Pratyaydipta Rudra

CONTACT INFORMATION

Address:
Department of Statistics
301D MSCS
Stillwater, OK 74078, U.S.A.
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EDUCATION

Ph.D., Biostatistics August 2010 - August 2015
The University of North Carolina, Chapel Hill, NC.
Advisor: Fred A. Wright, Professor & Andrew Nobel, Professor.
Title: Statistical tools for general association testing and control of false discoveries in group testing.

Master of Statistics August 2008 - May 2010
(Specialization: Applied Statistics)
Indian Statistical Institute, Kolkata, India.

Bachelor of Science in Statistics, August 2005 - June 2008
Ramakrishna Mission Residential College, University of Calcutta, Kolkata, India.

RESEARCH INTERESTS

Statistical Genomics; Bioinformatics; Multiple Hypothesis Testing; Test of Association; Kernel Methods in Statistics; Longitudinal Data Analysis; Multivariate Statistics; Nonparametric Methods; Statistical methods for clinical studies.

PROFESSIONAL EXPERIENCE

Associate Professor,
August 2022 - Present,
Department of Statistics
Oklahoma State University, Stillwater, OK.

Assistant Professor,
August 2018 - July 2022,
Department of Statistics
Oklahoma State University, Stillwater, OK.

Post Doctoral Fellow,
September 2015 - July 2018,
Department of Biotatistics & Informatics
University of Colorado, Anschutz Medical Campus, CO.

Supervisor: Katerina Kechris and Debashis Ghosh.

Graduate Research Assistant August 2010 - August 2015.
Supervisor: Fred A. Wright. Department of Biostatistics
The University of North Carolina at Chapel Hill

Published papers

1. **Rudra, P.**, Baxter, R., Hsieh, E. W., & Ghosh, D. (2022). "Compositional Data Analysis using Kernels in mass cytometry data". *Bioinformatics Advances*, 2(1).

2. Duddy, H. R., Schoonover, M. J., Williams, M. R., & **Rudra, P.** (2022). "Healing time of experimentally induced distal limb wounds in horses is not reduced by local injection of equine-origin liquid amnion allograft". *American Journal of Veterinary Research*, 83(8).

3. Jurek, K. A., Schoonover, M. J., Williams, M. R., & **Rudra, P.** (2022). "Effect of perfusate volume on amikacin concentrations after saphenous intravenous regional limb perfusion in standing, sedated horses". *Veterinary Surgery*, 51(4), 665-673.

4. Sypniewski, L. A., Knych, H., Breshears, M., Fang, W. B., Moody, D. E., **Rudra, P.**, ... & Brandão, J. (2022). "Pharmacokinetics, blood and urine profile effects, and injection site histopathology following three daily injections of subcutaneous high concentration buprenorphine in New Zealand white rabbits (Oryctolagus cuniculus)". *Journal of Exotic Pet Medicine*, 43, 51-56.

5. Hiney, K., Sypniewski, L., **Rudra, P.**, Pezeshki, A., & McFarlane, D. (2021). "Clinical health markers in dogs fed raw meat-based or commercial extruded kibble diets". *Journal of Animal Science*, 99(6).

6. Radcliffe, R.A., Dowell, R.D., Odell A., Richmond, P., Bennet, B., Larson, C., Kechris, K., Saba, L.M., **Rudra, P.**, Shi, W. (2020). "Systems genetics analysis of the LXS recombinant inbred mouse strains: Genetic and molecular insights into acute ethanol tolerance". *PLOS ONE*, 15(10), e0240253.

7. **Rudra, P.**, Cruz-Cortes, E., Zhang, X., Ghosh, D. (2020). "Multiple testing approaches for hypotheses in integrative genomics". *Wiley Interdisciplinary Reviews: Computational Statistics*, 12(6), e1493.

8. Kordas, G., **Rudra, P.**, Hendricks, A., Saba, L., Kechris, K. (2019). "Insight into genetic regulation of miRNA in mouse brain" *BMC genomics*, 20(1), 849.

9. Schuyler, R.P., Jackson, C., Garcia-Perez, J.E., Baxter, R.M., Ogolla, S.O., Rochford, R., Ghosh, D., **Rudra, P.**, Hsieh, E.W.Y. (2019). "Minimizing Batch Effects in Mass Cytometry Data" *Frontiers in immunology*, 10, 2367.

