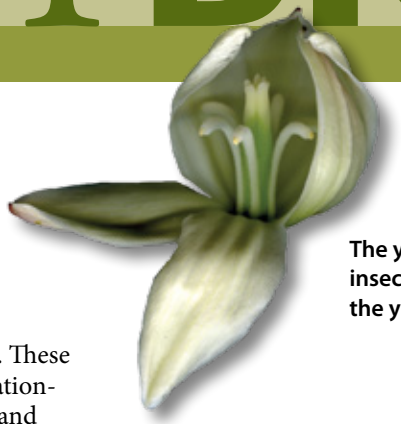
THE UNIVERSITY OF GEORGIA FRANKLIN COLLEGE OF ARTS AND SCIENCES

PLANTBIO

A DEPARTMENT OF PLANT BIOLOGY NEWSLETTER JUNE 2010

# Monocot Tree of Life

## Not Your Grandfather's Plant Systematics



The yucca flower is insect pollinated by the yucca moth.

Systematists have tried to understand how species are related to each other since Theophrastus, the father of botany, lived between the third and second century BC. Down through the ages, they have depended on comparing flower structure, stems and leaves to sort out relationships.

In the last 20 years plant systematists have added a dynamic tool to their toolkit—DNA sequencing. Thanks to the recent development of powerful high-through put technologies, also known as "next generation" technologies, researchers now have access to much more sequence data.

According to Plant Biology faculty member Jim Leebens-Mack, "the field of molecular systematics is taking full advantage of next generation sequencing technologies. In our **Monocot Tree of Life** project we are using these new technologies to sequence whole plastid genomes for a few hundred strategically chosen species and thousands of expressed nuclear genes for over fifty species. These data should allow us to resolve relationships among all monocot families and gain new insights into the evolution of morphological characteristics, life history traits and genome structure throughout monocot history."

Both Wendy Zomlefer, another Plant Biology faculty member participating in the **Monocot Tree of Life** project, and Jim, got hooked on studying non-grass monocot species, in the orders Liliales and Asparagales, respectively. Wendy's undergraduate days in Vermont helped forge her love of the liliaceous plants. After a long winter she would dream of spring and trilliums, Solomon seal and lily of the valley. For her these plants symbolized spring. Wendy, classically trained in plant systematics, has funding for student training in both molecular and morphological systematics. For Jim, the Asparagales, which include the orchids, irises, amaryllids, onion, agaves, yuccas and of course, asparagus, were fascinating. "As a postdoc I started studying the amazing obligate pollination mutualism between yuccas and yucca moths. Yucca moths have specialized mouthparts they use to collect yucca pollen and actively deposit it on yucca stigmas. This is not your typical insect pollination system! Female yucca moths place their egg in yucca ovaries before walking up the pistil and actively jamming pollen into the bowl-shaped yucca stigmas. In doing so, a yucca moth is promoting seed set in the pollinated flower and ensuring a food source for her seed-eating larvae." In his lab Ph.D students Jeremy Rentch and Michael McKain are continuing to investigate yucca evolution and diversification across the Agavaceae.

"As much as I love the Asparagales, we can't ignore the cereals in the Poaceae and their close relatives. Due in part to the work of Sue Wessler, Andy Paterson, Kelly Dawe, Katrien Devos, Jeff Bennetzen and others at UGA, the Poaceae has become the premier model for understanding plant genome evolution. In addition to resolving family-level relationships, the **Monocot Tree of Life** project is estimating the timing of genome duplications and changes in gene content within the Poales and throughout monocot history," Jim said.

The **Monocot Tree of Life** project involves plant systematists around the world in developing a comprehensive understanding of relationships among all plant species from algae to angiosperms.

**Jim and Wendy admire the century plant in the PBIO greenhouse.**

The **Monocot Tree of Life** project is part of the **iPlant Collaborative**. For more information visit, www.iplantcollaborative.org.


**Jenny Cruse-Sanders is the director of research and conservation at the Atlanta Botanical Garden.**

# Of Plants, Cocktails and a Frog Seranata

## A Visit with Jenny Cruse-Sanders

Our alum Jenny Cruse-Sanders is now the director of research and conservation for the Atlanta Botanical Garden (ABG) and we couldn't be prouder. I recently visited Jenny at the ABG and got a behind-the-scenes tour.

