

# Lan Huong Nguyen

PhD Candidate · ICME, Stanford University

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## Education

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### Stanford University

Stanford, CA

PhD in Computational and Mathematical Engineering (GPA 3.9)

Sep. 2013 - Exp. Jun. 2019

- Robust non-linear dimensionality reduction and latent structure recovery. Advised by Prof. Susan Holmes.
- Relevant coursework: numerical linear algebra, convex optimization, stochastic processes, probabilistic graphical models, distributed algorithms, statistical learning theory, Bayesian statistics, algorithms in advanced machine learning, theories of deep learning, statistical and machine learning methods for genomics

### California Institute of Technology

Pasadena, CA

B.S. in Applied Mathematics and Economics (GPA 3.8)

Sep. 2009 - Jun. 2013

- Graduated with honors from the Department of Computing & Mathematical Sciences.

## Experience

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### High-dimensional Data Statistics Graduate Research

Stanford, CA

Researcher in Holmes Lab

Sep. 2014 - Present

- Design robust dimensionality reduction and manifold learning methods for inferring latent structures and associated uncertainties in high-dimensional data
- Build statistical models for single cell RNA-seq and microbiome (16S, metagenomics, and metatranscriptomics) data
- Develop **R** and **Shiny** software packages implementing new data analysis and visualization techniques

### R for Data Science Introductory Course

Stanford, CA

Course Instructor for CME/STATS 195

Fall '16, '17, '18

- Created a short course on R application to data science covering topics such as data wrangling, exploration, visualization and modeling
- Taught a class of 60+ graduate and undergraduate students
- Course details and syllabus can be found at: <http://cme195.github.io>

### Genentech

South San Francisco, CA

Intern in Department of Bioinformatics

Jun. 2017 - Oct. 2017

- Studied the role of COP1 in activation and repression kinetics of LPS-induced genes
- Developed an open-source Bioconductor package for analyzing and visualizing short time-course RNA-seq data

### AOL Advertising

Palo Alto, CA

Intern in Large-Scale Analytics Team

Jun. 2014 - Oct. 2014

- Analyzed DoubleClick ad exchange auction bid data consisting of ~4-5 million entries per day
- Identified factors affecting winning rates of bids and developed classification models for predicting successful bidding
- Estimated market trends and winning price distribution. Designed Real Time Bidding algorithms

### Talentoday Startup

Palo Alto, CA

Consultanting Project

Sep. 2012 - Feb. 2013

- Worked with 30k+ user data to find the most predictive survey questions using QR factorization, and sparse CCA.
- Developed an answer-imputation technique using binomial matrix completion.
- Reduced the number of questions by 30% while retaining high test accuracy.

## Skills

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**Programming** R, Stan, Python, Matlab, C++, Spark, Scala, SQL

**Languages** English, Polish, Vietnamese

## Publications

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L.H. Nguyen, S. Holmes. **Diffusion t-SNE for manifold learning.** In preparation

L.H. Nguyen, S. Holmes. **Ten quick tips for effective dimensionality reduction.** PLOS Computational Biology (In review)

L.H. Nguyen., S. Holmes. **Bayesian Unidimensional Scaling for visualizing uncertainty in high dimensional datasets with latent ordering of observations.** BMC Bioinformatics (2017) <https://doi.org/10.1186/s12859-017-1790-x>

L.H. Nguyen. **‘TimeSeriesExperiment’ package for analysis and visualization of short time course data.** Bioconductor (2018) <https://doi.org/doi:10.18129/B9.bioc.TimeSeriesExperiment>

J.A. Grembi, L.H. Nguyen, T.D. Haggerty, C.D. Gardner, S.P. Holmes and J. Parsonnet. **Gut microbiota plasticity correlated with sustained weight loss after a low-carb or low-fat dietary intervention.** In preparation

P.H.T. Kamga, B. Li, M. McKerns, L.H. Nguyen, M. Ortiz, H. Owhadi, and T.J. Sullivan. **Optimal uncertainty quantification with model uncertainty and legacy data.** Journal of the Mechanics and Physics of Solids, 72 (2014) <http://dx.doi.org/10.1016/j.jmps.2014.07.007>

## Presentations

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BioVis at International Society for Computational Biology Prague, Czech Republic, Jul. 2017  
Presented an accepted paper on Bayesian dimensionality reduction for recovering laternt ordering of samples.

Ascona Workshop 2017: Statistical Challenges in Single-Cell Biology Ascona, Switzerland, Apr. 2017  
Presented a poster on mathematics of t-SNE and diagnostics for choosing its hyperparameters.

ASA’s Women in Statistics and Data Science Charlotte, NC, Oct. 2016  
Presented methods for detecting gradients in microbiome data based on indirect ordination. Invited student panelist.

useR 2016 Stanford, CA, Jun. 2016  
Presented **mvarVis**: An R package for Visualization of Multivariate Analysis Results.

Bioinformatics for Microbiome Symposium Stanford, CA, May 2016  
Presented a comparative study of differential abundance methods for analyzing sequencing data.

Additional Teaching Experience Stanford, CA, Oct. 2014 - Present  
Teaching assistant for: BIOS 221/STATS 366 Modern Statistics for Modern Biology, CS 261 Optimization and Algorithmic Paradigms, CME 200 Linear Algebra with Application to Engineering Computations, CME 106 Intro to Probability and Statistics

## Honors & Awards

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**ICME Stanford University** Stanford, CA  
Senior Teaching Fellow 2017-2018  
Institute of Computational and Mathematical Engineering teaching award.

**University of Chicago Midwest Trading Competition** Chicago, IL  
First Place Apr. 2013  
The UChicago Midwest Trading Competition is the nation’s premier algorithmic trading competition. Participants are asked to develop algorithms to make automated trading decisions. The competition tests technical programming skills, financial acumen, and ability to adjust based on algorithm performance.

## Extracurricular Activities

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**Stanford Women in Mathematics, Statistics and Computational Engineering** Stanford, CA  
Co-Founder and Financial officer Mar. 2018 - Present

**Stanford Polish Student Association** Stanford, CA  
Co-president, financial officer Oct. 2016 - Jun. 2018

**Asian American Graduate Students Association** Stanford, CA  
Core Member Jun. 2015 - Jun. 2016