Career Changers - Assistant genetics professors receive $1 million NSF Awards

Andrea Sweigart and David Nelson, assistant professors in the genetics department of the Franklin College of Arts and Sciences, each have been awarded grants from the National Science Foundation Faculty Early Career Development Program.

The five-year, $1 million grants support junior faculty who exemplify the role of teacher-scholars and the integration of education and research within the context of the mission of their organizations.

Sweigart is an evolutionary biologist who studies quantitative genetics and the processes that give rise to biological species, known as speciation. The grant will support further research on hybrid sterility, a subject whose origins go back to the time of Aristotle but which confused Darwin as it seemed to run counter to his concept of natural selection. Sweigart has spent years collecting data on the genetic basis and evolution of hybrid sterility in Mimulus, an ecologically diverse genus of wildflowers found west of the Rocky Mountains.

Nelson’s research focuses on how plants sense different signals in their environment, specifically one set of compounds found in smoke that stimulate seed germination after a fire, and another class of compounds called strigolactones that control root architecture, shoot growth and stimulate interaction with beneficial fungi in soil. While the two compounds are different, Nelson’s research uncovered a common element: both signals control plant growth through the same genetic pathway.

“The CAREER awards are among the NSF’s most prestigious. They are designed to identify the best and brightest up-and-coming scientists,” said Allen Moore, professor and head of the Genetics Department. “Our department is thrilled to have two award recipients this year, which replicates our success in 2012.

see Career page 5
graduate coordinator

It is difficult to identify the best goals for a graduate program when we are so accustomed to success! This year, two of our students – Jessica Hoffman and Elizabeth Lowry – were awarded NSF doctoral dissertation improvement grants. Of course this is a fantastic achievement, and evidence of the training that has gone into their development of a good project, a means to communicate that project to the reviewers, and an understanding of what it takes to make good science happen. And we had two students last year with the same national recognition and exposure to their work, and we have at this point a long-term track record of success that leads to an expectation for such success.

This year we have had four of our past doctoral graduates – Jeff Ross-Ibarra, Judith Mank, Adam Jones, and Roger Deal – visit to talk about the work they are doing as young faculty at some of the top universities in the world, and we are doing what we can to expose our current graduate students to their ideas and perseverance. We are always proud of the training we provide to young scientists at UGA Genetics, and this year one of our goals is improving the exposure our program gets to applicants, and improving the recruitment of top-quality students for our program.

But the training that we provide goes far beyond solid coursework and good resources. It requires constant, and repeated, interaction. By enforcing an annual frequency of a student presenting their work for all to see, and annually having a meeting with their committee, and participating in informal seminar series regularly, we accomplish two things. First of all, what most people focus on are the exciting new findings in a project, what comes from a year of addition: see grad coordinator page 5

The goal of a distillery is to separate a desired product from a jumbled mess, much like the goal of a Ph.D. program is to produce a highly trained scientist from the jumbled mess that enters the program. The best qualities that the budding scientist has are purified, concentrated, and then developed in a variety of ways. While the curriculum and research components rigorously increase the proof and quality of a graduate student, the environment of a department, much like the type of barrel a whiskey is aged in, is crucial for the outcome. These extra features of a graduate program make a student unique and marketable.

One such feature is the development of communication skills. Genetics graduate students can meet an accomplished scientist virtually every week through the departmental seminar series. This allows us to practice interacting with scientists both within and outside our own disciplines, and gives us ideas about the future—what we want to work on, where we want to do it, and with whom. We had several speakers this year that were former UGA genetics Ph.D. students. Among them were Jeffery Ross-Iberra, Joe Williams, Judith Mank, Claude dePamphilis and Rongfu Wang. Having the opportunity to meet with alumni who have been successful is encouraging and helps put how we are developing as future investigators into perspective.

We also have been very lucky with our graduate student invited speakers for departmental seminar. This year we were visited by Lee Dyer (University of Nevada, Reno), Adam Jones (Texas A&M University), and Joaquin Espinosa (University of Colorado). Next year will be another exciting series, as we will be visited by Allen Orr (University of Rochester), Eugene Koonin (NIH/NCBI), and Michael Lynch (University of Indiana).

