HUGH NGUYEN

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Scientist with 5+ experience in extracting insights and developing end-to-end algorithms for large-scale human biomedical data of various sources (high-dimensional physiological signals, multi-omics, EHR, imaging, notes, etc.); 2+ years of industry experience in big tech and start-up environments; expertise in AI/ML, biostatistics, signal processing, causal inference, and epidemiology. Strong knowledge of human physiology. Strong research interest in ML method and analytical tool development for applications in medicine and consumer health.

EDUCATION

JOHNS HOPKINS UNIVERSITY, Ph.D. and M.S. in Biomedical Engineering – Data Science Track *Dec 2022 (Expected)*

- Topic: ML Methods for Survival Analysis of High-dimensional, Longitudinal, and Multimodal Data in Cardiovascular Disease

TRINITY COLLEGE, B.S. in Mechanical Engineering, President's Fellow, Full-Ride Scholarship *May 2017*

EXPERIENCE

APPLE **Cupertino, CA**

Data Scientist PhD Co-op – Health Technologies *Jun 2021 – Dec 2021*

- Investigated human sleep phenotypes using 2+ million days of real-world tracking time-series data from the Apple Watch and Apple Health App, leveraging methods in statistics, AI/ML (LSTM autoencoder, clustering), signal processing, and causal inference; resulted in 1 internal ML conference abstract, 2 first-authored papers, and helped guide strategic directions in the health space.
- Cleaned, troubleshot, visualized, and performed root-cause analysis on naturalistic physiological datasets (e.g., exercise, sleep, heart rate) to influence the feasibility assessment and product design optimization of health features for future launches, in collaboration with teams from Health AI, Health Tech, HID, and Software.
- Led a team of 4 securing a spot in the finale of Apple's Shark-Tank-like intern competition (2% acceptance rate) to present ideas in front of Apple executives to improve user's eye protection (applicable to iPhones, iPads, and Macbooks).

PERTHERA AI **Boston, MA**

Biomedical Data Scientist Intern – Computational Biology *May 2020 – Dec 2020*

- Built the company's first AI-powered interpretable outcome prediction and phenotyping algorithms from concept to deployment for treatment response in patients with pancreatic cancer using multi-omic Real World Evidence (RWE) molecular profiling data; listed as a co-inventor for a patent. This work is actively being implemented by the company for other outcomes and datasets.
- Developed a smart literature recommendation system that recommended the most relevant papers to oncologists from 48,000+ Pubmed research papers using NLP methods.

JOHNS HOPKINS HOSPITAL **Baltimore, MD**

Health Informatics Researcher – Precision Care Medicine *Sep 2018 - Present*

- Developed personalized real-time early warning models for 9 critical illnesses and injuries in the ICU, leveraging ML methods on various types of high-dimensional biomedical data (e.g., biosignals from sensors, EHR/EMR, images, clinical trials, observational studies), led to the discovery of new biomarkers and insights for better understanding of disease to devise life-saving interventions.
- Led 8 research teams (40 ppl in total) on every step of their data science cycles to design, build, and ship models.
- Won Investigation Awards at RESS'19 & SCCM'20 – some of the most important cardiac arrest and critical care meetings worldwide.

MEDTRONIC **North Haven, CT**

Engineer – Minimally Invasive Therapies *Aug 2016 - May 2017*

- Designed, analyzed, and prototyped a portable, easy-to-use testing fixture device for a surgical stapler used in laparoscopic surgery, reduced manufacturing costs and enhanced affordability by 500%; collaborated with different teams (product, business, engineer) to integrate ideas and communicated recommendations to stakeholders with varying levels of technical knowledge.

TECHNICAL SKILLS

- Github Project Repo: https://hieu-hugh-nguyen.github.io
- Expertise in developing machine learning, statistical and computational methods for large-scale, multimodal biomedical data
- Strong coding skills in different languages: R, Python (TensorFlow, Keras, Pytorch, Pandas, Jupyter, Sklearn) (6+ yrs experience), SQL (PostGreSQL, MySQL, BigQuery) (4+ yrs), Linux/Unix Shell Scripting, Bash (4+ yrs), MATLAB (8+ yrs)
- Strong experience with Apple Health Cloud and other tools/frameworks/file systems used at Apple (e.g., Spark, Turi, Airflow, Git, Parquet, CSV, JSON)
- Deep understanding and strong experience with Supervised and Unsupervised ML, Deep Learning (RNNs, Autoencoders, CNNs, GANs, Transformers), Dimensionality Reduction (t-SNE, UMAP, PCA), Explainable AI, Time Series, Signal Processing, Causal Inference
- Proficient with High Performance/Distributed Computing, cloud platforms (Databricks, Google Colab, AWS, Azure), and container technologies (Docker, Kubernetes)
- Strong experience in processing, troubleshooting, cleaning, and harmonizing large datasets from real-world human studies

