

Nam D. Nguyen

PH.D. CANDIDATE IN COMPUTER SCIENCE

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Research Interests

Machine Learning Multiview Learning, Geometric Deep Learning, Interpretable Learning, Theoretical Machine Learning
Network Science Link Prediction, Network Diffusion, Community Detection
Bioinformatics Single-cell Multiomics, Gene Expression & Regulation, Precision Medicine

Education

Stony Brook University

PH.D. IN COMPUTER SCIENCE

Stony Brook, NY, USA

Aug. 2016 - Exp. Aug. 2021

- Thesis Proposal: "Interpretable Multiview Learning for Understanding Functional Multiomics"
- Committee members: Drs. Daifeng Wang (advisor), Fusheng Wang (committee chair), Steven Skiena
- GPA: 3.84/4.00

Hanoi University of Science and Technology

B.ENG. IN COMPUTER SCIENCE

Hanoi, Vietnam

Aug. 2005 - Aug. 2010

- Thesis Title: "Integrating Security into Software Engineering, Using Security Patterns and SecureUML"
- GPA: 3.16/4.00

Experience

Daifeng Wang Laboratory, Waisman Center, University of Wisconsin-Madison

RESEARCH FELLOW

Madison, WI, USA

Sep. 2019 - Current

- Design machine learning algorithms for problems in functional genomics, cancers, & brain disorders
- Implement these algorithms, resulting in their high empirical performance, & maintain them as Python/R packages on GitHub
- Formulate a theoretical framework for multiview learning, MV-ERM, to unify & analyze state-of-the-art multiview learning algorithms
- Solve the trade-off between parametric and nonlinear manifold alignment by designing a variant of stochastic gradient descent on a non-Euclidean space
- Survey state-of-the-art quantum machine learning algorithms for potential applications in genomics
- Collect & analyze single-cell (scRNA-Seq) data to identify the genetic risk of variation, molecular mechanisms and neuropathological changes associated with neuropsychiatric symptoms in Alzheimer Disease

Daifeng Wang Laboratory, Stony Brook University

RESEARCH ASSISTANT

Stony Brook, NY, USA

May 2017 - Aug 2019

- Designed, implemented, & deployed algorithms using manifold alignment to reveal functional links between gene networks
- Explored the capabilities of manifold alignment in the settings of multiview learning
- Designed & implemented computational pipelines to analyze RNA-Seq data for bladder cancer research
- Led a team in 2 prediction competitions on Kaggle (top 22%) and a project of training the machine to distinguished good from poor singing.

Department of Biology, Brookhaven National Laboratory

RESEARCH ASSISTANT

Brookhaven, NY, USA

May 2017 - May 2018

- Developed computational pipeline to collect & analyze RNA-Seq data of algae for the project "Large-Scale Comparative Regulatory Network Analysis in Photosynthetic Organisms"

Software Engineering Lab., Pohang University of Science and Technology (POSTECH)

RESEARCHER & SOFTWARE ENGINEER

Pohang, S. Korea

Mar. 2011 - May 2013

- Researched feature-oriented product line engineering & model checking
- Specified & implemented a set of rules to automatically verify consistency between a feature model and other requirements models
- Investigated the complex network structures (e.g., small world, scale-free) & formulated a set of software metrics for large-scale software systems

Graphics & Virtual Reality Lab., Vietnam Academy of Science and Technology

RESEARCH INTERN

Hanoi, Vietnam

Jun. 2007 - Aug. 2007

- Surveyed & applied the wavelet transform to image denoising and compression; implements a prototype in MATLAB

Publications

*equal contribution

JOURNALS

Jin*, T., **Nguyen*, N. D.**, Talos, F., & Wang, D. (2020). *ECMarker: Interpretable machine learning model identifies gene expression biomarkers predicting clinical outcomes and reveals molecular mechanisms of human disease in early stages*. **Bioinformatics**, , btaa935

Nguyen, N. D., Jin, T., & Wang, D. (2020). *Varmole: A biologically drop-connect deep neural network model for prioritizing disease risk variants and genes*. **Bioinformatics**. <https://doi.org/10.1093/bioinformatics/btaa866>

Nguyen, N. D., & Wang, D. (2020). *Multiview learning for understanding functional multiomics*. **PLOS Computational Biology**, **16**(4), e1007677.

