**Amin Shirazi, PhD Student**

Ames, IA

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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 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](https://www.stat.iastate.edu/statistical-consulting), 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](https://www.merck.com/) 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](https://gsdesign.shinyapps.io/prod/) to have an idea of what the oncology shiny I developed looks like), Statistical programming managerial dashboard for project monitoring using [ggplotly](https://plotly.com/ggplot2/), 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](https://github.com/cran/bshazard) and [smoothHR](https://github.com/arturstat/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](https://www.merck.com/). in 3 packages: [simtrial](https://keaven.github.io/simtrial/), [gsDesign2](https://github.com/keaven/gsDesign2) and [gsdmvn](https://github.com/keaven/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](http://kooshasetarehpasargad.com/koosha/en/), 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](http://infotech-co.com/), 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](https://plotly.com/))
  + Merck Adaptive two-in-one Design shiny
  + [PetFindr](https://earl88.github.io/PetFindr/index.html) shiny
* Package Development:
  + [pkglite](https://merck.github.io/pkglite/authors.html): a tool, grammar, and standard to represent and exchange R package source code as text files
  + [gsDesign2](https://keaven.github.io/gsDesign2/): non-proportional hazards and graphical multiplicity control with group sequential design
  + [r2rtf](https://merck.github.io/r2rtf/authors.html): an R package to create production-ready tables and figures in RTF format
  + [gsdmvn](https://keaven.github.io/gsdmvn/): simulation of fixed or group sequential design under non-proportional hazards
  + [simtrial](https://keaven.github.io/simtrial/): this package provides some basic routines for simulating a clinical trial
  + [gsDesign](https://keaven.github.io/gsDesign/): the gsDesign package supports group sequential clinical trial design
  + [PetFindr](https://earl88.github.io/PetFindr/index.html): an R interface for the [petfinder.com](https://www.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**](https://ashirazist.github.io/stat305.github.io/index.html) **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](https://www.stat.iastate.edu/2021-graduate-student-award-recipients), (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](https://isu-statcom.netlify.app/2006/10/officers/) 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.