Quang P. Nguyen

Curriculum Vitae

03784, West Lebanon NH
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Education

2017 - current **PhD in Quantitative Biomedical Sciences**, *Dartmouth College*, Hanover, NH.
Advisors: Anne G. Hoen, PhD and H. Robert Frost, PhD
Thesis title: Approaches in incorporating functional and ecological relationships to microbiome-outcome analyses

2013 - 2017 **B.S. in Biological Chemistry and Mathematics**, *Bates College*, Lewiston, ME.
Advisors: Larissa M. Williams, PhD
Thesis title: Bioinformatic analysis of transcription factor Nfe2 in zebrafish development

Publications

2021 Robert A. Shumsky, Laurens Debo, Rebecca M. Lebeaux, **Quang P. Nguyen**, Anne G. Hoen. Retail Store Customer Flow and COVID-19 Transmission. PNAS. Mar 2021. https://doi.org/10.1073/pnas.2019225118

2021 Jie Zhou, Anne G. Hoen, Susan McRitchie, Wimal Pathmasiri, Weston D. Viles, **Quang P. Nguyen**, Juliette C. Madan, Erika Dade, Margaret R. Karagas, Jiang Gui. Information Enhanced Model Selection for Gaussian Graphical Model with Application to Metabolomic Data. Biostatistics. Mar 2021. https://doi.org/10.1093/biostatistics/kxab006.

2021+ **Quang P. Nguyen**, Anne G. Hoen. & H. Robert Frost Taxonomic enrichment analysis using competitive isometric log-ratios. *In prep.*

2021+ **Quang P. Nguyen**, Anne G. Hoen. & H. Robert Frost An independent filter method for feature selection in microbiome relative abundance data. *In prep.*

2020+ **Quang P. Nguyen**, Margaret R. Karagas, Juliette C. Madan, Erika F. Dade, Hilary G. Morrison, Susan J. Sumner, Wilmal W. Pathmasiri, Susan McRitche, H. Robert Frost & Anne G. Hoen. Multi-omic Analysis of the Taxa-Function Relationship in Infant Gut Microbiomes. *Under Review.*

2019 Emily F. Winterbottom, Yuka Moroishi, David A. Armstrong, Paul J. Beach, **Quang P. Nguyen**, Nagi Ayad, Carmen J. Marsit, Zhigang Li, Margaret R. Karagas, David J. Robbins. Prenatal arsenic exposure alters the placental expression of multiple epigenetic regulators in a sex-dependent manner, and may increase the risk of congenital heart defects via PRDM6 inhibition. BMC Environmental Health, 18(1):18, February 2019

2018 Hoa L. Nguyen, Duc A. Ha, Robert J. Goldberg, Catarina I. Kiefe, Germán Chiriboga, Ha N. Ly, Cuong K. Nguyen, Ngoc T. Phan, Nguyen C. Vu, **Quang P. Nguyen**, and Jeroan J. Allison. Culturally adaptive storytelling intervention versus didactic intervention to improve hypertension control in Vietnam- 12 month follow up re- sults: A cluster randomized controlled feasibility trial. PLOS ONE, 13(12):e0209912, December 2018.

2017 Hoa L. Nguyen, Jeroan J. Allison, Duc A. Ha, Germán Chiriboga, Ha N. Ly, Hanh T. Tran, Cuong K. Nguyen, Diem M. Dang, Ngoc T. Phan, Nguyen C. Vu, **Quang P. Nguyen**, and Robert J. Goldberg. Culturally adaptive storytelling intervention versus didactic intervention to improve hypertension control in Vietnam: A cluster-randomized controlled feasibility trial. Pilot and Feasibility Studies, 3(1):22, May 2017.

Experience

06/2021 - 08/2021 **Biostatistics Intern**, *Regeneron Pharmaceuticals*, Tarrytown, NY.

09/2019 - current **Statistical Consultant**, *Dartmouth College - SYNERGY Institute*, Lebanon, NH.

- Collaborated with physicians at Dartmouth-Hitchcock on data processing and statistical analysis tasks for translational research projects.
- Current project: Analysis of longitudinal epilepsy patient data to determine the impact of new anti-epileptic drugs using inverse propensity score weighting and ordinal mixed models. Paper in preparation.

