December 2011
Issue 5

Biology Buzz

Denison University

Welcome to the Fall 2011 edition of the ***Biology Buzz***. This year the biology department is hoping to publish **two** editions of the *Biology Buzz*. The fall edition features a wrap-up of our summer activities, information about new faculty, introduces our senior fellows, and highlights the activities of current faculty. In the spring edition, we hope to have heard from alumni so that we can share some of your interesting activities with other alumni and our current students. Please let us know what you've been up to and how biology plays a role in your current activities by sending you former professors an email or drop a message into the email-box of the biology chair (rettig@denison.edu) or the biology administrative assistant (Ms. Jenny Etz, etz@denison.edu).

Visiting Faculty 2011-2012

Ebenezer Aluma

B.Sc in Zoology from the University of Lagos, Lagos Nigeria 1997

PhD in Biology from the Ohio University Athens, Ohio 2011

Teaching Human Physiology & Stream Monitoring/ Assessment

Ebenezer is interested in anthropogenic impacts on freshwater stream systems. The huge degradation of streams and creeks caused by oil pollution in his native Niger Delta region of Nigeria is the driving force behind his

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Fall 2011 Senior Fellows

Emily Miller '12

I remember the day in 8th grade when I received a project to construct a cell from Jell-O, and I first learned about cells and the organelles they contain. As I later munched on my fruit roll up "golgi apparatus" and my gumdrop "centrosomes," I was struck with the realization that every living organism is made up of those cells! Not only that, but every cell in my body contains microscopic structures like those organelles, all working together in perfect harmony to make me function. The thought of that beautifully complex, microscopic world blew my mind. It all seemed so magical, and my fascination with biology was officially sparked. I wanted to know more about how things work, from the smallest cells to the largest animals, and to continue learning more about the "magic" of life.

Denison has provided me with incredible opportunities for continuing and expanding this fascination. I have been able to experience a wide variety of subjects from herpetology and marine biology to genomics and genetics (which may have forever changed my perceptions of The Muppets and Dr. Seuss characters) that have broadened my interests and challenged me in new and exciting ways. Through these courses, I have gained an understanding of not only the microscopic cells that initially pulled me in, but also of the larger systems and organisms they comprise. My research experiences with sea urchin embryos sharpened my critical thinking skills, and further instilled in me a passion for discovering answers to the many exciting and unanswered questions that science presents to us. The more I learn and discover about the delicate yet simple intricacies of the biological world the more magical and fascinating it seems to me. I am excited to carry the passion and knowledge I have gained here into my future work as a veterinarian. ☺

Meet our Fall Senior Fellows!

* **Emily Miller '12**
* **Hallie Singer '12**
* **Rachel Stevenson '12**
* **Jessica Wilson '12**

Jessica Wilson '12

I do not know when I first fell in love with Biology. Was it when my 5 year old self first learned about the wonders of our immune system from the red-haired Ms. Frizzle and the Magic School bus crew? Or was it when in third grade I looked through my first microscope at skin cells in all their beauty? Or was it when I was in fifth grade and learned about how all the information that made me was contained in the unimaginably tiny form of DNA? I cannot say if it was any one of these moments or a gradual discovery of the wonders of the biological world. What I can say is that by the time I entered high school, I knew I would never learn enough about the world around me, always yearning to know more about the unseen microscopic world that affects every moment of my life and allows me to live.

At Denison, I have been able to truly embrace this desire and explore my curiosity. Professors not only encouraged my questions but also pushed me to never be satisfied with a simple answer because there is always more going on that can be explored. Only in this major have I gone from learning about the nesting habits of birds to dissecting a vast array of unique and beautiful flowers to creating histone mutations to studying HIV infectivity. As a curious first-year, I was able to embark on a directed study research experience which allowed me to truly practice the techniques and thinking processes I was taught in class. As a now-experienced sophomore, I assisted in passing on these experiences by TAing. As a junior, I was encouraged to develop my own lab experiments and now, as a senior, I have been allowed to truly embark on a research journey with all its success and failures waiting to undergo trouble-shooting. Truly, the plethora of lessons, skills and opportunities I have had within the Biology major has quenched my constant craving for biological knowledge and experiences. It has also allowed me to better appreciate the vast and lovely picture of the world around me, from the tiniest bacteriophage to the complexities of the human body to immense flow of genetic information from the primordial ancestors to the seemingly immeasurable number of species walking the earth now. I know that all of this will continue on with me after I move on to medical school. I will confront the rest of my life with the same curiosity I walked into Denison with, nurtured and honed by my four years here. I can only hope that I will be met with just as much support and opportunities as I received here. ☺

Biology faculty judge at Utica High School Science Fair

Andy McCall and **Laura Romano** served as judges at the Utica High School Science Fair earlier this month in Utica, OH.

