

# Julia Wrobel

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CV compiled on 2022-09-12

ACADEMIC APPOINTMENTS	<b>Department of Biostatistics &amp; Informatics</b> Colorado School of Public Health	
	Assistant Professor (Tenure Track)	Aug 2019 – Present
EDUCATION	<b>Columbia University Mailman School of Public Health</b> , New York, NY, USA	
	PhD in Biostatistics	Sep 2015 – Jun 2019
	• Dissertation title: Functional data analytics for wearable device and neuroscience data	
	• Advisor: Jeff Goldsmith	
	Master of Science (M.S.) in Biostatistics	Sep 2013 – May 2015
	• Practicum: Associations and Patterns in Ambulatory Blood Pressure	
	• Advisor: Jeff Goldsmith	
HONORS & AWARDS	<b>Swarthmore College</b> , Swarthmore, Pennsylvania, USA	
	Bachelor of Arts (B.A.) in Chemistry	Sep 2006 – May 2010
	ASA Biometrics Section JSM Travel Award	Jul 2018
	ENAR Distinguished Student Paper Award	Mar 2018
	NESS IBM Student Research Award Finalist	Mar 2018
	WSDS 2017 Conference Travel Award	Oct 2017
	Women in Statistics and Data Science conference in La Jolla, California	
	Gertrude M. Cox Scholarship for Women in Statistics	Jul 2017
	Summer Institute in Statistics for Big Data Travel Scholarship	Jul 2017
	University of Washington Department of Biostatistics	
	Certificate of Distinction, Columbia Department of Biostatistics	May 2015
	For outstanding research by a Master's student	
PRIOR WORK EXPERIENCE	Sigma Xi Scientific Research Society	May 2010
	<b>Department of Biostatistics</b> , Columbia University	
	Research Assistant	Jun 2014 – Jun 2019
	• Supervisor: Jeff Goldsmith	
	• Research areas: Functional data, neuroimaging, variational inference, accelerometers, interactive graphics	
	<b>Department of Biostatistics</b> , Columbia University	
	Research Assistant	Feb 2016 – Oct 2017
	• Supervisor: Sara Lopez-Pintado	
	• Research areas: Multivariate band depth for functional data, imaging statistics, nonparametric hypothesis tests	
	<b>Data Science and AI Research</b> , AT&T Labs	
PROFESSIONAL ORGANIZATIONS & SERVICE	Summer Intern - Statistical Research Group	May 2018 – Aug 2018
	• Supervisor: Senior Inventive Scientist Emily Dodwell	
	• Curve clustering and predictive modeling for addressable advertising delivery data	
	<b>Statistical Analysis Center for Clinical Trials</b> , Columbia University	
	Data Analyst & SAS Programmer	May 2014 – Aug 2015
	<b>Department of Immunology and Rheumatology</b> , Children's Hospital of Philadelphia	
	Immunology Research Scientist	Apr 2011 – Jul 2013
	<b>EDITORIAL SERVICE</b>	
	<b>Associate Editor for Reproducibility</b> ,	
	Journal of the American Statistical Association	Apr 2021 – Present

**Referee:** Annals of Applied Statistics, Applied Mathematical Modeling, Biometrics, Biostatistics, Canadian Journal of Statistics, Computational Statistics and Data Science, f1000Research, Electronic Journal of Statistics, Journal of the American Statistical Association, Journal of Computational and Graphical Statistics, Journal for the Measurement of Physical Behavior, Stat, Statistics and Computing, Statistics in Medicine, Statistical Methods in Medical Research, PLOS ONE

## MEMBERSHIPS

ASA, ENAR, WNAR

## DEPARTMENTAL AND UNIVERSITY COMMITTEES

Director, Health analytics and data science certificate program	Sep 2019 – Present
Director, Applied biostatistics certificate program	Aug 2022 – Present
Organizer, Biostatistics MS/PhD program student visit day	Mar 2020 – Present
Member, MS qualifying exam committee	Apr 2021 – Present
Member, PhD qualifying exam committee	Apr 2020 – Apr 2021
Member, Inference curriculum task force	Sep 2019 – Dec 2019

