Pratheepa Jeganathan

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Research Interests

- **Statistical Theory**: Multi-domain methods; High-dimensional statistical inference; Resampling methods for large-scale dependent data; Bayesian statistics; Classical and empirical saddlepoint approximations; Saddlepoint-based bootstrap method.
- **Application Areas**: High-throughput sequencing (currently working on microbiome and mass cytometry data); Survival analysis; Time series; Spatial statistics.

Education and Training

Postdoctoral Research Fellow 08/2016 - Present
Department of Statistics, Stanford University, Stanford, CA
Mentor: Professor Susan Holmes

PhD. in Mathematics (emphasis in Statistics) August 2016
Texas Tech University, USA
Advisor: Professor Alex Trindade

- Dissertation Topic: "Multivariate Extensions of Saddlepoint-Based Bootstrap and An Empirical Saddlepoint Approximation Method for Smoothing Survival Functions Under Right-Censoring."

M.S. in Statistics August 2013
Texas Tech University, USA
Advisor: Professor Alex Trindade

- Thesis Topic: "Saddlepoint-Based Bootstrap Inference for Spatial Dependence Parameter in the Lattice Process."

B.Sc. in Statistics and Operations Research August 2010
University of Peradeniya, Sri Lanka

- Minor in Pure Mathematics and Computer Science.

Research Experience

Postdoctoral Research Fellow in Computational Statistics 08/2016 - Present
Department of Statistics, Stanford University, Stanford, CA
Mentor: Professor Susan Holmes

- Develops structured classes for storing and statistical methods for analyzing multi-domain data (microbiome and CyTOF data).

- Develops statistical methods for NIH Project (4R01AI112401-04) : Predicting Resilience in the human microbiome NGS data.
- Develops statistical methods for March of Dimes Prematurity Research Center's microbiome projects.
- Developed Bayesian Inference for distinguishing true signal from reagent contamination in ultra-low biomass metagenomics.
- Statistical data analysis for microbiome projects.

Biostatistical Programmer 06/2013 - 08/2013

Clinical Research Institute, Texas Tech University Health Sciences Center, Texas

Advisors: Phillip Watkins and Professor Alexandre Trindade

- Assisted principal investigator with modeling data from dose escalation study.
- Assisted principal investigator with modeling survival and tumor growth data from multiple treatments for melanoma cancer.

Intern 09/2013 - 12/2013

Research and Testing Center, Lubbock, Texas

Advisor: Dr. Stephen Cox

- Assisted principal investigator with modeling data from the study of the predominant bacterial and fungal assemblages in agricultural soils during a record drought/heat wave and linkages to enzyme activities of biogeochemical cycling.

Undergraduate Industrial Training Intern 07/2009 - 10/2009

Demographic Health Survey Unit, Department of Census and Statistics, Sri Lanka

- Assisted with error checking and analyzing data from the pilot test of ESCAP/WG/WHO project for the improvement of disability measurement and statistics in Asia and Pacific in 2009.

Teaching Experience

Instructor (assigned) 04/2019 - 06/2019

Department of Statistics, Stanford University

- STATS 205 Introduction to Nonparametric Statistics

Graduate Part-Time Instructor 09/2012 - 07/2016

Department of Mathematics and Statistics, Texas Tech University

- Mathematical Statistics for Engineers and Scientists: Undergraduate Juniors (Spring 2015 [149 students], Summer 2015 [27], Spring 2016 [44], Summer 2016 [21]).
- Statistical Methods : Undergraduate Freshmen and Sophomores (Fall 2012[40+42], Spring 2013[15+43], Summer 2013 [21], Fall 2013 [116], Spring 2014 [45+47], Fall 2014 [125], Fall 2015 [44]).
- Introduction to Statistics with Application to Business : Undergraduate Juniors and Seniors (Summer 2014 [25]).

TEACH Fellow: 09/2014 - 05/2015

Teaching, Learning, and Professional Development Center, Texas Tech University

- Received a mentored advance training to further develop teaching skills.
- Developed a sample undergraduate course.
- Developed a professional teaching portfolio.