2011-2012 Department Photo

Front: Chris Weingart, Ebenezer Aluma, Eric Liebl, Jeff Thompson, Andy McCall, Jessica Rettig, Warren Hauk. Back: Geoff Smith, Clare Jen, Andrew Stoehr, Laura Romano, Jenny Etz, Rebecca Homan, Tom Schultz, Lina Yoo. Absent: Kristina Mead, Ayana Hinton, Heather Rhodes & Whitney Stocker

Staff News After admirably serving as a visiting assistant professor for two years, **Dr. Erin McMullin** secured a tenure-track position at Simon's Rock College. This fall **Dr. Ebenezer Aluma** joined us, teaching courses in Human Physiology and in Stream Assessment, replacing **Dr. Kristina Mead** who is on leave. **Dr. Heather Rhodes** is currently on a parental leave, spending time with her new daughter, Penny. During Thanksgiving Break **Dr. Ayana Hinton** gave birth to a girl, Atiya, and will be on parental leave in the spring semester. **Dr. Lina Yoo** is expecting a baby in the spring and will be on parental leave as well.

Summer 2011 was busy for biology faculty and students. Twenty-three biology students spent ten weeks on campus working on research projects, while eleven biology faculty hosted these students in their labs. Three biology majors participated in research off campus, working in labs at Colorado State University, Arizona State University, and Israel Deaconess Medical Center in Massachusetts. All of these students presented research posters in September at Denison's Summer Science Research Symposium, as described in TheDen article http://www.denison.edu/theden/2011/09/a-fall-harvest-of-summer-research/. Another story in TheDen highlights the research of six biology majors who travelled with **Dr. Geoff Smith** to the Bahamas for an intensive field experience working with rare iguanas, a research trip partially supported by endowed funds from **Leon C. and Grace Smith Greene** http://www.denison.edu/theden/2011/07/how-to-catch-an-iguana/. Providing opportunities for biology majors to participate in research continues to be an important goal for the department. For example during the 2011-2012 academic year, 20 seniors are conducting senior research projects. The department also hosted an Open House during Big Red Weekend in October. Current students and their parents attended, as well as alumni ranging from '70s through the '00s. We hope to see more alumni and parents on future Big Red Weekends.

Visiting Faculty *cont. from front page*

interest in stream biomonitoring and bioassessment. At the Ohio University, he studied the effects of acid mine drainage on benthic macroinvertebrate communities and how acid mine drainage (AMD) affects the bioaccumulation of mercury in crayfish inhabiting southeast Ohio's acid mine impacted streams.

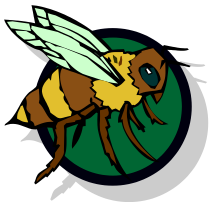
In southeast Ohio, acidification of streams from abandoned coal mines is a widespread legacy of disused coal mines left behind from over 200 years of coal mining in the area. Prior to the enactment of the Surface Mining Control and Reclamation Act of 1977, mining companies were not required by law to reclaim mined areas. This situation resulted in mining companies leaving behind mine chambers that contained exposed pyrite stores. When pyrite comes into contact with water (from rain events or nearby streams), oxidation reactions take place to yield ferrous iron sulfate and acidity as hydrogen ions. The sulfuric acid and hydrogen ions lower the pH and cause the mobilization of other heavy metals such as (Al, Mn, Zn, Pb, Cu, As, Ni, Cd, Co) from exposed coal or bedrock. A 1995 survey of the Appalachian region found that more than 5,100 miles of streams are impacted by AMD. The abundance of mercury emitting coal fired power plants in the regions and the acidic conditions in southeast Ohio's streams provide the perfect situation for studying trends in the bioaccumulation of mercury in freshwater invertebrates.

While teaching at Denison Ebenezer plans to expand his research in southeast Ohio. He is very excited to be a part of the Denison community and enjoys the wonderful faculty and students that are Denison. ☺

Fall Fellows *cont.*

Biology is not just an academic subject; it's a way of looking at the world. It has influenced the way I interpret what's around me and how I approach learning opportunities since I was in grade school. When I was 16, my biology background affected the lessons I took away from an Introduction to Psychology class and channeled my career interests into the field of neuroscience. When I was 17, this frame of reference led me to take on my first self-directed research project in a university lab, which directed my interests toward a concrete goal—to become a researcher and professor. Thinking biologically has never been something I could turn on and off. It was, and continues to be, a part of who I am.

