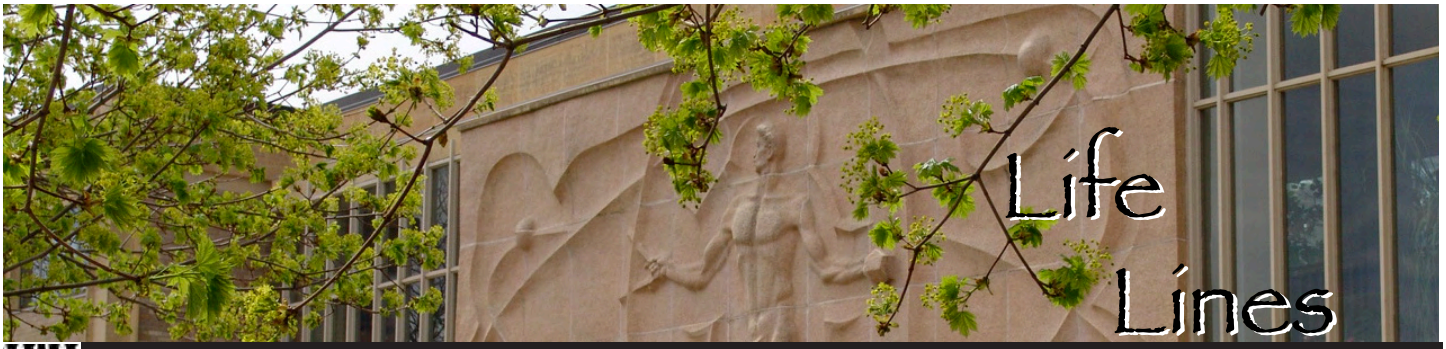


Gustavus Adolphus College ~ Biology department

Spring - Summer 2008

Greetings from the department:

I can think of few things more exciting and more fun than being a biologist. At whatever scale you look at the study of life, the view is always astonishing. To label myself as a good taxonomist might, I am a vertebrate behavioral ecologist, and as such study things at the organismal and population level. I'm regularly dazzled, though, by breakthroughs at all levels: the chemical geography of the developing embryo, the mystery of epigenetics, and the growing understanding of the neurobiology of perception, learning and empathy, to name a few I've encountered recently. Being in an academic setting at a school like Gustavus Adolphus College is a great way to keep one's feet wet with the discipline of new discovery. I was recently reminded that such is true at all levels of education when I had the chance to accompany my second-grade daughter's class to Seven Mile Creek County Park. I was the chaperone for a collection of five squirrely girls for an afternoon dedicated to playing games and going on hikes. My group decided to hike (it was their idea, really). Leaving the others, we headed up trail 3 past sandstone cliffs rising above us. Well, we were going past them until one of the girls led a rush to climb up the terraced stone to the forest above. For the next twenty minutes we were immersed in discovery, finding and identifying the spring wildflowers, collecting the shells of terrestrial snails (two with the snails still inside!), engaging in bedstraw fights (it clings!), walking along downed tree trunks, recreating the crime scene of a plucked dead robin lying on a log, and returning with hands and pockets full of feathers, flowers, seeds, cool bugs, and even a few morel mushrooms. Truly we were biologists at work. My group fanned out to join their friends, but two minutes later they were back saying, "let's do it again, in reverse!" By the time we hit the trail again, we had 18 second graders chanting "in reverse!" and scrambling up the wooded slope (thankfully with two other adults, as well). Biology is fun, whether you're a second grader, a college student, or a "vertebrate behavioral ecologist"! In this newsletter we are gathering stories of biologists—students, alumni, faculty and emeriti—to share some of the wonderful things we are all up to. If you have a story to tell, please send it in to me (grinnell@gac.edu), and we'll put it in a subsequent issue. Welcome!

Jon Grinnell, Co-chair
Biology Department
Gustavus Adolphus College

Please welcome our new faculty.

We have some new people in the department: Joel Carlin (2006), Maureen Carlson (2006), Eric Elias (2007), Sanjive Qazi (2007), and Karla Marz (2008).

In This Issue:

2 New faculty profiles

3 What's New?

4-5 Student research

6 What's the Next Step?

7 Biology Honors

8 Out of the Classroom

9 Awards/Honors

10 Tanzania J-term

11 Giants of the Earth

12 Alumni updates

Editor's note:

This is the first of hopefully many issues of a Biology newsletter which aims to share the outstanding achievements of students, faculty, and alumni and serve as a means of keeping those informed and engaged with the Biology Department. If you have a news item or a story to share, please send them to Jon Grinnell (grinnell@gac.edu / 507-933-7332).

Christine Askham
Life Lines Editor

New People in the Department

FACULTY SPOTLIGHT

Joel Carlin

Gustavus has been blessed to have Dr. Carlin in the Biology Department since 2006. Joel has taught introductory and advanced courses at Gustavus including Principles of Biology, Organismal Biology, Evolution, Aquatic Biology, Fish and Fisheries, and even a Wolf Biology J-Term course. Dr. Carlin has had great

Joel Carlin has been a Biology professor at Gustavus since 2006.

experiences with Gustavus biology students and faculty members. When interviewed, Dr. Carlin remarked that students show genuine curiosity in areas outside of lecture material and many are interested in being involved in research. He is also amazed at the cohesiveness of the faculty members and how they work well together. Faculty members put in time well beyond the requirements for their students because they really do care. "I have learned a lot from other faculty" he says, noting that he has incorporated specific ideas he's learned into his own lectures and labs.