## NATIONAL AND INTERNATIONAL SERVICE

Social Media co-Chair, ENAR Council for Emerging and New Statisticians (CENS)	Jul 2021 – Mar 2022
Member, ENAR Council for Emerging and New Statisticians	Apr 2020 – Mar 2022
Reviewer, ASA Statistics in Imaging student paper competition	Dec 2020
Member, CMStatistics Functional Data Analysis specialized team	Feb 2020 – Present

## GRANT SUPPORT

### PRESENT SUPPORT

Multiplexed single-cell imaging in pediatric lupus nephritis <ul style="list-style-type: none"> <li>Lupus Research Alliance Lupus Innovation Award (PI: Hsieh)</li> <li>Role: Co-Investigator</li> </ul>	Oct 2020 – Sep 2023
Novel Approaches to Assessing Cannabis Impaired Driving <ul style="list-style-type: none"> <li>R01DA049800, NIH (PI: Brooks-Russell)</li> <li>Role: Co-Investigator</li> </ul>	Jul 2020 – Apr 2025
Observational study of the effects of acute cannabis use on ocular activity relevant to driving <ul style="list-style-type: none"> <li>R01 Supplement, Institutes for Cannabis Research (PI: Brooks-Russell)</li> <li>Role: Co-Investigator</li> </ul>	Jul 2021 – Jun 2023
Spatial Mapping of Proteomic and Transcriptional Signatures in Kidney Disease <ul style="list-style-type: none"> <li>U01DK133113, NIH (PIs: Hsieh and Thurman)</li> <li>Role: Co-Investigator</li> </ul>	Jul 2022 – Jun 2027

### PAST SUPPORT

Network Analysis of the Ovarian Tumor Microenvironment <ul style="list-style-type: none"> <li>CCTSI Translational Methods Biostatistics/Bioinformatics Pilot Grant</li> <li>Role: PI</li> </ul>	Apr 2020 – Mar 2021
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## PUBLICATIONS

### PEER REVIEWED ARTICLES

<sup>‡</sup> indicates a graduate student or postdoc under my supervision

- T Vu, J Wrobel, BG Bitler, EL Schenk, KR Jordan, and D Ghosh, “SPF: A Spatial and Functional Data Analytic Approach to cell Imaging data”, *PLoS Computational Biology*, vol. 18, no. 6, 2022.
- C Harris, J Wrobel, and S Vandekar, “mxnorm: An R Package to Normalize Multiplexed Imaging Data”, *Journal of Open Source Software*, vol. 7, no. 71, 2022.
- R Miller, T Brown, J Wrobel, MJ Kosnett and A Brooks-Russell, “Influence of cannabis use history on the impact of acute cannabis smoking on simulated driving performance during a distraction task”, *Traffic Injury Prevention*, pp. 1–7, 2022.

