

FROM THE DEPARTMENT CHAIR



Circadian rhythm is a concept understood by scientists and non-scientists alike. It refers to activity peaks and valleys across an approximately 24-hour day (circa = about, dies = day). As obvious as this may seem, documenting the cellular and molecular mechanisms underlying circadian rhythms was the stuff of a recent Nobel Prize for Physiology and Medicine awarded to Jeffrey C. Hall, Michael Rosbash, and Michael W. Young. Interestingly, these scientists did not study humans in their efforts to understand a phenomenon of interest to humans. They did not even study a mammal. Instead, they used a “model system” in the form of fruit flies. A model system is an organism that has characteristics that make it especially well-suited to answering certain types of questions. In our own curriculum, we have a lab module in the introductory course for majors that makes use of the model system of stickleback fish for understanding anatomical evolution.

While the work of Hall, Rosbash, and Young earned a Nobel Prize, projects undertaken as “basic science” should be respected on their own merits, even if they fail to have ready application and yield international acclaim. If their work ultimately had no relevance to human affairs, it would still have been valuable in helping us to better understand nature. As we navigate a society that is increasingly hostile to basic science and a scientific understanding of the world, support for basic science becomes ever more important. (continued on page 2)

Renovations Coming to Biology Building

As a commentary on the frequency of pugilism in the sport, there is an old joke from Rodney Dangerfield that he “went to a fight the other night and a hockey game broke out.” Similarly, arriving at TCNJ during the past several years has felt like visiting a construction site at which a college campus broke out due to the numerous concurrent projects. While much of the work is now finished - Campus Town is up and running, Brower Student Center (aka, The Stud) has a fresh new look, and the STEM Building has been erected on the old footprint of Holman Hall, it is now Biology’s turn for some cosmetic and functional renovations. In addition to creating connections to Chemistry and STEM on the north and south ends of the building, respectively, there are a number of changes in the works, both large and small. Preceding any construction, the common spaces on all three floors were treated to new furnishings by Dean Osborn and the School of Science. The new tables and chairs have improved the aesthetics and comfort of the updated spaces. The more substantial changes are the renovations of Dr. Norvell’s research lab, the Botany teaching lab, and Dr. Shevlin’s research lab.



The space that served as Dr. Norvell’s lab for the past several years was formerly a teaching lab surrounded by satellite spaces devoted to various elements of microscopy (e.g., darkroom, microtomes). After the renovations, these spaces will have been transformed into a formal research lab, several faculty offices, and a student study space. Given her prominent role in the planning and her occupancy of both lab and office space following completion, this area of the building has been affectionately dubbed “Amanda World.”

In much the same way that the former Spectrophotometry Lab was repurposed as a shared research space for Drs. Nayak and Peel, the Botany teaching lab is being converted at present into a shared space for Drs. Elliott and Kress. Owing to similar equipment needs and other synergies, this should be a productive arrangement for these two teacher-scholars. In addition, the prep space from the lab will become a new home for shared instrumentation.

Finally, Dr. Shevlin will move to a new lab space in Fall 2018, and his existing lab will be renovated to both allow a first-floor connection to the STEM Building and create a large group study / meeting space. The latter space is likely to be in demand for lab meetings and practice presentations, as it will have an A/V system, whiteboards, and new furnishings.

While these several projects could have the potential to be disruptive, the effects have been minor to date. The affected faculty, particularly Drs. Norvell and Shevlin, have been understanding and adapted to the changes in timing and scope that are usually unavoidable in any construction project, much less one of this magnitude. Further, campus construction and the contractors for this work have been excellent partners thus far in the process.

You are welcome to drop in and survey the state of the building, but please “pardon our appearance” until late 2019. The results should be worth the wait. ~ K.W. Pecor

NEWS BRIEFS

Alum Publishes in PNAS

Biology and Applied Mathematics double major **Syndi Barish '16**, a past Goldwater Award honoree who is currently seeking a PhD at Yale University, was recently a co-author of her research at TCNJ with faculty mentors Dr. Dana Gevertz and Dr. Michael Ochs in a paper published in the prestigious scientific journal, the Proceedings of the National Academies of Sciences (PNAS).

