# Snigdha Panigrahi

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## Appointments

**Assistant Professor** — **University of Michigan**
*Department of Statistics* — *September 2018 – Present*

**Assistant Professor** — **University of Michigan**
*Department of Biostatistics (Joint Appointment)* — *January 2022 – Present*

**Visiting Researcher** — **Massachusetts Institute of Technology**
*Institute for Data, Systems, and Society* — *January 2019 - August 2019*

## Professional Activities

**Elected Member** — **The International Statistical Institute**
*2021 – Present*

**Associate Editor** — **Journal of Computational and Graphical Statistics**
*2021 – Present*

## Education

**Ph.D. in Statistics** — **Stanford University**
*Advisor: Prof. J. Taylor* — *2013 – 2018*

**Master in Statistics** — **Indian Statistical Institute, Kolkata**
*Specialization: Mathematics, Statistics and Probability.* — *2011-2013*

**Bachelor in Statistics** — **Indian Statistical Institute, Kolkata**
*2008-2011*

## Publications

Graduate student authors supervised or co-supervised by S.P. are underlined, while undergraduate student authors (at the time of research) are underlined and marked with a dagger (†).

**ACCEPTED/ PUBLISHED**

**[P1] S. Panigrahi**, K. Fry and J. Taylor. Exact Selective Inference with Randomization. *Biometrika.* 2024.

**[P2] S. Panigrahi**, J. Wang and X. He. Treatment Effect Estimation via Efficient Data Aggregation. *Bernoulli.* 2024.

**[P3] S. Panigrahi**, N. Stewart, C. Sripada and E. Levina. Selective Inference for Sparse Multitask Regression with Applications in Neuroimaging. *Annals of Applied Statistics.* 2024.

**[P4] S. Panigrahi**. Carving Model-free Inference. *Annals of Statistics.* 2023.

**[P5] S. Panigrahi**, P. W. MacDonald and D.Kessler. Approximate Post-Selective Inference for Regression with the Group LASSO. *Journal of Machine Learning Research.* 2023.

**[P6] S. Panigrahi**, S. Mohammad, A. Rao and V. Baladandayuthapani Integrative Bayesian models using Post-selective Inference: a case study in Radiogenomics. *Biometrics.* 2022.

**[P7] S.Panigrahi** and J. Taylor. Approximate Selective Inference via Maximum Likelihood. *Journal of the American Statistical Association.* 2022.

**[P8] S. Panigrahi**, P. Roy and Y. Xiao. Maximal Moments and Uniform Modulus of Continuity for Stable Random Fields. *Stochastic processes and their applications.* 2021.

**[P9] S. Panigrahi**, J. Taylor and A. Weinstein. Integrative methods for Post-selection Inference under Convex Constraints. *Annals of Statistics.* 2021.

**[P10]** B. Saeed†, **S. Panigrahi** and C. Uhler. Causal Structure Discovery from Distributions Arising from Mixtures of DAGs. *International Conference on Machine Learning*. 2020.

**[P11] S. Panigrahi**, J. Zhu and C.Sabatti. Selection-adjusted Inference: an application to confidence intervals for *cis*-eQTL effect sizes. *Biostatistics.* 2019.

**[P12]** Q. Zhao and **S. Panigrahi**. Selective Inference for Effect Modification: An Empirical Investigation. *Observational Studies.* 2019.

**[P13] S. Panigrahi**, N. Fawaz and A. Pudhiyaveetil. Temporal Evolution of Behavioral User Personas via Latent Variable Mixture models. *IUI Workshops' 19, CEUR-WS Volume 2327.* 2019.

**[P14] S. Panigrahi** and J. Taylor. Scalable methods for Bayesian Selective Inference. *Electronic Journal of Statistics.* 2018.

**[P15] S. Panigrahi**, J. Taylor and S. Vadlamani. Kinematic Formula for Heterogeneous Gaussian Related Fields. *Stochastic processes and their applications.* 2018.

