Univ.-Prof. Dr.-Ing. Martin Oberlack

* 02. June 1964
in Cologne, Germany

Contact Information

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Scopus ID	6603567719

Education / Academic Degrees

2000	Habilitation, Mechanical Engineering, Aachen University of Technology (RWTH), Germany
1994	Doctorate (with distinction), Mechanical Engineering, Aachen University of Technology (RWTH), Germany
1989	Diploma (with distinction), Mechanical Engineering / Aeronautics, Aachen University of Technology (RWTH), Germany

Professional Experience / Positions Held

09/17 - 08/19	Dean of Studies, Devision of Computational Engineering, TU Darmstadt
09/14 - 08/16	Dean of Studies, Dept. Mechanical Engineering, TU Darmstadt
01/11 - 12/12	Dean of Studies, Devision of Mechanics, TU Darmstadt
01/06 - present	Full Professor, Chair of Fluid Dynamics, Dept. Mechanical Engineering, TU Darmstadt
06/04 - 12/05	Full Professor, Chair of Fluid Dynamics, Dept. Applied Mechanics, TU Darmstadt
09/00 - 05/04	Full Professor, Hydromechanics, Dept. Civil Engineering, TU Darmstadt
05/97 - 08/00	Scientific Assistant, Dept. Mechanical Engineering, RWTH Aachen
05/95 - 04/97	Post Doc, Center for Turbulence Research, Stanford University
10/89 - 04/95	Researcher, Dept. Mechanical Engineering, RWTH Aachen

Awards, Honors and Chair Offers

10/17	Adjunct Professor, Novosibirsk State University, Russia
10/16	Elected Fellow of the American Physical Society for pioneering the use of symmetry methods for the study of turbulence and related fields and the derivation of new conservation laws in fluid dynamics
11/13	Athene-Best-Teaching Award 2013 of the Carlo and Karin Giersch-Foundation in the Dept. of Mech. Engineering, TU Darmstadt, Germany
11/13	E-Teaching-Award 2013 of the TU Darmstadt for the innovative development of electronic media in teaching, TU Darmstadt, Germany
04/04 - 11/13	Member Main Selection Committee Alexander von Humboldt Foundation
06/03	Offer of a Chair in Fluid Mechanics in the Department of Applied Mechanics, TU Darmstadt, Germany; accepted
01/03	Offer of a Chair in Environmental Fluid Mechanics in Civil Engineering, Hannover University, Germany; declined
11/00	Friedrich-Wilhelm Award of the Aachen University of Technology (RWTH) for the Habilitation Thesis
07/00	Hermann-Reissner-Award of the Dept. of Aero- and Astronautics of the University of Stuttgart for the Contributions in Turbulence Research
05/00	Academy Award 2000 of the North Rhine-Westphalia Academy of Sciences for the Habilitation Thesis (Karl-Arnold-Award)
03/00	Offer of a Chair in Hydromechanics and Hydraulics in the Department of Civil Engineering, TU Darmstadt, Germany; accepted
12/94	Borchers Medal of the Aachen University of Technology (RWTH) for the Dissertation

Research Interest and Scientific Expertise

- Turbulence Theory and Modelling
- High-Performance Computing (DNS, LES, RANS)
- Development of extended DG Schemes for Multi-Phase Flows and Singular Flow Problems
- Theory of Multi-Phase Flows, Contact Phenomena and Wetting
- Hydrodynamic Stability Theory
- Gas Dynamics, Shock Waves and Acoustic Theory and Simulation
- Theory and Simulation of Viscoelastic flows
- Theory of Simulation of Turbulent Combustion and Combustion Modelling
- Mathematical Methods in Fluid Mechanics (Lie Symmetry Theory, Conservation Laws, Fokas' Method, Perturbation Theory, etc.)

Editorial Board Member

10/21 - present	Editorial Board: *Communications Physics / Nature*
01/19 - present	Editor: *Fluid Dynamic Research*, Institut of Physics
01/19 - present	Book Series: *Progress in Turbulence - Fundamentals and Applications*, Springer
05/11 - present	Book Series: *Mathematical Physics: Theory and Applications*, Atlantis Press/Springer
06/02 - 05/08	Associate Editor: *Theoretical and Computational Fluid Dynamics*, Springer

04/02 - 12/08	Associate Editor: *Fluid Dynamic Research*, Japan Society of Fluid Mechanics
10/01 - 12/04	Editor: *Continuum Mechanics and Thermodynamics*, Springer

Founder and Coordinator of Local and National Research Collaborations

(*see Fundamental Research*)

09/00 - 03/06	Interdisciplinary Turbulence Initiative (iTi), DFG (German National Science Foundation)
08/02 - 07/05	Turbulent Flow with Strong Streamline Curvature, BMBF (Ministry of Education and Research)
06/02 - 05/03	Effectiveness and Limitations of Flush Cleaning Devices, DBU (German Federal Environmental Foundation)

Contributions to academic careers of former PhD or postdoctoral fellows

- *Early career scientists*

  Dr. F. Kummer, Research associate and group leader, TU Darmstadt, Germany
  Dr. F. Aldudak, Postdoctoral fellow, University Siegen, Germany
  Dr. N. Staffolani, Postdoctoral fellow, University of Tuscia, Italy
  Dr. F. Feng, Research associate, China Academy of Aerospace Areodynamics, China
  Dr. M. Reis, Postdoctoral fellow, University of Campinas, Brazil
  Dr. N. Emamy, Postdoctoral fellow, University of Stuttgart, Germany
  Dr. V. Avsarkisov, Postdoctoral fellow, Leibnitz-Institute for Atmospheric Physics, Germany
  Dr. H. Sadeghi, Postdoctoral fellow, University of Ottawa, Canada
  Dr. D. Klingenberg, Postdoctoral fellow, University of Cambridge, UK

- *Scientists with professorial rank*

  Prof. Dr. A.F. Cheviakov, Associate Professor, University of Saskatchewan, Canada
  Prof. Dr. D. Razafindralandy, Associate Professor, Université de La Rochelle, France
  Prof. Dr. C. Wang, Associate Professor, Shanghai Jiao Tong University, China
  Prof. Dr. N. Ali, Associate Professor, International Islamic University Islamabad, Pakistan
  Prof. Dr. Z. Abbas, Assistant Professor, The Islamia University of Bahawalpur, Pakistan
  Prof. Dr. A. Mehdizadeh, Assistant Professor, University of Missouri – Kansas City, USA
  Prof. Dr. M. Wacławczyk, Assistent Professor, University of Warsaw, Poland
  Prof. Dr. L. Lukassen, Assistent Professor, University of Oldenburg, Germany
  Prof. Dr. L. Sarno, Assistent Professor, Università degli Studi di Salerno, Italy

Research Projects and Contracts

Fundamental Research

01/92 - 12/94	EU Program JOULE II (Co-PI) *Individual Project: Improvement of Turbulence Modelling for Internal Combustion Engines*
01/92 - 12/94	DFG Collaborative Research Center (Aachen) *Individual Project: Flow and Combustion Modelling in Diesel Engines*
01/92 - 12/94	DFG Collaborative Research Center (Aachen) *Individual Project: Non-linear Perturbation Theory for Slender Vortices*
05/95 - 04/97	DFG Research Grant (PI) Center for Turbulence Research, Stanford University/NASA Ames, USA

	Analytical and Numerical Analysis of Two-point Velocity Correlations in Turbulent Boundary Layer Flows
04/99 - 03/02	DFG Research Grant (PI) *Similarity Theory and Modelling of Compressible Turbulent Shear Flows*
02/00 - 11/06	DFG Research Grant (PI) *Rotation of Plane Turbulent Channel Flow about the Streamwise Direction: Experiment and DNS* Co-PI: Prof. Dr. W. Schröder
09/00 - 03/06	DFG Research Group *Interdisciplinary Turbulence Initiative (iTi)* Spokespersons: Prof. Dr. M. Oberlack, Prof. Dr. J. Peinke 8 Projects between Fluid Mechanicians and Physicists Individual Sub-Project: *Symmetry Analysis of the Two-Point Correlation Equation in a ZPG Turbulent Boundary Layer Flow*
05/01 - 04/04	DFG Research Grant (PI) *Analytic Turbulent Scaling Laws from Generalised Symmetries of the Euler and Navier-Stokes Equations for a Physics Based Modelling*
01/02-12/10	DFG Collaborative Research Center: Flow and Combustion in Future Gas Turbine Combustion Chambers Spokesperson: Prof. Dr. J. Janicka Individual Sub-Project: *Modelling Turbulent Premixed Combustion Using Symmetries of the G-Equation*
06/02- 05/03	DBU University-Industry Research Collaboration: Effectiveness and Limitations of Flush Cleaning Devices Spokesperson: Prof. Dr. M. Oberlack Partners: 2 TU Darmstadt Institutes; 1 Industrial Partner
08/02 - 07/05	BMBF Research Collaboration: Turbulent Flow with Strong Streamline Curvature Spokesperson: Prof. Dr. M. Oberlack Partners: 7 Sub-Projects at 4 Universities Individual Sub-Project: *Physically Based Modelling on the Basis of Invariance Methods for Flows with Strong Swirl Numbers*
01/03 - 12/05	DFG Graduate School: Modelling, Simulation and Optimisation in Engineering Applications Spokesperson: Prof. Dr. M. Schäfer Individual Sub-Project: *Lagrange Averaged Euler and Navier-Stokes Equations*
01/03 - 12/05	DFG-CNRS German-French Binational Research Collaboration: Noise Generation in Turbulent Flows Spokesperson: Prof. Dr. C.-D. Munz Individual Sub-Project: *Physically Based Sub-Grid Scale Modeling for Large-Eddy Simulation to Enhance Turbulence Noise Prediction*
05/06-04/09	DFG Research Group (PI) *Active Statistical Turbulence Modelling using Lie Symmetry Methods*
09/06-09/07	Hessen Agency University-Industry Research Collaboration: Load-Dependent Control of Sewer Flush Cleaning for an Environmentally Optimised Planning of Sewage Networks and Sewage Treatment Plants

