THIEN - TAM "SAUL GOODMAN" NGUYEN

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Education

North Dakota State University Fargo, ND, United States
Ph.D. in Civil Engineering *Jan 2022 – Current*

- Dissertation: *Exascle High-Performance Framework for Multi-Scale Simulations of Blood Flow.*
- Dissertation Summary: The interactions between circulatory cells and blood plasma play a crucial role in metabolism, immune system, and even cancer metastasis. In order for Computational Modeling to make a significant contribution to understanding these complex systems, a novel methodology is proposed that combines Continuum and Molecular Dynamics on a hybrid staggered/unstaggered structured grid. Our application is being built on the AMReX framework, which is well suited to massive parallel capacity, multi-GPU utilization, and adaptive mesh refinement.
- Supervisor: Dr. Trung Bao Le
- Current GPA 3.8/4.0

Vietnam National University - University of Science Hanoi, Vietnam
B.Sc. in Physics *Sep 2014 – Jan 2019*

- Thesis Title: *Investigate the Effects of Binding Cholesterol and PK11195 to Translocator 18kDa TSPO Protein Dimer Embedded in Bilipid Membrane.*
- Thesis Summary: The research employed GROMACS software to conduct Molecular Dynamics simulations on a HPC Cluster at the VNU Key Laboratory. The simulated system, comprising approximately 350,000 atoms, included the hTSPO protein within a lipid bilayer. In the initial segment, we examined the binding affinity between hTSPO and cholesterol, both in the presence and absence of PK11195. In the second part, we employed a metadynamic technique to investigate the monomerization degree of hTSPO dimer in relation to Cholesterol binding.
- Supervisors: Dr. Toan The Nguyen, Dr. Paolo Carloni
- GPA 3.4/4.0

Research Positions

Graduate Research Fellow May 2023 – Present
Lawrence Berkeley National Laboratory *Berkeley, CA, United States*

- Engineering a novel flow solver using the AMReX framework.
- Developing and maintaining the in-house AMRESSIF source code (provide upon request).

Graduate Research Assistant Jan 2022 – Present
North Dakota State University (NDSU) *Fargo, ND, United States*

- Conducting a research project on the effects of Hemodynamics on Brain Aneurysms using a combination of the CFD method and the Unsupervised Machine Learning (ML) technique. Results show that ML is capable of stratifying patient-specific aneurysms and robust in both high- and low-fidelity CFD data, which can improve current Rupture Risk Calculators significantly. See the source code (DMD) on the attached GitHub page.
- Developing a continuum Naver-Stokes solver based on an Adaptive Mesh Refinement framework. The solver is aimed to model cancer's metastasis in the bloodstream in high detail. See the source code (AMRESSIF) on the attached GitHub page.

Undergraduate Research Fellow Sep 2018 – Nov 2018
Forschungszentrum Jülich *Jülich, Germany*

- Worked with Computational Biomedicine Group (IAS-5/INM-9) under Prof. Paolo Carloni supervision.
- Contributed to the prediction of Human Translocator 18kDa TSPO Protein by performing Bioinformatics and Clustering technique. A sequence of amino acids was found conserved between mice and human at the Cholesterol binding site.

Undergraduate Research Assistant Dec 2015 – Jan 2019

Key Laboratory of Multi-scale Simulations of Complex Systems *Hanoi, Vietnam*

- Extensively used Molecular Dynamics method to investigate the effect of binding Cholesterol and PK11195 ligand to the Translocator 18kDa TSPO protein dimer.
- Contributed to System Administration tasks on the Keylab's HPC Cluster. Familiarized with the Linux operating system on the servers.

Undergraduate Lab Assistant Jan 2015 – Nov 2015

Center for Material Sciences, VNU University of Science *Hanoi, Vietnam*

- Synthesized $Fe_3O_4 - X_mO_n$ core-shell nanomaterial using a sol–gel process. Study led to a proposal that Zn and Mn were the best candidates for X to have bifunctional materials.

Honors and Awards

Physics of Fluids Editor's Pick | *AIP Publishing* | United States 2025
- Volume 37, Issue 1

Figure selected for Front Cover | *Coalition for Academic Scientific Computation* | United States 2024
- Safe, Smart, Secure. Research Computing to Inspire Innovation

Division of Fluid Dynamics Travel Award | *American Physical Society* | United States 2022

Innovation Award - Employee of the Year | *Viettel Aerospace Institute* | Vietnam 2020

Distinguished Graduate Award | *VNU University of Science* | Vietnam 2018

Publications

Journal Article

1. **TT Nguyen**, D Kasperski, P K Huynh, T Q Le, T B Le; "Modal analysis of blood flows in saccular aneurysms". Physics of Fluids 1 January 2025; 37 (1): 011906. doi.org/10.1063/5.0243383

2. H Pan, X Wang, IN Ahmed, **T Nguyen**, Y Zhang, TB Le, and L Zhibin. "Current Knowledge Gaps in Understanding Corrosion/Erosion Threats, Assessment Methodologies, and Mitigation Strategies for Pipelines". Pipelines 2023. doi.org/10.1061/9780784485033.025

Conference Proceeding

1. **T Nguyen**, L Akerkouch, T B Le. "Migration of leukocytes in shear flows: Insights from simulation" Proceedings of the 2024 Design of Medical Devices Conference. doi.org/10.1115/DMD2024-1076

2. **T Nguyen**, T B Le, P K Huynh, T Q Le. "Surrogate Models of Blood Flow Dynamics in Brain Aneurysms using Dynamic Mode Decomposition" Proceedings of the 2023 Design of Medical Devices Conference. doi.org/10.1115/DMD2023-8522

3. **T Nguyen**, SNV R R Dathi, A Nonaka, T B Le. "A hybrid staggered/non-staggered formulation for simulating incompressible flows with block-structured mesh refinement". Bulletin of the American Physical Society.

