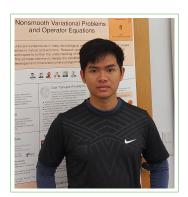Mohrenstraße 39
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ResearchGate/Hong Quan Ba Nguyen

Hong Nguyen

Curriculum Vitae

"The essence of mathematics lies in its freedom." - Georg Cantor
"It is true that a mathematician who is not somewhat of a poet, will never be a perfect mathematician." - Karl Weierstrass

Education

2020–2021 **PhD student enrolled in Humboldt-Universität zu Berlin**, *Weierstrass Institute for Applied Analysis & Stochastics* (WIAS), Berlin, Germany.
In the Research Group Nonsmooth Variational Problems & Operator Equations, Head: Prof. Michael Hintermüller, within the European Innovative Training Network Reduced Order Modelling, Simulation & Optimization of Coupled Systems (ROMSOC), in the Project 11 Optimal Shape Design of Air Ducts in Combustion Engines.

2018–2019 **Master de Sciences, Technologie, Santé, Mathematiques et Applications**, *Université de Rennes 1*, Rennes, France, *assez bien*.
Master 2 in Fundamental Mathematics & Applications within ENS Rennes program (skipped Master 1).

2014–2018 **Bachelor of Science in Mathematics**, *University of Science* (HCMUS), *Viet Nam National University, Ho Chi Minh City* (VNU HCM), Vietnam, *very good*.
Specialized in Mathematical Analysis & Numerical Analysis.

2011–2014 **Elementary Mathematics**, *Ben Tre High School for Gifted Students* (CBT), Vietnam, *very good*.

Master Thesis

Title *Staggered & well-balanced discretization of shallow-water equations.* [pdf][slide]

Supervisor Prof. Nicolas Seguin

Description This thesis investigates some staggered well-balanced finite volume schemes for the shallow water equations. A new staggered scheme, called "offset equilibrium", is developed to conquer the *dry-wet transition* issues where almost all the traditional finite volume schemes collapse. Higher-order extensions for this staggered scheme are also mentioned.

Master Courses

2018–2019 **Courses of Master 2 Program in Fundamental Mathematics with Applications, 2018–2019:**

Sep 2018 Prof. Nicoletta Tchou. *Sobolev spaces & elliptic equation.*

Sep 2018 Prof. Florian Méhats. *Hyperbolic equations.*

Nov 2018 Prof. Nicolas Seguin & Eric Darrigrand. *Finite Element Method* (FEM).

Nov 2018 Prof. Nicolas Seguin. *Numerics of transport.*

Nov 2018 Prof. Mohammed Lemou. *Numerical methods for kinetic transport equations.*

Dec 2018 Prof. Luis Miguel Rodrigues. *Master 2 Seminar*
▷ Hong Nguyen. "On the smallest constant for a Gagliardo-Nirenberg functional inequality". [pdf][slide]

Mar 2019 Vincent Duchêne. *Modeling & mathematical analysis of shallow free-surface fluid flows.*

Mar 2019 Prof. Marc Quincampoix. *Optimal control & Hamilton-Jacobi equations.*

Research Interests

○ **Mathematical Analysis** ▷ Partial Differential Equations (PDEs): Porous Medium equations (PME), Navier–Stokes equations (NSEs), Differential Geometry (DG).

○ **Numerical Analysis** ▷ Finite Difference Methods (FDMs), Finite Element Methods (FEMs), Finite Volume Methods (FVMs).

- **Mathematical Optimization** ▷ Optimal Control, Shape Optimization, Topology Optimization.
- **Fluid Mechanics** ▷ Fluid Dynamics, Computational Fluid Dynamics (CFDs).
- **Turbulence** ▷ Turbulence modeling.

Experience

Vocational

Jan 2025–now **Lecturer**, *University of Management & Technology (UMT)*, Ho Chi Minh City.
Department of Information Technology: Mathematics for Data Science & Artificial Intelligence.

Jan 2022–Dec 2024 **Self-employed**, Ben Tre city, Vietnam.
Educator & Writer.

Apr 2021–Dec 2021 **Software Development Engineer (SDE)**, *Math₊ Tec GmbH*, Vienna, Austria.
Secondments for technical & scientific training at the industrial partner within ROMSOC project.

Mar–Jun 2019 **Master Internship**, IRMAR, Rennes, Bretagne, France.

Miscellaneous

2015–2017 **Olympiad Trainer**, *Ben Tre High School for Gifted Students* (CBT), Vietnam.
Trainer of the selected team of CBT for Vietnamese Mathematical Olympiads (VMOs).