- S Seal, J Wrobel, AM Johnson, RA Nemenoff, EL Schenk, BG Bitler, KR Jordan, and D Ghosh, “On Clustering for Cell Phenotyping in Multiplex Immunohistochemistry (mIHC) and Multiplexed Ion Beam Imaging (MIBI) Data”, *BMC Research Notes*, vol. 15, no. 1, pp. 1–7, 2022.
- S Seal, T Vu, T Ghosh, J Wrobel, and D Ghosh, “DenVar: Density-based Variation analysis of multiplex imaging data”, *Bioinformatics Advances*, vol. 2, no. 1, 2022. **Recipient of 2022 ASA Biometrics Section Paper Award.**
- CR Harris, ET McKinley, JT Roland, Q Liu, MJ Shrubsole, K Lau, RJ Coffey, J Wrobel, and S Vandekar “Quantifying and correcting slide-to-slide variation in multiplexed immunofluorescence images”, *Bioinformatics*, vol. 38, no. 6, pp. 1700–1707, 2022.
- J Wrobel, J Silvasstar, R Peterson, K Sumbundu, A Kelley, D Stephens, SC Rushing, and S Bull, “Patterns of User Engagement in the BRAVE Study”, *JMIR Formative Research*, vol. 6, no. 2, 2022.
- EI McDonnell, V Zipunnikov, J Schrack, J Goldsmith, and J Wrobel, “Registration of 24-hour accelerometric rest-activity profiles and its application to human chronotypes”, *Biological Rhythm Research*, vol. 8, no. 9 pp. 1–22, 2022.
- B Steinhart<sup>‡</sup>, KR Jordan, J Bapat, MD Post, LJ Brubaker, BG Bitler, and J Wrobel, “The spatial context of tumor-infiltrating immune cells associates with improved ovarian cancer survival”, *Molecular Cancer Research*, vol. 19, no. 12, pp. 1973–1979, Oct 2021.
- A Brooks-Russell, T Brown, K Friedman, J Schwartz, KA Ryall, E Amioka, G Dooley, GS Wang, J Wrobel, B Steinhart<sup>‡</sup>, G Milavetz and MJ Kosnett, “Simulated Driving Performance among Daily and Occasional Cannabis Users”, *Accident Analysis & Prevention*, vol. 160, pp. 106326, Sep 2021.
- SC Rushing, A Kelley, S Bull, D Stephens, J Wrobel, J Silvasstar, R Peterson, C Begay, TG Dog, C McCray, DL Brown, M Thomas, C Caughlan, M Singer, P Smith, and K Sumbundu\*. “Efficacy and Impact of an mHealth Intervention to promote Mental Wellness for American Indian and Alaska Native Teens and Young Adults: A Randomized Controlled Trial of the BRAVE Study”, *JMIR Mental Health*, vol. 8, no. 9, pp. e26158, Aug 2021.
- J Wrobel and A Bauer, “registr 2.0: Incomplete Curve Registration for Exponential Family Functional Data”, *Journal of Open Source Software*, vol. 6, no. 61, pp. 2964, May 2021.
- AM Johnson, JM Boland, J Wrobel, EK Klezcko, MW Evans, K Hopp, L Heasley, ET Clambey, K Jordan, RA Nemenoff, and EL Schenk, “Cancer cell-specific MHCII expression as a determinant of the immune infiltrate organization and function in the non-small cell lung cancer tumor microenvironment”, *Journal of Thoracic Oncology*, vol. 16, no. 10, pp. 1694–1704, May 2021.
- J Wrobel, J Muschelli, and A Leroux, “Diurnal Physical Activity Patterns across Ages in a Large UK Based Cohort: The UK Biobank Study”, *Sensors*, vol. 21, no. 4, pp. 1545, Jan 2021.
- J Wrobel, ML Martin, R Bakshi, PA Calabresi, M Elliot, D Roalf, RC Gur, RE Gur, RG Henry, G Nair, J Oh, N Papinutto, D Pelletier, DS Reich, WD Rooney, TD Satterthwaite, W Stern, K Prabhakaran, NL Sicotte, RT Shinohara, and J Goldsmith, “Intensity warping for multisite MRI harmonization”, *Neuroimage*, vol. 223, pp. 117242, Dec 2020.
- MI Becker, DJ Calame, J Wrobel, and AL Person. “Online control of reach accuracy in mice”, *Journal of Neurophysiology*, vol. 124, no. 6, pp. 1637–1655, Nov 2020.
- J Wrobel, V Zipunnikov, J Schrack, and J Goldsmith, “Registration for exponential family functional data”, *Biometrics*, vol. 75, no. 1, pp. 48–57, Mar 2019. **Recipient of 2018 ENAR Distinguished Student Paper Award.**
- J Wrobel, “registr: Registration for exponential family functional data”, *Journal of Open Source Software*, vol. 3, no. 22, pp. 557 Feb 2018.
- S Lopez-Pintado and J Wrobel, “Robust non-parametric tests for imaging data based on data depth”, *Stat*, vol. 6, no. 1, pp. 405–419, Oct 2017.

