



Featured Scientist: Dr. Ben Bahr

By: Dr. Jessica McCann, Duke University

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*What's going on in
the North Carolina
Academy of Science:*

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- Photos and reflections from the Annual Meeting
- Award winners!
- New CASCAS Officers

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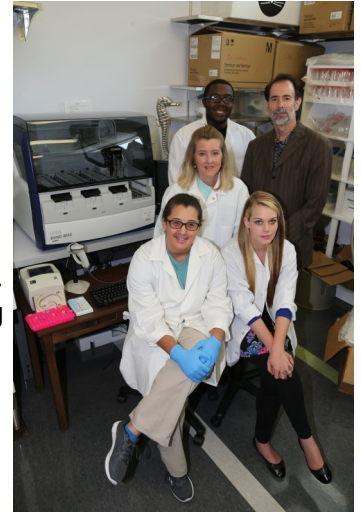
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For this issue of the newsletter, we are glad to share the conversation we had with Dr. Ben Bahr, the William C. Friday Chair and Professor of Molecular Biology and Biochemistry at UNC Pembroke.

It was probably inevitable that Dr. Bahr was going to be a scientist; he seemed to have been born one. His father was a rocket scientist, and Dr. Bahr described himself as a “space nut” from a very early age. During the space race, his father worked with companies like Lockheed that were building components of the early rockets. When NASA launched the Viking probes to Mars in 1975, Dr. Bahr cut and saved out all the newspaper articles he could find describing the mission. With his parents’ blessing, he attempted to make rocket fuel in his own back yard from pool chemicals, aluminum foil, and 50 cents of lab glassware from a YMCA tag sale. “I had my own mini-Hindenberg,” he said. He had planned to go to college and study the universe himself, but, “sometimes your decisions are made for you in life,” Dr. Bahr said. “I applied to 2 schools for undergrad – California Institute of Technology, where I was going to study cosmology, and UC Irvine. Well, CalTech didn’t take me, and at Irvine, I learned all about genetics and cell biology. My interests went from the universe and galaxies - tiny dots in the sky - to the brain and synapses - tiny dots along neurons that allow memory formation.”

Following a PhD and postdoctoral training in California, Dr. Bahr was hired as an Assistant Professor at the University of Connecticut in 1996. After a successful tenure that included a promotion to Professor and joint appointments in the departments of pharmacology and neurobiology, he made the move to UNC Pembroke in 2009. His research involves trying to understand how Alzheimer’s affects the brain early in disease, before symptoms arise, so that chances for treatment might improve. The other main focus in his laboratory is understanding how different risk factors are related to development of Alzheimer’s – risks like traumatic brain injury, stroke, or being subjected to nearby bomb blasts. Ultimately, he says, Alzheimer’s is a disease of protein accumulation, and these proteins have thousands, if not millions, of variations in how they accumulate or how they are decorated with other molecules. So the research is challenging, but his students are up for the challenge.

Throughout his career thus far, Dr. Bahr has trained over 130 undergraduates and has a publication record that includes at least 50 undergrad co-authors. When asked about his system for training undergraduates and moving so many successfully through the lab, he gave us some good advice. “Try not to overwhelm undergrads with information,” he said. “I was overwhelmed early in my career, and I almost stopped myself from going into brain



*Dr. Barr with some of his
research students.
Photo credit: Willis Glas-
gow*

Featured Scientist: Dr. Ben Barr

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research.” His PhD was spent studying the electric organ of *Torpedo californica* – an electric fish with a simple organ, dense in neuronal tissue made up of a single type of nerve cell. “The mammalian brain is overwhelmingly complex in comparison. When undergrads start in the lab, we start with ‘this is the front of the brain, this is the back of the brain. Neurons talk to each other, and we try to figure out what proteins are needed for neurons to communicate’. We keep it simple, to start, and they learn so much more as we go.”

