

2017 ACADEMY PROCEEDINGS

Summary of Meeting Activities

The one hundredth and fourteenth annual meeting of the North Carolina Academy of Science, Inc. was held at High Point University located in High Point, North Carolina, March 24 and 25 of 2017, with the Collegiate Academy (CANCAS) joining the Senior Academy. The conference theme was *Crossing Boundaries: Transforming STEM Research*.

Activities Friday, March 24, took place in the Webb Conference Center at High Point University. The meeting began with a Finance and Strategic Planning Committee meeting at 1:00 p.m. followed by a Senior Academy meeting of the Board of Directors from 2:00–5:00 p.m. Registration for the Academy Annual Meeting ran from 5:00–6:00 p.m. in the Webb Conference Center Ballroom. The poster session and conference reception was held in the Ballroom and lobby with heavy hors d'oeuvres provided for guests and presenters from 6:00–7:30 p.m. There were seventy posters representing research in the areas of Microbiology & Molecular Biology; Behavioral & Health Sciences, Cell Development; Ecology, Environmental Sciences, & Zoology; Biotechnology, Physics & Engineering, Genetics & Math; and Chemistry. Students were present to answer questions and discuss their findings throughout the evening. Judges for the CANCAS posters met prior to the session and after the session. The poster session was followed by opening and welcoming remarks in the lobby of the Webb Conference Center. Welcome remarks were given by Dr. Joanne Altman, High Point University's Director of Undergraduate Research and Creative Works, Professor of Psychology, and the Chair of the Local Arrangements Committee, and Dr. Francie Cuffney, President of NCAS.

On Saturday, March 25, activities were held in Cottrell Hall International Ballroom and rooms and the Wanek Center and Wanek Center Cinema. Registration was held in Cottrell Hall International Ballroom from 7:30–8:15 a.m. Exhibits and tables of vendors, meeting sponsors, and the graduate school fair, which provided information about several graduate programs in North Carolina, were available in Cottrell Hall International Ballroom from 8:30 a.m. to 2:00 p.m. Collegiate Academy oral presentations were given in two morning sessions, 9:00–10:00 a.m. and 10:15–11:15 a.m. Oral session one consisted of five concurrent groups: Microbiology; Genetics; Ecology; Biotechnology & Engineering; and Zoology, for a total of nineteen presentations. Oral session two consisted of four concurrent groups: Cellular & Developmental Biology; Environmental Science; Ecology & Behavioral Science; and Health Science, for a total of fifteen presenta-

tions. Three poster presentations by high school students, members of the Student Academy, were on display from 8:30 a.m. to 1:30 p.m. with presenters standing by their posters from 10:00–11:00 a.m.

From 11:30 a.m. to 12:30 p.m. four workshops offering a wide array of topics led by members of High Point University were held in rooms in Cottrell Hall. An interactive session to teach basic principles of making scientific diagrams and figures more effective entitled "Using Art as a Tool in Scientific Figure Making" was led by Veronica Segarra and Casey Garr from the Department of Biology and Jillian Davis from the Department of Exercise Science. Attendees to the "3D Printing" Workshop led by Jeffrey Regester from the Department of Physics were exposed to the entry-level tools for designing 3D objects and advanced algorithmic methods. Brett Woods from the Department of Biology, Daniel Erb from the School of Health Sciences, and Joy Greene from the School of Pharmacy led a session entitled "Best Practices in Applying to Medical and Other Health Professional Programs," which was particularly popular with undergraduate members. Allison S. Walker from the Department of English presented an engaging workshop session entitled "Going Viral: How to Post Accurate Science on Social Media (and get people to read it)." All workshops were informative and provided excellent content to attendees.

Conference participants received a ticket to exchange for lunch at several campus eateries in the Wanek Center, including The Point, The Great Day Bakery, and The Farmer's Market, and were able to pick up lunch between 11:30 a.m. to 2:00 p.m. From 12:30–1:30 p.m. a meeting was held of judges to determine CANCAS Derieux awards for the morning presentations.

Remarks and the keynote address were held from 1:30–3:00 p.m. in the Wanek Center Cinema. The Keynote Speaker, Dr. Karthik Aghoram, Associate Professor of Biological Sciences from Meredith College engaged the audience with an address titled "A spoonful of DNA, a handful of dirt, and a dash of reason: A simple recipe for successful, sustainable food production?"

Following a coffee break from 3:00 to 3:20 p.m. in the Cottrell International Ballroom, oral presentations continued with oral session three from 3:20 to 3:50 p.m. with presentations from Senior Academy members in the areas of Microbiology, Science Education, and Botany. A total of six presentations were given in the afternoon session.