- [J Wrobel](#), SY Park, AM Staicu, J Goldsmith, “Interactive graphics for functional data analyses”, *Stat*, vol. 5, no. 1, pp. 108–118, Feb 2016 **Selected as an exemplar paper of Stat**, showcased at the 2017 Joint Statistical Meetings.
- JH Kim, J Santaella-Tenorio, C. Mauro, [J Wrobel](#), M Cerdâ, KM Keyes, D Hasin, SS Martins, and G Li. “State medical marijuana laws and the prevalence of opioids detected among fatally injured drivers?”, *American Journal of Public Health*, vol. 106, no. 11, pp. 2032–2037, Aug 2016.
- S Canna, [J Wrobel](#), N Chu, PA Kreiger, M Paessler, EM Behrens, “Interferon- $\gamma$  mediates anemia but is dispensable for fulminant toll-like receptor 9–induced macrophage activation syndrome and hemophagocytosis,” *Arthritis and Rheumatism*, vol. 65 (7), pp. 1764–1775, Jul 2013.

#### CURRENTLY UNDER REVIEW

- S Bothwell<sup>‡</sup>, A Kaizer, R Peterson, D Ostendorf, V Catenacci, and [J Wrobel](#), “Pattern-Based Clustering of Daily Weigh-In Trajectories using Dynamic Time Warping”, 2022.
- A Brooks-Russell, [J Wrobel](#), T Brown, LC Bidwell, GS Wang, B Steinhart<sup>‡</sup>, G Dooley, and MJ Kosnett, “Effects of acute cannabis smoking by occasional and daily users on reaction time, judgment and memory using a tablet-based application”, 2022.
- S Smith<sup>‡</sup>, [J Wrobel](#), A Brooks-Russell, MJ Kosnett, and M Sammel, “A Latent Variable Analysis of Psychomotor Performance after Acute Cannabis Smoking”, 2022.
- B Steinhart<sup>‡</sup>, A Brooks-Russell, MJ Kosnett, PS Subramanian, and [J Wrobel](#), “A Video Analysis Pipeline for Assessing Changes in Pupillary Percent Light Reflex and Rebound Dilation Associated with Acute Cannabis Smoking”, 2022.
- [J Wrobel](#), B Sauerbrei, JZ Guo, A Hantman, and J Goldsmith, “Modeling Trajectories using Functional Linear First-Order Differential Equations”, 2022.

#### SOFTWARE

- J Goldsmith, F Scheipl, L Huang, [J Wrobel](#), J Gellar, J Harezlak, M McLean, B Swihart, L Xiao, C Crainiceanu, and P Reiss, “refund: Regression with Functional Data,” *R package available on CRAN*, version 0.1-17, May 2018. Over 3000 downloads per month.
  - author: “mfpcas.sc(): multilevel FPCA by smoothed covariance”
  - contributor: version 0.1-15 to present
  - maintainer: version 0.1-16 to present
- [J Wrobel](#), and T Ghosh, “VectraPolarisData” *R data package available on Bioconductor ExperimentHub* Apr 2022. Downloaded 99 times as of 08/20/2022.
- C Harris, [J Wrobel](#), and S Vandekar, “mxnorm: An R Package to Normalize Multiplexed Imaging Data” *R package available on CRAN and GitHub* Apr 2022. Downloaded over 1700 times as of 08/20/2022.
- [J Wrobel](#), EI McDonnell, A Bauer, and J Goldsmith, “registr: Registration for exponential family functional data,” *R package available on CRAN and GitHub* Nov 2017. Downloaded over 10,600 times as of 08/20/2022.
- [J Wrobel](#) and J Goldsmith, “refund.shiny: interactive graphics for functional data analysis,” *R package available on CRAN* Sep 2015. Downloaded over 22,600 times as of 08/20/2022.
- [J Wrobel](#) and S Lopez–Pintado, “depthTests: Nonparametric hypothesis tests based on multivariate band depth,” *R package available on GitHub* Sep 2017.