Dr. Barr recently won two top UNC system awards: the O. Max Gardner Award for contributions to the welfare of mankind and the James E. Holshouser Award for excellence in public service. Dr. Barr was also recently recognized by the Mayor and The Town of Pamlico Council for the recognition he has brought to the town of Pamlico and the university for the groundbreaking research he has done to lead us to an eventual cure for Alzheimer’s.



*Dr. Barr instructs students in his lab.
Photo credit: Willis Glasgow*

Thank you! Institutions with CANCAS Group Memberships

By: Dr. Daniel Stovall, NC Wesleyan College

Campbell University

East Carolina University

NC Wesleyan College

Pfeiffer

Wake Technical Community College

UNC Pamlico

NC State University

Please remember to renew your membership for the 2018 – 2019 academic year in the fall semester! More details forthcoming in the September 2018

Access to the Journal

Have you had difficulty accessing the Journal?

Are you an NCAS member?

If this fits you, see the document attached to the email along with this newsletter. The document walks you through how to gain access to the journal, even if you have had trouble with access in the past.

Many thanks to our Meeting Sponsors!

See their logos on page 8.

NCAS News & Reports

Hundreds Enjoy Annual “Astronomy Days” Event!

Report by: Dr. Lisa Kelly, UNC-Pembroke

From the Curiosity Classroom on the third floor of the museum, the Academy engaged hundreds of children and their parents in science during Astronomy Days at the North Carolina Museum of Natural Sciences in Raleigh. The Saturday-Sunday event ran from January 27-28, 2018. The Academy’s exhibit theme, “The Quest for Extraterrestrial Life,” complemented the Astronomy Days theme of “Space Telescopes and Missions.” Activities included living water bears and vinegar eels, and games that featured genetic traits, extreme environments and plant-animal relationships. Once again the water bears were a big hit! We gave away roughly 140 genetics wheels, 100 Pinwheel Galaxy pinwheels, 130 seed planters, and 100 draw-your-favorite alien sheets. The museum’s visitor count was 14,064 people for the two-day event.



Maria Pickering (kneeling at right) and some of the many volunteers who helped in the Academy’s booth during Astronomy Days

This was a great example of public outreach. I offer special “thanks” to those people who personally volunteered their time: Maria Pickering (Co-Organizer), Karen Guzman, Shana McAlexander, Mark McCallum, Bill Schmidt, Hayley Byers, Briana Landis, Barbara Teague, Anyela Arroyo, Maria Ariza, Valerie Sadler, Madelyn Shoup, Sophie Lindem, Leah Spinner, and Amanda McClain. Many thanks go to Maria Pickering (booth co-organizer) for bringing microscopic animals and a dozen volunteers from Meredith College. Special thanks go to Kari Wouk and to the museum for assigning our booth to the spacious Curiosity Classroom and for providing several additional volunteers.



Hundreds of children (included the two pictured above) visited the Academy’s booth during Astronomy Days.

Congratulations!

Let’s congratulate our friend and colleague Amy Sheck for her recent recognition by the... [drum roll]....Board of Governors! Congratulations Amy! Well deserved!

Read the article highlighting this good news here: <https://www.ncssm.edu/news/2018/02/12/seven-instructors-win-2018-unc-bog-teaching-awards>

Bryden Awards

Report By Dr. Lei Zhang, Winston-Salem State University

Congratulations to **Radmila Petric** at UNC-Greensboro for winning a 2018 Bryden Grant! The project is overseen by Professor Martina Kalcounis-Rueppell and is entitled “*The Effects of Broadband Anthropogenic Noise on Deer Mouse (Peromyscus maniculatus) Behavior.*”

The following proposals received honorable mentions:

Spero Gbewonyo, NC A&T University (Advisor: Dr. Lifeng Zhang) for the project entitled “*Low thermal conductive carbon fibrous composite nanomaterial.*”

CANCAS Derieux Award Winners

Report by: Dr. Daniel Stovall, NC Wesleyan College and Dr. Beth Cauley, Campbell University

Congratulations to the 2018 Annual Meeting’s Poster Winners!

