






VO THANH PHAT B.S., M.A., Ph.D.




✉ thanh.vo.1@und.edu  Google Scholar

 <http://sites.google.com/view/vtphat204>

Employment

- Aug 2024 - current  **(Tenure-Track) Assistant Professor**, Department of Mathematics and Statistics, University of North Dakota, North Dakota, USA.
- Sep 2019 - Aug 2024  **Rumble Research Fellow and Graduate Assistant**, Department of Mathematics, Wayne State University, Michigan, USA.
- Oct 2018 - Sep 2019  **Lecturer**, Department of Mathematics and Informatics, Ho Chi Minh City University of Education, Ho Chi Minh City, Vietnam.

Education

- Sep 2019 - Aug 2024  **Doctor of Philosophy in Applied Mathematics** at Wayne State University, Michigan, USA.
- Sep 2019 - May 2021  **Master of Art in Applied Mathematics** at Wayne State University, Michigan, USA.
- Sep 2014 - Jun 2018  **Bachelor of Science in Mathematics Teacher Education** at Ho Chi Minh City University of Education, Ho Chi Minh, Vietnam.

Research Interest

My main research areas are nonsmooth optimization and variational analysis. I am interested in both theoretical and numerical aspects with practical applications. To provide further clarity, my research projects can be categorized into three distinct parts:

- 1) **Qualitative Research:** optimality conditions for nonsmooth optimization problems, properties of generalized convexity and monotonicity, stability, regularity, etc.
- 2) **Quantitative Research:** generalized first- and second-order numerical methods for solving nonsmooth nonconvex optimization problems including unconstrained optimization problems, constrained optimization problems, composite optimization problems, difference programming, bilevel optimization, stochastic optimization, etc.
- 3) **Applications:** applying results in qualitative and quantitative studies for real practical optimization models in other fields such as machine learning, economics, neural networks, wireless systems, etc.

Research Publications

Peer-Reviewed Publications:

- 1) P. D. Khanh, B. S. Mordukhovich, V. T. Phat, L. D. Viet, *Characterizations of Strong Variational Convexity and Tilt Stability via Quadratic Bundles*, to appear in **Journal of Convex Analysis**, arXiv:2501.04629.
- 2) P. D. Khanh, B. S. Mordukhovich, V. T. Phat, L. D. Viet, *Generalized Twice Differentiability and Quadratic Bundles in Second-Order Variational Analysis*, to appear in **Set-Valued and Variational Analysis**, arXiv:2501.02067.
- 3) P. D. Khanh, V. V. H. Khoa, V. T. Phat, L. D. Viet, *Lipschitz Modulus of Convex Functions via Functions Values*, **Optimization Letters**, <https://doi.org/10.1007/s11590-025-02218-0> (2025).

- 4) P. D. Khanh, V. V. H. Khoa, B. S. Mordukhovich, V. T. Phat, *Local maximal monotonicity in variational analysis and optimization*, **Mathematics of Operations Research**, <https://doi.org/10.1287/moor.2023.0270> (2025).
- 5) P. D. Khanh, V. V. H. Khoa, B. S. Mordukhovich, V. T. Phat, *Local Minimizers of Nonconvex Functions in Banach Spaces via Moreau Envelopes*, **Vietnam Journal of Mathematics**, <https://doi.org/10.1007/s10013-025-00739-w>.
- 6) P. D. Khanh, V. V. H. Khoa, B. S. Mordukhovich, V. T. Phat, *Second-Order Subdifferential Optimality Conditions in Nonsmooth Optimization*, **SIAM Journal on Optimization**, 35(2), 678–711 (2025).
- 7) P. D. Khanh, B. S. Mordukhovich, V. T. Phat, D. B. Tran, *Inexact proximal method for weakly convex functions*, **Journal of Global Optimization**, 91:611–646 (2025).
- 8) P. D. Khanh, V. V. H. Khoa, B. S. Mordukhovich, V. T. Phat, *Variational and strong variational convexity in infinite-dimensional variational analysis*, **SIAM Journal on Optimization**, 34 (3), 2756–2787 (2024).
- 9) P. D. Khanh, B. S. Mordukhovich, V. T. Phat, D. B. Tran, *Globally convergent coderivative-based generalized Newton methods in nonsmooth optimization*, **Mathematical Programming**, 205 (1), 373–429 (2024).
- 10) P. D. Khanh, B. S. Mordukhovich, V. T. Phat, *Variational convexity of functions and variational sufficiency in optimization*, **SIAM Journal on Optimization**, 33 (2), 1121–1158 (2023).
- 11) P. D. Khanh, B. S. Mordukhovich, V. T. Phat, D. B. Tran, *Generalized damped Newton algorithms in nonsmooth optimization via second-order subdifferentials*, **Journal of Global Optimization**, 86 (1), 93–122 (2023).
- 12) P. D. Khanh, B. S. Mordukhovich, V. T. Phat, *A generalized Newton method for subgradient systems*, **Mathematics of Operations Research**, 48 (4), 1811–1845 (2023).
- 13) P. D. Khanh, V. T. Phat, *Second-order characterizations of quasiconvexity and pseudoconvexity for differentiable functions with Lipschitzian derivatives*. **Optimization Letters**. 14, 2413–2427 (2020).
- 14) P. D. Khanh, V. T. Phat, *Second-order characterizations of C^1 -smooth robustly quasiconvex functions*. **Operations Research Letters**. 46, 568–572 (2018).

