Kelly L. Sovacool

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Bioinformatics PhD candidate building open source tools for microbiome research and contributing to data science education along the way.

Education

2018-present **PhD Bioinformatics**, *University of Michigan*,
Dept. of Computational Medicine and Bioinformatics

2014-2018 **BS Biology**, *University of Kentucky*,
Dept. of Biology, Minor: Computer Science

Research Experience

2019-present **Graduate Student Researcher**, *Schloss Lab*,
Dept. of Microbiology and Immunology, University of Michigan
- Develop bioinformatics pipelines & software for microbial ecology.
- Analyze 16S rRNA amplicon sequence data.
- Apply machine learning methods to gut microbiome classification problems in colorectal cancer and *C. difficile* infection.
- Collaborate with other scientists on microbiome projects and mentor junior lab members.

2018-2019 **Rotation Student Researcher**, *Program in Biomedical Sciences*,
University of Michigan

2015-2018 **Undergraduate Lab Assistant**, *Moseley Bioinformatics Lab*,
Dept. of Molecular and Cellular Biochemistry, University of Kentucky
- Developed a computational tool in Python for identifying sets of orthologous and paralogous gene products in whole genomes to facilitate collinearity analysis and detection of gene duplication events.

2016-2018 **BIO395 Independent Research Student**, *Weisrock Lab*,
Dept. of Biology, University of Kentucky
- Developed bash scripts and a SNP calling pipeline in Snakemake.
- Population structure analysis of the *Ambystoma tigrinum* species complex.
- Bayesian species delimitation of the *Desmognathus fuscus* species complex.

2015-2016 **Undergraduate Lab Assistant**, *Jaromczyk Lab*,
Dept. of Computer Science, University of Kentucky
- Maintained the *Epichloë festucae* genome project database.
- Analyzed RNA-seq data of *Chenopodium quinoa* and coffee ringspot virus.

Awards

Grants & Fellowships

2020-2021   **Rackham Interdisciplinary Workshop Grant**, ($500)
University of Michigan

2020   **Conference Travel Grant**, *Rackham Graduate School*, ($800)
University of Michigan

2019-2020   **Rackham Interdisciplinary Workshop Grant**, ($500)
University of Michigan

2019-2021   **NIH T32 Bioinformatics Training Program Fellow**
University of Michigan

Dec 2017   **Oswald Research & Creativity Award**, *UK Office of Undergraduate Research*, 2nd place in the Biological Sciences category ($200)
University of Kentucky

May-Aug 2017   **Summer Research Grant**, *UK Office of Undergraduate Research*, ($2,000)
University of Kentucky

2014-2018   **Presidential Scholarship**, (out-of-state full tuition)
University of Kentucky

Honors

May 2018   **Graduated Cum Laude with Departmental Honors in Biology**
University of Kentucky

May 2018   **Biology Undergraduate Research Award Nominee**
University of Kentucky

2014-2018   **Lewis Honors College**
University of Kentucky

Service

2021-present   **CoderSpaces co-host**, *U-M ISR Data Science Hub*
Hold office hours at a weekly virtual help session for data science practitioners.

2019-present   **Organizer and Maintainer**, *U-M Software Carpentry*
- Co-lead development & maintenance of a custom curriculum for workshops teaching programming skills for reproducible research.
- Maintain the website and organize workshops.

2018-2022   **Executive Committee Member: Open Source Technical Lead**, *Girls Who Code at U-M DCMB*
- Plan, apply for funding, develop curriculum, and maintain resources to teach introductory Python programming & data science to young women.
- Facilitate collaborative development and maintenance of our teaching resources.
- Organize our year-round Club for high school women.
- Organize our annual Data Science Summer Experience for high school women in the Detroit area.