The impact fellow graduate students can have on the development of a scientist can’t be overlooked. Several aspects of the Genetics Department facilitate important discussions, camaraderie, support, and sometimes-even discourse. For one, many of us go to conferences together. Evolution and South-eastern Population Ecology and Evolutionary Genetics (SEPEEG) were highly attended, and our graduate students did well with awards: Caitlin Conn won best talk and Matt Zuellig took home best poster.

Many students participate in outreach activities throughout Athens and the surrounding area. A few of the many examples include a weekly plant science lesson initiative at Hilsman Middle School, judging in the Georgia Science and Engineering Fair, and a science project mentoring program at Colham Ferry Elementary. Every week we listen to and critique a different student’s research in a student seminar course. We also have been tasked with delving out departmental travel grant funds amongst ourselves. A graduate student panel evaluates applications for a competitive travel grant, which gives us further experience in communicating and interpreting research; the winners, in turn, get to have an enriching scientific adventure. These experiences allow us to learn from one another and shape each other into collaborative scientists.

Now for the fun stuff, this year has see graduate page 4
news | undergraduate coordinator

Nineteen undergraduates and their families attended our Spring 2013 graduation celebration, and we were honored to have Dr. Cornelia Bargmann (BS ’81) as guest speaker. As a UGA undergraduate, Dr. Bargmann began her research career in the labs of Drs. Wyatt Anderson and Sidney Kushner. She received a PhD from MIT and joined the faculty of the University of California – San Francisco in 1991. Since 2004, Dr. Bargmann has been at Rockefeller University, where she is the Torsten N. Wiesel Professor and Head of the Lulu and Anthony Wang Laboratory. Among her numerous awards, Dr. Bargmann has been a Howard Hughes Medical Institute investigator since 1995, was elected to the National Academy of Sciences in 2003, received a Breakthrough Prize in Life Sciences in 2013, and co-chairs the BRAIN Initiative, a 12-year research program launched by President Obama. Dr. Bargmann is truly one of the most distinguished alumni of UGA, and she gave a fascinating and inspiring talk about her journey as a scientist.

The Cynthia Kenyon Outstanding Undergraduate Award was announced at the ceremony. This annual award is named in honor of another distinguished UGA alumnus and is based on achievements in academics, research, and leadership. For only the second time, the 2013 award was given to two students, Spencer Mitchell and Drexel Neumann.

During the last year, an unusually high number of our undergraduates have been accepted into competitive research programs and selected to give research presentations. Megan Chesne, Austin Garner, Emily Fawcett, Jennifer Pal lansch, and Stephanie Wilding received summer CURO fellowships. Katha rine Korunes, Phillip Ogea, and Andrea Walens participated in summer programs at the U. of Wyoming, Columbia U., and Memorial Sloan Kettering, respectively.

Presentations at the Spring 2014 CURO symposium were given by Caroline Blatcher, John Brunson, Joshua Chang, Megan Chesne, Sarah Cunningham, Vict oria DeLeo, Anquilla Delevaux, Lauren Dennison, Emily Fawcett, DeJuana Ford, Austin Gar ner, Philip Grayeski, Devon Humphreys, Lisa Ishii, Piyush Joshi, Nikhil Ka math, Francine Katz, Kyung Min Ko, Jacob Kumro, Melissa Masserant, Jennifer Pallansch, Hannah Reiss, Brianna Stadsvold, Solomon Walker, Amy Webster, and Stephanie Wilding. Presentations at regional and national meetings were by Austin Garner, Katharine Korunes, and Stephanie Wilding (National Conference for Undergraduate Research); DeJuana Ford and Andrea Walens (American Association for Cancer Research); Devon Humphreys (Southeastern Population Ecology and Evolutionary Genetics conference and Evolution 2013); Ronke Olowojesiku (Emory University STEM Research and Career Symposium), and Stephanie Wilding (Society of Toxicology).

Being included as a co-author of a publication is a major achievement for an undergraduate. Philip Grayeski, Amy Webster and three former students (Michael Bray, Catherine Debban, and Erin Giglio) are co-authors of papers from research at UGA. Spencer Grimm is co-author of a 3D interactive textbook.