Dr. Carlin is fond of Gustavus' biology core curriculum which maintains small class sizes while keeping faculty available for teaching diverse upper-level courses. The curriculum is designed to progressively introduce students to peer-reviewed literature so that by the end of year two they will be fairly comfortable reading primary literature and writing scientific papers. Dr. Carlin and other biology faculty spent long hours rewriting the introductory lab manuals to reflect the new curriculum focus on investigative learning, allowing students to explore the scientific method and experimental design early on in their biology careers.

Dr. Carlin has also been involved in the Tri-Beta graduate school seminars and would like to provide specific help for students writing personal statements and CVs. He envisions a peer-review workshop where students bring in their own statements for their peers to critique and are able to read a variety of example essays. Dr. Carlin also has an interest in giving students experience with grant-writing and other practical aspects of science that are not learned by reading textbooks.

Many biology students are involved in research, thanks to some dedicated professors and college-wide support. Dr. Carlin believes in the importance of research and the practical tools students learn when working on a project. Gustavus has recently put money toward summer research, giving students a great opportunity to dive into an area of interest. This summer, Dr. Carlin will be working with Eric Elias of the Biology department, Dr. Amanda Nienow in the Chemistry department, and Kendra Kesty, a first-year student, on a project on the toxic effects of agricultural chemicals upon aquatic animals' growth and development.

When asked if there is anything Dr. Carlin would like to change at Gustavus, he replied that they should "move the tornadoes further away." Enough said.

by Jenna Kesty

Maureen Carlson
Biology Tecnical Coordinator

Maureen Carlson is a relatively new face to the biology department. Starting last fall Maureen has been working as the biology technical coordinator making sure our lab supplies are taken care of as well as supervising student workers. Before working at Gustavus she graduated from St. Mary's with a major in environmental biology and then spent nine years working for an environmental consulting company. Maureen says that she enjoys working with the students and faculty at Gustavus and envisions herself here for many years to come.

Karla Marz
Cell Biologist

Karla will start at Gustavus next Fall, filling the cell biology position vacated by Bill Heidcamp. Karla was an undergraduate at Macalester College, earned her PhD at Washington Universtiy (St. Louis) and did a post-doc at University of Virginia. Her specialty is the role that cryptochrome molecules play in the circadian clock, a field that links biochemistry and neurobiology. You'll hear more about her once she arrives!

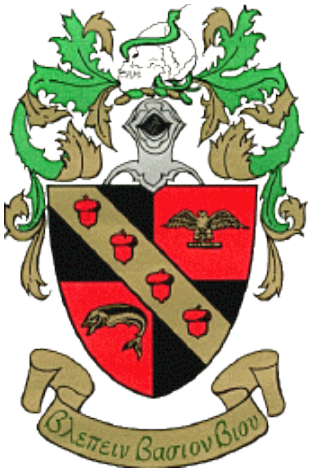
Nine Gusties mix business with science with the Mayo Scholars Program

Letter from Dr. Sanjive Qazi,

I was Faculty adviser for 9 students who completed the Mayo scholars program this academic year. The Mayo scholarship program is a cross collegiate award involving the participation of 8 Minnesota Private Colleges. The objective is to expose students to the business of science. The two groups representing Gustavus (9 students) were headed by two MBA students from Augsburg College (Audra Biesterfeld, Jane Collins) and they were charged with providing recommendations to the Mayo Licensing Manager to how to proceed with recently issued Mayo patents. The groups were very successful in understanding complex patents in the field of Pharmacogenomics; which

Mayo Scholars student team: Jason Pitt, Vwaire Orhurhu, Rochelle Molitor, Emily Barnard, Dan Chargo, Carly Ernst, Jennifer Pelowski, Rachel Dorr and Amy Waldner.

is the study of pharmacology and genetics to predict safer treatment protocols and specific design of drug regimens, and identifying potential diagnostic companies interested in licensing the technology. The Gustavus team worked on patents for genetic predispositions and drug metabolism for hormone dependent diseases, heart disease, and cancer. The benefits of this technology to provide improvements in patient care as well as some of the ethical and economic barriers to introducing these types of personalized diagnostic tests were assessed by the team. This project required the team to have productive and demanding collaborations with business leaders and then present their findings to leaders of the Mayo Science and Technology Transfer departments. The Gustavus team was exemplary in providing Mayo with 5 leads interested for the 12 patents studied. All students became accomplished at formal speaking and communication of state of the art scientific discoveries. Both the scientists and business leaders were very impressed with the Gustavus team this year and I am looking forward to setting up a new team next year.



Tri-Beta (BBB) update:

by Ashley Baumann (BBB officer)

The biological club has had an eventful year, throughout all of the global warming, gas leaks, surprise snow storms and of course everything else ol' Gustav likes to throw at us. Science on Saturday was a blast. The flow of youth from the St. Peter community was nonstop between our designated biology lab and the greenhouse, and with activities such as making birdfeeders with Katie Pesch, planting your very own peas with Chris Stark, and discussing 'what those little red things were under the microscope', there was hardly enough ATP to go around.

The Pre-Health Professional Panel that was held in partnership with the Pre-Health Club was helpful and interesting. The enthusiastic panelists had great bits of advice and weren't afraid to go into the gory details of what we know is QUITE a process.

The Biology Grad School panel that was held about a week after our first panel was a little more personal and the panelists got the chance to tell some stories about their experience other than just answering questions.

The year dwindled down with the Hiway 99 cleanup and Banquet, leaving only the Biology Majors Picnic to round out the year.

New Officers have been elected!

President- Lindsay Tebrake
Vice-President- Ashley Baumann
Treasurer- Sara Yunger
Secretary- Christine Askham
Social Coordinator- Melissa Mackley
Historian-Mollie Kelly

Student Research

Many Gustavus students participate in research with faculty members. Here are highlights of a few outstanding research students and their projects.

