TCNJ THE COLLEGE OF NEW JERSEY

EVOLUTIONS

NEWS OF THE DEPARTMENT OF BIOLOGY

Volume 3, No. 1 Spring 2016

FROM THE DEPARTMENT CHAIR

We started *Evolutions* in the 2013/2014 academic year, and in that short time the dynamic field of biology has seen amazing new discoveries. As my three-year term as Department Chair comes to a close, I am taking a moment to reflect on our field. Here are just a few highlights from genetics, evolution, and physiology.

In 2013, CRISPR was announced. It is a revolutionary new genetic technique that provides a fast and precise way to edit snippets of the genetic code. Its potential use in basic research and medicine are profound.

In 2014, evolutionary biologists made great strides in understanding the major evolutionary transition from dinosaurs to birds. By comparing many fossils to existing birds, they learned that feathers evolved in many different dinosaur lineages, well before birds appeared, and functioned as insulation, for display, and possibly helped in balance. The feathered dinos that eventually gave rise to birds also evolved smaller bodies and lighter bones.

In 2015, biologists studying the bowhead whale, which can live more than 200 years, reported on two unique gene mutations that help the whales avoid cancer and aging, even though they have 1,000x more cells than humans. Our excitement over discoveries like these fuel the Department's mission to provide the highest caliber education in biology to our students.

—Janet Morrison, Chair

PAC Launches Science Travel Award Fund

Students present their research at a poster session on campus during the 2016 Celebration of Student Achievement. The Physicians Advisory Committee has initiated a fund to help support students' travel to regional and national conferences to present research.

The Physician's Advisory Council, created in 2014 to help guide our students in their journeys to medical school, has initiated a fund to encourage independent research through partial funding of science student research presentations and travel to regional and national meetings. Recognizing the educational foundation which research can provide, and the importance of presenting research at a regional or national level, the Council recently established an endowed fund that one day will help to support the costs of meeting registration, submission fees, housing and transportation for deserving undergraduate science students at TCNJ.

Crystal Denlinger, MD '98, Assistant Professor in the Department of Medical Oncology at Fox Chase Cancer Center in Philadelphia, recognized the need to assist students in financing travel to present research findings, and took a lead role in creating the Science Research Presentation Fund, an opportunity for alumni physicians and others to contribute to the endowment fund.

"For many of us, research that we performed in college helped us build a competitive application to medical school," said Denlinger. "Establishing, and most importantly, growing this fund will enable us to support the best and brightest candidates on their journey towards their careers."

Questions about the Science Research Presentation Fund, or the process by which one can contribute to it, should be directed to Mr. Guy Calcerano in the TCNJ Office of Development. He can be reached at Guy.Calcerano@tcnj.edu.

NEWS BRIEFS

2016 Excellence in Biology Awardees Announced

Fourteen seniors recently received the 2016 *Excellence in Biology* awards, based on the overall criteria of academic excellence, dedication, and involvement in the college community. The awards were presented at the annual Awards Banquet at the end of the semester, and include a monetary award as well as a certificate.

Syndi Barish and **Andrew Goldfarb** tied for First Place for the Becton-Dickinson Award, with **Pratheek Mangini** receiving Honorable Mention. The Joseph Vena Award went to **Luke Pasick**, with **Pavan Patel** and **Nikita Paripati** receiving Honorable Mentions. **Paul Mitchell** received the Faculty Award, with **Jimi Salako** and **Kristen Randolph** taking Honorable Mentions. **Grace Lugo and Devon Gardner** shared First Place for the Secondary Education Award. And finally, the Susan Uyhazi Award was given to **Danielle Flood,** with Honorable Mentions being given to **Lauren McKay and Lydia Huang**.

Our heartiest congratulations go to these seniors on their exceptional accomplishments! We are sure that their futures are bright!

Beta Beta Best!