Jenny directs conservation research on rare plants and amphibians. This is a team effort that includes amphibian scientist Dante Fenolio, and amphibian specialists Mark Mandica and Robert Hill. They focus on both *in situ* and *ex situ* approaches to conservation as well as developing training opportunities for undergraduate interns.

Jenny was quick to credit the education and mentoring she received at UGA for providing the foundation for her job. Her M.S. in 1997 was with David Giannasi doing a floristic survey of Currahee and Soapstone mountains near Toccoa, Georgia. The unusual plant communities in this area included rare species like federally endangered *Echinacea laevigata* (smooth purple coneflower) and the rare orchid *Hexalectris spicata*. Jenny's Ph.D. was directed by Jim Hamrick and involved the study of evolutionary impacts of ginseng harvesting in the mountains of the Southern U.S. During her graduate student days she also worked with Jim Affolter, Director of Research at the State Botanical Garden of Georgia, as an intern for the Georgia Plant Conservation Alliance (GPCA). Her training with the GPCA and graduate research gave Jenny an opportunity to work with multiple state and federal agencies, partnerships which are important for her current position. As a graduate student she also began researching evolutionary patterns within a semi-domesticated cactus in Central Mexico. This project was later funded by NSF and became a collaboration with Kathy Parker in the Geography Department at UGA. From Athens, Jenny moved to Claremont, CA where she did a post-doc in the molecular biology laboratory at Rancho Santa Ana Botanic Garden. Next, Jenny joined the faculty at Salem College in Winston-Salem, NC and directed the Salem College Herbarium (listed by Index Herbariorum as the oldest herbarium in the U.S.). Her graduate work and post-doctoral experience made the perfect fit for her position at the ABG.

Keeping the PBIO UGA connection, Jenny is currently working on a project with Russell Malmberg and Will Rogers. "It's really nice to have UGA and ABG collaborating on research. The project focuses on recovering rare species of *Sarracenia*, insect-eating pitcher plants," said Jenny. On my tour of the ABG Jenny took me to see a greenhouse full of pitcher plants. She also showed me a new research lab, the library and the tissue culture facility. A highlight of any trip to ABG is the Fuqua Orchid Center (FOC), an astounding showplace where orchids are safe-guarded, grown from seeds and shared with other institutions. In the FOC, lush habitats have also been created to display the frogs. The search for the tiny creatures is especially fun for children.

**During graduate school days Jenny taught plant taxonomy to undergraduate students.**

Part of the tour included a trip to the Frog Pod, a cargo-shipping container modified into a laboratory for raising frogs at a cost of only $50,000, much less than building a laboratory from scratch. In this nursery space, the amphibian team is working hard to advance the science of captive species but getting the conditions just right has been a challenge. Jenny explained, "We've had to figure out the best foods, nutrients, and climate control. We share frogs with other gardens and conservation groups but do not reintroduce them into the wild." They hope the Frog Pod systems can be set up in other locations around the world.

Jenny plans to add a Science Café to the list of events at ABG. "It will be a monthly program that features a local scientist speaking informally about their work. It will be modeled on the popular Science Café that happens at Manuel's Tavern in Virginia Highlands where one Saturday a month they bring in a scientist to speak. The place is packed and people are listening and asking good questions. Creating a culture of science is a huge part of our mission", said Jenny.

Jenny's life outside the garden is shared with her husband Darby Sanders who works for Georgia Public Broadcasting, five-year-old daughter Tallulah Rose, who loves school, visiting the Garden and the High Museum, and new twin daughters Estella Fay and Luna Dorothy. Jenny, Darby and Tullulah enjoy the events and exhibits at the Garden. "I encourage everyone to attend Cocktails in the Garden, a social event that happens every Thursday night from May 6 – September 30. The garden looks different at night and the frogs in the conservatory are loud," Jenny said smiling, "and be sure to say hello if you're visiting the Garden."

