

Kelly Sovacool

✉ sovacool@umich.edu
🌐 sovacool.dev
in [kelly-sovacool](https://www.linkedin.com/in/kelly-sovacool)
🐙 [kelly-sovacool](https://github.com/kelly-sovacool)

Bioinformatician building and applying open source tools for microbiome research, and contributing to data science education along the way.

Education

- 2018-present **PhD Bioinformatics**, *Dept. of Computational Medicine and Bioinformatics*, University of Michigan
○ Advisor: Patrick D. Schloss
- 2014-2018 **BS Biology**, *Dept. of Biology*, University of Kentucky
○ Minor: Computer Science

Skills

- Languages & Tools R, Python, Bash, C++, Snakemake, R Markdown, Quarto, LaTeX, conda, git, GitHub, SLURM.
- Research gut microbiome composition, amplicon sequence analysis, metagenomics, supervised machine learning, data visualization, reproducible manuscripts.
- Software R package maintenance, continuous integration, high performance computing.

Research Experience

- 2019-present **Graduate Student Researcher**, *Schloss Lab, Dept. of Microbiology and Immunology*, University of Michigan
○ Develop and benchmark bioinformatics pipelines and software for microbial ecology.
○ Analyze 16S rRNA gene 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.

Teaching Experience

- Jan-Apr 2023 **Graduate Student Instructor**, *Dept. of Computational Medicine & Bioinformatics*, University of Michigan
 - BIOINF 576: Tool Development for Bioinformatics
- 2019-2022 **Facilitator & Capstone Project Mentor**, *Girls Who Code at U-M DCMB*, University of Michigan
 - Weekly Club during the school year and week-long Summer Experience for high schoolers to learn Python for data science
- 2018-present **Workshop Instructor & Helper**, *U-M Carpentries*, University of Michigan
 - 2-day Software Carpentry workshops teaching computational skills for reproducible research
- Jun 2022 **Instructor**, Virtual
 - Intro to R & RNA-Seq Workshop for ASM Microbe conference attendees
- Apr 2019 **DNA Day Ambassador**, *Michigan DNA Day*, Pioneer High School, Ann Arbor, MI
 - Epigenetics & Scientific Journeys
- Mar 2019 **Workshop helper**, *Graduate Society of Black Engineers and Scientists*, University of Michigan
 - Data Visualization with Python Workshop
- Mar 2019 **Capstone Activity Leader**, *Females Excelling More in Math, Engineering, & the Sciences*, University of Michigan
 - Binary Numbers through Ozobots with GWC at U-M DCMB
- 2012-2018 **Tutor**, *freelance*
 - for high school and college students in Biology, Calculus, Chemistry, Computer Science, and Bioinformatics.

Service

- 2019-present **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 open source teaching resources.
 - Organize our year-round Club and annual Data Science Summer Experience for high school women+.
- 2019-present **Organizer & Maintainer, *U-M Carpentries***
- Co-lead development & maintenance of a curriculum for workshops teaching programming skills for reproducible research.
 - Maintain the website, develop curriculum, and organize workshops.
 - Collaborate with U-M Women in Science and Engineering to organize workshops for women+.
- 2021-present **Mentor, *Schloss Lab***
- Mentor an undergraduate student in building reproducible machine learning models to predict *C. difficile* infection severity from gut microbiome composition.
- 2021-present **CoderSpaces co-host, *U-M ISR Data Science Hub***
- Hold office hours at a weekly virtual help session for data science practitioners
- 2021-present **Peer reviewer**
- PLOS ONE (1)
- 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 **Volunteer Sound Engineer, *various churches and non-profit organizations***
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Open Source Contributions

Software

mikropml, *User-Friendly R Package for Supervised Machine Learning Pipelines*

- Co-author and maintainer

schtools, *Schloss Lab tools for reproducible microbiome research (R package)*

- Co-author and maintainer

mikropml snakemake workflow, *Template for running mikropml with Snakemake*

- Co-author and maintainer

mothur, *Command-Line Tool for Processing 16S rRNA Gene Sequence Data*

- Contributor

mothur snakemake workflow, *Snakemake template for amplicon sequence analysis with mothur*

- Co-author

Curricula

U-M Software Carpentry, *Intro to R- the Unix shell- and git for workshops on reproducible research.*

