# William Consagra

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## Education

**University of Rochester** — **Rochester, NY**
*PhD Statistics* — *2017–2022*
Thesis: *Methods for Multidimensional Functional Data Analysis in Modern Neuroimaging*

**Rochester Institute of Technology** — **Rochester, NY**
*B.S./M.S. in Applied Mathematics* — *2010–2015*
Summa Cum Laude

## Research Interests

Computational statistics, deep learning, simulation-based inference, functional data analysis, signal and image processing, inverse problems, uncertainty quantification, neuroimaging

## Experience

### Research

**University of South Carolina** — **Columbia, SC**
*Assistant Professor, Department of Statistics* — *2024 - present*

**Harvard Medical School** — **Boston, MA**
*Postdoctoral Research Fellow, Psychiatry Neuroimaging Laboratory* — *2022 - 2024*

**University of Rochester Medical Center** — **Rochester, NY**
*Statistical Consultant, Department of Biostatistics and Computational Biology* — *2019 - 2022*

**University of Rochester Medical Center** — **Rochester, NY**
*Research Assistant, Department of Biostatistics and Computational Biology* — *2017 - 2022*

### Industrial

**Soleo Communications** — **Rochester, NY**
*Data Scientist* — *2015 - 2017*

## Papers

(* indicates co-first author)

## Under Review

[1] M. Cole, Y. Xiang, **W. Consagra**, A. Srivastava, X. Qiu, and Z. Zhang, "Alignment of continuous brain connectivity," 2025. arXiv: 2503.15830 [stat.ME].

[2] J. Lyu, L. Ning, **W. Consagra**, Q. Liu, R. J. Rushmore, B. Bilgic, and Y. Rathi, "Rapid whole brain mesoscale in-vivo mr imaging using multi-scale implicit neural representation," 2025. arXiv: 2502.08634 [eess.IV].

[3] E. Pena and **W. Consagra**, "Probabilistic analysis and dynamic prediction of the h-index," 2025.

[4] **W. Consagra**, Z. Gu, and Z. Zhang, "Neuropmd: Neural fields for density estimation on product manifolds," 2025. arXiv: 2501.02994 [stat.ML].

## Peer-Reviewed Journal and Conference Publications

[5] N. Newlin, K. Schilling, S. Koudoro, B. Q. Chandio, P. Kanakaraj, D. Moyer, C. E. Kelly, S. Genc, J. Y.-M. Yang, Y. Wu, N. Adluru, V. Nath, S. Pathak, W. Schneider, A. Gade, **W. Consagra**, Y. Rathi, T. Hendriks, A. Vilanova, M. Chamberland, T. Pieciak, D. Ciupek, A. T. Vega, S. Aja-Fernández, M. Malawski, G. Ouedraogo, J. Machnio, P. M. Thompson, N. Jahanshad, E. Garyfallidis, and B. Landman, "Introducing quantconn:

Overcoming challenging diffusion acquisitions with harmonization," in *Computational Diffusion MRI*, Cham: Springer Nature Switzerland, 2025, pp. 164–174.

[6] **W. Consagra**, L. Ning, and Y. Rathi, "A deep learning approach to multi-fiber parameter estimation and uncertainty quantification in diffusion mri," *Medical Image Analysis*, vol. 102, p. 103 537, 2025.

[7] M. Jensen-Battaglia, M. Sohn, **W. Consagra**, Y. Wang, Z. Zhang, M. LoCastro, J. Davis, K. Buettner, S. Mortaz, A. El-Jawahri, and K. P. Loh, "Trajectories of physical well-being among adults with acute myeloid leukemia," *Blood Advances*, 2024.

[8] K. Kyi, **W. Consagra**, E. Culakova, L. Berkhof, M. Janelsins, A. Conlin, J. Bearden, J. Berenberg, B. Canin, S. Mohile, and A. Magnuson, "Comparing mini-cog and blessed orientation-memory-concentration test for evaluating cognition in older patients with advanced cancer," *Journal of Geriatric Oncology*, p. 101 764, 2024.

[9] M. Munzer Dwedari*, **W. Consagra***, P. Müller, O. Turgut, D. Rueckert, and Y. Rathi, "Estimating neural orientation distribution fields on high resolution diffusion mri scans," in *Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 2024, pp. 307–317.

[10] **W. Consagra**, M. Cole, X. Qiu, and Z. Zhang, "Continuous and atlas-free analysis of brain structural connectivity," *The Annals of Applied Statistics*, vol. 18, no. 3, pp. 1815 –1839, 2024.

[11] **W. Consagra**, L. Ning, and Y. Rathi, "Neural orientation distribution fields for estimation and uncertainty quantification in diffusion mri," *Medical Image Analysis*, p. 103 105, 2024.

[12] **W. Consagra**, A. Venkataraman, and X. Qiu, "Efficient multidimensional functional data analysis using marginal product basis systems," *Journal of Computational and Graphical Statistics*, vol. 33, no. 2, pp. 567–577, 2024.