	Spokesperson: Dipl.-Ing. J. Steinhardt/Steinhardt GmbH
11/06-10/09	DFG Research Grant (PI) *Turbulent Diffusion: DNS, Modelling and Experimental Analysis* Co-PI: Prof. Dr. C. Tropea, Dr. S. Jacirlic
01/07-12/09	DFG Research Grant (PI) *Modelling of the Deformation of Alluvial Material due to Fluid Flow using Level-Set Method*
06/07-05/10	DFG Research Grant (PI) *Wall-Normal Rotating Channel Flow: Direct Numerical Simulation, Modeling and Lie Group Analysis*
07/07-06/10	BMBF Research Collaboration: Discrete-Continuous Optimisation of Complex Dynamical Water Supply and Sewage Disposal Networks Spokesperson: Prof. Dr. A. Martin Individual Sub-Project: *Transition from Hyperbolic to Parabolic PDEs in Hydrodynamics and its Numerical Implementation*
01/07-09/10	DFG Research Grant *Geometrical Structure of Small-Scale Turbulence* Spokesperson: Prof. Dr. N. Peters Co-PI: Prof. Dr. M. Oberlack, Prof. Dr. W. Schröder
11/07-10/12	DFG Excellence Cluster *Center for Smart Interfaces* Spokesperson: Prof. Dr.-Ing. C. Tropea Co-PI: 22 Professors from TU Darmstadt, MPI Mainz, Inst. Microtechnology Mainz
11/07-10/18	DFG Graduate School of Excellence *Computational Engineering* Spokesperson: Prof. Dr.-Ing. M. Schäfer Co-PI: 23 Professors TU Darmstadt
01/10-01/13	DFG Research Grant (PI) *Turbulent Couette–Poiseuille Flow with Wall Transpiration: Analytical Study and Direct Numerical Simulation*
01/10-01/13	DFG Research Grant *Theoretical, Numerical and Experimental Investigation of Fluid Droplets on Electrically Highly Loaded Insulating Layers* PI: Prof. Dr.-Ing. M. Oberlack, Prof. Dr.-Ing. T. Weiland, Prof. Dr.-Ing. V. Hinrichsen (all TU Darmstadt)
09/11-10/14	DFG Research Grant (PI) *Simulation of the Droplet Evaporation and Combustion and Droplet Impact on a Solid Surface Using a Discontinuous Galerkin Scheme*
06/10-05/16	DFG Priority Program (2 funding phases) *Transport Processes at Fluidic Interfaces* Spokespersons: Prof. Dr. rer. nat. D. Bothe, Prof. Dr. rer. nat. A. Reusken Individual Sub-Project: *Discontinuous Galerkin Simulation of Multiphase flows with Interfacial Equations*
02/14-1/17	DFG Research Grant (PI) *Higher Order Accurate Simulation of Compressible Multi-Phase Flows by Means of a Discontinuous Galerkin Method with Non-smooth Enrichments*
since 10/14	DFG Research Grant (PI) *Symmetry Based Scaling of Statistical Quantities of a Turbulent Couette Flow Extended by Wall-transpiration*

since 07/16	DFG Collaborative Research Center *Interaction between Transport and Wetting Processes* Spokesperson: Prof. Dr.-Ing. P. Stephan, Prof. Dr. rer. nat. D. Bothe, Individual Sub-Project: *Higher Order Schemes for Direct Numerical Simulation for Wetting and De-wetting Problems Based on Discontinuous Galerkin Methods*
01/16-12/17	DFG Research Grant (PI) *Helical and Extended Helical Invariant Flows: New Conservation Laws and their Importance for Turbulence*
09/16-08/19	DFG Priority Programme *Turbulent Superstructures* Spokesperson: Prof. Dr. J. Schumacher Individual Sub-Project: *Asymptotic Suction Boundary Layer: Alternative Linear and Weakly Non-modal Stability Modes – a New Route to Large-scale Turbulent Structures*
05/17-05/22	DFG Research Grant (PI) *Direct Numerical Simulation of the Droplet Evaporation and Combustion Using a Discontinuous Galerkin Scheme*
08/17-09/21	DFG Research Grant (PI) *Non-Gaussianity, Bounds on Turbulent Scaling Parameter and Conformal Transformations - Analyzing the Lundgren and Hopf Functional Equation of Turbulence Using Lie Symmetries*
since 04/18	DFG-FWF Research Grant (PI) *Experimental, Numerical and Analytical Investigation of Droplet Oscillation of a Viscoelastic Fluid (in cooperation with Prof. G. Brenn / TU Graz)*
since 07/18	DFG Collaborative Research Center (in cooperation with Uni Mainz) *Multiscale Simulation Methods for Soft-Matter Systems* Spokesperson: Prof. Dr. F. Schmidt Individual Sub-Project: *Dense Active Suspensions in the Chaotic Regime*
1/19-11/23	DFG-ANR Research Grant (PI) *Shock-like Focussing of Inertial Waves - the Local Generation of Turbulence (in cooperation with Prof. F. Godeferd, Université de Lyon)*
since 12/20	DFG Research Grant (PI) *Symmetry-based Turbulence Modelling for Engineering Applications*
since 01/21	DFG Network project (in cooperation with RWTH Aachen) *National High Performance Computing for Comp. Engineering Science* Spokesperson: Prof. Dr. Ch. Bischof Individual Sub-Project: *High-Order Methods and HPC*
since 02/21	DFG Research Grant (PI) *Aerodynamic noise generation in boundary layer flows*
since 03/22	DFG Collaborative Research Center (in cooperation with TU Graz) *Computational Electric Machine Laboratory: Thermal Modelling, Transient Analysis, Geometry Handling and Robust Design* Spokesperson: Prof. Dr. S. Schöps Individual Sub-Project: *Highly Efficient Rotor Cooling Using Heat Pipes*
since 10/23	DFG priority program (Co-founder and PI) *Hyperbolic Balance Laws in Fluid Mechanics: Complexity, Scales, Randomness (CoScaRa)*

Applied Research and Industry Contracts

Liewatech/Bad König	*Measuring Concept for the Hydrodynamic Evaluation of Flush Cleaning Devices*
American Waterless/ Zug, Switzerland	*Fluid Dynamic Design of a Blockage Indicator for the Seal Trap-Cartridge* (Waterless Europe AG)
Merck KGaA/Darmstadt	*Streakiness of Optical Sol-Gel Dip Coating*
BAW/Karlsruhe	*On the Optimal Application of Wall-Functions for Rough Surfaces*
LacTec/Rodgau	*Spray Nozzle Optimisation for the Application of Liquid Protection Film in the Automotive Industry*
Sewage Company/ Wetzlar	*Simulation of a Flush Cleaning Wave in a Reservoir Channel in Wetzlar*
Microdyn-Nadir/ Wiesbaden	*Model Computations and Optimization of Hydraulik Membranes*
Bosch/Stuttgart	*Analytic Modeling of Turbulent Flow within a Spherical Conical Seat Valve*