2019-2021	**Graduate Student Coordinator**, *U-M Data Analysis Networking Group*
	○ Organize monthly meetings & a one-day symposium for researchers to sharpen their data analysis skills.
	○ Apply for funding through a Rackham Interdisciplinary Workshop grant.
2009-present	**Live Sound Engineer**, *for various churches and non-profit organizations.*
	○ Set up, maintain, repair, and operate front of house, monitor, and recording systems during sound checks, rehearsals, services, and concerts.
	○ Train new sound techs in the art and science of live sound.
2021-present	**Peer review for scientific journals**, *PLOS ONE (1)*

Teaching Experience

2019-present	**Facilitator & Capstone Project Mentor**, Girls Who Code at U-M DCMB
	○ Aug 2021 - May 2022. Weekly virtual Club for high schoolers.
	○ 12-22 July 2021. Virtual Data Science Summer Experience.
	○ Aug 2020 - May 2021. Weekly virtual Club for high schoolers.
	○ 06-16 July 2020. Virtual Data Science Summer Experience.
	○ Aug 2019 - May 2020. Weekly Club for high schoolers.
	○ 15-19 July 2019. Data Science Summer Experience in Detroit, MI.
	○ Jan-May 2019. Weekly Club for high schoolers.
2018-present	**Software Carpentry instructor**, U-M Carpentries, umcarpentries.org
	○ 11-12 Jan 2021. Lead instructor for U-M WISE-sponsored virtual workshop.
	○ 06-07 Jan 2020. Lead instructor for U-M WISE-sponsored workshop.
	○ 01-02 July 2019. Workshop instructor.
	○ 22-23 May 2019. Workshop helper.
	○ 01 Mar 2019. Workshop helper.
	○ 17-18 Dec 2018. Workshop helper.
25 Apr 2019	**DNA Day Ambassador**, *Epigenetics & scientific journeys*, MI DNA Day Ann Arbor, MI
20 Mar 2019	**Workshop helper**, *Data visualization with Python*, Graduate Society of Black Engineers and Scientists University of Michigan
16 Mar 2019	**Capstone Activity Leader**, *Binary numbers through Ozobots with GWC at U-M DCMB*, Females Excelling More in Math, Engineering, & Science University of Michigan
2012-2018	**Tutor**, for high school and college students in Biology, Calculus, Chemistry, Computer Science, and Bioinformatics.

Presentations

Jun 2022	**ASM Microbe**, *Predicting the severity of C. difficile infections from the taxonomic composition of the gut microbiome*, Poster Washington, DC

Mar 2021	**Bioinformatics Student Research Hour**, *OptiFit: a fast method for fitting amplicon sequences to existing OTUs*, Talk University of Michigan
Jun 2020	**ASM Microbe**, *OptiFit: a fast method for fitting amplicon sequences to existing OTUs*, Poster, Cancelled due to COVID-19.
Apr 2018	**Showcase for Undergraduate Scholars**, *Developing a Global Homology Analysis for Comparative Genomics*, Poster University of Kentucky
Apr 2018	**Systems Biology & Omics Integration Seminar**, *Developing a Global Homology Analysis for Comparative Genomics*, Talk University of Kentucky
Apr 2018	**National Conference on Undergraduate Research**, *Developing a Global Homology Analysis for Comparative Genomics*, Poster University of Central Oklahoma
Apr 2016	**Showcase for Undergraduate Scholars**, *Processing RNA-seq Reads of Plants Infected with the Coffee Ringspot Virus*, Poster University of Kentucky
Apr 2016	**UT-KBRIN Bioinformatics Summit**, *Processing RNA-seq Reads of Plants Infected with the Coffee Ringspot Virus*, Poster Cadiz, KY
Apr 2015	**Showcase for Undergraduate Scholars**, *The Effect of Meditation on Performance*, Poster University of Kentucky

Continuing Education

27-30 Jan 2020	**Building Tidy Tools workshop at rstudio::conf**, *RStudio, PBC* San Francisco, CA
17-19 Dec 2019	**Winter School in Research Software Engineering**, *US Research Software Sustainability Institute* Seattle, WA
03-04 Jun 2019	**Software Carpentry Instructor Training**, *The Carpentries* University of Michigan
01-05 May 2019	**PyCon Education Summit & Conference**, *Python Sofware Foundation* Cleveland, OH
24-26 Apr 2019	**MICROBIOL 612.2**, *Riffomonas minimalR workshop* University of Michigan