08/2017 - current **Doctoral Research**, *Dartmouth College - Hoen & Frost Labs*, Hanover, NH.

Thesis Title: Approaches in incorporating functional and ecological relationships to microbiome-outcome analyses

- Developed a statistical method for sample-level competitive enrichment testing for microbiome relative abundance data based on the isometric log-ratio transformation. Paper in preparation.
- Developed an independent taxonomic filter feature selection method for microbiome relative abundance data based on Laplace Scores of ensembles of ecological distance metrics.
- Performed predictive modelling of NMR metabolomics profiles from DNA-based microbiome profiles using machine learning approaches. Paper under review at BMC Microbiology.
- Analyzed shotgun metagenomic sequencing data end-to-end from raw reads using Python and command line tools to infer community and functional differences between two archaeal populations in solar salterns.
- Implemented an end-to-end pipeline to analyze 16S rRNA data using DADA2 and R to infer differences in community composition in colon samples between cancer and healthy patients.

05/2016 - 05/2017 **Undergraduate Research**, *Bates College - Williams Lab*, Lewiston, ME.

Thesis Title: Bioinformatic analysis of transcription factor Nfe2 in zebrafish development

- Performed differential abundance and functional enrichment analyses of RNA-Seq data using DESeq2 and DAVID to infer the role of transcription factor Nfe2 in normal zebrafish development.
- Conducted gain-of-function assay to validate the significance of Alas2 gene in heme biosynthesis identified from bioinformatics analyses.

06/2015 - 08/2015 **Research Assistant**, *Institute of Population, Health and Development*, Hanoi, Vietnam.

Project Title: Culturally adaptive storytelling intervention versus didactic intervention to improve hypertension control in Vietnam

- Collected and translated interview samples contributing to a pilot study for a novel storytelling-based intervention to improve hypertension control in Vietnam
- Assisted in drafting the English manuscript for both the pilot (published Dec 2017) and main (published Dec 2018) studies.

Honors and Awards

2020 **DIFUSE Fellowship** - National Science Foundation

2017 **Graduate Fellowship** - Dartmouth College

2017 **Dean's List** - Bates College

2016 **Maine INBRE Summer Research Grant**

2016 **Charles Summer Libby Award** - Brooks Quimby Debate Council

2013 **Bates College Undergraduate Scholarship**

Presentations

2021 **MIT Microbiome Symposium**, *Taxonomic enrichment analysis using isometric log-ratios*, Poster, Virtual.

2020 **NESS NextGen**, *Taxonomic enrichment analysis using isometric log-ratios*, Virtual, Poster.

2020 **Virtual Microbiome Conference**, *The infant gut microbiome is associated but not strongly predictive of stool metabolite concentrations*, Virtual, Contributed Talk.

2019 **Northeast Regional IDeA Conference**, *Healthy Infant Metabolomes are Robust to Changes in the Microbiome*, Breton Woods, NH, Poster.

2017 **Mount David Summit**, *The role of transcription factor Nfe2 in zebrafish development*, Lewiston, ME, Contributed Talk.

2016 **Parents' Weekend**, *Bioinformatic Analysis of bulk RNA-Seq data to infer the role of transcription factor Nfe2 in normal zebrafish development*, Lewiston, ME, Poster.

Teaching Experience

2018 **QBS120: Statistical Theory**, *Dartmouth College*, Hanover, NH, *Teaching Assistant.*

- Tutored Masters and PhD students in graduate level statistical inference course.
- Designed and taught a weekly session reviewing and practicing relevant material and problems

2014 - 2017 **Bates College Writing Center**, *Bates College*, Lewiston, ME, *Peer Writing Tutor.*

- Instructed students in first year seminars on college level writing and communication.
- Guided students from a variety of disciplines in drop-in sessions focusing on effective academic writing.

2014 **CHEM 107/108: Atomic Structure and Chemical Reactivity**, *Bates College*, Lewiston, ME, *Peer Tutor*.

- Tutored students in 1-on-1 sessions focusing on understanding in-class concepts and homework problems.

2013 - 2014 **Writing Launchpad**, Hanoi, Vietnam, *Instructor & Curriculum Director*.