Published in July, 2017, Ms. Barish's paper, entitled "Evaluating optimal therapy robustness by virtual expansion of a sample population, with a case study in cancer immunotherapy," presents a method of using mathematical techniques to assess the efficacy and "robustness" of cancer therapies against a host of variables, including cancer type, site, side effects, etc.

The Proceedings of the National Academies of Sciences is a highly regarded, multi-disciplinary scientific journal which is global in scope. Our heartiest congratulations are extended to Syndi and to the faculty co-authors on the publication of their excellent work.

Jim Bricker Retires from Dept

There will be one less familiar face in the biology building next semester as Assistant Professor James Bricker, PhD retires after decades of teaching, research and other activities at The College of New Jersey.

Dr. Bricker has taught *Microbiology* and *Lab Techniques in Molecular Biology* for many years, and his research has included studies of the conservation genetics of the corn snake and white-tailed deer.

Dr. Bricker has also served from time to time as the Faculty Advisor to the TCNJ Fencing Club. Dr. Bricker is a fencing champion with world-class standing.

Jim – and his wry sense of humor – will be greatly missed. We wish him all the best as he engages in new activities in retirement.

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

Helen Kull, Editor biology@tcnj.edu

"Tasting the Tree of Life" Wins Awards

Long after the roasted crickets, breadfruit cakes and star fruit salad have been consumed and metabolized, the special dining event, "Tasting the Tree of Life: Exploring Biodiversity through Cuisine" held last February 28 continues to be a wild success.

On the academic side, a paper entitled "Tasting the Tree of Life: Development of a collaborate, cross-campus, science outreach and meal event" has been accepted for publication by the *Journal of Microbiology and Biology Education*. The proud authors of the paper are Dr. Wendy Clement, Dr. KT Elliott and Dr. Jeffrey Osborn, and TCNJ/Sodexo managers Patrice Mendes and Karen Roth, as well as students I. Destefano, K. Kearns, R. Kumar, A. Leto, J. Tumaliuan, L. Franchetti, E. Kulesza, and N. Tineo.

On the food service side, the event garnered "first place" recognition as 2017's "Best Special Event" by Food Management Magazine. Especially impressive to the judges was the unique,

creative menu that included 149 species/ingredients across the tree of life, many not usually offered in a dining hall, such as frog legs, vegemite, alligator sausage, and turtle soup.

While guests sampled and enjoyed the unusual foods, they also learned about the biodiversity of the planet, and the evolutionary origins of the food we eat. An "Ingredient Tree" was present at each station, and biology-students-turned-field-guides were on hand to provide additional information and occasional demonstrations.

The event not only taught attendees about the connections of food to living organisms and evolutionary processes, but also provided an unusual opportunity to highlight the chef's creativity and skills in preparing all manner of food in a delicious, delightful and educational manner. Kudos to all involved!

Welcome Dr. Melkamu Woldemariam!

The Biology Department is very pleased to have Dr. Melkamu G. Woldemariam join the department as our newest Teacher-Scholar Fellow. Dr. Woldemariam is a molecular ecologist who studies the regulation of plant defense responses against herbivore attack. He earned his PhD from the Friedrich-Schiller University and the Max Planck Institute for Chemical Ecology in Jena, Germany. His research at the Max Planck Institute was centered on understanding the ecological roles of regulatory genes that orchestrate jasmonate-mediated transcriptional and metabolomic responses

of *Nicotiana attenuata* plants against attack by the specialist herbivore, *Manduca sexta*.

Prior to joining TCNJ, he worked as a post-doctoral researcher at the Boyce Thompson Institute in Ithaca, NY, and an adjunct faculty member at Tompkins Cortland Community College in Dryden, NY. Melkamu is an outdoor enthusiast, and enjoys hiking, swimming and playing soccer. We are very happy to have Dr. Woldemariam on board!

