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

* 02. June 1964
in Cologne, Germany

## Contact Information


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| Web of Science ID | AAH-1305-2020 |
| Scopus ID | 6603567719 |


## Education / Academic Degrees

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|---|---|
| 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

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|---|---|
| 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

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|---|---|
| 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
- Creeping flows
- 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

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|---|---|
| 06/22 - present | International Advisory Board: *Archives of Mechanics* |
| 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 |

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| 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*)

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|---|---|
| 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*

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

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| | Center for Turbulence Research, Stanford University/NASA Ames, USA<br>*Analytical and Numerical Analysis of Two-point Velocity Correlations in Turbulent Boundary Layer Flows* |
| 04/99 - 03/02 | DFG Research Grant (PI)<br>*Similarity Theory and Modelling of Compressible Turbulent Shear Flows* |
| 02/00 - 11/06 | DFG Research Grant (PI)<br>*Rotation of Plane Turbulent Channel Flow about the Streamwise Direction: Experiment and DNS*<br>Co-PI: Prof. Dr. W. Schröder |
| 09/00 - 03/06 | DFG Research Group<br>*Interdisciplinary Turbulence Initiative (iTi)*<br>Spokespersons: Prof. Dr. M. Oberlack, Prof. Dr. J. Peinke<br>8 Projects between Fluid Mechanicians and Physicists<br>Individual Sub-Project:<br>*Symmetry Analysis of the Two-Point Correlation Equation in a ZPG Turbulent Boundary Layer Flow* |
| 05/01 - 04/04 | DFG Research Grant (PI)<br>*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<br>Spokesperson: Prof. Dr. J. Janicka<br>Individual Sub-Project:<br>*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<br>Spokesperson: Prof. Dr. M. Oberlack<br>Partners: 2 TU Darmstadt Institutes; 1 Industrial Partner |
| 08/02 - 07/05 | BMBF Research Collaboration: Turbulent Flow with Strong Streamline Curvature<br>Spokesperson: Prof. Dr. M. Oberlack<br>Partners: 7 Sub-Projects at 4 Universities<br>Individual Sub-Project:<br>*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<br>Spokesperson: Prof. Dr. M. Schäfer<br>Individual Sub-Project:<br>*Lagrange Averaged Euler and Navier-Stokes Equations* |
| 01/03 - 12/05 | DFG-CNRS German-French Binational Research Collaboration: Noise Generation in Turbulent Flows<br>Spokesperson: Prof. Dr. C.-D. Munz<br>Individual Sub-Project:<br>*Physically Based Sub-Grid Scale Modeling for Large-Eddy Simulation to Enhance Turbulence Noise Prediction* |
| 05/06-04/09 | DFG Research Group (PI)<br>*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 Opti- |

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| | mised Planning of Sewage Networks and Sewage Treatment Plants<br>Spokesperson: Dipl.-Ing. J. Steinhardt/Steinhardt GmbH |
| 11/06-10/09 | DFG Research Grant (PI)<br>*Turbulent Diffusion: DNS, Modelling and Experimental Analysis*<br>Co-PI: Prof. Dr. C. Tropea, Dr. S. Jacirlic |
| 01/07-12/09 | DFG Research Grant (PI)<br>*Modelling of the Deformation of Alluvial Material due to Fluid Flow using Level-Set Method* |
| 06/07-05/10 | DFG Research Grant (PI)<br>*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<br>Spokesperson: Prof. Dr. A. Martin<br>Individual Sub-Project:<br>*Transition from Hyperbolic to Parabolic PDEs in Hydrodynamics and its Numerical Implementation* |
| 01/07-09/10 | DFG Research Grant<br>*Geometrical Structure of Small-Scale Turbulence*<br>Spokesperson: Prof. Dr. N. Peters<br>Co-PI: Prof. Dr. M. Oberlack, Prof. Dr. W. Schröder |
| 11/07-10/12 | DFG Excellence Cluster *Center for Smart Interfaces*<br>Spokesperson: Prof. Dr.-Ing. C. Tropea<br>Co-PI: 22 Professors from TU Darmstadt, MPI Mainz, Inst. Microtechnology Mainz |
| 11/07-10/18 | DFG Graduate School of Excellence *Computational Engineering*<br>Spokesperson: Prof. Dr.-Ing. M. Schäfer<br>Co-PI: 23 Professors TU Darmstadt |
| 01/10-01/13 | DFG Research Grant (PI)<br>*Turbulent Couette–Poiseuille Flow with Wall Transpiration: Analytical Study and Direct Numerical Simulation* |
| 01/10-01/13 | DFG Research Grant<br>*Theoretical, Numerical and Experimental Investigation of Fluid Droplets on Electrically Highly Loaded Insulating Layers*<br>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)<br>*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)<br>*Transport Processes at Fluidic Interfaces*<br>Spokespersons: Prof. Dr. rer. nat. D. Bothe, Prof. Dr. rer. nat. A. Reusken<br>Individual Sub-Project:<br>*Discontinuous Galerkin Simulation of Multiphase flows with Interfacial Equations* |
| 02/14-1/17 | DFG Research Grant (PI)<br>*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)<br>*Symmetry Based Scaling of Statistical Quantities of a Turbulent Couette* |

