

# Wolfpack's Waggle

October 2016 Newsletter

NC State Apiculture Program

Dedicated to the dissemination of information and understanding of honey bee biology and management

Issue 4, October 2016



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## What have we been up to?

Summer is finally behind us, so this semester has been spent reflecting on what we were able to accomplish this past research season. We've had a parade of presentations at our weekly lab meetings on everyone's results, preliminary or otherwise. Hannah and Viki have made great strides in collecting pollinator samples from the NC Research Stations on their newly planted pollinator habitats, Parry continues to analyze the massive BIP virus dataset, Hongmei has been working diligently on her bioinformatics and new techniques in the lab, and Carl and James have been busily writing up the respective theses. Joe conducted a successful pilot experiment for his project on the effects of pesticides on queen quality, so he is poised to launch his project in earnest next spring. Of course, Jennifer has been doing a great job in getting the colonies ready for winter, and Deniz has been wrapping up the processing of samples and other projects in the Queen & Disease Clinic.



## BeeMORE initiative for undergraduate research

Our latest grant, funded by the USDA Research and Experiential Learning for Undergraduates (REEU) Fellowships Program, will help explore the importance of microbes in honey bee colonies.

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# New developments in the BEES network

Course enrollment predictably lower with increased overhead costs

The **BEES** network has officially moved to DELTA as of January 1, 2016, and is now including a 43% overhead on each person for each course. Perhaps predictably, this has resulted in a significant decrease in enrollment for the first half of the year: we're down 41.2% from the same period last year. We hope this trend does not continue and that enrollment will rebound later this year.

### Beginner level

- BEES 1.01: Basic honey bee biology and life history (1.66 hours)
- BEES 1.02: Introduction to beekeeping and hive management (1.95 hours)
- BEES 1.03: Importance of bees and beekeeping to society (1.71 hours)

### Advanced level

- BEES 2.01.02: Honey bee anatomy
- BEES 2.01.05: Queens and mating
- BEES 2.01.07: Foraging biology
- BEES 2.02.03: Pathogens, parasites, pests, and problems
- BEES 2.02.04: Varroa mite IPM
- BEES 2.02.05: Queen rearing and bee breeding
- BEES 2.03.01: Africanized bees
- BEES 2.03.07: History of beekeeping

**Sign up today @:**

<http://go.ncsu.edu/BEES>

## Lab spotlight: Hannah Levenson

**Hannah Levenson** joined our research group in the Fall of 2015 during her last year as an undergraduate at NC State, obtaining her degree in Environmental Technology and Design. She became interested in honey bees after working the summer prior at Smithers Vinscent, and

she's been hooked ever since.

We have been fortunate to keep her on board as a post-graduate research assistant since she graduated. While she has contributed to several projects in the lab and field, her main research has been



investigating the pollinator communities in the habitat plantings at the NCSU/NCDA research stations across the state. In this first year, she and her team have done a remarkable job at collecting samples from all across the state and identifying them.

# BeeMORE – Bees and microbes in organized undergraduate research and engagement



Undergraduate researchers from a former NSF-REU project in 2014. We hope to recapitulate the team-based research projects on microbes.

Microbiology and microbiologists will play a critical role in advancing food production and economic development around the world. American Academy of Microbiology reports emphasize the enormous economic impact microbiology will have on agricultural, environmental, biotechnology, and health initiatives in the near future (see: “How Microbes Can Help Feed the World, 2013”; <http://bit.ly/FeedTheWorldReport> and “Microb-Powered Jobs: How Microbiologists Can Help Build the Bioeconomy”; <http://bit.ly/1Q6t2lr>). In these important efforts, North Carolina State University is a regional leader that provides undergraduate (<http://bio.sciences.ncsu.edu/undergraduate/undergraduate-degrees/microbiology/>) and graduate ([go.ncsu.edu/microbiologygrad](http://go.ncsu.edu/microbiologygrad)) education programs that train students in critical thinking and problem solving involving microbes and their diverse roles. However, often only later in advanced training do students fully appreciate the beneficial

