NGHIA NGUYEN-TRUNG

Ph.D. Candidate, Department of Statistics and Operations Research, University of North Carolina at Chapel Hill

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EDUCATION

University of North Carolina at Chapel Hill · *Chapel Hill, NC, USA*

- **Ph.D. in Statistics and Operations Research** *Aug 2022 – May 2027 (Expected)*
  - Dissertation: *Advanced Fast First-Order Methods for Generalized Equations: Randomized, Inexact, and Preconditioned Techniques.*
  - Committee: Gabor Pataki, PhD (Chair), Sara Shashaani, PhD, Ion Necoara, PhD, Guanting Chen, PhD, Michael O'Neill, PhD, Quoc Tran-Dinh, PhD (Advisor).
- **M.S. in Statistics, Analytics and Data Science** *Aug 2022 – Dec 2025*

Hanoi University of Science and Technology (HUST) · *Hanoi, Vietnam*

- **Engineer in Mathematics and Informatics (5-year program)** *Aug 2017 – May 2022*
  - **GPA:** 3.70/4.00 – **Honors:** Valedictorian, School of Applied Mathematics and Informatics, Class of 2022.
  - **Distinction:** Thesis-based Degree with Highest Honors.

RESEARCH INTERESTS

- **Problems:** Operator Inclusions and Equations; Fixed-Point and Variational Inequality Problems; Saddle-Point/Minimax Problems; Constrained and Unconstrained Optimization.
- **Methods:** First-Order and Operator-Splitting Methods; Stochastic and Variance-Reduced Algorithms; Randomized Coordinate Methods; Distributed and Decentralized Algorithms.
- **Applications:** Decision-Making under Uncertainty; Machine Learning and Reinforcement Learning.

PUBLICATIONS AND PREPRINTS

Ph.D. Research

First-Author Preprints

1. **Nghia Nguyen-Trung**, Ion Necoara, Quoc Tran-Dinh. *Distributed Fast Fixed-Point Algorithms for Composite Monotone Inclusions over Networks*. arXiv:2609.14953, 2026.
2. **Nghia Nguyen-Trung**, Quoc Tran-Dinh. *A Class of Accelerated Fixed-Point-Based Methods with Delayed Inexact Oracles and Its Applications*. arXiv:2512.13547, 2025.
3. **Nghia Nguyen-Trung**, Ion Necoara, Quoc Tran-Dinh. *Optimistic Gradient Algorithms with Randomized Coordinate and Variance Reduction Strategies for Composite Inclusions*. Preprint, 2026. DOI: 10.13140/RG.2.2.26234.86726.

Journal Articles and Manuscripts under Revision

4. Quoc Tran-Dinh, **Nghia Nguyen-Trung**. *Revisiting Extragradient-Type Methods: Part 1–Generalizations and Sublinear Convergence Rates*. Computational Optimization and Applications, **94**, 141–210 (2026). DOI: 10.1007/s10589-025-00727-3.
5. Quoc Tran-Dinh, **Nghia Nguyen-Trung**. *Revisiting Extragradient-Type Methods: Part 2–Generalization and Unified Convergence Analysis of Anchored Extragradient-Type Variants*. Computational Optimization and Applications, to appear, 2026. DOI: 10.1007/s10589-026-00851-8. arXiv version: arXiv:2501.04585.
6. Quoc Tran-Dinh, **Nghia Nguyen-Trung**. *Unbiased and Biased Variance-Reduced Forward-Reflected-Backward Splitting Methods for Stochastic Composite Inclusions*. arXiv:2603.15576, 2026. Under revision at Computational Optimization and Applications.
7. Quoc Tran-Dinh, **Nghia Nguyen-Trung**. *New Accelerated Past-Extragradient Methods with Variance Reduction for Generalized Equations*. arXiv:2508.16791, 2025. Under revision at Mathematics of Operations Research.

Other Peer-Reviewed Journal Articles

8. Thuy Nguyen Thi Thu, **Nghia Nguyen-Trung**. *A Strongly Convergent Theorem for a Class of Quasimonotone Bilevel Split Variational Inequality Problems*. Vietnam Journal of Mathematics, 2026. DOI: 10.1007/s10013-026-00816-8.
9. Thuy Nguyen Thi Thu, **Nghia Nguyen Trung**. *An inertial-type algorithm for a class of bilevel variational inequalities with the split variational inequality problem constraints*. Optimization, 74(3), 589–613, 2025. DOI: 10.1080/02331934.2023.2262493.
10. Thuy Nguyen Thi Thu, **Nghia Nguyen Trung**. *Some novel inertial ball-relaxed CQ algorithms for solving the split feasibility problem with multiple output sets*. Journal of Applied Analysis and Computation, 14(3), 1485–1507, 2024. DOI: 10.11948/20230259.

