



BIOrhythms

Washington University Biology Department Newsletter

November 2017

Do You Have...

An announcement you'd like to make?

An interesting story or fun fact you'd like to share?

A professor or course you'd like to suggest for a spotlight?

We want your input! Send ideas and information to:

gerrity@wustl.edu

Helpful Links

[Biology Home Page](#)
[Biology Course Listings](#)
[Faculty Listings](#)

BIOrhythms is a publication of the Washington University Biology Department for Undergraduate Majors

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Calendar: Biology Events and links to event listings



Faculty Spotlight: Rachel Penczykowski



*Dr. Penczykowski, Rachel Fan (junior), and Austin Chen (sophomore) examine *Plantago* seedlings in the Goldfarb Plant Growth Facility*

Dr. Rachel Penczykowski grew up in Madison, Wisconsin, spending seven years of her childhood in the agricultural town of Immokalee, Florida, before moving back to Madison in 9th grade. As a child in southwest Florida, she enjoyed exploring the outdoors, often leading her siblings and friends on “backyard safaris” that involved counting and measuring flora and fauna including pinecones, citrus fruits, and anole lizards. More exciting safaris were possible when her family visited the nearby Audubon Corkscrew Swamp Sanctuary, where an incredible biodiversity of birds – as well as plenty of alligators – can be seen in the old growth bald cypress forest. Dr. Penczykowski attended public schools for her K-12 education, but her parents invested a lot of resources in private violin lessons. After 14 years of weekly violin lessons, thousands of hours of practicing, and several years of youth orchestra rehearsals, Dr. Penczykowski won a full-tuition music scholarship to the University of Wisconsin-Madison. There, she completed her B.S. degree as a double major in Biology and Music Performance. As an undergrad, she worked first in a lab in the Dept. of Biomolecular Chemistry, and then at the Center for Limnology (study of lakes and inland waters). At the Center for Limnology, she spent one summer supported by an NSF REU (Research Experience for Undergrads) grant to carry out an independent project studying phosphorus cycling in lakes.

She also spent two summers on field crews collecting water chemistry, plankton, and fish data for the North Temperate Lakes Long Term Ecological Research program. —cont'd on p. 2

WASHINGTON UNIVERSITY CAREER CENTER

Locations:

Danforth University Center,
Suite 110 with satellite offices
in Lopata Hall, Brauer Hall and
Steinberg Hall

Main Office Hours in the Dan-
forth University Center:
Monday-Friday: 8:30-5:00

Contact Us:

Phone: 314.935.5930

Fax: 314.935.5905

E-mail: careers@wustl.edu

Website: careercenter.wustl.edu

Have a Quick Question?

You can always stop by the
Career Center's Quick Ques-
tion hours in the main office
Monday-Friday, 11am-5pm for
assistance with CAREERlink,
writing your resume and cover
letters, or for quick guidance.

UPCOMING CAREER CENTER EVENTS

Winter Road Shows

Road Shows are 1-2 day trips
that focus on a specific interest
area within a city. Students have
the opportunity to meet with
organizations and learn more
about the various career paths
in the field. Road Shows are
open to all full time Washington
University students. St. Louis:
Biotech + Biomedical (Jan
10-11); Nov. 10: Winter Road
Show Information Session,
DUC, Room 248, 12 pm

How to Find an Internship in Global & Public Health

Come learn how to leverage

—CONT'D ON NEXT PAGE



*Observing nature at the Corkscrew Swamp
Sanctuary just outside of Immokalee,
Florida (L-R: friend, Rodelin; brother,
Isaac; Dr. Penczykowski; not pictured: sister,
Zoe). Photo taken ca. 1994.*

Dr. Penczykowski held two postdoctoral research positions before joining the faculty at Wash U. The first was in the lab of Dr. Anna-Liisa Laine at the University of Helsinki, Finland, where she studied the ecology and evolution of disease focusing on a common weedy plant (*Plantago*) and its powdery mildew pathogens on a Finnish archipelago. Her second postdoc was at her alma mater, UW-Madison, in the lab of Dr. Tony Ives. There, she studied food webs in agricultural systems, especially interactions involving pea aphids in alfalfa fields, the ladybugs and parasitoid wasps that attack pea aphids, and viruses that pea aphids transmit between plants.



