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Faculty Spotlight: Dr. Mary Lambo

How does sensory processing lend itself to life as we know it? If our experiences materialize due to sensory transduction, do these processes inspire our entire perspective? These questions sparked Mary Lambo’s interest in neuroscience and eventually motivated her research in neural plasticity and sensory processing. As new teaching faculty at Wash U, Mary now guides students through fundamental neuroscience concepts and challenges them to discover their own motivating questions.

Mary spent most of her early years in the northeast region of the United States, moving around with her parents and eight brothers. The family eventually moved to Georgia where she completed her undergrad degree at Georgia Institute of Technology. She decided to move back to New England for grad school, where she felt the most at home. She completed her PhD at Brandeis University in Boston studying homeostatic plasticity mechanisms in Gina Turrigiano’s Lab. She loved Boston for its progressive culture and proximity to the mountains of New Hampshire, providing access to two of her favorite hobbies, rock climbing and hiking.

Mary has always enjoyed problem-solving and was interested in mathematics as a young student. Her interest in math eventually led to an interest in science. Her specific interest in neuroscience stemmed from her undergrad psychology studies. She liked the challenging questions the discipline of psychology asks, but wasn’t satisfied with the methods used to answer those questions. She was more interested in the biology of psychological phenomena, which falls under the study of neuroscience.

—cont’d on p. 2
Bio 500 Research Spotlight: Benjamin French on the Elgin Lab

DNA in multicellular organisms is packaged into two major forms: euchromatin and heterochromatin. Euchromatin is more loosely packaged and contains most of our genes, while heterochromatin is more tightly packaged, contains only a small number of genes, and has high repeat density. It has been hypothesized that heterochromatin formation is a strategy to prevent spurious transcription of repetitious (junk) DNA (e.g., transposons).

I have been working in Dr. Elgin’s lab for the past two and a half years to analyze the characteristics of an unusual chromosome in Drosophila (fruit flies). The fourth chromosome of Drosophila melanogaster is unusual because this tiny chromosome is almost entirely heterochromatic yet contains about 80 protein-coding genes. In the Elgin lab, we use a combination of DNA manipulation experiments done in the wet lab and bioinformatic analyses done on the computer to identify factors that enable the expression of fourth chromosome genes within a mostly heterochromatic domain.

One aspect of the bioinformatics analysis involves the use of phylogenetic footprinting to identify regulatory factors (e.g., transcription factor binding sites) that are conserved in multiple Drosophila species. To aid us with these bioinformatic analyses, students participating in the Genomics Education Partnership (GEP) — a consortium of faculty and students from over 100 colleges and universities — construct and submit gene models for multiple Drosophila species.

During my time in the Elgin lab, I have primarily been responsible for the computational analyses. I have participated in the analysis and correction of the gene models submitted by GEP students and used these gene models to identify the transcription start sites of fourth chromosome genes in several Drosophila species.

Using a set of motif analysis tools, I have been able to determine that the core promoters of D. melanogaster and D. biarmipes fourth chromosome genes are enriched in binding sites for topoisomerase II, which suggests that topoisomerase II might play a role in regulating the expression of fourth chromosome genes. Next, we plan to take this finding to the wet bench, where we will insert a gene with an altered topoisomerase II binding site into the fourth chromosome of flies to see if this affects the gene’s expression. To learn more about the Elgin Lab, visit: http://www.biology.wustl.edu/faculty/elgin/.

Faculty Spotlight: Dr. Mary Lambo cont’d—

Mary found herself at a crossroads after completing her PhD and post-doc in the Turrigiano Lab. She could continue with academic research and become a principle investigator or pursue a field that had pulled at her for as long as she could remember: teaching.

