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Afrooz Jahedi

Education

2015–2020 **PhD**, *San Diego State University/ Claremont Graduate University*, San Diego, CA.
Computational Statistics

Title: *Novel Random Forest Methods and Algorithms for Autism Spectrum Disorders Research*

Advisors: Prof. Juanjuan Fan, Prof. Ralph-Axel Müller

2012–2014 **Master of Science**, *San Diego State University*, San Diego, CA.
Biostatistics

2011–2013 **Master of Science**, *Shiraz University*, Shiraz, Iran.
Mathematical Statistics

2002–2008 **Bachelor of Science**, *Shiraz Payam-e Noor University*, Shiraz, Iran.
Statistics

Teaching Experience

Soroosh College, Shiraz, Iran

Aug 2008 – May 2009 **Statistics and Modeling**, *Statistics Instructor*.
- Prepared and delivered lectures to college students
- Evaluated and graded class works, assignments, and papers

SDSU Department of Mathematics and Statistics, San Diego, CA

Jan 2014 – May 2014 **Advanced Biostatistics Methods (Stat 680B)**, *Graduate Assistant*.
- Course focus: Advanced clinical experiments methods
- Evaluated the exams
- Recorded the grades

Jan 2014 – May 2014 **Advanced Inferential Statistics (Stat 670B)**, *Graduate Assistant*.
- Course focus: Hypothesis testing and estimation
- Prepared solution for the home works
- Graded the home works

Jan 2014 – May 2014 &Jan 2012 – May 2012 **Actuarial Modeling (Stat 678)**, *Graduate Assistant*.
- Course focus: Actuarial Models and Applications of Probability and Statistics to Insurance and other Financial Risks
- Graded the home works

Sep 2013 – Dec 2013 **Survival Analysis (Stat 678)**, *Graduate Assistant*.
- Course focus: Survival parametric and semi-parametric survival modeling
- Prepared lecture presentation for the online classes

SDSU Office of Educational Opportunity Program, San Diego, CA

Sep 2012 – May 2014 **Statistics & Match Topics**, *Statistics & Math Tutor*.

- Tutored undergraduate courses including:
  - Elementary Business Statistics
  - Statistical Principles and Practices
  - Elementary Social Statistics
  - College Algebra
  - Topics in Mathematics
  - Calculus for Business Analysis & Calculus for the Life Science
- Held a weekly office hour for teaching, topic related discussion, and helping students with home works

Research Experience

Brain Development Imaging Lab, SDSU Research Foundation, San Diego

Sep 2018 – Present **Research Scholar, PhD Candidate**.

- Lead BDIL computational team that consists of four graduate students
- Supervise ongoing computational projects including:
  - Design and implement Shiny app for the *"iterMatch"* R package
  - Christopher project(Name?)
  - Detecting autism subtypes using non-negative matrix factorization on a multi-modal MRI dataset
- Write scientific manuscripts for undergoing projects
  - Mixed-Effects Random Forest-based Classification Algorithms for the Clustered Data
  - An iterative multivariate matching package for sample with missing values: The *"iterMatch"* package for R
  - Resting state fMRI connectome differentiating autism from typical development
  - Subtyping ASD participants using multi-modal imaging dataset
- Collaborated with other lab members for the statistical analysis in their paper including:
  - Underconnectivity Between Visual and Salience Networks and Links With Sensory Abnormalities in Autism Spectrum Disorder
  - The language network in autism: Atypical functional connectivity with default mode and visual regions
  - Classification of severe autism in fMRI using functional connectivity and conditional random forests

San Diego State University, San Diego, CA

Sep 2017 – Aug 2018 **Research Fellow, PhD Student**.

- Led the BDIL computational team consisted of two graduate students
- Supervised ongoing computational projects including:
  - Diagnostic classification of ASD using a multimodal MRI technique
  - Potential subtyping using behavioral measurements
  - Classification of high severity ASD in fMRI using functional connectivity and conditional random forest
  - Subtyping ASD participants using multi-modal imaging
  - Whole brain connectome and age association using Multivariate Distance Matrix Regression (MDMR)
- Wrote scientific manuscripts for undergoing projects
  - Matching Methods for Observational Data with Small Group Sizes
  - Classification of high severity ASD in fMRI using functional connectivity and conditional random forest
  - Functional connectivities are more informative than anatomical variables in diagnostic classification of autism
- Collaborated with other lab members for the statistical analysis in their paper including:
  - Repetitive behaviors in autism are linked to imbalance of corticostriatal connectivity: a functional connectivity MRI study

Brain Development Imaging Lab, SDSU Research Foundation, San Diego

Aug 2015 – Aug 2017 **Research Scholar, PhD Student**.