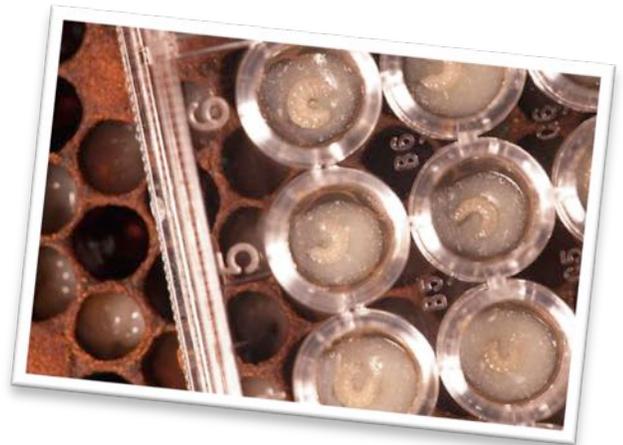
microbe-plant, microbe-animal, and specifically the microbe-insect interactions that promote agricultural productivity and environmental health.

The objectives of the proposed program are to have an intellectual and practical focus on honey bees and bee-microbe

interactions that introduces a cohort of students to the subject, prepares them for pursuing advanced degrees or industry and agriculture careers with the relevant technical skills, and prepares them for the interdisciplinary, team-driven approaches needed for success. As a concise overview, AFRI ELI program will be structured as follows:

i) Recruit participating students from HBCUs, Community Colleges, and from other Universities in the US and

Our latest grant from the USDA will facilitate a new initiative to recruit undergraduate summer researchers to develop and conduct research in how microbes are important to bee colonies.



We can study the interface between honey bees and microbes at the genomic, metabolomic, microscopic, and functional levels. Along with the participating faculty mentors, we aim to provide a wide array of different research experiences for the recruited undergraduates.

Puerto Rico to actively attract underrepresented groups in science to participate. We aim to have 75% of participating students come from off campus.

ii) Deploy a nine (9) week summer program that begins by teaching students the

## Undergraduate research (Continued)

foundational principles of bees, microbes and pollination, and skills germane to the research projects and future course work.

iii) Transition participants to mentored research in bee ecology, bee-microbe interactions, microbiological processes relevant to agriculture and insect populations, and other areas that 10 faculty mentors have committed to connect with the intellectual focus of the program.

iv) Hold weekly meetings to facilitate project updates, enhance student communication skills in science, and engage guests from academia, industry and associated partners.

v) Offer additional opportunities for the summer

participants that can include ongoing research opportunities (especially applicable for regional and NCSU participants), second summer or special term internships arranged with collaborating industries, and attendance to periodic seminars or topical sessions on the NCSU campus throughout the academic year.

Congratulations goes to Dr. Eric Miller in the Department of Plant & Microbial Biology and an expert in bacterial phage and microbial genomics and metabolism, as well we to Dr. Alexandria Graves in the CALS Office of Diversity and student affairs for getting this grant awarded and the initiative launched.

### NC State Apiculture Program

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Erin McDermott  
Hannah Levenson

Undergraduate Researchers  
Claire Collins (media intern),  
Christopher Juberg, Victoria Blanchard (UK exchange student)

## Support the NC State Apiculture Program!

*The Apiculture Science fund-raising efforts operate under the auspices of the North Carolina Agricultural Foundation, Inc. a 501(c)3 organization. You will receive an official receipt for your donation.*

**Make a gift toward emerging needs** – Consider supporting the program with a gift that would go toward the current area of greatest importance. Flexible funding enables the Apiculture Program to address critical needs as they emerge, often enhancing the program beyond what would be possible through restricted grant funding. Funding of any amount, from \$10 to \$10,000, will be extremely helpful.

**Make a gift-in-kind** – The Apiculture program is always seeking creative solutions to its material needs. If you have surplus equipment or other non-monetary assets to give (e.g., gently used honey extractors, microscopes, even vehicles), please consider donating them to the program. You will receive credit for the monetary value of the gift and the gratitude of our faculty and students.

**MAKE A DONATION**

**Make an estate gift** – If you are interested in planning an estate gift to benefit Apiculture, please let us know! We can provide you with the tools you and your attorney will need to ensure that your wishes are fulfilled. Please click the link above for more information.



## Check out our new website!

In conjunction with our department merger, we decided to update and move our program's website, which is now located at <http://ncsuapiculture.net>.

With a cleaner look and streamlined content, we hope this new look will be easier to navigate and enable us to include regular blog posts. Be sure to update your bookmarks!



## Video research awards to Parry and Joe

Dr. Parry Kietzman and Joe Milone both won their respective categories in a recent research competition at NC State. Applicants were asked to submit brief statements of their research, and several dozen were asked to then submit short videos for final consideration.