10. Shi, W., Zhuang, Y., Russell, P., Hobbs, B.D., **Rudra, P.**, Vestal, B., Hersh, C.P., Saba, L., Kechris, K. (2019). "Unsupervised discovery of phenotype specific multi-omics networks" *Bioinformatics*, 35(21) 4336-4343.

11. Anantharajan, J., Zhou, Zhang, L., H., Hotz, T., Vincent, M.Y., Blevins, M., Jones, D., Jason, A.E., Kuan, J.W.L., Ng, E.Y., Khoon, Y.Y., Baburajendran, N., Lin, G., Hung, A.W., Joy, J., Patnaik, S., Marugan, J.,**Rudra, P.**, Ghosh, D., Hill, J., Kaylor, T.H., Zhao, R., Ford, H., Kang, C. (2019). "Structural and functional analyses of an allosteric Eya2 phosphatase inhibitor" *Molecular cancer therapeutics*, 18(9), 1484-1496.

12. Oliphant, M.U., Vincent, M.Y., Galbraith, M.D, Pandey, A., Zaberezhnvv, V.,**Rudra, P.**, Johnson, K.R., Costello, J.C., Ghosh, D., DeGregori, J., Espinosa, J.M., Ford, H. (2019). "Six2 Mediates Late-stage Metastasis via Direct Regulation of Sox2 and Induction of a Cancer Stem Cell Program" *Cancer Research*, 79(4), 720-734.

13. Nedumaran, B., Pineda, R.H., **Rudra, P.**, Lee, S., Malykhina, A.P. (2019). "Association of genetic polymorphisms in the pore domains of mechanogated TREK-1 channel with overactive lower urinary tract symptoms in humans." *Neurourology and Urodynamics*, 38(1), 144-150.

14. **Rudra, P.**, Shi, W., Russell, P., Tabakoff, B., Hoffman P., Saba, L., Kechris, K. (2018). "Predictive Modeling of miRNA-mediated Predisposition to Alcohol-related Phenotypes in Mouse" *BMC genomics*, 19(1), 639.

15. **Rudra, P.**, Broadaway, K.A., Ware, E.B., Jhun, M.A., Bielak, L.F., Zhao, W., Smith, J.A., Peyser, P.A., Kardia, S.L., Epstein, M.P. and Ghosh, D. (2018). "Testing cross-phenotype effects of rare variants in longitudinal studies of complex traits". *Genetic epidemiology*, 42(4), 320-332.

16. Zhang, L., Zhou, H., Li, X., Vartuli, R., Rowse, M., Xing, Y., **Rudra, P.**, Ghosh, D., Zhao, R., Ford, H.L. (2018). "Eya3 Threonine Phosphatase Partners with PP2A to Induce c-Myc Stabilization and Tumor Progression". *Nature communications*, 9(1), 1047.

17. Russell, P., Vestal, B., Shi, W., **Rudra, P.**, Dowell, R.D., Radcliffe R.A., Saba, L., Kechris, K. (2018). "miR-MaGiC improves quantification accuracy for small RNA-seq". *BMC Research Notes*, 11(1), 296.

18. Vartuli, R., Zhou, H., Zhang, L., Powers, R.K., Klarquist, J., **Rudra, P.**, Vincent, M.Y., Ghosh, D., Costello, J.C., Kedl, R.M., Slansky, J.E., Zhao, R., Ford, H.L. (2018). "Eya3 promotes breast tumor-associated immune

suppression via threonine phosphatase-mediated PD-L1 upregulation". *The Journal of Clinical Investigation*, 128(6), 2535-2550.

19. **Rudra, P.***, Vestal, B.*, Shi, W.*, Russell, P., Odell, A., Dowell, R.D., Radcliffe, R., Saba, L., Kechris, K. (2017). "Model Based Heritability Scores for High-throughput Sequencing Data". *BMC Bioinformatics*, 18(1), 143. [*Equal contribution]

20. **Rudra, P.**, Zhou, Y., Wright, F.A. (2017). "A Procedure to Detect General Association Based on Concentration of Ranks". *Stat*, 6(1), 88-101.

21. O'Gorman W.E., Kong D.S., Balboni I.M., **Rudra, P.**, Bolen C.R., Ghosh, D., Davis M.M., Nolan G.P., Hsieh E.W.Y. (2017). "Mass Cytometry Identifies a Distinct Monocyte Cytokine Signature Shared by Clinically Heterogeneous Pediatric SLE Patients". *Journal of Autoimmunity*, 81, 74-89.