11. Thuy Nguyen Thi Thu, **Nghia Nguyen Trung**. *A hybrid projection method for solving the multiple-sets split feasibility problem*. Computational and Applied Mathematics, 42, Art. 292, 2023. DOI: 10.1007/s40314-023-02416-5.
12. Thuy Nguyen Thi Thu, **Nghia Nguyen Trung**. *A new iterative method for solving the multiple-set split variational inequality problem in Hilbert spaces*. Optimization, 72(6), 1549–1575, 2023. DOI: 10.1080/02331934.2022.2031193.
13. Thuy Nguyen Thi Thu, **Nghia Nguyen Trung**. *A parallel algorithm for generalized multiple-set split feasibility with application to optimal control problems*. Taiwanese Journal of Mathematics, 26(5), 1069–1092, 2022. DOI: 10.11650/tjm/220502.

RESEARCH EXPERIENCE

University of North Carolina at Chapel Hill · *Graduate Research Assistant* *Sep 2023 – Present*

- Developed unified frameworks for deterministic extragradient-type and operator-splitting methods, integrating Halpern anchoring and Nesterov acceleration for solving operator inclusions and equations. Established sublinear convergence rates for residual norms under monotonicity, co-hypomonotonicity, or a ρ-weak-Minty solution condition.
- Developed stochastic algorithms for structured nonmonotone operator inclusions and large-scale saddle-point problems using unbiased and biased variance-reduced estimators. Established sublinear rates up to $\mathcal{O}(1/k^2)$ and $o(1/k^2)$, with applications to decision-making under uncertainty and robust learning.
- Developed accelerated fixed-point frameworks with delayed inexact oracles. Established $\mathcal{O}(1/k^2)$ and $o(1/k^2)$ convergence rates and characterized their dependence on the staleness budget. Instantiated the framework for different distributed and parallel computing architectures.
- Developed accelerated decentralized fixed-point methods for composite monotone inclusions over networks, using preconditioning techniques that enable peer-to-peer communication without a central server. One variant lets agents use their own network-independent step sizes. Established $\mathcal{O}(1/k^2)$ and $o(1/k^2)$ rates for the consensus error and for the squared residual of the original problem at the network-average iterate, rather than for a lifted reformulation.
- Developed randomized block-coordinate optimistic gradient methods with variance reduction for possibly nonmonotone composite inclusions. Designed importance-sampling rules whose complexity bounds exploit heterogeneity across blocks.

Institute of Mathematics, Vietnam Academy of Science and Technology · *Visiting Researcher* *Feb 2022 – Jul 2022*

- Investigated projection-based numerical methods for generalized split variational inequality problems. Applied theoretical bounds to solve constrained optimal control problems.

Institute of Mathematics, Vietnam Academy of Science and Technology · *Research Intern* *Apr 2021 – Jul 2021*

- Conducted research on semidefinite programming with applications in graph theory and combinatorics.

Hanoi University of Science and Technology · *Undergraduate Research Assistant* *Aug 2020 – Jul 2022*

- Developed self-adaptive and inertial algorithms for split variational inequalities and split feasibility problems, using dynamic step sizes that avoid global operator norms, Lipschitz constants, and line searches.
- Extended splitting methods to quasimonotone bilevel variational inequalities and level-set constrained optimization, establishing strong convergence in Hilbert spaces.
- Developed parallel algorithms for generalized split feasibility problems, with applications to discrete optimal control and high-dimensional sparse recovery.

TEACHING & MENTORING EXPERIENCE

Graduate Teaching Fellow (Instructor of Record) · *UNC–Chapel Hill* *2024 – 2026*

STOR 113: Decision Models for Business and Economics; *STOR 155: Introduction to Data Models and Inference*

- Designed and delivered all lectures, course materials, homework, and examinations as sole instructor.
- Managed all grading, office hours, and individual student support across four summer sessions.
- Coordinated with fellow instructors and faculty to keep course delivery consistent across sections.

Graduate Teaching Assistant · *UNC–Chapel Hill* *2022 – Present*

STOR 612: Foundations of Optimization (Graduate course); *STOR 512: Optimization for Machine Learning and Neural Networks*; *STOR 415: Introduction to Optimization*; *STOR 215: Foundations of Decision Sciences*; *STOR 155: Introduction to Data Models and Inference*; *STOR 120: Foundations of Statistics and Data Science*; *STOR 113: Decision Models for Business and Economics*

- Led recitations and office hours, assisted students with theoretical and computational course material, and graded assignments and examinations for graduate and undergraduate courses in optimization, statistics, and data science.