TCNJ's *Chi Upsilon* chapter of *Beta Beta Beta* (the national biology honor society) was recently designated an "Outstanding Chapter" for the academic year 2014-2015. This recognition is given to no more than the top 10% of chapters in the country, and is based on our chapter's efforts to promote scholarship, biological research, and the dissemination of scientific information.

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

Helen Kull, Editor biology@tcnj.edu

Major Impacts of Non-Majors' Courses

"A better educated citizenry is the goal of a liberal arts educational institution," says Sudhir Nayak, PhD.

The Biology Department at The College of New Jersey has earned a highly enviable reputation for the rigor and quality of our undergraduate program. Each year, our majors reinforce that reputation far and wide as they enter and excel at graduate level biology programs, medical schools, teaching positions, research institutions and life-science related careers.

However, a significant number of students participate in our program each semester for whom biology will never be a career. The content and quality of our "non-majors courses," such as *Genetics in the News*, and *Biology of Alien Invaders,* is equally important. As the life sciences become more interdisciplinary, and increasingly a part of everyone's daily life in the form of healthcare decisions, environmental sustainability, nutrition and healthy lifestyles, threats from invasive species, and issues related to genetically-modified foods, assisted reproductive technology, stem cell therapies, etc., these course offerings are timely, and must adapt to a changing world.

"Integral to education at a liberal learning institution is not only science students taking non-science courses, but, equally important, non-science students taking science courses," adds Dr. Nayak, course instructor for *Genetics in the News*.

Each semester, non-majors courses are re-examined, revised, or newly created to help meet the needs of 21st century citizens in an increasingly biological world.

Wund Research Receives Eppley Support

Cheney Lake in Alaska is once again the research destination this spring for Professor Matthew Wund, Ph.D., and two of his research students for his continuing work "investigating the early stages of adaptive evolution in threespine stickleback fish."

But this time, they'll travel with the support of Captain Marion Eppley – or at least of his legacy, The Eppley Foundation.

Eppley was a physical chemist born in New Jersey and educated at Princeton a century ago. He served his country at sea in two world wars, spent decades engaged in research involving solutions and electromotive force, and established the Eppley Foundation for Research. The Foundation supports projects in the biological and physical sciences, and this year is supporting Wund's annual research work in Alaska.

"I'm so pleased to have the support of the Eppley Foundation for my research," says Wund. "With their long history of support for basic scientific research, they honor the memory of Captain Marion Eppley, who served our country honorably both as a scientist and a naval officer."

Wund's research involves the interactions of an individual organism's physical and behavioral traits (phenotypic plasticity) with the evolutionary mechanism of natural selection among the organisms within the population as they adapt to new environments. His initial findings from the work at the Cheney Lake site are currently in press (see citation next page), and include two TCNJ student co-authors, Omi Singh ('12) and Ashley Geiselman ('11).

SCHOLARSHIP

Research Presentations:

Two TCNJ Biology students, **Kyle Siegel** and **Dana Tedesco**, accompanied by Dickinson Lab Research Technician **Jessica Nardone '15,** presented research at the 45th Benthic Ecology Meeting in March in Portland, Maine. The topics of their research presentations were:

Kyle Siegel: "Effects of salinity on adhesive and shell properties in the barnacle *Amphibalanus amphitrite*"

Dana Tedesco: "Ocean acidification affects shell formation but not adhesion in the barnacle *Amphibalanus amphitrite*"

Kyle Siegel and Dana Tedesco take time out from their poster presentations at the 45th Benthic Ecology Meeting to view their model organisms *in situ* along the Maine coast.

Three TCNJ Biology students – **Alexa Avitto, Danielle Flood,** and **Margaret Kennedy** - recently attended the American Society for Biochemistry and Molecular Biology Meeting in San Diego with their research mentor, Tracy Kress, PhD. Ms. Kennedy received a TCNJ Honors Program Travel Award towards the trip, and both Dr. Kress and Ms. Avitto received Travel Awards from the ASBMB to help finance a portion of the trip. Their research presentation topics were:

Alexa Avitto: "An Investigation of the Role of the NuA4 and Swr1 Complexes in Coordination of Transcription and RNA Splicing"

Danielle Flood and **Margaret Kennedy:** "Histone H3K36 Methylation is Required for Efficient Pre-mRNA Splicing in *Saccharomyces cerevisiae*"

Alexa Avitto, Margaret Kennedy, Tracy Kress and Danielle Flood arrive at the EB Meeting in San Diego.