22. Getahun, A., Wemlinger, S., **Rudra, P.**, Santiago, M., van Dyk, L., and Cambier, J. (2017). "Impaired B Cell Function During Viral Infections due to PTEN-mediated Inhibition of the PI3K Pathway". *Journal of Experimental Medicine*, 214(4), 931-941.

23. Nedumaran, B., **Rudra, P.**, Burnham, E.L., Meacham, R.B., Malykhina, A.P. (2017). "Impact of Regular Cannabis Use on Biomarkers of Lower Urinary Tract Function". *Urology*, 109, 223.e9-223.e16.

24. **Rudra, P.**, Sen, P.K., Burdine, J., Sen, S. (2016). "Effect of Stroke Prevention Medication on Aortic Atheroma Progression Assessed Using New Statistical Paradigm". *Journal of Medical Statistics and Informatics*, 4(1), 4.

Work in progress

Submitted Papers/Under revision

1. Kaipa, Roha, M., Kennison, Sheila, M., **Rudra, P.**, "Sentence Processing in Trilinguals." (Submitted to South African Journal of Communication Disorders)

2. Baxter, R., Wang, C., Kong, D., Garcia-Perez, J., Coleman, B., Ghosh, T., Paul, D., Cooper, J., Claasen, M., Ghosh, D., **Rudra, P.**, Smith, M., Hsieh, E., "Cellular immune signatures in pediatric systemic lupus erythematosus" (Submitted to Journal of Autoimmunity)

3. Wilson, H.P., Pierre, A., Cooley, B., **Rudra, P.**, Dorsey, A.W., Chatterjee, S., Janbain, M., Velez, M., Majumder, R., "A Novel Application of Protein S in Adjunct Therapy for Hemophilia B." (Submitted to American Journal of Hematology)

Manuscripts under preparation

1. **Rudra, P.**, Wright, F.A., Nobel, A., "A Random Effects Model and Testing Procedure for Group-level FDR Control." (Under preparation)
2. **Rudra, P.**, Lucas, A., Lawrence, I., Klug, A., McCullagh, E., "Comorbidities between auditory dysfunction and neurodevelopment disorders - a chart review study." (Under preparation)
3. Goodarzi, P., McFarlane, D., Hiney, K.M., Sypniewski, L., **Rudra, P.**, Willis, E., Pezeshki, A., "Fecal microbiota and blood metabolomics profile of client-owned dogs fed raw meat based or commercial extruded kibble diets". (Under preparation)
4. Doden G., DiGeronimo P.M., Rudra P., Buchweitz J.P., Zyskowski J., Brandão J. "Comparison of serum and hepatic vitamin and mineral concentrations in managed Elasmobranchii". (Under Preparation)

Work in progress

1. Olaifa, J.*, **Rudra, P.**, "Effect of covariates on partitioning the variance using a generalized linear mixed effects model" (In progress)
2. Pearcy, J.*, **Rudra, P.**, "A statistical exploration of Patagonia Picnic Table Effect" (In progress)
3. Barillo, A., Dugat, D., Ramachandran, A., **Rudra, P.**, "Incidence of bacterial contamination of intravenous fluid bags using one-way valve with a leur lock versus puncture port sampling" (In progress)

Technical Reports

Bose, S., Pal, A., Mallick, J., Kumar, S. and **Rudra, P.**, "A Hybrid Approach for Improved Content-based Image Retrieval using Segmentation." (Technical report, BIRU/2012/3, Indian Statistical Institute)

Packages developed

1. Shi, W., Russell, P., **Rudra, P.**, Vestal, B., Kechris, K., Saba, L., "Heritability of Gene Expression for Next-Generation Sequencing (HeritSeq)" (CRAN)
2. Ghosh, T., Lui, V., **Rudra, P.**, Seal, S., Vu, T., Hsieh, E., Ghosh, D., "Differential expression using kernel-based score test (cytoKernel)" (Bioconductor)

*Student authors

Active grants

1. "Role of histotripsy synergized CD40 signaling in the re-engineering of cold tumors."
   Role: Co-investigator (P.I. : Ashish Ranjan), NIH (RO1)

Pending proposals

1. "Effect of dosage and perfusate volume on synovial fluid amikacin concentrations following saphenous intravenous regional limb perfusion in standing, sedated horses"
   Role - Co-investigator (P.I.: Megan Williams), Oklahoma State University CVM Research Advisory Committee

2. "Impact of immune aging on nanoparticle immunotherapy"
   Role: Co-investigator (P.I. : Ashish Ranjan), NIH

