

Curriculum Vitae

"It is true that a mathematician who is not somewhat of a poet, will never be a perfect mathematician." - Karl Weierstrass

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, Mathématiques 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*.

Title	<i>Staggered & well-balanced discretization of shallow-water equations.</i> [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 <i>dry-wet transition</i> issues where almost all the traditional finite volume schemes collapse. Higher-order extensions for this staggered scheme are also mentioned.

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*.

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- **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 Quân Bá Hồng, Nguyễn Quân 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 Quân 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], T_EX/L^AT_EX, 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] TRÀ QUỐC KHANH: PDEs, Inverse Problems.
- [4] ĐOÀN TRẦN NGUYỄN TÙNG: Numerical Analysis, Data Science, Deep Learning \subset Machine Learning \subset Artificial Intelligence.

Referees

In chronological order:

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|---|-------------------------------------|
| [1] Dr. Đào Mạnh Khang | <i>Bachelor Teacher</i> |
| [2] Dr. Nguyễn Tấn Trung | <i>Bachelor Teacher</i> |
| [3] Dr. Đào Nguyên Anh | <i>Bachelor Supervisor</i> |
| [4] Prof. Nicolas Seguin | <i>Master Supervisor</i> |
| [5] Prof. Michael Hintermüller | <i>Primary PhD Supervisor</i> |
| [6] Prof. Trần Đan Thư | <i>Head of IT Department of UMT</i> |

Hobbies

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



Updated to Jan 1, 2025.