From the Department Chair (continued from page 1)

I speak from experience. During college, I worked as a bookstore clerk in my hometown. While on the job after my junior year, one of my elementary school teachers, a lady whom I held in high esteem, appeared in my store. She recognized me and asked for an update. I shared that I was near completion of my bachelor's degree and planning for grad school in biology. Intrigued, she asked which disease I planned on curing. When I replied that I wanted to study the ecology of freshwater animals, this educator asked me why I would choose to waste my life on such a pursuit.

In the moment, I was undeterred and brushed aside her commentary. Such is the hubris of youth. As I reflect on this event nearly 20 years out, I better understand that "science for the sake of science" can be a tough sell, even for individuals whom we might otherwise count as allies. Therefore, it is the responsibility of us all to share with our friends and family the importance of scientific research, however esoteric it may seem on the surface. Even if there is no obvious connection to a tangible human benefit, you never know when fly research might help us better appreciate our sleep patterns.

- Keith Pecor, Chair

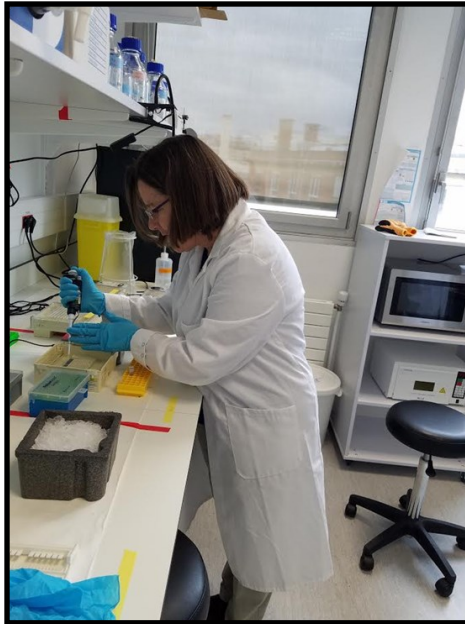
SCHOLARSHIP

Sabbatical à L'Institut

Professor Marcia O'Connell (right) spent three months of her sabbatical in Paris, working with colleagues at the Pasteur Institute. Here is a brief report of her experience:

Every Monday through Friday for three months during the spring of 2017 I woke up at 8 a.m. in my apartment in Montmartre, took the metro to L'Institut Pasteur, walked up to the 5th floor of Le Bâtiment Jacob Monod, and pinched myself. I was on sabbatical and working full-time in the lab of my dear friend and brilliant colleague, Dr. Laure Bally-Cuif. It was a magical experience, and as I have said many times since, it was everything I had hoped for – and more.

Living in Paris in an apartment directly across from Sacré Coeur, walking over to Place du Tetre, or eating the occasional meal at the Crêperie on the first floor of my building, were all a dream come true. I had always wanted to use the French I had learned in college to live in a French-speaking country, and since I had wisely subjected myself to the very strict tutoring of M. Gilbert Segal during the fall of 2016, I was



thrilled that my French had returned to a solid intermediate level when I arrived in Paris. In addition, although I occasionally made mistakes – for example accidentally ordering “Un brioche” instead of “Une brioche” – I found the French to be universally delightful, patient, warm, and appreciative.

The icing on the cake therefore was that I was actually able to accomplish several of my scientific goals as well! I had written a proposal to carry out two sets of experiments while in Dr. Bally-Cuif's lab, and arrived with a box containing

three tubes of DNA that I would need for my experiments. As a result of Laure's incredible generosity and spectacular facilities – as well as the tremendous patience of her colleagues, especially Marion Coolen and Delphine Cussigh – I left the lab with that same box, but with 61 additional tubes! New DNA constructs I had made, fixed embryos from experiments I had performed, RNA transcripts and antibodies given to me by Marion, morpholinos purchased for me by Marion..... a treasure trove!

