annual *Drosophila* conference and an invited speaker at the Biophysical Society Meeting, a Gordon Conference on lipoproteins, a FASEB Summer Conference on lipid droplets, and a Naito conference on Membrane Dynamics in Sapporo, Japan.

Jack Werren received a Provost Multidisciplinary Award to investigate the venoms of parasitoid wasps. This is a new research direction that offers promise for discovery of new drugs for treatment of disease. Other work includes studies of gene transfers from symbiotic bacteria to animals; development of curriculum for high school science teachers (in collaboration with **Bob Minckley**, **Michael Clark**, and **Seth Bordenstein**); and investigations of genome evolution in insects. Ten new papers have been produced, including one on the

role of selfish DNA in evolution that will soon be published in Proceedings of the National Academy of Science USA. Jack gave eleven invited talks, including one at the Sackler Symposium: In Light of Evolution. Jack was nominated for the International Prize in Biology this year, and although he was not the prize winner, he was invited to the ceremony in Japan to present his work on symbiosis, and also briefly met the Emperor.

Achievements and Milestones

Yasir Ahmed welcomed son Elan Vital-Hashim Braimah. He was born January 18, 2011 and weighed 6 lbs 15 oz.

After a three-year engagement, **Debamita Chatterjee** and **Nirmalya Chatterjee** were married in India on February 12, 2011.

Dan McNabney is engaged to Jessica Custer and they are getting married in October.

Professor **Tony Olek** won "Dancing with UR Stars" as part of Spirit Week 2011. Tony's salsa dancing with the group Salseros elicited massive cheering from the crowd, leading them to defeat UR mascot Rocky Yellowjacket (hip-hop), Dean John Burdick (swing), and SA president Scott Strenger (Celtic).

Dan Scantlebury received the Biology department's graduate teaching award. He also received an NSF Doctoral Dissertation Improvement Grant, "Patterns of Adaptive Radiation in Sphaerodactylus Geckos."

Jing Zhu and Jie Zhang welcomed son Jason on Oct 22, 2010. He was 6 lbs 6 oz. when he was born, and now he's 5 months old and 21 lbs! He is a happy baby most of the time and smiles a lot.

Hellos

Kristin Curtice-Teaching Lab Manager

I would like to take this opportunity to introduce myself as your new Biology Teaching Lab Manager. I am actually a returning employee of the University of Rochester, having worked formerly in the Functional Genomics Center. In 2005, I moved to the Deep South where I served as a Technical Associate at Mississippi State University's Life Sciences and Biotechnology Institute. Since completing my degree at the SUNY College of Environmental Science and Forestry in Syracuse, NY, my career interests have included biotechnology and research, medical technology, and science education. I am pleased to discover that this combination is reflected almost daily in my role in the Teaching Lab.

As a native of New York State, I am thrilled to return home to an area that easily entertains my passion for the outdoors. I spend as much time as I can in the Adirondack Park, and throughout the year I frequent my hometown of Bristol for downhill skiing and horseback riding. I volunteer as a coach and trainer for the Livingston County 4H Equestrian Program where my dog and horses are active participants as well!

I would like to thank the University of Rochester's Biology Department for the warm welcome that I have received thus far, and I look forward to working with the faculty, staff, and students in further development of the Teaching Labs!

Deb Lawrence-Front Office Secretary

I grew up in the suburbs of Buffalo, New York: Kenmore and Tonawanda. I distinctly remember my first trip to Rochester; it was for my grandmother's funeral. Driving down Ridge Road there was this expanse of red brick as far as my childlike eyes could see. I was so wowed by this! THIS was Kodak and somehow I knew that *some day* I would work for this company. For twenty-two years my badge gained me entry into the secured buildings and passageways of this world-renowned company--until that fateful day that every Kodaker fears. The day I heard the booming sound of the layoff hammer come crashing down. Alas, my Kodak career was over.