When I enrolled at Denison, I found I wasn't alone in living and breathing biology. I found that Denison's liberal arts focus cultivates interdisciplinary thinking among all its students, and that biology majors are encouraged to bring their life-sciences worldview to the table even in non-science classes. Within the biology curriculum, we are asked to use our biological thinking to grapple with real-world issues and critically examine controversial topics like animal research, global warming, and gene therapy. In my time here, I've grown in my ability to think biologically. I've been supported in three summers of biology research, I've been offered intellectually engaging coursework and, most significantly,



Rachel Stevenson '12

I've been provided with a network of critically thinking peers and mentors with whom to discuss ideas, try out skills and define my goals. Denison has not only sharpened the focus of the biological lens through which I view the world, it's also broadened my horizons. I'm excited to see where my biology degree will take me after graduation. ☺

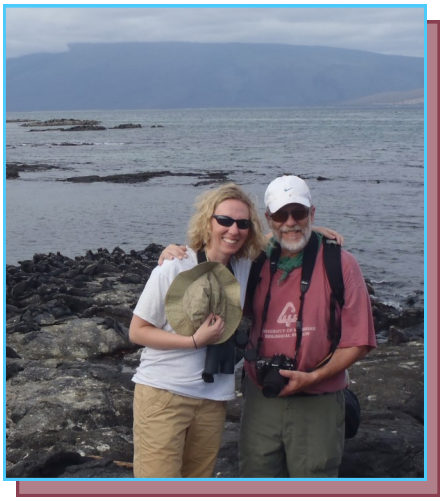
Hallie Singer '12

I have always had a passion for learning and it was during a summer camp in fourth grade when I first fell in love with science. I remember the teacher mixing different chemicals together and staring at them as they changed colors or overflowed from their container and it was this experience that made me want to learn how things worked and why they behaved the way they did. When I first learned about biology, it was no different. I was immediately hooked and it has fascinated me ever since. The simple fact is that biology is relevant to everything, from microorganisms invisible to the naked eye to large, complex animals. What fuels my passion for biology is that although there is an incredible complexity to living cells and the tissues and organs they make up, for the most part, everything works harmoniously together each and everyday. That is pretty impressive when you know the slightest little change can cause so much to go wrong!

My passion for biology has only grown since I have been at Denison. I have had multiple opportunities from TAing and tutoring other students to conducting summer research on V-ATPases and endangered iguanas. Furthermore, Denison has provided such a wide variety of classes from molecular biology and microbiology to evolution and ecology, which have provided me with a strong foundation for vet school. However, the learning I have gained at Denison was more then just in the classroom. The faculty of the biology department is also extremely passionate and is willing to make sure you know the material and answer any questions you may have. Some of my favorite memories are talking about biology with some of my professors just for fun! I am eager to continue studying biology and look forward to a career that embraces my passion for both learning and science.☺

Learning Together Again

Tom Schultz and wife Janet, took a "fact finding" tour to Ecuador and visited the rainforest of the Napo River Valley and the Galapagos Islands. They were joined by travel companions **Holly Menninger '00** and her husband, Dan Fergus, also a biologist. Highlights included pygmy marmosets, snorkeling with sea lions, and salt-snorting marine iguanas. That's Holly, Dr. Schultz, and the iguanas on Isla Fernandina in the Galapagos. Dr. Schultz also had the opportunity to improve his dance technique by watching blue-footed boobies do the real thing.



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Catch up on prior newsletters at www.denison.edu/academics/departments/biology/ The spring edition will be available online only.

The fall newsletter is available on paper & electronically. In the future, if you would prefer an electronic copy or no longer wish to receive any biology mailings, please send a message to **biology@denison.edu**.

BioReserve: Butterfly Garden!

Using alumni donated funds, the biology department purchased 46 native trees and shrubs (representing 18 species) for the new Tree Species Trail at the BioReserve. These trees and shrubs supplement the initial plantings of Spring '10, and bring the total number of native Ohio species to 45. Members of the DU Biological Society joined faculty and BioReserve manager Whitney Stocker in planting over half of the new trees and shrubs. A second event is scheduled for spring 2012 to finish the plantings.

Funds to create the new butterfly garden were generously donated by Denison alumna **Jerilyn Thornton '63.** The fenced in garden is a 25 foot square located at the front of the property near the ponds. 22 species of plants can be found in the garden, including different varieties of the same plant species. Thank you!

DUBS members Robert Stenger '13 & Chafi Samen '13 planting arrowwood viburnum (*Viburnum dentatum*).