Throughout ungrad and grad school Mary taught in a variety of settings and always found it gratifying. She feels that she has a more direct and immediate impact by working with students in the classroom. She enjoys experimenting with new pedagogical strategies, designing courses, and thinking on end about the most effective ways to teach neuroscience. She also prefers the pace of teaching over that of research. Working long hours in a lab can be isolating, whereas teaching gives one the opportunity to connect and interact with others more regularly. Now in the Biology Department at Wash U, she can help shape minds and reveal new perspectives, which ties into her interests in psychology, learning and behavior. She is able to help students on their educational journey, in an academic setting that feels familiar and comfortable.

Mary currently co-teaches Bio 404: Laboratory of Neurophysiology with several other neuroscience faculty members and a lab section of Bio 2970: Principles of Biology II. She appreciates the value that Wash U places on teaching and the institution’s commitment to a cohesive and integrated community of both research and teaching faculty. The concepts, methods and procedures taught in the Laboratory of Neurophysiology course in particular are closely aligned with her grad school studies. She will be a biology major advisor in future semesters and is currently working with Yehuda Ben-Shahar on developing a new neuroscience course, hopefully to be offered in spring 2020, stay tuned!
There is no longer an application process for the Neuroscience Track of the Biology major. This is exciting news for students who were on the waitlist and students who are interested but haven’t declared yet. In the past, admission to the track was restricted to 28 students per graduation year, largely due to class size restrictions for Bio 404: Laboratory of Neurophysiology. Most students used Bio 404 to satisfy the lab requirement for the Track. As more students were admitted to Wash U, the demand for the Track and Bio 404 grew, causing the GPA requirement to increase with the demand. Rather than continue this trend, the Track advisors wanted to be more inclusive. They dropped the GPA requirement and broadened the options for satisfying the lab requirement. Students can now select one of two Advanced Laboratory Pathways:

**Laboratory Pathway 1** (choose one of the following courses):
- Biol 404 Laboratory of Neurophysiology (enrollment by prior permission of instructor; contact Erin Gerrity at gerrity@wustl.edu for waitlist details)
- Biol 360 Biophysics Laboratory (enrollment by registration priority on WebSTAC)
- Biol 373 Laboratory on the Evolution of Animal Behavior (enrollment by registration priority on WebSTAC)

**Laboratory Pathway 2:**
- Any other upper-level biology laboratory course on the list of approved laboratory courses for the Biology Major (see p. 2 of the Biology Handbook) plus 6 credits of Biol 500N and/or Biol 500U (Independent Research in Neuroscience)

Students using Laboratory Pathway 2 who already have credit for Biology 500/500A/500S/500T for independent research in neuroscience can request a waiver allowing them to have their prior Biology 500 credit count toward the Biology 500N/500U requirement. Waiver requests can be submitted to Patrick Clark (pclark@wustl.edu). Direct enrollment in Bio 500N will be possible beginning in Spring Semester 2019.

The new Neuroscience Track requirements can be found in the Fall 2018 (or later) Biology Majors Handbook and here: [http://wubio.wustl.edu/undergraduate/major/neuroscience-track](http://wubio.wustl.edu/undergraduate/major/neuroscience-track).

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**Major Spotlight: The Neuroscience Track of the Biology Major**

Check out the New Biology Commons, Life Sciences 201!

We hope students will enjoy studying in this newly decorated space located on the second floor of the Life Sciences building.

In case you forgot what it looked like before…
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/Living Earth Collaborative Seminars, Thursdays, 4:00pm, Rebstock 322, check the website for topics/schedule:  http://wubio.wustl.edu/files/biology/imce/living_earth_collaborative.eepb_seminars.pdf

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

Plant and Microbial Biosciences Brunch: most Fridays 9:00-10:00 in Rebstock 322:  https://wubio.wustl.edu/pmb-brunch-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 2018

9th  Registration Begins (November 9-14)

21st  Thanksgiving Break—no classes (November 21-25)

December 2018

7th  Last day of classes

8th  December Recognition Ceremony

13th  Final exams begin

20th  Last day to file Intent to Graduate in May 2019