Julia Wrobel

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CV compiled on 2022-12-21

ACADEMIC APPOINTMENTS

Department of Biostatistics & Informatics Colorado School of Public Health
Assistant Professor (Tenure Track) — Aug 2019 – Present

EDUCATION

Columbia University Mailman School of Public Health, 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

Swarthmore College, Swarthmore, Pennsylvania, USA
Bachelor of Arts (B.A.) in Chemistry — Sep 2006 – May 2010

HONORS & AWARDS

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

Sigma Xi Scientific Research Society — May 2010

PRIOR WORK EXPERIENCE

Department of Biostatistics, Columbia University
Research Assistant — Jun 2014 – Jun 2019
- Supervisor: Jeff Goldsmith
- Research areas: Functional data, neuroimaging, variational inference, accelerometers, interactive graphics

Department of Biostatistics, 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

Data Science and AI Research, AT&T Labs
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

Statistical Analysis Center for Clinical Trials, Columbia University
Data Analyst & SAS Programmer — May 2014 – Aug 2015

Department of Immunology and Rheumatology, Children's Hospital of Philadelphia
Immunology Research Scientist — Apr 2011 – Jul 2013

PROFESSIONAL ORGANIZATIONS & SERVICE

EDITORIAL SERVICE

Associate Editor for Reproducibility,
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, Journal of Statistical Software, 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 — Oct 2020 – Sep 2023
- Lupus Research Alliance Lupus Innovation Award (PI: Hsieh)
- Role: Co-Investigator

Novel Approaches to Assessing Cannabis Impaired Driving — Jul 2020 – Apr 2025
- R01DA049800, NIH (PI: Brooks-Russell)
- Role: Co-Investigator

Observational study of the effects of acute cannabis use on ocular activity relevant to driving — Jul 2021 – Jun 2023
- R01 Supplement, Institutes for Cannabis Research (PI: Brooks-Russell)
- Role: Co-Investigator

Spatial Mapping of Proteomic and Transcriptional Signatures in Kidney Disease — Jul 2022 – Jun 2027
- U01DK133113, NIH (PIs: Hsieh and Thurman)
- Role: Co-Investigator

PAST SUPPORT

Network Analysis of the Ovarian Tumor Microenvironment — Apr 2020 – Mar 2021
- CCTSI Translational Methods Biostatistics/Bioinformatics Pilot Grant
- Role: PI

PUBLICATIONS

METHODOLOGY AND SOFTWARE

‡ indicates a graduate student or postdoc under my supervision

23) S Bothwell‡, A Kaizer, R Peterson, D Ostendorf, V Catenacci, and J Wrobel, "Pattern-Based Clustering of Daily Weigh-In Trajectories using Dynamic Time Warping", *Biometrics*, to appear, 2022.

22) 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.

21) 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.

20) 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**.

19) 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.

18) 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.

17) 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.

16) 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.

15) 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.

14) 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**.

13) J Wrobel, “registr: Registration for exponential family functional data”, *Journal of Open Source Software*, vol. 3, no. 22, pp. 557 Feb 2018.

12) 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.

11) 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.

COLLABORATIVE

10) 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.

9) 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.

8) 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.

7) B Steinhart[‡], 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.

6) A Brooks-Russell, T Brown, K Friedman, J Schwartz, KA Ryall, E Amioka, G Dooley, GS Wang, J Wrobel, B Steinhart[‡], G Milavetz and MJ Kosnett, “Simulated Driving Performance among Daily and Occasional Cannabis Users”, *Accident Analysis & Prevention*, vol. 160, pp. 106326, Sep 2021.

5) 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.

4) 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.

3) 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.

2) 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.

1) S Canna, J Wrobel, N Chu, PA Kreiger, M Paessler, EM Behrens, "Interferon-γ mediates anemia but is dispensable for fulminant toll-like recepter 9–induced macrophage activation syndrome and hemophagocytosis," *Arthritis and Rheumatism*, vol. 65 (7), pp. 1764–1775, Jul 2013.

CURRENTLY UNDER REVIEW

- J Wrobel, B Sauerbrei, JZ Guo, A Hantman, and J Goldsmith, "Modeling Trajectories using Functional Linear Differential Equations", 2022.
- A Leroux, C Crainiceanu, and J Wrobel, "Fast Generalized Functional Principal Components Analysis", 2022.
- B Steinhart‡, 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.
- S Smith‡, J Wrobel, A Brooks-Russell, MJ Kosnett, and M Sammel, "A Latent Variable Analysis of Psychomotor Performance after Acute Cannabis Smoking", 2022.
- A Brooks-Russell, J Wrobel, T Brown, LC Bidwell, GS Wang, B Steinhart‡, 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.
- M Ahmadian, C Rikert, A Minic, J Wrobel, B Bitler, F Xing, M Angelo, E Hsieh, D Ghosh and K Jordan, "A Platform-Independent Framework for Phenotyping of Multiplex Tissue Imaging Data", 2022.
- T Vu, S Seal, J Wrobel, T Ghosh, M Ahmadian, and D Ghosh, "A functional and spatial analytic approach to cell imaging data using entropy measures", 2022.
- J Laborde, J Wrobel, C Colin-Leitzinger, A Soupir, B Bitler, S Tworoger, JM Schildkraut, LC Peres, and BL Fridley, "Bayesian models for the analysis of cancer multiplex immunofluorescence data", 2022.
- Y Wang, JN Stroh, G Hripcsak, CC Low Wang, TD Bennett, J Wrobel, C Der Nigoghossian, S Mueller, J Claassen, and DJ Albers, "A methodology of phenotyping ICU patients from EHR data: high-fidelity, personalized, and interpretable phenotypes estimation", 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 229,000 downloads.
  - author: "mfpca.sc(): multilevel FPCA by smoothed covariance"
  - contributor: version 0.1-15 to present
  - maintainer: version 0.1-16 to present

- J Wrobel, C Crainiceanu, and A Leroux, "fastGFPCA: fast generalized functional principal components analysis" *R package available on Github* Oct 2022.
- J Wrobel, and T Ghosh, "VectraPolarisData" *R data package available on Bioconductor ExperimentHub* Apr 2022. Downloaded 165 times as of 12/20/2022.
- 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 2604 times as of 12/20/2022.
- 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 11,995 times as of 12/20/2022.
- J Wrobel and J Goldsmith, "refund.shiny: interactive graphics for functional data analysis," *R package available on CRAN* Sep 2015. Downloaded over 24,116 times as of 12/20/2022.
- 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**

- "Detecting changes in pupillary light response associated with acute cannabis consumption," *2022 CMStatistics*, London, UK, Dec 2022.
- "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*, Philadelpha, 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 Consulting II (12 enrolled students) — Spring 2023
Biostatistical Methods II (28 enrolled students) — Spring 2023
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 19.9K 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
- "Nonparameteric 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

- 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, Graduated Fall 2022
- Connor McCullough, Department of Bioengineering, Graduated Fall 2022