

DEPARTMENT OF BIOLOGY
WILLIAMS COLLEGE
WILLIAMSTOWN, MASSACHUSETTS 01267



Thompson Biology Laboratory
(413) 597-3315
(413) 597-3495 fax

2021-2022

September 10, 2021 – Matt Carter, Associate Professor of Biology
“Strategies for designing and delivering a scientific presentation”

It takes time, effort and skill to design and deliver an engaging scientific talk that audiences understand and remember. In this one-hour presentation, we will discuss three aspects of designing an outstanding scientific talk: (1) organizing complex scientific information into a clear narrative; (2) using PowerPoint or Keynote software to visually communicate scientific concepts; and (3) improving verbal and nonverbal delivery during a presentation. This seminar is open to anyone and is especially applicable to senior thesis students.

September 17, 2021 (BIOL Class of 1960 Scholar) – [Dr. Amanda Larracuente](#), University of Rochester
“Intragenomic conflict and satellite DNA in *Drosophila melanogaster*”

Conflicts arise within genomes when genetic elements are selfish and fail to play by the rules. Meiotic drivers are selfish genetic elements found in a wide variety of taxa that cheat meiosis to bias their transmission to the next generation. One of the best-studied drive systems is an autosomal male driver found on the 2nd chromosome of *Drosophila melanogaster* called Segregation Distorter (SD). Males heterozygous for SD and sensitive wild type chromosomes transmit SD to >95% of their progeny, whereas female heterozygotes transmit SD fairly, to 50% of their progeny. SD is a sperm killer that targets sperm with large blocks of tandem satellite repeats (called Responder) for destruction through a chromatin condensation defect after meiosis. The molecular mechanism of drive is unknown. We combine genomic, cytological, and molecular methods to study the population dynamics of this system and how the driver and the target satellite DNA interact. These interactions provide insight into the regulation of satellite DNAs in spermatogenesis and the mechanisms of meiotic drive.

September 24, 2021 – [Dr. Joseph LaChance](#), Georgia Tech
“Evolution and prediction of genetic disease risks in ancient and modern humans”

Human genomes have been shaped by natural selection, population bottlenecks, and archaic admixture. These evolutionary processes contribute to hereditary differences in disease risk across populations. Here, I explore how disease risks have changed over time and address some of the challenges of applying genomic medicine approaches to diverse global populations. Intriguingly, genetic information can be used to infer the relative health of ancient samples (including Neanderthals) – even when remains are incomplete. On a broad scale, hereditary disease risks are similar for ancient and modern humans. However, individuals who lived in the recent past appear to have been healthier than individuals who lived in the deep past. My lab has also used time series data and computational approaches to infer the strength of natural selection that has been acting on disease-associated alleles. Differences in risk allele frequencies across populations can contribute to health disparities, including elevated rates of prostate cancer in men of African descent. Research in my lab has focused on the evolutionary causes of this health disparity and the development of a novel genotyping array that is optimized for detecting disease associations in sub-Saharan Africa. Finally, genetic predictions do not always generalize well across populations. To address this challenge, we are leveraging evolutionary information to improve the transferability of polygenic risk scores. Just as medicine benefits from knowledge of family history, so too can public health genomics benefit from knowledge of our species' history.

October 8, 2021 – Thesis Talks with the Banta, Ting, Williams, Gill, Maroja, Dean, Lebestky, Loehlin and Thuronyi labs

October 15, 2021 – Thesis Talks with the Auer, Cazares, Chen, Holland, Edwards, Marvin, Morales and van der Vinne labs

October 29, 2021 – [Dr. Kristala Prather](#), MIT

“Engineered Autonomous Control of Metabolic Pathways”

Dr. Prather engineers microorganisms for use as “microbial chemical factories” for the synthesis of small molecules. This approach allows access to important chemicals from renewable feedstocks, thus lessening environmental impact.

April 22, 2022 (BIMO Class of 1960 Scholar) – [Dr. Mary Gehring](#), MIT / Whitehead

April 29, 2022 – [Dr. Alexander Jackson](#), University of Connecticut

May 6, 2022 – Data Blitz and Thesis Poster Presentations

Thesis students will present a poster on their research project, starting with a short, one-minute presentation about their work to a general audience 1:00pm. The purpose of this presentation is to succinctly summarize their thesis projects so that they can be understood by all faculty, students and friends in attendance. This will be followed immediately by a poster session on the 2nd floor of the Hopper where students will talk about their research and findings.