Those in the company who are let go have a saying: There IS life after Kodak. Recently married to Scot Lawrence, with a year's worth of severance pay coming in, I took advantage of this time to just be and enjoy life, as well as do a little career exploration. Not one to mind getting my hands dirty, I delved into helping out at my church and the Stone-Tolan House working as a volunteer gardener. During this time, I also obtained certification in professional dog grooming. Neither proved to be the "next career," though I learned a lot about gardening, dogs and myself in the process.

When it was time for me to return to the working world, Strong Staffing at The Employment Center here at the U of R was my saving grace. Sylvia Seeley was a guardian angel to me, always making sure I was matched up with the perfect job. Two of the assigned positions were at The Employment Center, where I not only enjoyed getting to know the staff and meeting lots of really nice (and interesting) people every day, but I feel I have made some life-long friends as well. It was while I was on assignment as a Data Entry Operator at The Employment Center that I saw the posting for the position for secretary in Biology. So on a crisp August morning, I crossed over the pedestrian bridge and met with Brenna. And the rest, as they say, is history!

Being a newbie to the University, I have the honor of parking waaaaaaay out in Zone 3, which allows me a lot of time to think in the morning as I'm walking in.
It was during this walk into Hutchison Hall on my first day that I realized I've been working my way upstream along the Genesee River! By this, I mean I started "up north" at Kodak Park in Building 9, then moved slightly south to Building 59, down to the Hawkeye Plant by the Driving Park Bridge, then onto Kodak Office downtown. From there I went to The Employment Center across from campus, and finally ended up here! Every step has been slightly further up stream. One can't help but wonder, at some point, may I be working aboard one of the many cruise boats that frequent the riverways and actually be ON the great Genesee River?!! Hmmm.

Outside of the working world I have many interests! For a number of years I enjoyed Civil War reenacting, fulfilling an avid interest in history while rubbing elbows with others who are also passionate about the time period. My love for animals transpired into eight years of much heartfelt volunteerism at Lollypop Farm (for the record, only four cats have come home with me!). At present we have two cats, Calvin and Boots, who are more canine than feline. When we get home each night, the cats run to the back door waiting to go "OUTSIDE" no matter the weather. They enjoy the gardens as much as we do.
Oh, yes, remember that volunteer work I did for the church and Stone-Tolan House? All of that effort now goes into our own backyard! After years of living in apartments, my husband and I wanted some land of our own to play with. Our goal is to turn our yard into a park-like setting with various unique sections. For instance, as you pull into our driveway, "Lilac Row" is there to greet you. In the side yard is nestled a semi-hidden raised bed to attract colorful and essential wildlife such as bees, butterflies and hummingbirds. Just over the fence is the vegetable garden and one of two daylily beds. Under the big old oak tree will be the future fairy garden (what's a proper garden without fairies?!!) and a swing that Scot surprised me with one birthday (he also designed and constructed the apparatus from which this swing hangs). Last year we added a pond to the grounds complete with goldfish and lily pads, and now we have frogs too! Yes, I love all critters, even frogs, snakes and lizards. This year's big project will be Scot's garden railroad, which is a big hit with both kids and adults alike. The one garden supply we are always in need of, though, are rocks, big and small, to frame beds or create walls. So if you happen to know anyone who would like to dispose of some rocks, maybe you could give us a call!

The South Campus Forest: History, Biodiversity, and Preservation Efforts

By Justin Ramsey

Land conservation is a longstanding tradition among North American colleges and universities. Cornell's Sapsucker Woods, Princeton's Institute Woods, the Harvard Forest —these and many other natural areas are maintained by academic institutions for habitat preservation, undergraduate education, and community recreation.

Despite its urban location, the University of Rochester harbors high-quality forests and wetlands on its south campus. These habitats are home to a remarkable diversity of plant and animal species and provide recreational opportunities for university students and Rochester-area residents. The south campus nonetheless faces significant environmental challenges related to invasive plants and human disturbance. This article describes the history of south campus habitats, the flora and fauna that reside there, and efforts by the Department of Biology to protect forests and wetlands for future generations.