Both Parry and Joe did an excellent job and received small grants to further their research.

## Random notes

### Recent publications

Traynor, K. S., D. R. Tarpay, C. A. Mullin, J. L. Frazier, M. Frazier, J. S. Pettis, and D. vanEngelsdorp. (2016).

Pesticide exposome: assessing risks to migratory honey bees from pesticide contamination in the hive environment in the Eastern United States. *Scientific Reports* **6**: 33207. DOI: 10.1038/srep33207.

Simone-Finstrom\*, M., H. Li-Byarlay\*, M. H. Huang, M. K. Strand, O. Rueppell, and D. R. Tarpay. (2016). Migratory management and environmental conditions affect lifespan and oxidative stress in honey bees. *Scientific Reports*, **6**: 32023. DOI: 10.1038/srep32023.

Li-Byarlay, H., M. H. Huang, M. Simone-Finstrom, M. Strand, D. R. Tarpay, and O. Rueppell. (2016). Honey bee (*Apis mellifera*) drones resistant to paraquat exhibit increased tolerance, not avoidance or repair, of oxidative damage. *Experimental Gerontology*, **83**: 15–21.

### Recent presentations

Parry, Hongmei, James, Joe, and David all attended a recent conference in Orlando, FL. The International Congress for Entomology (ICE) was preceded by the bi-annual breakout meeting of the North American

section of the International Union for the Study of Social Insects (IUSSI).

Strange, J. P., D. A. Delaney, D. R. Tarpay, and R. R. James. (2016). Sixteen novel microsatellite loci for *Megachile rotundata* (Hymenoptera: Megachilidae) and related taxa. ICE Conference, Orlando FL. [POSTER]

Kietzman, P. M. and D. R. Tarpay. (2016). Identification of stop signaling in foraging honey bee (*Apis mellifera* L.) colonies. ICE Conference, Orlando FL.

Tarpay, D. R. (2016). Sustainability of honey bees through increased genetic diversity at the colony and population levels. ICE Conference, Orlando FL. [INVITED SYMPOSIUM]

Withrow, J. and D. R. Tarpay. (2016). Emergency queen selection in honey bees (*Apis mellifera*). ICE Conference, Orlando FL.

Li-Byarlay, H., M. Simone-Finstrom, M., M. Huang, M. Strand, O. Rueppell, and D. R. Tarpay. (2016). Oxidative Stress in Honey Bee Drones: Increased Tolerance Instead of Repair Damage. IUSSI Breakout Meeting, Orlando FL. [POSTER]

## Teacher's corner: Courses at NC State

This semester, our ENT 203 course, "An introduction to the honey bee and beekeeping", has regained traction and quickly exceeded the maximum enrollment of 180 students. Joe Milone is doing a great job TAing the course for the first time, and James Withrow is assisting for the third straight year. Regrettably, we will not be offering ENT 401 next semester because of changes to our newly merged department and policies about distance education courses, but we still hold out hope to revive the course someday.

<http://go.ncsu.edu/honeybees>



## Tarpy's back page

Autumn, and particularly October, is synonymous with the state fair here in North Carolina. When I first started my position in September 2003, I was on the job for only 2 weeks before I was informed that my position was the traditional judge of honey and hive products. Never having judged a honey show before at that point, I was fairly intimidated to say the least! Also, being so new, we didn't have anyone else in the lab at that point (including Jennifer, who wasn't hired until the following February), so I was practically flying solo. Many, many thanks that first year to the NCDA crew and others to help shepherd me along.

Fast-forward to today, we now make it a lab tradition to all help out with judging the exhibit entries (except for the extracted honey categories—that is left to out-of-state judges, not only because of the high volume of entries but also because it is perhaps the most politically charged). This year we had most everyone in the lab help out: Jennifer, Deniz, Erin, Parry, Carl, James, Joe, Hongmei, Viki, and I were all in attendance. In doing so, we teamed up and judged everything from the photography, to wax figurines, to comb and creamed honey. Usually, we save the mead tasting until after everything else has been judged, and we usually have a lot of fun doing so (as the picture on the front page will verify).

Times are changing, of course, and with our new departmental merger and de-emphasis on traditional extension duties, it remains unclear if we will continue to help out the NCDA with the state fair with judging. While it never has been an official part of my job description, it has been important to keep the connection to the beekeeping community. It will be unfortunate if we don't continue, however, as October just simply wouldn't be October without it.

Sincerely, David