Workshop and Conference Organisation

Udine/Italy	*Theories of Turbulence* Organizers: Prof. Dr. M. Oberlack, Prof. Dr. F.-H. Busse CISM Workshop, 17.-21.09.2001
Darmstadt/Germany	*Darmstadt Colloquium on Hydraulic Engineering (DAWAKO)* Organizer: Prof. Dr. M. Oberlack 18./19.10.2001
Bad Zwischenahn/ Germany	*Interdisciplinary Turbulence Conference 03'* Organizers: Prof. Dr. J. Peinke, Prof. Dr. M. Oberlack 21.-24.09.2003
Aachen/Germany	*Turbulence in Power Engineering I* Organizers: Prof. Dr. St. Pischinger, Prof. Dr. M. Oberlack 16.07.2004
Darmstadt/Germany	*Turbulence in Power Engineering II* Organizers: Prof. Dr. M. Oberlack, Prof. Dr. St. Pischinger 06.06.2005
Bad Zwischenahn Germany	*Interdisciplinary Turbulence Conference 05'* Organizers: Prof. Dr. M. Oberlack, Prof. Dr. J. Peinke 25.-28.09.2005
Osnabrück/Germany	*Drainage Control, Flush Cleaning, Water Protection* Organizer: Prof. Dr. M. Oberlack 31.-31.10.2006
Bertinoro/Italy	*Interdisciplinary Turbulence Conference 08'* Organizers: Prof. Dr. M. Oberlack, Prof. Dr. J. Peinke, Prof. Dr. A. Talamelli 28.09.-02.10.2008
Kanpur/Indien	*2nd Indo German Conference on PDE, Scientific Computing and Optimization in Applications* Organizers: Prof. Dr. B. V. Rathish Kumar, PD Dr. S. B. Hazara, Prof. Dr. D. Bahuguna, Prof. Dr. M. Oberlack 7.-09.10.2009
Bertinoro/Italy	*Interdisciplinary Turbulence Conference 10'* Organizers: Prof. Dr. M. Oberlack, Prof. Dr. J. Peinke, Prof. Dr. A. Talamelli

	19.10.-22.10.2010
Bertinoro/Italy	*Interdisciplinary Turbulence Conference 12'* Organizers: Prof. Dr. M. Oberlack, Prof. Dr. J. Peinke, Prof. Dr. A. Talamelli 30.09.-03.10.2012
Bertinoro/Italy	*Interdisciplinary Turbulence Conference 14'* Organizers: Prof. Dr. M. Oberlack, Prof. Dr. J. Peinke, Prof. Dr. A. Talamelli, Prof. Dr. Ch. Vassilicos 21.-24.09.2014
Bertinoro/Italy	*Interdisciplinary Turbulence Conference 16'* Organizers: Prof. Dr. M. Oberlack, PD R. Örlü, Prof. Dr. J. Peinke, Prof. Dr. A. Talamelli 07.-09.09.2016
Chicago/USA	*International Conference on Turbulence and Shear Flow Phenomena* Chair Executive Committee: Prof. Dr. M. Oberlack Executive Committee: Prof. Dr. A. Johansson, Prof. PD. H. Nagib, Prof. PD Lex Smits, Prof. PD. H. J. Sung, Prof. PD S. Tavoularis, 06.-09.07.2017
Cargese/France	*Summer School on Symmetries and Applications* Organizers: Prof. Dr. J.-F. Ganghoffer, Prof. Dr. M. Oberlack 16.-20.04.2018
Bertinoro/Italy	*Interdisciplinary Turbulence Conference 18'* Organizers: Prof. Dr. M. Oberlack, PD R. Örlü, Prof. Dr. J. Peinke, Prof. Dr. A. Talamelli 04.-07.09.2018
Southampton/UK	*International Conference on Turbulence and Shear Flow Phenomena* Chair Executive Committee: Prof. Dr. M. Oberlack Executive Committee: Prof. PD B. Ganapathisubramani, Prof. Dr. A. Johansson, Prof. PD Lex Smits, Prof. PD. H. J. Sung, Prof. PD S. Tavoularis, 06.-09.07.2019

Individual Invitations for Research Collaborations Abroad

Stanford/USA 07/94	On the Local Structure of the Two-Point Correlation Function for a Consistent Modelling of the Dissipation Tensor and the Pressure-Strain Tensor, *Center for Turbulence Research, Stanford University/NASA Ames*
Stanford/USA 05/95 - 04/97	Analytical and Numerical Analysis of the Two-Point Velocity Correlations in Turbulent Boundary Layer Flows, *Center for Turbulence Research, Stanford University/NASA Ames*
Stanford/USA 07/98	Group Analysis, DNS and Modeling of a Turbulent Channel Flow with Streamwise Rotation, *Center for Turbulence Research, Stanford University/NASA Ames*
Cambridge/UK 02/99	Lie-Group Analysis of Turbulent Flows, *The Isaac Newton Institute for Mathematical Sciences, University of Cambridge*
Cambridge/UK 04/99	Symmetries and Sub-Grid Scale Models, *The Isaac Newton Institute for Mathematical Sciences, University of Cambridge*
Edinburgh/UK 03/00	Galilean-Invariance and LET Models of Turbulence, *Department of Physics and Astronomy, University of Edinburgh*
Stanford/USA 08/01	Modelling of Premixed Turbulent Combustion Using G-equation, *Center for Turbulence Research, Stanford University/NASA Ames*
Hampton/USA 09/02	Analysis and Modeling of Turbulent Diffusion Waves, *NASA Langley Research Center*

Stanford/USA 07/06	Modeling Flame Brush Thickness in Premixed Turbulent Combustion, *Center for Turbulence Research, Stanford University/NASA Ames*
Cambridge/UK 09/08	Scaling law of fractal-generated turbulence and its derivation from a new scaling group of the multi-point correlation equation & Helical flows, conservation laws and symmetries, *The Isaac Newton Institute for Mathematical Sciences, University of Cambridge*
Shanghai/China 03/09	On the unification of homotopy analysis method with the Lie group theory, *Jiao Tong University*
Stockholm/Sweden 04/10	Turbulence and conservation laws, *Nordic Institut for Theoretical Physics (NORDITA)/KTH Stockholm*
Los Angeles/USA 10-11/14	Mathematics of Turbulence, *Institut for Pure and Applied Mathematics/UC Los Angeles*
Princeton/USA 08/17	Symmetry methods in turbulence and hydrodynamic stability theory, *Mechanical and Aerospace Engineering/Princeton University*
Rechovot/Israel 12/18-01/19	Fluid flows from graphene to planet atmospheres, *Weizmann Institut*

Teaching

Courses taught

Sum 90 - Win 90/91	Mechanics (Statics), *Exercise, RWTH Aachen*
05/94	A New Dissipation Tensor Model for Strongly Anisotropic Compressed Turbulence *Short Course on Turbulence in Compressible Flows, Valladolid/Spain*
Win 97/98	Flow and Temperature Boundary Layers II *RWTH Aachen*
04/99, 04/01, 04/03, 04/05	Similarity Solutions in Turbulent Shear Flows *Lecture during the Short Courses: "Turbulenz", LSTM, University Erlangen-Nürnberg*
Win 00/01 - Win 05/06	Turbulent Flows (common Course with Prof. Ph.D. K. Hutter, Prof. Dr. A. Sadiki
Sum 00 - present	Hydromechanics and Hydraulics A
since Win 00/01	Hydromechanics and Hydraulic B
Win 00/01 - Win 05/06	Hydromechanics and Hydraulic C
Sum 01 - Sum 06	Selected Chapters in Hydromechanics
Sum 01 - Sum 06	Similarity Methods in Fluid Mechanics and Turbulence
Sum 02 - Win 05/06	Numerical Methods in Hydromechanics
Sum 05	Hydrodynamics II
Win 05/06	Hydrodynamics I
Sum 06 - present	Boundary Layer Theory
Win 06/07 - Win 11/12	Symmetry and Selfsimilarity in Fluid Mechanics
Win 06/07 - Win 07/08	Mechanics II
Sum 07 - present	Fundamentals of Turbulence
Win 07/08 - present	Advanced Fluid Dynamics
Sum 08 - Sum 11	Hydrodynamic Stability Theory
Sum 08 - present	Tutorium Analysis and Numerics in Fluid Dynamics
Sum 09 - present	High Order Numerical Methods in Fluid Flow Simulation and Optimization
Win 09/10 - present	Mechanics I (Statics)
Sum 14 - present	Mathematical Methods in Fluid Mechanics: Exact and Symmetry Methods

Theses Directed (Bachelor and Master)

