

## **Prof. Dr.-Ing. Prof. E.h. Peter Eberhard**

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### **Professional Career**

March 15, 1966 born in Stuttgart

- 1991 Graduation in Mechanical Engineering (Dipl.-Ing.), University of Stuttgart
- 1991 - 2000 Fully Funded Research Associate at the Institute B of Mechanics, University of Stuttgart (since 1996 C1-level corresponding to Assistant Professor)
- 1995 Visiting Scientist at the Mathematics and Computer Science Department, Argonne National Laboratory, USA
- January 1996 Doctoral Degree (Dr.-Ing.), University of Stuttgart, thesis about 'Optimization of Multibody Systems'
- 1996 - 1997 Visiting Scientist at the University of California, UC Berkeley, USA
- January 2000 Habilitation Degree (Dr.-Ing. habil.), University of Stuttgart, thesis about 'Contact Investigations using Hybrid Multibody/Finite Element Simulations'
- 2000 - 2002 Full Professor (C3) of Mechanics and System Dynamics at the Institute of Applied Mechanics at the Friedrich-Alexander-University Erlangen-Nuremberg
- since 2002 Director and Full Professor (C4, W3) at the Institute of Engineering and Computational Mechanics (until 2005: Institute B of Mechanics), University of Stuttgart

### **Activities for IUTAM (Int. Union of Theoretical and Applied Mechanics)**

- 2012 - 2020 Treasurer, Member of the Bureau, General Assembly Member of IUTAM
- since 2020 elected Member-at-Large, General Assembly Member of IUTAM
- 2006 - 2012 elected German representative in the General Assembly
- 2010 - 2018 Member of the Congress Committee
- 2008, 2012 Member of the Int. Paper Committee for the ICTAMs in Adelaide and Beijing
- since 2014 Representative of IMSD in IUTAM
- 2016 Book IUTAM - A Short History (with Juhasz, S. Eds.). Dordrecht: Springer, 2016. Open Access [link.springer.com/book/10.1007%2F978-3-319-31063-3](http://link.springer.com/book/10.1007%2F978-3-319-31063-3).
- 2016 Chair of the Nominations Subcommittee for the CC
- 2018 Member of the Nominations Subcommittee for the CC
- 2006 organization of IUTAM Symposium: Multiscale Problems in Multibody System Contacts in Stuttgart
- 2012 organization of IMSD Conference 2012 International Conference on Multibody System Dynamics in Stuttgart (endorsed by IUTAM)

## Research Interests

with my team of currently about 35 researchers (plus MSc/BSc-students) we do research in

- multibody systems (e.g. vibrations, model order reduction, sub-structured systems, recognizing damage by machine learning, vibrations in paintings and music instruments, simulation of flexible gear drives, vibrations in brake systems for cars, simulation of optical-mechanical systems with deformable lenses and mirrors, delay-differential equations for metal cutting, flexibility in steering systems, experimental modal analysis, ...)
- mechatronics and control (e.g. simulation and control of magnetically levitating trains (currently our largest funded project together with CRRC Sifang in China), model predictive control, force control, safety systems for cars and motorbikes, control of uncertain systems, inverse uncertainty, control with guarantees based on Gaussian processes, driving simulator with a 6dof platform, ...)
- optimization (e.g. particle swarm optimization, distributed and decentralized optimization, robot swarms driven by optimization algorithms, ...)
- robotics (e.g. serial and parallel robots, flexible and rigid robots, swarm robotics, localization of driving and flying robots, interaction between robots, autonomous and self-organizing swarms, force-controlled manipulators, ...)
- biomechanics (e.g. mechanics of hearing, implants and prostheses, ...)
- meshless and particle methods (e.g. discrete element method, smoothed particle hydrodynamics, particle dampers, friction stir welding, laser welding, deep hole drilling, fluid structure interaction between fluids, particles and elastic structures, ...)

In most of these areas we have a mix of basic research, applied research, industrial research and use analytical methods, simulations and hardware experiments. Algorithms and methods are developed and implemented in software which is often also commercially used by companies or used by other research institutes worldwide.