Stephanie Soiseth
Senior Biology/Latin Major

Stephanie is busy completing her last year at Gustavus with majors in both Biology and Latin. In years past she has completed research under Dr. Lammert looking at the affects of phenytoin on tetrahymena. Since her sophomore year she has worked as a TA for the department in various labs. Stephanie has also spent the last two summers working at a remote field camp monitoring salmon escapement totals for the commercial fisheries branch of the Alaska Department of Fish and Game. She enjoys studying microbiology as well as protists (basically anything that needs a microscope to see) and plans on a career in the medical field.

by Stephanie Soiseth

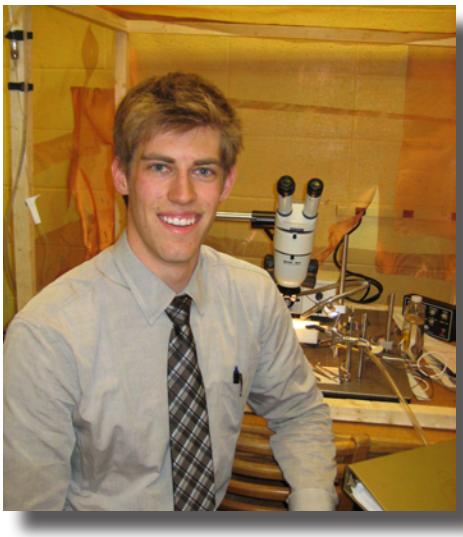
Ashley Grivna
Junior Biology Major

Ashley Grivna was set on pursuing a career as a veterinarian when she first came to Gustavus. Now in her junior year she has found a passion in ecology and conservation biology. Ashley is currently researching moonwort growth and aging with Cindy Johnson-Groh. In her spare time she works in the biology stock room. This summer Ashley will be participating in an internship with the Department of Natural Resources surveying plants around Minnesota. She ultimately plans to work in a State park as a naturalist. One of her most memorable biology moments happened last fall when the department received a shipment about crayfish she had a nightmare about them resulting in her falling off her loft.

by Stephanie Soiseth

Nick Murray
Sophomore Biology and Biochemistry Major, Neuroscience Minor

Meet Nick Murray. He is a sophomore student who is finishing the core biology sequence and who is currently enjoying Evolution, Ecology, and Behavior. Nick, like many other Gustavus students, has a strong desire for learning outside of the classroom. He takes advantage of the opportunities Gustavus offers from doing neuroscience research to Big Partner Little Partner to helping lead organizations like Africa Partners Medical, a group that donates needed medical supplies. Nick recognizes that all of his experiences here would not have been possible without help from the Gustavus faculty and he values



Nick Murray does research on primary afferent neurons that respond to cowhage, an itch-causing substance found in the spicules of the plant *Mucuna pruriens.*

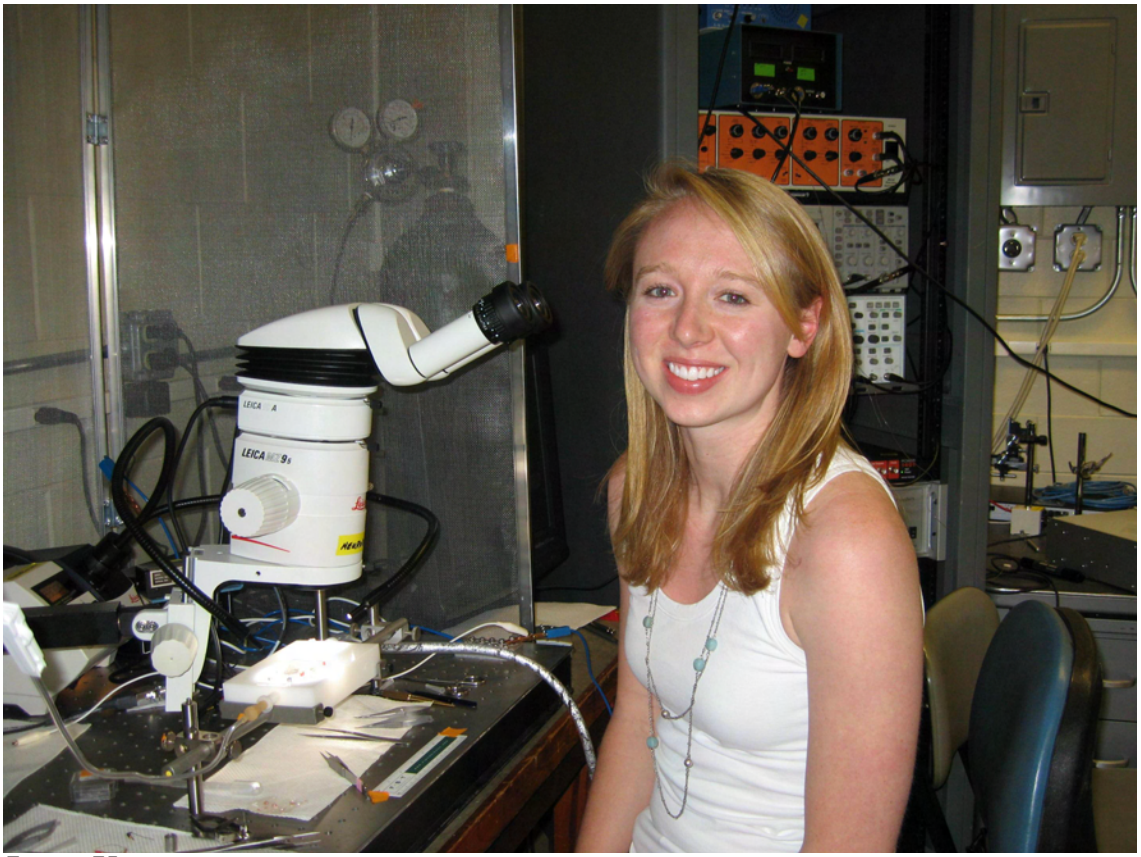
the enthusiasm displayed by his professors. Dr. Sanjive Qazi, for example, holds weekly talks about his HIV and cancer research and encourages students to get involved.