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| | *Flow Extended by Wall-transpiration* |
| since 07/16 | DFG Collaborative Research Center<br>*Interaction between Transport and Wetting Processes*<br>Spokesperson: Prof. Dr.-Ing. P. Stephan, Prof. Dr. rer. nat. D. Bothe,<br>Individual Sub-Project:<br>*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)<br>*Helical and Extended Helical Invariant Flows: New Conservation Laws and their Importance for Turbulence* |
| 09/16-08/19 | DFG Priority Programme<br>*Turbulent Superstructures*<br>Spokesperson: Prof. Dr. J. Schumacher<br>Individual Sub-Project:<br>*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)<br>*Direct Numerical Simulation of the Droplet Evaporation and Combustion Using a Discontinuous Galerkin Scheme* |
| 08/17-09/21 | DFG Research Grant (PI)<br>*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)<br>*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)<br>*Multiscale Simulation Methods for Soft-Matter Systems*<br>Spokesperson: Prof. Dr. F. Schmidt<br>Individual Sub-Project:<br>*Dense Active Suspensions in the Chaotic Regime* |
| 1/19-11/23 | DFG-ANR Research Grant (PI)<br>*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)<br>*Symmetry-based Turbulence Modelling for Engineering Applications* |
| since 01/21 | DFG Network project (in cooperation with RWTH Aachen)<br>*National High Performance Computing for Comp. Engineering Science*<br>Spokesperson: Prof. Dr. Ch. Bischof<br>Individual Sub-Project: *High-Order Methods and HPC* |
| since 02/21 | DFG Research Grant (PI)<br>*Aerodynamic noise generation in boundary layer flows* |
| since 03/22 | DFG Collaborative Research Center (in cooperation with TU Graz)<br>*Computational Electric Machine Laboratory: Thermal Modelling, Transient Analysis, Geometry Handling and Robust Design*<br>Spokesperson: Prof. Dr. S. Schöps<br>Individual Sub-Project:<br>*Highly Efficient Rotor Cooling Using Heat Pipes* |
| since 10/23 | DFG priority program (Co-founder and PI)<br>*Hyperbolic Balance Laws in Fluid Mechanics: Complexity, Scales, Randomness (CoScaRa)* |

*Applied Research and Industry Contracts*

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| 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**

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

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

**Individual Invitations for Research Collaborations Abroad**

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|---|---|
| Stanford/USA<br>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<br>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<br>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<br>02/99 | Lie-Group Analysis of Turbulent Flows, *The Isaac Newton Institute for Mathematical Sciences, University of Cambridge* |
| Cambridge/UK<br>04/99 | Symmetries and Sub-Grid Scale Models, *The Isaac Newton Institute for Mathematical Sciences, University of Cambridge* |
| Edinburgh/UK<br>03/00 | Galilean-Invariance and LET Models of Turbulence, *Department of Physics and Astronomy, University of Edinburgh* |
| Stanford/USA<br>08/01 | Modelling of Premixed Turbulent Combustion Using $G$-equation, *Center for Turbulence Research, Stanford University/NASA Ames* |
| Hampton/USA<br>09/02 | Analysis and Modeling of Turbulent Diffusion Waves,<br>*NASA Langley Research Center* |

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| Stanford/USA<br>07/06 | Modeling Flame Brush Thickness in Premixed Turbulent Combustion, *Center for Turbulence Research, Stanford University/NASA Ames* |
| Cambridge/UK<br>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<br>03/09 | On the unification of homotopy analysis method with the Lie group theory, *Jiao Tong University* |
| Stockholm/Sweden<br>04/10 | Turbulence and conservation laws, *Nordic Institut for Theoretical Physics (NORDITA)/KTH Stockholm* |
| Los Angeles/USA<br>10-11/14 | Mathematics of Turbulence, *Institut for Pure and Applied Mathematics/UC Los Angeles* |
| Princeton/USA<br>08/17 | Symmetry methods in turbulence and hydrodynamic stability theory, *Mechanical and Aerospace Engineering/Princeton University* |
| Rechovot/Israel<br>12/18-01/19 | Fluid flows from graphene to planet atmospheres, *Weizmann Institut* |

## Teaching

*Courses taught*

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| Sum 90 - Win 90/91 | Mechanics (Statics), *Exercise, RWTH Aachen* |
| 05/94 | A New Dissipation Tensor Model for Strongly Anisotropic Compressed Turbulence<br>*Short Course on Turbulence in Compressible Flows, Valladolid/Spain* |
| Win 97/98 | Flow and Temperature Boundary Layers II<br>*RWTH Aachen* |
| 04/99, 04/01,<br>04/03, 04/05 | Similarity Solutions in Turbulent Shear Flows<br>*Lecture during the Short Courses: "Turbulenz", LSTM, University Erlangen-Nürnberg* |
| Win 00/01 - Win 05/06 | Turbulent Flows<br>(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*

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|---|---|
| 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 |

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| 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*

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|---|---|
| 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,<br>*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*, |

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| | 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 |

*Conference Participation with (invited) oral Presentation*

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| Munich/Germany | *Eighth Symposium on Turbulent Shear Flows*, 1991 |

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| 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 Turbulence"*, 2006 |

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| 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 66$^{th}$ 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 67$^{th}$ annual Division of Fluid Dynamics meeting*, 2014 |
| Erlangen/Germany | *GAMM Annual Meeting*, 2014 |
| Darmstadt/Germany | $2^{nd}$ *International Conference on Numerical Methods in Multiphase Flows*, |

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| | 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 | *$9^{th}$ International Symposium on Turbulence and Shear Flow Phenomena*, 2015 |
| Delft/Netherlands | *$15^{th}$European Turbulence Conference*, 2015 |
| Corsica/France | *Whither Turbulence and Big Data In the $21^{st}$ 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 $68^{th}$ 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 | *$11^{th}$ 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 | *$10^{th}$ International Symposium on Turbulence and Shear Flow Phenomena*, 2017 |
| Erfurt/Germany | *EUROMECH Colloquium 586: Turbulent Superstructures in Closed and Open Flows*, 2017 |
| Stockholm/Sweden | *$16^{th}$European Turbulence Conference*, 2017 |
| Denver/USA | *American Physical Society $70^{th}$ 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 | *$20^{th}$ 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 $71^{th}$ 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 | *$17^{th}$European Turbulence Conference*, 2019 |
| London/UK | *IUTAM Symposium on Laminar-Turbulent Transition*, 2019 |
| Southampton/UK | *$11^{th}$ International Symposium on Turbulence and Shear Flow Phenomena*, 2019 |
| Seattle/USA | *American Physical Society $72^{th}$ annual Division of Fluid Dynamics meeting*, 2019 |

