

## Arkaprava Roy

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### CURRENT POSITION

*Assistant Professor* June 2020 - Present  
Department of Biostatistics,  
University of Florida, Gainesville, FL, USA

*Associate Member* June 2022 - Present  
Biostatistics and Computational Biology (BCB-SR), Imaging Research Group, UF Health  
Cancer Center

*Associate Member* June 2021 - Present  
Research Design and Data Coordinating center (RDDC), UF

*Associate Member* August 2023 - Present  
UF Artificial Intelligence Academic Initiative

### PREVIOUS POSITION

*Postdoctoral Associate* July 2018 - May 2020  
DSS, Duke University, Durham, NC, USA  
Mentor: Dr. David B. Dunson

### EDUCATION

*PhD in Statistics* August 2014 - May 2018  
North Carolina State University, Raleigh, NC  
Advisors: Dr. Subhashis Ghosal and Dr. Ana-maria Staicu  
Topic: *Bayesian methods for high dimensional models in brain imaging*

*Masters in Statistics,* July 2012 - June 2014  
Indian Statistical Institute, India

*Bachelors in Statistics,* July 2009 - June 2012  
Indian Statistical Institute, India

### TECHNO- LOGICAL SKILLS

*Programming Languages:* C, C++, Python, Java (basic), Bash coding (basic).  
*Statistical Packages:* R, Matlab.  
*Database Management Tool:* SQL.

## RESEARCH WORKS

(\*-student author while submission.)

### Methodology:

- [1] **Roy, A.**, Ghoshal, S., Prescott, J., Choudhury, K. **Bayesian Modeling of the Structural Connectome for Studying Alzheimer Disease** (2019) *Annals of Applied Statistics*.
- [2] **Roy, A.**, Ghoshal, S., Choudhury, K. **High dimensional Single Index Bayesian Modeling of the Brain Atrophy over time** (2020) *Bayesian Analysis*.
- [3] **Roy, A.**, Karmakar, S. **Analyzing initial stage of COVID-19 transmission through Bayesian time-varying model.** (2020) Unsubmitted pre-print.
- [4] **Roy, A.**, Reich, B. J., Guinness, J., Shinohara, R., Staicu, A.M. **Spatial shrinkage via the product independent Gaussian process prior** (2021) *Journal of Computational and Graphical Statistics*.
- [5] **Roy, A.**, Dunson, D.B. **Nonparametric Graphical Model for Counts** (2021) *Journal of Machine Learning Research*.
- [6] **Roy, A.**, Borg, J. S., Dunson, D.B. **Bayesian time-aligned factor analysis of paired multivariate time series** (2021) *Journal of Machine Learning Research*.
- [7] **Roy, A.**, Lavine, I., Herring, A.H. Dunson, D.B. **Perturbed factor analysis: Improving generalizability across studies.**(2021) *Annals of Applied Statistics*.
- [8] **Roy, A.**, Karmakar, S. **Time-varying autoregressive models for count time-series.** (2021) *Electronic Journal of Statistics*.
- [9] Karmakar, S., **Roy, A.** **Bayesian modelling of time-varying conditional heteroscedasticity.** (2021) *Bayesian Analysis*.
- [10] **Roy, A.**, Ghoshal, S. **Optimal Bayesian Smoothing of Functional Observations over a Large Graph** (2021) *Journal of Multivariate Analysis*.
- [11] **Roy, A.** **Multivariate Gaussian RBF-net for smooth function estimation and variable selection** (2021) *Statistical Analysis and Data Mining*.
- [12] Giudici, P. S., Tarantino, B., **Roy, A.** **Bayesian time-varying autoregressive models of COVID-19 epidemics** (2022) *Biometrical Journal*.
- [13] **Roy, A.**, Sarkar, A. **Bayesian Semiparametric Multivariate Density Deconvolution via Stochastic Rotation of Replicates** (2023) *Computational Statistics & Data Analysis*.