Nick's interest and appreciation for research has grown while a student at Gustavus. He took on his own Sigma Xi research project during his first year and presented his second project on the neurobiology of itch transduction at this year's annual research symposium and the Midbrains regional conference at Macalester. Nick also values the opportunities to get involved in current research and attended the American Pain Society's annual meeting in Tampa, FL this spring. To continue exposure to research, Nick hopes to start a journal club where fellow students read and discuss primary scientific literature.

Nick was recently awarded a Summer Undergraduate Research Fellowship (SURF) at the Mayo Clinic and will be researching the neuroplasticity of inflammation processes. After his summer stint at Mayo, Nick plans to carry his love for biology and exploration outside the lab as he heads to the Boundary Waters Canoe Area for a canoe expedition.

by Jenna Kesty

STUDENT RESEARCH



Jenna Kesty
Senior Biology Major Neuroscience Minor

When asked about her learning experience at Gustavus, Jenna has a lot to say and good advice for students. From North Bay, Ontario, she had only vaguely heard of Gustavus through her father, a 1976 Gustie Grad. Like many college freshmen, she enrolled without knowing what she was getting into. However, through her classes she found new world opening up and inviting her to discover the delights of biology.

Jenna's favorite part of Gustavus is being able to know professors on a personal level. "Students are often intimidated," she explains, "but the professors really are here to help you, so take advantage of it." She is amazed at the time professors spend with students in their office and labs in addition to teaching. It was the encouragement and life advice offered by some special professors that gave her the confidence to fulfill her dream of doing medicine.

Jenna believes that undergraduate research experience is an important part of a complete biology education. Jenna got her feet wet when she spent June 2007 in Woods Hole, MA at the renowned Marine Biological Laboratory as a teaching assistant for the Neurobiology course with Gustavus faculty member Dr. Heather Wenk. During this time, Jenna learned a variety of electrophysiological techniques and was exposed to the fascinating world of research through lectures and discussion with Nobel laureates and pioneers in the field. She enjoyed it so much that she continued doing research this semester and presented her project at the annual Sigma Xi conference.

Gustavus has helped Jenna gain a strong foundation in biology which will help in her future career. Next year, Jenna will be attending the Wake Forest University School of Medicine in Winston-Salem, NC. She will be leaving behind her sister Kendra, who is a freshman, but taking with her some great memories of her undergraduate experiences.

by Jenna Kesty

Amanda Halfen
First-year Chemistry/ Biology

Amanda (aka Mandy) Halfen is a freshman just finishing up her first year of biology. Inspired by one of her high school teachers, she is interested in persuing science whether that may be biology or chemistry. Mandy is especially interested in neuroscience and cell-cell interactions. Her future career plans include working in the medical field in a research based setting.

by Jenna Kesty

What's the Next Step?

A glimpse into the future.
These senior Bio majors were asked what their plans are for next year...

Zach Alwine plans on doing research and/or lab work for a year, then attend medical school.
Emily Barnard will be workling and volunteering at undisclosed/currently unknown locations .
Andy Bryan will be attending the University of Minnesota Medical School.
Alex Burleigh will be living in the happiest country in the world AND studying Biology by going to graduate school for Systems Biology in Copenhagen, Denmark.
Meredith Carlson is going to graduate school at the University of London for epidemiology this fall
Brian Castle will first be working at Tuscarora Lodge and Outfitters as part of the Outfitting Staff over the summer, but will be beginning a Ph.D. program in Biomedical Engineering at the University of Minnesota in the fall.
Holly Cooper plans on attending pharmacy school out at the University of Colorado Health Sciences Center in Denver.
Lydia Davitt will be working for ACR Home and Minneapolis Park and Rec.
Dan Freeman will be attending University of Minnesota Duluth Medical School in the fall
Erin Ge will be attending medical school at Loyola in Chicago.
Danielle Gergen will either be attending graduate school in England for forensic biology or hopefully getting a job!
Whit Homan is directing a nonprofit in Chicago which fights for environmental justice
Carl Johnson is a mysterious man with such elaborate plans that only he can understand their complete depth.
Kristin Johnson plans to teach life science at a middle or high school in the Twin Cities area and to obtain a Masters in science education.
Jenna Kesty will be attending Wake Forest University School of Medicine in Winston-Salem, NC.
Stephanie Lewis is planning on working in some seasonal environmental education positions, then pursuing graduate school in Biology.
Krystal Long will be working toward her OD degree at the Ohio State Universty College of Optometry for the next four years.
Katie Pesch will be attending the University of Minnesota Medical School-Duluth.
Brigette Peterson will be working as a cardiac specialist for Aurora Medical until going to graduate school to be a physician assistant.
Jeff Rock will be teaching English in Japan for the next year and will then attend law or graduate school
Ian Ruppel has been focusing first on graduation and Gustavus life, has no prospects yet for the future, but plans to be working in the field of ecological conservation.
Matt Seiffert will first canoe about 2000 miles from St Peter to Hudson Bay. After that, he will work as either a research assistant or a tech at OHSU in Portland, Oregon.
Mike Stangler will be working next year, but is still trying to decide which career path to follow.
JoJo Ulmen is searching for jobs in "the cities" that provide patient-care interaction and in a year she intends to go to physical assistant school.
Amy Waldner is currently undecided, but will participate in the Post-baccaulaureate Intramural Research Training Award at National Institutes of Health or go to medical school.
Chris Ward is looking for a Middle School or High School Biology teaching job for next year.
Connor Ziegler will be attending the University of Minnesota-Duluth Medical School in August.
Sarah Zierke has a research assistantship and will be attending MSU-Mankato to get her Masters in Biology.

