Thomas Minh Nguyen

Davis, CA
919-619-5766 | tmh.nguyen9192w@gmail.com| https://linkedin.com/in/thomas-minh-nguyen
https://thomasmhnguyen.github.io/

EDUCATION

University of California-Davis Davis, CA
Ph.D. in Chemical Engineering | GPA: 3.69/4.00 Sep. 2019 - Jun. 2025

North Carolina State University Raleigh, NC
B.S. in Chemical & Biomolecular Engineering | GPA: 3.77/4.00 Aug. 2013 - May 2017

WORK EXPERIENCE

Graduate Student Researcher Davis, CA
UC Davis Department of Chemical Engineering Jan. 2020 – Jun. 2025

- Designed and implemented **nonlinear computational fluid dynamics (CFD)** simulations in **Python** to model fluid flow, particle transport, and particle clogging phenomena in confined microfluidic flow systems.
- Enabled **100x faster** decision-making and reduced analysis times by over **500 hours** through **algorithmic optimization**, **version control (Git)**, and **object-oriented programming**.
- Authored **50+ technical documents** and **presentations**, translating key phenomena, simulation results, and actionable insights to diverse stakeholders and non-technical audiences.
- ***Project:*** *Simulation-driven optimization of fluidic systems*
    - Collaborated with engineers to align simulation results with product design requirements and deliver modeling-driven recommendations for hardware development.
    - Implemented performance studies from **1,000+ CFD simulations** and experimental data, recommending design modifications that improved system performance by **25%.**
- ***Project:*** *Analysis and Prediction of Structural Deformation Patterns*
    - Applied **modal decomposition** with **spectral signal processing techniques** to extract dominant spatial deformation modes in simulation data, achieving over **75% accuracy**.

Teaching Assistant Davis, CA
UC Davis Department of Chemical Engineering Jan. 2021 – Jun. 2025

- Provided technical guidance to **200+ students** in downstream bioprocessing unit operations, chemical engineering fundamentals, and scientific computing through **Python/MATLAB**.
- Developed and implemented Python scripts to extract, clean, and analyze metrology data from thermocouples, distillation columns, and DAQ-based pressure sensors, enabling **30% faster** turnaround times on assignments and grading.

Post-Baccalaureate (Post-bac) Research Fellow Baltimore, MD
National Institute on Aging, NIH Oct. 2017 - Aug. 2019

- Applied **Agile software-development practices** to redesign ETL **Python/Bash** HPC system computational pipelines, reducing **resource utilization by 65%** and increasing **project delivery completion speeds** by **22%**.
- Diagnosed and resolved computational data quality and pipeline issues through root cause analysis, implementing fixes that prevented **$15,000+** in experimental reruns.
- Implemented **software validation protocols** including **unit testing, documentation, and version control** on 6 computational pipelines consisting of **200+ programming scripts**.

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- ***Project**: Forecasting and Prediction of Time-Series Biological Data (**2017 – 2019**)*
    - Developed **statistical models** and **probabilistic forecasting** methods to identify and predict significant trends from **65M+ datapoints**, improving predictive accuracy by ~**20%**.
- ***Project:** Predictive Classification and Analysis of high-dimensional biological data (**2018 - 2019**)*
    - Applied **unsupervised ML** methods to classify **2M+ biological datapoints** into functional sub-populations based on dominant signals. Validated cluster consistency via cross-dataset correlation analysis, achieving **89%** similarity.

Manufacturing Intern Durham, NC

Biogen Jun. 2017 - Aug. 2017

- Collaborated with engineers to audit and streamline reagent usage across manufacturing areas, outsourcing **37 chemical reagent inputs** and increasing worker efficiency by ~**32%**.
- Evaluated integration of third-party materials and equipment performance into existing **chemical reagent preparation** and **fluid handling** workflows, recommending cost-saving opportunities and reducing manufacturing expenses by **~$1,000/month**.
- Supported **3 process optimization and scale-up studies** to improve yield and reliability of protein therapeutic products, handling small-scale reactor equipment and ensuring compliance with FDA cGMP manufacturing guidelines **(21 CFR Parts 210/211)**.

Small Scale Manufacturing Intern Holly Springs, NC

Seqirus May. 2016 - Aug. 2016

- Identified production bottlenecks associated with **2x scale-up** in vaccine manufacturing, recommending workflow changes that prevented a **45% drop** in overall worker productivity.
- Conducted **risk assessment** of process materials to determine safety impact on employees. Authored **2 regulatory documents** to execute change of process materials, minimizing **safety risk and hazards**.
- Assisted with commissioning/decommissioning of **bioreactor equipment**. Worked with supply chain employees to update SAP supply chain software for manufacturing processes and inventory management.

Manufacturing Intern Raleigh, NC

BTEC at North Carolina State University Aug. 2015 - May 2016

- Applied **DOE methodologies** on lab-scale bioprocessing and electromechanical equipment (centrifugation, buffer exchange, AKTA-FPLC, cell counters, mixing vessels), resulting in **20%** improvement in final desired protein purity.
- Revised **4 experimental protocols** based on Failure Modes and Effects Analysis (**FMEA**) and Corrective and Preventative Actions (**CAPAs**) assessments, ensuring system reliability and compliance with laboratory standards.

Process Engineer Intern Morrisville, NC

Integrated Project Services (IPS) May 2015 - Aug. 2015

- Optimized workflow to review and modify **AutoCAD engineering schematics** (P&IDs, PFDs) for senior-level PEs and other engineers, increasing team efficiency by **25%**.
- Validated process components (valves, instruments, etc.) against master equipment lists to verify technical specifications, configuration accuracy, and documentation completeness.

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PERSONAL PROJECTS

Physics-based Machine Learning for Differential Equation Solvers 2025

- Built a **physics-informed neural network (PINN) model** for predicting heat/mass transfer phenomena. Achieved **70% accuracy** when compared to analytical benchmarks.

Machine Learning prediction of sports performance data 2025

- Built and evaluated **four machine-learning classifiers** (logistic, SVM, random forest, gradient boost) for prediction outcomes, achieving strong predictive performance through SHAP analysis.

Multi-Class Food Image Classification with CNNs 2025

- Developed a deep learning computer-vision model to classify ~5,000 images into 101 categories, achieving F1 scores as high as 0.91.

Mechanistic PK/PD Modeling of Caffeine Metabolism Using SBML 2025

- Implemented PK/PD modeling and SBML simulation workflow to study caffeine metabolism, analyzing dosage, physiological, and enzyme dependent dynamics.

TECHNICAL SKILLS

Programming: Python, MATLAB, R, C++

Scripting, Automation, Tools: Bash/Linux Shell, HPC Systems, Slurm, GitHub, Git, Docker

Modeling & Simulations: Process-based (Aspen Plus, SuperPro Designer), Multiphysics (fluids, fluid-structure, thermal), transport phenomena, numerical methods (finite differences), ODE/PDE solvers, predictive modeling, ML (classification, physics-based)

Modeling Applications*:* Aspen Plus, SuperPro Designer, COMSOL Multiphysics, Ansys Fluent, AutoDesk Inventor, AutoCAD, Solidworks

Data Analysis: time-series analysis, statistical inference, regression analysis, dimensionality reduction, signal processing, image processing, uncertainty quantification, Monte Carlo simulations