*Dr. Penczykowski's field assistants
(L: brother, Isaac; R: friend, Felipe) collect
data during a backyard safari in Immo-
kalee, Florida, in 1993.*

Dr. Penczykowski studies these questions using common weeds like *Plantago* both because they are convenient model systems, and because diseases of uncultivated plants sometimes spillover to crop species. She views the “agro-ecological interface” as a critical frontier for future research.

Dr. Penczykowski joined the Wash U Biology Department in Fall 2017 and will begin teaching courses next year. She is also a Bio 200/500 Independent Research mentor and currently has two undergrads working in her lab. The students are involved in local field work to census and collect seeds and pathogen samples from plants in Forest Park, Tyson Research Center, and Shaw Nature Reserve. They also cultivate the focal host plants in the greenhouse and perform powdery mildew inoculations and identification in the lab.

For fun, Dr. Penczykowski plays violin and occasionally trains for triathlons. But mostly, she and her husband chase after their two young children, who sometimes join in for field work! To learn more, visit her lab page at: <https://penczykowskilab.com/>.

Faculty Spotlight: Rachel Penczykowski

Cont'd—These exciting opportunities to conduct research as an undergrad helped her decide to go to graduate school to study ecology.

During an Intro to Parasitology course in her senior year, Dr. Penczykowski first learned of the field of disease ecology. After months of grossing out her friends and roommates with tales of parasites she'd learned about in class, Dr. Penczykowski came to realize that the ecology of host-parasite interactions was the topic she was most passionate about and wanted to pursue for a PhD. She completed her PhD in Biology in the lab of Dr. Meghan Duffy at Georgia Tech, studying how fungal diseases of the small freshwater crustacean *Daphnia* are affected by lake environments, and the effects of such diseases for aquatic food webs. Her dissertation research involved integrated field, lab, and mathematical modelling components.

Dr. Penczykowski's PhD and postdoc research on diseases in different types of ecosystems has inspired the projects she is currently tackling in her lab here at Wash U. These include studying *Plantago* species and their fungal pathogens along a latitudinal gradient spanning the entire Mississippi River, across large-scale variation in climate and other environmental factors. One question that fascinates Dr. Penczykowski is how variation in winter temperatures and snow cover affects pathogen overwintering success and resulting patterns of epidemiology and host-parasite coevolution. She is also broadly interested in the role parasites play in food webs, and plans to investigate how plant diseases affect the flow of energy and nutrients to soil communities, herbivores, and higher trophic levels.

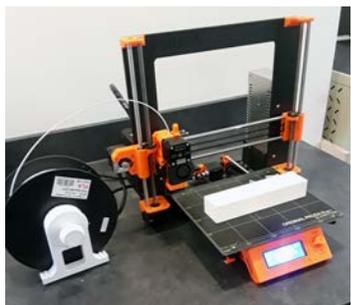
Research Spotlight: Undergrad Odion Asikhia's Bio 500 Research in the Strassmann Queller Lab

During the course of evolution there have been many key innovations that have fundamentally altered life on earth. For example, the transition of prokaryotes to eukaryotes, asexual to sexual populations, primate to human societies represent just a few of these types of innovations. My research is specifically interested in the transition from unicellular to multicellular life. This transition is fascinating because multicellularity requires an immense amount of cellular cooperation. Our previous research has shown relatively simple mechanisms such as how an organism grows or disperses to new habitats can either promote or disrupt this cooperation and the evolution of multicellularity.