Open Source Software Contributions

mikropml	User-Friendly R Package for Supervised Machine Learning Pipelines. Co-author and maintainer. https://github.com/SchlossLab/mikropml

schtools	Schloss Lab tools for reproducible microbiome research (R package). Co-author and maintainer. https://github.com/SchlossLab/schtools
mothur	Command-Line Tool for Processing 16S rRNA Gene Sequence Data. Contributor. https://github.com/mothur/mothur

Skills

research	16S amplicon sequence analysis, metagenomics, gut microbiome
software	R, Python, Snakemake, git, GitHub, conda, continuous integration
data science	supervised machine learning, data visualization, reproducible manuscripts

Publications

1. *Lapp Z, ***Sovacool KL**, Lesniak N, King D, Barnier C, Flickinger M, Krüger J, Armour CR, Lapp MM, Tallant J, Diao R, Oneka M, Tomkovich S, Anderson JM, Lucas SK, and Schloss PD, (2022). Developing and Deploying an Integrated Workshop Curriculum Teaching Computational Skills for Reproducible Research. JOSE. http://dx.doi.org/10.21105/jose.00144.

2. **Sovacool KL**, Westcott SL, Mumphrey MB, Dotson GA, and Schloss PD, (2022). OptiFit: An Improved Method for Fitting Amplicon Sequences to Existing OTUs. Accepted for publication at mSphere. http://dx.doi.org/10.1101/2021.11.09.468000.

3. *Duda M, ***Sovacool KL**, Farzaneh N, Nguyen VK, Haynes SE, Falk H, Furman KL, Walker LA, Diao R, Oneka M, Drotos AC, Woloshin A, Dotson GA, Kriebel A, Meng L, Thiede SN, Lapp Z, and Wolford BN, (2021). Teaching Python for Data Science: Collaborative Development of a Modular & Interactive Curriculum. JOSE, 4(46):138. ISSN 2577-3569. http://dx.doi.org/10.21105/jose.00138.

4. Everson KM, Gray LN, Jones AG, Lawrence NM, Foley ME, **Sovacool KL**, Kratovil JD, Hotaling S, Hime PM, Storfer A, Parra-Olea G, Percino-Daniel R, Aguilar-Miguel X, O'Neill EM, Zambrano L, Shaffer HB, and Weisrock DW, (2021). Geography Is More Important than Life History in the Recent Diversification of the Tiger Salamander Complex. PNAS, 118(17). ISSN 0027-8424, 1091-6490. http://dx.doi.org/10.1073/pnas.2014719118.

5. *Topçuoğlu BD, *Lapp Z, ***Sovacool KL**, Snitkin E, Wiens J, and Schloss PD, (2021). Mikropml: User-Friendly R Package for Supervised Machine Learning Pipelines. JOSS, 6(61):3073. ISSN 2475-9066. http://dx.doi.org/10.21105/joss.03073.

6. Hagan AK, Lesniak NA, Balunas MJ, Bishop L, Close WL, Doherty MD, Elmore AG, Flynn KJ, Hannigan GD, Koumpouras CC, Jenior ML, Kozik AJ, McBride K, Rifkin SB, Stough JMA, **Sovacool KL**, Sze MA, Tomkovich S, Topcuoglu BD, and Schloss PD, (2020). Ten Simple Rules to Increase Computational Skills among Biologists with Code Clubs. PLOS Computational Biology, 16(8):e1008119. ISSN 1553-7358. http://dx.doi.org/10.1371/journal.pcbi.1008119.

7. Goodin MM, Farman M, Inocencio H, Jang C, Jaromczyk JW, Moore N, and **Sovacool KL**, (2016). Processing RNA-Seq Data of Plants Infected with Coffee Ringspot Virus. In *Proceedings of the 15th Annual UT-KBRIN Bioinformatics Summit 2016: Cadiz, KY, USA. 8-10 April 2016*. BMC Bioinformatics. http://dx.doi.org/10.1186/s12859-016-1154-y.

* *Indicates co-first author.*