History

The Town of Brighton was established in 1814 on the southern border of the City of Rochester. The eastern and central portions of Brighton have long harbored residential neighborhoods, commercial real estate, and light industry. In contrast, West Brighton has an agricultural history, for several reasons. First, West Brighton rests on a flood plain on the eastern shore of the Genesee River. Until the construction of the Mt. Morris Dam by Letchworth State Park in 1952, the region was subject to frequent flooding that discouraged development. Second, transportation corridors directly connected eastern and central portions of Brighton to downtown Rochester but largely bypassed West Brighton. Finally, large land acquisitions by the City of Rochester and other educational institutions left relatively little property in the hands of private citizens. For these reasons, West Brighton maintains a rural landscape of fields and woodlands despite its close proximity to the University of Rochester and Rochester International Airport.

The original homesteader of West Brighton was Thomas Warrant, an English coppersmith who established his home in 1819. Thomas Warrant is perhaps most famous for his involvement with the Underground Railroad. The Warrant Homestead— which was moved during the construction of the Erie Canal to its current location at the intersection of E. River Rd. and W. Henrietta Rd. — was a hiding place for escaped slaves seeking passage by boat into Canada. In total, the Warrant family had nine children, many of whom married local residents and established new homesteads in West Brighton.

The soils of West Brighton are well-suited to agriculture, and by the late 1800's, farms and nurseries had been established in the vicinity of Crittenden and E. River Rd. The Warrant lands had apple orchards, for example, while the Crittenden property had a dairy. The Baker farm was located on what is now the Genesee Valley Park, which was established by the City of Rochester in 1888 via a controversial land acquisition. Genesee Valley Park was designed by Frederick Law Olmsted to preserve small areas of forest; however, the majority of the land was maintained as open grassy fields suitable for sporting activities and picnics. Agriculture persisted in West Brighton through the 1950's, at which time schoolchildren would wait under the watchful eyes of milk cows at bus stops along E. River Rd. As agricultural activities become less economically viable, however, farmlands were divided into smaller parcels and eventually transferred to the City of Brighton, the Catholic Church, and the University of Rochester.

While the UR River Campus and Medical Campus are located on the southern boundary of the City of Rochester, the university recognized early on that it had limited opportunities for growth to the north, east, or west. Thus, in 1948, the U of R purchased the core area of the south campus from Cora Warrant, a great-granddaughter of Thomas Warrant, in West Brighton. Subsequent purchases of small farms extended university property southwards. In 1982, the University of Rochester obtained St. Agnes's School (now the Alumni & Development Center) and associated forested land from the Sisters of St. Joseph. This acquisition rounded out south campus boundaries, which now extend from E. River Rd. southwards to the vicinity of Crittenden Rd., and approximately one-half the distance from the Lehigh Valley Trail to W. Henrietta Rd.

South campus land acquisitions were not motivated by conservation intentions but the area nonetheless has tremendous ecological value. The majority of the land had been used for agriculture—orchards, dairy farms, annual crops—yet some areas were left forested. No longer subject to human disturbance, south campus green space reverted to nature. Woodlots developed into primary forests, low-lying areas become swamps and marshes, and agricultural areas developed second growth forests. Today, the West Brighton landscape harbors several old-growth forests embedded in a matrix of wetlands and second growth woodlands. The University of Rochester owns one old-growth forest area as well as the lion's share of secondary growth and wetland habitats east of the Lehigh Valley Trail.

Plant communities

The University of Rochester south campus harbors ~250 vascular plant taxa, the majority of which have now been identified to the species level. This is surprising biodiversity for an urban location, and reflects the presence of multiple ecological communities as well as the old age of its forests.