Nguyen, N. D., Blaby, I. K., & Wang, D. (2019). *ManiNetCluster: A novel manifold learning approach to reveal the functional links between gene networks*. **BMC Genomics**, **20**(12), 1–14.

CONFERENCE TALKS & PRESENTATIONS

Nguyen, N. D., Jin, T., & Wang, D. (2020). *Varmole: A biologically drop-connect deep neural network model for prioritizing disease risk variants and genes*. *The 13th annual RECOMB/ISCB conference on regulatory & systems genomics with DREAM challenges (RSGDREAM)*.

Nguyen, N. D., & Wang, D. (2020). *Multiview learning for understanding functional multiomics*. *The 28th conference on intelligent systems for molecular biology (ISMB)*. <https://doi.org/10.7490/f1000research.1118190.1>

Nguyen, N. D., Blaby, I., & Wang, D. (2019). *ManiNetCluster: A novel manifold learning approach to reveal the functional links between gene networks*. *The international conference on intelligent biology and medicine (ICIBM)*. Columbus, OH, USA.

Nguyen, N. D., Blaby, I., & Wang, D. (2018). *A manifold learning based approach to reveal the functional linkages across multiple gene networks*. *Proceedings of the 2018 ACM international conference on bioinformatics, computational biology, and health informatics (ACM-BCB)*, 514–514. Washington, D.C., USA.

MANUSCRIPTS IN PREPARATION

Nguyen, N. D., & Wang, D. (2021). *Deep Manifold Alignment for Regularized Learning to Reveal Functional Multiomics of Genotyp-Phenotype Interactions*. *In Preparation*.

Honors & Awards

2019	NSF (US National Science Foundation) Travel Award , ICIBM 2019	USA
2018	Best Poster Award , ACM-BCB 2018	USA
2016-2017	VEF Doctoral Fellowship , The US National Academy of Sciences	USA
2011-2012	POSTECH Research Scholarship , National Research Foundation of Korea	S. Korea
2010	Scholarship for Excellent Students , Ministry of Education and Training of Vietnam	Vietnam

Activities

TEACHING

2018	Mentor , Computer Science and Informatics Summer Research Experience Program	Stony Brook Univ.
2018	Guest Lecturer , BMI511 - Translational Bioinformatics	Stony Brook Univ.
2017	Teaching Assistant , CSE114 - Introduction to Object-Oriented Programming	Stony Brook Univ.
2016	Teaching Assistant , CSE101 - Computer Science Principles	Stony Brook Univ.

SERVICES

2018-2019	Student Member , International Society for Computational Biology (ISCB)	Global
2011	Organizing Volunteer , 12th International Conference on Software Reuse (ICSR 2011)	Pohang, S. Korea

Skills

Programming	Python/PyTorch, R (5-year experience); MATLAB (3-year experience); C++, Java (2-year experience)
DevOps & Reproducible Report	Bash, AWK, Vim, Git, LaTeX, Markdown & RMarkdown
Software Engineering	Object-Oriented Analysis & Design, UML (3-year experience)
Bioinformatics	Next-generation Sequencing Analysis (RNA-Seq), Differential Gene Expression Analysis, WGCNA

Certifications

Coursera Certificates	Social Network Analysis, Game Theory, Model Thinking
IBM Certified	Solution Designer - Object-Oriented Analysis & Design
IBM Certified	Application Developer - Rational Application Developer for WebSphere Software V6.0
IBM Certified	Database Associate - DB2 Fundamentals