- since 1992 more than 150 theses directed

Dissertations Directed

- Breuer St.: Experimental and Theoretical Analysis of Axisymmetric Turbulence During the Compression Stroke of a Reciprocating Engine, *Dissertation, RWTH Aachen*, (2000)
- Wenzel H.: Direct Numerical Simulation of Flame Front Propagation in Homogeneous Turbulence, *Dissertation, RWTH Aachen*, (2000)
- Arlitt R.G.H.: Compressible Turbulence - Symmetry Analysis and Direct Numerical Simulation, *Dissertation, RWTH Aachen*, (2004)
- Guenther S.: Symmetry methods for turbulence modeling; *Dissertation, TU Darmstadt*, (2005)
- Khujadze G.: DNS and Lie Group Analysis of Zero Pressure Gradient Turbulent Boundary Layer Flow; *Dissertation, TU Darmstadt*, (2006)
- Wendling I.: Dynamic Large-Eddy Simulation of Turbulent Flows in Complex Geometries; *Dissertation, TU Darmstadt*, (2007)
- Weller T.: Lie Group Analysis, Direct Numerical Simulation and Wavelet Analysis of a Turbulent Channel Flow Rotating about the Streamwise Direction; *Dissertation, TU Darmstadt*, (2007)
- Schaffner J.: Modelling of Flush Cleaning in Sewer Channels; *Dissertation TU Darmstadt*, (2007)
- Kraft S.: Modelling of the Deformation of Alluvial Material due to Fluid Flow using Level-Set Method; *Dissertation TU Darmstadt*, (2009).
- Mehdizadeh A.: Direct Numerical Simulation, Lie Group Analysis and Modeling of a Turbulent Channel Flow with Wall-normal Rotation; *Dissertation TU Darmstadt*, (2010)
- Kummer F.: The BoSSS Discontinuous Galerkin solver for incompressible fluid dynamics and an extension to singular equations; *Dissertation TU Darmstadt*, (2011)
- Aldudak F.: Geometrical Structure of Small Scales and Wall-bounded Turbulence; *Dissertation TU Darmstadt*, (2012)
- Emamy N.: Free surface fluid flow controlled by surface and electro-magnetic forces; *Dissertation TU Darmstadt*, (2013)
- Avsarkisov V.: Turbulent Poiseuille flow with uniform wall blowing and suction; *Dissertation TU Darmstadt*, (2013)
- Rosteck A.: Scaling Laws in turbulence - a theoretical approach using Lie-point symmetries; *Dissertation TU Darmstadt*, (2013)
- Mousavi R.: Level-Set Method for Simulating the Dynamics of the Fluid-Fluid Interfaces: Application of a Discontinuous Galerkin Method; *Dissertation TU Darmstadt*, (2014)
- Müller B.: Methods for higher order numerical simulations of complex inviscid fluids with immersed boundaries; *Dissertation TU Darmstadt*, (2014)
- Kelbin O.: Conservation laws of helical flows; *Dissertation TU Darmstadt*, (2014)
- Lukassen L.: A colored-noise Fokker-Planck equation for non-Brownian particles in shear-induced diffusion; *Dissertation TU Darmstadt*, (2015)
- Klein B.: A high-order Discontinuous Galerkin solver for incompressible and low-Mach number flows; *Dissertation TU Darmstadt*, (2015)
- Kallendorf C.: An Eulerian discontinuous Galerkin method for the numerical simulation of interfactial transport; *Dissertation TU Darmstadt*, (2016)
- Hau J.-N.: Aerodynamic sound production in shear flows – A novel approach to analytic source identification and its numerical validation; *Dissertation TU Darmstadt*, (2016)
- Meng X.: Dynamical modelling and numerical simulation of grain-fluid mixture flows; *Dissertation TU Darmstadt*, (2017)
- Krämer-Eis St.: Compressible multi-phase simulation using a sharp-interface Discontinuous Galerkin scheme; *Dissertation TU Darmstadt*, (2017)
- Utz T.: Level set methods for high-order unfitted discontinuous Galerkin schemes; *Dissertation TU Darmstadt*, (2018)

- Krause, D.: A Cut Cell Discontinuous Galerkin Method for Particulate Flows; *Dissertation TU Darmstadt*, (2019)
- Dierkes, D.: A high-order discontinuous Galerkin solver and exact solutions for helically invariant flows; *Dissertation TU Darmstadt*, (2020)
- Kikker, A.: A High-Order (EXtended) Discontinuous Galerkin Solver for the Simulation of Viscoelastic Droplet; *Dissertation TU Darmstadt*, (2020)
- Smuda, M.: Direct Numerical Simulation of Multi-Phase Flows Using Extended Discontinuous Galerkin Methods; *Dissertation TU Darmstadt*, (2021)
- Geisenhofer, M.: From Shock-Capturing to High-Order Shock-Fitting; *Dissertation TU Darmstadt*, (2021)
- Zhang, Y. : Instability and acoustics of compressible exponential boundary layer flows; *Dissertation TU Darmstadt*, (2022)
- Yalcin, A.: Revisiting linear stability of the asymptotic suction boundary layer and plane Couette flow; *Dissertation TU Darmstadt*, (2022)
- Klingenberg, D.: Development of novel Reynolds-averaged Navier-Stokes turbulence models based on Lie symmetry constraints; *Dissertation TU Darmstadt*, (2022)
- Gebler, T.: Linear and non-linear analysis of puffs in pipe flows; *Dissertation TU Darmstadt*, (2022)
- Deußen, B.: Theoretical and numerical investigation of active suspensions: Determinism, chaos and intermittency; *Dissertation TU Darmstadt*, (2023)
- Gutierrez, J.: Direct numerical simulation of the droplet evaporation and combustion using a discontinuous Galerkin scheme; *Dissertation TU Darmstadt*, (2023)
- Dokoza, T.: On a fully non-linear theory of turbulent super-structures in plane Couette flow and Rayleigh Benard convection; *Dissertation TU Darmstadt*, (2024)
- Nguyen, C.: Turbulent round jet flows: Direct numerical simulations and a symmetry analysis; *Dissertation TU Darmstadt*, (2024)
- Vandergrift, J.: Implicit discontinuous Galerkin shock tracking methods for compressible flows with shocks; *Dissertation TU Darmstadt*, (2024)
- Rieckmann, M.: The extended Discontinuous Galerkin method for evaporation and contact lines; *Dissertation TU Darmstadt*, (2024)

Present Graduate Advisees

- Plümacher, D.: Turbulence theory based on the Lundgren pdf and the Hopf functional approach; since 09/16.
- Beck, L.: Highly accurate numerical simulation of wetting, dewetting and fluid-splitting phenomena between elastic surfaces; since 01/19.
- Liu, J.: Shock-like Focussing of Inertial Waves - the Local Generation of Turbulence; since 10/19.
- Sun, W.: Theoretical, numerical and experimental investigations of gravity-driven fluid-granular mixture flows; since 05/20.
- Görtz, S.: Acoustic and turbulence in a supersonic free shear layer using discontinous Galerkin methods; since 01/21.
- Putz, F.: RANS modelling - a symmetry approach; since 08/21.
- De Broeck, L.: Modeling and numerical simulation of acoustics in boundary layer flows; since 09/21.
- Akbari, S.: Numerical Investigation of helical flows - the transition between 2D and 3D turbulence; since 03/22
- Toprak, M.: High Performance Computing, Research Data Management, Numerical Simulations; since 07/22
- Shishkina, I.: Highly efficient rotor cooling using heat pipes; since 09/22
- Miao, C.: Highly accurate numerical simulation of wetting and dewetting on flexible substrates

including Heat transfer; since 04/23
- Ben Gozlen, H.: Dense active suspensions in the chaotic regime; since 06/23
- Conrad, J.: Viscoelastis stability and turbulence; since 09/23
- Wilhelm, K.: 3D spatially evolving oblique modes; since 11/23
- Ye, X.: Numerical modeling of two-phase flows in electric fields; since 05/24
- Benedikt, N.: Variation of turbulent round jet inflow condition: direct numerical simulations and extended symmetry analysis; since 10/2024
- Albert, J.: Symmetries and a variational theory of scaling parameters in turbulent scaling laws; since 11/2024
- Mukdasanit, P.: Lagrangian turbulence - symmetries and scaling laws; since 12/2024

Post-Docs

- Kurenkov A.: Modelling and simulation of premixed combustion; 01/03 - 06/06.
- Groll R.: Modelling and simulation of two-phase flow; 08/03-11/04.
- Frewer M.: Statistical turbulence modelling using symmetry methods; 02/05-12/12.
- Khujadze G.: Direct numerical simulation of a buoyant turbulent boundary layer; 03/06-01/13.
- Weller T: DNS of a turbulent channel flow with streamwise rotation; 05/07-08/08
- Wacławczyk M.: Modeling of turbulence-interface interaction in two-fluid systems; 03/10-09/15
- Hazra S. B.: Coupling of level-set and Discontinuous Galerkin methods; 11/08-12/09.
- Reis M.: Constitutive modeling of a non-reactive, conducting and polar continuum under the influence of electromagnetic fields; 09/12 - 03/13
- Cao, D.T.: Dynamic analysis of catastrophic landslides considering thermo-poro-mechanical effects; 11/14-10/15
- Guo, X.: Hypoplastic constitutive model for unsaturated soil and debris materials; 11/14-10/15
- Feng, F.: Aerodynamic sound simulation of linear shear and turbulent jet flows using Discontinuous Galerkin methods; 06/15-05/16
- Müller, B.: Higher order accurate simulation of compressible multi-phase flows by means of a Discontinuous Galerkin method with non-smooth enrichments; 04/14-12/17
- Kummer, F.: Development of extended Discontinuous Galerkin methods for singular flow problems; 02/15-07/18
- Klingenberg, D.: Coupling OpenFOAM with BoSSS; 10/22-09/23
- Deußen, B.: Symmetry analysis of active suspensions; 03/23-08/23
- Smuda, M.: Direct numerical simulation of multi-phase flows using extended Discontinuous Galerkin methods; since 09/21