Old-growth forest. Approximately 12 acres of the south campus is comprised of old-growth forest. These areas were historically subjected to small-scale timber harvest by farmers but were never plowed or converted to agricultural use. A similar old-growth stand—locally known as the "Lynch Woods" in reference to the Lynch family farm—is located south of Crittenden Road on property now owned by the Town of Brighton. Both mature woodlands occur on shallow eskers that rise 5 to 10 feet above adjoining habitats and have numerous depressions that develop ephemeral ponds during the spring and early summer. The geological origin of these areas probably made them ill-suited to agriculture, since they had an uneven surface and would require frequent irrigation during the summer months.

Common canopy trees within mature woodland areas include Red Maple, Red Oak, American Beech, Black Cherry, Tuliptree, and Sassafras. In the subcanopy, Hop-Hornbeam, Witch-hazel and Musclewood are abundant. Most tree species are represented by small, medium-sized, and large individuals, and the forest floor is littered with fallen logs and woody debris. The forest understory is dominated by Mayapple, White Woodland Aster, Enchanter's Nightshade, Sensitive Fern, New York Fern, and several sedge species. Many other plant species are scattered through forest understory, however, including Jack-in-the-Pulpit, White Baneberry, White Trillium, Tall Meadowrue, Indian Pipe, Trout Lily, Rattlesnake Root, Canada Mayflower, Cinnamon Fern and Christmas Fern.

Second growth forest. Forest habitats developed rapidly in abandoned agricultural area. While most of the plants occurring in second growth forest can be found in mature forest, the most common trees are fast-growing, shade intolerant species like American Ash, Big-Tooth Aspen, and Eastern Cottonwood. There is less age-structure within second growth areas and fewer snags and fallen trees. Understory communities are locally variable, dominated by native plants in some areas (Black Chokeberry, Virginia Knotweed, Sensitive Fern, New York Fern) and nonnative plants in others (Common Buckthorn, Garlic Mustard, Honeysuckle, Oriental Bittersweet). In some locations, oriental bittersweet comprises >50% of vegetation cover and is in urgent need of management.

Rochester forest herbs. *Wildflowers growing on the south campus and other Monroe Co. old-growth forests. Clockwise from upper left: White Baneberry; White Wood Aster; Wild Geranium; Indian Pipe; Ground Cone; Lowbush Blueberry; White Trillium. Photos by J. Ramsey, T. Ramsey, and A. Green.*

Low-lying agricultural areas of the south campus developed into a maple-ash swamp environment. The tree community here is comprised primarily of flood tolerant species like Silver Maple and American Ash. The forest canopy is relatively "open" in comparison to upland woodland areas, mature or otherwise. Areas of standing water harbor Duckweed, Water Plantain, Arrowhead, Marsh Marigold and other aquatic plants. Dryer microsites have dense fern cover. The maple-ash swamp is probably the least known portion of the south campus, as would-be visitors are scared away by mosquitoes, pools of standing water, and an abundance of poison ivy.

Wildlife

West Brighton is home to a diverse fauna, including many species of birds, mammals, amphibians, and reptiles. With its numerous habitats and abundance of water—including a reed-grass marsh—the south campus is an excellent destination for wildlife viewing.

Birds. More than 90 bird species have been observed on the south campus, including eleven warbler species, five thrushes, seven woodpeckers and seven sparrows. Particularly impressive are the Pileated Woodpeckers, crow-sized birds that make startlingly loud hammering noises while foraging in the mature woodlands and the maple-ash swamp. Wild Turkeys saunter through the forest understory while Osprey and Belted Kingfishers stalk their aquatic prey while flying above the marsh. Several families of wood ducks are present on the south campus as well as numerous Great Blue Herons and Green Herons. Thrushes call from the dense shade of the mature woodlands while Red Breasted and White Breasted Nuthatches quietly ascend large tree trunks while foraging. Gray Catbirds and Ruby Crowned Kinglets prefer shrubby areas near the meadows and marsh.

Mammals. White-tailed deer are probably the most charismatic

mammals in West Brighton. A large population occurs on the south campus as well as adjoining areas of Genesee Valley Park and the Lynch Woods-- it is not uncommon to see groups of 5-10 deer ambling along forest paths or plodding through the maple-ash swamp, especially in the morning and evening hours. In many areas of the U.S., deer herbivory can have devastating effects on urban plant communities. We have observed relatively little deer browse on the south campus, perhaps because grassy fields in Genesee Valley Park and vegetable gardens on private property are a more attractive food source.

