Manju M. Johny

Data Scientist · Statistician
Ames, Iowa
mjohny@iastate.edu | mjohny.github.io | mjohny | mjohny

Summary

- Ph.D student passionate about statistics, and finding creative ways to solve new problems.
- 5+ years experience in teaching and research. Interested in nonparametric statistics, time series and image analysis.
- Strong scientific background. Life long learner excited for new challenges.

Education

Doctor of Philosophy in Statistics — *Ames, IA*
Iowa State University — *May 2021 (Expected)*

Master of Science in Statistics — *Ames, IA*
Iowa State University — *May 2017*

Bachelor of Arts in Chemistry and Mathematics — *St. Louis, MO*
Saint Louis University — *May 2014*

Skills

Programming R, Rstudio, JMP, Excel, Git, LaTeX (fluent); Python, Jupyter Notebook, SAS (familiar)
Languages English, Malayalam (fluent); Spanish (familiar)
Other Effective public speaker with excellent teaching evaluations; creative and excited to learn

Employment

- **Teaching Assistant**, Iowa State University, Ames, IA — *Aug 2014-Pres*
  Role: Develop lesson plans and instruct lecture (class sizes: 60-100 students)
- **Machine Learning Intern**, NASA Glenn Research Center, Cleveland, OH — *Aug-Dec 2018/Jun-Aug 2019*
  Role: Work on interdisciplinary team to develop artificial intelligence for PeTaL (Periodic Table of Life).
- **Research Fellow**, Food and Drug Administration, St. Louis, MO — *May-Aug 2013/14*
  Role: Lab work and analysis to test for contamination of pharmaceutical materials
- **Math Lab Tutor**, Jefferson College, Hillsboro, MO — *May-Aug 2012*
  Role: Assist students in mathematics including algebra, trigonometry, calculus, probability and statistics.

Honors & Awards

International

- **First Place (Cleveland) and Global Nominee**, NASA's International Space Apps Challenge (Hackathon) — *2018*
  Our design concept was for an autonomous free-flyer to inspect space craft damage.
- **Second Place**, Statistical Significance Poster Award, Joint Statistical Meetings — *2018*
  Competition highlighted statisticians' contributions to society and was accompanied by a fun write-up component.
- **Second Place**, Prudsys Data Mining Cup (International Student Competition) — *2016*
  Our team, along with the top 5, was invited to Berlin, Germany to present our solution for the competition.

Domestic

- **Teaching Excellence Award**, Iowa State University (Graduate Teaching Award) — *2018*
- **Alumni Fellowship**, Iowa State University — *2014*
- **ORISE Fellowship**, Oak Ridge Institute for Science and Education — *2013-14*
- **Pi Mu Epsilon Member**, US National Mathematics Honor Society — *2014*
- **Vice President's Scholarship**, Saint Louis University — *2010-14*
- **Bright Flight Scholarship**, Missouri Department of Higher Education — *2010-14*

Research

Machine Learning Intern, NASA Glenn Research Center *Cleveland, OH*

Mentors: Vikram Shyam, Ph.D; Herbert Schilling, Ph.D *Fall 2018/Summer 2019*

- Developed image and pattern classification capabilities for Periodic Table of Life (a biomimetic design tool) using deep learning. Neural networks were utilized to identify and locate organisms, and underlying patterns in images.
- Research culminated in formal talk to NASA Glenn Research Center, and a paper publication.

Master's Creative Component (Thesis), Iowa State University *Ames, IA*

Advisor: Petruţa Caragea, Ph.D; Committee: Diane Debinski, Ph.D, Yehua Li, Ph.D *Spring 2016-17*

- Title: Functional Anova Approach to Detecting Changes in Soil Moisture and Temperature
- Utilized ANOVA for functional data to study the effects of climate change on soil parameters. Approach involved smoothing time series curves using non-parametric methods, and developing a parametric bootstrap procedure.

Research Fellow, DPA/CDER/US Food and Drug Administration *St. Louis, MO*

Mentors: Jason Rodriguez, Ph.D; Connie Gryniewicz-Ruzicka, Ph.D *Summer 2014*

- Developed an algorithm in MATLAB to transfer laboratory methods to field instruments. Developed rapid screening methods to identify adulteration of pharmaceutical materials on Ion Mobility Spectrometry instruments.
- Research culminated in formal talk to DPA/CDER/FDA.

Mentors: Jason Rodriguez, Ph.D; Hongping Ye, Ph.D *Summer 2013*

- Developed Raman and near Infrared spectral libraries for screening of pharmaceutical materials. Performed analysis to test for ruminant contamination in heparin.
- Research culminated in formal talk to DPA/CDER/FDA, and poster presentation.

Publications & Presentations

Publications:

- **Johny, M. M.**, Caragea, P. C., Debinski, D. M., Sherwood, J., A Functional Anova Approach to Detecting Changes in Soil Moisture and Temperature. (In Preparation)
- Vaziri, G. J., **Johny, M. M.**, Caragea, P. C., Adelman, J. S., Social context affects thermoregulation but not activity level during avian immune response, *Behavioral Ecology 2019*, 30 (2), 383–392, https://doi.org/10.1093/beheco/ary177
- Shyam, V., Friend, L., Whiteaker, B., Bense, N., Dowdall, J., Boktor, B., **Johny, M. M.**, Reyes, I., Naser, A., Sakhamuri, N., Kravets, V., Calvin, A., Gabus, K., Goodman, D., Schilling, H., Robinson, C., Reid, R. O., Unsworth, C., PeTaL (Periodic Table of Life) and Physiomimetics, *Designs* 2019, 3(3), 43; https://doi.org/10.3390/designs3030043
- Rodriguez, J. D., Skaggs, S. K., **Johny, M. M.**, Srivastiva, H. K., Loethen, Y. L.,Arzhantsev, S. L., Kauffman, J. F., Buhse, L. F., Distribution of Spectral Libraries Across Different Field Deployable Raman and Near Infrared Instruments. *Am. Pharm. Review 2014*, 17 (1), 10-17.

