

ACADEMY PROCEEDINGS

Summary of Meeting Activities

The one hundredth and ninth annual meeting of the North Carolina Academy of Science, Inc. was held at Campbell University, Buies Creek, North Carolina, on 23–24 March 2012, with the Collegiate Academy (CANCAS) joining the Senior Academy.

Activities Friday, 23 March took place in Maddox Hall, the John W. Pope, Jr. Convocation Center, D. Rich Hall, Lundy-Fetterman School of Business, Taylor Bott Roger Fine Arts Building, and Marshbanks Residential Restaurant. The meeting began with a Finance 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., both held in Maddox Hall. Registration ran from 5:00–6:00 p.m. in the lobby of the Convocation Center. The poster session was held along the concourse of the Convocation Center from 6:00 p.m. to 7:30 p.m. with sixty-three posters. Judges for the poster session met prior to the session in room 156G of the Convocation Center. The Triangle Jazz Quartet provided background music for the poster session and heavy hors oeuvres were provided for guests and presenters. Following the poster session a special forum on Exploration for Natural Gas and the Future of NC, a scientific Perspective was held in Turner Auditorium of D. Rich Hall. The forum was open to the public. Dr. Karen Guzman, Immediate Past-President of the NCAS welcomed the Academy membership and public to the event. Dr. Mark Hammond, Dean of the College of Arts and Sciences, Campbell University also welcomed those in attendance to the University and the forum. The forum was moderated by Dr. Charles Lytle of the Academy. Forum participants were Dr. Kenneth Taylor, Assistant State Geologist in North Carolina, Dr. Matt Matthews, Geologic Consultant, Mr. Bill Holman, Director of State Policy, Nicholas Institute for Environmental Policy Solutions, Duke University, and Dr. Robert Jackson, Nicholas School of the Environment and Earth Sciences, Duke University. Each participant gave a fifteen minute presentation and then took 5 minutes of questions. After the four presentations an open forum was conducted. The focus of the forum was on the science of the industry and environment. After the poster session the Campbell University Walker Biology Club hosted a mixer for CANCAS members in the Rumley Center on campus.

On 24 March activities were held in the Lundy-Fetterman School of Business, the Taylor Bott Roger Fine Arts Building, and Marshbanks Residential Restaurant. Registration was held in the lobby of Lundy-Fetterman

starting at 7:30 a.m., with a light breakfast fare available in the Lundy-Fetterman Falwell Lounge. Exhibits of vendors and meeting sponsors were available in room 107 and along hallways of Lundy-Fetterman from 8:30 a.m. to 5:00 p.m. Posters from the North Carolina Student Academy of Science were also set up in the hallways from 8:30 a.m. to 1:00 p.m. A student academy brunch was held in Lundy-Fetterman room 146 from 10:00 to 11:00 a.m. and students were present at their posters from 12:45–1:45 p.m. to answer questions and discuss their findings. Collegiate Academy oral presentations were given from 8:30 a.m. to 11:00 a.m. A meeting for judges and session chairs was held 7:30–8:00 a.m. in Lundy-Fetterman room 133. Morning sessions included Microbiology, Physiology, Toxicology, & Biochemistry, Health & Environmental Sciences, Cell Biology & Biotechnology, Zoology, Ecology, and Botany. A total of 36 presentations were given in the morning sessions. Concurrent to Collegiate Academy presentations a special panel presentation designed for high school science teachers, “Preparing Students for College Science” was held from 8:30 to 10:00 a.m. Panel participants were Dr. Bill Schmidt, Physics Meredith College, Dr. Catherine Banks, Chemistry, William Peace University, Dr. Alton Banks, Chemistry, N. C. State University, and Dr. Tim Metz, Biology, Campbell University.

The Keynote address was presented in Scott Concert Hall of the Taylor Bott Roger Fine Arts Building from 11:15 a.m. to 12:30 p.m. After welcoming remarks from Dr. Karen Guzman, Dr. L. Michael Larsen Chair of Biological Sciences, Campbell University introduced the keynote speaker, Dr. Stuart Pimm, Doris Duke Chair of Conservation Ecology at the Nicholas School of the Environment at Duke University. Dr. Pimm’s presentation, “Biodiversity – The Most Beautiful Carbon” was a compelling look at efforts to conserve world biodiversity and what can be done to assist in the effort.

After the keynote address box lunches were available in Lundy-Fetterman for a lunch break from 12:45 to 1:45 p.m. A judges meeting was held during this time. Vendors’ exhibits were available in the hallways.