Graduate Teaching Assistant 09/2011 - 08/2012

Department of Mathematics and Statistics, Texas Tech University

- Discussion leader for Calculus I, College Algebra (Fall 2011, Spring 2012).
- Tutor at the Missouri Tutoring Center (Summer 2012).

Assistant Lecturer 08/2010- 06/2011

Department of Statistics and Computer Science, University of Peradeniya, Sri Lanka

- Courses Taught: Statistical Simulation, Time Series Analysis, and Regression Analysis.
- Lab Assistant: Statistical Applications (Minitab, R, and SAS).
- Teaching Assistant: Theory of Statistics.

Awards

- Travel Award for Women in Statistics and Data Science Conference 2017 : $200
  - Kindly declined the award due to another Symposium.
- Best Presentation/Poster Award, Joint Statistical Meeting, American Statistical Association, Section for Programmers and Analysts, August 2016: $500
  - Winner of the Monsanto Grant for the Presentation.
- Fuller Graduate Scholarship, Department of Mathematics and Statistics, Texas Tech University, 2015-2016: $800
  - Recognizes the outstanding academic records at the Department of Mathematics and Statistics, Texas Tech University.
- John White Graduate Scholarship, Department of Mathematics and Statistics, Texas Tech University, 2014 -2016: $1600
  - Recognizes the outstanding mathematical talent as demonstrated by high academic achievement.
- Runner-up, Graduate Research Poster Competition (Multidisciplinary I), Texas Tech University, April 2015: $100.
- TEACH (Teaching Effectiveness and Career enhancement) Fellowship, Teaching, Learning, & Professional Development Center, Texas Tech University, 2014-2015: $1000

  - Helped to further develop teaching skills of PhD students and increase the potential to be successful in academia. I was one of the fellows out of fourteen selected for 2014-2015 TEACH program cohort.

- National Science Foundation - Pan-American Advanced Study Institute Fellowship to attend the workshop, Buzios, Brazil, June 2014: $2200.
- Conference Grant, American Statistical Association, Section for Statistical Programmers and Analysts, August 2013: $100.
- Student Roundtable Award, Joint Statistical Meeting, American Statistical Association, Section for Physical and Engineering Sciences, August 2013.
- Summer Research Thesis Award, Graduate school, Texas Tech University, June 2013: $2300.
- Graduate Student Scholarship, Society for Industrial and Applied Mathematics Texas Tech University Chapter, 2013-2014: $800.
- Award for Academic Excellence, University of Peradeniya, Sri Lanka, 2010.
- Half Colors for Athletics, University of Peradeniya, Sri Lanka, 2008.

Peer-Reviewed Journal Papers [Google Scholar]

6. Jeganathan, P., Benjamin J Callahan, Diana M. Proctor, David A Relman, and Susan P Holmes, "The Block Bootstrap Method for Longitudinal Microbiome Data", *Under Revision, https://arxiv.org/abs/1809.01832* , (2018 +).

5. Jeganathan, P., Paige, R.L., and Trindade, A.A., "An Empirical Saddlepoint Approximation Based Method for Smoothing Survival Functions Under Right Censoring", *Canadian Journal of Statistics,* **accepted**, (2018 +).

4. Benjamin J Callahan, Daniel B DiGiulio, Daniela Goltsman, Christine Sun, Elizabeth Costello, Jeganathan, P., Joseph R Biggio, Maurice L Druzin, Gary M Shaw, David K Stevenson, Susan P Holmes, David A Relman, "Replication and Refinement of a Vaginal Microbial Signature of Preterm Birth", *Proceedings of the National Academy of Sciences* , (2017).

3. Fukuyama, J and Rumker, L and Sankaran, K and Jeganathan, P and Dethlefsen, L and Relman, D A and Holmes, S P, "Multidomain analyses of a longitudinal human microbiome intestinal cleanout perturbation experiment", *PLOS Computational Biology* **13**, 8 (2017).