Past grants

1. "Leveraging deep active-transfer learning to identify low-resource mobility functioning information in public clinical notes."
   Role: Consultant (P.I. : Thanh Thieu), OCAST Oklahoma Health Research HR21, 2021-2022

2. "Statistical Learning Methods to Uncover Causal Networks for Systemic Lupus Erythematosus using Multi-omics Data"
   Role: P.I., College of Arts and Sciences Summer Research Award (ASR), 2022

3. "A Retrospective Study to Determine the Levels of Protein S, a Physiological Anticoagulant in COVID-19 Patients"
   Role: Co-investigator (P.I.: Rinku Majumder), LSUHSC School of Medicine – COVID-19 intramural research grant, 2020-2021

4. "Does feeding raw meat based diet reduce intestinal inflammation in dogs?"
   Role: CO-investigator (P.I.: Dianne McFarlane), Vet Med internal grant: Red Account (RAC), 2020-2021

Honors and Awards

The Kalyani Sen International Student Scholarship in Biostatistics, UNC-CH (2014-15)

The Fryer Fellowship, Department of Biostatistics, UNC-CH (2012-14)

Gillings Merit Scholarship, School of Public Health, UNC-CH (2010-11)

Sabyasachi Roy Memorial Gold Medal for the best project work in second year of M.Stat, Indian Statistical Institute (2010-11)

Award for the top rank in the university for bachelor degree in statistics, University of Calcutta (2005-08)

Invited Presentations

1. "Statistical methods for finding cytometric markers associated with Systemic Lupus Erythematosus" Invited Talk at the Annual Conference of International Indian Statistical Association, Bengaluru, India (December, 2022).

2. "Kernel-based methods for statistical analysis of Mass Cytometry Data" Invited Talk, Departmental Colloquium, Department of Statistics, Texas A&M University (October 2021).

3. "Compositional Data Analysis using Kernels in Mass Cytometry Data" Invited Talk at WNAR (Western North American Region of International Biometric Society) annual meeting, Virtual conference (June 2021).

4. "Kernel Distance Covariance Approach for Testing Association in Longitudinal Studies" Invited Talk at the Annual Conference of International Indian Statistical Association, Virtual conference (May, 2021).

5. "Testing abundance of cell populations in high-dimensional mass cytometry data" Invited Talk, Online Statistics Seminar, University of Arkansas, AR (November 2020).

6. "Quantifying association in large biological data sets" Invited Talk, Indian Statistical Institute, Kolkata, India (January 2020).

7. "Control of False Discoveries in Grouped Hypothesis Testing for eQTL Data" Invited Talk, Department of Industrial Engineering and Management, Oklahoma State University, OK (October 2019).

8. "Bayesian networks in integrative genomics: An example with a recombinant inbred mouse panel" Invited Talk, Department of Integrative Genomics, Oklahoma State University, OK (September 2019)

9. "Control of False Discoveries in Grouped Hypothesis Testing for eQTL Data" Invited Talk, WNAR (Western North American Region of International Biometric Society) annual meeting, Portalnd, OR (June 2019).

10. "Simulation of Cross-phenotypic Effects of Rare Variants Across Time", Invited Talk, Open Science Grid All-Hands Meeting 2018, Salt Lake City, UT (March 2018).

Other Presentations

1. "Statistical learning with high-dimensional mass cytometry data", Contributed poster presentation, Annual Conference of International Indian Statistical Association, Mumbai, India (December 2019).

2. "Statistical learning with high-dimensional mass cytometry data", Contributed poster presentation, Pacific Symposium on Biocomputing, Big Island, HI (January 2019).

3. "Control of False Discoveries in Grouped Hypothesis Testing for eQTL Data", Contributed poster presentation, International Conference on Multiple Comparison Procedures, Riverside, CA (June 2017).

4. "Predisposition to Alcohol Related Phenotypes Mediated by microRNA Expression", Contributed poster presentation, Research Society of Alcoholism Annual Meeting, Denver, CO (June 2017).

5. "Controlling False Discovery Rate for Grouped and Hierarchical Hypothesis Testing: Recent Advancements", Statistical Genomics Working Group, University of Colorado, Anschutz Medical Campus, CO (May 2017).

6. "Predisposition to Alcohol Related Phenotypes Mediated by microRNA Expression", Contributed Talk, Bioinformatics Journal Club, University of Colorado, Anschutz Medical Campus, CO (January 2017).