**To learn more about the garden visit www.atlantabotanicalgarden.org**

**Jenny working with Will Rogers in Russell Malmberg's lab at UGA.**


**The climate controlled Frog Pod is a nursery for rare and endangered species.**

# Q&A

# California Dreaming

## Saying Goodbye to Sue Wessler and Catching Up with Her Former Student, Dawn Holligan Nagel

*Interviewed by Beth Richardson*

**Sue Wessler (seated fifth from the left) shares a serious moment with her class. Her daughter Becca (first on the left) will start at Scripps College in the fall.**

**Q** Sue, after 27 years at UGA, you will soon be moving to Southern California and even though it is a tremendous loss for our department everyone is really happy for you. Are you setting up a new lab and teaching classes? New household?

**A** Thank you. My startup package at UC Riverside will allow me to continue my research program and to expand my teaching program. My lab will be in the brand new Genomics Building which has an open-lab design. I will be sharing a large lab with Natasha Raikhel. Ironically, I met Natasha when I arrived at UGA in 1983, and she learned molecular biology in both my lab and in Joe Key's.

UC Riverside is renovating the first floor of a building next door to the Genomics Building for my teaching facility where I can double the number of students that take my Dynamic Genome courses (which were developed with my HHMI Professor Award at UGA). In addition, I was given a second faculty position for a scientist/science educator so that the two of us will comprise a unique faculty team focused on training the next generation of science educators.

With regard to where I will live, the plans are to build a house with my partner Shelly Schuster, he is president of the Keck Graduate Institute, on a gorgeous lot in the foothills of the San Bernardino Mountains. We plan to build a small solar-powered modern home surrounded with desert plants. We will have extra bedrooms for family and friends.

**Q** Were you originally hired at UGA by Gary Kochert? Were you one of the first women hired?

**A** I was actually "hired" into a position that was given to Joe Key when he stepped down as head of the Biology Division. I interviewed in three departments (Genetics, Biochemistry and Botany) and chose Botany. Gary was the department head and I still remember seeing him standing there when I got off the plane with a sign that said "Waxy Locus". This was when you could still go to the gate, and I remember thinking that people getting off the plane must have been thinking what poor person had a name like Waxy Locus!

I was not the first woman in the department – Judy Jernstedt was here when I arrived. The department was also great back then. I recall the fourth floor was Greg Schmidt, Joe Key, Gary Kochert, Glen Galau and of course, Alan Jaworski who had the lab next to mine. Russell Malmberg came a couple of years later. Then there was Mel Fuller who I remember very well. He was a hoot!

Overall the department was incredibly supportive and Gary especially protected my research time before tenure. Time has passed incredibly quickly. Soon I was the senior person trying to protect the research time of my "junior" colleagues.

**Q** How many theses and dissertations have you supervised? Was the mentoring process easy for you?

**A** Four Masters of Science degrees and 16 Ph.Ds. Mentoring is never easy, but it is worth it. It is my favorite part of the job.

Sue Wessler circa 1985.

Alex Nagel and Dawn Holligan Nagel.

Dawn Holligan Nagel in the lab.

**Q** In this article we are also featuring your former graduate student Dawn Holligan Nagel. Dawn was in your lab for many years as both a student and as a technician. I realize it is hard to single out one student, but would you comment on her time in your lab?

**A** Dawn wasn't just a graduate student in my lab. She started as an undergraduate worker and did such a fantastic job orchestrating the lab's move from the Life Science Building to Plant Sciences that I hired her as a technician after she graduated. She then became a project coordinator and then a graduate student. Finally, she spent her last few months before moving to San Diego as a postdoc! Dawn and I were together ten years. The good news is that she will only be 90 minutes away from my new home!

**Q** If you had one wish for the PBIO department, what would it be?

**A** That it continue to be the sort of place where people want to spend most of their career.

**Q** Will you be taking surfing lessons?

**A** Not at my age! Shelly and I have been commuting for 10 years. We are both looking forward to just hanging out at home without having to go through Hartsfield–Jackson. Even better, both of my daughters will be living in the same town (Claremont). Nicole, now 25, is in her first year of Osteopathy School at Western University in Pomona and Becca, now 17 and in her senior year at Athens Academy, was just accepted to Scripps College (one of the Claremont Colleges), so we will both be heading west in August/September.