2. Jeganathan, P., Paige, R.L., and Trindade, A.A., "Saddlepoint-Based Bootstrap Inference for Spatial Dependence parameter in the Lattice Process", *Spatial statistics* **12**, 1-14 (2015).

1. Pérez-Torres, A., Vera-Aguilera, J., Sahaza, J. H., Vera-Aguilera, C., Moreno-Aguilera, E., Pulido Camarillo, E., and Jeganathan, P., "Hematological Effects, Serum, and Pulmonary Cytokine Profiles in a Melanoma Mouse Model Treated with GK1", *Cancer Biotherapy and Radiopharmaceuticals* **30(6)**, 247-254 (2015).

Pending Manuscripts

- Henry Cheng, Jeganathan, P., David A Relman, and Susan P Holmes, "Combined use of metagenomic sequencing and host response profiling for the diagnosis of suspected sepsis", *In preparation* , (2018 +).
- Fiona R Strouts, Jeganathan, P., Veda Khadka, Henry Cheng, David A Relman, Susan P Holmes, "Microbial Sequences in Healthy Human Blood: The Role of Metagenomic Sequencing in Uncovering Bacterial Translocation ", *In preparation* , (2018 +).

Software

- http://github.com/PratheepaJ/BARBI: An R package for distinguishing true signal from reagent contamination noise in ultra-low biomass metagenomics NGS Data. (access will be given upon request)
- http://github.com/PratheepaJ/bootLong: An R package for the block bootstrap inference for longitudinal microbiome data. (development version)
- http://github.com/PratheepaJ/ESPA: An R package for the empirical saddlepoint approximation method for smoothing survival functions with right censoring (development version).
- http://github.com/PratheepaJ/SPBBspatial: An R package for the saddlepoint-based bootstrap inference for the spatial dependence parameter in the spatial regression models (development version).

Conference Presentations

- Bayesian Inference for Distinguishing True Signal from Reagent Contamination Noise in Ultra-Low Biomass Metagenomics NGS Data **(Invited Poster)**, *Genome Research Day*, 23andMe, 05/2018.
- The Block Bootstrap Method for Longitudinal Microbiome Data **(Oral Presentation)**, *BCATS*, Stanford University, 04/2018.
- The Block Bootstrap Method for Analyzing the Human Microbiome During Pregnancy **(Poster)**, *Stanford Bio-X Seed Grants Symposium*, Stanford University, 03/2017.
- The Block Bootstrap Method for Analyzing the Human Microbiome During Pregnancy **(Poster)**, *Postdoctoral Research Symposium*, Stanford University, 12/2016.
- An Empirical Saddlepoint Approximation Method for Smoothing Survival Functions with Right Censoring **(Contributed Oral Presentation)**, *ASA Joint Statistical Meetings*, Chicago, 08/04/2016.
- Saddlepoint-Based Bootstrap Inference for the Spatial Dependence Parameter in the Spatial Regression Model using R **(Poster)**, *15th Annual Red Raider Mini-Symposium*, Texas Tech University, 11/06/2015.
- Multivariate Saddlepoint Density Approximation for the Yule-Walker Estimators in the Autoregressive Processes **(Poster)**, *Graduate Research Poster Competition*, Texas Tech University, 04/2015.

- Multivariate Saddlepoint Density Approximation for the Yule-Walker Estimators in the Autoregressive Processes **(Poster)**, *Conference of Texas Statisticians*, Austin, Texas, 04/2015.
- Saddlepoint-Based Bootstrap Inference for Spatial Dependence Parameter in the Lattice Process **(Contributed Oral Presentation)**, *ASA Joint Statistical Meetings*, Montreal, Canada, 08/2013.
- Saddlepoint-Based Bootstrap Inference for Spatial Dependence in the Lattice Process **(Poster)**, *Center for Stochastic Processing and Advanced Bioimaging*, Aalborg University, 05/2013.
- Saddlepoint-Based Bootstrap Inference for Spatial Dependence Parameter in the Lattice Process **(Contributed Oral Presentation)**, *MAA Texas Sectional Meeting*, Texas Tech University, 04/2013.
- Saddlepoint-Based Bootstrap Inference for Spatial Dependence in the Lattice Process **(Poster)**, *Graduate Research Poster Competition*, Texas Tech University, 04/2013.