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| Chicago/USA | *American Physical Society 73$^{th}$ 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: 5020; 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)

[10] Oberlack M., Arlitt R., Peters N.: On Damköhler Statistics in Homogeneous Combustion, *Combustion Theory and Modelling.*, vol. 4, pp. 495–509, (2000)

[11] Oberlack M.: Unified Approach for Symmetries in Plane Parallel Turbulent Shear Flows, *J. Fluid Mech.*, vol. 427, pp. 299-328, (2001)

[12] Oberlack M., McComb W.D., Quinn A.: Solution of Functional Equations and Reduction of Dimension in the Local Energy Transfer Theory of Turbulence, *Phys. Rev. E.* vol. 63(02), pp. 026308-1–026308-8, (2001)

[13] Oberlack M., Wenzel H., Peters N.: On Symmetries and Averaging of the G-equation for Premixed Combustion, *Combustion Theory and Modelling.*, vol. 5, pp. 363-383, (2001)

[14] Oberlack M.: On the Decay Exponent of Isotropic Turbulence, *Proc. Appl. Math. Mech. (PAMM)*, vol. 1, pp. 294-297, (2002)

[15] Oberlack M., Guenther S.: Shear-Free Turbulent Diffusion - Classical and New Scaling Laws, *Fluid Dynamic Research*, vol. 33(5-6), pp. 453-476, (2003)

[16] Oberlack M.: Lie-Bäcklund Symmetries of the *G*-equation without Advection, *Journal of the Calcutta Mathematical Society*, vol. 1, pp. 41-52, (2004)

[17] Kraft S., Wendling I., Oberlack M., Carati D.: Analysis of the applicability of dynamic subgrid scale models in complex geometries, *Proc. Appl. Math. Mech. (PAMM)*, vol. 4, pp. 462-463, (2004)

[18] Khujadze G., Oberlack M.: DNS and Scaling Laws from New Symmetries of ZPG Turbulent Boundary Layer Flow, *Theoret. Comput. Fluid Dynamics*, vol. 18(5), pp. 391-411, (2004)

[19] Guenther, S., Oberlack, M., Brethouver, G., Johansson, A.V.: Investigations of Shear Free Turbulent Diffusion in a Rotating Frame, *Proc. Appl. Math. Mech. (PAMM)*, vol. 4, pp. 458-459, (2004)

[20] Grebenev V., Oberlack M.: A Chorin-Type Formula for Solutions to a Closure Model for the von Kármán-Howarth Equation, *J. Nonlinear Math. Phys.*, vol. 12(1), pp. 1-9, (2005)

[21] Guenther S., Oberlack M.: On the Incompatibility of the Exponential Scaling Law for a ZPG Boundary Layer Flow with Reynolds Averaged Turbulence Models, *Phys. Fluids*, vol. 17, 048105, (2005)

[22] Kurenkov A., Oberlack M.: Modeling Turbulent Premixed Combustion Using the Level Set Approach for Reynolds Averaged Models, *Flow, Turbulence and Combustion*, vol. 74, pp. 387-407, (2005)

[23] Breuer St., Oberlack M., Peters N.: Non-Isotropic Length Scales During the Compression Stroke of a Motored Piston Engine, *Flow, Turbulence and Combustion*, vol. 74, pp. 145-167, (2005)

[24] Kurenkov A., Oberlack M.: RANS-simulation of premixed turbulent combustion using the level set approach, *Proc. Appl. Math. Mech. (PAMM)*, vol. 5, pp. 469-470, (2005)

[25] Guenther S., Oberlack M.: Implication for Lie group symmetries for RANS modeling, *Proc. Appl. Math. Mech. (PAMM)*, vol. 5, pp. 563-564, (2005)

[26] Khujadze G.., Oberlack M.: DNS and Lie group analysis of turbulent boundarly layer flow, *Proc. Appl. Math. Mech. (PAMM)*, vol. 5, pp. 565-566, (2005)

[27] Weller T., Oberlack M., Recktenwald I., Schröder W.: DNS and Experiment of a Turbulent Channel Flow with Streamwise Rotation - Study of the Cross Flow Phenomena, *Proc. Appl. Math. Mech. (PAMM)*, vol. 5, pp. 569-570, (2005)

[28] Oberlack M., Cabot W., Pettersson Reif B. A., Weller T.: Group analysis, DNS and Modeling of a Turbulent Channel Flow with Streamwise Rotation, *J. Fluid Mech.*, vol. 562, pp. 383-403, (2006)

[29] Khujadze G., Oberlack M., Chagelishvili G.: Direct Numerical Simulation of Stochastically Forced Laminar Plane Peculiarities of Hydrodynamic Fluctuations, *Phys. Rev. Lett.*, vol. 97, 034501, (2006)

[30] Kurenkov A., Oberlack M.: LES of premixed turbulent combustion using the level set approach, *Proc. Appl. Math. Mech. (PAMM)*, vol. 6, pp. 533-534, (2006)

[31] Grebenev V.N.., Oberlack M.: Integration of infinite chain of transport equations for cumulants, *Proc. Appl. Math. Mech. (PAMM)*, vol. 6, pp. 519-520, (2006)

[32] Weller T., Oberlack M.: DNS of a Turbulent Channel Flow with Streamwise Rotation - Study of the Reverse Effect of the Cross Flow, *Proc. Appl. Math. Mech. (PAMM)*, vol. 6, pp. 553-554, (2006)

[33] Grebenev V.N., Oberlack M.: Hidden Symmetries to a Hanjalic-Launder semi-empirical Model of Turbulence, *Reg. and Chaotic Dynamics*, vol. 11(3), pp. 371-381, (2006)

[34] Oberlack M, Wacławczyk M.: On the Extension of Lie Group Analysis to Functional Differential Equations, *Arch. Mech.*, vol. 58(6), pp. 597-618, (2006)

