# JAMES MATUK

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## Education

Ph.D. Statistics, The Ohio State University, Columbus, OH      Aug. 2016 - Aug. 2021
    Advisors: Oksana Chkrebtii and Sebastian Kurtek
    Dissertation: Bayesian Frameworks for Simultaneous Estimation, Registration, and Inference for Functions and Planar Curves

M.S. Statistics, The Ohio State University, Columbus, OH      Aug. 2016 - Dec. 2018

B.S. Mathematics, Duquesne University, Pittsburgh, PA      Aug. 2012 - May 2016
    Honors: *summa cum laude*

## Experience

### Univeristy of Pittsburgh, Pittsburgh, PA

Data Scientist, Epidemiology Data Center      Apr. 2023 - Present

### Duke University, Durham, NC

Postdoctoral Associate      Aug. 2021 - Mar. 2023
    Advisors: David Dunson and Amy Herring
Data+ Project Manager      May 2022 - Jul. 2022
    Project: Pilot Earthquake Early Warning in Kathmandu

### The Ohio State University, Columbus, OH

Graduate Research Associate, Department of Statistics      Jan. 2018 - Aug. 2021
Graduate Teaching Associate, Department of Statistics      Aug. 2017 - May 2020

   - Recitation leader for STAT 4201: *Introduction to Mathematical Statistics* (Autumn 2017, 140 students)
   - Instructor for STAT 3303: *Bayesian Analysis and Statistical Decision Making* (Spring 2020, 50 Students students)

Consultant, Department of Statistics, Statistical Consulting Service Aug. 2018 - Dec. 2018
University Fellow, Department of Statistics      Aug. 2016 - Aug. 2017

## Duquesne University, Pittsburgh, PA

Undergraduate Research Assistant, Department of Mathematics     Jan. 2015 - May 2016

# Publications

## Peer-Reviewed Publications

6. **Matuk, J.**, and Guo, X. *Shape-Restricted Estimation and Spatial Clustering of COVID-19 Infection Rate Curves*, Spatial Statistics, 2022.

5. **Matuk, J.**, Bharath, K., Chkrebtii, O., and Kurtek, S. *Bayesian Framework for Simultaneous Registration and Estimation of Noisy, Sparse and Fragmented Functional Data*, Journal of the American Statistical Association, 2021.

4. **Matuk, J.**, Bharath, K., Chkrebtii, O., and Kurtek, S. *Geometric Empirical Bayesian Model for Classification of Functional Data under Diverse Sampling Regimes*, IEEE/CVF Conference of Computer Vision and Pattern Recognition Workshops, 2021.

3. **Matuk, J.**, Herbei, R., and Kurtek, S. *Bayesian Registration of Functions*, Wiley StatsRef, 2021.

2. **Matuk, J.**, Chkrebtii, O., and Niezgoda, S. *Bayesian Inference for Polycrystalline Materials*, Stat, 2020.

1. **Matuk, J.**, Chkrebtii, O., and Kurtek, S. *Estimation of Sparsely Observed Signals with an Empirical Bayesian Model*, 53$^{\text{rd}}$ Asilomar Conference on Signals, Systems, and Computers, IEEE, 2019.

## Book Chapters

1. **Matuk, J.**, Mohammed, S., Kurtek, S., and Bharath, K. *Biomedical Applications of Geometric Functional Data Analysis.* In Grohs, P., Holler, M., and Weinmann, A. (editors), *Handbook of Variational Methods for Nonlinear Geometric Data*, Springer, 2019.

## Pre-Prints

2. **Matuk, J.**, Herring, A. H., and Dunson, D. B. *Bayesian modeling of nearly mutually orthogonal processes*, arxiv.org:2205.12361, 2022+. Submitted to Biometrika.

1. **Matuk, J.**, Kurtek, S., and Bharath, K. *Robust Persistent Homology using Elastic Functional Data Analysis*, arXiv:2106.15436, 2021+. Submitted to IEEE Transactions on Pattern Analysis and Machine Intelligence.

# Awards

9. *Early Career Travel Award*, International Society for Bayesian Analysis World Meeting, Jul. 2022.

8. *Craig Cooley Memorial Prize*, Department of Statistics, The Ohio State University, Apr. 2021.

7. *Student & Early Career Funding Award*, Symposium on Data Science and Statistics, Jun. 2020.

6. *Hannan Graduate Student Travel Award*, Institute of Mathematical Statistics, Apr. 2020.

5. *Third Place Prize for Best Oral Presentation in Mathematical & Physical Sciences* for the presentation *Bayesian Framework for Simultaneous Registration and Estimation of Noisy, Sparse and Fragmented Functional Data* at the Edward F. Hayes Graduate Research Forum, The Ohio State University, Mar. 2020.

4. *2020 ASA Statistics in Imaging Student Paper Competition Runner-up Award* for the paper *Bayesian Framework for Simultaneous Registration and Estimation of Noisy, Sparse and Fragmented Functional Data*, Jan. 2020.

3. *Student Paper Contest Finalist* for the paper *Estimation of Sparsely Observed Signals with an Empirical Bayesian Model* at the Asilomar Conference on Signals, Systems, and Computers, Monterey, CA, Nov. 2019.

2. *Award for Outstanding Research Associate*, Department of Statistics, The Ohio State University, Apr. 2018.

