

FROM THE DEPARTMENT CHAIR



It has been an active semester of course innovation, driven by our intention to better align our overall

curriculum with a national consensus about modern biology education, outlined in an important document entitled “Vision and Change.” A key goal is to fully embrace inquiry-based, student-centered pedagogies in both the classroom and the lab, and to view science as a “way of knowing” about the broader world. Our classrooms increasingly contain small groups working to interpret data, students presenting their research, or a vigorous discussion about science in the news.

This fall, we piloted two revised core courses: *Themes in Biology*, and *Biology of the Eukaryotic Cell*. After the faculty participated in designing learning goals for *Themes*, Drs. Wendy Clement and Tracy Kress designed the course and taught a double section this fall. The *Euk* faculty similarly designed a new, weekly, three-hour investigative lab component for *Euk* that teaches cell biology lab techniques, and guides the students in real scientific investigation and problem-solving. Dr. Marcia O’Connell pioneered the first offering.

Non-major courses also are being updated. Dr. Luke Butler dove into “Human Form and Function” this semester and Dr. Curt Elderkin will take on “Humanity and the Natural World” next fall. Change is good!

- Janet Morrison, PhD, Chair

Curriculum Changes in Core Classes



Two of the biology department’s five core classes for majors were revised this past semester in an effort to better meet changing standards for 21st century curricula.

Themes in Biology, the foundational major’s course within our program, was co-taught this semester by professors Wendy Clement and Tracy Kress. They brought new student-centered pedagogical practices to the classroom based on their experiences at the National Academies Summer Institute on Undergraduate Education, which they attended this past summer. In class, students worked almost exclusively in groups to drive their learning of core principles in biology through data analysis, experimental design, and reading of the primary literature. New hypothesis-driven research projects were introduced to the lab, one utilizing our own Dr. Matt Wund’s work with stickleback fish from Alaska. Students studied fish from a unique freshwater or marine environment, and used molecular techniques including PCR to test their hypotheses about the molecular basis of the phenotypes predicted based on the fish’s environment.

Similarly, the core course *The Biology of the Eukaryotic Cell* was also newly-designed to include some lab experiments in addition to the recitation portion of the course. Taught by Dr. Marcia O’Connell, the course included two multi-week laboratory experiments: one, addressing a hypothesis about the evolutionary conservation of heat shock proteins, using yeast as the model eukaryote; and the second addressing a hypothesis regarding the role of motor proteins in generating the fundamental body pattern, using fruit flies as the model organism.

The changes to these courses have not only enhanced the courses in achieving specific learning outcomes more thoroughly, but also in strengthening the ability of the biology curriculum to more broadly meet general outcomes for biology majors, regarding scientific method, experimental design, data analysis and presentation and the like. The department will continue to develop more such student-centered approaches.

NEWS BRIEFS

Elderkin Elucidates Etheria

Using DNA sequencing, Curt Elderkin, PhD and his research colleagues have discovered several new cryptic species related to the species *Etheria elliptica* (freshwater oyster). Cryptic species are those which are morphologically identical to another, yet cannot interbreed, and thus belong to a different species. The species are widespread and common in African streams.

Reinert Helps Rescue Rattlers

After years of professional advocacy towards this goal, Howard Reinert reports that the Eastern Massasauga Rattlesnake has been proposed for listing as a federally threatened species under the Endangered Species Act. The wetland species has decreased in numbers significantly over the past few decades, due to loss of habitat, eradication, and poor land management. Dr. Reinert has researched this species in depth and is an expert on its physiological ecology.

Bricker Takes First Place

Jim Bricker, PhD took his division's FIRST PLACE title in the US Fencing Association's Men's Foil National Tournament this past summer. He went on to compete at the World Event in France in October, finishing 12th. He has been fencing for decades, and has served as the Faculty Advisor to the TCNJ Fencing Team. Congrats, Jim!

Another Beautiful Bio Babe!

The Biology Department is pleased to welcome yet another baby to its family: **Cecilia Valerie**, born to Professor Kathryn T. Elliott and her husband Drew in June. Cecilia was a star at our recent holiday gathering.!

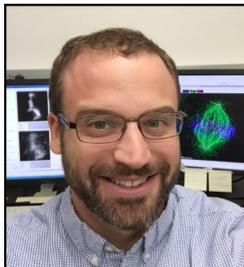


Evolutions is published twice yearly by the Department of Biology at The College of New Jersey.