Books and Chapters:

- 1) P. D. Khanh, V. V. H. Khoa, B. S. Mordukhovich, V. T. Phat, *Variational convexity of functions in Banach spaces*, (J. M. Amigo et al., eds), **Springer Proceedings in Mathematics and Statistics** (M.J. Canovas et al., eds), 424, pp. 237–260, link, Springer (2023).

Submitted Manuscripts:

- 1) P. D. Khanh, B. S. Mordukhovich, V. T. Phat, *Coderivative-Based Newton Methods in Structured Nonconvex and Nonsmooth Optimization*, submitted to **Mathematical Programming**, arXiv:2311.18586.

Skills

Languages	📖 Vietnamese (Native), English (Professional Proficiency)
Coding	📖 Matlab, Python, \LaTeX
Teaching Software	📖 Geogebra, Google Meet, Teams, Zoom
Educational Platforms	📖 Blackboard, Canvas, Cengage Webassign, Hawkes Learning, Knewton, MyLab & Mastering, Webwork
Others	📖 Octave, Wolfram Alpha, Overleaf

Professional Services

Conference Organization

I am an organizer of the following conferences:

- The 2025 Midwest Optimization Meeting, University of North Dakota, Grand Forks, North Dakota, USA (October 31, 2025 - November 01, 2025) (co-organized with Ryan Zerr, Bryce Christopherson, Adewale Lukman)

Journal Reviewer

I served as a referee for journals including:

- Applied Mathematics and Optimization
- Journal of Optimization Theory and Applications
- Journal of Global Optimization
- Mathematics of Operations Research
- Mathematical Programming
- Optimization
- Set-Valued and Variational Analysis
- SIAM Journal on Optimization

Here is my ORCID ID profile: <https://orcid.org/0000-0003-1211-8025>.

Professional Membership

I have been a member of:

- American Mathematical Society
- International Working Group on Generalized Convexity
- Society for Industrial and Applied Mathematics (SIAM)

University Services

I served in the following committees at the University of North Dakota:


- Applied Mathematics Curriculum/Course Committee (2025 - 2026)
- Graduate Admissions Committee (2025 - 2026)

Teaching

University of North Dakota, Grand Forks, North Dakota, USA

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|-------------|---|--|
| Spring 2026 | 📖 | MATH 207 , <i>Introduction to Linear Algebra</i> |
| Fall 2025 | 📖 | MATH 516 , <i>Topics in Applied Mathematics</i> |
| | 📖 | MATH 266 , <i>Elementary Differential Equations</i> |
| Summer 2025 | 📖 | MATH 266 , <i>Elementary Differential Equations</i> |
| | 📖 | MATH 207 , <i>Introduction to Linear Algebra</i> |


Teaching (continued)


Spring 2025  **MATH 515**, *Topics in Applied Mathematics*

Fall 2024  **MATH 165**, *Calculus I*

Wayne State University, Detroit, Michigan, USA

Spring/Summer 2024  **MAT 2020**, *Calculus II*


Winter 2023  **MAT 1800**, *Elementary Functions*


Fall 2022  **MAT 0993**, *Beginning Algebra*


Winter 2022  **STA 1020**, *Elementary Statistics*

Fall 2021  **MAT 2010**, *Calculus I*

Ho Chi Minh City University of Education, Ho Chi Minh, Vietnam

Summer 2023  **MATH 1408**, *Theory of Linear Optimization*

Summer 2022  **MATH 1408**, *Theory of Linear Optimization*

Spring 2019  **MAT 1437**, *Theory of Nonlinear Optimization*

Research and Travel Funding

Principal Investigator

I am a PI/co-PI of the following grants:

- US National Science Foundation, Grant No. DMS-2526465, “Conference: 2025 Midwest Optimization Meeting”; October 01, 2025 - September 30, 2026 (Co-Principal Investigator)


Participant

The following grants provided support for my research and travel:

- US National Science Foundation, Grant No. DMS-2534607, “Conference: SIAM Great Lakes 2025 Meeting”.
- US National Science Foundation, Grant No. DMS-2204519, “Variational Analysis: Theory, Algorithms, and Applications”.
- US National Science Foundation, Grant No. DMS-2323340, “Conference: 2023 Midwest Optimization Meeting”.
- US National Science Foundation, Grant No. DMS-1808978, “Advanced Research on Second-Order Variational Analysis with New Applications to Optimization, Control, and Practical Modeling”.
- US National Science Foundation, Grant No. DMS-1512846, “Second-Order Variational Analysis and Its Applications”.
- US Air Force Office of Scientific Research, Grant No. 15RTO462.