[35] Grebenev V.N., Oberlack M.: Approximate Lie symmetries of the Navier-Stokes equations, *J. Nonlinear Math. Phys.*, vol. 14(2), pp. 157-163, (2007)

[36] Razafindralandy D., Hamdouni A., Oberlack M.: Analysis and Development of Subgrid Tur-

bulence Models Preserving the Symmetry Properties of the Navier-Stokes equations, *Europ. J. Mech. B/Fluids*, vol. 26(4), pp. 531-550, (2007)

[37] Grebenev V.N., Oberlack M.: Compatible Differential Constraints to an Infinite Chain of Transport Equations for Cumulants, *Comm. Nonlinear Sci. Numer. Simulat.*, vol. 12(3), pp. 336-349, (2007)

[38] Frewer M., Oberlack M., Guenther S.: Symmetry investigations on the incompressible stationary axisymmetric Euler equations with swirl, *Fluid Dyn. Res.*, vol. 39(8), pp. 647-664, (2007)

[39] Recktenwald I., Weller T., Schröder W., Oberlack M.: Comparison of DNS and PIV data of turbulent channel flow rotating about the streamwise axis, *Phys. Fluids*, vol. 19, 085114, (2007)

[40] Wang Y., Hayat T., Ali N., Oberlack M., Magnetohydrodynamic peristaltic motion of a Sisko fluid in a symmetric or asymmetric channel, *Physica A*, vol. 387, pp. 347-362, (2008)

[41] Vigdorovich I., Oberlack M.: Analytical study of turbulent Poiseuille flow with wall transpiration, *Phys. Fluids*, vol. 20, 055102, (2008)

[42] Grebenev V.N., Oberlack M., Grishkov A. N.: Lie algebra methods for the applications to the statistical theory of turbulence, *J. Nonlinear Math. Phys.*, vol. 15(2), pp. 227-251, (2008)

[43] Khujadze G., Oberlack M., Chagelishvili G.: DNS of stochastically forced laminar plane Couette flow, *Proc. Appl. Math. Mech. (PAMM)*, vol. 8, pp. 10763-10764, (2008)

[44] Vigdorovich I., Oberlack M.: Asymptotic study of turbulent Poiseuille flow with wall transpiration, *Proc. Appl. Math. Mech. (PAMM)*, vol. 8, pp. 10599-10600, (2008)

[45] Mehdizadeh A., Oberlack M.: A study of effects of wall-normal rotation on the turbulent channel flow, *Proc. Appl. Math. Mech. (PAMM)*, vol. 8, pp. 10607-10608, (2008)

[46] Ali N., Wang Y., Hayat T., Oberlack M.: Long wavelength approximation to peristaltic motion of an Oldroyd 4-constant fluid in a planar channel, *Biorheology*, vol. 45(5), pp. 611-628, (2008)

[47] Abbas Z., Wang Y., Hayat T., Oberlack M.: Hydromagnetic flow in a viscoelastic fluid due to the oscillatory stretching surface, *Int. J. Non-Linear Mech.*, vol. 43(8), pp. 783-793, (2008)

[48] Grebenev V.N., Oberlack M., Grishkov A. N.: Lie algebra methods in turbulence, *Proc. Appl. Math. Mech. (PAMM)*, vol. 8, pp. 10593-10594, (2008)

[49] Khujadze G.., Oberlack M.: Turbulent diffusion: Direct numerical simulation, *Proc. Appl. Math. Mech. (PAMM)*, vol. 9, pp. 451-452, (2009)

[50] Abbas Z., Wang Y., Hayat T., Oberlack M.: Slip effects and heat transfer analysis in a viscous fluid over an oscillatory stretching surface, *Int. J. Numer. Meth. Fluids.*, vol. 59(4), pp. 443-458, (2009)

[51] Ali N., Wang Y., Hayat T., Oberlack M.: Slip Effects on the Peristaltic Flow of a Third Grade Fluid in a Circular Cylindrical Tube, *ASME J. Appl. Mech.*, vol. 76, pp. 011006-1–10, (2009)

[52] Grebenev V.N., Oberlack M.: A Geometric Interpretation of the Second-Order Structure Function Arising in Turbulence, *Math. Phys. Anal. Geom.*, vol. 12, pp. 1-18, (2009)

[53] Kinzel M., Holzner M., Lüthi B., Tropea C., Kinzelbach W., Oberlack M.: Experiments on the spreading of shear-free turbulence under the influence of confinement and rotation, *Exp. Fluids*, vol. 47(4-5), pp. 801-809, (2009)

[54] Ali, N., Wang, Y., Hayat, T., Oberlack, M.: Numerical solution of peristaltic transport of an Oldroyd 8-constant fluid in a circular cylindrical tube, *Can. J. Phys.*, vol. 87, pp. 1047-1058, (2009)

[55] Vigdorovich I., Oberlack M.: Turbulent Poiseuille flow with near-critical wall transpiration, *Proc. Appl. Math. Mech. (PAMM)*, vol. 10, pp. 457-458, (2010)

[56] Oberlack M., Cheviakov A. F.: Higher-order symmetries and conservation laws of the *G*-equation for premixed combustion and resulting numerical schemes, *J. Eng. Math.*, vol. 66, pp. 121-140, (2010)

[57] Abbas Z., Wang Y., Hayat T., Oberlack M.: Mixed convection in the stagnation-point flow of an upper-convected Maxwell fluid towards a vertical stretching surface, *Nonlin. Analysis: Real World Appl.*, , vol. 11, pp. 3218-3228, (2010)

[58] Oberlack M., Rosteck A.: New Statistical Symmetries of the Multi-Point Equations and its Importance for Turbulent Scaling Laws, *Discrete Cont. Dyn. S.-S*, vol. 3(3), pp. 451-471, (2010)

[59] Mehdizadeh A., Oberlack M.: Analytical and numerical investigations of laminar and turbulent Poiseuille-Ekman flow at different rotation rates, *Phys. Fluids*, vol. 22, 105104, (2010)