Helen Kull, Editor; biology@tcnj.edu

New Fellow and Techs for Biology

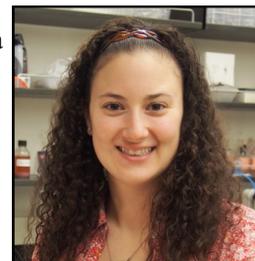
Full 2015 brought a record number of incoming freshman biology majors to the department: a total of 132 new students, with outstanding qualifications and academic preparation. The semester also brought three new faculty/staff people working in the department: **David Wynne**, **Carolyn Klaube**, and **Jessica Nardone**. Welcome!



David Wynne is the department's first Teacher-Scholar Fellow, a position which seeks to train new faculty to excel in both the classroom and within an active, vital undergraduate research program. Dr. Wynne was raised in Montclair, and received his undergraduate education in Biology at Amherst College, where he first engaged in *C. elegans* research. He received his PhD from UC Berkeley, studying chromosome segregation during mitosis. He continued with post-doc studies at Rockefeller University, investigating the mechanisms of chromosomal movement during meiosis and mitosis.

Dr. Wynne also briefly taught high school biology and chemistry, and middle school science. He is very pleased to have the opportunity to hone his teaching and researching skills here at the College, and be mentored within a department and at an institution with such an impressive record of involving students in research.

Jessica Ann Nardone is hardly "new" to us, having just received her Bachelor's degree from TCNJ in May 2015, with a major in Biology, minor in Chemistry, and receiving Biology departmental honors. But her place here with us is relatively new, working part-time as a Research Technician in Dr. Dickinson's Marine Eco-Physiology and Biomaterials Lab, funded in part by a grant from the Office of Naval Research.



Ms. Nardone is responsible for the development and set-up of large research projects, and the recording and analysis of data, as well as monitoring seawater chemistry, and maintaining the barnacle cultures. She was formerly a student in Dr. Erickson's Neuro-Physiology Lab, working with brainstem spinal cords of mice, and also investigated the thermal ecology of turtles at Miami University of Ohio – so she is no stranger to labs!



Carolyn Klaube is also a new Research Technician, who works with Dr. Janet Morrison in a position funded in part through Dr. Morrison's endowed chair, the Barbara Meyers Pelson '59 Chair in Faculty-Student Engagement. She assists the research students with plant identification, and collection and analysis of various types of data for the ecological studies which are part of Dr. Morrison's research.

Ms. Klaube received her BS in Ecology (minor in Plant Biology) from Cook College, Rutgers University. She then received her Masters from Montclair State University, with a concentration in Ecology and Evolution. She has taught classes in Dendrology, Wetland Ecology, Landscape Ecology and General Ecology and Biology at Rutgers and Montclair. The Biology Department is delighted to have these three working with us!

SCHOLARSHIP

STUDENT

Dr. Wendy Clement and three of her research students attended the Botanical Society of America's annual meeting held in Alberta, Canada this year. **Isabel Distefano, Theodore Stammer, and Patrick Gallagher** each presented a poster of their research pertaining to the phylogeny and/or morphology of *Viburnum* (Adoxaceae). Mr. Gallagher also received one of about 12 nationwide PLANTS travel awards (Preparing Leaders and Nurturing Tomorrow's Scientists) from the Botanical Society of America in support of his attendance.

Five students attended the 100th Annual Meeting of the Ecological Society of America held in Baltimore this past August, with their research mentor **Dr. Janet Morrison**. Presenting posters of their research at the meeting were **Ryan Goolic, Liz Matthews, Cindy Timko, Gio Tomat-Kelly, and Mitch Vaughn**.

Paul Mitchell traveled to Anchorage, Alaska in June with his research mentor **Dr. Matthew Wund** to attend and present research at the annual meeting of the Animal Behavior Society, and to additionally engage in field research and collect three-spine stickleback specimens and data. Their data collection was hampered by the wildfires that were spreading over much of the area at the time. We're glad they arrived back safely!