Guest Scientists and Humboldt Research Fellows

- Wacławczyk M. (Gdansk/Poland): Development of hybrid deterministic and stochastic method for turbulence modelling; 08/03-07/04.
- Grebenev V.N. (Novosibirsk/Russia): Application of differential constraints for verification of closure procedure in parametric turbulent models; 01/04-05/04.
- Viccione G. (Salerno/Italy): Particle method for free surface fluid dynamical problems; 11/04-5/05
- Wacławczyk M. (Gdansk/Poland): On the extension of Lie group analysis to functional differential equations and its application to the Hopf equation of turbulence; 02/05.
- Grebenev V.N. (Novosibirsk/Russia): Unification of Lie group analysis and singular asymptotic methods and application to fluid mechanics; 02/05-05/05 & 08/06.
- Wang C. (Shanghai/China): Unsteady boundary layers solved by homotopy analysis method with applications to debris and mud flows, *Humboldt Research Fellowship*, 11/06-10/07.
- Razafindralandy D. (La Rochelle/France): Reinterpretation of symmetry breaking due to rotation, *Humboldt Research Fellowship*, 02/07-09/07.
- Grebenev V.N. (Novosibirsk/Russia): Symmetry analysis methods in turbulent flows; 02/07-04/07

& 11/07-12/07.

- Vigdorovich I. (Moscow State University/Russia): Near-wall turbulent flows and asymptotic methods; *03/07-06/07.*
- Ali N. (Quaid-I-Azam University/Pakistan): Peristaltic flows; *08/07-02/08.*
- Abbas Z. (Quaid-I-Azam University/Pakistan): Streching plate flows; *08/07-02/08.*
- Cheviakov A. (University of BC Vancouver/Canada): Analysis of systems of nonlinear partial differential equations within the framework of nonlocally related PDE systems, *Humboldt Research Fellowship*, 05/08-08/08.
- Vigdorovich I. (Moscow State University/Russia): Asymptotic structure and scaling laws for turbulent Poiseuille flow with wall transpiration; *09/08-10/08*, *04/09-05/09.*
- Chagelishvili G. (Georgian National Astrophysical Observatory Tbilisi/Georgia): A comparative numerical analysis of linear and nonlinear mechanisms of acoustic wave generation by vortical perturbations in 2D compressible plane uniform shear flows; *05/08-7/08*, *11/08-12/08*, *12/10*, *03/11-04/11*, *01/12-02/12.*
- Wacławczyk M. (Gdansk/Poland): Statistical and SGS modelling of turbulence-interface interactions, *Humboldt Research Fellowship*, 03/08-02/10.
- Grebenev V.N. (Novosibirsk/Russia): Length scales of turbulent motion generated by two-point correlation tensor for homogeneous isotropic turbulence, *04/09-05/09*, *11/09-12/09*, *11/10-12/10.*
- Hoyas S. (University of Valencia/Spain): DNS of transpirating channel flow, *07/12-08/12.*
- Cheviakov A. (Saskatchewan/Canada): New conservation laws of helical flows, *06/11-07/11*, *06/12-07/12.*
- Grebenev V.N. (Novosibirsk/Russia): Potential symmetry transformations for trajectories of an ideal steady fluid flow, *08/13*, *11-12/13.*
- Cheviakov A. (Saskatchewan/Canada): Generalized Ertel's theorem and infinite hierarchies of conserved quantities for three-dimensional time dependent Euler and Navier-Stokes equations, *05/13.*
- Delbende I. (UPMC - University of Paris 6, LIMSI - CNRS/France): Numerical simulation of helically symmetric flows, *04/13.*
- Chagelishvili G. (Georgian National Astrophysical Observatory Tbilisi/Georgia): A comparative analysis of linear and non-linear aerodynamic sound generation in subsonic shear flows; *01/13*, *12/13.*
- Chagelishvili G. (Georgian National Astrophysical Observatory Tbilisi/Georgia): Aerodynamic sound generation and Kelvin modes in linear shear flows; *01/15-04/15.*
- Grebenev V.N. (Novosibirsk/Russia): Symmetries of the Lundgren pdf approach to turbulence, *04-05/16.*
- Hoyas S. (University of Valencia/Spain): DNS of transpirating Couette flow, *07-08/16.*
- Grebenev V.N. (Novosibirsk/Russia): Symmetries of the Novikov pdf approach to turbulence, *10-11/16.*
- Chagelishvili G. (Georgian National Astrophysical Observatory Tbilisi/Georgia): On the hydrodynamic stability analysis of linear shear flows and their group-invariant solutions; *11-12/16.*
- Reis, M. (Campinas, Brazil): Thermodynamic modeling and numerical simulation of a two-phase reacting ionic flow, *Humboldt Research Fellowship*; *11/15-10/17*
- Poroseva, S. (Albuquerque/USA): Modelling of turbulent diffusion using symmetries; *04/17*
- Bakhshandeh, R. (Teheran/Iran): Geometry of two-point velocity correlation tensor of homogeneous isotropic turbulence with helicity in Sol-manifold coordinates; *06-09/17*
- Grebenev, V. (Novosibirsk/Russia): On the conformal group in 2D turbulence; *10-11/17*
- Cheviakov, A. (Saskatchewan/Canada): Extended thermodynamics and helical flows; *04/18*
- Pukhnachev, V. (Novosibirsk/Russia): Symmetry analysis of viscoelastic models; *04/18*
- Sadeghi, H. (Toronto/Canada): Symmetry analysis and DNS of a turbulent plane jet, *Humboldt Research Fellowship*; *06/16-5/18*
- Liao, S. (Shanghai/China): Propagation of numerical noises in simulation of turbulence; *09-11/18*

- Praturi, D. (College Station/USA): A unified theory for flow-thermodynamic interactions in compressible turbulence using symmetries, *Humboldt Research Fellowship*; *01/20-12/21*
- Liu, W. (Chinese Academy of Science Chengdu/China): Modeling of debris flows, *China Scholarship Council Fellowship*; *08/19-07/20*
- Sarno, L. (Salerno/Italy): Modelling of rheologically stratified granular flows by a multi-layer depth-averaged approach, *Marie Curie Grant*; *09/19-09/22*
- Grebenev V.N. (Novosibirsk/Russia): Symmetry analysis methods in helical turbulent flows; *03/24-05/24*

Invited Seminars and Lectures

Personal Invitations to International Conferences

Ascona/Switzerland	*2nd Monte Verita Colloquium on Fundamental Problematic Issues in Turbulence*, 03/1998
Bremen/Germany	*GAMM Annual Meeting*, 04/1998
Dresden/Germany	*International workshop: The Physics of Turbulence*, 08/1998
Cambridge/UK	*Workshop on Mathematics of Closure*, 04/1999
Göttingen/Germany	*GAMM Annual Meeting*, 04/2000
Hamilton/Canada	*MATH 2000*, 06/2000
Oberwolfach/Germany	*Analytical and Statistical Approaches in Fluid Models, Oberwolfach*, 09/2000
Zürich/Switzerland	*GAMM Annual Meeting*, 02/2001
Munich/Germany	*STAB-Symposium*, 11/2002
Bad Honnef/Germany	*Workshop on Non-Ideal Turbulence*, 04/2003
Calcutta/India	*Keynote Speaker (N.R. Sen Memorial Lecture): Int. Symp. Recent Advances in Mathematics and its Applications (ISRAMA)*, 12/2003
Göttingen/Germany	*IUTAM Symposium 'One Hundred Years of Boundary layer Research'*, 08/2004
Tegernsee/ Ringberg Castle	*Workshop on Interdisciplinary Aspects of Turbulence, Ringberg Castle, Lake Tegernsee*, 04/2005
Sicily/Italy	4^{th} *International Workshop on Wall-Bounded Turbulent Flows (EMFCSC)*, 10/2006
Belchatow/Poland	*Keynote Speaker: XVIIth National Conference of Fluid Mechanics, Poland*, 09/2006
London/UK	*Fractal Turbulence Workshop. Imperial College London*, 02/2008
Vancouver/Canada	*Keynote Speaker: International Conference on Similarity: generalizations, applications and open problems*, 08/2008
Prague/Czech Republic	*Keynote Speaker: Mathematical Theory in Fluid Mechanics*, 05/2009
Stockholm/Sweden	*NORDITA and Linné FLOW Centre Workshop on Turbulent Boundary Layers*, 04/2010
Ottawa/Canada	*Keynote Speaker: International Symposium on Turbulence and Shear Flow Phenomena*, 07/2011
Marseille/France	*Colloquium Turbulence Marseille*, 09/2011
London/UK	*Turbulent flows generated/designed in multiscale/fractal ways: fundamentals and application*, 03/2011
Oldenburg/Germany	*Keynote Speaker: Wind Energy and the Impact of Turbulence on the Conversion Process (EUROMECH Colloquium)*, 02/2012
Cambridge/UK	*Keynote Speaker: Topological Fluid Dynamics (IUTAM Symposium)*, 06/2012