- Initiated and lead BDIL computational team that consists of four bioinformatics graduate students, including:
  - Trained new members
  - Defined relevant machine learning projects for new students
  - Troubleshoot technical and statistical project issues
  - Documented research results
- Developed group-wise and pair-wise Matching algorithms for observational data with small group sizes
- Initiated computationally complex brain-behavior association project using multivariate distance matrix regression (MDMR) technique on resting-state fMRI data
- Wrote scientific manuscripts for undergoing projects at computational team
  - Published paper Distributed intrinsic functional connectivity patterns predict diagnostic status in large autism cohort
- Collaborated in statistical analysis with other ongoing projects in the lab including:
  - Network Organization is Globally Atypical in Autism: A Graph Theory Study of Intrinsic Functional Connectivity Network Community Structure in Autism

Feb 2014 – Aug 2015 **Research Assistant**.

- Established collaboration with other BDIL members to do research on resolving statistical challenge
  - Diagnostic classification of intrinsic functional connectivity highlights somatosensory, default mode, and visual regions in autism
  - Patterns of atypical functional connectivity and behavioral links in autism differ between default, salience, and executive networks

Department of Mathematics and Statistics, SDSU, San Diego

Feb 2013 – Jan 2014 **Masters Student**.

- How bird strike is changing from 1990 to 1999 in the United States and what are the factors that have affected the bird strike in California
- Support Vector Machines modeling technique to discriminate breast cancer tumor type
- Best predictive heart disease modeling by comparing CART, Bagging, Random Forest and Neural Network methods
- House price prediction using Neural Network
- Classification Regression Tree for predicting spammed emails

Business Administration Department, SDSU, San Diego

Sep 2013 – Dec 2013 **Research Assistant**.

- Process large volume of data for statistical modeling using R
- Data management and manipulation techniques in R and SPSS
- Compute and analyze data using multiple regression, clustered analysis, and classification and regression trees in R and SPSS
- Compile data reports by creating charts to describe and interpret findings of analyses
- Document results and findings

Department of Statistics, Shiraz University, Shiraz

Sep 2009 – Dec 2011 **Masters Student**.

- Thesis Topic: Bounds for how much influence an observation can have on some indices of descriptive statistics and linear regression
- Distinguish outliers, extreme data and discordant data, and the way of treating them

Department of Statistics, Payam-e Noor University, Shiraz

Sep 2003 – May 2008 **Bachelor Student**.

- Factors affecting the Shiraz Payam-e Noor University students GPA
- Finding the influential factors on healing the scaphoid fracture