[60] Liu Z., Oberlack M., Grebenev V.N., Liao S.-J.: Explicit series solution of a closure model for the von Kármán-Howarth equation, *ANZIAM J.*, vol. 52, pp. 179-202, (2010);

[61] Gampert M., Goebbert J. H., Schaefer P., Gauding M., Peters N., Aldudak F., Oberlack M.: Extensive strain along gradient trajectories in the turbulent kinetic energy field, *New J. Phys.*, vol. 13, 043012, (2011)

[62] Rosteck A., Oberlack M.: Lie Algebra of the Symmetries of the Multi-Point Equations in Statistical Turbulence Theory, *J. Nonlinear Math. Phy.*, vol. 18, suppl. 1, pp. 251-264, (2011)

[63] Grebenev V.N., Oberlack M.: Geometric Realization of the Two-Point Velocity Correlation Tensor for Isotropic Turbulence, *J. Nonlinear Math. Phy.*, vol. 18(1), pp. 109-120, (2011)

[64] Wang Y., Ali N., Hayat T., Oberlack M.: Peristaltic motion of a magnetohydrodynamic micropolar fluid in a tube, *Appl. Math. Model.*, vol. 35, pp. 3737-3750, (2011)

[65] Oberlack M.: On a class of SGS filters for LES with shape preserving concatenation properties, *Comm. Nonlinear Sci. Numer. Simulat.*, vol. 16, pp. 4403-4407, (2011)

[66] Wang Y., Oberlack M.: A thermodynamic model of multiphase flows with moving interfaces and contact line, *Continuum Mech. Therm.*, vol. 23, pp. 409-433, (2011)

[67] Wacławczyk M., Oberlack M.: Closure proposals for the tracking of turbulence-agitated gas-liquid interface in stratified flows *Int. J. Multiphas. Flow*, vol. 37(8), pp. 967-976, (2011)

[68] Kraft, S., Wang, Y., Oberlack, M..: Large Eddy Simulation of Sediment Deformation in a Turbulent Flow by Means of Level-Set Method, *J. Hydraul. Eng.-ASCE*, vol. 137(11), pp. 1394-1405, (2011)

[69] Aldudak, F., Oberlack M.: Dissipation element analysis in turbulent channel flow, *J. Fluid Mech.*, vol. 694, pp. 332-351, (2012)

[70] Grebenev, V., Oberlack M.: A geometry of the correlation space and a nonlocal degenerate parabolic equation from isotropic turbulence, *Z. Angew. Math. Mech. (ZAMM)*, vol. 92(3), pp. 179-195, (2012)

[71] Müller, B., Kummer, F., Oberlack M., Wang, Y.: Simple multidimensional integration of discontinuous functions with application to level set methods, *Int. J. Numer. Meth. Engng.*, vol. 92(7), pp. 637-651, (2012)

[72] Kallendorf, Ch., Cheviakov, A., Oberlack M., Wang, Y.: Conservation laws of surfactant transport equations, *Phys. Fluids*, vol. 24, pp. 102105, (2012)

[73] Klein, B., Kummer, F., Oberlack M.: A SIMPLE based discontinuous Galerkin solver for steady incompressible flows, *J. Comput. Phys.*, vol. 237, pp. 235-250, (2013)

[74] Kelbin, O., Cheviakov, A., Oberlack, M.: New conservation laws of helically symmetric, plane and rotationally symmetric flows, *J. Fluid Mech.*, vol. 721, pp. 340-366, (2013)

[75] Grebenev, V., Grishkov, A.N., Oberlack, M.: The Extended Symmetry Lie Algebra and the Asymptotic Expansion of the Transversal Correlation Function for the Isotropic Turbulence, *Adv. Math. Phys.*, Article ID 469654, 11 pages, (2013)

[76] Oberlack, M., Zieleniewicz, A.: Statistical symmetries and its impact on new decay modes and integral invariants of decaying turbulence, *J. Turb.*, vol. 14(2), pp. 4-22, (2013); (special issue of the Turbulence Colloquium Marseille 2011)

[77] Kummer, F., Oberlack M.: An extension of the discontinuous Galerkin method for the singular poisson equation, *SIAM J. Sci. Comput.*, vol. 35(2), pp. A603-A622, (2013)

[78] Wacławczyk, M., Oberlack, M.: Application of the extended Lie group analysis to the Hopf functional formulation of the Burgers equation, *J. Math. Phys.*, vol. 54, pp. 072901, (2013)

[79] Nold, A., Oberlack, M.: Symmetry analysis in linear hydrodynamic stability theory: Classical and new modes in linear shear, *Phys. Fluids*, vol. 25(10), pp. 102105, (2013)

[80] Grebenev, V., Oberlack, M., Grishkov, A.N.: Infinite dimensional Lie algebra associated with conformal transformations of the two-point velocity correlation tensor from isotropic turbulence, *Z. Angew. Math. Phys.*, vol. 64, pp. 599-620, (2013)

[81] Wang, Y., Oberlack M., Zieleniewicz, A.: Constitutive modeling of multiphase flows with moving interfaces and contact line, *Continuum Mech. Thermdyn.*, vol. 25, pp. 705-725, (2013)

[82] Müller, B., Kummer, F., Oberlack, M.: Highly accurate surface and volume integration on implicit domains by means of moment-fitting, *Int. J. Numer. Meth. Engng.*, vol. 96(8), pp. 512-528, (2013)

[83] Chagelishvili, G., Khujadze, G., Foysi, H., Oberlack, M.: Spanwise reflection symmetry breaking and turbulence control: plane Couette flow, *J. Fluid Mech.*, vol. 745, pp. 300-320, (2014)

[84] Avsarkisov, V., Oberlack, M., Hoyas, S.: New Scaling Laws for Turbulent Poiseuille Flow with Wall Transpiration, *J. Fluid Mech.*, vol. 746, pp. 99-122, (2014)