## Internal and External Positions

since 2021	Coordinator Priority Programme SPP 2353: Daring More Intelligence – Design Assistants in Mechanics and Dynamics’ funded by the German Research Foundation
since 2016	Coordinator Priority Programme SPP1897 ‘Calm, Smooth, and Smart – Novel Approaches for Influencing Vibrations by Means of Deliberately Introduced Dissipation’ funded by the German Research Foundation
2012 - 2014	Chairman of DEKOMECH (Deutsches Komitee für Mechanik)
2014 - 2016	Vice-Chairman of DEKOMECH (Deutsches Komitee für Mechanik)
2012 - 2014	Chairman of IMSD (Int. Association of Multibody System Dynamics)

2014 - 2016 Vice-Chairman of IMSD (Int. Association of Multibody System Dynamics)

2010 - 2016 Member of the Board (Vorstandsrat) of the GAMM (Society of Applied Mathematics and Mechanics)

since 2021 elected Speaker of the Professors in the Senate of the University of Stuttgart

since 2019 elected Member of the Senate of the University of Stuttgart

since 2014 Member of the University Committee for Scientific Misconduct at the University of Stuttgart

since 2011 Member of the Senate Committee for Research/Structure at the University of Stuttgart

2010-2016 Chairman of the Doctoral Examination Committee of the Mechanical Engineering Department of the University of Stuttgart

since 2007 Founding Member of the Stuttgart Research Centre "Simulation Technology (SimTech)" (Exzellenzcluster SimTech)

since 2005 Guest Member and former elected member of the ASME Technical Committee on Multibody Systems and Nonlinear Dynamics

2002 - 2006 Dean of Studies "Mechatronics"

Member of GAMM, EUROMECH, IMSD, ISSMO (Int. Society of Structural and Multidisciplinary Optimization)

### **Member of Editorial Boards**

- founding Co-Editor of the journal 'International Journal of Mechanical System Dynamics'
- Co-Editor "Lecture Notes Applied and Computational Mechanics", Springer book series
- Associate Editor of the journal 'Mechanics Research Communications'
- Associate Editor of the journal 'Archive of Mechanical Engineering'
- former Associate Editor of the "European Journal of Mechanics A/Solids"
- former Contributing Editor of the "International Journal of Non-Linear Mechanics"
- Member of the Editorial Board "Computational Particle Mechanics"
- Member of the Editorial Board "Structural and Multidisciplinary Optimization"
- Member of the Advisory Board "Multibody System Dynamics"
- Member of the Editorial Board "Advances in Applied Mechanics"
- Member of the Editorial Board "ZAMM"
- former Member of the Editorial Board "Acta Mechanica Sinica"
- Member of the Editorial Board "International Journal of Applied Mathematics and Mechanics (IJAMM)"
- Member of the Editorial Board "Lecture Notes in Applied Mathematics und Mechanics"

### **Conference Organization as Chairman (no sessions mentioned)**

- Chairman: EUROMECH Colloquium 442 Computer-Aided-Optimization of Mechanical Systems, 2003
- Chairman: IUTAM Symposium: Multiscale Problems in Multibody System Contacts, 2006
- Chairman: IMSD Conference 2012 International Conference on Multibody System Dynamics

### **Professional Offers, Awards and Recognitions**

2000 Richard-von-Mises Award GAMM (Ges. für Ang. Mathematik und Mechanik)

2002 Offer of a Full Professorship (C4) at the University of Karlsruhe

2002	Offer of a Full Professorship (C4) at the University of Stuttgart
2011	Offer of a Full Professorship (W3) at the Technical University of Munich
Nov. 2007	Honorary Professorship from the Nanjing University of Science and Technology, Nanjing, PR China
since 2010	Guest Professor Shanghai Jiao Tong University, Shanghai, PR China

### **Books and Publications**

- Author, Co-Author, Editor of about 7 books
- Translations of books in English, Russian, and Chinese language
- As of February 2022 author and co-author of about 540 publications. For a complete list see [http://info.itm.uni-stuttgart.de/staff/Eberhard/eberhard\\_publicationen.php](http://info.itm.uni-stuttgart.de/staff/Eberhard/eberhard_publicationen.php)

### **More Details**

- founder of the 'Competence Center for Laser-Doppler- Vibrometry in Biomechanics' 2013
- about 63 completed supervised doctoral theses (about 30 more are already admitted by the Department of Mechanical Engineering but not yet finished)
- more than 580 supervised student theses in mechanics since Oct 2002
- reviews for about 70 different journals as well as many scientific organizations, universities and companies
- fully funded projects with more than 60 different companies in Germany, China, Norway, Switzerland and Japan