Ali Turfah

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Education

Ph.D. in Biostatistics, *University of Michigan*   2021 – Present
Co-Advisers: Drs. Xiaoquan (William) Wen and Lili Zhao

M.A. in Statistics, *Columbia University*   2019 – 2020

B.S.E. in Data Science, *University of Michigan*   2014 – 2018
Minor in Mathematics

Awards and Honors

- Chair's List of Academic Achievement (Columbia University)   Spring 2020
- First Place Award (DataFest, Columbia University)   2019
- Dean's Honor List (University of Michigan)   Fall 2017, Winter 2018
- University Honors (University of Michigan)   Fall 2017, Winter 2018
- Best Software Award (iGEM Conference)   2016
- Gold Medalist (iGEM Conference)   2016, 2017

Research Experience

Interpretable Clustering with the Distinguishability Criterion   2023 – 2024
Department of Biostatistics, University of Michigan
Adviser: Xiaoquan (William) Wen, PhD
- Develop a probabilistic criterion to assess the separability of a given cluster configuration and control the detection of spurious clusters
- Implement a merging procedure construct clusters from mixture model components and assess the relative distances between these clusters

Improving Vaccine Safety Analysis for Rare Adverse Events   2021 – 2023
Department of Biostatistics, University of Michigan
Advisers: Lili Zhao, PhD and Xiaoquan (William) Wen, PhD
- Propose a Bayesian logistic regression model to estimate vaccine-adverse event associations based on VAERS data using a Dirichlet Process mixture prior to allow data-guided information sharing between estimates
- Design embedded negative control and group enrichment procedures to mitigate reporting biases and identify more general vaccine-adverse event associations, respectively

Diabetes and Cognitive Function   2021–2022
Department of Biostatistics, University of Michigan
Advisers: Lili Zhao, PhD and Eva Feldman, MD, PhD
- Identify mechanisms underlying the relationships between obesity, metabolic dysfunction, and cognitive impairment using a mouse model
- Conduct survival analyses to identify associations between mouse diet and metabolic profiles with performance on cognitive tasks (Morris Water Maze and Puzzle Box escape)

Medical Evidence Normalization   2021
Department of Biomedical Informatics, Columbia University
Adviser: Chunhua Weng, PhD
- Design a standard computational representation of PICO Observation elements for the extraction and summarization of medical evidence to facilitate medical evidence computation tasks
- Implement a proof-of-concept system to detect contradictions in medical literature findings, scaling this process to be applied to 100,000 abstracts published in PubMed from 2015-2020

Medical Evidence Dependency-informed Attention Summer 2020

Department of Biomedical Informatics, Columbia University
Adviser: Chunhua Weng, PhD

- Develop a novel and interpretable attention mechanism that incorporates identified medical evidence based on dependency relations between PICO elements
- Benchmark performance against standard attention in BioBERT, improving performance by up to +0.3 F1 score on medical question-answer datasets

▬ Industry Experience

Data Analyst Intern 2020

Icahn School of Medicine at Mount Sinai, New York, NY
Adviser: Samantha Sartori, PhD

- Perform survival analyses and generated visualizations for cardiovascular outcomes studies
- Implement automated report generation process to track the progress of large-scale studies for presentation to sponsors and review boards

Data Scientist, *Algo*, Troy, MI 2018 – 2019

- Lead design and implementation of new forecasting modules, improving accuracy by 12% over original forecaster
- Appointed customer-facing technical lead of behind-schedule, successfully delivering the project on time by incorporating new development and requirements-gathering practices
- Optimize and corrected SQL in daily ETL processes, lessening system strain and reducing processing errors
- Mentor new employees through on-boarding process with pair programming exercises, overviews of relevant statistical concepts, and one-on-one meetings to discuss progress

Machine Learning Engineering Intern, *Algo*, Troy, MI Summer 2017

- Integrate statistical clustering methods into API, enabling on-demand analysis of store performance data
- Implement web scraper to augment available customer data and improve the quality of downstream analyses
- Built API endpoints to export results in email and powerpoint formats, allowing results to be readily shared
- Develop proof-of-concept system to automate unit testing, simplifying deployment and reducing bug reports

▬ In Review

Elzinga, Sarah E., Kai Guo, **Ali Turfah**, Rosemary E. Henn, Ian F. Webber-Davis, John M. Hayes, Crystal M. Pacut, Samuel J. Teener, Andrew D. Carter, Diana M. Rigan, Adam M. Allouch, Dae Gyu Jang, Rachel Parent, Emily Glass, Geoffrey G. Murphy, Stephen I. Lentz, Kevin S. Chen, Lili Zhao, Junguk Hur, and Eva L. Feldman (2024). "Immune-mediated mechanisms of progressive obesity, prediabetes, and cognitive impairment". In.

Turfah, **Ali** and Xiaoquan Wen (2024). "Interpretable clustering with the Distinguishability criterion". In: *arXiv preprint arXiv:2404.15967*.

Turfah, **Ali**, Xiaoquan Wen, and Lili Zhao (2023). "Non-parametric Bayesian mixture model to study adverse events of COVID-19 vaccines". In: *arXiv preprint arXiv:2306.02123*.

▬ Publications

Turfah, **Ali**, Hao Liu, Latoya A Stewart, Tian Kang, and Chunhua Weng (2022). "Extending PICO with Observation Normalization for Evidence Computing". In: *Studies in health technology and informatics* 290, pp. 268–272.

Kang, Tian, **Ali Turfah**, Jaehyun Kim, Adler Perotte, and Chunhua Weng (2021). "A neuro-symbolic method for understanding free-text medical evidence". In: *Journal of the American Medical Informatics Association*.

