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Engineering & Scientific Consulting

Manju Johny, Ph.D.

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Professional Profile

Dr. Manju Johny is a data scientist with over seven years of experience applying statistics, machine learning, and artificial intelligence (AI) to solve complex challenges across scientific and engineering domains. She has worked on diverse applications spanning biological, ecological, and environmental sciences, aerospace engineering, remote sensing, oceanography, maritime analytics, computer science, marketing, and business analytics.

Dr. Johny specializes in data analysis and software development for a variety of data types, including time series, images, satellite imagery, and geospatial datasets, ranging from small-scale studies to large-scale (big data) projects. Her expertise includes:

- **Advanced Data Modeling** – Bayesian statistics, neural networks, predictive inference, classification, and hypothesis testing.
- **Data Fusion and Uncertainty Quantification** – Integrating multimodal and multi-instrument data sources with robust uncertainty estimation.
- **Experimental Design & Analytics** – Developing statistical methodologies for experimental studies.
- **Data Visualization & Interpretability** – Emphasizing explainability and visualizations in statistical and machine learning models for actionable insights.

Dr. Johny holds an M.S. and Ph.D. in Statistics from Iowa State University. She began her career as a postdoctoral researcher at NASA Jet Propulsion Laboratory (JPL), California Institute of Technology, where she developed statistical and machine learning solutions for Earth-observing satellites. Her work included constructing long-term atmospheric carbon dioxide (CO_2) and solar-induced fluorescence (SIF) datasets from multiple sources, and assessing post-wildfire vegetation recovery using SIF, a measure of photosynthesis. She had internships at the US Food and Drug Administration (FDA), where she developed capabilities for identifying adulteration of pharmaceutical materials, and at NASA Glenn Research Center, where she developed an artificial intelligence system to generate engineering design suggestions inspired by biomimicry.

Beyond her technical expertise, Dr. Johny is passionate about data science communication. She has taught statistics courses to STEM and non-STEM students and enjoys collaborating with scientists and engineers across disciplines. She is always eager to explore new applications of data science and welcomes opportunities to collaborate on solving complex challenges across diverse fields.

Academic Credentials & Professional Honors

Ph.D., Statistics, Iowa State University, 2021

M.S., Statistics, Iowa State University, 2017

B.A., Chemistry and Mathematics, Saint Louis University, 2014

First Place, NASA International Space Apps Challenge (Hackathon) in Cleveland, 2018.

Second Place, Statistical Significance Award, Joint Statistical Meetings, 2018.

Second Place, Prudsys Data Mining Cup, 2016.

Teaching Excellence Award, Iowa State University, 2018.

Alumni Fellowship, Iowa State University, 2014.

Oak Ridge Institute for Science and Education Fellowship, 2013-2014.

Vice President's Scholarship, Saint Louis University, 2010-2014.

Bright Flight Scholarship, Missouri Department of Higher Education, 2010-2014.

Prior Experience

Postdoctoral Fellow, NASA Jet Propulsion Laboratory, 2021-2024

Graduate Research Assistant, Iowa State University, 2021

Graduate Teaching Assistant, Iowa State University, 2014-2021

Machine Learning Intern, NASA Glenn Research Center, 2019

Machine Learning Intern, NASA Glenn Research Center, 2018

Chemistry Intern, US Food and Drug Administration, 2014

Chemistry Intern, US Food and Drug Administration, 2013

Publications

Johny MM, Hobbs J, Yadav V, Johnson M, Parazoo N, Nguyen H, Braverman A. A Bayesian hierarchical framework for fusion of remote sensing data: An example with solar-induced fluorescence. arXiv, 2025, arXiv:2503.03901; https://doi.org/10.48550/arXiv.2503.03901.

Nguyen H, Johny MM, Liu J, Kulawik S, Baker D, Hobbs J, Braverman A, Katzfuss M, Yadav V. OCO2GriddedXCO2 _SIF. Version 3. OCO-2 Gridded bias-corrected XCO2, SIF, and other select fields aggregated as Level 3 daily files. Archived by National Aeronautics and Space Administration, U.S. Government, Goddard Earth Sciences Data and Information Services Center (GES DISC). 2024. https://doi.org/10.5067/0QR48EPN1BVR. Digital Science Data.

Johny MM. Functional ANOVA-Type Methods with Interpretable Visualization for Comparisons among Groups of Time Series (Publication No. 28721344), [Doctoral dissertation thesis, Iowa State University], ProQuest, 2021.