PUBLICATIONS

1. **Nguyen, H.T.***, Kim, H.B.*, Jin, Q.*, Tamby, S., Romer, T.G., Sung, E., Liu, R., Greenstein, J.L., Suarez, J.I., Storm, C. and Winslow, R.L., 2021. Computational Signatures for Post-Cardiac Arrest Trajectory Prediction: Importance of Early Physiological Time Series. *Anaesthesia Critical Care & Pain Medicine*, p.101015. Link
2. **Nguyen, H.T.***, Ambale-Venkatesh, B.*, Reis J., Wu C.O., Carr J., Nwabuo, C., Gidding S., Guallar E., and Lima J.A., 2022. Lifetime vs 10-year Cardiovascular Disease Prediction in Young Adults Using Statistical Machine Learning and Deep Learning: The Coronary Artery Risk Development in Young Adults (CARDIA) Study. *MedRxiv*. Link
3. Swamynathan, R., Varadarajan, V., **Nguyen, H.T**., Wu, C.O., Liu, K., Bluemke, D.A., Kachenoura, N., Redheuil, A., Lima, J.A. and Ambale Venkatesh, B., 2022. Association between Biomarkers of Inflammation and 10-Year Changes in Aortic Stiffness: The Multi-Ethnic Study of Atherosclerosis. *SSRN* 4092893. Link
4. Palepu, A.K., Murali, A., Ballard, J.L., Li, R., Ramesh, S., **Nguyen, H.**, Kim, H., Sarma, S., Suarez, J.I. and Stevens, R.D., 2021. Digital signatures for early traumatic brain injury outcome prediction in the intensive care unit. *Scientific reports*, 11(1), pp.1-9. Link
5. Ciuffo, L., **Nguyen, H.**, Marques, M.D., Aronis, K.N., Sivasambu, B., de Vasconcelos, H.D., Tao, S., Spragg, D.D., Marine, J.E., Berger, R.D. and Lima, J.A., 2019. Periatrial fat quality predicts atrial fibrillation ablation outcome. *Circulation: Cardiovascular Imaging*, 12(6), p.e008764. Link
6. Woulfe, K.C., Siomos, A.K., **Nguyen, H.**, SooHoo, M., Galambos, C., Stauffer, B.L., Sucharov, C. and Miyamoto, S., 2017. Fibrosis and fibrotic gene expression in pediatric and adult patients with idiopathic dilated cardiomyopathy. *Journal of cardiac failure*, 23(4), pp.314-324. Link
7. Nakano, S.J., Siomos, A.K., Garcia, A.M., **Nguyen, H.**, SooHoo, M., Galambos, C., Nunley, K., Stauffer, B.L., Sucharov, C.C. and Miyamoto, S.D., 2017. Fibrosis-related gene expression in single ventricle heart disease. *The Journal of pediatrics*, 191, pp.82-90. Link

Under Review:

8. **Nguyen, H.T.**, Vasconcellos H.D., Keck K., Reis J., Lewis C., Sidney S., Lloyd-Jones D., Schreiner, P., Guallar, E., Wu C., Lima J.A., and Ambale-Venkatesh, B., 2022. High-Dimensional Multivariate Longitudinal Data for Survival Analysis of Cardiovascular Event Prediction in Young Adults: Insights from a Comparative Explainable Study. Under Review.
9. Gong, K.*, Lu, R.*, Bergamaschi, T., Sanya, A.; Guo, J., Kim, H.B., **Nguyen H.T.**, Greenstein, J., Winslow. R.L, and Stevens, R.D., 2022. Predicting Intensive Care Delirium with Machine Learning: Model Development, External Validation, and Impact Simulation.
10. Varadarajan, V., Dorbala, S., **Nguyen, H.T.**, Post, W., Watson K., Mcclelland R., Shea S., Wu C., Ambale-Venkatesh B., and Lima J.A., 2022. Association of myocardial mechanical markers of extracellular volume expansion with Heart Failure and All-Cause Mortality: The Multi-Ethnic Study of Atherosclerosis. Under Review.

In Preparation:

11. **Nguyen, H.T.**, Liu, X., Wang, Z., and Bianchi M.T., 2022. Unsupervised Clustering Reveals Day-of-week Phenotypes in Real-world Sleep Tracking Data. Under Apple's Internal Review.
12. **Nguyen, H.T.***, Liu, X.*, Wang, Z., and Bianchi M.T., 2022. Real-world Exercise Patterns in a Large Naturalistic Cohort. Under Apple's Internal Review.

