OLIVIA WM LANG

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EDUCATION

Cornell University, Ithaca, NY   **Computational Biology PhD,** *(in progress)*
Colby College, Waterville, ME   **Bachelor of Arts, May 2015**
Major: Computational Biology*, Minor:* Chinese & Mathematics

HIGHLIGHTED COURSEWORK

Open Science Grid User School	Computational Genetics & Genomics
Programming Languages	Quantitative Genetics & Genomics
Data Analysis and Visualization	Systems Biology

RESEARCH EXPERIENCE

Research Assistant, **Dr. Frank Pugh**, Cornell University   **November 2019-present**

- Characterize the genomic architecture determinants of the positioning of transcription start sites (TSS)
- Develop ScriptManager as a tool for non-programmers to analyze genomic datasets in a point-and-click fashion
- Perform quality controls on NGS data to confirm genotypes of samples (develop and run GenoPipe)
- Build various other bioinformatic tools that support analysis of next generation sequencing datasets
- Process and analyze genomic datasets from a variety of functional assays
- Write documentation and tutorials for bioinformatics data processing including the websites that they are hosted on
- Manage students working on computational projects ranging from tool development to ML using NGS data

PhD Student, **Dr. Jason Mezey**, Cornell University   **August 2017-present**

- Coursework on Computational Genetics and Genomics
- Research Assistant looking into evolutionary patterns between gut microbiomes of related individuals

Associate Biocuration Scientist, **The Saccharomyces Genome Database**, Stanford University   **November 2015—July 2017**

- Write various scripts to facilitate the incorporation of data into the database and to check quality of existing data
- Test data and tools, checking for accuracy, expected behavior, and possible improvements to function or display
- Review and add ~20 papers to the database every week, tagging genes and information in need of deeper curation
- Curate sequence data for the coordinates of genomic features from common yeast strains

Senior Capstone Project, **Biology Department**, Colby College   **September 2014 – May 2015**

- Used Trinity and ABySS to process *Illumina* sequencer data and assemble a transcriptome *de novo*
- Wrote scripts using Biopython tools to process the transcripts and find alignments with genes from NCBI databases
- Presented findings and methods at Colby's Liberal Arts Symposium, Spring 2015

Research Assistant, **Dr. Stephanie Taylor Computer Science Department**, Colby College   **Summer 2013 & 2014**

- Applied differential equations to mathematically model the proteins responsible for circadian rhythms
- Built a circadian model that combined published models to characterize elements that elicit certain behaviors

CAREER GOALS

The barriers for smaller labs and institutions to conduct genomics research are breaking down with the declining costs and increased accessibility to sequencing technologies. However there still remains a struggle with the computational analysis of the data for many molecular biologists. I am pursing my PhD to both develop my technical skills as a bioinformatician as well as to gain insight to interesting biological questions that can be answered by leveraging genomics data. This experience will

prepare me to lead a team of developers that collaborate with molecular biologists to create useful and accessible tools for the wider research community.

TEACHING EXPERIENCE

Teaching Assistant, **Quantitative Genetics and Genomics**, Cornell University   **January – May 2019**

- Wrote exercises for and lectured two lab sections
- Proofread and graded tests and homework exercises for the course

Youtube Help Videos, *Saccharomyces* **Genome Database**, Stanford University   **March—September 2016**

- Participated in making help tutorial videos for accessing data and using tools on the SGD website

Teaching Assistant, **Computer Science Department**, Colby College   **September 2014 – May 2015**

- Tutored students on their Python and Java projects during weekly, three-hour evening help sessions
- Assisted professors with answering questions for students during their weekly, two-hour lab section

Teaching Assistant, **Mathematics Department**, Colby College   **September—December 2012**

- Hosted weekly, two-hour evening homework help sessions in addition to extra sessions for exam preparation
- Assisted professor with student work evaluation (about 20 calculus problem sets every week)

RELEVANT TRAINING

INTERSECT Bootcamp (USRSE)   **2023 July 10-14**

- Applied and accepted position in bootcamp for 4.5 day workshop for building research software developer skills
- Topics include software design, project management, and a variety of git-related topics – read more

