

Michael Sekula

Curriculum Vitae

Date: 7/21/22

CONTACT INFORMATION

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EDUCATION

Doctor of Philosophy in Biostatistics May 2020
University of Louisville, Louisville, KY
Dissertation: “Novel Bayesian methodology for the analysis of single-cell RNA-sequencing data”

Master of Science in Biostatistics May 2015
University of Louisville, Louisville, KY
Thesis: “optCluster: An R package for determining the optimal clustering algorithm and optimal number of clusters”

Bachelor of Science in Mathematics Education May 2010
Saginaw Valley State University, University Center, MI
Minor in Physics
Summa Cum Laude

PROFESSIONAL EXPERIENCE AND EMPLOYMENT

Assistant Professor June 2020 - Present
Department of Bioinformatics and Biostatistics
University of Louisville, Louisville, KY

Graduate Student Instructor Aug. 2017 - May 2020
Department of Bioinformatics and Biostatistics
University of Louisville, Louisville, KY

Science Teacher Aug. 2010 - June 2013
Pleasure Ridge Park High School
Jefferson County Public Schools, Louisville, KY

HONORS & AWARDS

- University of Louisville Faculty Favorite Nominee, 2021, 2019
- School of Public Health and Information Sciences Dean’s Award, University of Louisville, 2020
- Graduate Dean’s Citation, University of Louisville, 2020

- Best Student Presentation in Complex Modeling Techniques Session, Kentucky American Statistical Association Chapter, 2019
- Boyd Harshbarger Travel Award, Southern Regional Council on Statistics, 2019, 2018
- Best Student Presentation in Biostatistics Session, Kentucky American Statistical Association Chapter, 2018
- President of University of Louisville Biostatistics Club, 2016 – 2017
- University Fellowship, University of Louisville, 2015 – 2017
- ETS Recognition of Excellence for Mathematics: Content Knowledge, 2010
- Outstanding Senior in Mathematics Education, Saginaw Valley State University, 2010

PROFESSIONAL MEMBERSHIPS

- American Statistical Association (ASA)
- Delta Omega Honor Society, Beta Pi Chapter
- Kentucky Academy of Science

TEACHING

University of Louisville

PHST 200: Reasoning with Data in Daily Life

- 2021 – Spring (*Developed new course*), Fall
- 2022 – Spring

PHST 301: Quantitative Methods in Public Health

- 2018 – Fall (*Previously PHUN 301 until Fall 2018*)
- 2019 – Fall
- 2020 – Fall (*Developed new hybrid/online course implementation*)
- 2021 – Spring, Summer, Fall

PHST 302: Intermediate Statistical Analysis

- 2019 – Spring (*Developed new course*)
- 2021 – Spring (*Co-instructor - 50% of lectures*)

PHST 602: Biostatistics Seminar

- 2022 – Spring

PHST 703: Biostatistical Consulting Practicum

- 2022 – Summer (*2 students*)

PHUN 301: Quantitative Public Health

- 2017 – Fall (*Substantially revised course*)

STUDENT MENTORING

PhD students for whom I serve(d) as a committee member:

Sagnik Bhadury, Biostatistics (Expected Fall 2022). TBD

Siddhesh Kulkarni, Biostatistics (Summer 2022). “Bayesian Methodologies for Constrained Spaces”

RESEARCH FUNDING

Funded Grants

Title:	Identifying and Removing Barriers to Treatment of Hepatitis C Infection in Kentucky Medicaid
Funding Agency:	Kentucky Cabinet for Health and Family Services – State University Partnership Program
PI:	B. Little
Role:	Co-investigator
Effort:	15%
Duration:	07/01/2020 - 06/30/2022
Total Costs:	\$391,787
Direct Costs:	\$262,843
Description:	The overarching goal of this study is to perform population health analyses aimed at identification of patients with hepatitis C virus and decreasing barriers to treatment for Kentucky Medicaid beneficiaries.

Funded Contract Work

Funding Group:	University of Louisville School of Dentistry
Effort:	40%
Duration:	January 2022 - Present
Description:	Collaborative support in the planning, design, and statistical analysis of research projects within the school. Prepare statistical write-ups for training, protocols, proposals, grants, and publications. Provide mentorship and statistical support to residents during their thesis project work.