Novosibirsk/Russia	*Keynote Speaker: The Third German-Russian Week of the Young Researcher "Aviation and Space"*, 09/2013
Orlando/USA	*Keynote Speaker: 10^{th} International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT)*, 07/2014
Prague/Czech Republic	*Keynote Speaker: International Conference on Heat Transfer and Fluid Flow (HTFF)*, 08/2014
College Station/USA	*Keynote Speaker: Turbulence Symposium 2015*, 04/2015
Kyoto/Japan	*Keynote Speaker: RIMS Workshop on Near-Wall Flows: Transition and Turbulence*, 06/2016
Montreal/Canada	*Invited Lecturer: ICTAM 2016 / Thematic Session Turbulence*, 04/2016
Rom/Italy	*Invited Lecturer: 19^{th} International Conference on Finite Elements in Flow Problems (FEF)*, 2017
Delmenhorst/Germany	*Keynote Speaker: 100 Years of Fokker-Planck Equation: Its Impaction, Turbulence Modeling and Simulation*, 2017
Krakau/Poland	*Invited Lecturer: International Scientific Conference Humboldt-Kolleg "Limits of Knowledge"*, 2017
St.Petersburg-Moscow/Russia	*Invited Lecturer: Int. Symp. Topical Problems of Nonlinear Wave Physics: Nonlinear Dynamics and Complexity,* 2017
Lyon/France	*Invited Lecturer: EUROMECH Colloquium 589: Turbulent Cascades II*, 2017
Munich/Germany	*Keynote Speaker: GAMM Annual Meeting*, 2018
Novosibirsk/Russia	*Invited Lecturer: Mathematical Problems of Continuum Mechanics*, 2019

Invited Seminar Speaker

Stockholm/Sweden	*Department of Mechanics, Royal Institute of Technology, Prof. Dr. A.V. Johansson*, 1994
Erlangen/Germany	*Lehrstuhl für Strömungsmechanik, University Erlangen-Nürnberg, Prof. Dr.-Ing. Dr. h.c. F. Durst*, 1997
Munich/Germany	*Lehrstuhl für Fluidmechanik, Technische Universität München, Prof. Dr.-Ing. R. Friedrich*, 1997
Aachen/Germany	*Lehrstuhl B für Mathematik, RWTH Aachen, Prof. Dr. W. Plesken*, 1997
Darmstadt/Germany	*Graduiertenkolleg im Fachgebiet Energie- und Kraftwerkstechnik, Technische Universität Darmstadt, Prof. Dr.-Ing. J. Janicka*, 1998
Aachen/Germany	*Aerodynamisches Seminar, Aerodynamisches Institut, RWTH Aachen, Prof. E. Krause, Ph. D.*, 1998
Delft/Netherlands	*Laboratory for Aero and Hydrodynamics, Fluid Mechanics Colloquium, Delft University of Technology, Prof. Dr. F.T.M. Nieuwstadt*, 1998
Darmstadt/Germany	*Minisymposium: Ähnlichkeitstheorie und Lie-Gruppen in Strömungsmechanik und Technik, Prof. Dr. rer.nat. K. G. Roesner*, 1998
Paris/France	*Departement de Modeles pour l'Aerodynamique et l'Energetique, ONERA - CERT, Prof. Dr. B. Aupoix*, 1998, *ENS-Cachan, LMD-CNRS, Prof. Dr. M. Farge*, 1998
Bremen/Germany	*ZARM - University of Bremen, Prof. Dr.-Ing. H. J. Rath*, 1998
Aachen/Germany	*Lehrstuhl für Theoretische Physik D und Institut für Theoretische Physik, RWTH Aachen, Prof. Dr. rer.nat. J. Schnakenberg*, 1998
Göttingen/Germany	*DLR-Kolloquium Göttingen, Prof. Dr. Meier*, 1999
Ulm/Germany	*Universität Ulm, Theoretische Physik, Abteilung für Mathematische Physik, PD Dr. Baumann*, 1999
Marburg/Germany	*Philipps-Universität Marburg, Fachbereich Physik, Prof. Dr. B. Eckhardt*,

	1999
Warwick/UK	*Dept. of Mathematics, University of Warwick, Dr. S. Nazarenko*, 1999
Eindhoven/Netherlands	*Fac. Mechanical Engineering, Eindhoven University of Technology, Prof. Dr. L.P.H. de Goey*, 2000
Edinburgh/UK	*Department of Physics and Astronomy, The University of Edinburgh, Prof. Dr. W. D. McComb*, 2000
Stuttgart/Germany	*Institut für Aerodynamik und Gasdynamik, Universität Stuttgart, Prof. Dr.-Ing. C.-D. Munz*, 2000
Cambridge/UK	*Isaac Newton Institute for Mathematical Sciences, University of Cambridge, Prof. Dr. R. B. Pelz*, 2000
Darmstadt/Germany	*Fachgebiet Energie- und Kraftwerkstechnik, Technische Universität Darmstadt, Prof. Dr.-Ing. J. Janicka*, 2000
Mannheim/Germany	*Lehrstuhl für Mathematik I, Universität Mannheim, Prof. Dr. E. Binz*, 2001
Tübingen/Germany	*Mathematisches Institut, Universität Tübingen, Prof. Dr. H. Yserentant*, 2002
Aachen/Germany	*Lehr- und Forschungsgebiet für Mechanik, RWTH Aachen, Prof. Dr. J. Ballmann*, 2002
Bochum/Germany	*Lehrstuhl für Strömungsmechanik, Ruhr-Uni Bochum, Prof. Dr.-Ing. B. Rogg*, 2002
Hampton VA/USA	*NASA Langley Research Center, Dr. T. Gatski* ,2002
Calcutta/India	*Calcutta Mathematical Society and Indian Statistical Institute, Prof. H.P. Mazumdar*, 2003
Bochum/Germany	*Lehrstuhl für Strömungsmechanik, Ruhr Uni Bochum, Prof. Dr.-Ing. B. Rogg*, 2006
Hamburg/Germany	*Institut für Thermofluiddynamik, University of Hamburg-Harburg, Prof. Dr.-Ing. H. Herwig*, 2008
Prague/Czech Republic	*Institute of Thermomechanics of the Czech Academy of Sciences*, *Mathematical Institute of the Czech Academy of Sciences*, 2008
Shanghai/China	*Shanghai Jiao Tong University, Prof. Dr. S. Liao*, 2009
Aachen/Germany	*RWTH Aachen, Prof. Dr.-Ing. N. Peters*, 2010
Stuttgart/Germany	*University of Stuttgart, Prof. Dr.-Ing. W. Ehlers*, 2010
Munich/Germany	*TU München, Prof. Dr.-Ing. R. Friedrich*, 2011
Münster/Germany	*University of Münster, Prof. Dr. rer. nat. R. Friedrich*, 2012
Southampton/UK	*University of Southampton, Prof. Dr. R. Sandberg*, 2012
Munich/Germany	*TU Munich, Prof. Dr. V. Gravemeier*, 2013
Bochum/Germany	*TU Bochum, Prof. Dr. R. Grauer*, 2013
Bremen/Germany	*Jacobs University, Prof. Dr. M. Oliver*, 2015
Kyoto/Japan	*Research Institute for Mathematical Sciences (RIMS), Prof. Dr. G. Kawahara*, 2016
Albuquerque/USA	*University of New Mexico, Prof. Dr. S. Poroseva*, 2016
Albuquerque/USA	*Sandia National Lab, Dr. D. Appelo*, 2016
Los Alamos/USA	*Los Alamos National Lab, Dr. R. Ristorcelli*, 2016
Princeton/USA	*Princeton University, Prof. Dr. M. Hultmark*, 2017
Rechovot/Israel	*Weizmann Institute, Prof. Dr. G. Falkovich*, 2019
Melbourne/Australia	*Australasian Fluid Mechanics Seminar (virtual), Prof. Dr. J. Soria*, 2020
Zurich/Switzerland	*ETH Zurich (virtual), Prof. Dr. S. Mishra*, 2020
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Conference Participation with (invited) oral Presentation