- Co-author and maintainer

Girls Who Code at U-M DCMB, *Intro to Python for Data Science for Girls Who Code clubs.*

- Co-author and maintainer

Code Clubs, *Short coding tutorials for lab meetings*

- Contributor

U-M DANG!, *repro-packs: Organizing projects for reproducibility and headache prevention.*

- Author

Intro to R & RNA-seq, *Workshop for 2022 ASM Microbe attendees*

- Contributor

Presentations

Talks

- Nov 2022 **Bioinformatics Student Research Hour**, *Predicting _C. difficile_ infection severity from the taxonomic composition of the gut microbiome*, University of Michigan
- Feb 2022 **Seminar for the KG Jebsen Center for Genetic Epidemiology**, *Intro to git & GitHub*, (Virtual) Norwegian University of Science and Technology
- Mar 2021 **Bioinformatics Student Research Hour**, *OptiFit: a fast method for fitting amplicon sequences to existing OTUs*, (Virtual) University of Michigan
- Apr 2018 **Systems Biology and Omics Integration Seminar**, *Developing a Global Homology Analysis for Comparative Genomics*, University of Kentucky

Posters

- Jun 2022 **ASM Microbe**, *Predicting the severity of _C. difficile_ infections from the taxonomic composition of the gut microbiome*, Washington, DC

- Jun 2020 **ASM Microbe**, *OptiFit: a fast method for fitting amplicon sequences to existing OTUs*, Virtual
- Apr 2018 **Showcase for Undergraduate Scholars**, *Developing a Global Homology Analysis for Comparative Genomics*, University of Kentucky
- Apr 2018 **National Conference on Undergraduate Research**, *Developing a Global Homology Analysis for Comparative Genomics*, University of Central Oklahoma
- Apr 2016 **Showcase for Undergraduate Scholars**, *Processing RNA-seq Reads of Plants Infected with the Coffee Ringspot Virus*, University of Kentucky
- Apr 2016 **UT-KBRIN Bioinformatics Summit**, *Processing RNA-seq Reads of Plants Infected with the Coffee Ringspot Virus*, Cadiz, KY
- Apr 2015 **Showcase for Undergraduate Scholars**, *The Effect of Meditation on Performance*, University of Kentucky

Awards

Grants and Fellowships

- 2022 **Conference Travel Grant**, *Rackham Graduate School*, University of Michigan
 ○ \$900
- 2020-2021 **Rackham Interdisciplinary Workshop Grant**, *Rackham Graduate School*, University of Michigan
 ○ \$500
- 2020 **Conference Travel Grant**, *Rackham Graduate School*, University of Michigan
 ○ \$800
- 2019-2020 **Rackham Interdisciplinary Workshop Grant**, *Rackham Graduate School*, University of Michigan
 ○ \$500
- 2019-2021 **NIH T32 Bioinformatics Training Program Fellow**, *Bioinformatics Graduate Program*, University of Michigan
 ○
- 2017 **Oswald Research & Creativity Award**, *2nd place in Biological Sciences*, *Office of Undergraduate Research*, University of Kentucky
 ○ \$200

- 2017 **Summer Research Grant**, *Office of Undergraduate Research*, University of Kentucky
○ \$2,000
- 2014-2018 **Presidential Scholarship**, *University of Kentucky*
○ out-of-state full tuition
[Honors](#)
- 2018 **Graduated Cum Laude with Departmental Honors in Biology**, University of Kentucky
- 2018 **Biology Undergraduate Research Award Nominee**, University of Kentucky
- 2014-2018 **Lewis Honors College**, University of Kentucky

Continuing Education

- Jan 2020 **Building Tidy Tools workshop at rstudio::conf**, *Rstudio, PBC*, San Francisco, CA
- Dec 2019 **Winter School in Research Software Engineering**, *US Research Software Sustainability Institute*, Seattle, WA
- Jun 2019 **Software Carpentry Instructor Training**, *The Carpentries*, University of Michigan
- May 2019 **PyCon Education Summit & Conference**, *The Python Software Foundation*, Cleveland, OH
- Apr 2019 **MICROBIOL 612.2**, *Riffomonas Minimal R Workshop*, University of Michigan

Publications

* Indicates co-first author