Dr. Manuel Baumann

Curriculum Vitæ

About Myself

Date of birth	04-10-1986
Birth place	Berlin
Nationality	German
Education	PhD in Applied Mathematics
Experience	5+ years in industrial R&D translating basic research into real-world applications

Professional Experience

2022–Present **SIMULIA R&D Software Engineering Manager**, *Dassault Systèmes*, Darmstadt.

CST Studio Suite is a high-performance 3D EM analysis software package for designing, analyzing and optimizing electromagnetic (EM) components and systems. Development of C++ code for the time-domain solver of CST, the primary tool used by over 70% of our customers.

- Project lead: Solver-accurate electromagnetic field interpolation
  - Implementation of fast and robust numerical methods in C++
  - Technical consultancy for high-performance computing customers
- Researcher: Physics-informed artificial intelligence
  - Integrate data-driven deep learning methods with numerical simulation
  - Build AI-based surrogate models for electrical machine applications

2023–Present **Lecturer**, *Technical University of Darmstadt*.

Teaching weekly lectures on the "Introduction to Scientific Computing in C++" (5 ECTS). This Master-level course covers advanced topics of C++ and presents practical computational science applications with an emphasis on scientific software development.

- Design of course material and exercises
- Modern teaching approach using live-coding and code submits in GitLab
- Course topics: object-oriented programming · parallelization · external libraries OpenMP/Eigen

2020–2022 **Research Scientist**, *Philips Research*, Hamburg.

Development of magnetic resonance (MR) image reconstruction techniques. Translation of basic research on MR Fingerprinting into industrial production. As a result, a GPU-accelerated MR Fingerprinting implementation has been included in the Philips reconstruction framework.

- BMBF project: MR-guided high-intensity focused ultrasound therapy for pancreatic cancer
- Research highlights:
  - Fast reconstruction: Implementation of real-time 3D MR Fingerprinting using C++/CUDA
  - Fast acquisition: Dixon water/fat separation for undersampled image acquisitions
  - Robust imaging: Motion detection and motion correction for abdominal MR Fingerprinting
- From research into practice: Supported preclinical studies at University Hospital Cologne
- Co-inventor of patent application EP4137834A1 on MR Fingerprinting research

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Academic Background

2018–2020 **Postdoctoral Researcher**, *Max Planck Institute for Dynamics of Complex Technical Systems*, Magdeburg.

Development of mathematical models and efficient algorithms for the simulation and control of power grid networks with respect to renewable energy sources, flexible consumers and new storage devices.

- BMBF project: Consistent Optimization and Stabilization of Electric Power Grids
- Research focus:
  - Complexity reduction of dynamic power flow simulations based on network clustering
  - Surrogate models for coupled microgrids using neural networks
  - Mathematical expertise: numerical optimization · graph theory · control systems and complexity reduction · machine learning
- From research into practice: Replacing an expensive two-level optimization by a fast pre-trained neural network at our industry partner ENSO NETZ GmbH

2013–2018 **Doctoral Researcher**, *Delft University of Technology*.

Theory and implementation of numerical linear algebra algorithms for the efficient computer simulation of seismic wave propagation.

- PhD thesis: *Fast Iterative Solution of the Time-Harmonic Elastic Wave Equation at Multiple Frequencies* (2018)
- Research focus:
  - Development of fast and memory-efficient numerical solvers for large-scale linear systems
  - Implementation of a coupled Python/Fortran 90 software framework
  - Mathematical expertise: numerical analysis · matrix computations · finite-element method · approximation methods
- Highlights: Publication of five peer-reviewed journal publications and several contributions to international conferences

Education

2012–2013 **Master of Science**, *Delft University of Technology*.
Applied Mathematics · Topic of Master thesis: Nonlinear model-order reduction

2011–2012 **Master of Science**, *KTH Royal Institute of Technology*.
Computational Science & Engineering · Major: High-performance computing

2008–2011 **Bachelor of Science**, *Technical University of Berlin*.
Mathematics · Topic of Bachelor thesis: Simulation and control of mixtures in a stirrer

2007–2011 **Bachelor of Science**, *Technical University of Berlin*.
Engineering Sciences · Topic of Bachelor thesis: Computational fluid dynamics using CUDA

Study Scholarships

2016 SIAM Certificate of Recognition for founding the first Dutch SIAM Student Chapter at TU Delft

2011–2013 Two-year Erasmus Mundus study scholarship awarded by the European Commission

2011 Award for Best Bachelors Thesis in Mathematics at TU Berlin

2007–2011 Study scholarship awarded by the Friedrich Ebert Foundation

Supervision of Students

2024 Celine Reddig, Research internship and MSc Thesis at Dassault Systèmes
Accurate Field Interpolation for the Finite Integration Technique within Hexahedral Cells

2021 David Heesterbeek, Research internship at Philips Research
Mathematical Optimization of MR Fingerprinting Sequences

2019 Frances Weiß, MSc Thesis at Max Planck Institute
Simulation, Analysis, and Model Order Reduction for Dynamic Power Network Models

Languages

German	**Mother tongue**	
English	**Business fluent**	*Extensive experience in English-speaking work environments*
Dutch	**Advanced**	*Lived and studied abroad for five years*
French	**Intermediate**	*Reading and comprehension at C1 level*

Interests

race cycling · outdoor activities · skiing instructor · traveling

Darmstadt, October 28, 2025