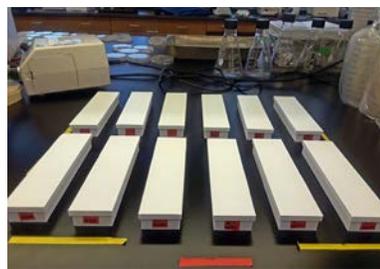
In this study, we want to investigate the importance of germline sequestration in the evolution of multicellularity. Germline sequestration is thought to be important in the transition from unicellular to multicellular life as it allows organisms to differentiate or segregate specialized germline cells (that pass on genetic information to the next generation). This could prevent the spread of non-multicellular cell lines and allow stable multicellularity to evolve. The goal of my experiment is to manipulate the transfer of germline cells and observe how it influences the evolution of multicellularity.

I am using the social amoeba *Dictyostelium discoideum* to create pseudo-organisms (i.e. synthetic multicellular organisms made up of millions of microbes) in order to test how different types of germline sequestration affect the evolution of multicellularity. I have created these pseudo-organisms by 3D printing growth plates with specific characteristics that allows me to test effects of sequestration. In short, early compartmentalized segregation of germline cells should result in the greatest promotion of multicellularity as there are fewer cell divisions for mutant non-multicellular mutants to emerge.

This experiment is interesting as it will increase our understanding of what environmental and selective forces promote this transition to multicellularity. It gives us a different perspective in understanding diseases that function on the breakdown of multicellularity, ex cancer. It also provides one explanation for why plants are less susceptible to metastatic cancer compared to humans. These 3D printed pseudo-organisms are also unique because they afford us the ability to explore lifecycles that do not exist in nature.—*Odion Asikhia*



Odion Asikhia created pseudo-organisms by 3D printing growth plates with specific characteristics that allows her to test effects of germline sequestration in the Strassmann/Queller Lab.



CAREER CENTER cont'd— your time off during winter break to: develop a target list of nonprofit health agencies, health departments and government agencies; build relationships with public health professionals; explore options and career paths. Nancy Klepper and Deanna Kopriva McPherson, public/global health career consultants, will lead a discussion as well as answer questions. Please bring your laptops as various relevant websites will be explored. Nov. 13: How to Find an Internship in Global & Public Health, DUC, Room 232, 5:30 pm

Career Early Action

First Year students including dual degree and sophomores, are you already thinking about summer 2018? If you're an early planner, this program is right for you.

We'll discuss how you figure out what to do over summer breaks, including finding your tribe, networking and information interviews, and other search strategies.

This program is offered three times! Choose the date that best fits your schedule and RSVP in CAREERlink.

Nov. 16: Career Early Action, South 40 House, College Hall, 6 pm

Nov. 17: Career Early Action, DUC, Room 276, 1 pm

Nov. 20: Career Early Action, South 40 House, College Hall, 6 pm

For more upcoming events, go to careers.wustl.edu/events.

Course Spotlight: Bio 4936 Seminars in Ecology and Evolution

Coursemaster: Joan Strassmann—strassmann@wustl.edu
Assistant to the Instructor: Tyler Larsen—tjlarsen@wustl.edu

What: At least once a week there are seminars from researchers in ecology or evolution. These seminars are given by local people and by visitors. This semester there are also a number of presentations by job candidates. The point of these seminars is to learn about exciting research. What questions are they asking? What are they discovering? What new scientific stories can we hear about ecology or evolution? What makes up these fields anyway? The seminars are often followed by receptions which are a chance to get to know each other better and to ask questions.

This course invites undergraduates to listen to these presentations and write about them. After all, this is a major part of the ideas climate at Wash U. It would be a great idea to get in the habit of going to seminars, with this course, or without.

In addition to attending seminars, we will meet three times during the semester, early on and a couple of times later.

When: Most seminars are 4:00 on Thursdays, though some are on other days. Look carefully at the schedule below. The three meetings will be arranged at a time that works for the students in the course.