Publications

[Pub1] Nguyen Anh Dao, Jesús Ildefonso Díaz, Quan Ba Hong Nguyen. *"Pointwise Gradient Estimates in Multi-dimensional Slow Diffusion Equations with a Singular Quenching Term"*. Adv. Nonlinear Stud. (2020). DOI https://doi.org/10.1515/ans-2020-2076. [pdf]

Preprints

[Prp1] Nguyen Quan Ba Hong. *"Continuous Adjoint Approaches for Shape Optimization for Stationary Incompressible Stokes, Oseen, and Navier–Stokes Equations with Constant Density and Constant Viscosity: A Survey, General Formal Derivations, and Partial Rigorous Analysis"*. [arXiv]

Books & Other Writings

[Bk1] Nguyễn Quản Bá Hồng, Nguyễn Quản Trung Nhân. *Some Thoughts on Learning, Teaching, & Research: A Short Novel – Vài Suy Nghĩ Về Việc Học, Việc Dạy, & Nghề Nghiên Cứu: 1 Tiểu Thuyết Ngắn.*

Courses

Oct 12–23, 2020 Thematic Einstein Semester (TES): *Energy-based mathematical methods for reactive multiphase flows.*
▷ TES Student Compact Course: *Variational Methods for Fluids & Solids*.

Apr–Jun 2020 Dr. Stephan Schmidt. *Computational Geometry & Shape Optimization*. Master course, Humboldt Universität zu Berlin, 2020.

Seminars

Mar 2020–now Berliner Oberseminar Nichtlineare partielle Differentialgleichungen (Langenbach-Seminar), Research Group 1: *Partial Differential Equations*, WIAS Berlin, Germany.

Mar 2020–now Material Modeling Seminar, WIAS Berlin, Germany.

Mar 2020–now Numerical Mathematics Seminars, Research Group 3: *Numerical Mathematics & Scientific Computing*, WIAS Berlin, Germany.

Mar 2020–now Modern Methods in Applied Stochastics & Nonparametric Statistics, Research Group 6: *Stochastic Algorithms & Nonparametric Statistics*, WIAS Berlin, Germany.

Mar 2020–now Joint Research Seminar on Mathematical Optimization, Research Group 8: *Non-smooth Variational Problems & Operator Equations*, WIAS Berlin, Germany.

Mar 2021–now Optimization, Control & Inverse Problems, Research Group 8: *Non-smooth Variational Problems & Operator Equations*, WIAS Berlin, Germany.

Mar 2020–now Berlin Mathematics Research Center MATH$^+$ Events.

Nov 2020–Apr 2021 ROMSOC Scientific ESRs Seminar.

Schools

Jul 26–30, 2021 Summer Schools on Applied Mathematics and Mechanics 2021 (SAMM 2021): *Shape & Topology Optimization*. GAMM Juniors, Graz University of Technology (Technische Universität Graz), Graz, Austria.

Jul 1–2, 2021	Durham Days of Analysis & PDE Summer School. Durham University, United Kingdom.
Sep 7–10, 2020	Model Order Reduction Summer School 2020 (MORSS2020). École polytechnique fédérale de Lausanne (EPFL), Lausanne, Switzerland.
Jul 20–24, 2020	162nd European Study Group with Industry. University of Leeds, United Kingdom.

Workshops

Apr 29, 2021	FUHRI2021: Finite volUme metHods for Real-world applIcations, WIAS Berlin, Germany.
Sep 28–29, 2020	ROMSOC Internal Workshop.
Sep 15, 2020	ROMSOC Ethical Monitoring - 3rd Workshop on Ethics.

Conferences

Mar 24–25, 2021	Annual Meeting of the Second Phase of the DFG Priority Programme 1962 (SPP1962): *Non-smooth & Complementarity-based Distributed Parameter Systems: Simulation & Hierarchical Optimization*. Deutsche Forschungsgemeinschaft (DFG) + WIAS, Germany.
Sep 14–17, 2020	Deutsche Mathematiker-Vereinigung (German Mathematical Society) Annual Meeting 2020 (DMV2020), Technische Universität Chemnitz, Chemnitz, Germany.