CONFERENCE TALKS AND PRESENTATIONS

2/2021. "A Machine Learning Model to Predict Brain Trauma Outcome in the Intensive Care Unit." Palepu, A.K., Murali, A., Ballard, J.L., Li, R., Ramesh, S., Nguyen, H., Kim, H., Sarma, S., Suarez, J.I. and Stevens, R.D. Critical Care Congress.

10/2020. "Effect of Arterial Catheter on Vasopressor Use in Patients With Shock: A Propensity Score Matching Analysis on a Multi-Center Retrospective Cohort." Nguyen H, Barros A, Lee H, Mclean S, Rivera P, Margare S, Samani S. Chest Annual Meeting.

2/2020. "A Physiology-Driven Computational Model for Post-Cardiac Arrest Outcome Prediction." Nguyen H, Kim K, Jin Q, Tamby S, Romer T, Sung E, Liu R, Greenstein J, Winslow R , Suarez J, Storm C, Stevens R. Critical Care Congress.

2/2020. "Effect of Arterial Catheters on Days on Vassopressors in the ICU: A Causal Inference Approach." Nguyen H, Barros A, Samani S, Lee J, Rivera P, McLean S, Jagber M. Critical Care Congress Datathon.

11/2019 - "A Machine Learning-Based Prediction of Cardiac Arrest Outcome Using a Large Multi-Center Database." Nguyen H, Kim K, Jin Q, Tamby S, Romer T, Sung E, Liu R, Greenstein J, Winslow R , Suarez J, Storm C, Stevens R. AHA Resuscitation Symposium, AHA Annual Meeting.

9/2019 - "A Machine Learning-Based Prediction of Cardiac Arrest Outcome Using a Large Multi-Center Database." Nguyen H, Kim K, Jin Q, Tamby S, Romer T, Sung E, Liu R, Greenstein J, Winslow R , Suarez J, Storm C, Stevens R. BMES Annual Meeting.

11/2016 - "Predicting Left Ventricular Assist Device (LVAD) Performance with Human Circulatory System Model." Nguyen H, Palladino." J. Sigma Xi Annual Meeting and Student Research Conference.

11/2016 - "Gene Expression of Transcription Factors in Pediatric Cardiomyopathy and Noonan Syndrome." Nguyen H, Chatfield KC, Stauffer BL. Annual Biomedical Research Conference, American Microbiology Society.

1/2015 - "Fibrosis-Related Gene and MicroRNA Expression in Pediatric Idiopathic Dilated Cardiomyopathy." Nguyen H, Siomos A, Nunley K, Stauffer BL, Sucharov CC, Miyamoto SD. American Federation for Medical Research, Western Regional Meeting.

INVITED PEER REVIEW SERVICE

Reviewer for the Journal of Biomedical Informatics, International Journal of Medical Informatics, Artificial Intelligence in Medicine, Frontiers in Cardiovascular Medicine, Computer Methods and Programs in Biomedicine, and International Journal of Cardiology.

HONORS AND AWARDS

2021, Star Research Achievement Award | Society of Critical Care Medicine 2021 Virtual Conference
The award recognizes excellence in critical care research

2020, Star Research Achievement Award | Society of Critical Care Medicine 2020 Florida Conference
The award recognizes excellence in critical care research

2019&2020, ACCM Research Day Award | Department of Anesthesiology and Critical Care Medicine at Johns Hopkins
Best poster presentation

2019, Young Investigator Award | American Heart Association Resuscitation Science Symposium (RESS)
The award is presented for top-scoring abstracts submitted to the symposium; AHA RESS is one of the most important meetings in the world for Cardiac Arrest

2017, President's Fellow | Trinity College, Dept. of Engineering
One senior student is selected as the best student from each major to represent their program of study

2016, Presentation Award | Annual Biomedical Research Conference, American Society for Microbiology, 2016
The award recognizes the best presentations at the conference

2016, Junior Engineering Prize | Trinity College, Dept. of Engineering
The award recognizes one rising senior engineering major who, voted by the Engineering faculty, has demonstrated outstanding academic achievement and shown evidence of professional development

2013-2017, Full Scholarship | Trinity College
All tuition, room, board, and required fees are covered

2014, Research Grant | The Daniel and Janet Mordecai Foundation
The grant provides stipends for a summer research and travel expenses to present research

2014, One of Ten Young Promising Faces | Vietnamese Fund for Young Talents and National Committee Youth of Vietnam
The award honors 10 Vietnamese under 35-year-old who stood out in fields of study, scientific research, production, society, sport, arts, and national defense

INVITED SPEAKER ACTIVITIES

Guest speaker/lecturer for 5 data science sessions that: i) taught data tools to 80+ physicians and healthcare professionals, ii) sparked interest in 'AI in Medicine' in 50+ students, and iii) offered advice to 200+ data science internship-seekers, sponsored by VinAI Research, YSEALI, FPT Software, and Johns Hopkins.