Miscellaneous Experience

Awards and Achievements

2025  GLSIAM 2025 Travel Award (funded by the US National Science Foundation)

Miscellaneous Experience (continued)

- 2023
 - Thomas C. Rumble Fellowship: only two graduate students in the department receives this award per academic year (tuition fee, health insurance and stipend are covered).
 - Graduate Student Professional Travel Awards for SIAM Conference on Optimization (funded by Graduate School, Wayne State University)
 - 25th Midwest Optimization Meeting Travel Award (funded by the US National Science Foundation)
 - The William Martin Borgman Endowed Scholarship for Mathematics, Department of Mathematics, Wayne State University.
- 2022
 - Travel Award for the 9th Heidelberg Laureate Forum, Heidelberg, Germany.
 - Graduate Student Professional Travel Awards for the 24th Midwest Optimization Meeting (funded by Graduate School, Wayne State University).
 - The M.F. Janowitz Endowed Mathematics Scholarship, Department of Mathematics, Wayne State University.
 - The William Martin Borgman Endowed Scholarship for Mathematics, Department of Mathematics, Wayne State University.
 - Outstanding Graduate Student at Wayne State University: only one graduate student in each department receives this award per academic year.
- 2021
 - The M.F. Janowitz Endowed Mathematics Scholarship, Department of Mathematics, Wayne State University.
- 2020
 - The M.F. Janowitz Endowed Mathematics Scholarship, Department of Mathematics, Wayne State University.

Conferences

- Oct 31 - Nov 01, 2025
 - The 27th Midwest Optimization Meeting, University of North Dakota, Grand Forks, North Dakota, USA.
- Sep 27 - 28, 2025
 - 2025 SIAM Great Lakes Section Annual Meeting, Illinois Institute of Technology, Chicago, Illinois , USA.
- Mar 10 - 15, 2025
 - (Invited Talk) The School and Workshop “Variational Analysis and Optimization 2025” (ICOVAOpt-2025), Vietnam Institute for Advanced Study in Mathematics (VIASM), Hanoi, Vietnam.
- Nov 8 - 9, 2024
 - The 26th Midwest Optimization Meeting, Workshop on Large Scale Optimization and Applications, University of Waterloo, Ontario, Canada.
- Oct 12, 2024
 - 2024 SIAM Great Lakes Section Annual Meeting, Purdue University Northwest, Hammond, Indiana, USA.
- Feb 28, 2024
 - The 14th Annual Graduate Research Symposium, Wayne State University, Detroit, Michigan, USA.
- Oct 21 - 22, 2023
 - The 25th Midwest Optimization Meeting, University of Michigan, Ann Arbor, Michigan, USA.
- Aug 7 - 12, 2023
 - The 10th Vietnam Mathematical Congress 2023 (VMC-2023), The University of DaNang - University of Science and Education, Da Nang, Vietnam.
- Jul 12 - 15, 2023
 - International Conference on Optimization and Variational Analysis with Applications 2023 (ICOVAA-2023), Vietnam Institute for Advanced Study in Mathematics (VIASM), Hanoi, Vietnam.
- May 31 - Jun 03, 2023
 - SIAM Conference on Optimization (OP23), The Sheraton Grand Seattle, Seattle, Washington, USA.

Miscellaneous Experience (continued)

- Oct 28 - 29, 2022  The 24th Midwest Optimization Meeting and Workshop on Large Scale Optimization and Applications, University of Waterloo, Ontario, Canada.
- Sep 24, 2022  2022 SIAM Great Lakes Section Annual Meeting, Wayne State University, Detroit, Michigan, USA.
- Sep 18–23, 2022  9th Heidelberg Laureate Forum 2022, Heidelberg, Germany.
- Sep 13-16, 2022  XIII International Symposium on Generalized Convexity and Monotonicity (GCM XIII), Online.
- Mar 8 - 10, 2022  The 12th Annual Graduate Research Symposium, Wayne State University, Detroit, Michigan, USA.
- Oct 29 - 30, 2021  The 23rd Midwest Optimization Meeting, Grand Valley State University, Allendale, Michigan, USA.
- Mar 1 - 5, 2021  The 11th Annual Graduate Research Symposium, Wayne State University, Detroit, Michigan, USA.
- Octo 16 - 17, 2020  The 22nd Midwest Optimization Meeting, Online.
- Oct 18, 2019  The 21st Midwest Optimization Meeting, Northern Illinois University, DeKalb, Illinois, USA.
- Dec 13-15, 2018  International Workshop: Variational Analysis and Related Topics (dedicated to Professor Boris Mordukhovich's 70th birthday), Hanoi Pedagogical University 2, Xuan Hoa, Vinh Phuc, Vietnam.