[85] Lukassen, L., Oberlack, M.: Colored-noise Fokker-Planck equation for the shear-induced self-diffusion process of non-Brownian particles, *Phys. Rev. E*, vol. 89, pp. 052145, (2014)

[86] Avsarkisov, V., Hoyas, S., Oberlack, M., García-Galache, J. P.: Turbulent plane Couette flow at moderately high Reynolds number, *J. Fluid Mech.*, vol. 751, R1, pp. R1-1-10, (2014)

[87] Wacławczyk, M., Staffolani, N., M., Oberlack, M., Rosteck, A., Wilczek, M., Friedrich, R.: Statistical symmetries of the Lundgren-Monin-Novikov hierarchy, *Phys. Rev. E*, vol. 90, pp. 013022, (2014)

[88] Frewer, M., Oberlack M., Grebenev, V.N.: The dual stream function representation of an ideal steady fluid flow and its local geometric structure, *Math. Phys. Anal. Geom.*, vol. 17(1-2), pp. 3-25, (2014)

[89] Cheviakov, A. F., Oberlack, M.: Generalized Ertel's theorem and infinite hierarchies of conserved quantities for three-dimensional time dependent Euler and Navier-Stokes equations, *J. Fluid Mech.*, vol. 760, R1, pp. 368-386, (2014)

[90] Klein, B., Kummer, F., Keil, M., Oberlack M.: An extension of the SIMPLE based discontinuous Galerkin solver to unsteady incompressible flows, *Int. J. Numer. Meth. Fluids*, vol. 77, pp. 571-589, (2015)

[91] Oberlack, M., Wacławczyk, M., Rosteck, A., Avsarkisov, V.: Symmetries and their importance for statistical turbulence theory, *Bulletin of the JSME: Mechanical Engineering Reviews*,

vol. 2(2), pp. 1-72, (2015); *(invited review article)*

[92] Kallendorf, Ch., Fath, A., Oberlack, M., Wang, Y.: Exact solutions to the interfacial surfactant transport equation on a droplet in a Stokes flow regime, *Phys. Fluids.*, vol. 27, pp. 082104, (2015)

[93] Janocha, D.D., Wacławczyk, M., Oberlack, M.: Lie symmetry analysis of the Hopf functional-differential equation for turbulence, *Symmetry*, vol. 7, pp. 1536-1566, (2015)

[94] Klewicki, J., Oberlack, M.: Finite Reynolds number properties of a turbulent channel flow similarity solution, *Phys. Fluids.*, vol. 27(9), pp. 095110, (2015)

[95] Nold, A., Oberlack, M., Cheviakov, A.F.: On new stability modes of plane canonical shear flows using symmetry classification, *J. Math. Phys.*, vol. 56, pp. 113101, (2015)

[96] Hau, J.-N.., Chagelishvili, G., Khujadze, G., Oberlack, M., Tevzadze, A.: A comparative numerical analysis of linear and nonlinear aerodynamic sound generation by vortex disturbances in homentropic constant shear flows, *Phys. Fluids*, vol. 27(11), pp. 126101, (2015)

[97] Wacławczyk M., Oberlack M.: Reply to "Comment on 'Statistical symmetries of the Lundgren-Monin-Novikov hierarchy"', *Phys. Rev. E* 92, 067002 (2015)

[98] Wacławczyk M., Janocha D.D., Oberlack M.: Reply to "Comments on Janocha et al. Lie Symmetry Analysis of the Hopf Functional-Differential Equation. Symmetry 2015, 7, 1536–1566", *Symmetry*, 8(4), 24 (2016)

[99] Wacławczyk, M., Oberlack, M.: Response to "Comment on 'Application of the extended Lie group analysis to the Hopf functional formulation of the Burgers equation"' [J. Math. Phys. 57, 034102 (2016)], *J. Math. Phys.*, vol. 57, pp. 034103, (2016)

[100] Klein, B., Müller, B., Kummer, F., Oberlack, M.: A high-order Discontinuous Galerkin solver for low-Mach number flows, *Int. J. Num. Fluids*, vol. 81(8), pp. 489-520, (2016)

[101] Chagelishvili, G., Hau, J.-N.., Khujadze, G., Oberlack, M.: Mechanical picture of the linear transient growth of vortical perturbations in incompressible smooth shear flows, *Phys. Rev. Fluids*, vol. 1(4), pp. 043603, (2016)

[102] Grebenev, V.N., Oberlack, M., Megrabov, A.G., Grishkov, A.N.: Symmetry transformations of an ideal steady fluid flow determined by a potential function, *J. Math. Phys.*, vol. 57, pp. 103506, (2016)

[103] Hau, J.-N., Oberlack, M., Chagelishvili, G.: On the optimal systems of subalgebras for the equations of hydrodynamic stability analysis of smooth shear flows and their group-invariant solutions, *J. Math. Phys.*, vol. 58, pp. 043101, (2017)

[104] Dierkes, D., Oberlack, M.: Euler and Navier-Stokes equations in a new time-dependent helically symmetric system: derivation of the fundamental system and new conservation laws, *J. Fluid Mech.*, vol. 818, pp. 344-365, (2017)

[105] Müller, B., Krämer-Eis, St., Kummer, F., Oberlack, M.: A high-order Discontinuous Galerkin method for compressible flows with immersed boundaries, *Int. J. Num. Eng.*, vol. 110, pp. 3-30, (2017)

[106] Wacławczyk, M., Grebenev, V., Oberlack, M.: Lie symmetry analysis of the Lundgren-Monin-Novikov equations for multi-point probability density functions of turbulent flow, *J. Phys. A: Math. Theor.*, vol. 50, pp. 175501, (2017)

[107] Utz, T., Kummer, F., Oberlack, M.: Interface-preserving level-set reinitialization for DG-FEM, *Int. J. Numer. Meth. Fluids*, vol. 84(4), pp. 183-198, (2017)