The Senior Academy Annual Business Meeting and the Collegiate Academy (CANCAS) Business Meeting ran concurrently from 4:00–5:00 p.m. The Senior Academy met in the Cottrell Baur Institute for Executive Education on the first floor and CANCAS met in the Cottrell Graves Collaboratorium on the second floor. The Senior Academy Board of Directors Meeting was held from 5:00–6:00 p.m. From 5:00–7:00 p.m. meeting attendees

were treated to a reception and awards ceremony in the Cottrell International Ballroom.

The two-day annual meeting was attended by 326 people: 50% were undergraduates, 41% professionals, 6% graduate students, and 2% were high school students. There were eight vendors and six graduate programs represented at the graduate school fair.

Senior Academy Business Meeting Summary

President Francie Cuffney called the meeting to order at 4:08 p.m. with twenty-eight people in attendance.

The minutes of the 2016 Business meeting were presented and approved.

Maria Santisteban head of the nominating committee presented the slate of officers for 2017-2018:

- President-elect (2017-2018) Jean-Luc Scemanma
- Vice President (2017-2018) Taek You
- Elected Member (2017-2020) Maria Fadri

A motion was made to vote for the slate by acclamation. The motion was seconded and the slate of officers was passed by acclamation.

Reports:

Local Arrangements Committee Chair: Dr. Joanne Altman

President: Francie Cuffney

Treasurer: Shana McAlexander

- Report
- Budget

Moved on to report from the treasurer for comment and discussion.

Treasurer’s Report — Shana McAlexander

1. Summary of 2016 Cash Flow to date:

Revenues	\$25,765.64
<u>Expenses</u>	<u>\$28,847.07</u>
Net	(3,081.43)
Current bank balances and total net worth (not including NCSAS):	
Wells-Fargo Checking	\$3,705.67
Wells-Fargo Savings	\$2,701.77
PayPal	\$11,261.55
US Bank (Author Billing)	\$2,355.13
<u>Schwab Endowment</u>	<u>\$33,339.35</u>
Total Net worth	\$55,363.47

Shana McAlexander distributed copies of the proposed budget for 2018, which mirrors the proposed 2017 budget.

2018 Annual Budget

INCOME

Membership	5,900.00
CANCA	2,000.00
NCSAS	0.00
Journal subscription, exchanges, page charges	8,000.00
Interest	0.00
Annual meeting	15,000.00
Yarbrough Contributions	500.00
Bryden Contributions	100.00
Trust Fund Contribution	1,500.00
Miscellaneous sales	0.00
Transfer from Operations Reserve	0.00

TOTAL INCOME 33,000.00

EXPENDITURES

Office expenses and salaries	500.00
Journal expenses	7,000.00
CANCAS	500.00
NCSAS	500.00
Annual meeting	15,000.00
Yarbrough Grants	1,500.00
Bryden Grants	1,000.00
Accounting	1,500.00
Technology expenses	5,000.00
Publicity/Outreach	500.00
Taxes, fees	0.00
Transfer to Investments	0.00

TOTAL EXPENDITURES 33,000.00

The 2018 budget was approved unanimously.

Journal Editor — Dr. Mark McCallum has assumed the role of Managing Editor. Dr. Melanie Lee-Brown will be stepping down as Executive Editor of the Journal; any suggestions for a replacement, contact Dr. McCallum. The journal finished its first year as a continuous publication in 2016; pricing has not changed. Yarbrough and Bryden winners will get first three pages free. Please invite colleagues to submit; there are short communications available for undergraduate projects.

Resolution of Thanks

Resolution of Thanks for High Point University (Resolutions for 114th Annual Meeting of the North Carolina Academy of Science at High Point University, High Point, NC) — Dr. Judy Moore. Resolution passed by acclamation:

“Whereas the 114th Annual Meeting of the North Carolina Academy of Science hosted by High Point University at High Point, NC in 2017 has been a great success;

Whereas the attendees were inspired and educated by a wonderful group of oral and poster presentations as well as provided opportunities for social interactions and networking with good food and entertainment;

Whereas Dr. Karthik Aghoram, Ph.D. provided a fascinating plenary address that provided an interesting and thoughtful discussion of the role of molecular biology and providing sufficient food for the world’s population;

Whereas engaging workshops and special sessions on a diverse selection of interesting and important topics were provided; therefore

Be it resolved that the North Carolina Academy of Science expresses its deepest gratitude and appreciation to High Point University, to Dr. Nido Qubein President of High Point University, to the Local Arrangements Committee chaired by Dr. Joanne Altman, and to all the High Point University faculty, staff, and students for an outstanding meeting.”