We commonly observe Eastern Gray Squirrels, Red Squirrels, Eastern Chipmunks, Woodchucks and Eastern Cottontails in and around the University of Rochester south campus. Northern and Southern Flying Squirrels are occasional visitors to feeder stations on private property adjacent to the south campus, and presumably reside on the south campus as well. American Beaver were known on the south campus marsh during the 1960's and 1970's but are no longer present. Muskrats, however, are common in the marsh. Among mammalian predators, we most commonly see (and hear!) Gray Foxes and Red Foxes on the south campus.

Amphibians and Reptiles. Spring Peepers, Green Frogs, and Bull Frogs are the most conspicuous amphibians on the south campus due to their frequent calling during the spring and summer months. Chorus Frogs were previously reported from small ponds by the Laser Lab on the northwestern boundary of the south campus, but their current status is unknown. American Toads are abundant in terrestrial habitats (forests and meadows) throughout the south campus. Numerous tadpoles reside in the marsh and larger pools in the maple-ash swamp, indicating that frog and toad species are successfully reproducing on university property. Common reptiles include Garter Snakes, Northern Brown Snakes, and Snapping Turtles, the latter of which can be seen nesting in sandy areas around the marsh.

Undergrad forest activities. *U of R undergraduates evaluating forest structure, plant community composition, and soil characteristics on the south campus and other Monroe Co. old-growth forests. Photos by J. Ramsey and T. Ramsey.*

Preservation

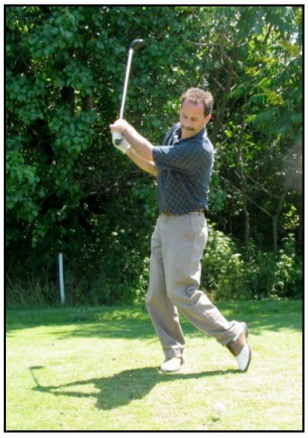
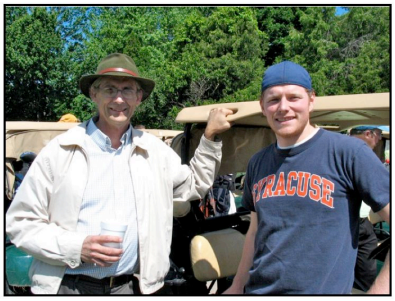
The south campus faces numerous threats related to anthropogenic disturbance and invasive organisms. For example, university property is crisscrossed by small paths developed by hikers and bike-riders. This impromptu network is difficult to navigate and causes unnecessary trampling of ecologically-sensitive wetlands and wildflower communities. Several areas are heavily impacted by invasive plants, including Oriental Bittersweet, Honeysuckle, Common Buckthorn, and Garlic Mustard. Moreover, development of new university buildings on parts of the south campus is inevitable.

The Department of Biology is working with University of Rochester administration and the Town of Brighton to protect our forests and wetlands, and to encourage their use in education and community outreach. At present, our activities have four principle goals: (1) development of a comprehensive trail system; (2) eradication of aggressively invading plants; (3) identification of areas of special conservation concern, including stands of old-growth forest and other unusually diverse habitats; and (4) use of West Brighton forests for educational activities. Currently, the south campus is used as an "outdoor laboratory" for several courses in the Departments of Biology and Earth & Environmental Sciences.