1. *Chuck Loch Memorial Award for Excellence in Mathematics*, Department of Mathematics, Duquesne University, Apr. 2016.

# Presentations

## Talks

14. *Bayesian Functional Principal Component Analysis using Relaxed Mutually Orthogonal Processes*,

    - Invited Talk, University of Pittsburgh, Jun. 2023
    - Invited Talk, Duke University, Sep. 2022.
    - International Society of Bayesian Analysis World Meeting, Montreal, CA, Jul. 2022.
    - Joint Statistical Meeting, Washington D.C., Aug. 2022.

13. *Introduction to ANOVA*, Guest Lecture for STA 610 (Multilevel and Hierarchical Models), Duke University, Sep. 2022.

12. *Topological Data Analysis through Alignment of Persistence Landscapes.* Geometry and Topology Meet Data Analysis and Machine Learning (virtual), Jul. 2021.

11. *Bayesian Framework for Simultaneous Registration and Estimation of Noisy, Sparse and Fragmented Functional Data,*

    - Eastern North American Region of the International Biometric Society Spring Meeting (virtual), Mar. 2021.
    - Joint Statistical Meetings (virtual), Aug. 2020.
    - Edward F. Hayes Graduate Research Forum, The Ohio State University, Mar. 2020.

10. *Shape Based Classification of Curves*, Invited Talk, Duquesne University (virtual), Mar. 2021.

9. *A Bayesian Model for Incomplete Closed Curves*, The Ohio State University's Statistics Department Student Seminar (virtual), Oct. 2020.

8. *Bayesian Inference for Polycrystalline Materials*, Symposium on Data Science and Statistics (virtual), Jun. 2020.

7. *Functional and Shape Data Analysis*, Invited Talk, Duquesne University, Mar. 2019.

6. *Bayesian Inference for Material Texture*, Electron Backscatter Diffraction Topical Conference, University of Michigan, May 2018.

5. *Bayesian Calibration of Inexact Computer Models*, Research Group in Design of Physical and Computer Experiments, The Ohio State University, Mar. 2018.

4. *The Curvature Noise Distribution and Applications,*

    - Joint Mathematics Meetings, Seattle, WA, Jan. 2016.
    - Bowling Green State University, Nov. 2015.

3. *Curvature Noise vs. Image Noise*, Mathematical Association of America Mathfest, Washington D.C., Aug. 2015.

2. *A Non-local approach for Denoising Image Data*, Mathematical Association of America Regional Meeting, Washington and Jefferson College, Apr. 2015.

1. *A Study of the Buades, Coll, and Morel Non-local Means Algorithm*, Pi Mu Epsilon Regional Meeting, Youngstown State University, Mar. 2015.

## Posters

7. *Geometric empirical Bayesian model for classification of functional data under diverse sampling regimes*, 6th IEEE CVPR International Workshop on Differential Geometry in Computer Vision and Machine Learning (virtual), Jun. 2021.

6. *Shape-Restricted Estimation and Clustering for COVID-19 Infection Rate Curves*, Center for Clinical and Translational Science Annual Meeting (virtual), The Ohio State University, Jan. 2021.

5. *Estimation of Sparsely Observed Signals with an Empirical Bayesian Model*

   - Center for Clinical and Translational Science Annual Meeting, The Ohio State University, Dec. 2019.
   - Asilomar Conference on Signals, Systems, and Computers, Nov. 2019.
   - International Conference on Statistical Distributions and Applications, Grand Rapids, MI, Nov. 2019.

4. *Function Estimation Through Phase and Amplitude Separation*, Joint Statistical Meetings, Denver, CO, Aug. 2019.

3. *Functional Principal Component Analysis of Phase and Amplitude Variability*, Statistics and Biostatistics Graduate Student Poster Session, The Ohio State University, Sep. 2017.

2. *Curvature Noise vs. Image Noise*, Summer Undergraduate Research Program, Duquesne University, Jul. 2015.

1. *A Non-Local Approach for Denoising Image Curvature Data*, Duquesne University Undergraduate Research and Scholarship Symposium, Apr. 2015.

# Software

Proficient: LaTeX, MATLAB, R
Competent: C++, JMP, Python, SPSS

# Editorial Activities

Peer Reviewer: Annals of Applied Statistics, Biostatistics, Journal of Data Science, Journal of the Royal Statistical Society (Series C), Medical and Biomedical Engineering and Computing

# Service Activities

Session Chair
   Joint Statistical Meetings, 2023
      Session: Advances in statistical methods for topological and geometric data analysis
   International Society for Bayesian Analysis, 2022 World Meeting
      Session: Recent applications of scalable Bayesian inference using stochastic gradient
         MCMC
American Statistical Association's DataFest

Mentor at Duke University, 2022
Mentor at The Ohio State University, 2017 & 2018
Duke Datathon
Mentor, 2021
Statistics and Biostatistics Graduate Student Association at The Ohio State University
President, 2019-2020 Academic Year
Ohio State Science Fair
Judge, 2017
Pi Mu Epsilon (U.S. Mathematics Honors Society), Duquesne University Chapter
President, 2015-2016 Academic Year
Vice President, 2014-2015 Academic Year


# Membership

American Statistical Association
Sections: Bayesian Statistical Science, Statistics in Imaging
Eastern North American Region of the International Biometric Society
Institute of Mathematical Statistics
Society for Industrial and Applied Mathematics