From 1:45 to 3:00 p.m. three special events were presented, all in Lundy-Fetterman. Dr. Robert Panoff presented “Computational Thinking Across the Curriculum: Dynamic Explorations for a Changing World” in Lynch Auditorium. Dr. Darryl Daley, Mr. David Guzman, and Dr. Thomas Abraham presented “Science Photography Workshop” in room 126. A panel of presenters led a Graduate School Workshop in room 147.

Oral presentations continued from 3:15 to 4:30 p.m. with presentations from the Senior Academy members in the areas of Cell Biology & Genetics, Development Biology, Education, Ecology, Zoology, Botany, and Mathematical

Modeling & Prediction. A total of 29 presentations were given in the afternoon sessions.

From 4:30 to 5:30 p.m. three additional special sessions were held. Dr. Carr Thompson of Burroughs Wellcome Fund led a session entitled "Scientists Engaging Students in the Environment" held in room 149. Dr. Bruce Archambeault, IBM Distinguished Engineer, led a session entitled "The Science Behind the Effects of Wireless Communication" in Lynch Auditorium. A third session was a panel discussion entitled "Teaching Pre-College Students to do Research." Panelists included Sunny Liu of NCSU, Brian Wood of Enloe High School, John Bartlett of Campbell University, and Jon Bennett of the NC School of Science and Mathematics.

The Senior Academy Annual Business Meeting and the Collegiate Academy (CANCAS) Business Meeting ran concurrently from 5:30–6:30 p.m. The Senior Academy met in Lynch Auditorium and the Collegiate Academy met in room 47 of Lundy-Fetterman. From 6:30–8:30 p.m. meeting attendees were treated to a banquet and award ceremony in the Marshbanks Residential Restaurant.

Approximately 229 people attended the two-day annual meeting.

Senior Academy Business Meeting Summary

President Melanie Lee-Brown called the meeting to order at 5:50 p.m. on Saturday 24 March 2012. Approximately forty people attended the meeting which was held in Lundy-Fetterman School of Business at Campbell University in Buies Creek, North Carolina. An outline of the meeting's activities is given below:

Dr. Karen Guzman, chair of the nominating committee, announced the slate of candidates for open positions on the Board of Directors (2012–2011), and biographies of the candidates were distributed. Nominations were solicited from the floor. With no nominations from the floor a motion was made to close nominations and continue with the vote, the motion was seconded and passed. Ballots were distributed and voting proceeded. The newly elected board members are:

President Elect—Michael Kingston (Elon University)
Vice President—Constance Lowery (Catawba College)
Secretary—Francie Cuffney (Meredith College)
Junior Board Member—Jason Pajski (Mount Olive College)

President's Report

Dr. Melanie Lee-Brown reported that it had been a successful year for the Academy. Changes have been made to increase visibility of the Academy and we

hope to see more growth in the future. UNC-Pembroke will host the annual meeting in 2013. We are currently looking for a host site for the 2014 annual meeting.

Secretary's Report

Dr. Francie Cuffney, Secretary of the Academy reported that:

The Board of Directors met five times over the past year since the last annual business meeting.

Approximately 230 people attended last year's annual meeting at Elon University.

The CANCAS workshop was hosted at Lenoir-Rhyne University, 22 October 2011. Dr. Shaun William organized and hosted the meeting, and Dr. Steve Warshaw (NCSAS) identified and confirmed workshop leaders for the morning sessions. This year's workshop was focused on both research and career preparation, and was the first joint workshop for CANCAS and NCSAS students.

Dr. Jeff Coker resigned his position on the Board as Chair of the Education Committee; Dr. Lin Coker was approved by the Board to fill this vacancy.

The web presence of the Academy continues to improve and stabilize. Meeting registration and abstract submissions were handled via the web.

The Board took a major step in approval of going online with the Journal of the Academy.

The Board continues to explore ways to publicize the Academy, increase membership, and increase participation.

Strategic Planning Committee

Dr. Gerhard Kalmus presented a recommendation from the committee for a membership vote. The committee recommends deletion of the position of Executive Secretary. After discussion, the motion passed with one no vote.

An announcement was made to the membership that the Journal will be going electronic. Issues 3 and 4 of the current volume will be combined as a single unit and published electronically. Members will be provided the option of receiving paper copies for an additional fee beginning with Volume 129.

Finance and Endowment Committee Report

Dr. Cathleen Cieslieski reported on a recommendation from the Finance and Endowment Committee to change the fee structure of the Academy. The following fee structure was approved by a vote of the membership.