Publication

1. **Jahedi A**, Müller RA, Fan J. *Mixed effects random forests-based classification algorithms for the clustered data, an application to autism spectrum disorders*. Under Submission. 2020.
2. **Jahedi A**, Hillis T, Oslon M, Müller RA, Fan J. *An iterative multivariate matching package for sample with missing: The "iterMatch" package for R*. Under Submission. 2020.
3. **Jahedi A**, Fan J, Müller RA. *Matching methods for observational data with small group sizes, applied to an autism spectrum disorder study*. Under Submission. 2020.
4. M.A. Reiter, **A. Jahedi**, A.R.J. Fredo, and R-A. Müller, *Classification of high severity autism in fMRI using functional connectivity and conditional random forests.* Under submission, 2020
5. Keehn RJ, Pueschel EB, Gao Y, **Jahedi A**, Alemu K, Carper R, Fishman I, Müller RA. *Underconnectivity Between Visual and Salience Networks and Links With Sensory Abnormalities in Autism Spectrum Disorder*. Journal of the American Academy of Child & Adolescent Psychiatry. 2020 Feb 29.
6. Eill A, **Jahedi A**, Gao Y, Kohli JS, Fong CH, Solders S, Carper RA, Valafar F, Bailey BA, Müller RA. *Functional connectivities are more informative than anatomical variables in diagnostic classification of autism. Brain connectivity*. 2019 Oct 1;9(8):604-12.
7. Gao Y, Linke A, Jao Keehn RJ, Punyamurthula S, **Jahedi A**, Gates K, Fishman I, Müller RA. *The language network in autism: Atypical functional connectivity with default mode and visual regions*. Autism Research. 2019 Sep;12(9):1344-55.
8. Fredo AJ, **Jahedi A,** Reiter M, Müller RA. *Diagnostic classification of autism using resting-state fMRI data and conditional random forest*. 2018;12(2.76):6-41.
9. Keown CL, Datko MC, Chen CP, Maximo JO, **Jahedi A**, Müller RA. *Network organization is globally atypical in autism: a graph theory study of intrinsic functional connectivity*. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging. 2017 Jan 1;2(1):66-75.
10. Abbott AE, Linke AC, Nair A, **Jahedi A**, Alba LA, Keown CL, Fishman I, Müller RA. *Repetitive behaviors in autism are linked to imbalance of corticostriatal connectivity: a functional connectivity MRI study*. Social cognitive and affective neuroscience. 2018 Jan;13(1):32-42.
11. **Jahedi A** , Nasamran CA, Faires B, Fan J, Müller RA. *Distributed intrinsic functional connectivity patterns predict diagnostic status in large autism cohort. Brain connectivity*. 2017 Oct 1;7(8):515-25.
12. Abbott AE, Nair A, Keown CL, Datko M, **Jahedi A**, Fishman I, Müller RA. *Patterns of atypical functional connectivity and behavioral links in autism differ between default, salience, and executive networks.* Cerebral cortex. 2016 Oct 1;26(10):4034-45.
13. Falahpour M, Thompson WK, Abbott AE, **Jahedi A**, Mulvey ME, Datko M, Liu TT, Müller RA. *Underconnected, but not broken? Dynamic functional connectivity MRI shows underconnectivity in autism is linked to increased intra-individual variability across time.* Brain connectivity. 2016 Jun 1;6(5):403-14.
14. Chen CP, Keown CL, **Jahedi A**, Nair A, Pflieger ME, Bailey BA, Müller RA. *Diagnostic classification of intrinsic functional connectivity highlights somatosensory, default mode, and visual regions in autism*. NeuroImage: Clinical. 2015 Jan 1;8:238-45.
15. Barr JR, **Jahedi A**, Ehsani M. *Support vector machine: A tutorial with R*. International Journal of Semantic Computing. 2013 Jun;7(02):185-203.

Google Scholar Citations

Presentation and Talk

- Talk at Society of Neuroscience (SFN), "Functional connectivities are more informative than anatomical variables in diagnostic classification of autism," San Diego, Nov 5, 2018
- Talk at IEEE 40th International Conference on Engineering in Medicine and Biology, "Diagnostic classification of Autism using resting-state fMRI data and conditional random forest," Honolulu, Hawaii, July 17-21, 2018
- Poster presentation at Symposium on Data Science and Statistics doctoral forum, "Diagnostic prediction in autism using conditional random forest," San Diego, May 18th, 2018
- Poster presentation at SIAM International Conference on Data Mining, "Diagnostic prediction in autism using conditional random forest," San Diego, May 4, 2018
- Poster presentation at Applied Computational Sciences and Engineering & Computational Science Sympo-

