Vivek Gopalakrishnan

Curriculum Vitæ

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Education

2019–present **MSE, Biomedical Engineering**, *Johns Hopkins University*, Baltimore, MD.
GPA: *4/4*; Focus Area: *Biomedical Data Science*; Expected graduation date: *May 2021*

2017–present **BS, Biomedical Engineering**, *Johns Hopkins University*, Baltimore, MD.
GPA: *3.75/4*; Dean's List (2018-2019); Expected graduation date: *May 2021*

Areas of Interest

- Designing and building data science solutions to improve the diagnosis and treatment of disease.
- Using machine learning to better understand previously intractable neurological disorders.

Experience

2018–present **Research Assistant**, *Neurodata Lab*, Johns Hopkins University.
- Developed novel split criteria to enable accurate high-dimensional regression using the Random Forest algorithm.
- Discovered neuro-connectively similar subtypes of autism using joint embeddings of multi-network connectomes.

2018–2019 **Research Intern**, *Ghebremichael Lab*, Ragon Institute of MGH, MIT and Harvard.
- Quantified performance of ROC models in binary and multi-class settings.
- Identified biomarkers for antiretroviral toxicity by applying machine learning methods to HIV-patient data.

2017–2018 **Design Team Member**, *Dept. of Biomedical Engineering*, Johns Hopkins University.
- Developed a clinical machine learning algorithm to predict the onset of lung failure in pediatric patients.

2017 **Summer Research Intern**, *Fondazione Bruno Kessler*, Trento, Italy.
- Created autonomous data collection vehicles by mounting spectral cameras on drones.
- Implemented deep learning algorithms to quantitatively assess environmentally-related crop damage from image data.

2016-2017 **Independent Researcher**, *BioSeq*, Tufts University.
- Used next-generation sequencing to create a novel microbiome dataset characterizing oral health.
- Identified biomarkers for oral health by analyzing high-dimensional genomic data using unsupervised clustering and hidden Markov models.
- Presented at the 2017 Intel International Science and Engineering Fair, Los Angeles, CA.

Publications and Conference Presentations

[1] Jong Soo Lee, Elijah Paintsil, **Vivek Gopalakrishnan**, and Musie Ghebremichael. "A comparison of machine learning techniques for classification of HIV patients with antiretroviral therapy-induced mitochondrial toxicity from those without mitochondrial toxicity". *BMC Medical Research Methodology* 19.1 (Dec. 2019), p. 216. ISSN: 1471-2288. DOI: 10.1186/s12874-019-0848-z.

[2] **Vivek Gopalakrishnan** and Joshua T Vogelstein. "Towards discovering heterogeneity in autism via multi-network connectomics". Biomedical Engineering Society (BMES), Philadelphia, PA. Oct. 2019.

Submitted (Peer-Reviewed Research Articles)

[3] Nian Wang, Robert J Anderson, David G Ashbrook, **Vivek Gopalakrishnan**, Youngser Park, Carey E Priebe, Yi Qi, Joshua T Vogelstein, Robert W Williams, and G Allan Johnson. "Node-specific heritability in the mouse connectome". *Under review.* (July 2019). DOI: 10.1101/701755.

In Preparation

[4] **Vivek Gopalakrishnan** and Musie Ghebremichael. "Comparison of the accuracy of different receiver operating characteristic (ROC) models". *Draft available upon request.* (Jan. 2020).

Grants and Awards

2019 **Joseph C. Pistritto Research Fellowship**, *Dept. of Computer Science*, Johns Hopkins University.
This fellowship allowed me to conduct an independent summer research project focusing on the clinical applications of machine learning.

2018 **AWS Cloud Credits for Research Grant**, *Dept. of Computer Science*, Johns Hopkins University.
This research grant gave me the necessary computational resources to conduct extensive simulation studies of my extensions to the Random Forest algorithm.

2017 **Second Place Winner**, *Intel International Science and Engineering Fair*, Category: Microbiology.
Project: Identification of biomarkers of oral health from next-generation sequencing data.

2017 **Semi-Finalist**, *Regeneron Science Talent Search*, Microbiology.
Project: A molecular and physiological analysis of a weight loss supplement (EGCG).

Skills

Programming	Python, R, C++, SQL
Mathematics	Statistics, Machine Learning, Network Theory
Other	Unix, git, LaTeX

Teaching

2018–present **Head PILOT Leader**, *Dept. of Academic Support*, Johns Hopkins University.
- Lead tutoring sessions for Linear Algebra and Multivariable Calculus.
- Additional responsibilities include writing weekly problem sets and preparing junior leaders to teach their sessions.

Leadership

2017–present **Music Director**, *The JHU AllNighters*, Johns Hopkins University.

- Compose original arrangements and lead rehearsals as part of the AllNighters, JHU's premeir all-male a cappella group.
- Recorded an eight-song professional studio album (2019).