Graduate student	\$20 with access to e-journal
Regular	\$50
Joint	\$60
Patron	\$75
Emeritus	\$30 with access to e-journal
Associate	\$100
Small institution	\$150
sponsorship	
Large institution	\$300
sponsorship	
Life membership	\$750
Sustaining member	\$500 minimum

Treasurer's Report

Dr. Alan Goble, Treasure, distributed copies of his report and the proposed budget for 2012–2013.

1. Summary of 2011 Cash Flow (not including NCSAS):

Inflows	\$81,435
<u>Outflows</u>	<u>112,263</u>
Net	(30,828)

2011 Year End Total net worth (including NCSAS):

Wachovia	\$17,748.37
Business	
Checking	
PayPal	1,352.52
<u>Schwab</u>	<u>38,323.66</u>
<u>Endowment</u>	
Net worth	\$ 57,460.55

Summary of 2012 Cash Flow (to date)

Inflows	\$29,837.66 (incl. PayPal inflows)
<u>Outflows</u>	<u>8,760.23</u> (incl. PayPal charges)
Net	\$21,077.43

Dr. Alan Goble distributed copies of the proposed budget for 2012

2012 Annual Budget

INCOME

Membership	8,500.00
CANCA	1,000.00
NCSAS	1,000.00
Journal subscription, exchanges,	14,000.00
page charges	
Interest	5.00
Annual meeting	10,000.00
Yarbrough Contributions	600.00
Bryden Contributions	150.00
Trust Fund Contribution	1,200.00
Miscellaneous sales	0.00
Transfer from Operations Reserve	0.00

TOTAL INCOME 36,454.00

EXPENDITURES

Office expenses and salaries	1,200.00
Journal expenses	13,000.00
CANCAS	500.00
NCSAS	1,000.00
Annual meeting	9,905.00
Yarbrough Grants	1,000.00
Bryden Grants	0.00
Accounting	1,000.00
Technology expenses	700.00
Publicity/Outreach	500.00
Taxes, fees	50.00
Transfer to Investments	7,500.00

TOTAL EXPENDITURES 36,455.00

The 2013 budget was approved unanimously.

Journal Editor's Report

Dr. Frank Schwartz, Editor announced that issue #1 of the Journal of the North Carolina Academy of Science (JNCAS) was published with a slight delay resulting in the issue being sent out in March. Issue #2 will include five papers, three book reviews as well as results of the elections for new board members. Issue #3 has two papers accepted and will include abstracts from the annual meetings. Starting with issue #3 the first ten pages of an article will be free with page charges reinstated for additional pages. Issue # 4 will contain the proceedings of the annual meeting. No time has been set for the publication of issues 3 and 4.

Robert R. Bryden Research Grants Committee Annual Report

Both recipients of the Bryden award for 2011/2012 presented at the 2012 annual meeting.

Dr. Gerhard W. Kalmus and Dr. Jean-Luc Scemama reviewed five proposals from five different institutions. A decision was made to fund two proposals for the coming year. Each awardee was given \$1,000. Awardees were:

Joseph C. White from Wake Forest University for a proposal entitled "Seasonal water sources in riparian tree species of the southeastern U.S.; impacts of drought and stream pollution.

David Steinberg from Duke University for a proposal entitled "Characterizing motion detection system of a tropical lizard.

Resolution of Thanks (Annual Meeting)

Edson Justiniano, Board Member at Large, read this resolution of thanks:

“Whereas the 109th Annual Meeting of the North Carolina Academy of Science hosted by Campbell University in 2012 has been a great success, and

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, and

Whereas Dr. Stuart L. Pimm provided a fascinating keynote address that opened our eyes to the importance of biodiversity to our planet, and the simple and imaginative ways by which we, in our roles of citizen scientists, can help make a positive contribution to its future, and

Whereas engaging workshops on the role of computation across the curriculum, on graduate or professional career paths and scientific photography were provided, and

Whereas a public forum discussing the exploration of natural gas reserves recently discovered in North Carolina, provided an important venue for discussing its benefits and impact, from the perspective of the science underlying these issues

Be it resolved that the North Carolina Academy of Science expresses its deepest gratitude and appreciation to Campbell University: to the President Dr. Jerry M. Wallace, the Vice President of Academic Affairs and Provost, Dr. M. Dwaine Green, the Dean of the College of Arts and Sciences Dr. Mark Hammond, to the Local Arrangements Committee chaired by Dr. Karen Guzman, and to all of the Campbell University faculty, staff and students for an outstanding meeting.”