- [14] **Roy, A. Nonparametric Group Variable Selection with Multivariate Response for Connectome-Based Modeling of Cognitive Scores** (2023) *Journal of Royal Statistical Society - Series C*.
- [15] Jarquin, D., **Roy, A.**, Clarke, B., Ghoshal, S. **Sparse Multicategory Classification with Applications to Studying Effects of Rice Genes** (2023) *Journal of Applied Statistics*.
- [16] Ellis, D.\*, **Roy, A.**, and Datta, S. Clustering single cell multi-assay omics data with jrSiCKLSNMF. (2023) *Frontiers in Genetics*.
- [17] Duan, L., **Roy, A. Spectral Clustering, Spanning Forest, and Bayesian Forest Process** (2023) *Journal of the American Statistical Association-T&M*
- [18] **Roy, A.**, Lan Z. **Double soft-thresholded model for multi-group scalar on vector-valued image regression** (2024+) (Under Major revision for *Bayesian Analysis*)
- [19] Lan Z., **Roy, A. Spatial Autoregressive Model for von-Mises Fisher Distributed Principal Diffusion Directions** (2024+) (RR at *Technometrics*)
- [20] **Roy, A.**, Lan, Z., Zhang, Z. **Nonparametric Modeling of Diffusion MRI Signal in Q-space** (Submitted) (2024+)
- [21] Agarwala, N.\*, **Roy, A.**, Roy, A **Conic Sparsity: Estimation of Regression Parameters in Closed Convex Polyhedral Cones** (Submitted) (2024+)
- [22] Chang, P.\*, **Roy, A. Individualized Multi-Treatment Response Curves Estimation using RBF-net with Shared Neurons** (Submitted) (2024+)
- [23] **Roy, A.**, Roy, A, Ghosal, S. **Bayesian Inference for High-dimensional Time Series by Latent Process Modeling** (Submitted) (2024+)

#### **Application:**

- [1] Bhattacharya, S.\*, **Roy, A.** (2024). **Linking stability with molecular geometries of perovskites and lanthanide richness using machine learning methods.** *Computational Material Science*

#### **Collaborative:**

- [1] Wade, F.E., Kellaher, G.K., Pesquera, S., Baudendistel, S.T., **Roy, A.**, Clark, D.J., Seidler, R.D., Ferris, D.P., Manini, T.M. and Hass, C.J., (2022). **Kinematic analysis of speed transitions within walking in younger and older adults.** *Journal of Biomechanics*, p.111130.
- [2] Downey, R.J., Richer, N., Gupta, R., Liu, C., Pliner, E.M., **Roy, A.**, Hwang, J., Clark, D.J., Hass, C.J., Manini, T.M. and Seidler, R.D., (2022). **Uneven terrain treadmill walking in younger and older adults.** *Plos one*, 17(12).

- [3] Shah, V.A., Cruz-Alemida, Y., **Roy, A.**, Cenko, E., Downey, R.J., Ferris, D.P., Hass, C.J., Reuter-Lorenz, P.A., Clark, D.J., Manini, T.M. and Seidler, R.D., (2023). **Uneven terrain versus dual-task walking: differential challenges imposed on walking behavior in older adults are predicted by cognitive and sensorimotor function.** (Submitted)
- [4] Huang, M, Wang, H, Mackey, C, Chung, MC, Guan, J, Zheng, G, **Roy, A.**, Xie, M, Vulpe, C, Tang, X. **YAP at the Crossroads of Biomechanics and Drug Resistance in Human Cancer.** *International Journal of Molecular Sciences.* 24(15):12491.
- [5] Dean, E.A., **Roy, A.**, Lin, R.Y., Gharaibeh, R.Z., Li, D.M., Gauthier, J., Jobin, C., Al-Mansour, Z.A. and Wingard, J.R., 2023. Gut Microbiome Faecalibacterium Abundance in Patients with Plasma Cell Disorders Undergoing Autologous Hematopoietic Stem Cell Transplant Is Associated with Progression Free Survival. Under revision for *Transplantation and Cellular Therapy*.

## PROFESSIONAL MEMBERSHIP

- American Statistical Association (ASA),
- International Indian Statistical Association (IISA).

## PROFESSIONAL ACTIVITIES

- Served as a reviewer for AoAS (1), JASA (3), Biometrika (2), JABES (2), Gifted Child Quarterly (1), JRSS-C (2), Machine Learning (1), BMC-Bioinformatics (2), Communications in Statistics – Case Studies and Data Analysis (2), Statistics in Biosciences (1), Journal of Computational and Applied Mathematics (1), Bayesian Analysis (3), JCGS (2), CSDA (2), Biometrics (3), Mathematics (1), Statistics in Medicine (2), Scientific Reports (1), Journal of Nonparametric Statistics (1), Statistica Sinica (1), Journal of Machine Learning Research (JMLR) (5), Technometrics (1), Australian & New Zealand Journal of Statistics (1), IEEE Transactions on Medical Imaging (1), Journal of Multivariate Analysis (1), Statistics (1), Transplantation and Cellular Therapy (1), Bernoulli (1).

