

# 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

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.

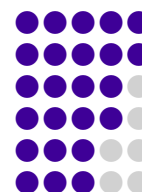
## STRENGTHS & HOBBIES

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

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## 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.* DOI: 10.1007/s10596-017-9667-7.
  - 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.
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## 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].
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## 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.
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## Doctoral Thesis

- Baumann, Manuel (2017). “Fast Iterative Solution of the Time-Harmonic Elastic Wave Equation at Multiple Frequencies”. ISSN 111-22-3-44444: Delft University of Technology.

# REFEREES

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## **Prof. Dr. Volker Mehrmann**

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