Graduating with honors
The few, the proud

In order for Biology majors to graduate with "Honors in Biology", three steps must be completed.

1. Completion of a Biology Major with a minimum GPA of 3.5 in all regular semester Biology Courses completed at Gustavus.
2. Either - completion of a research project and thesis - or - an extensive literature review, preferably with some experimental components under the direction of an Honors Committee.
3. Completion of an oral examination.

2008 Honors proposals:

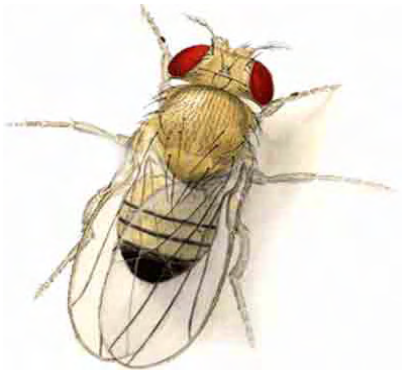
Sarah Cowles: The extraction of lion (*Panthera leo*) formants using mathematical wavelet analysis to determine larnyx position.

Leah Hogdal: Effect of oxidative stress on progeny production and sperm storage of *Drosophila melanogaster.*

Asitha Jayawardena: Auditory characteristics of *Periplaneta americana* (cockroach).

Jason Pitt: Ethical & scientific case studies: is "good" science enough for the implementation of pharmacogenomic based research into mainstream healthcare?

Isaac Weeks: The influences of lozenge on female sperm storage in *Drosophila melanogaster.*



Drosophila melanogaster- a model organism commonly studied by reasearch students.

2007 Honors:

Althea Archer: From farmland to prairie: tall-grass prairie restoration in the Linnaeus arboretum, Gustavus Adolphus College, St. Peter, Minnesota.
*Althea now works towards a MS degree at the University of Wisconsin, Madison.

Tanner Miest: Fertility and immunity: female tradeoffs after copulatory *Serratia marcescens* exposure in *Drosophila melanogaster.*
*Tanner now pursues the MD/PhD at Mayo Medical School in Rochester, MN.

Senior Highlight: Alex Burleigh

Alex Burleigh- senior Biology major experiencing Denmark yet again, but this time through graduate school.

Her story in her own words--

I originally decided to study abroad for a semester in Denmark because I wanted to get away from the United States and experience a new and different culture that I knew nothing about. I chose the Denmark International Study program primarily because of the reputation of their Science Programs, particularly the Biotechnology and Biomedicine program. While I was there I had the opportunity to take courses at two of the largest Universities in Copenhagen. I also got to travel to Germany and Poland with the program where we visited the Max Plank Institute of Genetics and the Center for Sensory Motor Interaction where were able to see some of the current research being done in Genetics and neurorehabilitation.

While studying Danish and the controversial philosophies of Soren Kierkegaard, I also was able to take an extensive and challenging course in Metabolic Engineering & Functional Genomics. As only one of a few American students in my class, I came to be completely fascinated by everything that I was learning in this class. I knew that I wanted to continue studying in this field. Upon arrival to the United States, I found myself missing everything about Denmark and my classes there. Everything from the laid back and modest Danes and the benefits of the social welfare state, to the many hours I spent doing Polymerase Chain Reactions with my Danish lab partners.

I decided to apply to the Systems Biology graduate program at the university where I studied, Denmark Technical University, and was fortunate enough to earn the Danish State Scholarship covering all tuition and living expenses. I am completely thrilled to be going back to Denmark in the fall to study what I am passionate about in one of most unique and wonderful countries in the world!

OUT OF THE CLASSROOM

Research Interests of Biology faculty

Margaret Bloch-Qazi
"My research focuses on the general question: What do females do with all of the sperm they receive during mating? This question stems from the observation that in most animals with internal fertilization, many more sperm are transferred during mating than are ultimately used to fertilize the female's eggs. In many of these animals, the female reproductive tract is a complex and dynamic landscape through which sperm traverse. This landscape contains specific regions and/or structures which are specialized for retaining sperm after insemination, a phenomenon called female sperm storage. Sperm entering the female reproductive tract (and the sperm storage organs in particular) have several potential fates including: fertilization, death/digestion, and/or expulsion from the female. Although female sperm storage is a common phenomenon in the animal world and an understanding of its role and male and female fitness is emerging, a detailed understanding of the molecular and physiological mechanisms of female sperm storage remain poorly understood.
Ultimately, I am interested in how females manage sperm in order to better understand the fitness consequences of female sperm storage. This research is classified as basic research since it addresses questions about fundamental biological processes. Information gained from this research can contribute to our understanding of animal development, reproductive behavior, physiology, and insect management strategies (both control and conservation)."

Sanjive Qazi
"I am the lab instructor for Microbes in Human Health (BIO118), Organismal Biology (BIO102) and Cell and Molecular Biology (BIO201) at Gustavus. This was my first year teaching at an American college. Prior to Gustavus I worked extensively performing research in universities. I worked in teams researching techniques focused on delivering patient-tailored care at the facility. In this scenario, each patient was screened with imaging technologies, cancer markers and drug sensitivity trials. It was my goal to extract statistically significant factors in the patient objective response given the multitude of different variables. My work was performed in collaboration with clinicians, nurses, scientists and students. I was also involved in applying genomic and proteomic innovations that allowed for the simultaneous measurement of thousands of messenger RNA levels or hundreds if kinase screens requiring a new integrative paradigm to study the molecular mechanisms occurring in the functioning of normal and pathologic cells. This technology is poised to provide fundamental new insights into the progression of important classes of diseases and identification of potential new target sites for the development of therapeutic agents. I plan to continue research at Gustavus to further understand disease states using Bioinformatic and Computational Biology tools on large gene expression data sets."