## AREAS OF INTEREST

Bayesian non-parametric & semi parametric modeling, high dimensional data, big data, sparse estimation, neuroimaging data, cancer imaging, time series, spatiotemporal data, measurement error modeling, neural net, machine learning

## PRESENTATIONS

### Posters

**Roy, A.**, Jarquin, D., Clarke, B., Ghoshal, S. **Sparse Multicategory Classification with Applications to Studying Effects of Rice Genes** *JSM 2016, Chicago*

**Roy, A.**, Dunson, D.B. **Nonparametric Graphical Model for Counts** *CRCNS PI Meeting 2019, Austin*

### Talks

Student Seminar series, NCSU  
 Bayesian Seminar series, NCSU  
 Bayesian Seminar series, NCSU, *Invited*  
 JSM 2019, Denver, *Invited*  
 Statistics Seminar, 2019 UMBC, *Invited*  
 Statistics Seminar, 2020 IIT, Kanpur, *Invited*  
 JSM 2020, Online, *Invited*  
 ENAR 2021, Online, *Invited*  
 IISA 2021, Online, *Invited*  
 EcoStat 2021, Online, *Invited*  
 Department seminar 2021, UF, Department of Statistics, *Invited*  
 CMStat 2021, Online, *Invited*  
 Department seminar 2022, Virginia tech, Department of Statistics, *Invited*  
 ICSA 2022, Gainesville, US, *Invited*  
 JSM 2022, DC, US, *Invited*  
 BSU seminar, University of Cambridge *Invited*  
 CMStat 2022, London, UK, *Invited*  
 IISA 2022, Bengaluru, India, *Invited*  
 ASA FL Chapter, 2023, Gainesville, US, *Invited*  
 Statistical Methods in Imaging Conference 2023, Minnesota, US, *Invited*  
 IISA 2023, Golden, US, *Invited*  
 ICSA 2023, Ann Arbor, US, *Invited*  
 JSM 2023, Toronto, Canada, *Invited*  
 CMstat 2023, Berlin, Germany *Invited*  
 JSM 2024, Portland, USA, *Invited*  
 Theory and Foundations of Statistics in the Era of Big Data, 2024, FSU, USA *Invited*

### **Distinguished speaker**

The Research Workshop on Computational Bayes (Virtual), 2022, School of Statistics, University of the Philippines-Diliman

### **Awards**

New Researcher Travel Award, Institute of Mathematical Statistics, 2023.

### **FUNDED RESEARCH**

#### National Science Foundation:

Collaborative Research: Novel Modeling and Bayesian Analysis of High-dimensional Time Series. Proposal number DMS-2210281. Funding level \$110000. Duration: 09/01/2022–08/31/2025. Role: PI.

#### National Institute of Health:

U01 AG061389-04 (Todd Manini, David Clark, Rachael Seidler), Multimodal imaging of brain activity to investigate walking and mobility decline in older adults, Role: Project manager.

R01 AG076490-01 (Terence Ryan, PI), Linking kynurenine accumulation and the AHR pathway to exacerbated aging, Role: Co-I.

P30CA247796 (Johnathan Licht,PI), P30 UF Health Cancer Center Support Grant. Duration: 6/1/23 - 5/31/27, Role: Biostatistician, Biostatistics and Computational Biology (BCB) Shared Resource

Other:

NASA Human Research (Rachael Seidler, PI), Effect of Head-Down Tilt +/- CO2 on Human Glymphatic Function, Role: Co-I.

## ADVISING

MS advising:

Madison Moore (2020-2022)

Yutao Zhang (2020-2022)

PhD advising:

Peter Chang (2022-Present)

Zitian Wu (jointly with Dr. Susmita Datta) (2023-Present)

PhD thesis committee

*Biostatistics:*

Hasibul Hasan, graduated 2022

Dorothy Ellis, graduated 2023

Runzhi Zhang, graduated 2023

Rongzi Liu, current

*External:*

Heejun Shin, Statistics, graduated 2024

Cheng Zeng, Statistics, current

## SERVICE

*Chair, Seminar Committee*

October 2020 - 2022

University of Florida

*Grant Reviewer*

2021, 2023

CTSI Pilot RFA - Statistical Review Committee, UF

*SRMC Reviewer*

06/2022-present

UF Health Cancer Center

*Invited session organizer at*

ICSA conference, Gainesville, US

06/19/2022-06/22/2022

JSM conference, DC, US

08/06/2022-08/11/2022

JSM conference, Toronto, Canada

08/05/2023-08/10/2023

CMstat 2023, Berlin, Germany

12/16/2023-12/18/2023

*Roundtable organizer at*

JSM conference, DC, US

08/06/2022-08/11/2022

*Student competition judge*

Poster Session, ICSA, Gainesville

2022

Paper competition Committee, ENAR

2023-Present

Paper and Poster competition, ASA Fl Chapter, Gainesville

2023

Paper competition, IISA, Golden

2023

*PHPs Annual Research Day*

University of Florida

2022, 2023

*External thesis reviewer*

University of Padua

2023

*International organizing committee member*

International Indian Statistical Association

2024

## **Teaching Experience**

University of Florida:

STA 6177 – Applied Survival Analysis (2 times)

PHC 6084 – Bayesian Biostatistical Methods (2 times)

PHC 6068 – Biostatistical Computing (PhD core course, 2 times)