## AT REVISION

**[R1]** S. Liu and **S. Panigrahi**. Selective Inference with Distributed Data. *Journal of Machine Learning Research.* 2023+.

## AT SUBMISSION

**[S1]** Y. Huang†, S. Pirenne, **S. Panigrahi** and G. Claeskens. Selective Inference using Randomized Group Lasso Estimators for General Models.

**[S2]** Y. Huang, **S. Panigrahi** and W. Dempsey. Selective Inference for Sparse Graphs via Neighborhood Selection.

**[S3]** R. Perry, **S. Panigrahi**, D. Witten and J. Bien. Inference on the proportion of variance explained in principal component analysis.

### IN PREPARATION

**[S1]** Y. Wang, **S. Panigrahi** and X. He. Asymptotically-exact Selective Inference for Quantile Regression.

### TECHNICAL REPORTS

**[T1] S. Panigrahi**. PhD Dissertation. An Approximation-Based Framework for Post-Selective Inference. 2018.

**[T2]** X. Tian, **S. Panigrahi**, J. Markovic, N. Bi and J. Taylor. Selective sampling after solving a Convex Problem. 2017.

## Funding

### CURRENT

1. **NSF CAREER AWARD (Recommended)**. Perturbation Methods for Quantifying Uncertainties in Machine Learning Models. Dates: **July 2024 – July 2029**. Role: **PI**.

2. **NIH R01**. Leveraging ML Algorithms and Data Integration Techniques to improve Efficiency of Causal Moderation Analyses of Micro-randomized trial data. Dates: **March 2024 – November 2027**. Role: **Co-I**.

3. **NSF-DMS 2113342**. Amount granted: **$150,000**. Dates: **August 2021 – July 2024**. Role: **PI**.

   **Statistics**: Reusing Data Efficiently for Iterative and Integrative Inference.

4. **Award by Departments of Statistics and Biostatistics**. Amount granted: **$10,000**. Role: **PI** joint with Co-PI W. Dempsey.

   **Joint Retreat**: Uncertainty Quantification for Learned Networks from Heterogeneous Data.

5. **NSF-DMS 1951980**. Amount granted: **$800, 000**. Dates: **June 2020 – May 2024**. Role: **PI**. joint with Co-PIs X. He, L. Wang, K. Kato, Q. Zheng.

   **FRG Collaborative Research**: Quantile-Based Modeling for Large-Scale Heterogeneous Data.

## Patents

1. Apparatus and method for recording transition history and selecting next playback from the transition history, US20170366860A1.

2. Content search and pacing configuration, Application: US16066135.

3. Apparatus and method for concurrent video viewing with user-added realtime content, Application: US15774485.

4. Apparatus and method for providing customized ratings for a user, US20170337196A1.

## Talks and Tutorials

1. *Selective Inference using Randomized Group LASSO Estimators*: Statistics and Applied Probability Seminar, UC Santa Barbara, October 2023.

2. *Selective Inference using Randomized Group LASSO Estimators*: Big Data and Machine Learning in Econometrics, Finance, and Statistics, University of Chicago, October 2023.

3. *Selective Inference using Randomized Group LASSO Estimators*: Poster Presentation at the Joint Statistical Meetings, Toronto, August 2023.

4. *Approximate Selective Inference via Maximum Likelihood*: ICSA Applied Statistics Symposium, Ann Arbor, June 2023.

5. *Selective Inference using Randomized Group LASSO Estimators*: Biostatistics Seminar, University of Washington. May 2023.

6. *Approximate Selective Inference via Maximum Likelihood*: Statistics Seminar, University of Pittsburg. April 2023.

7. *Approximate Selective Inference via Maximum Likelihood*: IISA Conference, Bangalore. December 2022.

8. *Approximate Selective Inference via Maximum Likelihood*: Computational and Methodological Statistics Seminar, London. December 2022.

9. *Approximate Selective Inference via Maximum Likelihood*: Neyman Seminar, UC Berkeley. November 2022.