Presentation of Certificates

President Francie Cuffney announced members of the Board who are either stepping down or completing a term of office and who will receive certificates of appreciation:

Vice President:	Dr. James Fuller
President-Elect:	Dr. Alan Goble
Immediate Past President:	Dr. Maria Santisteban
Elected Member:	Dr. Mark McCallum
Executive Editor of JNCAS:	Dr. Melanie Lee-Brown
Annual Meeting Committee Chairperson:	Dr. Shaun Williams
Local Arrangements Committee Chairperson:	Dr. Joanne Altman
Strategic Planning Committee Chairperson:	Dr. Parke Rublee
Graduate Counselor:	Dr. Carlos C. Goller

Plaque of Appreciation

Dr. Francie Cuffney announced the transfer of presidency to Dr. Alan Goble. A plaque of appreciation was presented to Immediate Past President Dr. Francie Cuffney.

The meeting adjourned at 4:54 P.M.

Report of the Collegiate Academy of the North Carolina Academy of Science (CANCAS)

New CANCAS Officers and Campus Liaisons (2017–2018)

President:	Jawuanna McAllister,	NC Wesleyan University; jm234787@my.ncwc.edu
Vice President:	Sean Bryant,	Lenoir-Rhyne University; sean.bryant@my.lr.edu
Secretary:	Renelsa Blackman,	Lenoir-Rhyne University; renelsa.blackman@my.lr.edu
Historians:	Anne Elkins	NC State University; acelkin2@ncsu.edu
Campus Liaisons:	Evan Poag and Laura Haymore,	Guilford College, poagej@guilford.edu; haymorelc@guilford.edu
	Kayla Lavan,	NC Wesleyan College, kl234511@my.ncwc.edu
	Aubrey Hite,	Lenoir-Rhyne University, aubrey.hite@my.ncwc.edu;
	Laura Dytrt, and	laura.dytrt@my.lr.edu;
	Sinclair Do,	sinclair.do@my.lr.edu
	Micaela Robson,	Campbell University, mjrob-son0828@email.campbell.edu
	Trina Phan,	Nash Community College, tphan363@st.nashcc.edu

Faculty on Executive Committee for 2017–2018

Executive Co-Director:	Dr. Beth Cauley,	Campbell University
Co-Director:	Dr. Daniel Stovall,	North Carolina Wesleyan College

CANCAS continues to recruit student campus liaisons from CANCAS member institutions; if interested, contact Dr. Beth Cauley (cauley@campbell.edu) or Dr. Dan Stovall (dstovall@ncwc.edu). The CANCAS Fall Workshop will be held at Campbell University concurrently with SNCURCS on Saturday, November 4. CANCAS Executive Officers and student officers/board members will meet at that time to set the strategic plan for 2017–2018.

Bryden Graduate Grants

Congratulations to Halley Shah at UNC-Greensboro for winning a 2017 Bryden Grant! The project is overseen by Professor Zhenquan Jia and is entitled “Molecular Studies of Air Pollutant benzo(a)pyrene1.6-guinone-Induced Endothelial Dysfunction: Implications in Chemical Atherogenesis.” The following proposals received honorable mentions: Radminla Petric UNC-Greensboro (Advisor: Dr. Martina Kacounis-Rueppell) for the project entitled “Effects of Broadband Anthropogenic Noise

on Deer Mouse (*Peromyscus maniculatus*) Behavior.” Kevin Parker, UNC Greensboro (Advisor: Dr. Matina Kalconuis-Ruppell) for the project entitled “Species-specific Temperature Thresholds for Bat Activity and Winter Occupancy Probability.”

NCAS Annual Meeting (March 24 & 25 High Point University High Point, North Carolina)

Derieux Awards:

Oral Presentation Awards

Microbiology

First Place: Hall, Alyssa (Lenoir-Rhyne University). The effect of carbon source and essential oil on the morphology and growth of *Aspergillus niger*.

Second Place: Lee, Nathan (Guilford College). The effect of a recombinant hydrolytic enzyme on hybrid biofilms of *Staphylococcus aureus* and *Candida albicans*.

Third Place: Hamilton, Byron (Guilford College). What’s an old book good for? Testing an Ayurvedic cure for acne.

Genetics and Cellular & Developmental Biology

First Place: Lynch, Luke (Lenoir-Rhyne University). Exploiting synthetic lethal relationships with the SWI/SNF chromatin remodeling complex via miRNAs.

Second Place (tie): Mundell, Cary (UNC Pembroke). Study of a positive lysosomal modulator for treating age related brain dysfunction.

Second Place (tie): Stacherski, Abbi (Lenoir-Rhyne University). Investigating the effects of gibberellic acid on cell growth in pumpkins (*C. pepo*).

Third Place: Zapatero, Zack (Davidson College). Deciding to be a helper: exploring the *in vitro* function of the Cd4 enhancer NCE.