#### PRESENTATIONS INVITED TALKS

- “Challenges and advances in multiplex imaging,” 2022 *JSM*, Washington DC, USA, Aug 2022.
- “Modeling trajectories using functional linear first-order differential equations,” 2022 *EcoSta*, Kyoto, Japan, Jun 2022.
- “Challenges and advances in multiplex imaging,” 2022 *ASA Statistical Methods in Imaging*, Nashville, TN, USA, May 2022.

- “Quantifying the quality of cell-type labeling in Vector-Polaris multiplex imaging data,” *2022 ASA Statistical Methods in Imaging*, Nashville, TN, USA, May 2022.
- “Challenges and advances in multiplex imaging,” *Department of Biostatistics PENNSIVE Statistical Imaging Group, University of Pennsylvania*, Seminar, Mar 2022.
- “Registration for wearable device data with application to circadian rhythm chronotype discovery,” *Department of Statistics and Actuarial Science, University of Waterloo*, Virtual Department Seminar, Mar 2022.
- “Registration for wearable device data with application to circadian rhythm chronotype discovery,” *Department of Biostatistics, Epidemiology, and Informatics, University of Pennsylvania*, Virtual Department Seminar, Feb 2022.
- “Challenges in multiplex imaging,” *2021 CMStatistics*, Virtual Conference, Dec 2021.
- “Registration for wearable device data with application to circadian rhythm chronotype discovery,” *Department of Biostatistics, Vanderbilt University*, Jun 2021.
- “Intensity warping for multisite MRI harmonization,” *2021 Statistical Methods in Imaging*, Virtual Conference, May 2021.
- “Online control of reach accuracy and functional data models for dynamic movement,” *2020 CMStatistics*, Virtual Conference, Dec 2020.
- “Registration for wearable device data with application to circadian rhythm chronotype discovery,” *Department of Biostatistics, Johns Hopkins University*, Virtual Department Seminar, Sep 2020.
- “Registration for wearable device data with application to circadian rhythm chronotype discovery,” *Department of Epidemiology and Biostatistics, University of California San Francisco*, Virtual Seminar, Aug 2020.
- “Physical activity patterns across ages in the NHANES data,” *2020 JSM*, Philadelphia, PA, USA, Aug 2020.
- J Wrobel, B Bitler, C Rickert, and K Jordan, “Multiplexed Ion Beam Imaging (MIBI) analysis of the ovarian tumor microenvironment,” *Department of Immunology and Microbiology, CU Anschutz School of Medicine*, Virtual Seminar, Jul 2020.
- “Modeling kinematic behavior using functional linear first-order differential equations,” *2020 ENAR*, Nashville, TN, USA, Mar 2020.
- “Circadian rhythms revealed by accelerometers,” *Use of Wearable and Implantable Devices in Health Research*, Banff International Research Station, Alberta, Canada, Feb 2020.
- “Intensity warping for multisite MRI harmonization,” *2019 CMStatistics*, London, UK, Dec 2019.
- “Identifying circadian chronotypes using accelerometers,” *2018 CMStatistics*, Pisa, Italy, Dec 2018.
- “Modeling the effects of high-dimensional covariates on 3D kinematics,” *2018 PEPS Workshop on advances in functional data analysis*, Rennes, Brittany, France, Oct 2018.
- “Registration for exponential family functional data,” *2018 JSM*, Vancouver, Canada, Aug 2018.
- “Clustering and Modeling Addressable Advertising Impression Curves,” *AT&T Labs Intern Research Showcase*, New York, NY, USA, Jul 2018.
- “Introduction to Shiny using NBA Data,” *RLadies NYC, hosted at NBA NYC*, New York, NY, USA, May 2018.
- “Registration for exponential family functional data,” *2017 CMStatistics*, London, UK, Dec 2017.
- “Identifying patterns in physical activity,” *2017 AT&T Labs Graduate Student Symposium*, New York, NY, USA, Dec 2017.
- “Registration for binary functional data,” *2017 ICSA Applied Statistics Symposium*, Chicago, IL, USA, Jun 2017.