10. *Approximate selective inference via Maximum Likelihood*: Statistics Seminar, KU Leuven. March 2022.

11. *Approximate Methods for Joint Estimation of Group-sparse Parameters post Selection*: Statistics Seminar, University of Minnesota. November 2021.

12. *Treatment Effect Estimation with Efficient and Privacy-Preserving Data Aggregation*: Biostatistics Seminar, University of Michigan. October, 2021.

13. *Approximate Methods for Joint Estimation of Group-sparse Parameters post Selection*: International Seminar on Selective Inference. August 2021.

14. *Posterior inference post Selection of Group-sparse Regression Models*: Biostatistics Seminar, University of Michigan. December, 2020.

15. *Carving for Treatment Effect estimation: via efficient Model Aggregation*: Joint Statistical Meetings, August 2020.

16. *Carve your data for adaptive inference: don't split data*: International Symposium on Nonparametric Statistics, Paphos, June 2020 (Canceled due to Covid-19).

17. *Carve your data for adaptive inference: don't split data*: The Statistical Learning and Data Science Conference, UC Irvine, May 2020 (Canceled due to Covid-19).

18. *Data-efficient integrative inference via carving* : The Interface Between Selective Inference and Machine Learning, Banff, March 2020. (Canceled due to Covid-19).

19. *Carve your data for adaptive inference: don't split data*: Statistics Seminar, Ohio State University, January 2020.

20. *Post-selective estimation of linear mediation effects*: Workshop on Higher-Order Asymptotics and Post-Selection Inference, Washington University, St. Louis. August 2019.

21. *Journey Lecture: Big data summer institute*: Michigan School of Public Health, July 2019.

22. *Carve your data for adaptive inference: don't split data*: New Researchers' Conference, Fort Collins, June 2019.

23. *Carve your data for adaptive inference: don't split data*: Statistics Seminar, Michigan State University , April 2019.

24. *Carve your data for adaptive inference: don't split data*: Indian Institute of Science, Bangalore, March 2019.

25. *Carve your data for adaptive inference: don't split data*: Indian Statistical Institute, Bangalore, March 2019.

26. *Carve your data for adaptive inference: don't split data*: Indian Statistical Institute, Kolkata, March 2019.

27. *Adaptive inference post data explorations*: MIDAS, University of Michigan, November, 2018.

28. *A tutorial on recent advances in Selective Inference*: Adaptive Data Analysis Workshop, Simons Institute for Theory of Computing, UC Berkeley. July, 2018.

29. *An approximation based approach for randomized conditional inference- with an application in eQTLs*: Statistics Seminar, CMU Statistics and Data Science. Feb, 2018.

30. *An approximation based approach for randomized conditional inference- with an application in eQTLs*: Statistics Seminar, University of Michigan. Feb, 2018.

31. *An approximation based approach for randomized conditional inference- with an application in eQTLs*: Department of Biostatistics, Harvard T.H. Chan School of Public Health. Jan, 2018.

32. *An approximation based approach for randomized conditional inference-* with an application in eQTLs: Statistics Seminar, Columbia University. Jan, 2018.

33. *Selection adjusted estimation of effect sizes with an application in eQTLS*: Workshop in Operations Research and Data Science, The Fuqua School of Business, Duke University. Dec, 2017.

34. *Adaptive estimation of effect sizes in eQTLS*: Berkeley statistics and genomics seminar, Oct, 2017.

35. *A Pseudo-likelihood approach to Selective Inference*: Workshop on Higher-Order Asymptotics and Post-Selection Inference, Washington University, St. Louis. 2017.

36. *Bayesian Selective Inference in Linear Model*: 10th International Conference on Multiple Comparison Procedures, UC Riverside; 2017.

37. *Bayesian Selective Inference in Linear Models*: Workshop on Higher-Order Asymptotics and Post-Selection Inference, Washington University, St. Louis; 2016.