Munich/Germany	*Eighth Symposium on Turbulent Shear Flows*, 1991
Delft/Netherlands	*Fourth European Turbulence Conference*, 1992
Tempe AZ/USA	*International Conference on Near-Wall Turbulent Flows*, 1993
Kyoto/Japan	*Ninth Symposium on Turbulent Shear Flows*, 1993
Emmen/Switzerland	*Eurovisc Workshop 1994 on Turbulent Boundary Layers in Three Dimensions*, 1994
Syracuse NY/USA	*Meeting of The American Physical Society's Division of Fluid Dynamics*, 1996
Delft/Netherlands	*2nd International Symposium on Turbulence, Heat and Mass Transfer*, 1997
Nordfjordeid/Norway	*International Conference on Modern Group Analysis VII*, 1997
Grenoble/France	*Eleventh Symposium on Turbulent Shear Flows*, 1997
Stuttgart/Germany	*International Workshop on Similarity Methods*, 1998
Santa Barbara CA/USA	*1st International Conference on Turbulence and Shear Flow Phenomena*, 1999
New Orleans LA/USA	*Meeting of The American Physical Society's Division of Fluid Dynamics*, 1999
Barcelona/Spain	*8th European Turbulence Conference*, 2000
Stockholm/Sweden	*2nd International Conference on Turbulence and Shear Flow Phenomena*, 2001
Southampton/UK	*9th European Turbulence Conference*, 2002
Princeton NJ/USA	*IUTAM Symposium on Reynolds Number Scaling in Turbulent Flow*, 2002
Abano-Padua/Italy	*GAMM Annual Meeting*, 2003
Sendai/Japan	*3nd International Conference on Turbulence and Shear Flow Phenomena*, 2003
Tallahassee FL/USA	*Theoretical and Computational Fluid Dynamics Symposium*, 2003
Toulouse/France	*5th EUROMECH Fluid Mechanics Conference*, 2003
Bad Zwischenahn	*iTi Turbulence Conference*, 2003
Antalya/Türkei	*Int. Symposium on Turbulence, Heat and Mass Transfer 4*, 2003.
Dresden/Germany	*GAMM Annual Meeting*, 2004
Kassel/Germany	*Workshop on Integrated Water Research and Water Management*, 2004
Trondheim/Norway	*10th European Turbulence Conference*, 2004
Aachen/Germany	*BMBF Workshop: Turbulence in Energy Technology*, 2004
Orleans/France	*International Workshop on LES of Complex Flow and Noise Generation in Turbulent Flow*, 2004
Dresden/Germany	*6th International Conference on Urban Drainage Modelling*, 2004
Luxembourg	*GAMM Annual Meeting*, 2005
Cambridge MA/USA	3^{rd} *M.I.T. Conference on Computational Fluid and Solid Mechanics*, 2005
Williamsburg VA/USA	4^{th} *International Conference on Turbulence and Shear Flow Phenomena*, 2005
Poitiers/France	*Direct and Large-Eddy Simulation - 6*, .2005
Copenhagen/Denmark	10^{th} *International Conference on Urban Drainage*, 2005
Berlin/Germany	*GAMM Annual Meeting*, 2006
Porquerolles/France	*Conference on Turbulence and Interactions*, 2006,
Kingston/Canada	14^{th} *Annual Conference of the Computational Fluid Dynamics Society of Canada*, 2006
Heidelberg/Germany	31^{st} *International Symposium on Combustion*, 2006
Stockholm/Sweden	6^{th} *Euromech Fluid Mechanics Conference*, 2006
Nagoya/Japan	*IUTAM Symposium "Computational Physics and New Perspectives in Tur-*

	bulence", 2006
Dubrovnik/Croatia	5^{th} *International Symposium on Turbulence, Heat and Mass Transfer*, 2006
Porto/Portugal	11^{th} *European Turbulence Conference*, 2007
München/Germany	5^{th} *International Symposium on Turbulence and Shear Flow Phenomena*, 2007
Lissabon/Portugal	14^{th} *Int. Symp. on Applications of Laser Techniques to Fluid Mechanics*, 2008
Aachen/Germany	16^{th} *DGLR Symposium of STAB*, 2008
San Antonio TEX/ USA	61^{st} *Annual Meeting of the APS Division of Fluid Dynamics*, 2008
Gdanzk/Poland	*GAMM Annual Meeting*, 2009
Seoul/Korea	6^{th} *International Conference on Turbulence and Shear Flow Phenomena*, 2009
Stockholm/Sweden	7^{th} *IUTAM Symposium on Laminar-Turbulent Transition*, 2009
Rom/Italy	6^{th} *International Symposium on Turbulence, Heat and Mass Transfer*, 2009
Marburg	12^{th} *European Turbulence Conference*, 2009
Turino/Italy	*EUROMECH Small Scale Turbulence and Related Gradient Statistics*, 2009
Karlsruhe/Germany	*GAMM Annual Meeting*, 2010
Lulea/Sweden	*Modern Group Analysis (MOGRAN) 14*, 2010
State College PA/USA	16^{th} *U.S. National Congress of Theoretical and Applied Mechanics*, 2010
Munich/Germany	16^{th} *International Conference on Finite Elements in Flow Problems (FEF)*, 2011
Trento/Italy	*European Workshop on High Order Nonlinear Numerical Methods for Evolutionary PDEs (HONOM)*, 2011
Minneapolis/USA	11^{th} *US National Congress Computational Mechanics*, 2011
Ottawa/Canada	7^{th} *International Symposium on Turbulence and Shear Flow Phenomena*, 2011
Warsau/Poland	13^{th} *European Turbulence Conference*, 2011
Marseille/France	*Colloquium Turbulence Marseille*, 2011
Darmstadt/Germany	*GAMM Annual Meeting*, 2012
State College PA/USA	*Int. Conf. Num. Meth. Multiphase Flow, Penn State*, 2012
Cambridge/UK	*IUTAM Symposium, Topological Fluid Dynamics (INI Cambridge)*, 2012
Rom/Italy	*European Fluid Mechanics Conference*, 2012
Vienna/Austria	*ECCOMAS*, 2012
Lyon/France	14^{th}*European Turbulence Conference*, 2013
Poitiers/France	8^{th} *International Symposium on Turbulence and Shear Flow Phenomena*, 2013
Pittsburgh/USA	*American Physical Society 66th annual Division of Fluid Dynamics meeting*, 2013
Sidi Bou Said/Tunisia	*Turbulence Colloquium Mediterranea*, 2013
Lulea/Sweden	*Conference on Nonlinear Mathematical Physics*, 2013
Bordeaux/France	*European Workshop on High Order Nonlinear Numerical Methods for Evolutionary PDEs (HONOM)*, 2013
Lyon/France	*Int. Conf. on Extended Finite Element Methods - XFEM*, 2013
San Francisco/USA	*American Physical Society 67th annual Division of Fluid Dynamics meeting*, 2014
Erlangen/Germany	*GAMM Annual Meeting*, 2014

Darmstadt/Germany	*2nd International Conference on Numerical Methods in Multiphase Flows*, 2014
Los Angelos/USA	*Mathematics of Turbulence, UCLA*, 2014
Vancouver/Canada	*Symmetry Methods, Applications and Related Fields*, 2014
Darmstadt/Germany	*International Conference on Transport Processes at Fluidic Interfaces*, 2015
Melbourne/Australia	*9th International Symposium on Turbulence and Shear Flow Phenomena*, 2015
Delft/Netherlands	*15th European Turbulence Conference*, 2015
Corsica/France	*Whither Turbulence and Big Data In the 21st Century*, 2015
College Station/USA	*Texas A&M Workshop On Small-Scale Processes in Turbulence*, 2015
Lecce/Italy	*GAMM Annual Meeting*, 2015
Trento/Italy	*European Workshop on High Order Nonlinear Numerical Methods for Evolutionary PDEs (HONOM)*, 2015
Boston/USA	*American Physical Society 68th annual Division of Fluid Dynamics meeting*, 2015
Braunschweig/Germany	*GAMM Annual Meeting*, 2016
Venice/Italy	*IUTAM Symposium on Helicity, structures and singularity in fluid and plasma dynamics*, 2016
Provo/USA	*Challenges in Non-Equilibrium Statistical Physics and Fluid Dynamics*, 2016
Orlando/USA	*11th AIMS Conference on Dynamical Systems, Differential Equations and Applications*, 2016
Cambridge/England	*IMA Conference on Turbulence, Waves and Mixing*, 2016
Weimar/Germany	*GAMM Annual Meeting*, 2017
Chicago/USA	*10th International Symposium on Turbulence and Shear Flow Phenomena*, 2017
Erfurt/Germany	*EUROMECH Colloquium 586: Turbulent Superstructures in Closed and Open Flows*, 2017
Stockholm/Sweden	*16th European Turbulence Conference*, 2017
Denver/USA	*American Physical Society 70th annual Division of Fluid Dynamics meeting*, 2017
Marseille/France	*Symmetry and Computation*, 2018
Munich/Germany	*GAMM Annual Meeting*, 2018
Glasgow/UK	*ECCM-ECFD*, 2018
Marseille/France	*20th International Couette-Taylor Workshop*, 2018
New York/USA	*WCCMXIII and PANACM II*, 2018
London/UK	*EUROMECH Col. 598: Coherent structures in wall-bounded turbulence: new directions in a classic problem*, 2018
Atlanta/USA	*American Physical Society 71th annual Division of Fluid Dynamics meeting*, 2018
Mainz/Germany	*Dynamic Coarse-Graining and Memory Effects in Soft Matter Systems*, 2018
Vienna/Austria	*GAMM Annual Meeting*, 2019
Turino/Italy	*17th European Turbulence Conference*, 2019
London/UK	*IUTAM Symposium on Laminar-Turbulent Transition*, 2019
Southampton/UK	*11th International Symposium on Turbulence and Shear Flow Phenomena*, 2019
Seattle/USA	*American Physical Society 72th annual Division of Fluid Dynamics meet-*

	ing, 2019
Chicago/USA	*American Physical Society 73th annual Division of Fluid Dynamics meeting*, 2020