[108] Emamy, N., Niroobakhsh, Z., Mousavi, R., Kummer, K., Oberlack, M.: Numerical investigation of laminar vortex shedding applying a discontinuous Galerkin Finite Element method,

*Prog. Comput. Fluid Dyn.*, vol. 17(3), pp. 131-140, (2017)

[109] Emamy, N., Kummer, F., Mrosek, M., Karcher, M., Oberlack, M.: Implicit-explicit and explicit projection schemes for the unsteady incompressible Navier-Stokes equations using a high-order dG method, *Computers and Fluids*, vol. 154, pp. 285-295, (2017)

[110] Grebenev, V., Wacławczyk, M., Oberlack, M.: Conformal invariance of the Lungren-Monin-Novikov equations for vorticity fields in 2D turbulence, *J. Phys. A: Math. Theor.*, vol. 50, pp. 435502, (2017)

[111] Kraheberger, St., Hoyas, S., Oberlack, M.: DNS of a turbulent Couette flow at constant wall transpiration up to $Re_\tau = 1000$, *J. Fluid Mech.*, vol. 835, pp. 421-443, (2018)

[112] Gandía-Barberá, S. Hoyas, S., Oberlack, M., Kraheberger, St.: The link between the Reynolds shear stress and the large structures of turbulent Couette-Poiseuille flow, *Phys. Fluids*, vol. 30, pp. 041702, (2018)

[113] Grebenev, V., Oberlack, M.: Homogeneous Isotropic Turbulence: Geometric and Isometry Properties of the 2-point Velocity Correlation Tensor (Review Article), *J. Nonlinear Math. Phy.*, vol. 25(4), pp. 650-672, (2018)

[114] Sadeghi, H., Oberlack, M., Gauding M.: On new scaling laws in a temporally evolving turbulent plane jet using Lie symmetry analysis and direct numerical simulation, *J. Fluid Mech.*, vol. 854, pp. 233-260, (2018)

[115] Bakhshandeh, R., Oberlack, M.: Geometry of two-point velocity correlation tensor of homogeneous isotropic turbulence with helicity in Sol-manifold coordinates, *J. Math. Phys.*, vol. 59, pp. 103507, (2018)

[116] Grebenev, V., Wacławczyk, M., Oberlack, M.: Conformal invariance of the zero-vorticity Lagrangian path in 2D turbulence, *J. Phys. A: Math. Theor.*, vol. 52, pp. 335501, (2019)

[117] Dillen, S., Oberlack, M., Wang, Y.: Analytical investigation of rotationally symmetrical oscillating flows of viscoelastic fluids, *J. Non-Newton Fluid*, vol. 272, pp. 104168, (2019)

[118] Smuda, M., Oberlack, M.: On the analytical solution of the two-phase Couette flow with wall transpiration, *Phys. Fluids*, vol. 31, pp. 123603, (2019)

[119] Klingenberg, D., Oberlack, M., Plümacher, D.: Symmetries and Turbulence Modeling, *Phys. Fluids*, vol. 32, pp. 025108, (2020)

[120] Dierkes, D., Cheviakov, A., Oberlack, M.: New similarity reductions and exact solutions for helically symmetric viscous flows, *Phys. Fluids.*, vol. 32, pp. 053604, (2020) *(Editor's Pick Award)*

[121] Plümacher, D., Oberlack, M., Wang, Y., Smuda, M.: On a Non-linear Droplet Oscillation Theory via the Unified Method, *Phys. Fluids.*, vol. 32, pp. 067104, (2020)

[122] Praturi, D.S., Plümacher, D., Oberlack, M.: The hierarchy of multi-point probability density functions and characteristic functions in compressible turbulence, *Phys. Fluids.*, vol. 32, pp. 066102, (2020)

[123] Deußen, B., Oberlack, M., Dierkes, D.: Statistical theory of helical turbulence, *Phys. Fluids.*, vol. 32, pp. 065109, (2020)

[124] Sadeghi, H., Oberlack, M.: New scaling laws of passive scalar with a constant mean gradient in decaying isotropic turbulence, *J. Fluid Mech.*, vol. 899, pp. A10, (2020)

[125] Wacławczyk, M., Grebenev, V., Oberlack, M.: Conformal invariance of characteristic lines in a class of hydrodynamic models, *Symmetry*, vol. 12(9), pp. 1482, (2020)

[126] Kikker, A., Kummer, F., Oberlack, M.: A fully coupled high-order discontinuous Galerkin solver for viscoelastic fluid flow, in press with *Int. J. Numer. Meth. Fluids*, vol. 93, pp. 1736-

1758, (2021)

[127] Sadeghi, H., Oberlack, M., Gauding, M.: New symmetry induced scaling laws of passive scalar transport in a temporally evolving turbulent plane jet, *J. Fluid Mech.*, vol. 919, pp. A5 1-27, (2021)

[128] Yalcin, A., Turkac, Y., Oberlack, M.: On the temporal linear stability of the asymptotic suction boundary layer, *Phys. Fluids.*, vol. 33, pp. 054111, (2021) *(featured article)*

[129] Deußen, B., Jayaram, A., Kummer, F., Wang, Y., Speck, T., Oberlack, M.: High-order simulation scheme for active particles driven by stress boundary conditions, *J. Phys.: Condens. Matter*, vol. 33, pp. 244004, (2021)

[130] Deußen, B., Oberlack, M., Wang, Y.: Probability theory of active suspensions, *Phys. Fluids.*, vol. 33, pp. 061902, (2021)

[131] Grebenev, V.N., Grischkov, A.N., Oberlack, M. and Wacławczyk, M.: Second-order differential invariants of the inviscid Lundgren-Monin-Novikov equations for 2d vorticity fields, *ZAMP*, vol. 72(129), (2021)

[132] Liu, J., Oberlack, M., Wang, Y.: Analytical Investigation of Viscoelastic Stagnation-Point Flows with Regard to Their Singularity, *Appl. Sci.,* vol. 11, pp. 6931, (2021); Special Issue *Viscoelasticity: Mathematical Modeling, Numerical Simulations, and Experimental Work,*