#### CONTRIBUTED TALKS

- “Registration for exponential family functional data,” *2017 Joint Statistical Meetings*, Baltimore, MD, USA, Jul 2017.
- “Interactive graphics for functional data analyses,” *2016 Joint Statistical Meetings*, Chicago, IL, USA, Aug 2016.

#### POSTERS

- “Can early intervention save money in addressable advertising?,” *2018 AT&T Labs Intern Poster Session*, Bedminster, NJ, USA, Jul 2018.

- “Removing scanner variability from structural MRIs,” *2018 Statistical Methods in Imaging (SMI) Conference*, Philadelphia, PA, USA, Jun 2018.
- “Communicating results of functional data analyses with interactive graphics,” *2017 Women in Statistics and Data Science (WSDS) Conference*, La Jolla, California, USA, Oct 2017.
- “Can we use statistics to compare pictures? An application to brain imaging data,” *2016 Women in Science at Columbia (WISC) Symposium*, New York, NY, USA, Apr 2016.
- “Associations and Patterns in Ambulatory Blood Pressure,” *Columbia University Department of Biostatistics 75th Anniversary Gala*, New York, NY, USA, Apr 2015.

## LEADERSHIP

**imgfun: Image and Functional Data Analysis Working Group**, Colorado School of Public Health  
Co-founder and Organizer Jan 2022 – Present

**Biostatistics Graduate Student Research Working Group**, Columbia University  
Founder and Organizer Dec 2015 – Jun 2019

**Columbia Biostatistics Computing Club**, Columbia University  
Founder and Co-Organizer Dec 2016 – Jun 2018

**Biostatistics Student Cohort**, Columbia University  
Doctoral Student Leader Aug 2015 – Jun 2019

## TEACHING

### Full Courses

Biostatistical Methods II (34 enrolled students) Spring 2022  
Biostatistical Methods II (24 enrolled students) Spring 2021

- Developed YouTube videos for flipped-classroom format which have been watched over 14.7K times since January 2021

### Guest Lectures

- “Introduction to web scraping”, R for Data Science, Colorado School of Public Health, November 2019
- “Introduction to web APIs”, R for Data Science, Colorado School of Public Health, November 2019
- “Nonparametric hypothesis testing”, Biostatistics Methods I, Colorado School of Public Health, October 2019
- “Gibbs sampling and the Metropolis-Hasting algorithm”, Advanced Data Analysis, Colorado School of Public Health, September 2019
- “Introduction to Bayesian regression”, Longitudinal Data Analysis, Columbia University Mailman School of Public Health, November 2018
- “Building Shiny apps with flexdashboard”, Data Science I, Columbia University Mailman School of Public Health, October 2017

## ADVISING

### PhD Thesis Advising

- Samantha Bothwell (Biostatistics), 2021-Present
- Suneeta Godbole (Biostatistics), joint with Andrew Leroux, 2022-Present

### Master’s Thesis Advising

- Jared Rieck (MS in Biostatistics), 2022-Present
- Savannah Mierau (MPH in Biostatistics), joint with Alex Kaizer, 2021-Present
- Shelby Smith (MS in Biostatistics), joint with Mary Sammel, 2021-2022
- Benjamin Steinhart (MS in Biostatistics) 2020-2022
- Samantha Bothwell (MS in Biostatistics), 2019-2021

### Doctoral Examination and Defense Committees

- Yanran Wang, Department of Biostatistics and Informatics, Expected graduation 2023
- Alex Jensen, Department of Biostatistics and Informatics, Expected graduation 2022
- Connor McCullough, Department of Bioengineering, Expected graduation 2022