Ecology & Behavioral Science

First Place: Resh, Gabrielle (Elon University). Do mockingbirds normally copy their mimetic song directly from model species, or from other mockingbirds?

Second Place: Petrie, Zack (Warren Wilson College). Effect of powerlines on magnetoreception in *Notophthalmus viridescens*.

Third Place: Hoffman, Audrey (Catawba College). VOC interference limits host detection of the parasitic plant *Cuscuta gronovii*.

Zoology & Environmental Science

First Place: Nance, Dawson (Elon University). Examining the effects of parasitism of female mate choice and copulation duration.

Second Place: Eskeland, Emma (Elon University). Examining two closely related species for evidence of selection against hybridization.

Third Place: Lough, Daniel (Wake Forest University). Revisions of mammal and bird ranges in Manu National Park: results of a multiyear camera trapping study across a 3.2 km elevation gradient.

Health Science, Biotechnology, & Engineering

First Place: Edmark, Sarah (High Point University). Methylglyoxal sensitizes *Bacillus oleronius* to topical antibiotics.

Second Place: Sanchez, Miguel (Lenoir-Rhyne University). Collateral sensitivity: identification of *Burkholderia multivorans* bacterial mutants through PCR and gel electrophoresis.

Third Place (tie): Lightsey, Emma (Warren Wilson College). Detection of rabies antibodies in Wolf-Dog Hybrid Sera.

Third Place (tie): McKee, Taylor (Lenoir-Rhyne University). The effects of tetracycline and erythromycin on mitochondria activity as demonstrated by regeneration rate in *Lumbriculus variegatus*.

Poster Presentation Awards

Molecular Biology & Microbiology

First place: Johnson, Michele (High Point University). Capsaicin induces metabolic gene expression in myotubes.

Second place: Ulrich, Rebecca (High Point University). Small molecule modulation of virulence behaviors in *Staphylococcus epidermidis*.

Third place: Gerges, Ereny (UNC-Pembroke). Cadmium from cigarette smoke increases the risk and severity of lower respiratory tract infection by decreasing the immune response of alveolar macrophages.

Botany & Zoology

First place: Phan, Trina (Nash Community College). Using mtDNA to accurately describe diversity within the Northern Dusky Salamander species complex.

Second place (tie): Forget, Sarah (High Point University). Effects of seasonal frond angles on leaf temperature and associated ecophysiology of the evergreen fern, *Polystichum acrostichoides*.

Second place (tie): Reardon, Elizabeth (High Point University). Phylogeographic analysis of mitogenomes of five tropical Asian birds.

Third place (tie): Mann, Sherese (NC A&T University). Improving Alzheimer’s literacy in STEM college students through service learning.

Third place (tie): Watts, David (NC State University). Who's that? Can nocturnal aye-eyes (*Daubentonia madagascariensis*) determine who is talking?

Ecology & Environmental Science

First place: Morgan, Micah (High Point University). Photo enzymatic repair effectiveness of *Moina* exposed to UV-B radiation.

Second place (tie): Grunvald, Warren (Elon University). Assessing morphological traits for evidence of in situ hybridization between two closely related insect species.

Second place (tie): Wagoner, Aaron (UNC Greensboro). Monitoring wildlife biodiversity at wetland restoration sites on the University of North Carolina Greensboro (UNCG) campus.

Third place (tie): Watson, Tyler (East Carolina University). The *Fundulus diaphanus* species complex: convergent evolution?

Third place (tie): Miller, Lauren and Bea Balajonda (Elon University). Potential effects of habitat and host plant use on opportunity for hybridization between two insect species.

Physical Science, Biotechnology, Science Education, & Chemistry

First place: Marshall, Jennifer (High Point University). Extending the substrate scope of the Chan-Lam cross coupling reaction using photoredox catalysis.

Second place: Barksdale, Emma James (High Point University). Antibacterial assessment of cyclogossine A, A cyclic heptapeptide from *J. gossypifolia*.

Third place (tie): Barbaretta, Jason (High Point University). A novel application of TEC-disulfide replacement showcased in the synthesis of SFTI-1.

Third place (tie): Winspear, Spencer (Campbell University). Optimization of an electrophilic bromination of vanillin to be used as a pedagogical experiment.

Molecular Genetics, Health Science, & Cell Biology

First place: Veale, Sarina (NC A&T State University). Student learning gains in a health disparities research course.

Second place: Dixon, Cameron (St. Andrews University). Biochemical characterization of wasp venom.

Third place: Hedgepeth, Lonzie (UNC Pembroke). Representation of protein-DNA binding dynamics via a Gal induction informed mathematical model.

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