Other research awards and recognition for leadership were received by Victoria DeLeo (CAES Undergraduate Research Initiative grant), Devon Humphreys (Best Undergraduate Talk award, travel award to a national meeting, and Honorable Mention for an NSF Graduate Research Fellowship), Nakul Talathi (William Moore Crane Leadership Scholarship), Brandon White (Student Advisory Board for the Dean of

head’s note

As I come to the end of my first 3-year term as Head of Department (has it really been 3 years??), it is interesting to reflect on the accomplishments and changes that have occurred over this time. First and foremost, the Department of Genetics is in great shape. We have a terrific staff, talented researchers, engaged course instructors, and transformational educators. I think we are on an upward trajectory, and I’m delighted to be able to report all of the good news.

Many of the Genetics office staff are new, compared to when I arrived. Darlene Strickland, Tina Weidemann, and Cheryl Gantt-Nelson in the main office were here before me, but Cecily (finance), Michelle (finance), Beverly (UG education) and Lacey Tench (grants coordinator) are new. Susan White has been in the department, but she has a different job from when I arrived as the Graduate Secretary. Dave Brown remains as our IT professional (and I wouldn’t trade him for anyone), and Carmen Rodriguez continues to provide support for the Undergraduate Laboratory courses. Beyond the personnel, however, we have created a new atmosphere in the Department. Rather than the typical “gatekeeper” role for staff (telling people what can and cannot be done), the people in the office see themselves as facilitators. Their job is to try and help you accomplish what you want to get done. This philosophy applies to support for students, faculty or other staff. Genetics remains a fantastic place to work.

The support staff is among the best in the University, and they support one of the finest teaching and research units at UGA. Our undergraduates continue to achieve and graduate to exciting new areas. They clearly take advantage of being at a major research university, and are engaged in ongoing research projects in laboratories both within the Department and in other life sciences departments on campus. At the recent CURO (Center
**Hightower Award**

The Hightower Awards are funded by one of the earliest alumnae, Dr. Robin Hightower. Hightower earned her PhD in Genetics at the University of Georgia in 1985. Starting in 2011, she decided to give back and support future generations of UGA genetics students. Madhumati Mukherjee and Matt Zuellig were named the 2013-2014 Robin Hightower Award winners. Madhumati received this award based on her work on “Elucidating the role of CRL2LRR-1 in regulating Notch signaling in Caenorhabditis elegans vulva development” and Matt for his research: “The Evolutionary Genetics of Hybrid Lethality in Mimulus guttatus and M. nasutus.”

A member of Ed Kipreos’ lab, Madhumati’s dissertation focuses on understanding the role of the cullin-2 ring ubiquitin ligase (CRL2) and its substrate recognition subunit LRR-1 in regulating Notch signaling in the nematode model system Caenorhabditis elegans. The Hightower Award made possible Madhumati’s trip to the 19th International C.elegans meeting in University of California, Los Angeles. Madhumati said, “As a 3rd year doctoral candidate I was able to connect with eminent researchers in the C elegans field from all over the world. Talking to them and attending the various seminars broadened my understanding of my project and gave me fresh new ideas that I have since implemented in my project. I am extremely grateful for the Hightower award as it helped me expand my research horizon, connect with geneticists from all around the world and to present my research to the C. elegans community.”

Matt works in Andrea Sweigart’s lab, where he studies the evolutionary and genetic basis of traits that contribute to reproductive isolation between two closely related plant species, Mimulus gullatus and Mimulus nasutus – otherwise referred to as common yellow monkeyflowers. His research is to identify genes that have allowed these two species to diverge form a common ancestor and become new species – helping to answer a question that Charles Darwin is famous for asking “how do new species evolve?” Matt wrote to Dr. Hightower thanking him by saying, “My research requires me to genotype large numbers of plants in order to identify genes involved in the speciation process, which is an expensive undertaking. The Robin Hightower Award has helped to offset some of these costs and has given me some freedom in projects that I pursue within Dr. Sweigart’s lab. Aside from a certain degree of financial independence, your wife’s award also forced me to think about important questions in my field and compose a compelling argument for why we should pursue one of those questions – an act that forced me to think independently and outside the box. It is for both of those reasons that I want to thank you for your kind support!”