Category	Award	Name	Institution	Title
Botany, Ecology, & Environmental Science	3 rd Place	Angela Camacho & Kathryn Buchanan	Wake Technical Community College	DNA Barcoding in Species Identification: Family Theridiidae, Comb Footed Spiders
	3 rd Place	Gabby Downs	UNC - Pembroke	Biological Pesticide Application & Technology Utilizing <i>Heterorhabditis bacteriophora</i> and <i>Steinernema carpopsae</i>
	3 rd Place	Jacob Jackson	Gardner-Webb	Investigation to determine the amount of pre-consumer vegetable material from campus cafeteria that can be consumed by epigeic earthworm species <i>Eisenia fetida</i> in a vermibed
	2 nd Place	Nathan Patrick & Zachary Erlemann	Wake Technical Community College	Determination of the efficacy of the matK, rbcL, and ITS primers for coffee species identification
	1 st Place	Cheyenne Lee	UNC-Pembroke	Antimicrobial Effects of St. John the worker plant based Native American tea
Genetics & Physiology	3 rd Place	Tyler Scott	Nash Community College	Taxonomic perspective of <i>Eurycea guttolineata</i> and <i>Eurycea longicauda</i> based on mitochondrial DNA sequence
	2 nd Place	Nabiha Khan	Meredith College	Metabolic trend line of triglycerides post-consumption
	2 nd Place	Sarah Hammood	Guilford College	Metal/antibiotic pleiotropy and epistasis in <i>Escheria coli</i>
	1 st Place	Dalton Chapman	East Carolina University	Investigating the role of antimicrobial peptides on biofilm formation in <i>Streptococcus mutans</i>

CANCAS Derieux Award Winners (continued)

Report by: Dr. Daniel Stovall, NC Wesleyan College and Dr. Beth Cauley, Campbell University

Category	Award	Name	Institution	Title
Microbiology	3 rd Place	Wyatt Zander	Catawba	Exploring the effects of artificial sweeteners on gut-associated bacterial growth and metabolism
	3 rd Place	Sarah Dejarnette	Wake Technical Community College	The effect of paper type on <i>Dunaliella salina</i> growth
	2 nd Place	Kaitlyn Mizelle	Campbell University	Recombinant expression of a putative lignin degrading enzyme from <i>Paenibacillus glucanolyticus</i>
	1 st Place	Kaitlin Frey	Wake Technical Community College	Detecting carbapenem resistance in the environment
Chemistry, Engineering & Physics, Science Education	3 rd Place	Paul Mefford	Campbell University	Concentration of lead in soil and plant life from a 30 year old gun range
	3 rd Place	Courtney Hatcher	Campbell University	Alternate strategies for teaching undergraduates the principles of complex molecular interactions involved in biological processes
	2 nd Place	Benjamin Abraham	Campbell University	Synthesis of levodopa from tyrosine via aromatic substitution reactions
	2 nd Place	Kaitlin Grigg	Campbell University	Connecting chemistry to art: the development of labs for an interdisciplinary course
	1 st Place	Spencer Winspear	Campbell University	A preliminary mechanistic study on the halogenation of vanillin using bleach and sodium halide salts
Cell Developmental & Molecular Biology	3 rd Place	Allison Lindsay	UNC - Pembroke	Postmortem protein degradation as a tool for estimating time of death in forensic cases
	3 rd Place	Cora Bright	UNC - Pembroke	Dissecting the synthetic lethality between htz1 and RPB2-2SL: an analysis of a second site suppressor
	2 nd Place	Meghan Chung	Wake Technical Community College	Expression pattern of the histone modifier gene EZH2 in mouse uteri during early pregnancy
	1 st Place	Zack Flaccavento	Campbell University	Expression of cloned carbonic anhydrase and discovery of new chemotherapeutic inhibitors

CANCAS 2018–2019 Officers

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If you'd like to be involved in
CANCAS, contact
Dr. Daniel Stovall
(dstovall@newc.edu)!

