

Quang P. Nguyen

Curriculum Vitae

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GitHub: <https://github.com/qpmnguyen>

Education

- 2017 - expected 06/2022 **PhD in Quantitative Biomedical Sciences**, *Dartmouth College*, Hanover, NH.
Advisors: Anne G. Hoen, PhD and H. Robert Frost, PhD
Thesis title: Approaches in incorporating taxa-function relationships to microbiome-outcome analyses
- 2013 - 2017 **B.S. in Biochemistry and Mathematics**, *Bates College*, Lewiston, ME.
Advisors: Larissa M. Williams, PhD
Thesis title: Bioinformatic analysis of transcription factor Nfe2 in zebrafish development

Publications

- 2021+ **Quang P. Nguyen**, Anne G. Hoen. & H. Robert Frost. cILR: Competitive isometric log ratio for taxonomic enrichment analysis. *Under Review at PLOS Computational Biology*. Pre-print: <https://doi.org/10.1101/2021.09.07.459294v1>
- 2021+ **Quang P. Nguyen**, Anne G. Hoen. & H. Robert Frost. Evaluating of trait-based taxon-sets for enrichment analysis in microbiome relative abundance data. *In prep.*
- 2021+ Rebecca M. Lebeaux, Juliette C. Madan, **Quang P. Nguyen**, Modupe O. Coker, Erika F. Dade, Yuka Moroishi, Thomas J. Palys, Benjamin D. Ross, Melinda M. Pettigrew, Hilary G. Morrison, Margaret R. Karagas, Anne G. Hoen. Impact of antibiotics to off-target infant gut microbiota and resistance genes in cohort studies. *Under review at Pediatric Research*. Pre-print: <https://doi.org/10.1101/2021.11.02.21265394>
- 2021 **Quang P. Nguyen**, Margaret R. Karagas, Juliette C. Madan, Erika F. Dade, Hilary G. Morrison, Susan J. Sumner, Wimal W. Pathmasiri, Susan McRitchie, H. Robert Frost & Anne G. Hoen. Associations between the gut microbiome and metabolome in early life. *BMC Microbiology*. Aug. 2021. <https://doi.org/10.1186/s12866-021-02282-3>.
- 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>.

- 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.

Experiences

- 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
 - Assessed the usage of microbe-trait databases for taxon-set analysis in microbiome taxonomic relative abundance data using R.
 - Developed a statistical method for sample-level competitive enrichment testing for microbiome relative abundance data based on the isometric log-ratio transformation with associated R package.
 - Performed predictive modelling of NMR metabolomics profiles from DNA-based microbiome profiles using machine learning approaches using *caret* in R.
 - Implemented end-to-end pipeline to analyze 16S rRNA gene sequencing and whole genome shotgun sequencing datasets using R and Python.
- 06/2021 - 08/2021 **Biostatistics Intern in Early Clinical Development**, *Regeneron Pharmaceuticals*, Tarrytown, NY.
 - Co-developed a novel latent class growth trajectory model for patient subgroup identification in clinical trials and validated approach using simulation experiments.
 - Implemented model as an R package for internal distribution and applied to real-world data to gain clinical insights.
- 06/2020 - 09/2020 **Data Science Infused Undergraduate STEM Education (DIFUSE) Fellow**, *Dartmouth College*, Hanover, NH.
 - Supported faculty in basic sciences in incorporating data science modules in undergraduate classrooms.
 - Developed an interactive Shiny application for exploring complex Eddy Covariance data sets for BIO16 class using R. Source Code on GitHub.

- 09/2019 - 01/2021 **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.
 - Analyzed longitudinal epilepsy patient data to determine the impact of new anti-epileptic drugs using inverse propensity score weighting and ordinal mixed models.
- 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**

Poster and Presentations

- 2022 **Rhode Island Microbiome Symposium**, *Evaluation of trait-based taxon-sets for enrichment analysis in microbiome relative abundance data*, Contributed talk, Virtual.
- 2021 **International Meeting on Emerging Diseases and Surveillance**, *Methods for Counting COVID-19 Deaths in U.S. States and Territories*, Contributed Oral Abstract, Virtual.
- 2021 **Northeast Regional IDeA Conference**, *Taxonomic enrichment analysis using isometric log-ratios*, Contributed talk, Virtual.
- 2021 **Holistic Bioinformatic Approaches used in Microbiome Research symposium**, *Taxonomic enrichment analysis using isometric log-ratios*, Poster, Virtual.
- 2021 **Harvard Chan Microbiome in Public Health Center (HCMPH) symposium**, *Taxonomic enrichment analysis using isometric log-ratios*, Poster, Virtual.
- 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.

Service

- 2022 - current **DELPHI Group**, *Carnegie Mellon University*, Virtual, *Volunteer Contributor*.
 - Collaborated with DELPHI researchers on research projects and developing epidemiological forecast tools in the R programming language.
- 2020 - current **Peer Reviewer**.
 - Clinical and Translational Medicine
 - Journal of Open Source Software
 - The R Journal
 - Pacific Symposium on Biocomputing
 - Journal of Women's Health
- 03/2020 - 05/2021 **The COVID Tracking Project**, *The Atlantic*, Virtual, *Data Quality and Science Communication*.
 - Published 7 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.

Professional Affiliations

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

- Programming Proficient in R and Python programming languages. Basic familiarity with Julia, Bash, C++

Software	Proficient in version control using Git/GitHub. Proficient in utilizing snakemake, nextflow, and targets pipeline tools with Slurm HPCs. Basic familiarity with PyTorch and Tensorflow frameworks for deep learning
Bioinformatics	Experienced in processing metagenomic DNA sequencing data (amplicon and shotgun sequencing) using tools such as metaSPAdes, phyloseq, DADA2, Qiime2
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
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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
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