Eight TCNJ students attended the 7th Annual Lehigh Valley Society for Neuroscience Undergraduate Research Conference in April at Moravian College, accompanied by research mentor Jeffery Erickson, PhD. Two of Dr. Erickson's lab students, **Anshu Patel** and **Sapna Shah**, presented posters on their research, and **Sapna Shah** received first place of 32 posters total in the poster competition, with her poster, "Maternal behavior in a serotonin-deficient context: Continuing analysis of the Pet-1 knockout mouse".

Five TCNJ research students accompanied Janet Morrison, PhD and research technician Carolyn Klaube to Kutztown University in April to attend the annual meeting of the Mid-Atlantic chapter of the Ecological Society of America. Four students presented research, and **Jennifer Wells'** poster presentation earned 2nd Place in the Undergrad Poster Competition. Congrats!

Senior Biology major **Abby Calixto** will present research at the American Society for Microbiology Meeting in June in Boston, with a poster entitled: "Characterization of Mutations in Acinetobacter baylyi ADP1 yqgF Reveals an Unexpected Role in Enhancing Susceptibility to DNA Damage." Ms. Calixto received two separate, competitive travel awards totaling $2,000 from among applicants across the nation to help fund her travel to the meeting. Congratulations, Abby!

Newly Published:

Wund, M. A., O. D. Singh, A. Geiselman, and M. A. Bell. In Press. Morphological evolution of an anadromous threespine stickleback population within one generation after reintroduction to Cheney Lake, Alaska. Evolutionary Ecology Research.

Rittschof D, Essock Burns T, **Dickinson GH,** Zmina S, and Alberman N. Natural glues and fouling management by interfering with glue curing. 2015. SQU Journal of Agriculture and Marine Sciences. 19:34-39.

Sokolova IM, Matoo OB, **Dickinson GH,** and Beniash E. Physiological effects of ocean acidification on animal calcifiers. 2016. In: Stressors in the marine environment: physiological and ecological responses and societal implications, Sloan M and Whiteley N, Eds. Oxford University Press, Oxford, UK.

Sorenson MR, Jha DK, Ucles SA, Flood DM, Strahl BD, Stevens SW, **Kress TL**. Histone H3K36 methylation regulates pre-mRNA splicing in Saccharomyces cerevisiae. RNA Biol. 2016 Apr 2; 13 (4):412-426.

Department of Biology
PO Box 7718
Ewing, NJ 08628-00718

TCNJ THE COLLEGE OF NEW JERSEY

Upcoming EVENTS

COMMENCEMENT 2016!

Biology Department Ceremony

Friday, May 20 at 9 am in Packer Gym

Main (College-Wide) Ceremony

Thursday, May 19 at 3 pm in Lions Stadium
(or indoor venues if necessary)
More information at
http://commencement.tcnj.edu/

MUSE!

The 2016 Mentored Undergraduate Summer Experience (MUSE) runs campus-wide June 6-July 29. This year, eight labs will be filled with 17 research students gaining critical research skills, and contributing to work at TCNJ.

FACULTY SKETCH

Keith Pecor, Ph.D

Associate Professor
Ecologist
9 Years at TCNJ
Incoming Chair of Biology Department

BS, Biology, University of Memphis
MS, PhD, Biology, University of Michigan

Favorite course as an undergraduate: Invertebrate Zoology
Favorite non-science course as an undergrad: History of Immigration to the United States
Research interests: Ecology of freshwater invertebrates
Hobbies: Motorcycles, guitars, and woodworking