sium (ACSSESS), "Resting-state fMRI connectome differentiating autism from typical development," San Diego, April 6, 2018
- Poster presentation at the Organization of Human Brain Mapping, "Language network connectivity indicates subgroups in children with autism spectrum disorders," Vancouver, Canada, June 25, 2017
- Poster presentation at Applied Computational Sciences and Engineering & Computational Science Symposium (ACSSESS), "Diagnostic prediction of autism in resting-state functional MRI using conditional random forest", San Diego, April 21, 2017
- Poster presentation at Society of Neuroscience (SFN), "Diagnostic prediction of autism in resting-state functional MRI using conditional random forest," San Diego, Nov 18, 2016
- Poster presentation at Society of Neuroscience (SFN), "Resting-state fMRI connectome differentiating autism from typical development," San Diego, Nov 18th, 2016
- Talk at Student Research Symposium (SRS), "Resting-state fMRI connectome differentiating autism from typical development," San Diego State University, Nov 21, 2016
- Poster presentation at 21st Joint Symposium Neural Computing, "Diagnostic Prediction in Autism using Conditional Random Forest of Resting-State Functional Connectivity", USC, Los Angeles, 2015
- Talk at 2015 Student Research Symposium (SRS), "Diagnostic Prediction in Autism using Conditional Random Forest of Resting-State Functional Connectivity," San Diego State University, March 6, 2015
- Poster presentation at Society of Neuroscience (SFN), "Diagnostic prediction in autism using random forest and resting-state functional connectivity" Washington DC., Nov 18, 2014

Honor & Award

2015–2020 **PhD Fellowship**, *Computational research Center (CSRC) at San Diego State University*.
2018–2019 **PhD Fellowship**, *National Institutes of Health (NIH)*.
2017–2018 **Graduate Fellow**, *San Diego State University*.
Feb 2018 **Travel Award**, *SIAM International Conference on Data Mining*.
2015–2017 **PhD Fellowship**, *National Institutes of Health (NIH)*.
Oct 2016 **Travel Award**, *Clinical and Cognitive Neuroscience*.
March 2014 **Student Scholarship**, *Pharma SUG*.

Professional Experience

May 2003 – Aug 2008 **Farasaan Industrial Co., Shiraz, Iran**, *Data and Knowledge Management Expert & Project Evaluator at annual "Ayeneh" Congress*.
- Defined and design related projects for data and Knowledge Management infrastructure
- Defined statistical matrices and corresponding KPI for each project
- Managed project execution to ensure adherence to budget, schedule, and scope
- Assigned duties, responsibilities, and authorities for project personnel
- Hold scrum meetings to discuss performance, risks, and task plans, and monitored project milestones and deliverable
- Prepared project status reports by collecting, analyzing, and summarizing information and trends using statistical methods
- Participated in weekly meetings to improve the "Ayeneh" congress framework
- Evaluated and interviewed workers performance based on defined congress framework
- Prepared detailed reports on audit findings
- Defined and designed statistical metrics for the congress performance

Professional Affiliation

2020 **Grant Reviewer**, *Auckland Medical Research Foundation*.
2020 **Peer Reviewer**, *eLife*.
2020 **Peer Reviewer**, *Autism research*.
2020 **Peer Reviewer**, *International Journal Of Scientific Reports*.

2020 **Peer Reviewer**, *Journal of Neuroscience Methods*.
2019–Present **Member**, *American Association for the Advancement of Science*.
2016–Present **Member**, *Society of Neuroscience (SFN)*.
2015–Present **Member**, *Society of Industrial and Applied Mathematics (SIAM)*.
2015–Present **Computational Team Lead**, *Brain Development Imaging Lab (BDIL)*.
2018–2019 **SIAM Officer**, *SDSU chapter*.
2018–2019 **Board Member**, *Association of Iranian American Professionals (AIAP)*.
2018–2019 **Volunteer judge**, *Greater San Diego Science Engineering Fair, San Diego, CA*.
2014–2014 **Executive Officer**, *San Diego chapter of American Statistical Association (ASA)*.
2014–2015 **Officer**, *SDSU SAS User Club*.
2005–2007 **President**, *Student Statistical Association, Shiraz Payam-e Noor University* .

Technical Skill

- **Programming**: R, Python, MATLAB, Minitab, S-plus, SAS, SPSS, SQL
- **Languages**: Fluent in English and Farsi, Familiar with German and Arabic, and Spanish
- **General Software**: Linux, Latex, Git, Windows, MS Office

Reference

- Juanjuan Fan: jjfan@sdsu.edu, Fax: (619) 594-6746
- Ralph-Axel Müller: rmueller@sdsu.edu, Phone: (619)-594-0176 or (619)-594-5276
- Barbara A. Bailey: bbailey@sdsu.edu, Phone: (619) 594-4170