SERVICE ACTIVITIES (INTRAMURAL)

- SPHIS Teaching Faculty Learning Community, *2018 - Present*
- SPHIS Faculty Council, *July 2021 - Present*
- Biostatistics PhD Comprehensive Exam Committee, *Summer 2021, 2022*
- Course Director – PPH 523, *Fall 2021*

SERVICE ACTIVITIES (EXTRAMURAL)

- Judge, American Statistical Association – Kentucky Chapter Spring Meeting, 2021
- Journal Referee
 - BMC Medical Research Methodology (2021)
 - Computational Statistics & Data Analysis (2020)
 - Journal of Statistical Computation and Simulation (2020)
 - Statistics in Medicine (2022)

METHODOLOGICAL PUBLICATIONS (PEER-REVIEWED JOURNALS)

1. **Sekula, M.**, Gaskins, J., and Datta, S. (2022). Single-cell differential network analysis with sparse Bayesian factor models. *Frontiers in Genetics*, 12, 810816.
2. **Sekula, M.**, Gaskins, J., and Datta, S. (2020). A sparse Bayesian factor model for the construction of gene co-expression networks from single-cell RNA sequencing count data. *BMC Bioinformatics*, 21, 361.
3. **Sekula, M.**, Gaskins, J., and Datta, S. (2019). Detection of differentially expressed genes in discrete single-cell RNA sequencing data using a hurdle model with correlated random effects. *Biometrics*, 75(4), 1051-1062.
4. **Sekula, M.**, Datta, S., and Datta, S. (2017). optCluster: An R Package for Determining the Optimal Clustering Algorithm. *Bioinformatics*, 13(3), 101.

COLLABORATIVE PUBLICATIONS (PEER-REVIEWED JOURNALS)

1. Gupta, A., Meriwether, K., Tuller, M., **Sekula, M.**, Gaskins, J., Stewart, J.R., Hobson, D., Cardenas-Trowers, O., Francis, S. (2020). Candy cane compared with boot stirrups in vaginal surgery: A randomized controlled trial. *Obstetrics & Gynecology*, 136(2), 333-341.

SOFTWARE PACKAGES

- scSFMnet ([available on GitHub](#))
- scREhurdle ([available on GitHub](#))
- hbfm ([available on GitHub](#))
- optCluster ([available on GitHub](#))

PRESENTATIONS

1. “Single-cell differential network analysis with sparse Bayesian factor models”. Bioinformatics and Biostatistics Seminar Series. University of Louisville, Louisville, KY. January 21, 2022.

2. “A sparse Bayesian factor model for the construction of gene co-expression networks from discrete single-cell RNA sequencing data”. Bioinformatics and Biostatistics Seminar Series. University of Louisville, Louisville, KY. September 6, 2019.
3. “A sparse Bayesian factor model for the construction of gene co-expression networks from discrete single-cell RNA sequencing data”. Poster session presented at the Southern Regional Council on Statistics Summer Conference. General Butler State Resort Park, KY. June 3, 2019.
4. “A sparse Bayesian factor model for the construction of gene regulatory networks from discrete single-cell RNA sequencing data”. Kentucky American Statistical Association Chapter Meeting. University of Louisville, Louisville, KY. April 4, 2019.
5. “A correlated random effects hurdle model for detecting differentially expressed genes in discrete single-cell RNA sequencing data”. Contributed paper session at East North American Region (ENAR). Philadelphia, PA. March 26, 2019.
6. “A correlated random effects hurdle model for detecting differentially expressed genes in discrete single-cell RNA sequencing data”. Contributed paper session at Joint Statistical Meetings (JSM). Vancouver, British Columbia, Canada. July 30, 2018.
7. “Detection of differentially expressed genes in discrete single-cell RNA sequencing data using a hurdle model with correlated random effects”. Poster session presented at the Southern Regional Council on Statistics Summer Conference. Virginia Beach, VA. June 5, 2018.
8. “Advanced R programming”. University of Louisville Biostatistics Club Seminar. University of Louisville, Louisville, KY. April 6, 2018.
9. “A correlated random effects hurdle model for differential gene expression analysis of discrete single-cell RNA sequencing data”. Kentucky American Statistical Association Chapter Meeting. University of Louisville, Louisville, KY. March 2, 2018.
10. “Hurdle model with correlated random effects for differential expression of single-cell RNA sequencing data”. Bioinformatics and Biostatistics Seminar Series. University of Louisville, Louisville, KY. October 27, 2017.