Joel Carlin
Originally from Indiana, Joel Carlin received his B.S. in marine biology from the University of North Carolina at Wilmington and a M.S. in zoology from Louisiana State University, where he studied salamander evolution in the southeastern U.S. Dr. Carlin then worked as a marine biologist for the South Carolina Department of Natural Resources for three years, before going on to receive a Ph.D. in fisheries and aquatic sciences from the University of Florida for his work on the systematics and population genetics of groupers, a diverse subfamily of commercially valuable tropical fishes. His research interests lie at the crossroads of ecology, geography, and genes. A strong supporter of undergraduate research, he combines field ecology techniques with molecular biology to examine evolution, species ecology and habitat conservation.

Jeff Dahlseid
"I am interested in engaging students in my quest to understand how the expression of genes is regulated by cell-mediated changes, specifically changes involving the stability and translation of messenger RNA (mRNA). I have several potential projects based in a wonderful model system (that also makes the lab smell pretty good!). Using bakers' yeast, the lab can employ easily accessible molecular and genetic approaches to understand the cellular biochemistry of specialized mRNA degradation pathway, the so-called nonsense-mediated mRNA decay (NMD). NMD is part of the natural repertoire for regulating gene expression, based on the recent demonstration that 6-9% of the wild-type mRNAs in yeast accumulate when NMD is inactivated."

Eric Elias
"My interests include studying the natural life histories of Minnesota fishes, the use of fishes as bioindicators of environmental problems, and reproductive endocrine disruption in aquatic organisms. I have conducted research in the area of environmental estrogens affecting the reproductive anatomy and physiology in fish. I enjoy hunting, fishing, camping, hiking, and spending time with my family."

Micheal Ferragamo
"I am intrigued by the question of how animal brains acquire, process and display information as they go about their daily activities. My students learn how to measure electrical events in neurons and apply a variety of analytical techniques as they try to find answers to that question. My greatest joy comes in conveying the excitement of my field to young people by working in partnership with them in the laboratory, and by offering courses that include Introduction to Neuroscience, Neurobiology and Comparative Physiology".

Jon Grinnell
"My interests fall into the broad categories of behavioral ecology and conservation biology. I am fascinated by how animals use and interpret acoustic signals and the role such signaling plays in the social life of the animal. Most of my work has been done with large mammals (African lions, American bison) and it continues now with student involvement in lab and field research on bison. In the summer we conduct observational research on a population of free-ranging bison in South Dakota; during the school year we analyze the recordings made in the field, make sense of our observations and make plans for the next year. In collaboration with The Nature Conservancy, we're also looking at some conservation genetics and management issues in bison. I love my job and relish my times outdoors. I teach animal behavior, vertebrate zoology, and introductory courses."

Kiki Harbitz
Kiki Harbitz teaches Cell and Molecular Biology and 's areas of expertise fall in ecology, evolution, behavior, and environmentalism. Courses taught at Gustavus include Anat & Phys I and II, Principles of Biology, and Evolution Ecology and Behavior. Her interests include animal behavior, aquatic macroinvertebrates, and anything in nature.

Emily Hoefs
Emily Hoefs graduated from Gustavus in 2006 and is currently the Naturalist of the Linnaeus Arboretum. She works on educational programming in the arboretum, networking with the area school groups and community members. Her work in biology, specifically in botany and horticulture, equip her with passion and skills to teach the importance of plants and environmental stewardship. She is also the curator of the Biology Department greenhouse.

.Colleen Jacks
"I use two plants as model systems in my research on genes and how genes are regulated in eukaryotes: Arabidopsis thaliana and Medicago truncatula. Arabidopsis is a small dicotyledonous weed related to broccoli, cauliflower and mustard that was the first plant to have its genome sequenced. I am studying the expression of ribosomal protein gene families in Arabidopsis using the technique of RT-PCR to measure the plant's use of multiple, evolutionarily-conserved genes for the same

Research Interests of Biology faculty (cont.)

protein. M. truncatula is a nitrogen-fixing legume similar to alfalfa that is used to dissect the process of root nodulation and nitrogen fixation. I am collaborating with researchers at the University of Minnesota who study the effect of "knocking down" specific genes in roots using the technique of RNAi. This collaboration is the current basis of the lab in BIO 388 Molecular Genetics."

Cindy Johnson-Groh
Cindy Johnson-Groh is a plant ecologist with an interest in plant conservation and plant demography. She and her students have studied a rare genus of ferns, moonworts (Botrychium). Cindy's work has included plant demography, modeling and management issues with particular reference to the underground ecology and population dynamics of these ferns. She has worked with the US National Forest Service and the US Fish and Wildlife Service in the Midwest, West and Alaska to understand the ecology of these ferns and to assist these agencies with conservation of moonworts. She teaches Conservation Biology, Plant Systematics, Organismal Biology and the Natural History of Tanzania. She is also the Executive Director of the Linnaeus Arboretum and is a self-proclaimed "plant chauvinist" with passion for plant biology, ecology and the importance of plants in our world.