Requirements: Attend 10 seminars. Take notes on paper, not computer, because you should be mostly listening. For each write a brief piece of 300 to 500 words that gives the following:

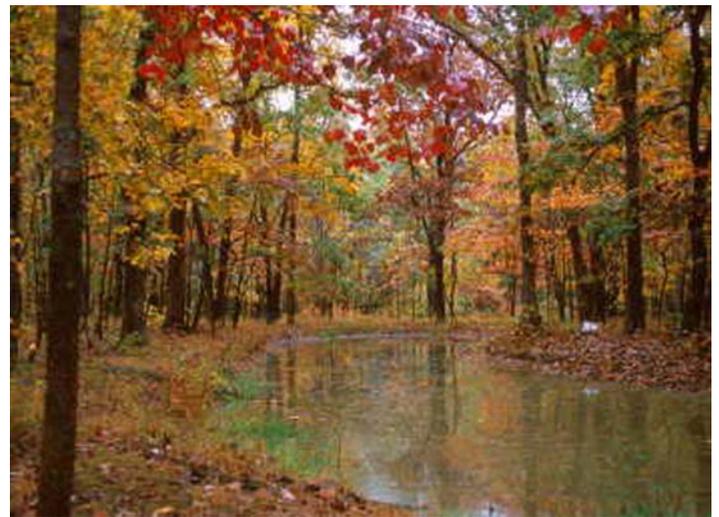
1. Title of the presentation, speaker name, date, and place.
2. What hypotheses or general ideas is the speaker testing or exploring? Choose one of them and write a brief piece on it:
 - a. What is the main idea?
 - b. What evidence does the speaker give to support it?
 - c. What do you think about it?
 - d. How important is it?
 - e. Do you agree that the evidence supports the theory?

Listen intently to the whole seminar, but only write about one piece that seems to be a complete sub story. If you want a bit more detail, people usually put the reference for a given point on the slide and you can look up the paper, but this is not required. Since you are listening more than taking notes, if there is a figure or something you want to go back to, the reference is a way to do it. At our first meeting, I will guide you on this trick.—*Joan Strassmann*

Tyson Research Center Annual Information Session for Undergrad Research 11/14

We are recruiting undergraduates for fellowships at Tyson Research Center in summer 2018. Join us for an information session on Tuesday, November 14 from 5:00-7:00 pm in DUC 234. This will be a chance for students to learn about Tyson, meet a variety of researchers and hear about their projects, and receive information about the application process.

Learn more here: <https://tyson.wustl.edu/undergraduate-opportunities/>



Synapse MD Panel 11/30

Synapse is hosting an MD panel on November 30th from 6-7pm in Seigle 301, featuring two neurologists, a neuroradiologist, and a psychiatrist. By attending this panel, students can learn more about these WashU physicians' experiences throughout their education, clinical practices, and research endeavors. Students will be able to ask them questions, while also eating free food!



Biology Department Calendar

Links to General Calendars and Regular Events:

Washington University Record Calendar: <http://news.wustl.edu/Pages/Calendar.aspx>

Biology Department Seminars, Mondays, 4:00pm, Rebstock 322, check the website for topics/schedule: <http://wubio.wustl.edu/events>

Evolution, Ecology, & Population Biology Seminars, Thursdays, 4:00pm, Rebstock 322, check the website for topics/schedule: http://wubio.wustl.edu/events?field_event_tags_tid=18

History & Philosophy of Science Seminar Series: <http://pages.wustl.edu/hpbm/events>

PMB Super Group: most Tuesdays 9:00-10:00 in McDonnell 362: <http://wubio.wustl.edu/events/pmb-super-group-seminar-series>

Donald Danforth Plant Science Center (DDPSC), Weekly Seminar Series—check the website for event details and topics: <http://www.danforthcenter.org/events/scientific-seminars>

Division of Biology & Biomedical Sciences (DBBS), all lectures and seminars: <http://dbbs.wustl.edu/Pages/Events.aspx>



November 2017

- 10th Registration Begins (November 10-15)
- 14th Tyson Undergrad Info Session, 5:00pm DUC 234
- 22nd Thanksgiving Break—no classes (November 22-26)
- 30th Synapse MD Panel, 6:00pm Seigle 301



December 2017

- 8th Last day of classes
- 14th Final exams begin