38. *Maximal Moments and Modulus of Continuity of Stable Random Fields*: Extreme Value Analysis Conference, University of Michigan, Ann Arbor; 2015.

39. *Moments of Partial Maxima of Symmetric Stable Processes*: Workshop on Heavy Tailed Distributions and Extreme Value Theory, Indian Statistical Institute, Kolkata; 2013.

## Teaching

### REGULAR OFFERINGS

New Course Developed by S.Panigrahi is underlined.

### UNIVERSITY OF MICHIGAN

**Stats 415**: Data Mining and Machine Learning. 2024 Winter. Upper-level undergraduate students.

**Stats 600**: Regression Analysis. 2020, 2022, 2023 Fall. Core first year PhD course .

**Stats 280**: Honors Introduction to Statistics & Data Analysis. 2018, 2019, 2020, 2022 Fall. Honors level course for undergraduate students who are interested in a challenging introductory course.

**Stats 605**: Statistical methods for Adaptive Data Analysis. 2019, Winter. Advanced PhD course.

### SUMMER TRAINING PROGRAM

Big Data Summer Institute (BDSI): 2023 Summer, 2024 Summer. Training students in "Statistics for Trustworthy Machine Learning".

## Advising (Students at UM who S. Panigrahi supervised or co-supervised for independent research)

### PhD

Judy Wu Expected Graduation: 2028.

Yumeng Wang (Advised by S. Panigrahi and X. He) Expected Graduation: 2025.

Yiling Huang (Advised by S. Panigrahi) Expected Graduation: 2027.

Soham Bakshi (Advised by S. Panigrahi) Expected Graduation: 2027.

Peter W. MacDonald (Advised by E. Levina and J. Zhu)

Daniel Kessler (Advised by E. Levina)

### Masters

Natasha Stewart.

### Undergraduate advising

Independent Research: Yiling Huang (2021-22), Peiran Wang (2023-)

Undergraduate Research Program in Statistics (URPS) Project: Haiming Li (2023-24), Po-Tsun Chen (2023-24), Yihan Yao (2023-24), Yuezhou Qu (2023-24), Corrine Liu (2023-24), Hannah Daane (2022-23), Peiran Wang (2022-23), Renee Jia Er Sew (2021-22), Yiran Fan (2021-22), Tian Xie (2020-21), Qiang Chen (2020-21).

Big Data Summer Institute (2023): Mentored a group of 11 undergraduate students in "Statistics for Trustworthy Machine Learning". More details at `https://sph.umich.edu/bdsi/research-activities/index.html`.

## Seminar/ Conference Organization

1. Workshop on Translational Research on Data Heterogeneity, April 2024: Statistical Decision-making for Complex, Big Data. Co-organized with X. He, L. Wang, K. Kato, Q. Zheng.
2. Session in ICSA, 2023 Conference (Ann Arbor): Statistical Decision-making for Complex, Big Data.
3. Quantile Regression and Data Heterogeneity Workshop, February 2022. Co-organized with X. He, L. Wang, K. Kato, Q. Zheng.
4. Statistics Seminar Series, Department of Statistics, University of Michigan. Winter 2020.
5. Session in IISA, 2019 Conference (Mumbai): Causal Analysis: cutting edge applications and novel techniques.

## Other Professional Services

**Service on Diversity-Equity-Inclusion committee**. 2022-23.

**Referee for journals**. Annals of Statistics, Journal of the American Statistical Association, Journal of the Royal Statistical Society Series B, Electronic Journal of Statistics, Biometrika, Journal of Machine Learning Research, Journal of Computational and Graphical Statistics, Journal of Privacy and Confidentiality, Information and Inference.

**Undergraduate curricula development**. Probability for Data Science, University of Michigan, 2019-2020.

**Service as Teaching volunteer**. the Schwab Learning Center, Stanford University, 2014-15 Summer.

**Service as Consultant**. Stanford Statistics Free Consulting Service, 2014-15.