**Bishops...from page 1**

After being awarded Jessica said, “I was extremely grateful to receive the Bishop fellowship for the 2013-2014 academic year. The award will enable me to attend the Evolution conference in June 2014, where I will present my research on determining how aging is influenced by different genetic and metabolic factors. Presenting at this conference will allow me to improve my science communication skills and find new collaborators to work on future projects.”

The Bishop Graduate Fellowship also will benefit Jenna’s professional development. She said, “This summer, I will be presenting a chapter of my dissertation at the Society for the Study of Evolution national meeting. Attending and presenting at a conference is invaluable at this part of my career. Networking, while at a conference, is one way to potentially discuss new research avenues and establish valuable professional collaborations. I am grateful for the opportunity the Bishop fellowship will aid in my attendance at this meeting. In addition, part of the funds will allow me to attend a symposium to celebrate one of the leading population geneticists. This is a two-day intensive course learning about new developments in the field of population genetics. I am truly appreciative of the Bishop fellowship, as it will provide the means for the betterment of my career.”

Joe Groom and Megan Behringer
undergrad...from page 3

the Franklin College), and Amy Webster (Summer Research Program at the Max Planck Institute in Dresden, Germany). Of note, Amy also received the 2014 Barry M. Goldwater Scholarship, the most prestigious undergraduate science honor in the US. This year, our department is one of the few to have three Goldwater scholarship recipients enrolled at the same time; Victoria DeLeo (2012), Philip Grayeski (2013), and Amy Webster (2014).

To date, 18 of the 2014 graduates have been accepted to post-baccalaureate programs: Vinay Choksi and Anisha Hegde (U. of Virginia), Philip Grayeski (U. of North Carolina – Chapel Hill), Nikhil Kamath (U. of Arkansas), Jennifer Pallansch (Case Western Reserve U.), Kristine Sufrak and Stephanie Wilding (Medical College of Georgia), and Nakul Talathi (U. of Pennsylvania) will enroll in medical school; Caitlin Austin and Hailey Campbell (Emory U.), Devon Humphreys (U. of Texas at Austin), Katharine Korunes and Andrea Walens (Duke U.), Khailee Marischuk and Katie VanDenHeuvel (U. of Wisconsin-Madison), Alyse Ragauskas (U. of Tennessee), and Caroline Thomsen (Virginia Commonwealth U.) will enroll in graduate programs; and Ronke Olowojesiku will enroll in a Post-baccalaureate Intramural Research Training program (NIH).

Our undergraduate program continues to grow and prosper. Enrollment in our large courses (GENE3000 and GENE3200) is at an all-time high and we have one of the fastest growing majors in Franklin College. We also have a new annual award for the Outstanding Thesis by a graduating major. Along with the Kenyon award, this new award reflects the high caliber of past, current, and future undergraduates in our department. Recipients of both 2014 awards, along with accomplishments of the next group of talented undergraduates, will be included in the next newsletter.

Mary Bedell

Tyler Haeffs (BS ’13) is interning as a surgical assistant for Dr. Robert M. Fryer, D.D.S. in Atlanta and will attend Harvard School of Dental Medicine in the fall of 2014.

Curtis Hendrix (BS ’13) is attending medical school at Mercer University.

Grant Moody (BS ’13) is attending medical school at the Medical College of Georgia.

Drexel Neumann (BS ’13) is a lab manager at Omni International in Nashville.

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all work in the lab, or millions of next-generation sequence reads, or a field experiment. I think the second thing we gain from seeing a project as it grows and builds, and seeing it repeatedly, is a chance to discuss the basic components again and again and again.

By the time a student leaves the Department of Genetics, they should have seen more than a hundred varied presentations of how genotypic data can be used to determine whether there is limited migration, or some form of adaptation, that separates individuals at different locations on the map. They should have seen the results of innumerable experiments that isolate the effect of excluding a component of a genetic pathway, and what it does to the development of an organism, or the enzymatic output of that pathway. That repetition is not mundane, it is practice. Similarly, when faculty interact with a project repeatedly through committee meetings, annual presentations, and so on, we gain in the ability to immediately sniff out concerns with the data, the experimental design, or the time that may be involved to resolve a project.