Brenda Kelly
"My Research interest lies in the spectroscopic characterization of proteins. Specifically, I am interested in an enzyme called gamma-glutamyl cysteine synthetase. This enzyme catalyzes the rate limiting step in the synthesis of glutathione, an important antioxidant and detoxicant in biological systems. Through characterization of the protein's structure using spectroscopic techniques (UV-Vis, fluorescence, resonance Raman, electron paramagnetic resonance), we can learn about the structural features of the enzyme active site and the conformational changes that the enzyme must undergo to 'do its chemisty' (i.e. catalyze the reaction). Courses taught (course subjects that I am interested in): General Chemistry, Biochemistry, Proteins, Food Chemistry, Organic Chemistry, Cell and Molecular Biology."

John Lammert
John Lammert is an immunologist and microbiologist who is known for his phenomenal recall of students past and present. He has recently had a book published by Pearson Prentice Hall, "Techniques in Microbiology" (2007).

Pamela Kittelson
"I have broad interests in plant population and evolutionary ecology. My most recent research focuses on identifying the impacts of invasive plants on native species. In particular, I want to know how invaders affect native leaf construction, biomass, water use efficiency and nutrient content. I also am interested in measuring how the impact of the invader changes when resources are added or when native species richness increases. My students and I also completed research related to restoration ecology, especially in tallgrass prairies and oak savannas. We published work on genetic diversity and local adaptation within these fragmented ecosystems. Finally, I also am interested in species interactions, especially between plants and insects whether as herbivores or pollinators. I teach a variety of classes: general biology for majors and non-majors, plant physiology, ecology, and evolution. I love to learn new things, I enjoy interacting with students, I love the great outdoors and all the organisms that make this planet so beautiful."

Heather Wenk
Heather Wenk studies the neurobiology of pain sensation, has taken Gustavus students to her summer job teaching neuroscience at Woods Hole, and recently came back from a "pain meeting" at which she was an invited speaker and to which she took her four research students. She has been an integral and valued member of the Biology Department for the last two years and will be missed as she starts a tenure-track job at Washington & Jefferson College in Pennsylvania next Fall.

Biology Honors

We had another sucessful year in the Biology department and some outstanding awards were given to commemorate those who went above and beyond to acheive.

Rubert Anderson Research Award

Mackenzie M. Consoer
Amy J. Waldner

Beta Beta Beta National Biology Honor Society (inducted 2008)

AManda L. Brock
Sarah A. Cowles
Ashley M. Grivna
Lauren A. Johnson
Chelsea C. Koepsell
Melissa R. Mackley
Rochelle J. Molitor
Stephanie D. Snyder
Mathew A. Stewart
Alanna N. Velo
Kristin M. Willer

J. A. Edquist Award
(recognizes outstanding academic achievement in biology)

Jenna Kesty

Charles L. Hamrum Award
(recognizes the achievements of an upper class student majoring in biology)

Sarah A. Zierke

Outstanding Service Award
(recognizes a student or students for outstanding service to the department)

Ashley M. Grivna
Kristin M. Willer

Academic Assistants

Jenna M. Kesty
Stephanie J. Lewis
Stephanie A. Soiseth
Amy J. Waldner

Systematics Collection Curator Award

We will initiate a new award next year when we appoint the first students to organize and make accessible a portion of one of the plant, insect or vertebrate collections. This will come with a budget to be administered by the student, funded through alumni and endowed funds. Sarah Zierke (08) and Thereasa Schollett (07) laid the groundwork for this when they digitized part of the Lepidoptera collection last year. See their work: http://gustavus.edu/academics/biology/projects/bugs/home.html

Environmental Justice and the Natural History of Tanzania

J-term course with Cindy Johnson-Groh

Witnessing ceremonial lion killings by traditional Maasai warriors, observing up to 100 elephants at a time, hunting for honey, hiking up volcanoes, sitting under infamous Baobab trees, and camping in or around National Parks are only some reasons which draw Cindy Johnson-Groh and an excited group of students back to Tanzania year after year. Through the UMAIE program, Professor Johnson-Groh brings fifteen college students from the Midwest to Tanzania every other January. Gusties made the three week journey January 2008.

The J-term course focuses on natural history, conservation biology, anthropology, as well as current social and political issues in Tanzania. In order for this wide array of disciplines to be explored, the group travels extensively throughout the country in order to hit all of the big national parks. The group travels in an open German Military Transport truck which has been converted into a Safari vehicle. African ecosystems in Tanzania range from dry, desert-like areas to lush Serengeti grasslands with volcanoes and lakes in between. Students study the components such as animals, plants, geology, and ecology which allow these ecosystems to function. Not only is the ecology and biological aspects of Tanzania studied, but the group also learns about the Tanzanian people. Traditional hunter-gatherer tribes, the Hadzabe and pastoral tribes, the Maasai are visited. Students are involved in hunting and fashioning their own arrows. The Hadzabe tribe leads students on a hunt for honey and students participate in the goat roast with the Maasai tribe.

These wild African elephants are only a glimpse of the big game fauna seen by students in Tanzania.
photo by Steph Lewis

The *Acacia* tree
photo by Steph Lewis

This trip is not for the weak bodied or minded. Daily physical activity and rugged living conditions are perfect for the more adventurous of students. There are always alternatives, but who would want to miss a climb up a volcano starting in the middle of the night to arrive at the summit by sunrise? All but two nights are spent camping in tents. Though rain is possible any time of year, January is in between rainy season and temperatures range between 50 and 90 degrees. the country, visiting all of the bigogy which allow these ecosystems to function.

History of the course

A former Gustavus professor, Bob Bellig, started the Tanzania J-term tradition in the 1970's. The trip started as a collaboration between some of Bob's students, the Petersen brothers and Bob. The Petersen brothers had grown up in Tanzania, but had attended Gustavus. The brothers subsequently started their own company called Dorobo Safaries. These Gustavus alumni are also very active in community conservation, and according to Cindy Johnson-Groh are active in conservation the `right' way. They give back to the community in a meaningful way that supports conservation.