The resolution was approved by acclamation.

Certificates of Appreciation

Dr. Melanie Lee-Brown acknowledged outgoing members of the Board by presenting each with a Certificate of Service.

Immediate Past president—Karen Guzman
President—elect—Mickael Cariveau
Vice—President—Maria Santisteban
Executive Secretary—Gerhard Kalmus
Secretary—Francie Cuffney
Finance Committee Chair—Cathleen Ciesielski
Publications Committee Chair—Paul Hager
Collegiate Academy President—Marcus Ford

On behalf of the membership, new President Dr. Mickael Cariveau thanked Melanie Lee-Brown for her outstanding service as the Academy President in 2011/2012, presenting her with a plaque for her service.

Adjournment

The meeting was adjourned at 6:50 p.m.

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

New CANCAS Officers and Campus Liaisons (2012–2013)

President	Jennifer Floyd	Mount Olive University
Vice President	Sam Kelly	Guilford College
Secretary	Katie St. Clair	Campbell University
Historians	Tatum Lemly	Guilford College
	Micahel Khayat	
Campus Liaison	Morgan Gregg	Elon University
Campus Liaison	K.T. Piotrowski	Campbell University
Campus Liaison	Canna Zheng	Guilford College
Campus Liaison	Leah Sigmon	Lenior-Rhyne University
Campus Liaison	April Tucker	Mount Olive University

CANCAS Executive Officers and student officers/board members will meet in August to set the strategic plan for 2012–2013.

Faculty on Executive Committee for 2012–2013

Co-Director:	Dr. Michele Malotky	Guilford College
Co-Director:	Dr. Erin Lindquist	Meredith College
Yarbrough Grants Coordinator	Dr. Yuko Miyamoto	Elon University

Fall Undergraduate Research Workshop

The CANCAS workshop was hosted at Lenoir-Rhyne University, 22 October 2011. Dr. Shaun William organized and hosted the meeting, and Dr. Steve Warshaw (NCSAS) identified and confirmed workshop leaders for the morning sessions. This year's workshop was focused on both research and career preparation, and was the first joint workshop for CANCAS and NCSAS students.

Several NCSAS students and parents attended from surrounding middle and high schools. Undergraduate students and faculty attended from: Campbell University, East Carolina University, Elon University, Guilford College, Lenoir-Rhyne University, Meredith College, and UNC Asheville.

After attending morning sessions on scientific careers, service learning projects, and research project development and presentations, all students, including a few NCSAS students, broke off into career interest groups for lively lunch discussions. In the afternoon CASCAS students practiced their interview skills in mock interviews and attended a career panel. Panelists represented careers in health care, research, and education (college professor). CASCAS students seemed particularly interested in how to apply to graduate school and choose a graduate research mentor.

New Guidelines for Abstract Submission

A committee was created to craft a new set of guidelines for abstract submission for the annual NCAS meeting starting in 2013. A copy of the guidelines will be posted at the CASCAS website and should be linked/referenced at the host meeting site each year.

CASCAS Membership Dues

Changes to CASCAS membership dues were proposed and voted on during the CASCAS officers meeting on

24 March 2012. The following changes to the fees are summarized below:

Undergraduate membership	\$10 + online Journal
Group membership	\$40 → \$60

Yarbrough Grants

Seven of Eight 2011 awardees attended and presented their research at the annual meeting in March. Four of the awardees received Derieux awards.

Collegiate Academy Goals and Initiatives

The primary goals for 2012/2013 are to increase membership and participation, build community within the membership and foster the relationship with the Student Academy including building a mentor program.

NCAS Annual Meeting (23–25 March 2012 at Campbell University)

A new rubric for was used for judging CASCAS posters and oral presentations this year. There were 62 posters and 37 oral presentations at the meeting.

Derieux Awards:

Oral Presentations

Microbiology, Cell Biology, and Biotechnology

First place:

Marcus Ford*, Victoria Ellis, Morgan Campbell, Sandra Westergaard, John Bartlett. Campbell University. Prevalence of Methicillin Resistant Staph Aureus (MRSA) on Campbell University Campus and the Efficacy of Current Cleaning Products

Second place:

Morgan J. Gregg* and Dr. Yuko J. Miyamoto. Elon. Examining The Role of mTOR if T cell Proliferation Under Immunosuppression by Rapamycin

Third place:

Lydia B. Shedlofsky. Guilford College. The effect of mutating the FMN riboswitch into the permanently off position on the virulence of *P.lumenscens*

Physiology, Toxicology, Biochemistry, Health & Environmental Sciences I & II

First place:

Melanie A. Kemp* and Vicki Collins. Warren-Wilson College. Palatability and Nutritive Content of Wolffia for Warren Wilson College Laying Hens

Second place:

Janna A. Joyner. Peace College. Analysis of PCB accumulation within trophic levels of biota inhabiting an EPA superfund watershed.