Undergraduate Research Mentor · *UNC–Chapel Hill* *Sep 2026 – Present*

- Mentoring two undergraduate students on a joint research project in robust bond portfolio optimization, including problem formulation, literature review, computational implementation, and regular research meetings.

TALKS AND PRESENTATIONS

1. "A Class of Accelerated Fixed-Point-Based Methods with Delayed Inexact Oracles and Its Applications", *SIAM Conference on Mathematics of Data Science (MDS26)* (Poster Presentation, Scheduled), Salt Lake City, UT, USA, Nov 16–20, 2026.
2. "Optimistic Gradient Algorithms with Randomized Coordinate and Variance Reduction Strategies for Composite Inclusions", *INFORMS Annual Meeting* (Contributed Talk, Scheduled), San Francisco, CA, USA, Nov 1–4, 2026.
3. "A Class of Accelerated Fixed-Point-Based Methods with Delayed Inexact Oracles and Its Applications", *STOR Graduate Student Showcase, University Research Week* (Poster Presentation), UNC–Chapel Hill, Oct 19, 2026.
4. "Optimistic Gradient Algorithms with Randomized Coordinate and Variance Reduction Strategies for Generalized Equations" (Preliminary results), *Graduate Student Seminar*, STOR Department, UNC–Chapel Hill, Oct 31, 2025.
5. "New Hybrid Projection Method and Shrinking Projection Method for Solving Multiple-Set Split Variational Inequalities", *20th Workshop on Optimization and Scientific Computing*, Hanoi, Vietnam, Apr 21–23, 2022.
6. "A New Hybrid Projection–Proximal Point Algorithm for Split Variational Inequality Problems", *VIASM International Conference on New Trends in Numerical Optimization and Applications*, Hanoi, Vietnam, Dec 26–27, 2021.
7. "A New Self-Adaptive Algorithm for Solving Multiple-Set Split Variational Inequalities", *Conference on Contemporary Issues in Mathematics and Applications*, Hanoi, Vietnam, Oct 30–31, 2021.
8. "Semidefinite Programming and Applications in Combinatorial Optimization", *Institute of Mathematics, VAST*, Hanoi, Vietnam, Jul 2021.
9. "Strong Convergence Analysis for Split Feasibility Problems in Hilbert Spaces", *19th Workshop on Optimization and Scientific Computing*, Hanoi, Vietnam, Apr 22–24, 2021.

HONORS, AWARDS, AND GRANTS

Silver Reviewer Award · *ICML* *2026*
- Awarded to top-performing reviewers at ICML 2026 based on Area Chair evaluation.

Excellence in Teaching Assistance and Instruction Award · *UNC–Chapel Hill* *2024, 2025*
- Recognized by the department for exceptional undergraduate teaching and leadership as Instructor of Record.

Valedictorian, School of Applied Mathematics and Informatics · *HUST* *2022*
- Ranked 1st overall among all graduating students in the School of Applied Mathematics and Informatics.

Scientific Research Contest – Second Prize · *HUST* *2021*
- Recognized for original algorithmic development in split feasibility problems.

National Mathematics Development Program Fellowship · *VIASM* *2020 – 2021*
- Highly competitive national scholarship awarded by the Vietnam Institute for Advanced Study in Mathematics.

HUST Academic Excellence Scholarship (Type A) · *HUST* *2018 – 2022*
- Maintained top 1% merit ranking across all undergraduate semesters.

Travel Support
- **SIAM Travel Award** · *SIAM* 2026
- **STOR Raj Chandra Bose Travel Award** · *UNC-Chapel Hill* 2026
- **UNC-Chapel Hill Graduate Student Transportation Grant** · *UNC-Chapel Hill* 2026

PROFESSIONAL SERVICE

Conference Session Chair:
- *INFORMS Annual Meeting 2026*: First-Order, Proximal, and Interior-Point Algorithms (Nonlinear Optimization) (Scheduled).

Peer Reviewer:
- **Journals:** *Journal of Optimization Theory and Applications*; *EURO Journal on Computational Optimization*; *Optimization and Engineering*; *Journal of Computational and Applied Mathematics*.
- **Conferences:** International Conference on Machine Learning (ICML); Neural Information Processing Systems (NeurIPS).

TECHNICAL SKILLS

Computing: Python (PyTorch, NumPy, SciPy, Pandas), MATLAB, R.
Optimization Software: Gurobi, CVXPY, CVXOPT, AMPL, GAMS.

PROFESSIONAL MEMBERSHIPS

- Society for Industrial and Applied Mathematics (SIAM).
- Institute for Operations Research and the Management Sciences (INFORMS).