Curriculum Vitae

Truong-Vinh Hoang

Email: hoang@uq-rwth.aachen.de

Tel: +49-170-843-7228

Former and current Positions

- 5.2021 - present: **Postdoctoral researcher**

Chair of Mathematics for Uncertainty Quantification (MATHUQ), Department of Mathematics, RWTH Aachen University, url: https://www.uq.rwth-aachen.de/go/id/eibnp/?lidx=1

- 10.2017 - 3.2020: **Postdoctoral researcher**

Institute of Scientific Computing (WiRe), Faculty of Information, Carl-Friedrich-Gauß-Fakultät, Technische Universität Braunschweig, Germany, url: https://www.tu-braunschweig.de/wire

- 09.2013 - 09.2017: **Research engineer - Doctoral candidate**

Department of Aerospace and Mechanical Engineering, Faculty of Applied Sciences, University of Liège, Belgium, url: http://www.ltas-cm3.ulg.ac.be/staff.htm

- 08.2010 - 08.2011: **Research assistant**

University of Technology, Vietnam National University HCMC, Vietnam, url: https://vnuhcm.edu.vn/

Education and Qualification

- 09.2017, **PhD. in engineering sciences**

Department of Aerospace and Mechanical Engineering, Faculty of Applied Sciences, University of Liège, Belgium, Major: *Numerical simulation*

Thesis: *Stochastic multi-scale modelling of adhesion contact failure in MEMS*

- 07.2013, **Master in mechanical engineering**

University of Liège, Belgium, grade: **very distinction** (top 8 %)

- 06.2010, **B.Eng in mechatronics**

University of Technology, HCMC Vietnam National University, Vietnam, grade: **very good** (top 10 %)

Qualification profile

Experience in Research and Development

- Uncertainty quantification:

  - Characterisation of uncertainty: e.g. parametric distributions, non-parametric approach such as polynomial chaos expansion, and random fields

  - Uncertainty propagation: e.g. spectral method, surrogate model-based Monte Carlo simulation (MCS), and multi-fidelity MCS

  - PDE-constrained inverse problem: e.g. Bayesian approach, MCMC algorithm, conditional expectation

  - Data assimilation methods for tracking dynamical problems such as ensemble Kalman filter, neural-network-based ensemble filters

- Machine learning and data science:

  - Implement supervised/unsupervised ML models for regression, classification, or generating new data, using e.g. Tensorflow and Scikit-learn

  - Softcomputing solver for PDE using deep neural networks

  - Bayesian neural networks

  - Familiar with stochastic gradient descent methods and automatic differentiation

- Numerical methods for simulating engineering problems

  - Numerical solutions of differential equations: finite Elements method

  - Multiscale modelling

  - Shape and topology optimization

  - Time integration schemes

  - Mechanics (dynamic, non-linear elasticity, fracture, damage)

  - Heat conduction equation, diffusion

- Writing scientific publications and proposals

- Development of (open-source) softwares

Grants

- Project: "*Efficient functional representation of the structural mechanical response dependent on polymorphic uncertain parameters and uncertainties*" in the framework of "DFG-SPP 1886, Polymorphic uncertainty modelling for the numerical design of structures" (2017 -2020)

- FNRS-FRIA PhD Grant "*Stochastic multi-scale modeling MEMS stiction*" (2013-2017)

- "3SMVIB: *3-Scale modelling for robust-design of vibrating micro sensors project*", in the framework of MNT.ERA-NET (FP7) program (2013-2016)

Management and Communication skills

- Collaboration with other research groups at different universities and institutions

- Organization of research workshops

- Presentation at international conferences (> 12)

- Preparation of new lecture materials

- Providing theorical courses and guiding practical sessions for master classes

- Supervision of research assistants

Programming skills

- PDE solvers: Fenics, FreeFEM++, openFoam

- Programming languages: Python, C++, Matlab

- Packages for scientific computing: Numpy, Scipy, Matplotlib

- Machine learning tools: Tensorflow, Keras, Scikit-learn, Panda

- Software development tools: Git, SVN

- Others: Latex, Jupyter notebook, Linux OS, Bash script, High-performance computing