Talks

Apr 12, 2021	Hồng Quản Bá Nguyễn (WIAS Berlin). "*Optimal Shape Design of Air Ducts in Combustion Engines: Design a General Shape Optimization Framework*". ROMSOC ESR Seminar. [abstract]
Sep 7, 2020	Hong Nguyen (WIAS Berlin). "*A shape optimization problem for stationary Navier-Stokes flows in three-dimensional tubes*". Model Order Reduction Summer School 2020 (MORSS2020), École polytechnique fédérale de Lausanne (EPFL), Lausanne, Switzerland. [abstract][slide]
Jun 26, 2019	Hong Nguyen. "*Staggered & well-balanced discretization of shallow water equations*". PhD interview, Department of Mathematics, RWTH Aachen University, Aachen, Germany. [slide]

Miscellaneous

Feb 22, 2021	WIAS-Day2021 ▷ Hong Quan Ba Nguyen (Research Group 8)'s Research Profile.
Nov 30, 2020	ROMSOC Blog ▷ Hong Nguyen. *Optimal shape design of air ducts* [pdf].
Jun 18, 2020	Prof. Luis Miguel Rodrigues's recognition of Master equivalence & admission to doctoral studies of NGUYEN Quan Ba Hong. IRMAR, Rennes, France.
May 27, 2019	Prof. Luis Miguel Rodrigues's recommendation letter for NGUYEN Quan Ba Hong. IRMAR, Rennes, France.

Visits

Apr 2021–now	MATH+TEC GmbH, Vienna, Austria.
Apr 2021–now	Vienna University of Technology/Technische Universität Wien, Vienna, Austria.
Apr 23, 2021	University of Vienna/Universität Wien, Vienna, Austria.
Mar 2020–now	Humboldt-Universität zu Berlin, Berlin, Germany.
Jun 25–27, 2019	Department of Mathematics, Rheinisch-Westfälische Technische Hochschule (RWTH) Aachen University, Aachen, Germany.
Sep 2018–Jun 2019	UFR Mathématiques, Université de Rennes 1, Rennes, Bretagne, France.
Sep 2018–Dec 2018	Université Rennes 2 - UFR Sciences sociales, Rennes, Bretagne, France.
Mar 2017	Vietnam Institute for Advanced Studies in Mathematics (VIASM), Hanoi, Vietnam.

Awards & Scholarships

Mar 2020–Aug 2021	Marie Skłodowska-Curie Actions (MSCA) PhD Fellowship, *Horizon 2020 - Innovative Training Network - European Industrial Doctorate Programs*, Grant Agreement number: 765374 - Reduced Order Modelling, Simulation & Optimization of Coupled Systems (ROMSOC) [H2020-MSCA-ITN-2017-EID/ROMSOC/ESR11].
2018–2019	Lebesgue Master Scholarship for *Master 2* program within ENS Rennes program.
2017	Scholarship of *Vietnam Institute for Advanced Studies in Mathematics* (VIASM).
2016	Special Prize ⟸ First Prize in Algebra + First Prize in Analysis, in *Vietnamese Mathematical Olympiad for College Students* (VMC 2016).
2015	Second Prize in Algebra, Second Prize in Analysis, in *Vietnamese Mathematical Olympiad for College Students* (VMC 2015).

2014	First Prize #1 in Ben Tre city Mathematical Olympiad for High School Students.
2013	Second Prize in Ben Tre city Mathematical Olympiad for High School Students.
2012	Gold Medal ranked #2, in *Vietnamese Apr 30th Mathematical Olympiad for Central & Southern Vietnam*.

Computer Skills

GitHub	GitHub/NQBH ▷ GitHub/ROMSOC project.
Basic	R, Fortran, Fireshape, Firedrake, FEniCS, Python 3, Star-CCM+.
Intermediate	git, C/C++, OpenFOAM.
Advanced	UNIX/Linux [openSUSE, (K)Ubuntu], TEX/LATEX, Matlab.

Languages

Vietnamese	Mother tongue
English	Intermediate

Collaborators

In alphabetical order:

[1] Phạm Ngô Gia Bảo: Data Science, Deep Learning $\subset$ Machine Learning $\subset$ Artificial Intelligence.

[2] Hoàng Công Đức: Data Science, Deep Learning $\subset$ Machine Learning $\subset$ Artificial Intelligence.

[3] Dr. Trà Quốc Khanh: PDEs, Inverse Problems.

[4] Đoàn Trần Nguyên Tùng: Numerical Analysis, Data Science, Deep Learning $\subset$ Machine Learning $\subset$ Artificial Intelligence.

Referees

In chronological order:

[1]	**Dr. Đào Mạnh Khang**	*Bachelor Teacher*
[2]	**Dr. Nguyễn Tấn Trung**	*Bachelor Teacher*
[3]	**Dr. Đào Nguyên Anh**	*Bachelor Supervisor*
[4]	**Prof. Nicolas Seguin**	*Master Supervisor*
[5]	**Prof. Michael Hintermüller**	*Primary PhD Supervisor*

Hobbies

- Psychology
- Philosophy
- Literature
- Blogging
- Arts (emotions carriers): movies, animes, mangas, (instrumental) musics, etc.   □