Review Activities

Governmental & Semi-Governmental Funding Organizations, Sci. Societies and Universities

- Academy of Finland
- Alexander von Humboldt Foundation *(Member Main Selection Committee 2003-2014)*
- Brunswick Scientific Society (BWG)
- Canadian Applied and Industrial Mathematical Society (CAIMS)
- Cyprus University of Technology, Cyprus
- DFF / Independent Research Fund Denmark
- ERC (European Research Council)
- Gauss Centre for Supercomputing (GCS)
- German Academic Exchange Service (DAAD)
- German Academic Scholarship Foundation (SDV)
- German Federal Environmental Foundation (DBU)
- German Research Foundation (DFG)
- German-Israeli Foundation for Scientific Research and Development (GIF)
- Hermann-Reissner Foundation
- John von Neumann Institute for Computing (NIC)
- Kazakhstan National Center for Science and Technology Evaluation
- Max-Planck Society (MPG)
- Nanyang Technological University, Singapore
- Natural Sciences and Engineering Research Council of Canada (NSERC)
- Netherlands Organisation for Scientific Research (NWO)
- Pacific Institute of the Mathematical Sciences (PIMS)
- Partnership for Advanced Computing in Europe (PRACE), EU research infrastructure for HPC (High Performance Computing)
- Swedish Research Council (VR)
- Swiss National Science Foundation (SNSF)
- United States Department of Energy (DOE)
- United States - Israel Binational Science Foundation (BSF)
- University of Saskatchewan, Canada

Appointment Commission

- Consulted as external reviewer at various appointment procedures worldwide

Doctoral Examinations Inland and Abroad

- A. P. Quinn: Local Energy Transfer Theory in Forced and Decaying Isotropic Turbulence, 02/2001, University of Edinburgh, UK, Faculty of Science and Engineering.
- A. Kurenkov: Reconstruction and stability analysis of interfaces between electrically con-ducting fluids, 05/2005, TU Ilmenau.
- C. Rorai: Vortex reconnection in superfluid helium, University of Triest, Italy, The Doctorate School in Environmental and Industrial Fluid Mechanics, 01/2012.
- F. Henke: An extended finite element method for turbulent premixed combustion, TU München, 02/2013

International Conferences

- Member "Scientific Advisory Committee" *11th International Symposium on Turbulent Shear Flows*, Grenoble/France, 1997
- Member "Advisory Committee" *4th International Symposium on Engineering Turbulence Modelling and Measurements*, Corsica/France, 1999
- Member "Lead Organizers Committee" *ASME Fluids Engineering Division Summer Meeting*, Montreal/Canada, 2002
- Member "Advisory Committee" *5th International Symposium on Engineering Turbulence Modelling and Measurements*, Mallorca/Spain, 2002
- since 2001: "Founder and Lead Organizers Committee Member" *Interdisciplinary Turbulence Conference (iTi)*
- Member "Scientific Advisory Committee" *Workshop on Interdisciplinary Aspects of Turbulence*, Ringberg Castle/Tegernsee, 2005
- since 2007: Member "Scientific Advisory Committee" *International Symposium on Turbulence and Shear Flow Phenomena (biennial)*, München, 2007; Seoul/South Korea, 2009, Ottawa/Canada 2011; Poitiers/France, 2013, Melbourne/Australia, 2015, Chicago/USA, 2017
- since 2015: Member and Chair "Executive Committee" *International Symposium on Turbulence and Shear Flow Phenomena (biennial)*
- Member "Scientific Committee" *3rd International Conference on Heat Transfer and Fluid Flow*, Budapest, Hungary, 2016.

International Journals

- American Institute of Aeronautics and Astronautics (AIAA) Journal
- Applied Mathematical Modelling
- Applied Mathematics E-Notes (AMEN)
- Applied Scientific Research
- Archive of Applied Mechanics
- ASME Journal of Fluids Engineering
- Boundary-Layer Meteorology
- Chemical Engineering Science
- Colloids and Surfaces A: Physicochemical and Engineering Aspects
- Combustion and Flame
- Computational Mechanics
- Computers and Fluids
- Continuum Mechanics and Thermodynamics
- Discrete and Continuous Dynamical Systems (DCDS) series A
- European Journal of Mechanics - B/Fluids
- European Physical Journal - Plus
- Flow, Turbulence and Combustion
- Fluid Dynamics Research
- International Journal of Computational Fluid Dynamics
- International Journal of Multiphase Flow
- International Journal for Numerical Methods in Fluids
- International Journal of Heat and Fluid Flow
- International Journal of Thermal Sciences
- Journal of Computational Physics
- Journal of Engineering Mathematics
- Journal of Fluid Mechanics
- Journal of Hydraulic Research
- Journal of Mathematical Physics

- Journal of Nonlinear Mathematical Physics
- Journal of Physics A: Mathematical and General
- Journal of Process Control
- Journal of the Calcutta Mathematical Society
- Meccanica
- Meteorologische Zeitschrift
- Nature
- Nonlinear Dynamics
- Nonlinearity
- Open Physics
- Physical Review E
- Physical Review Fluids
- Physics of Fluids
- Proceedings A of the Royal Society
- Symmetry
- Symmetry, Integrability and Geometry: Methods and Applications (SIGMA)
- SIAM Journal of Applied Mathematics
- Theoretical and Computational Fluid Dynamics
- Zeitschrift für Angewandte Mathematik und Mechanik (ZAMM)
- Zeitschrift für Angewandte Mathematik und Physik (ZAMP)

International Publishing Houses

- Springer (Berlin, Heidelberg, New York)
- Wiley (Chichester, New York, Weinheim, Brisbane, Singapore, Toronto)
- Cambridge University Press (Cambridge)
- Amsterdam University Press

Association Memberships

- The American Physical Society (APS)
- German Committee for Mechanics (DEKOMECH)
- International Association of Applied Mathematics and Mechanics (GAMM)
- European Mechanics Society (EUROMECH)
- European Research Community on Flow Turbulence and Combustion (ERCOFTAC)
- Society of Industrial and Applied Mathematics (SIAM)
- German Association of University Professors and Lecturers (DHV); elected chair of the Darmstadt branch

Publications

- Total number of publications: > 300
- Total number of publications in peer-reviewed journals and books: > 160
- Total number of publications in peer-reviewed conference proceedings: > 70
- Total number of books: 11
- Granted patent: 1
- Total number of citations: 4604; h-index: 36 (Google Scholar)

Scientific Qualification

[1] Numerical Simulation of the Propagation an the Extinction of a Turbulent Flame During Adiabatic Expansion Considering a One-Dimensional Reciprocating Engine (in German), *Master Thesis, RWTH Aachen*, (1989)

[2] Derivation and Solution of a Length-Scale and Dissipation Tensor Equation for Turbulent Flows (in German), *Dissertation, RWTH Aachen*, (1994)

[3] Symmetry, Invariance and Self-Similarity in Turbulence (in German, English Translation Available), *Habilitation Thesis, RWTH Aachen*, (2000)

Refereed Archival Journals

[4] Oberlack M., Peters N.: Closure of the Two-Point Correlation Equation as a Basis of Reynolds-Stress Models, *Applied Scientific Research*, vol. 51, 533-538, (1993)

[5] Oberlack M.: Non-Isotropic Dissipation in Non-Homogeneous Turbulence, *J. Fluid Mech.*, vol. 350, pp. 351-374, (1997)

[6] Oberlack M.: Similarity in Non-Rotating and Rotating Turbulent Pipe Flows, *J. Fluid Mech.*, vol. 379, pp. 1-22, (1999)

[7] Oberlack M.: Symmetries and Scaling-Laws in Turbulence, *Zeitschrift für Angewandte Mathematik und Mechanik (ZAMM)*, vol. 79, pp. S123-S126, (1999)

[8] Oberlack M.: Symmetries, Invariance and Scaling-Laws in Inhomogeneous Turbulent Shear Flows, *Flow, Turbulence and Combustion*, vol. 62(2), pp. 111-135, (1999)

[9] Oberlack M.: Asymptotic Expansion, Symmetry Groups and Invariant Solutions of Laminar and Turbulent Wall-Bounded Flows, *Zeitschrift für Angewandte Mathematik und Mechanik (ZAMM)*, vol. 80(11–12), pp. 791-800, (Special Issue of ZAMM at the occasion of the 125th birthday of Ludwig Prandtl), (2000)

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