[13] K. P. Loh, **W. Consagra**, A. Magnuson, A. Baran, N. Gilmore, S. Giri, M. LoCastro, S. Isom, M. B. Sohn, G. R. Williams, D. K. Houston, B. Nicklas, S. Kritchevsky, and H. D. Klepin, "Associations of interleukin-6 with functional trajectories in older adults with cancer: Findings from the health, aging, and body composition study," *Experimental Gerontology*, vol. 177, p. 112 185, 2023.

[14] K. Wang, **W. Consagra**, M. Jensen-Battaglia, A. Kleckner, I. R. Kleckner, and K. P. Loh, "Chemotherapy-related symptoms and exercise adherence in older patients with myeloid neoplasms," *Supportive Care in Cancer*, vol. 31, no. 10, p. 572, 2023.

[15] T. Xue, H. S. Karimi, **W. Consagra**, F. Zhang, W. Cai, L. J. O'Donnell, L. Ning, and Y. Rathi, "A deep learning framework for estimating multi-fiber picaso model parameters of tissue microstructure using diffusion mri," in *2023 IEEE 20th International Symposium on Biomedical Imaging (ISBI)*, 2023.

[16] L. Liu, **W. Consagra**, X. Cai, A. Mathias, A. Worster, J. Ma, P. Rock, T. Kwong, and P. A. Kavsak, "Sex-specific absolute delta thresholds for high-sensitivity cardiac troponin t," *Clinical Chemistry*, 2022.

[17] **W. Consagra**, M. Cole, and Z. Zhang, "Analyzing brain structural connectivity as continuous random functions," in *Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 2022, pp. 276–285.

[18] **W. Consagra**, A. Venkataraman, and Z. Zhang, "Optimized diffusion imaging for brain structural connectome analysis," *IEEE Transactions on Medical Imaging*, vol. 41, no. 8, pp. 2118–2129, 2022.

[19] M. E. Yurcheshen, W. Pigeon, C. Z. Marcus, J. A. Marcus, M. P. McDermott, **W. Consagra**, K. Nguyen, and J. Marsella, "Does unconscious socioeconomic bias influence tele-evaluation of obstructive sleep apnea? An exploratory analysis," *Sleep Med*, vol. 100, pp. 225–229, 2022.

## Peer-Reviewed Abstracts (Selected)

[20] S. Cetin-Karayumak, ..., **W. Consagra**, ..., and Y. Rathi, "Harmonizer: A deep learning framework for transforming low-resolution clinical dmri to research-grade quality," in *Proceedings of the International Society for Magnetic Resonance in Medicine (ISMRM)*, **Power Pitch**, 2025.

[21] J. Lyu, L. Ning, **W. Consagra**, Q. Liu, and Y. Rathi, "Rapid whole brain 180um mesoscale in-vivo t2w imaging," in *Proceedings of the International Society for Magnetic Resonance in Medicine (ISMRM)*, **Oral**, 2025.

[22] ——, "Rotating-view super-resolution (rover)-mri reconstruction using tailored implicit neural network," in *Proceedings of the International Society for Magnetic Resonance in Medicine (ISMRM)*, **Oral Power Pitch**, 2024.

## Presentations

### Invited Presentations

**EcoSta**
*NeuroPMD: Neural Fields for Density Estimation on Product Manifolds* *August 2025*

**ASA Statistical Methods in Imaging Conference**
*Deep Learning for Biophysical Parameter Estimation and Uncertainty Quantification in Diffusion MRI* *May 2025*

**NeuroConnect 2024: Advancing Brain Network Research Workshop**
*Continuous and Atlas-free Analysis of Brain Structural Connectivity* *August 2024*

**ICSA Applied Statistics Symposium**
*Continuous and Atlas-free Analysis of Brain Structural Connectivity* *June 2024*

**Joint Statistical Meetings**
*Optimized Diffusion Imaging for Structural Connectome Analysis* *August 2022*

### Contributed Presentations

**UofSC Inverse Problems and Uncertainty Quantification Working Group**
*From Signals to Structural Connectomes: Deep Learning for Neuroimaging Inverse Problems* *February 2025*

**Upstate Chapter of the American Statistical Association**
*Optimized Diffusion Imaging for Structural Connectome Analysis* *May 2022*

**Upstate Chapter of the American Statistical Association**
*Efficient Multidimensional Functional Data Analysis using Marginal Product Basis Systems* *April 2021*

**ENAR**
*Efficient Multidimensional Functional Data Analysis using Marginal Product Basis Systems* *March 2021*

### Poster Presentations

**ASA Statistical Methods in Imaging Conference**
*Neural Orientation Distribution Fields for Estimation and Uncertainty Quantification in Diffusion MRI* *May 2023*

**International Conference on Medical Image Computing and Computer-Assisted Intervention**
*Analyzing Brain Structural Connectivity as Continuous Random Functions* *September 2022*

**Society for Industrial and Applied Mathematics Conference on the Life Sciences**
*A Stochastic Differential Equation Approach to Modeling Calcium Cycling in Ventricular Myocytes* *August 2014*