As I now sit in my office at TCNJ back in New Jersey, I am excited about the research I will now be able to conduct with my students for years to come, but also newly appreciative of the 23 years I have spent at this institution. I have received tremendous support over the years to do a job I truly love – but also to stretch far beyond what I thought was my potential, both personally and professionally. Bien fait TCNJ!! ~M.O.C

Newly Published

Coffey WD, **Nardone JA**, Yarram A, Long WC, Swiney KM, Foy RJ, and **Dickinson GH**. 2017. Ocean acidification leads to altered micro-mechanical properties of the mineralized cuticle in juvenile red and blue king crabs. *J. Experimental Marine Biology and Ecology*. 495: 1-12.

Marshall, C.A. & **Wund, M.A.** 2017. The evolution of correlations between behavioural and morphological defense in Alaskan threespine stickleback fish (*Gasterosteus aculeatus*): evidence for trait compensation and cospecialization. *Evolutionary Ecology Research* 18: 305-322.

Morrison, J.A. 2017. Effects of white-tailed deer and invasive plants on the herb layer of suburban forests. *AoB PLANTS* 9 (6), plx058, <https://doi.org/10.1093/aobpla/plx058> (in the Special Issue, Interactions between white-tailed deer and invasive plants in North American forests)

Duhita Mahatmya, D., **J.A. Morrison**, R.M. Jones, P.W. Garner, S.N. Davis, J. Manske, N. Berner, A. Johnson, and J. Ditty. 2017. Pathways to undergraduate research experiences: a multi-institutional study. *Innovative Higher Education* 42:491-504.

Research Presentations

Goolic, Ryan and **J.A. Morrison**. Facilitative interactions between two invaders of suburban forests: *Microstegium vimineum* and *Alliaria petiolata*.

Sohn, Olivia and **J.A. Morrison**. Herbivory and induced thorn defenses in native and non-native invasive plants in suburban forests. (poster, presented by student)

Grillo, Marisa and **J.A. Morrison**. The role of bird dispersers and edge effects in the invasion of a non-native shrub, *Berberis thunbergii*, in a fragmented suburban forest. (poster, presented by student)

Bellissimo, Katherine. YqgF/YqgE interactions and role susceptibility to DNA damage. Poster presentation by student at the American Society for Microbiology Microbe Annual Conference, June 2017.

Accepted for Publication

Clement, W.L., K.T. Elliott, O. Cordova-Hoyos*, I. Distefano*, K. Kearns*, R. Kumar*, A. Leto*, J. Tumaliuan*, L. Franchetti, E. Kulesza*, N. Tineo*, P. Mendes, K. Roth, and J.M. Osborn. Accepted. Tasting Tree of Life: Development of a collaborate, cross-campus, science outreach and meal event. *Journal of Microbiology and Biology Education*.

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UPCOMING EVENTS

Hippocrates Luncheon Sunday, April 8, 2018

AMSA's 6th 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 6, 7 pm Location: ED 212

Some of our best and brightest will be inducted into *Beta Beta Beta*, the national biology honor society, at this annual event. The guest speaker for this event is **Dr. David Gruber**, Professor of Biology at CUNY-Baruch College, Radcliffe Fellow at Harvard University, and a National Geographic explorer.

COMMENCEMENT 2018!

Thurs May 17 and Fri May 18

Celebrate with family, friends and alums as members of the Class of 2018 receive their diplomas and set off for fame and fortune. The time and location for the Biology Department Ceremony has not yet been announced, but will certainly be posted on the TCNJ website in the near future. The Main College-Wide Ceremony will be held in Lions Stadium at a time yet to be announced over the course of the two-day event.

More information will be available at <http://commencement.tcnj.edu/>

Of Trails and Paths Forward

David Ecker,

Class of '76, visited the campus this past fall after decades away, and was very pleasantly surprised to find his independent study project—the nature trail behind Kendall Hall—still there! The project was done under the supervision of ecology professor Ed Rockel. Mr. Ecker went on to earn a PhD in biochemistry, and has had a successful career in medicinal chemistry and pharmacological research. He founded bio-scientific companies, and served as a science advisor to the US Dept. of Health and Human Services. He recalls the Biology Dept. at TSC fondly, and is impressed with the changes on campus - and things that are the same!

