Van-Thanh Nguyen, Ph.D.

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About Me

- I am a doctor in Applied Mathematics. My research interests include Numerical methods for PDEs, Numerical simulations, Parallel computing, Krylov subspace methods, Multiscale modeling, and Machine learning.

Education

30 hours, Feb 2024 — Training at Materials Center MINES Paris - Évry, France.

16 hours, Feb 2024 — Training at Institute for Development and Resources in Intensive Scientific Computing (DRIS) - Orsay, France.

25 hours, Jan - April 2024 — Training Introduction of Deep Learning (FIDLE) - remote and live, France.

Nov 2017 – April 2022 — **Ph.D. in Applied Mathematics, Inria Paris & Sorbonne University**, Paris, France.
Thesis title: *Acceleration techniques of the Parareal algorithm for solving some differential equations*.

Sept 2016 – June 2017 — **M.Sc. in Mathematics, University of Orléans**, Orléans, France.
Thesis title: *A staggered scheme for the linear wave equation with Coriolis source term on triangular meshes*.

Sept 2012 – June 2016 — **B.Sc. in Mathematics, University of Science**, Hochiminh city, Vietnam.
Thesis title: *A finite volume scheme for Stokes equation*.

Research & Professional Experience

Jan 2025 – July 2025 — **Biomécanique team, Université Paris-Est Créteil Val-de-Marne, MSME**, Créteil, France.
Working on articles to get them accepted for publications in journals.

Dec 2023 – Dec 2024 — **Postdoctoral researcher, Biomécanique team, Université Paris-Est Créteil Val-de-Marne, MSME**, Créteil, France.
Project title: *Hybrid aerogels for sustainable construction: a new modelling approach to characterize effective properties*.
Supervisors: Salah Naili & Vu-Hieu Nguyen.
Description: We study the multi-physical behavior of aerogels in development and to better understand the microstructural effects on their effective mechanical and thermal properties. We developed deep neural networks, specifically multilayer perceptron models, based on data generated from the multiscale homogenization models to predict the effective properties of composite materials.
Skills: Python · Deep Learning · TensorFlow · Keras · Scikit-Learn · MATLAB · Numerical Simulation · Multiscale Modeling · COMSOL Multiphysics · Finite Element Method · Rhino 3D · ImageJ

Research & Professional Experience (continued)

June 2022 – Nov 2023 — **ALPINES team, Inria Paris**, Paris, France.
Working on articles to get them accepted for publications in journals, participating in conferences.

Nov 2017 – April 2022 — **Ph.D. ALPINES team , Inria Paris**, Paris, France.
Thesis title: *Acceleration techniques of the Parareal algorithm for solving some differential equations*.
Advisor: Laura Grigori.
Description: This PhD thesis focuses on some techniques to accelerate Parareal's convergence in solving some differential equations. Specifically, we study:

- An interpretation of parareal as a two-level additive Schwarz in time preconditioner and, based on that, a variant that accelerates convergence by using a GMRES-type procedure.
- The acceleration of GMRES using a deflation technique of the smallest singular values of the problem.
- The idea of using a reduced model which is based on the two-scale asymptotic expansion for the coarse propagator in Parareal framework.

Skills: Numerical Analysis · Computer Science · High Performance Computing (HPC) · Applied Mathematics · Python · MATLAB · FreeFem++ · C/C++

April 2017 – June 2017 — **Internship, LAGA , Université Sorbonne Paris Nord**, Villetaneuse, France.
Thesis title: *A staggered scheme for the linear wave equation with Coriolis source term on triangular meshes*.
Advisors: Pascal Omnes, Emmanuel Audusse & Minh-Hieu Do.
Description: This thesis studies a finite volume method for a well-balanced scheme using staggered grid for the first order linear wave equation with Coriolis source term.
Skills: Numerical Analysis · Finite Volume Method · MATLAB

Pedagogical Experience

Sept 2015 – June 2016 — **Assistant Lecturer**, University of Science, Hochiminh city, Vietnam.
Teaching MATLAB for under graduated students.

Sept 2013 – June 2017 — **Tutor**.
Teaching Mathematics, Physics and Chemistry for primary, secondary school and under graduated students.

Research Publications

Journal Articles

1. V.-T. Nguyen, V.-H. Nguyen, and S. Naili, "Deep learning-based multiscale prediction of composite aerogels' effective thermal conductivity," *International Journal of Mechanical Sciences*, p. 110 617, 2025, ISSN: 0020-7403. DOI: https://doi.org/10.1016/j.ijmecsci.2025.110617.
2. M.-H. Do, V.-T. Nguyen, and P. Omnes, "Analysis of dissipation operators that damp spurious modes while maintaining discrete approximate geostrophic equilibriums for the b-grid staggered scheme on triangular meshes," *Journal of Computational Physics*, vol. 489, p. 112 261, 2023, ISSN: 0021-9991. DOI: https://doi.org/10.1016/j.jcp.2023.112261.

3. V.-T. Nguyen and L. Grigori, "Interpretation of parareal as a two-level additive schwarz in time preconditioner and its acceleration with gmres," *Numerical Algorithms*, vol. 94, p. 029 072, 2023, ISSN: 1572-9265. DOI: 10.1007/s11075-022-01492-8.

4. L. Grigori, S. A. Hirstoaga, V.-T. Nguyen, and J. Salomon, "Reduced model-based parareal simulations of oscillatory singularly perturbed ordinary differential equations," *Journal of Computational Physics*, vol. 436, p. 110 282, 2021, ISSN: 0021-9991. DOI: https://doi.org/10.1016/j.jcp.2021.110282.

Doctoral Thesis

1. V.-T. Nguyen, *Acceleration techniques of the Parareal algorithm for solving some differential equations*. Paris, France: Sorbonne Université, 2022. URL: https://theses.hal.science/tel-03950073.

Conferences & Seminars

13-17th June 2022	CANUM 2022, *Parareal Simulations of Oscillatory Singularly Perturbed Ordinary Differential Equations*, V.-T. Nguyen, L. Grigori, S. Hirstoaga and J. Salomon - Évian-les-Bains, France.
1-5th March 2021	SIAM CSE21, *Parareal Simulations of Oscillatory Singularly Perturbed Ordinary Differential Equations*, V.-T. Nguyen, L. Grigori, S. Hirstoaga and J. Salomon - Fort Worth, Texas, U.S - virtual conference.
7th June 2019	CINE-PARA day, *Another interpretation of Parareal as a two-level domain decomposition preconditioner*, V.-T. Nguyen and L. Grigori - Université Paris-Dauphine, France.
20-24th May 2019	Parallel in time workshop PINT 2019, *Another interpretation of Parareal as a two-level domain decomposition preconditioner*, V.-T. Nguyen and L. Grigori - Bielefield, Germany.

Skills

Languages	French (Intermediate), English (Professional Efficiency) , Vietnamese (Mother tongue).
Programming	C/C++, Python, Julia, R, FreeFem++, MATLAB, LaTeX, COMSOL Multiphysics, Rhinoceros 3D, ImageJ.
Academic skills	Mathematical modeling, Numerical simulation, Parallel computing, Multiscale modeling, Machine learning.
Communication	Academic writing, presentations, scientific articles, team communication, open-minded and collaborative.
Personal interests	Reading, cooking, traveling, chess, flute.

Fundings

2021	SIAM travel award, CSE21.
2016	Scholarship of MITSUBISHI Foundation.
2015	Scholarship of Vietnam Institute for Advanced Study in Mathematics (VIASM).