Teaching experience

- "Uncertainty Quantification, Parametric Problems, and Model Reduction"(2019 link)

- "Practical Course in Simulation of Fluid Dynamics" (2017, 2018 link)

- "Seminar: Deep Learning and Mathematics behinds it" (2018, 2019 link)

- "Elements of Stochastic processes" (2013 link)

Awards

- *FRIA fellowship* (Belgian national fund for researches in industry and agriculture - F.R.S.-FNRS) for PhD research, 2013 - 2017 (€110.000)

- *Full scholarship* for Master program at University of Liège, Belgium 2011-2013. (€24.600)

- *Award for top-scorer* in the university national intake examination, Vietnam, 2005

Languages

- English   fluent
- German   good
- French   good
- Vietnamese   mother tongue

Others

- Driving licence (category B)

- Medium-distance runner (10 - 21.0975 km)

List of publications

Journal publications

[1] Drieschner, M, Matthies, HG, Hoang, T. V., et al. (2019) *Analysis of polymorphic data uncertainties in engineering applications.* GAMM-Mitteilungen.

[2] Hoang, T. V., Wu, L., Golinval, J. C., Arnst, M., & Noels, L. (2018). *Stochastic multiscale model of MEMS stiction accounting for high-order statistical moments of non-Gaussian contacting surfaces.* Journal of Microelectromechanical Systems, (2), 137-155.

[3] Hoang, T. V., Wu, L., Paquay, S., Golinval, J. C., Arnst, M., & Noels, L. (2017). *A computational stochastic multiscale methodology for MEMS structures involving adhesive contact.* Tribology International, 110, 401-425.

[4] Hoang, T. V., Wu, L., Paquay, S., Obreja, A. C., Voicu, R. C., Müller, R., & Noels, L. (2015). *A probabilistic model for predicting the uncertainties of the humid stiction phenomenon on hard materials.* Journal of Computational and Applied Mathematics, 289, 173-195.

Preprints and in preparations

[5] Hoang, T. V., Matthies, HG. *An efficiently computational method for parameter identification in the context of random set theory via Bayesian inversion.* Submitted to International Journal for Uncertainty Quantification.

[6] Hoang, T. V., Vondrejc, J., & Matthies, HG. *Neural network-based ensemble filters for non-linear data assimilation.* (in preparation).

Articles in conference proceedings

[7] Hoang, T. V., Rosić, B. and Matthies, H.G. (2018). *Characterization and propagation of uncertainties associated with limited data using a hierarchical parametric probability box.* PAMM, 18(1), p.e201800475.

[8] Rosić, B., Kumar Shivanand, S., Hoang, T. V., & G. Matthies, H. (2018). *Iterative spectral identification of bone macroscopic properties described by a probability box.* PAMM, 18(1), e201800404.

[9] Hoang, T. V., Wu, L., Paquay, S., Golinval, J.C., Arnst, M. and Noels, L. (2017). *A stochastic multi-scale model for predicting MEMS stiction failure.* In Micro and Nanomechanics, Volume 5 (pp. 1-8). Springer, Cham.

[10] Hoang, T. V., Wu, L., Paquay, S., Golinval, J. C., Arnst, M., & Noels, L. (2016, April). *A study of dry stiction phenomenon in MEMS using a computational stochastic multi-scale methodology.* In Thermal, Mechanical and Multi-Physics Simulation and Experiments in Microelectronics and Microsystems (EuroSimE), 2016 17th International Conference on (pp. 1-4). IEEE.

Doctoral thesis

[11] Hoang, T. V. (2017). *Stochastic multiscale modeling of MEMS stiction failure* (Doctoral dissertation, University of Liège, Belgium).
https://orbi.uliege.be/bitstream/2268/214455/5/main.pdf