## Meet Dawn Holligan Nagel

**Q** Dawn, you received your undergraduate degree in 2000 at UGA in Biology, and then you decided to do graduate work in the Plant Biology Department in 2001. Who helped spark your interest in plants and genetics?

**A** Susan Wessler and the years spent in her lab as an undergraduate student and technician. Her excitement and enthusiasm about her research was very influential on my decision to become a graduate student and pursue a scientific career.

**Q** You were a student, and at times, a technician in Sue Wessler's lab. Tell me about the mentoring you received from Sue and the scope of your project. Are you continuing that research today?

**A** Sue is an outstanding scientist who cares deeply about the success of her students and postdocs. So my success today and that of her former students are a result of the excellent mentoring received while in her lab. I think that her confidence in my ability to succeed and constant guidance was truly instrumental in my scientific growth. She absolutely refused to give in to mediocrity and as such helped me to realize my full potential.

As a graduate student, I worked on understanding the impact of transposable elements in eukaryotic genomes using a combined computational and experimental approach. Presently, I'm a postdoc in Dr. Steve Kay's lab at University of California, San Diego, working on the molecular basis of the circadian clock in higher plants.

**Q** Any advice/life lessons you'd like to share with our current graduate students?

**A** Always do something that you are passionate about.

**Q** What are you and Alex doing for fun in sunny Southern California?

**A** Well, we've been living in San Diego for about eight months and of course the weather is absolutely spectacular. Since we have pretty much the ocean, mountains and desert at our doorsteps, we've been doing a lot of outdoor activities. So far we have spent a lot of time hiking the many beautiful trails here. For example, we've taken day trips to the famous Joshua Tree National Park, Laguna Mountains and the Anza Borrego Desert. We've recently taken up mountain biking, though I'm not sure how much longer I'll survive that. Surprisingly, though we spend a lot of time at the beach, neither of us have any intention of taking up surfing.

# GRADUATE STUDENT AWARDS


DEEN


GEVAERT


GROMALLY

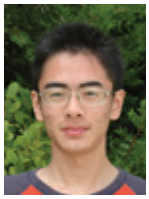

HAN


LYNCH


PREVOST


RODRIGUEZ


SUGIYAMA


TANG

**Deen, Cecile** - *Chang Lab*
Highland Biological Station's Charles W. Ash Memorial Scholarship, 2009
Departmental Palfrey Small Grant, 2009
PBGSA Research Assistance Award 2010

**Estep, Matt** - *Bennetzen Lab*
2nd-place talk PBGS Symposium, 2009

**Estill, Jamie** - *Bennetzen Lab*
1st-place talk PBGS Symposium, 2009

**Gevaert, Scott** - *Donovan Lab*
Departmental Palfrey Small Grant, 2009
1st-place poster PBGS Symposium, 2009
Outstanding Teaching Assistant, 2010

**Gormally, Cara** - *Donovan Lab*
National Estuarine Research Reserve Graduate Fellowship, NOAA, 2007-2009
Wilbur Duncan Award for Outstanding Plant Biology Graduate Student, 2009
K. Patricia Cross Future Leaders Award
Excellence in Teaching Award, 2009

**Han, Yujun** - *Wessler Lab*
2nd-place poster PBGS Symposium, 2009
Winner of the cover art competition at the Maize Genetics Conference, 2009
Outstanding Teaching Assistant, 2009

**Kanizay, Lisa** - *Dawe Lab*
Departmental Palfrey Small Grant, 2009

**Lynch, Patrick** - *Zomlefer lab*
Jaworski Travel Award, 2009
Georgia Native Plant Society Grant
Georgia Botanical Society Marie Mellinger Field Botany Grant, 2009

**Mason, Chase** - *Donovan Lab*
GSA 2009-2010

**McKain, Michael** - *Leebens-Mack Lab*
Jaworski Travel Award, 2009
3rd-place talk PBGS Symposium, 2009

**Prevost, Luanna** - *Peterson Lab*
Selected for the 2009-2010 Graduate School Emerging Leaders Program
Outstanding Teaching Assistant, 2009