## Teaching and Mentoring

**University of South Carolina**
*Guest Lecturer for MATH 728: Uncertainty Quantification in Physical and Biological Applications* *Spring 2025*

**University of South Carolina**
*Instructor for STAT 587: Big Data Analytics* *Spring 2025*

**University of South Carolina**
*Instructor for STAT 205: Elementary Statistics for the Biological and Life Sciences* *Fall 2024*

**University of Rochester**
*Teaching Assistant for BST:426 Linear Models* *2021*

**University of Rochester**
*Teaching Assistant for BST:467 Applied Statistics in Biomedical Sciences* *2017,2018*

**Rochester Institute of Technology**
*Teaching Assistant for Calculus 1* *2014*

**Rochester Institute of Technology**
*Academic Support Center Math/Physics Tutor* *2012 - 2015*

**Rochester Institute of Technology**
*Collegiate Science & Technology Entry Program Tutor* *2011 - 2012*

## Advising and Mentoring

### PhD Thesis Advisor

**Xunan Yang**
*University of South Carolina* *2024-Present*

### Graduate Committee Member

**Hagen Sanchez (Master's)**
*University of South Carolina* *2025*

**David Custer (Master's)**
*University of South Carolina* *2025*

### Mentorship

**Mohammed Munzer Dwedari**
*Harvard Medical School* *2023-2024*
First Position: AI Software Engineer at ept AI

**Harvard Medical School**
*Mentor for MIT Research Science Institute (RSI)* *2023*
First Position: Undergraduate Student at MIT

## Leadership

**Inverse Problems and Uncertainty Quantification Working Group** **2024-Present**
*Co-founder and Organizer* *University of South Carolina*

**Functional and Complex Data Analysis (FUNCODA) Working Group** **2024-Present**
*Co-founder and Organizer* *University of South Carolina*

**Computational Bioimaging Seminar** **March 2023-January 2024**
*Co-founder and Organizer* *Harvard Medical School*

## Honors and Awards

**National Institutes of Health**
*T32 Training Fellowship* *2023-2024*

**American Statistical Association**
*Student Paper Award, Section on Statistics in Imaging* *2022*
Title of paper: "Optimized Diffusion Imaging for Brain Structural Connectome Analysis"

**Upstate Chapter of the American Statistical Association**
*Student Presentation Award, Statistical Methodology Section* *2021*
Title of talk: "Combating the Curse of Dimensionality in Multidimensional Functional Data Analysis"

**Upstate Chapter of the American Statistical Association**
*Statistical Data Analysis Competition Winner* *2018*

**University of Rochester**
*Sproull Fellowship* *2017 - 2022*

**Rochester Institute of Technology**
*Outstanding Undergraduate Scholar Award* *2014 - 2015*

## Patents

**Patent number: 11314793**
*Automated query processing*

## Software

**MultiFiberInversion**: Python (PyTorch) package for simulation based inference approach to diffusion MRI inversion and uncertainty quantification. Hosted on personal GitHub page.

**NeuroPMD**: Python (PyTorch) package for deep neural density estimation on product manifold domains. Hosted on personal GitHub page.

**NODF**: Python (PyTorch) package for deep neural field based methodology for diffusion MRI inversion and uncertainty quantification. Hosted on personal GitHub page. Implementation and extensions now maintained: `https://github.com/MunzerDw/nodf-hashenc`.

**SBCI_Modeling_FPCA**: MATLAB package for data-driven basis expansion of continuous brain structural connectivity. Code is maintained: `https://github.com/sbci-brain/SBCI_Modeling_FPCA`.

**eMFDA**: Python package for multidimensional functional data smoothing and fPCA using marginal product basis functions. Hosted on personal GitHub page.

**OpEdd**: Python package for optimal experimental design and sparse estimation for diffusion MRI. Hosted on personal GitHub page.

## Professional Service

**Proposal Reviewer**:
- NSF-DMS (2025)

**Journal/Conference Reviewer**:
- Journal of the American Statistical Association
- Journal of Computational and Graphical Statistics
- The Annals of Applied Statistics
- Journal of Statistical Theory and Practice
- Medical Image Analysis (2)
- NeuroImage
- Frontiers in Neuroscience (2)
- MICCAI (2023, 2024, 2025)

**Workshop & Session Organizer**:
- Program Committee for MICCAI Workshop UNSURE: Uncertainty for Safe Utilization of Machine Learning in Medical Imaging (2023, 2024, 2025)

## University Service

**Member**
*Top Scholar Selection Committee* *2025*

## Department Service

**Member**
*Data Science/Analytics Programs* *2024-2025*

**Member**
*Colloquium and Seminar Committee* *2024-2025*

**Faculty Advisor**
*Mu Sigma Rho* *2024-2025*

**Judge for Student Presentation Award**
*Palmetto Symposium* *2025*

## Professional Affiliation

Member of the Institute of Mathematical Statistics