Seminars and Workshops

- Saddlepoint Approximations and its Extensions **(Seminar)**, Professor Owen's Group meeting, Department of Statistics, Stanford University, 11/17/2016.
- An Empirical Saddlepoint Approximation Method for Smoothing Survival Functions with Right Censoring **(Interview Talk)**, *Professor Holmes' Group Meeting*, Stanford University, 03/02/2016.
- An empirical saddlepoint approximation method for smoothing survival functions with right censoring **(Seminar)**, Department of Mathematics and Statistics, Texas Tech University, 01/28/2016.
- Read Web Data with R **(Seminar)**, LubbockR Meetup Group, 11/23/2015.
- Saddlepoint Approximation with Applications in Statistics and Integrate Your Report Using Sweave in CRAN **(Seminar)**, Department of Mathematics and Statistics, Texas Tech University, 03/2014.
- Winter School on Spatial and Spatio-Temporal Statistics **(Workshop)**, (30 hours), Pan-American Advanced Study Institute, Buzios, Brazil, 06/16 - 06/26/2014.
- Summer School on Topics in Space-Time Modeling and Inference, **(Workshop)**, 5 ECTS/2.5 credit hours, Center for Stochastic Processing and Advanced Bioimaging, Aalborg, Denmark, 05/27 - 05/31/2013.
- Boost Your Spatiotemporal Data Analysis With Physical Knowledge **(Roundtable Discussion)**, (Discussion Leader: Alexander Kolovos, Director of SpaceTimeWorks, LLC), *Joint Statistical Meetings*, American Statistical Association, Section in Physical and engineering Sciences, 08/2103.
- Workshop on Environmetrics, *North Carolina State University*, 10/2012.

Academic Service

- **Journal Reviewer:** The Journal of the Iranian Statistical Society, 2018 - present.
- **Journal Reviewer:** Sri Lankan Journal of Applied Statistics (SLJAS), 2017 - present.
- **Abstract Reviewer:** Peradeniya University International Research Sessions, Sri Lanka, 09/2017.
- **Student Member:** College of Arts and Sciences Committee for Academic Programs, Texas Tech University, 2015-2016
  - Discussed and voted for the proposed graduate and undergraduate courses along with the dean and seven faculty members.
- **Mentor:** Lauro Cavazos and Ophelia Powell-Malone Mentoring Program, Texas Tech University, 2015 - 2016
  - Mentored an undergraduate student from an underrepresented group.
- **Grader:** The competition on the Emmy Noether Day, 05/13/2015.
- **Oral and Paper Presentation Judge:** TTU Undergraduate Research Conference, 04/11/2015.
- **Statistical Consultant for Graduate Students:** Scholar Retreat Program, Texas Tech University, 02/16 - 02/20/2015
  - Assisted fellow PhD students to analyze the data for their studies.
- **Member of Staff-Student Counseling Committee:** Faculty of Science, University of Peradeniya, Sri Lanka, 2007-2008.

Other Activities

- **Sergeant At Arms:** Articulate Toastmasters Club, Lubbock, Texas, 07/2015-12/2015.
- **Member:** Raider Badminton Club, 02/2013 - 04/2014
- **Treasurer:** Sri Lankan Students' Association in Texas Tech University, 2012-2013.
- **Assistant Secretary:** Operations Research Society, University of Peradeniya, Sri Lanka, 2008 - 2009
  - A member of a group of students who launched the first Operations Research Society in Sri Lanka.
- **Member:** University Athletic Team, University of Peradeniya, Sri Lanka, 2007-2009.