Amin Shirazi, PhD Student

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SUMMARY

- The focuses of my research are related to multiple testing of high-dimensional data when the variables are highly dependent, such as gene expression and microbiome data. Unlike other Bayesian and shrinkage methods in the literature, I exploit the dependence to propose a procedure with a more powerful test. For each of the comparisons in multiple testing, I run a linear model on the genes which are at a small distance from each other, where they are more probable to share the same information. Then proposed a test statistic that is based on the residuals of the linear model, which have a smaller standard deviation, so a higher signal-to-noise ratio is achieved

- In addition, I gained broad knowledge and related technical skills in programming in R and Shiny apps. I have in total of 15 months internship experience in two different pharmaceutical companies where I developed/contributed to multiple R package development/validation related to group sequential designs, oncology survival analysis, and designs with non-proportional hazard. Furthermore, I am the creator and maintainer of Merck Oncology Survival shiny app for Merck's internal survival analysis to generate multiple deliverables (Tables, listings, and figures) for regulatory submissions

- I am currently a consultant in the Consulting Group at the Department of Statistics, Iowa State University, where I Provide advice to researchers about their research designs, choosing statistical methods, and interpreting statistical analysis results

EDUCATION

- **Iowa State University (ISU), Ames, IA, August 2017–July 2022**
  Doctor of Philosophy, Ph.D., Statistics

- **Shahid Beheshti University (SBU), Tehran, Iran, September 2011–February 2014**
  Master of Science, MSc, Mathematical Statistics

- **IKIU, Qazvin, Iran, September 2006–September 2010**
  Bachelor of Science, BSc, Statistics

RESEARCH INTERESTS

- Multiple hypothesis testing, Model Assessment, Genomics and microbiome data analysis, Data Visualization, Monte Carlo (MCMC) methods, Bayesian Data Analysis, R Package Development, Shiny apps

AWARDS AND HONORS:

- Daniel H. Mowrey Graduate Consulting Awards, (Spring 2021), Iowa State University
  Awarded in recognition of outstanding contributions in statistical consulting while working toward a graduate degree
- Teaching excellence award (Spring 2020), Iowa State University
  Awarded in recognition of outstanding teaching while working toward a graduate degree

COMPUTING SKILLS

- Working Knowledge: GitHub, Bitbucket, R, R Markdown, JMP, LATEX, SAS, Shiny, rJAGS, rStan
- Basic Knowledge: html, SPSS

SOFTWARE DEVELOPMENT

- SHINY APPS:
  - Merck Oncology Survival Shiny app
  - Merck Programming System Tracking Dashboard (using plotly)
  - Merck Adaptive two-in-one Design shiny
  - PetFindr shiny

- PACKAGE DEVELOPMENT:
  - pkglite: a tool, grammar, and standard to represent and exchange R package source code as text files
  - gsDesign2: non-proportional hazards and graphical multiplicity control with group sequential design
  - r2rtf: an R package to create production-ready tables and figures in RTF format
  - gsdmvn: simulation of fixed or group sequential design under non-proportional hazards
  - simtrial: this package provides some basic routines for simulating a clinical trial
  - gsDesign: the gsDesign package supports group sequential clinical trial design
  - PetFindr: an R interface for the petfinder.com API (V2)

- OTHER:
  - Merck Oncology Analysis package
  - Merck qualification package
  - Merck Adaptive two-in-one package

RESEARCH EXPERIENCE

Department of Statistics, ISU, Ames, IA
- Performing research on statistical data analysis of microbiome and gene expressed data and specifically applying a regression-based model to multiple testing procedure to improve the test power while controlling FDR
- Implementing Bayesian and shrinkage methods to compare Linear Models for Microarray Data (LIMMA) and Dependence Boosted Differentially Expressed Analysis (DBDE)

PAPERS AND TECHNICAL REPORTS

- **Amin Shirazi**; Peng Liu; Yomou Qiu, Dependence Boosted Differentially Expressed Analysis (pre-print)
- **Amin Shirazi**; Peng Liu; Yomou Qiu, Application of Limma in DBDE in identifying differentially expressed genes for small samples (pre-print)
- Jean Batzer; **Amin Shirazi**; Daren Mueller, Numbers of pod and seed endophyte isolates (in preparation)
- **Amin Shirazi;** Jane Liao; Suhas R. Sanjee, Automated Validation of Clinical Trial Analysis and Reporting Deliverables Using testthat, Phuse US Connect 2021
- Madhusudhan Ginnaram; Simiao Ye; Yalin Zhu; Yilong Zhang; **Amin Shirazi**, A Process to Validate Internal Developed R Package under Regulatory Environment, PharmaSUG 2021
- Mohammad Jafari; Fangwei Hou; **Amin Shirazi**; Mostafa Hassanalian, Determination of Experimental/Numerical Errors on Identification of Flutter Derivatives for a NACA 0020 Airfoil, AIAA SciTech Forum and Exposition (in review)
- Mohammad Jafari; Fangwei Hou; **Amin Shirazi**; Experimental Identification of Aeroelastic Wind Load Parameters with Uncertainty: Design of Experiment Method (in review)
- Mohammad Jafari; Fangwei Hou; **Amin Shirazi**, Sensitivity Analysis of Effective Parameters and Prediction of Across-wind Response of Tall Buildings in Time Domain (in review)