4. **T Nguyen**, T B Le, A Joshi, L Akerkouch. "Numerical simulation of White Blood Cell rolling on endothelial wall". Bulletin of the American Physical Society.

Presentation and Media

1. **Video** "V2694553: Hemodynamics of Brain Aneurysms: using Dynamic Mode Decomposition". 77th Annual Meeting of the American Physical Society's Division of Fluid Dynamics, UT, USA. doi.org/10.1103/APS.DFD.2024.GFM.V2694553
2. **Presentation** "Developing an AMReX-based Application for Exascale Simulation of Incompressible Flow". 77th Annual Meeting of the American Physical Society's Division of Fluid Dynamics, UT, USA.
3. **Presentation** "A hybrid staggered/non-staggered formulation for simulating incompressible flows with block-structured mesh refinement". 76th Annual Meeting of the American Physical Society's Division of Fluid Dynamics, Washington DC, USA.
4. **Presentation** "Numerical simulation of White Blood Cell rolling on endothelial wall". 75th Annual Meeting of the American Physical Society's Division of Fluid Dynamics, IN, USA.
5. **Presentation** "Dynamic Mode Decomposition of Inflow Jet in Intracranial Aneurysms". 19th National Congress of Theoretical and Applied Mechanics (USNC/TAM), TX, USA.

Teaching Experience

Teaching Assistant - CE309 Aug 2024 – Dec 2024
North Dakota State University *Fargo, ND, United States*

Teaching Assistant - CE309 Aug 2023 – Dec 2023
North Dakota State University *Fargo, ND, United States*

Professional Employment

Cyberinfrastructure (CI) Assistant Sep 2022 – May 2023
Established Program to Stimulate Competitive Research (ND-EPSCoR) *Fargo, ND, United States*

- Implemented Computational Fluid Dynamics (CFD) visualization tools on NVIDIA Omniverse.
- Enhanced user engagement and operational efficiency by deploying interactive applications for CCAST On-Demand website, improving project collaboration across disciplines.

Research-Facing Track Intern May – Aug 2022
Center for Computationally Assisted Science and Technology (CCAST) *Fargo, ND, United States*

- Supported software solutions to CCAST users. Installed and maintained requested packages.
- Trained research lab members in scaling tests to optimize resources on HPC cluster.

Structure Design and Simulation Engineer Sep 2019 – Dec 2021
Viettel Aerospace Institute *Hanoi, Vietnam*

- Investigated the aerodynamic performance of wings and fins on Unmanned Aerial Vehicles.
- Estimated the pressure loss of a check valve design using Simcenter Star-CCM+ software.
- Designed and tested a zigzag safety pin mechanism for aerial vehicles. The final design was manufactured showing operational reliability under variable G-force conditions.

Technical Support Engineer Feb 2019 – Aug 2019
Tek Experts *Hanoi, Vietnam*

- Provided high-level technical support for the Micro Focus suite to global customer's servers. Averaged 4 tickets per week with 4.9/5.0 satisfaction score.

Skills and Languages

Techniques: High-Performance Computing, Physics, Applied Mathematics, Machine Learning
Simulation Software: Virtual Flow Simulator (developer), AMReX (developer), GROMACS, ParaView, VMD, Ansys, Abaqus, COMSOL, Autodesk Inventor, Siemens NX, Blender
Programming Languages: MATLAB, C/C++, Python, Julia, MPI, Scripting, LaTeX
Human Languages: Vietnamese (Native), English (Full Professional Proficiency)

Service and Outreach

Bison Ambassadors Mar 2022 – Dec 2023
NDSU Foundation *Fargo, ND, United States*

References

Trung Bao Le North Dakota State University
trung.le@ndsu.edu *Fargo, ND, United States*

- Dr. Trung Le is Assistant Professor of Civil, Construction and Environmental Engineering Department at the North Dakota State University

Andy Nonaka Lawrence Berkeley National Laboratory
ajnonaka@lbl.gov *Berkeley, CA, United States*

- Dr. Andy Nonaka is Staff Scientist and Group Lead of the Center for Computational Sciences and Engineering at the Lawrence Berkeley National Laboratory

Khang Hoang North Dakota State University
khang.hoang@ndsu.edu *Fargo, ND, United States*

- Dr. Khang Hoang is Interim Executive Director of the Center for Computationally Assisted Science and Technology (CCAST) at the North Dakota State University.

Toan The Nguyen VNU University of Science
toannt@vnu.edu.vn, toannt@hus.edu.vn *Hanoi, Vietnam*

- Dr. Toan Nguyen is Professor and Head of Physics Department at the VNU University of Science. He is also the Director of VNU Key Laboratory for Multiscale Simulation of Complex Systems.