**Rodriguez, Yainitza** - *Momany Lab*
ASM Robert D. Watkins Graduate Research Fellowship, 2006-2009

**Shirk, Rebecca** - *Hamrick Lab*
NSF GRFP Fellowship, 2009-2012

**Sugiyama, Anna** - *Peterson Lab*
Organization for Tropical Studies Research Fellowship Program, 2009
Las Cruces Restoration Workshop Graduate Research Grant (NSF), 2009
Outstanding Teaching Assistant, 2010
PBGSA Research Assistance Award 2010

**Yai Hernandez-Rodriguez, Scott Gevaert, Lisa Kanizay and Brunie Burgos at the PBGSA herb sale. Funds are raised for graduate student awards.**

## Got Plants? PBGSA goes greener!

Last year the Plant Biology Graduate Student Association (PBGSA) initiated the PBGSA Research Assistance Awards (RAA). They continue to raise funds for these awards by selling herbs (and this year plants, too) in the spring time and by holding a silent auction of donated gifts and artwork during the Holiday Party. In 2009, these events raised $1700 and $575 respectively. The 2010 herb and plant sale was held on Thursday, April 22 on the greenway in front of the Plant Sciences Building. They raised $1000 to offer two $500 awards in 2010. The RAAs were presented on May 13 to Cecile Deen and Anna Sugiyama. Congratulations Cecile and Anna!

PBGSA thanks everyone for their support!

# NEWS BRIEFS

**Peggy Brickman** (left) **and Paula Lemons** (right) congratulate **Cara Gromally** winner of the Wilbur Duncan Award for Outstanding Plant Biology Graduate Student.

**Lisa Donovan** was a 2009 Fulbright Scholar and visiting professor at Radboud University, Nijmegen Netherlands.

**Kathrin Stanger-Hall** was the 2009 recipient of the University of Georgia Sandy Beaver Excellence in Teaching Award.

PBIO department head **Michelle Momany**, **Carla Ingram** and **Garnett S. Stokes**, the Dean of Franklin College at the Staff Awards event. Carla received the 2010 Franklin College Staff Excellence Award. Carla will be retiring in June with 32 years of service to the department. She will be greatly missed by everyone in the department.
Best wishes Carla!

**Rebecca Sharitz** received the 2010 National Wetlands Award from the Environmental Law Institute.

**Wendy Zomlefer** was the 2009 recipient of the GAIA Award of Excellence in Botanical Illustration and Research from the Florida Society of Botanical Artists.

**Tang, Haibao** - *Paterson Lab*
Graduate School Doctoral Dissertation Completion Assistantship, 2009 & 2010
3rd-place poster PBGS Symposium, 2009

**Winger, Sarah Jardeleza** - *Farmer Lab*
International Society of Evolutionary Protistology Award for best student oral presentation.

**Zhou, Jianli** - *Ye Lab*
Outstanding Teaching Assistant, 2009

## HERBARIUM NEWS

**Donald J. Banks**

The GA Herbarium recently received a generous donation of $1,000 from alumnus Donald J. Banks, who received his Ph.D. from the Botany (now Plant Biology) Department in 1963 under Wilbur Duncan. He was, in fact, the first Ph.D. to matriculate from our department! His dissertation was on the taxonomy of *Paspalum setaceum* (Poaceae). Dr. Banks, now retired, had a career as a plant geneticist (peanut breeding and genetics) for the Agricultural Research Service of the U. S. Department of Agriculture at Oklahoma State University. He has very fond memories of his days at UGA and has maintained a long friendship with classmate Samuel Jones, former Director of the Herbarium. We are grateful for Dr. Banks' gift, which will be used to defray expenses for student projects in the herbarium.

*—Wendy B. Zomlefer, Director of the GA Herbarium*

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*Photo Credits:* Dawn Nagel courtesy of Dawn Nagel. Donald J. Banks courtesy of Donald J. Banks. B&W of Sue Wessler by Larry Hodge. All other photos by Beth Richardson.
*Dogwood Drawings*: Wendy Zomlefer, *Guide to Flowering Plant Families.* The UNC Press.

**ALUMS—Let us know what you're up to these days. Email beth@plantbio.uga.edu**

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