So it is a funny thing about training future scientists: we put a lot of effort into a curriculum that defines the state of the art of genetic research - including cell signaling, gene interactions, dynamics of alleles through space and time, and how to deal with gigabytes of genomic data efficiently. But the success of our students comes from seeing the less exciting parts over and over and over again, just like learning a language or apprenticing with a crafts-person. That means that the goal of our program, effectively, is to become fluent in the language and ideas of genetic experiments, statistical analyses, and bioinformatic methods, far beyond the limited goals of a dissertation. As long as we keep doing that well, I figure we’ll keep having great success stories among our graduate students. John Wares

career...from page 1

In addition to being outstanding researchers, all four faculty have undergraduate researchers in their laboratories, thereby exposing our students to the very best evolutionary and molecular genetics research,” he added.

Sweigart and Nelson join Kelly Dyer and Douglas Menke as recipients of the NSF CAREER award from the Genetics Department since 2012.

CAREER grants allow young faculty members to solidify their research programs and progress toward scholarly publishing. The program includes an educational component, for which Nelson and Sweigart have teamed with other UGA faculty to develop new courses and materials.

Condensed from article by Alan Flurry, February 3, 2014, Columns.uga.edu
Friends of Genetics

We proudly recognize alumni and friends who have supported our academic programs from March 31, 2013 to March 31, 2014. We are grateful for the generosity of all of our donors. If your name is listed incorrectly or is missing, please e-mail tench@uga.edu so that we may properly acknowledge your generosity. To make a gift to the department, please refer to the gift form on page 7.

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Anonymous (2)
education environment. Jonathan Eggenschwiler (development of the nervous system) and Melissa Davis (epigenetics and breast cancer research) joined us two years ago. Melissa teaches in the new medical school curriculum, providing a link between our department and the medical school partnership here at UGA in Athens. Of course, Andrea Sweigart (evolution) and Dave Nelson (molecular genetics) joined us three years ago but both were hired before my tenure. I will point out, however, that both Andrea and Dave were awarded NSF CAREER awards this year. These 5-year grants are “the National Science Foundation’s most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research”. I think this describes our faculty and our department perfectly, and we are delighted to note that Andrea and Dave join Kelly Dyer and Doug Menke in holding active CAREER awards. Finally, we have offers out to individuals to join us as assistant professors in Molecular Ecology, Evolutionary Genetics, and Bioinformatics. By my count that is 5 new hires under my watch, and 8 (including me) that have been hired in the last three years.

Kelly Dyer was promoted to Associate Professor with Tenure this year, joining Dave Hall (Associate Professor with Tenure) and Rodney Mauricio (Professor) promoted last year, and Jessie Kissing (Professor) promoted two years ago. As Head of Department, I cannot take any credit for these accomplishments, but promotion is the ultimate accolade and I am proud that my colleagues have been rewarded during my tenure. Promotion is also a sign of the health of the Department. We don’t just hire, we grow in experience and accomplishments.

Yes, the future of the Department of Genetics looks bright. We continue to increase in size; our research is thriving, and our undergraduate and graduate programs expanding. The faculty continues to be recognized for excellence in both research and teaching. The staff is among the best anywhere, I am delighted that the faculty and the Dean have asked me to serve another 3-year term as Head of Department.

Allen Moore

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If you would like to make a pledge gift, please contact Ros Raley at rraley@franklin.uga.edu or (706) 542-3581.
## Awards & Honors

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## 2014 Distinguished Research Professors

The title Distinguished Research Professor was bestowed upon four faculty who are recognized internationally for their original contributions to knowledge and whose work promises to foster continued creativity in their discipline.

Allen Moore, a professor of genetics in the Franklin College of Arts and Sciences, conducts research that has had tremendous impact on the fields of quantitative genetics and evolutionary biology. He has led a highly successful and productive research program on the genetics of sociality, which analyzes various social behaviors, such as aggression, mating, altruism and parental care.

Insects have played a central role in elucidating the evolution of social behavior, and Moore has created extraordinarily robust insect systems that allow him to manipulate experimentally various social behaviors and to quantify the effects of those manipulations on genetic variation.

Moore has made an impact on the field of evolution by creating a quantitative genetic framework for analyzing such social behaviors.

Article by James Hataway, for information on all of this year’s winners, April 14, 2014, columns.uga.edu