Vaziri GJ, Johny MM, Caragea PC, Adelman JS. 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 MM, Reyes I, Naser A, Sakhamuri N, Kravets V, Calvin A, Gabus K, Goodman D, Schilling H, Robinson C, Reid RO, Unsworth C. PeTaL (Periodic Table of Life) and Physiomimetics, Designs, 2019. 3(3), 43, https://doi.org/10.3390/designs3030043.

Rodriguez JD, Skaggs SK, Johny MM, Srivastiva HK, Loethen YL, Arzhantsev SL, Kauffman JF, Buhse LF. Distribution of Spectral Libraries Across Different Field Deployable Raman and Near Infrared Instruments, Am. Pharm. Review, 2014. 17 (1), 10-17.

Presentations

Johny MM, Hobbs J. Flexible Emulation for Hydroclimate Scenarios with Bayesian Transport Maps, SIAM Conference on Uncertainty Quantification, Trieste, Italy, 2024.

Johny MM. Monitoring the effect of wildfires using solar-induced chlorophyll fluorescence, 19th International Workshop on Greenhouse Gas Measurements from Space, Paris, France, 2023.

Johny MM. Bayesian hierarchical regression for modeling solar-induced chlorophyll fluorescence, JPL-FMI-Aalto-LUT workshop on data fusion and satellite UQ, Finnish Meteorological Institute, Helsinki, Finland, 2023.

Johny MM. Investigating the effect of California wildfires using satellite observations of solar-induced chlorophyll fluorescence, Postdoc Seminar Series, NASA Jet Propulsion Laboratory, Pasadena, CA, USA Feb 2023

Johny MM. Hierarchical Fourier regression for modeling solar-induced chlorophyll fluorescence, Uncertainty Quantification for Remote Sensing Inverse Problems Virtual Breakout Meeting, NASA Jet Propulsion Laboratory, Pasadena, CA, USA, 2022.

Johny MM. Investigating the effect of wildfires on solar-induced chlorophyll fluorescence using functional ANOVA methodology, NASA Ames Earth Science Seminar, NASA Ames Research Center (Virtual), July 2022.

Johny MM. Investigating Atmospheric Carbon Dioxide and Solar-Induced Chlorophyll Fluorescence (SIF), SIAM Conference on Uncertainty Quantification, Atlanta, GA, USA, 2022.

Johny MM. Functional ANOVA for Comparing Spatio-temporal Satellite Data, Uncertainty Quantification for Remote Sensing Inverse Problems Virtual Breakout Meeting, NASA Jet Propulsion Laboratory, Pasadena, CA, USA, October 2021.

Johny MM. Functional ANOVA for Satellite Data, Uncertainty Quantification for Remote Sensing Inverse Problems Virtual Breakout Meeting, NASA Jet Propulsion Laboratory, Pasadena, CA, USA, 2020.

Johny MM. Periodic Table of Life (PeTaL): Image Classification, NASA GRC Midterm Presentations, NASA Glenn Research Center, Cleveland, Ohio, USA, 2018.

Johny MM, Caragea PC, Debinski DM, Sherwood J, A Functional Anova Approach to Detecting Changes in Soil Moisture and Temperature, Joint Statistical Meetings, Vancouver, British Columbia, Canada, 2018.

Johny MM, Caragea PC, Debinski DM, Sherwood J. A Functional Anova Approach to Detecting Changes in Soil Moisture and Temperature, Conference on Predictive Inference and Its Applications, Ames, Iowa, USA, 2018.

Johny MM, Chakraborty A, Han Y, Li X, Mao X, Zhang H. Data Mining Cup Solution, Prudsys Personalization Summit, Berlin, Germany 2016.

Rodriguez JD, Skaggs SK, Johny MM, Srivastava HK, Loethen YL. Evaluating the Performance of Field Screening Using Portable Raman and Near Infrared Spectrometers, IFPAC Conference, 2015.

Johny MM, Skaggs SK, Gryniewicz-Ruzicka CM, Rodriguez JD. Development of IMS Library for Detection of Adulterants; Standardization of Raman Spectra Across 5 Different Instruments, FDA Summer Research Symposium, St. Louis, MO, USA, 2014.

Johny MM, Ye H. Disaccharide Analysis to Test Ruminant Contamination of Heparin, FDA Summer Research Symposium, St. Louis, Missouri, USA. 2013

Rodriguez JD, Skaggs SK, Johny MM, Arzhantsev S, Loethen YL, Srivastava HK, Kauffman JF, Buhse LF. Developing Spectral Libraries for Domestic and Foreign Screening of Pharmaceutical Materials, CDER Science Day, White Oak, Maryland, USA, 2013.