PROFESSIONAL EXPERIENCE

Statistical Consultant, January 2021-present

Consulting Group, Department of Statistics, ISU, Ames, IA
- Providing advice to researchers about their research designs, choosing statistical methods, interpreting statistical analysis results, use of statistical software to analyze data
- Statistical modelling for clients' research study using linear models, generalize linear models (glm's), Bayesian (JAGS, Stan) models, linear mixed effect models, etc.
- Co-author in the statistical methodology, analysis, and conclusion sections of two research papers with the clients

Biostatistics Graduate Intern, May 2021–August 2021

Merck & Co., Late Development Statistic Group, North Wales, PA
- Developing Merck & Co internal packages: Oncology Survival Analysis package (mksurv), Qualification package (mkqualify), and Merck Adaptive two-in-one Design package
- Creating and developing three shiny apps for Merck internal resources: Oncology survival analysis shiny (see gsDesign Shiny app to have an idea of what the oncology shiny I developed looks like),

Statistical programming managerial dashboard for project monitoring using ggplotly, and a shiny app for adaptive two-in-one studies (for oncology trials)

- Integrating Oncology Survival Package and shiny apps to enable users to generate submission-ready reports for regulatory submission purposes by downloading the results in the standard reporting format
- Contributing to developing Merck qualification package for assessing and reporting risk levels of internal packages at Merck
- Merck survival package (mksurv) development which provides standard tools for time-to-event data analysis in supporting Merck clinical studies with tools to analyze and report of Kaplan-Meier curve (including drug labeling), Restricted Mean Survival Time (RMST) analysis, Piecewise Hazard Ratio table and figure, max-combo test, etc.
- The workshop planner and coach for 'R for clinical trial analysis and reporting' workshop for the Summer 2021 Intern Program

Biostatistics Graduate Intern, September 2020–May 2021

ClinChoice, Biostatistics and Programming Division, Washington, PA

- Running simulation to compare the asymptotic results for a fixed or group sequential design under non-proportional hazard assumptions
- Package validation for Group Sequential Design packages using unit tests and snapshot tests
- Running unit tests for deliverables (rtf tables, graphical outputs, and data frames) in the analysis and reporting of the group sequential package
- Simulation studies for oncology clinical trials using smoothed hazard rate procedures (comparing bshazard and smoothHR to the internal procedure at ClinChoice)

Biostatistics Graduate Intern, June 2020–September 2020

Merck & Co., Design Methodology Division, North Wales, PA

- Collaborating to package development at Merck & Co. in 3 packages: simtrial, gsDesign2 and gsdmvn
- Conducting simulation studies for fixed and group sequential designs under non-proportional hazard assumption
- Research in design methodology for group sequential designs for time-to-event endpoint trials

TEACHING EXPERIENCE

- STAT 305, Engineering Statistics, ISU, Instructor, Fall 2020, Spring 2021
- STAT 305, Engineering Statistics, ISU, Teaching assistant, Summer 2019, Spring 2018
- STAT 588, Statistical Theory for Research, ISU, Co-instructor, Spring 2019
- STAT 330, Probability and Statistics for Computer Science, Teaching assistant, Fall 2018
- STAT 226, Introduction to Business Statistics, ISU, Teaching assistant, Fall 2017

SERVICE /VOLUNTEER ACTIVITIES

Statistics in the Community, Former Treasurer and Executive Member, August 2019 – present

- STATCOM at Iowa State offers statistical advice and expertise free of charge to governmental and nonprofit groups in the local community

Statistics faculty committee - student representative, August 2019 – May 2021

Department of Statistics, Iowa State University, Ames, Iowa

- Communicate relevant information from the student association to the faculty members

Iranian Students and Scholars' Association, Treasurer, ISU, August 2018 –August 2019

- Event planner for 5 big events, as a teamwork, for the members of the association and non-Iranian people
- Organized the new year celebration event and hosted approximately 300 people
- Communicated with finance committee and senate of Iowa State University for funds to hold events

PROFESSIONAL ORGANIZATION MEMBERSHIP

- American Statistical Association (ASA), Institute of Mathematical Statistics (IMS)
- Iranian Statistical Society (ISS)