Open Science Grid User School   **2020 July 13—July 24**

- Applied and accepted to attend workshops and build a foundation of knowledge of high throughput computing
- Mentored by Dr. Carrie Brown at the University of Nebraska, working to apply HTC approaches to my research
- Granted access to the open science connect grid

Cornell's BioHPC Workshop Series

- Parallel processing, scheduling and load balancing   **2020 May 4-13**
- Using Docker in BioHPC Cloud   **2020 April 27-29**
- Software installation and Conda   **2020 May 5- 4**
- Practical Linux Examples in Bioinformatics   **2018 October 17**

Teaching & Learning in the Diverse Classroom   **2020 October 1-31**

- Learned a framework for inclusive course design and teaching practices
- Participated in discussions with other students and educators on social identities and their impact in the classroom

Women Leaders: Mastering Influence, Power, and Authenticity, **Stanford Continuing Studies**   **2016 February 7**

- Weekend workshop for women at all stages in their careers to practice networking and navigating work environments

Winter Bioinformatics Course, **Jackson Laboratory**, Bar Harbor, ME   **2014 January**

- Practiced mouse handling, preparing DNA library samples (MiSeq), and processing procedures (Galaxy and BLAST)
- Discussed various new technologies and approaches in the field of genetics and their impacts on research, including exome sequencing, various forms of high-throughput sequencing (like RNAseq), CRISPR

PUBLICATIONS

- Lang O, Srivastava D, Pugh BF, Lai WKM. (2023) GenoPipe: identifying the genotype of origin within (epi)genomic datasets. *Nucleic Acids Res*. [in press]
- Mittal C, Lang O, Lai WKM, Pugh BF. (2022) An integrated SAGA and TFIID PIC assembly pathway selective for poised and induced promoters. Genes Dev. doi: 10.1101/gad.350026.122. [PMID: 36302553]
- Lang OW, Pugh BF, Lai WKM. (2022) ScriptManager: an interactive platform for reducing barriers to genomic analysis. PEARC'22. 2022 Jul; doi: 10.1145/3491418.3535161. [ACM Digital Library]
- Lang OW, Nash RS, Hellerstedt ST, Engel SR, SGD Project. (2018) An Introduction to the Saccharomyces Genome Database (SGD). Methods Mol Biol. 2018 May 15; 1757:21-30. doi: 10.1007/978-1-4939-7737-6_2. [PMID: 29761454]
- MacPherson KA, Starr B, Wong ED, Dalusag KS, Hellerstedt ST, Lang OW, Nash RS, Skrzypek MS, Engel SR, Cherry JM. (2017) Outreach and online training services at the Saccharomyces Genome Database. Database (Oxford). 2017 Jan 1; pii: bax002. doi: 10.1093/database/bax002. [PMID: 28365719]

SKILLS

Programming Languages

- Java, Python, R, Perl, MATLAB, Ruby, C
- Javascript and HTML from building Docusaurus-powered websites that leverage MDX and React style components

Software Experience

- Aligners and Assemblers: BWA, Bowtie, Hisat2, Trinity, AbySS, NextGenMapper
- Common bioinformatic tools and APIs: Samtools, Bedtools, USCS binaries, HTcount, Deseq2, SRA tools, Seqtk, FASTX toolkit, ENCODE API, NCBI's E-utils
- Python packages: scipy, matplotlib, biopython, numpy, pandas
- Package Managers: Anaconda, Docker, Singularity

AWARDS/FELLOWSHIPS

• **Travel costs to attend Intersect Bootcamp**	**INTERSECT'23**
• **Travel Fellowship to cover conference costs ($715)**	**GLBIO'23**
• **Best Paper Award in the Applications and Software Short Paper Track**	**PEARC'22**
• **Student Program is a fellowship to cover hotel expenses and includes special workshops**	**PEARC'22**