Nicolas, J., B. Claessen, D. Cao, M. Chiarito, S. Sartori, H. Qiu, R. Goel, M. Nardin, A. Roumeliotis, B. Vogel, **A. Turfah**, et al. (2021). "A Sex Paradox in Clinical Outcomes Following Complex Percutaneous Coronary Intervention". In: *International journal of cardiology* 329, pp. 67–73.

▬ Abstracts and Posters

Turfah, **Ali** and Xiaoquan Wen (2024). "Interpretable Clustering with the Distinguishability Criterion". In: *Joint Statistical Meetings (Portland, Oregon)*.

Elzinga, Sarah, Mohamed Noureldein, Kai Guo, Dae-Gyu Jang, John Hayes, Rosemary Henn, Ian Webber-Davis, Faye Mendelson, Rachel Parent, Diana Rigan, Adam Allouch, **Ali Turfah**, Lili Zhao, Geoffrey Murphy, Junguk Hur, and Eva L. Feldman (2023). "Long-term high-fat feeding: Connecting metabolism, cognitive impairment, and altered microglial morphology". In: *Journal of the Neurological Sciences* 455.

Turfah, **Ali**, Xiaoquan Wen, and Lili Zhao (2023). "Non-parametric Bayesian mixture model to study adverse events of COVID-19 vaccines". In: *International Chinese Statistical Association Applied Statistics Symposium (University of Michigan, Ann Arbor, MI)*.

Miller, Erin, Rima Charara, **Ali Turfah**, and Jennifer Mendez (2022). "Optimizing older adult blood pressure screening in a community setting by interprofessional students". In: *Innovation in Aging* 6.Suppl 1, p. 517.

Chiarito, M., A. Roumeliotis, D. Cao, D. Power, S. Sartori, Z. Zhang, A. Reisman, T. Mtisi, M. Nardin, J. Nicolas, H. Qiu, **A. Turfah**, et al. (2021). "Prevalence and prognostic impact of high bleeding risk status in patients undergoing percutaneous coronary intervention for left main coronary artery disease". In: *Journal of the American College of Cardiology* 77.18 Supplement 1, pp. 1148–1148.

Nardin, M., D. Cao, M. Chiarito, J. Nicolas, S. Sartori, Z. Zhang, H. Qiu, **A. Turfah**, G. Giustino, R. Chandiramani, et al. (2021). "Prognostic value of the academic research consortium for high bleeding risk criteria in patients with diabetes melitus undergoing PCI". In: *Journal of the American College of Cardiology* 77.18 Supplement 1, pp. 167–167.

Nicolas, J, D Cao, B Claessen, S Sartori, A Roumeliotis, R Goel, R Chandiramani, G Stefanini, **A Turfah**, S Chen, et al. (2020). "Intersection of the Academic Research Consortium–high bleeding risk criteria in patients undergoing PCI for acute coronary syndromes: insights from a high-volume single centre registry". In: *European Heart Journal* 41.Supplement_2, ehaa946–2494.

Nicolas, J., D. Cao, B. Claessen, S. Sartori, R. Chandiramani, A. Roumeliotis, R. Goel, A. Camaj, F. Beerkens, **A. Turfah**, G. Dangas, U. Baber, S. Sharma, A. Kini, and R. Mehran (2020). "Long-term outcomes in high-bleeding risk patients undergoing PCI for acute coronary syndromes: results from a large single-center PCI registry". In: *European Heart Journal* 41.

Nicolas, J., D. Cao, B. Claessen, S. Sartori, A. Roumeliotis, R. Goel, R. Chandiramani, G. Stefanini, **A. Turfah**, S. Chen, G. Dangas, U. Baber, S. Sharma, A. Kini, and R. Mehran (2020). "Intersection of the Academic Research Consortium - high bleeding risk criteria in patients undergoing PCI for acute coronary syndromes: insights from a high-volume single center registry". In: *European Heart Journal* 41.

Nicolas, J., B. E Claessen, D. Cao, M. Chiarito, S. Sartori, H. Qiu, R. Goel, M. Nardin, A. Roumeliotis, B. Vogel, **A. Turfah**, R. Chandiramani, U. Baber, N. Barman, J. Sweeny, P. Krishnan, A. Kini, S. K. Sharma, G. D. Dangas, and R. Mehran (2020). "Sex Disparities Among Patients Undergoing Complex Percutaneous Coronary Intervention (PCI): Insights From a Single-Center Large-Volume PCI Registry". In: *Journal of the American College of Cardiology* 76.17 Supplement S, B162–B163.

Teaching Experience

Big Data Summer Institute, *University of Michigan* Summers 2023 and 2024

Deliver workshop-style lectures on linear and logistic regression to undergraduate program participants

Mathematics Tutor 2012 – 2019

Volunteer tutoring for college-level math courses and mathematics sections of GRE and PCAT exams

Service

Alumni Mentor, *Columbia University* 2023 – Present

Mentor current Statistics M.A. students in preparation for Ph.D. programs

Peer Mentoring Committee, *University of Michigan* 2022 – 2023

Provide support to incoming students by mentoring programs and communicate concerns to the department

Graduate Student Mentor, *Ardsley High School*, New York, NY 2020 – 2021

Assist high-school students with statistical analysis components of projects for the Westchester Science and Engineering Fair

Workshop Leader, *Canton Public Library*, Canton, MI Winter 2016

Organized and delivered superhero themed chemistry workshop to elementary school library patrons