7. "A microRNA eQTL study in a panel of recombinant inbred mouse strains", Contributed poster presentation, National Institute on Drug Abuse Genetics Consortium Meeting, Rockville, MD (December 2016).

8. "A microRNA eQTL study in a panel of recombinant inbred mouse strains", Contributed poster presentation, Research Society of Alcoholism Annual Meeting, New Orleans, LA (June 2016).

9. "Studying the genetics of microRNA expression for alcohol related traits", Contributed poster presentation, International Conference on Quantitative Genetics, Madison, WI (June 2016).

10. "Model-based Heritability Scores for High-throughput Sequencing Data", Contributed Talk, ASA CO/WY Chapter Spring Meeting, University of Colorado, Boulder, CO (April 2016).

11. "Measuring and Testing Heritability", Contributed Talk, Bioinformatics Journal Club, University of Colorado, Anschutz Medical Campus, CO (March 2016).

12. "Effect of Stroke Prevention Medication on Aortic Atheroma Progression.", Contributed poster presentation, The Butcher Symposium, Westminster, CO (November 2015).

13. "A Procedure to Detect General Association Based on Concentration of Ranks.", Invited talk, SAMSI, NC (February 2015).

14. "A Procedure to Detect General Association Based on Distance of Ranks.", Contributed poster presentation, JSM, Boston, MA (August 2014).

Teaching Experience

Standard course load for assistant professors in the Department of Statistics at OSU is four courses for the academic year.

Instructor

- OSU, STAT 6203 — Spring 2021, 2023
  - Large Sample Inference.
- OSU, STAT 5083 — Spring 2020, 2022
  - Statistics for Biomedical Researchers.
- OSU, STAT 5013 — Fall 2018-22
  - Statistics for Experimenters-I.
- OSU, STAT 5023 — Spring 2019
  - Statistics for Experimenters-II.
- OSU, STAT 4043-5543 — Fall & Spring 2018-23
  - Applied Regression Analysis.
- CU Anschutz, BIOS 6606 — Fall 2017
  - Statistics for Basic Sciences.

Guest Lecture

- CU Anschutz, BIOS 7659 — Fall 2016
  - Statistical Methods in Genomics
- CU Anschutz, BIOS 6640 — Spring 2016
  - Python and R in Data Science
- CU Anschutz, BIOS 7731 — Fall 2015
  - Advanced Mathematical Statistics-I

Teaching Assistant

- UNC-CH, BIOS 664: — Spring 2013
  - Sample Survey Methodology.

- UNC-CH, BIOS 662: Fall 2012
  - Intermediate Statistical Methods.
- UNC-CH, BIOS 600 Fall 2012
  - Principles of Statistical Inference.
- UNC-CH, BIOS 767 Spring 2012
  - Longitudinal Data Analysis.

Mentoring Experience

- Masters student: Fisher Ankney Graduated, 2020
- Masters student: Sarah Clark Graduated, 2022
- Masters student: Rashawn Howard Graduated, 2022
- PhD student: Julius Olaifa, Benedict Kongyir Current

Professional Activities

Committee Member October 2019-Present.
WNAR member engagement committee, Western North American Region of International Biometric Society.

College of Arts and Sciences committee member September 2022-2023.
Sabbatical leave committee, Oklahoma State University.

College of Arts and Sciences committee member September 2021-2022.
Scholarship committee, Oklahoma State University.

Departmental committee chair September 2018-Present.
Seminar committee, Oklahoma State University.

Departmental committee chair August 2021-Present.
Social committee, Oklahoma State University.

Departmental committee member August 2022-Present.
Graduate committee, Oklahoma State University.

Departmental committee member August 2018-Present.
Assessment committee, Oklahoma State University.

Organizer September 2016-2018.
Statistical Genomics Working Group, Department of Biostatistics and Informatics, University of Colorado, Anschutz Medical Campus.

PreK Grant Reviewer
Colorado Clinical and Transitional Sciences Institute, University of Colorado, Anschutz Medical Campus, 2016.

Publication Referee
Bioinformatics, Biometrics, TEST, BMC Bioinformatics, The American Statistician, Genome Biology, Metbolites, Cancers.

Professional Memberships

American Statistical Association. (2011-Present)
American Society of Human Genetics. (2018-Present)
International Indian Statistical Association. (2019-Present)
Internation Biometric Society (ENAR and WNAR). (2019-present)
International Society for Computational Biology. (2019-Present)
Statistics Without Borders. (2015-Present)

Software and Languages known

R, Matlab, SAS, C, Python, JMP.