PRESENTATIONS

Penn State's 39th Summer Symposium (Chromatin and Regulation of Gene Expression) – Poster	**2023 August 6-9**
"Interpreting transcription start site patterns in yeast"	
Northeast Regional Yeast Meeting (NERY'23) – Poster	**2023 July 27-28**
"Interpreting transcription start site patterns in yeast"	
Great Lakes Bioinformatics Conference (GLBIO'23) – Poster	**2023 May 15-19**
"GenoPipe: identifying the genotype of origin within (epi)genomic datasets"	
Practice and Experience in Advanced Rsearch Computing (PEARC'22) – Speaker	**2022 July 4-10**
"ScriptManager: an interactive platform for reducing barriers to genomic analysis"	
Computational Biology Student Seminar – Speaker	**2021 November 5**
"GenoPipe: post-sequencing validation of experiment metadata"	
Computational Biology Student Seminar – Speaker	**2021 April 2**
"Applying a method for quality control of genetic backgrounds to the Yeast Knockout Collection"	
OSG User School Lightning Talk – Speaker	**2020 July 24**
"Bioinformatic Tool Development for Sequencing-based Assays"	
Computational Biology Student Seminar –Speaker	**2020 May 5**
"GenoPipe: a QC tool for sample strain background"	
The Allied Genetics Conference in Orlando, FL. –Poster Presentation	**2016 July 13-17**
"The *Saccharomyce* Genome Database Variant Viewer tool"	
Colby Liberal Arts Symposium -- Speaker	**2015 April 30**
"The De Novo Assembly and Analysis of the Soapberry Bug Transcriptome"	

Colby Summer Research Retreat -- [Speaker]   **2014 July 24**
   "Gene Regulatory Mechanisms of the Circadian Rhythm Modeled Using Systems of Differential Equations"
Colby Undergraduate Research Symposium – [Speaker] with Mary Fletcher ('13) and Roxana Gheroghe('15)   **2013 May 1-3**
   "The Importance of Activator-Repressor Balance in Various Models of Repression in Circadian Clocks"

LEADERSHIP

Graduate Women in STEM, **Social Chair**, Cornell University   **May 2021 – May 2022**

- Improve the lives of individuals in the science, technology, engineering, and mathematics (STEM) fields
- Empower women and gender minorities in the Cornell community
- Make tools of science and scientific thinking available to Cornell and the local community
- Build community within the organization so that members can support each other in graduate school

Computational Biology Graduate Student Association, **President**, Cornell University   **2018 – 2019, 2021 – present**

- Set-up a Q&A panel for students to answer questions of other students about rotations and A-exams
- Participated in developing of a "survival skills" resource to support students throughout their degree work
- Organized field events for fostering communication between graduate students in the program (bowling, skating, etc)
- President for the academic years 2018-2019, 2021-2022, and served as an officer for 2022-2023 and 2023-2024

Touch Rugby at Cornell, **Officer**, Cornell University   **August 2019 – present**

- Promote and empower undergraduate women to take on leadership positions within the organization
- Founding member that coordinated members to register with Cornell as an official organization
- Teach a co-ed group of students, faculty, and staff with any interest in touch rugby, regardless of experience
- Establish a culture of inclusion, participation, and fun to keep competition friendly
- Enforce compliance with Cornell's COVID safety precautions as Health Officer Liaison
- Coordinated practices and drafted budgets to allocate club funding for new equipment

Cornell Men's Rugby Football Club, **Assistant Coach**, Cornell University   **September 2018 – November 2019**

- Coached rugby players in technical skills for safe tackling and promote good body positioning to prevent injury
- Developed practice drill sequences to specifically target and round out skill development

Cornell Grads Vote Club, **Treasurer**, Cornell University   **August 2018 – December 2019**

- Register voters and promote voter turnout through tabling, organizing events, and distributing voter information
- Collaborated in the Cornell University Votes Coalition for the 2018 Midterm elections
- Participated in planning events, managing van routes to voting precincts, and increasing voter turnout

OTHER EXPERIENCE AND PROFESSIONAL MEMBERSHIPS

Association for Computing Machinery (ACM), Member   **May 2022-present**

Graduate Women in Science (GWiS), Member   **September 2017-December 2022**

Association for Women in Science (AWIS), Member   **September 2017-present**

Admitted Students Program, Alumni Panelist, **Colby College**   **2018 April 20**

Genetics Society of America (GSA), Member   **2016**