MUSE 2015

Twenty-two biology students participated in MUSE (Mentored Undergraduate Summer Experience) 2015, working with eight faculty members and making twelve presentations of research at the end of the eight-week experience. The students and their faculty mentors were:

+ **Preethi Govindarajan** and **Cecilia Johnson**, working with **Dr. Luke Butler**;
(continued next column)



Isabel Distefano, Theodore Stammer, and Patrick Gallagher (l-r) attended the Botanical Society of America's annual meeting in Alberta, Canada in July of 2015 with research mentor and professor Dr. Wendy Clement.

+ **Isabel Distefano, Patrick Gallagher, and Theodore Stammer**, with **Dr. Wendy Clement**;

+ **Taliah Khan, Kyle Siegel, and Dana Tedesco**, with **Dr. Gary Dickinson**;

+ **Alexa Avitto and Margaret Kennedy**, with **Dr. Tracy Kress**;

+ **Gia Pratta, Michael Wolek and Sam Platt**, with **Dr. Donald Lovett**

+ **Ryan Goolic, Cindy Timko, Elizabeth Matthews, Mitch Vaughn, and Jen Wells** with **Dr. Janet Morrison**

+ **Nirmity Borkhetaria and Farsha Rizwan**, with **Dr. Matthew Wund**

+ **Kate Badecker and Tim Salmon**, with **Dr. Nina Peel**

Wund Receives Eppley Grant

Matthew Wund, PhD, TCNJ '99, was recently awarded a grant from the Eppley Foundation, in support of his on-going research in Alaska, studying the rapid evolution of new populations of three-spine stickleback fish.

FACULTY (a sampling of publications)

Amanda Norvell, Jason Wong, Kristen Randolph, Letitia Thompson, 2015.

Wispy and Orb cooperate in the cytoplasmic polyadenylation of localized *grk* mRNA. *Developmental Dynamics*. Oct; 244(10):1276-85

Foster, SA, **Wund, MA**, Graham, MA, Earley, RL, Gardiner, R, Kearns, T, & Baker, JA (2015). Iterative development and the scope for plasticity: contrasts among trait categories in an adaptive radiation. *Heredity*. 115(4), 335-348.

Timmins-Schiffman E, **Coffey WD, Hua W**, Nunn BL, **Dickinson GH**, and Roberts SB. (2014) Shotgun proteomics reveals physiological response to ocean acidification in *Crassostrea gigas*. *BMC Genomics*. 15: 951.

Odum, RA and **HK Reinert**. 2015. The Aruba island rattlesnake *Crotalus unicolor* SSP: a case history in *ex situ* and *in situ* conservation. *International Zoo Yearbook* 49: 104-112.

Hollingsworth, A and **HK Reinert**. 2015. *Crotalus horridus* (Timber Rattlesnake): Coloration, pattern, exophthalmia, and enophthalmia. *Herpetological Review* 46 (3) :444-445.

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UPCOMING EVENTS

Biology Colloquia, Spring 2016

Generally held in SC-P101

Friday, February 12

Eric Goldwaser, TCNJ '11
Rowan School of Osteopathic Medicine

Friday, March 11

Erik Cordes, Temple University

Friday, March 25

Michael Reiskind,
North Carolina State University

Friday, April 22

Michael Elnitsky, Mercyhurst College

Hippocrates Luncheon

Sunday, April 3, Noon

Business Building Lounge

AMSA's 4th Annual Hippocrates Luncheon brings together students interested in med school with our health-professions alumni for an informal lunch and panel discussion about careers in medicine and the health professions.

Tri-Beta Induction Ceremony

Friday, April 8, 7 pm

Education Bldg, Room 115

The best and brightest of our majors will be inducted into *Beta Beta Beta*, the national biology honor society at this annual event. At 8 pm, Dr. Michael Kalos, Chief Scientific Officer in Cancer Immunobiology at Eli Lilly and Company will speak about genetic approaches to immunotherapies for various cancers.

Biology Awards Dinner

Date and Location TBA

Each year, the department presents awards to those seniors who have demonstrated outstanding accomplishment and academic excellence in biology. At this writing, the date and location have not yet been set, but will likely be on a Friday evening in early May at a local restaurant.

Commencement!

Thur May 19 and Fri May 20

Department Ceremony

Celebrate with family, friends and alums as members of the Class of 2016 receive their diplomas and set off for fame and fortune! The time and location for the Biology Dept ceremony has not yet been announced, but will certainly be posted on the TCNJ website in the near future. The Main Ceremony will be held in Lions Stadium at 5:30 pm on Thursday, May 19, 2016.