Professor Cindy Johnson-Groh's own interest in the ecology of EastAfrica began with a trip to Kenya (north of Tanzania). She became intrigued with East Africa ecosystems and jumped at the chance to lead the J-term trip when Bob Bellig left.

by Christine Askham

Giants of the Earth
Updates on former faculty

Mary Anderson
After Gustavus, Mary Anderson headed to the National Institutes of Health for a fellowship in a lab studying Batten's Disease (a fatal inherited disorder involving the CLN2 gene). She says t was a great opportunity to get back in the lab, to volunteer at the Children's Cancer Unit on her "off time", and to marvel at the research being presented every week. It didn't feel too far from her Gustie home because she played in the NIH orchestra every week along with 3 other Gusties who were there as participants in the Normal Volunteer Program!
As her two-year fellowship was came to a close, she accepted a job at Digene and began work in their R&D department. Her primary area of research was optimization of the company's diagnostic kit for HPV (human papilloma virus, the cause of cervical cancer). Regarding HPV, Mary states "it's a topic about which I'm passionate now that the cancer is known to be virtually 100% preventable". After some time in R&D, the company asked her to take a troubleshooting position in the molecular biology manufacturing labs. So that's her current position.

Myron Anderson

Is still playing golf, horseing around, and is the Vice President of the Arkansas-Oklahoma Synod of the ELCA.

Bob Bellig
Bob Bellig retired to a lake home near Bemidji, Mn. where he could pursue his interests in traveling, hunting and fishing - activities that he was never able to do at G.A. because of his extreme devotion to teaching and research which consumed 37 years of his professional career.

Judy Biederman
Judy Biederman has been catching up-- on all thoses things that we say we will get to "some day". She has been able to read more novels and historical fiction as well as enjoy her home and friends. She also has been able to to help out some at her family business, a local waste and recycling company. Next on the agenda is a cruise through the Panama Canal next February.

Pam Freeman
Pam is currently an PhD Candidate at the University of Nebraska - Lincoln in the Ecology, Evolution and Behaivor research unit. Her main area of study is animal behavior. She is in the 4th, and hopefully final, field season of a project that investigates the causes of mortality in juvenile thirteen-lined ground squirrels. As she says, "little did I know that I would leave the population in the GAC arboretum to wrangle my own population down here. Her only qualm, is that spring and fall are great, but the winters are pathetically brown for her northern taste.

Bill Heidcamp
Since leaving Gustavus Bill has been a full time administrator as Dean of CAS at AUS in the UAE. Basically he is helping to build a completely new university which is now only ten years old. His job is to build the Arts and both Natural and Social Sciences. Most of his tasks for two years have been hiring new faculty and expanding programs at a very rapid rate. This past month, they put on the first ever student production in theater in the area (Romeo and Juliet) and had their first ever Choral Ensemble production. They have had majors in Chemistry, Biology, and Math added in just the past year and are planning additional majors in Arabic Studies and History. In summary, it keeps him busy.

Pam Olson
Pam Olson graduated from GAC in 1993 (Biology) and then worked in the department as Technical Coordinator from 1994 or 1995 until just after the tornado in 1998. Currently, she and her husband still reside in St Peter with their two boys (11yrs and 8yrs) a dog, a bird, 5 fish and one frog. They are the owners of The Spoke Bike and Ski Shop in Mankato. They're never quite sure what each new year will bring - but try to enjoy each to the fullest with their family and friends. (...and hoping to survive the quickly approaching "teenage years" !)

Kay Rezanka
Kay is a '93 Gustie Grad who served as biology lab instructor and lab coordinator from 1994-1996. She is currently a biology instructor at Central Lakes College in Brainerd, MN. When not teaching, she serves as a volunteer and consultant to the board of my local lake association. During her free time she enjoys gardening, birding, fishing, and spending time with her fiance.

compiled by Christine Askham

Unlimited options

What some Gustie alumni are doing today

Stephen Handler (2005) completed a MA in Conservation and Sustainable Forestry from the U of Montana. Stephen is now working at a start up company called ClearSky Climate Solutions. (www.clearskysolutions.com).

Jim Eckberg (2005) completed a MA in Ecology from University of Nebraska Lincoln.

Carrie Byron (03) - Yellowstone National Park bison project

Josie Thulien (05) – Science teacher at St Peter HS

Nadine Lysiak (03) finishing PhD at Boston University after dissertation research on the conservation genetics of North Atlantic right whales using stable isotope signatures.

Dan Lewer (02) finishing DVM degree at Oregon State University after working as a zoo vet tech and marine mammal researcher with Hatfield Marine Science Center in Newport, Oregon.

Kimberley MacArthur (04) continues her studies of the spatial sensorimotor processing in homing pigeons in the neuroscience PhD program at Washington University, St. Louis.

Carrie Byron (2003) in Yellowstone National Park

Ann Morris (04) graduates this May with an MD from the University of Iowa Medical School.

Erich Ziegler (06) teaches middle and high school science in the Forest Park schools.

Nicole Soper Gordon (07) Is currently working on a PhD in Plant Biology at the University of Massachusetts in Amherst.

Britta Hansen (07)- attending the optometry program at the University of California, Berkeley.

Emily Petraitis (07)-currently working at VCA Feist Animal Hospital in St. Paul and just completed an interview at Ross Veterinary School and is waiting to hear back.

Would you like the electronic version? Send us your e-mail address!

GUSTAVUS ADOLPHUS COLLEGE
Department of Biology
800 West College Ave.
St. Peter, MN 56082

507-933-7333
gustavus.edu/academics/biology/