Jessica Schaner* and Dean Kahl. Warren Wilson College. Untapped Abundance: Antioxidants in Edible Invasive Plants

Third place:

Lauren W. Stranahan. Elon University. Antidepressant Impairs Zebrafish Motor Development and Behavior: Ramifications of Pharmaceutical Drugs in the Environment.

Laura M. Lilley* and Dr. Dean Kahl. Warren Wilson College. The Mutarotation of Glucose in Dimethyl Sulfoxide

Zoology, Botany, and Ecology

First place:

Andres Camacho. Lenoire-Rhyne College. Behavioral response of subterranean termite *Reticulitermes virginicus* as a result of exposure to acoustical vibrations

Second place:

Alice Sloan* and Michael Torres. Warren Wilson College. The Suitability of Lower Peterson Creek (Queensland, Australia) as Habitat for the Platypus, *Ornithorhynchus anatinus*

Third place:

Camille Taylor* and Amy E. Boyd. Warren Wilson College. Grafting Tomatoes for Resistance to Early Blight and Late Blight in the Warren Wilson College Garden

Poster Sessions**Ecology, Toxicology, Health Sciences Physiology and Science Education****First place:**

Victoria Ellis* and Karen Guzman. Campbell University. Lasting effects of chronic caffeine dosage on heart rate, growth rate and activity of zebrafish embryos

Second place:

Keely A. Ford* and David N. Judge. Gardner-Webb University. Population dynamics of a seed shrimp (*Crustacea: Ostracoda: Cypria sp*) and its ectocommensal Protozoan (*Ciliophora: Peritricha: Lagenophryidae: Lagenophrys discoidea*) in a North Carolina pond

Third place:

Allen R. Mullins*, Robert W. Boyce, Tyler K. Willett, Glenn R. Jones, Edward L. Boone. UNCW. Absenteeism in a metropolitan law enforcement agency weight loss program

Cellular, Molecular Biology, Biotechnology, Biochemistry, and Pharmacology**First place:**

Grace Anderson, Almagul Kanafina, Emily Lehman, Paul Steimle. UNCG. Identification and Characterization of a Myosin II Heavy Chain Kinases (MHCK-D) in *Dictyostelium*

Second place:

Brittany L. White. Elon. The establishment of successful talin knockdown and appropriate conditions for inducing focal adhesion kinase (FAK) phosphorylation in mammalian cells (HEK293AD)

Ben Dyer and Michelle S. Thomas. Campbell University. Cloning and Characterization of the Coxiella burnetii Macrophage Infectivity Potentiator Protein

Third place:

Michael T. Wyngarden, Mary B. Hawkins. NCSU. Binding Properties and Function of *M. undulatus* Estrogen Receptors with Chlordane and the Effects of Amino Acid Mutation on Binding

Microbiology, Chemistry, & Astronomy**First place:**

Jeremy D. Griffin and David N. Judge. Gardner-Webb University. Analysis of Pungency Chemicals in Ginger Soft Drinks by HPLC

Second place:

Ashley Williams and Parke Rublee. UNCG. Do physical characteristics and human use affect the aquatic microbial community of lakes on Mount Desert Island, Maine?

Third place

David R. Citron, Taek You, Larsen, and Sang Seob Lee. Campbell University. Discovery and Identification of Environmental Microorganisms from Soil Samples of Buies Creek, North Carolina

Zoology/Botany**First place:**

Lindsey M. Stanley, Mariana V. Gattegno, Jelena Y. Atkins, and David H. Dommer. Mount Olive College. Wavelength-dependent effects of light on the geotactic response of 2nd instar larval *Drosophila melanogaster*

Second place:

Krystal T. Piotrowski and John C. Havran. Campbell University. Floral Morphological Comparison of Two Closely Related Hawaiian Violets

Third place:

LaShonda M. Caine, Bobbie J. Legg, Sean P. Graham and David A. Beamer. Nash CC. The Phylogeography of the Seepage Salamander (*Desmognathus aeneus*)