CANCAS Derieux Award Winners

Report by: Dr. Daniel Stovall, NC Wesleyan College and Dr. Beth Cauley, Campbell University

Congratulations to the 2018 Annual Meeting's Oral Presentation Winners!

Category	Award	Name	Institution	Title
Microbiology	3 rd Place	Aubrey Hite	Lenoir Rhyne University	The effects of clove oil (<i>Eugenia caophyllata</i>) on the growth of antibiotic-resistant Gram-negative bacteria
	2 nd Place	Dana Waskiewicz	Guilford College	The effects of green tea on staphylococcal, lactose fermenting, bacteria of the buccal flora
	2 nd Place	Sean Bryant	Lenoir Rhyne University	Identification of Bacteria through fourier-transform infrared spectroscopy
	1 st Place	Sinclair Do	Lenoir Rhyne University	Influence of capsaicin on the growth of pathogenic microorganisms
Biotechnology, Molecular Biology, Chemistry, & Physiology	3 rd Place	Hannah Aaron	Lenoir Rhyne University	Confirming monofloral honey composition through the comparison of PCR, pollen counting, and basic color identification methods
	2 nd Place	Justin Ashby	Lenoir Rhyne University	Type 2 cGMP-dependent protein kinase suppresses tumorigenesis in the mouse colon
	1 st Place	Victoria Hudson	East Carolina University	Expressing scorpion antarease in <i>E. coli</i>
Environmental Science, Genetics, & Physiology	3 rd Place	Cerita Mattison	Nash Community College	The future of conservation: tough questions from a population assessment of the Bali Starling on <i>Nusa Penida</i>
	2 nd Place	Kaitlin Smith	UNC Pembroke	Reducing Alzheimer-type protein accumulation pathology and associated synaptopathogenesis to treat early dementia in a mouse model
	2 nd Place	Trina Phan	Nash Community College	Using maximum likelihood networks to infer reticulation events between lineages in the northern dusky salamander species
	1 st Place	Renelsa Blackman	Lenoir Rhyne University	The effects of exogenous juvenile hormone III on 5 th instar tobacco hornworms (<i>Manduca sexta</i>)

Thank You Judges & Moderators!

This year's annual meeting boasted fantastic array of student presentations, including outstanding posters and oral presentations. Every year, volunteer judges with expertise in a variety of fields share of their time to provide valuable feedback to student presenters. These judges take their jobs very seriously, and deliberate carefully on award winners. Moderators create a professional environment for the oral presenters to showcase their hard work and results. Without these volunteers, the annual meeting would not be a success! Thank you all for what you do for our CANCAS presenters.

Thank You to Our Sponsors!

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The **objective** of the North Carolina Academy of Science is to “encourage the advancement of science within the state of North Carolina by promotion of scientific research and by the fostering of education in the sciences”. The North Carolina Academy of Science meets these objectives by...

- Publishing a peer reviewed scholarly journal, the *Journal of the North Carolina Academy of Science*.
- Fostering and encouraging student involvement in the sciences through support of the Collegiate (CANCAS) and Student Academies (NCSAS).
- Promoting interactions among scientists and students throughout North Carolina.
- Providing a forum for exchange of ideas for solving issues important to North Carolina.

The Academy members include individuals from academia, industry, government, and all others who support the objectives and goals of the Academy.

North Carolina Academy of Science

Our Mission

The North Carolina Academy of Science promotes public appreciation of science, science education, scientific research and a meaningful role for science in public policy.

Our Goals:

Promote public appreciation of science

- Partnership with Science Centers
- Public Lecture Series
- Newsletter

Promote science education

- NCAS Webpage
- Academic Lecture Series
- NCAS Publications: Journal, Educational Publications
- Student Academy - Middle & High School

Promote scientific research

- Yarbrough and Bryden Research Grants
- CASCAS Undergraduate Research Workshop
- Presentation Opportunities at Annual Meetings
- Journal of the North Carolina Academy of Science

Promote science in public policy

- Symposia
- News Releases
- Position Statements
- Interactions with Public Officials

