Amin Shirazi, PhD Student

Ames, IA

515-708-6372 | ashirazist@gmail.com | LinkedIn | Homepage | GitHub

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 regression 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 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, a 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
  Dissertation: Dependence Boosted Differentially Expressed Analysis
  Advisor: Professor Peng Liu
  Cumulative GPA: 3.78/4.00

- **Shahid Beheshti University (SBU), Tehran, Iran**   **September 2011–February 2014**
  Master of Science, MSc, Mathematical Statistics
  Critical Component: Testing Statistical Hypothesis for Jump Models in Stochastic Differential Equations
  Advisor: Professor H.D. Hamedani
  Cumulative GPA: 3.70/4.00

- **IKIU, Qazvin, Iran**   **September 2006–September 2010**
  Bachelor of Science, BSc, Statistics
  Cumulative GPA: 3.65/4.00

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

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
- Characterizing a procedure to introduce a powerful test for multiple testing of dependent data by first running a linear model, and then removing false positives to control FDR
- Implementing Bayesian and shrinkage methods to compare Linear Models for Microarray Data (LIMMA) and Dependence Boosted Differentially Expressed Analysis (DBDE)

- Conducting empirical study to identify differentially expressed genes for a human breast cancer data set (GDS2250)
- Identifying differentially expressed genes in X chromosome abnormalities of cancel data using gene ontology information

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. The validation included running unit tests for evaluation and record the expected output of a function using code. The main task was to conduct snapshot testing for deliverables (rtf tables, graphical outputs, and data frames) in the analysis and reporting of the group sequential package
- Writing R functions to generate in rtf format for Adverse Effect (AE) summary tables to be aligned with the mock tables
- 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

Data Analyst, R&D department   **July 2015–July 2017**
Koosha Setareh Iranian International Co, Tehran, Iran
- Implementing statistical skills to interpret market data in collaboration with sales and marketing department
- Performing generalized linear model using Beta random variables to data from market research which successfully increased sales by 15%
- Generating creative business reports, tables, charts, and graphs for the logistic department

Data Analyst, R&D department   **September 2014–June 2015**
Iranian Shaygan Pars, Tehran, Iran
- Interpreting sales data applying statistical models as a teamwork with sales department
- Applying Bayesian analysis using 'rstan' to provide credible intervals for the odds ratio of product sales

Statistical Consultant and Data Analyst   **May 2014–September 2014**
Info Tech International Company, Tehran, Iran
- Designing, conducting, and interpreting the survey analysis on the customer satisfaction of the company service
- Providing statistical consultant to the engineering and sales departments

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

TEACHING EXPERIENCE
INSTRUCTOR:
STAT 305, Engineering Statistics   **Fall 2020 - Spring 2021**
Iowa State University
- Prepared and led lectures for both in-person and online lectures
- Wrote and graded exams

- Topics included engineering data collection, descriptive statistics, elementary probability distributions, principles of experimentation, confidence intervals and significance tests, one- and two-sample studies, regression analysis, and JMP
- Approximately 70 students

TEACHING ASSISTANT:

STAT 305, Engineering Statistics   **Summer 2019**
Iowa State University
- Statistics for engineering problem solving
- Covering principles of engineering data collection, descriptive statistics, elementary probability distributions, principles of experimentation, confidence intervals and significance tests, one- and two-sample studies, regression analysis, and statistical software
- Approximately 100 students

STAT 588, Statistical Theory for Research   **Spring 2019**
Iowa State University
- Co-instructor of the course
- Helping construct tests, grading assignments, maintaining weekly office hours to communicate in person with students as needed
- Approximately 30 students

STAT 330, Probability and Statistics for Computer Science   **Fall 2018**
Iowa State University
- Helping construct tests, grading assignments, maintaining weekly office hours to communicate in person with students as needed
- Approximately 80 students

STAT 305, Engineering Statistics   **Spring 2018**
Iowa State University
- Grading weekly quizzes and assignments
- Approximately 80 students

STAT 226, Introduction to Business Statistics   **Fall 2017**
Iowa State University
- Grading assignments and exams with eight other graders to share the grading across all nine sections
- Approximately 700 students in all sections

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

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)

AWARDS AND HONORS:
Daniel H. Mowrey Graduate Consulting Awards, (Spring 2021), Iowa State University
- Awarded in recognition of outstanding contributions in the area of statistical consulting while working toward a graduate degree

Teaching excellence award (Spring 2020), Iowa State University
- Awarded in recognition of outstanding teaching of statistical courses while working toward a graduate degree

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)

- ❖ References will be provided upon request.