DR. MANUEL BAUMANN

Applied Mathematician & Scientific Programmer

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EXPERIENCE

Doctoral Research

Delft University of Technology

July 2013 – Jan 2018 Delft, NL

- Thesis title: *Fast Iterative Solution of the Time-Harmonic Elastic Wave Equation at Multiple Frequencies*
- Scientific supervision: Martin B. van Gijzen (TU Delft) and René-Édouard Plessix (Shell International)
- My research interests include: Numerical Linear Algebra, Model-Order Reduction, Optimal Control and Parallel Programming

Student Research Assistant

Technical University of Berlin

Oct 2009 – Aug 2011 Berlin, GER

- Modeling, Simulation, and Control of Drop Size Distributions in Stirred Liquid/Liquid Systems

Internship as Scientific Programmer

German Aerospace Center DLR

June 2009 – Sep 2009 Braunschweig, GER

- Coupled Flow-Structure Simulations with MPI

EDUCATION

M.Sc. in Applied Mathematics (double degree program)

Delft University of Technology

Aug 2011 – June 2013 Delft, NL

M.Sc. in Scientific Computing (double degree program)

Royal Institute of Technology

Aug 2011 – June 2013 Stockholm, SE

B.Sc. in Mathematics

Technical University of Berlin

Oct 2008 – Aug 2011 Berlin, GER

B.Sc. in Engineering Science

Technical University of Berlin

Oct 2007 - March 2011 Berlin, GER

LIFE PHILOSOPHY

"Good things don't come to those who wait."

MOST PROUD OF

SIAM Student Chapter
I co-founded the SIAM Student Chapter at TU Delft and served as the first president.

International Collaborations
Within my PhD research, I collaborated with colleagues from China, Singapore, Venezuela, France and The Netherlands.

Inter-cultural Understanding
I lived and studied in three different countries of Europe.

Project baNaNa
We organize technical 'baNaNa' talks for PhD students in Numerical Analysis.

STRENGTHS & HOBBIES

Hard-working | Disciplined | Innovative | Communicative

Race biking | Outdoor | Skiing instructor | Traveling

PROGRAMMING SKILLS

Python	●●●●●
MATLAB	●●●●●
Fortran 90	●●●●○
git	●●●●○
MPI/CUDA	●●●○○

LANGUAGES

German (native)	●●●●●
English	●●●●●
Dutch	●●●○○
French	●●○○○

PUBLICATIONS

Journal Articles

- Baumann, Manuel, Reinaldo Astudillo, Yue Qiu, Elisa Ang, Martin B. van Gijzen, and René-Édouard Plessix (2017). "An MSSS-Preconditioned Matrix Equation Approach for the Time-Harmonic Elastic Wave Equation at Multiple Frequencies". In: *Computat. Geosci.* 22.1, pp. 43–61.
- Baumann, Manuel and Martin B. van Gijzen (2017b). "Efficient iterative methods for multi-frequency wave propagation problems: A comparison study". In: *Procedia Comput. Sci.* 108, pp. 645–654.
- Baumann, Manuel and Martin B. Van Gijzen (2015). "Nested Krylov methods for shifted linear systems". In: *SIAM J. Sci. Comput.* 37.5, S90–S112.

Technical Reports

- Baumann, Manuel and Martin B. van Gijzen (2017a). *An Efficient Two-Level Preconditioner for Multi-Frequency Wave Propagation Problems*. Tech. rep. DIAM Report 17-03 [under review].
- Baumann, Manuel, Peter Benner, and Jan Heiland (2016). *Space-time Galerkin POD with application in optimal control of semi-linear parabolic partial differential equations*. Tech. rep. arXiv:1611.04050 [under review].

Conference Proceedings

- Baumann, Manuel and Martin B. van Gijzen (2016). "A Fast Iterative Solution of the Time-harmonic Wave Equation with MSSS-preconditioned IDR(s)". In: *Proceedings of 78th EAGE Conference & Exhibition*.
- Baumann, Manuel, Jan Heiland, and Michael Schmidt (2015). "Discrete Input/Output Maps and their Relation to Proper Orthogonal Decomposition". In: *Numerical Algebra, Matrix Theory, Differential-Algebraic Equations and Control Theory*. Ed. by Peter Benner, Matthias Bollhöfer, Daniel Kressner, Christian Mehl, and Tatjana Stykel. Springer International Publishing, pp. 585–608.

Doctoral Thesis

- Baumann, Manuel (2017). "Fast Iterative Solution of the Time-Harmonic Elastic Wave Equation at Multiple Frequencies". ISBN 978-94-6295-827-2: Delft University of Technology.

REFEREES

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