

Michelle Böck *Ph.D. in Applied and Computational Mathematics*

Contact details: michelle.boeck@gmail.com • +46 (0) 76 103 1674

Homepage: people.kth.se/~miboeck

LinkedIn Profile: [linkedin.com/in/michelle-boeck](https://www.linkedin.com/in/michelle-boeck)

Address: Förrådsgatan 5, 16939 Solna, Sweden

Nationality: Austrian



About me

I am a recent Ph.D. graduate in applied and computational mathematics as well as a physicist, with experience in and passion for applying interdisciplinary research to solve real-world problems. This passion recently resulted in my doctoral thesis. I am also passionate about bringing people together. During my Ph.D. studies, I co-founded a network for female Ph.D. students at KTH (WOP@KTH), I organize weekly German language lunches at my current employer and I guide a weekly yoga practice for fellow Ph.D. students at the KTH Department of Mathematics, among other activities.

Education

KTH Royal Institute of Technology Ph.D. Degree in Applied and Computational Mathematics Specialization in optimization.	STOCKHOLM, SWEDEN Sep 2013 – June 2019
ETH Zürich Exchange during Master studies, Physics Focused on particle and medical physics.	ZÜRICH, SWITZERLAND Sep 2009 – Aug 2010
TU Wien, Vienna University of Technology M.Sc. Degree in Engineering Physics Specialization in applied physics.	VIENNA, AUSTRIA Oct 2005 – Dec 2010

Academic and Professional Experience

RaySearch Laboratories AB Research Engineer RaySearch Laboratories AB is a global medical technology company specializing in software for radiation therapy. As a research engineer I conduct method studies involving interdisciplinary problem solving. This allows me to combine my knowledge and research experience in mathematics and physics with my industrial experience to improve cancer treatment methods.	STOCKHOLM, SWEDEN June 2019 – present
Industrial PhD Student In my PhD thesis with the title <i>Toward Robust Optimization of Adaptive Radiation Therapy</i> conceptual frameworks, combining a variety of robust optimization approaches with adaptive radiation therapy, are presented and evaluated. Adaptive radiation therapy is an evolving treatment method in which the treatment plan is reoptimized in response to patient-specific interfractional variations occurring throughout the course of treatment. The proposed optimization frameworks give the opportunity to generate adapted robust plans which account for the actual interfractional variations.	Sep 2013 – June 2019
Hermes Medical Solutions AB Application Physicist Hermes Medical Solutions AB is a global company specializing in nuclear medicine software for co-registration and fusion of studies from any imaging modality (e.g. CT, MRI and PET), radiology reporting and remote viewing. My role as an application physicist involved technical support and trouble-shooting across the range of Hermes products. I was responsible for planning and conducting customer training in the Nordic countries.	STOCKHOLM, SWEDEN Nov 2011 – Aug 2013
University of Oslo, Department of Experimental Particle Physics Research Fellow Supervisor: Erlend Bolle, erlend.bolle@fys.uio.no I worked in the COMPET (compact pet) research group, working on the design and construction of a preclinical PET scanner providing high-resolution, high-sensitivity and MRI-compatibility, by using a novel geometry and detector concept. My work included Monte Carlo simulations of the scanner with the GEANT4 based software tool GATE (GEANT4 application for tomographic emission) to evaluate its performance characteristics and count-rate behaviour.	OSLO, NORWAY Jan 2011 – Jul 2011

Paul Scherrer Institute PSI

VILLIGEN, SWITZERLAND

Student Researcher

Aug 2010

Supervisor: Prof. Tony Lomax, tony.lomax@psi.ch and Antje-Christin Knopf, a.c.knopf@umcg.nl

Project title: *The benefit of proton beam rescanning in single field uniform dose (SFUD) plans compared to intensity modulated (IMPT) plans*

The goal of the project was to understand the influence of motion and rescanning on IMPT plans compared to SFUD plans. Plans for two different patients with scaled modulations were calculated to investigate how the influence of motion and rescanning scales with the magnitude of modulation in the IMPT plans, and if there were symptomatic differences between SFUD and IMPT plans.

Austrian Institute of Technology AIT in collaboration with
TU Wien, Vienna University of Technology

VIENNA, AUSTRIA

Sep 2008 – Jun 2009

Master's Thesis

Supervisor: Dr. Christoph Reichl, christoph.reichl@ait.ac.at and

Prof. Roland Grössinger, roland.groessinger@tuwien.ac.at

Master's Thesis title: *Numerical analysis of an impinging jet in a turbulent flow field*

The scope of the master's thesis was to gain better understanding of turbulent flow fields inside vehicles. Different degrees and spectra of turbulence are produced by different setups of turbulence generators located in a test wind tunnel.

Medical University of Vienna, Department of Radiotherapy

VIENNA, AUSTRIA

Student Researcher

Jul 2008

Supervisor: Prof. Dietmar Georg, dietmar.georg@meduniwien.ac.at

Project title: *Advanced kernel methods versus Monte Carlo based dose calculations for high energy photon beams*

The aim of the project was to compare the dose accuracy of advanced kernel-based methods and Monte Carlo algorithms in different commercially available treatment planning systems and to investigate if the Monte Carlo based algorithms have advantages.

Please refer to my [LinkedIn profile](#) for the complete list of my work and academic experiences.

Technical Skills

- Programming: C, C++, Fortran and Matlab.
- Modeling systems for optimization problems and solvers: GAMS, CPLEX and SNOPT.
- Modeling systems for computational fluid dynamics: ANSYS Fluent and GAMBIT.

Languages:

- German (*native language*),
 - English (*full professional proficiency*),
 - Swedish (*full professional proficiency*) and
 - Italian (*limited working proficiency*).
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Published Articles

- [1] Michelle Böck, Kjell Eriksson, and Anders Forsgren. On the interplay between robustness and dynamic planning for adaptive radiation therapy. *Biomedical Physics & Engineering Express*, 5(4):045004, 2019.
- [2] Michelle Böck, Kjell Eriksson, Anders Forsgren, and Björn Hårdemark. Toward robust adaptive radiation therapy strategies. *Medical Physics*, 44(6):2054–2065, 2017.
- [3] W. Tilser H. Kühnelt K. Haindl F. Reining M. Opitz Ch. Reichl, M. Böck. On the correlation of the acoustic signal of microphones mounted on a flat plate to the turbulence of an impinging jet. *The Journal of the Acoustical Society of America*, 123(5):3251–3251, 2008.