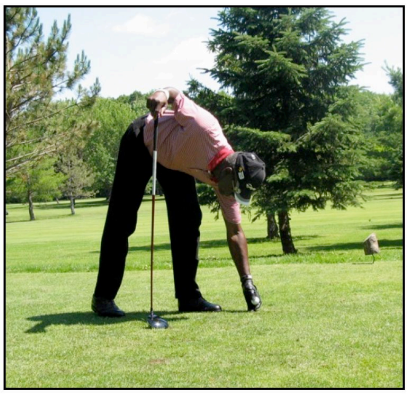
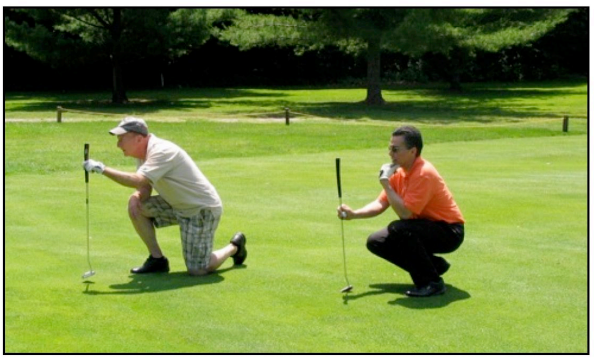
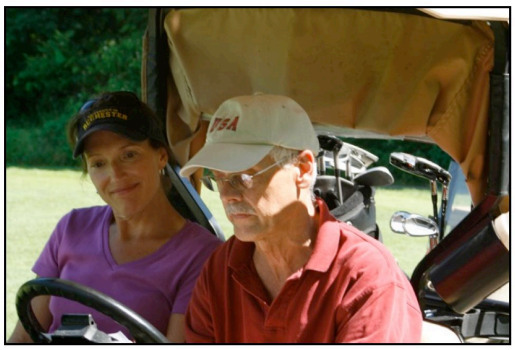
These efforts are part of a larger ecological analysis of Rochester forest habitats. The south campus is remarkable for its diverse plant and animal communities, yet other high quality forests are also hidden in the broader landscape of Monroe County —steep slopes above Irondequoit Bay that were too perilous to develop for agricultural use or residential properties, marshy woods along Lake Ontario's shore deemed too wet for human habitation, and long-forgotten woodlots now surrounded by young shrubby forest on abandoned agricultural lands. The Department of Biology has now surveyed twenty of these old-growth areas, evaluating tree regeneration, species diversity, biological invasion, and other components of forest health that are critical for development of management strategy. On these properties, large-statured oak and maple trees have stood since the founding of Rochester—our hope is that they can survive into the future, silent reminders of our region's natural heritage.

Howard Bryant Memorial Golf Tournament
June 17, 2010







Howard Bryant Memorial Golf Tournament

Please join us!

Thursday, June 16, 2011

Registration: 10:00 AM
Shotgun Start: 11:00 AM
Dinner: 5:30 PM

Registration Fee:
$90.00/person

Fee includes golf, lunch, and chicken/pasta primavera dinner.

Prizes!

- Closest to Pin
- Longest Drive
- Raffles
- Doorprizes

All registered golfers will receive one *free golf pass* ($30 value) for the Brockport Country Club!!!

Brockport Country Club
3739 Monroe Orleans County
Line Road, Brockport
www.playbrockport.com

Not A Golfer?
"Dinner Only" fee
is $30.00
Kids under 10 get
in free!

Free Appetizers before Dinner!
Free Bar after Dinner!

Howard Bryant

Howard was a beloved member of the Biology Department at the University of Rochester for over 40 years.

All proceeds from this tournament benefit The Howard Bryant Memorial Scholarship Fund. The Fund was established in 2004 to honor Howard's legacy of caring and support by providing aid to students in need of financial assistance and who are interested in pursuing a career in Science or Engineering.

Registration

Please send checks & form to:

Kathy Giardina
University of Rochester
Department of Biology
487 Hutchison Hall
Rochester, NY 14627

Checks made payable to:
University of Rochester

Unable to join us? *Direct Donations to the Howard Bryant Memorial Scholarship Fund are welcome and can be mailed to the address above.*

Name: _____

Name: _____

Name: _____

Name: _____

No. of Golfers _____
x $90.00 ea=(Total_____)

Dinner Only _____
x $30.00 ea=(Total_____)