Conference and Meeting Presentations:

- **Johny, M. M.**, "Periodic Table of Life (PeTaL): Image Classification" NASA GRC Midterm Presentations, Cleveland, OH USA; Oct 2018.
- **Johny, M. M.**, Caragea, P. C., Debinski, D. M., Sherwood, J., "A Functional Anova Approach to Detecting Changes in Soil Moisture and Temperature" Joint Statistical Meetings, Vancouver, British Columbia; Jul. 2018.
- **Johny, M. M.**, Caragea, P. C., Debinski, D. M., Sherwood, J., "A Functional Anova Approach to Detecting Changes in Soil Moisture and Temperature" Conference on Predictive Inference and Its Applications, Ames, Iowa; May. 2018.
- Iowa State University Team 1 (Chakraborty, A., Han, Y., **Johny, M. M.**, Li, X., Mao, X., Zhang, H.), "Data Mining Cup Solution" Prudsys Personalization Summit, Berlin, Germany; July 2016.
- Rodriguez, J. D., Skaggs, s. K., **Johny, M. M.**, Srivastava, H. K., Loethen, Y. L., "Evaluating the Performance of Field Screening Using Portable Raman and Near Infrared Spectrometers" IFPAC Conference; Feb. 2015.
- **Johny, M. M.**, Skaggs, S. K., Gryniewicz-Ruzicka, C.M., Rodriguez, J. D., "Development of IMS Library for Detection of Adulterants; Standardization of Raman Spectra Across 5 Different Instruments" FDA Summer Research Symposium, St. Louis, MO USA; Aug 2014.
- **Johny, M. M.**, Ye, H., "Disaccharide Analysis to Test Ruminant Contamination of Heparin" FDA Summer Research Symposium, St. Louis, MO USA; Aug 2013.

- Rodriguez, J. D., Skaggs, S. K., **Johny, M. M.**, Arzhantsev, S., Loethen, Y. L., Srivastava, H. K., Kauffman, J. F., Buhse, L. F., "Developing Spectral Libraries for Domestic and Foreign Screening of Pharmaceutical Materials" CDER Science Day; White Oak, MD USA; Sept 2013.

Teaching

Instructor:

- STAT 330: Probability and Statistics for Computer Science, Iowa State University *Spring 2019 - Pres*
- STAT 101: Principles of Statistics, Iowa State University *Fall 2015 - Spring 2018*
- STAT 105XW: Introduction to Statistics for Engineers (online), Iowa State University *Summer 2017*

Lab Instructor:

- STAT 101: Principles of Statistics, Iowa State University *Fall 2014 - Spring 2015*

Grader:

- STAT 401: Statistical Methods for Research Workers (graduate level), Iowa State University *Summer 2015*
- STAT 104: Introduction to Statistics, Iowa State University *Fall 2014 - Spring 2015*

Activities & Community Outreach

- Mentor: NASA Club, John Marshal School of Information Technology (high school) *2018*
- Member: American Statistical Association *2014-18*
- Member: STAT-ers Club, Iowa State University *2014-17*
- Member (Demonstration Captain): Chemistry Club, Saint Louis University *2012-13*
- Volunteer: Lion's Club International, Saint Louis University *2013*
- Volunteer: Sunrise Assisted Living, Des Peres, MO *2008-13*

Graduate Courses

Theoretical Courses:

- Advanced Probability Theory and Statistical Inference (STAT 542, STAT 543, STAT 641, STAT 642, STAT 643)
  - Probability measures, L_p spaces, conditional probability, moment generating functions, convergence, central limit theorems, sufficiency, estimation, maximum likelihood, decision theory, hypothesis testing, etc
- Theory & Application of Linear Models (STAT 611)
  - Theory of least squares, best linear unbiased estimation, distribution of quadratic forms, etc.

Applied Courses:

- Advanced Statistical Methods (STAT 500, STAT 510, STAT 520, STAT 601)
  - Randomization-based inference, ANOVA, linear models, generalized linear & mixed models, estimation & inference, Monte Carlo studies, bootstrap, cross validation, latent variables, model assessment, etc
- Bayesian Statistics & Advanced Bayesian Methods (STAT 544, STAT 615)
  - Prior specification, hierarchical models, MCMC algorithms, hierarchical models, state-space models, etc.
- Nonparametric Statistics (STAT 546)
  - Smoothing methods for estimating density and regression functions, parameter selection, cross validation, etc
- Time Series Analysis (STAT 551)
  - Stationarity, temporal dependence, MA & AR structures, prediction & forecasting, etc.
- Ecological Statistics (STAT 534)
  - Estimation of abundance, survival from recapture studies, hierarchical models, etc.

Programming:

- Introduction to R; Statistical Computing (STAT 579, STAT 580)
  - Programming in R, graphics, looping, function construction, introduction to C, interface of R & C

If you are interested in learning more about me or viewing some of my research projects, please visit my website: https://mjohny.github.io