- Designed and taught a 1-month intensive English essay writing course for Vietnamese high school students.
- Led a curriculum design team to identify effective methods to teach English writing.

Service

2020 - current **The COVID Tracking Project**, *The Atlantic*, Virtual, *Data Quality and Science Communication*.

- - Published 4 articles on different aspects of COVID-19 data reporting including death count definitions, probable case definitions, usage of antibody tests, and antigen test reporting guidelines.
  - Lead teams collecting, annotating, and interpreting daily COVID-19 data from official state dashboards.

2020 - current **Journal of Open Source Software**, *Peer Reviewer*.

2020 - current **The R Journal**, *Peer Reviewer*.

2019 - current **Epidemiology Club**, *Dartmouth College*, Lebanon, NH, *Executive Board*.

2019 - 2020 **New Hampshire Academy of Sciences**, Lyme, NH, *Volunteer Reviewer*.

2017 - 2018 **QuantBlitz Data Analysis Club**, *Dartmouth College*, Hanover, NH, *Member*.

2013 - 2017 **Brooks Quimby Debate Council**, *Bates College*, Lewiston, ME, *Member, Tournament Director (2014), Convener (2015), Vice President (2016-2017)*.

- Accolades
  - Top 40 - 2016 United States Universities Debating Championships
  - Semifinalist - 2016 United States Northeast Regional Championships
  - Octofinalist - 2016 Brown University Parlimentary Debate Tournament
  - Octofinalist - 2014 Northeastern Pro-Am Parlimentary Debate Tournament

Professional Affiliations

2020-current **New England Statistical Society**, *Member*.

2020-current **Soceity of Epidemiological Research**, *Member*.

2017-2020 **Sigma Xi**, *Member*.

Relevant Coursework

Graduate Foundations of Biostatistics I/II/III, Foundations of Epidemiology I/II, Applied Epidemiological Methods I, Foundations of Bioinformatics I/II, Machine Learning and Statistical Data Analysis, Applied Machine Learning, Biostatistics Consulting Lab, Clinical Epidemiology

Undergraduate	Mathematical Models in Biology, Graph Algorithms, Real Analysis, Probability Theory, Mathematical Statistics, Biostatistics, Linear Algebra, Multivariable Calculus, Computability Theory, Molecular Biology, Biological Chemistry I/II, Organic Chemistry I/II, Advanced Inorganic Chemistry, Advanced Genetics
Certifications and short courses	Strategies and Techniques for Analyzing Microbial Population Structures (STAMPS 2019) Python for Data Science and Machine Learning Bootcamp (Udemy, 2019) Data Science and Machine Learning Bootcamp in R (Udemy, 2017)

Skills

Software	Programming: R, Python, Julia, Bash Version Control: Git Workflows: Snakemake, Rmarkdown Deep Learning Frameworks: PyTorch
Bioinformatics	Experienced in processing metagenomic DNA sequencing data (amplicon and shotgun sequencing) Tools: AMPHORA2, metaSPAdes, PRODIGAL, DIAMOND, bowtie2, MUSCLE, phyloseq, vegan, ape, DADA2 Databases: NCBI SRA, EGGNOG, SILVA, KEGG
Statistical	Experienced in analyzing high-dimensional data sets using statistical learning methods in R and Python

References

Anne G. Hoen, PhD

- Associate Professor of Epidemiology, Biomedical Data Science & Microbiology and Immunology
- Dartmouth-Hitchcock Medical Center
  One Medical Center Drive, HB 7927
  Lebanon, NH 03756
- Anne.G.Hoen@Dartmouth.edu

H. Robert Frost, PhD

- Assistant Professor of Biomedical Data Science
- Dartmouth-Hitchcock Medical Center
  One Medical Center Drive
  Lebanon, NH 03756
- Hildreth.R.Frost@Dartmouth.edu

Margaret R. Karagas, PhD

- Department Chair and James W. Squires Professor of Epidemiology
  Professor of Community and Family Medicine
- Dartmouth-Hitchcock Medical Center
  One Medical Center Drive
  Lebanon, NH 03756
- Margaret.R.Karagas@Dartmouth.edu

A. James O'Malley, PhD

- Professor of The Dartmouth Institute

  Professor of Biomedical Data Science
- Dartmouth-Hitchcock Medical Center
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