[133] Datta, R., Yelash, L., Schmid, F., Kummer, F., Oberlack, M., Lukáčová-Medvid'ová, M., Virnau, P.: Shear-thinning in Oligomer Melts - Molecular Origins and Hybrid Multiscale Simulations, *Polymers*, vol. 13, pp. 2806, (2021)

[134] Wacławczyk, M., Grebenev, V., Oberlack, M.: Conformal invariance of the 1-point statistics of the zero-isolines of 2d scalar fields in inverse turbulent cascades, *Phys. Rev. Fluids*, vol. 6, pp. 084610, (2021)

[135] Dokoza, T., Plümacher, D., Smuda, M., Jegust, C., Oberlack, M.: Solution to the 1D Stefan Problem using the Unified Transform Method, *J. Phys. A: Math. Theor.*, vol. 54, pp. 375203, (2021)

[136] Zhang, Y., Oberlack, M.: Inviscid instability of compressible exponential boundary layer flows, *AIP Advances*, vol. 11, pp. 105308, (2021)

[137] Sarno, L., Tai, Y.-C., Wang, Y., Oberlack, M.: A well-posed multilayer model for granular avalanches with $\mu(I)$-rheology, *Phys. Fluids*, vol. 33, pp. 103319, (2021)

[138] Grebenev, V.N., Wacławczyk, M. and Oberlack, M.: Reply to Comment on 'Conformal invariance of the Lundgren-Monin-Novikov equations for vorticity fields in 2D turbulence', *J. Phys. A: Math. Theor.*, vol. 54, pp. 438001, (2021)

[139] Gebler, T., Plümacher, D., Kahle, J., Oberlack, M.: Algebraic stability modes in rotational shear flow, *Fluid Dyn. Res.*, vol. 53(6), pp. 065509, (2021)

[140] Hoyas, S., Oberlack, M., Alcántara-Ávila, F., Kraheberger, St.V., Laux, J.: Wall turbulence at high friction Reynolds numbers, *Physical Review Fluids*, vol. 7(1), pp. 014602, (2022) (Awarded with Editors' Suggestion)

[141] Oberlack, M., Hoyas, S., Kraheberger, St.V., Alcántara-Ávila, F., Laux, J.: Turbulence statistics of arbitrary moments of wall-bounded shear flows: A symmetry approach, *Phys. Rev. Lett.*, vol. 128(2), pp. 024502, (2022) (Awarded with Editors' Suggestion)

[142] Deußen, B., Wang Y., Oberlack, M.: A deterministic two-phase model for an active suspension with non-spherical active particles using Eulerian spatial averaging theory, *Phys. Fluids*, vol. 34, pp. 023302, (2022)

[143] Klingenberg, D., Oberlack, M.: Statistically Invariant Eddy Viscosity Models, *Phys. Fluids*,

vol. 34, pp. 055114, (2022)

[144] Zhang, Y., Görtz, S., Oberlack, M.: Over-reflection of acoustic waves by supersonic exponential boundary layer flows, *J. Fluid Mech.*, vol. 945, pp. A9-1–A9-32, (2022)

[145] Liu, J., Oberlack, M., Wang, Y., Delache, A., Godeferd, F.S.: Focusing of inertial waves by a vertically annular forcing, *Phys. Fluids*, vol. 34, pp. 086601, (2022)

[146] Sarno, L, Wang, Y., Tai, Y.-C., Papa, M. N., Villani, P., Oberlack, M.: A well-posed multilayer model for granular avalanches: comparisons with laboratory experiments, *Phys. Fluids*, vol. 34, pp. 113307, (2022) (Awarded as featured article)

[147] Praturi, D.S., Plümacher, D., Oberlack, M.: On the Lie symmetries of characteristic function hierarchy in compressible turbulence, *Euro. Jnl of Applied Mathematics*, vol. 34(5), pp. 913-935, (2023)

[148] Oberlack, M., Hoyas, S., Laux, J., Klingenberg, D.: Reply to Comment on "Turbulence statistics of arbitrary moments of wall-bounded shear flows: A symmetry approach", *Phys. Rev. Lett.*, vol. 130(6), pp. 069403, (2023)

[149] Dokoza, T., Oberlack, M.: Reynolds number induced growth of the large-scale rolls in plane Couette flow using resolvent analysis, *J. Fluid Mech.*, vol. 968, pp. A23-1–A23-23, (2023)

[150] Grebenev, V. N., Grishkov, A. N., Oberlack, M.: Symmetry of the Lundgren-Monin-Novikov Equation for the Probability Distribution of the Vortex Field, *Doklady Physics*, vol. 68(3), pp. 92-96, (2023)

[151] Liu, J., Wang, Y., Oberlack, M.: Focusing of weakly nonlinear inertial waves by a vertically oscillating annular forcing, *Phys. Fluids*, vol. 35, pp. 116606, (2023) (Awarded as featured article)

[152] Alcántara-Ávila, F., García-Raffi, L.M., Hoyas, S., Oberlack, M.: Validation of symmetry-induced high moment velocity and temperature scaling laws in a turbulent channel flow, *Phys. Rev. E*, vol. 109, pp. 025104, (2024)

[153] Dokoza, T., Hennigs de Lara, J.V., Oberlack, M.: Invariant scaling laws for plane Couette flow with wall-transpiration, *Phys. Fluids*, vol. 36, pp. 035138, (2024)

[154] Sun, W., Yalcin, A., Oberlack, M.: Stability of plane Couette flow with constant wall transpiration, *Phys. Rev. Fluids*, vol. 9(5), pp. 053906, (2024)

[155] Hoyas, S., Oberlack, M.: Turbulent Couette flow up to $Re_\tau = 2000$, *J. Fluid Mech.*, vol. 987, pp. R9-1–R9-11, (2024)

[156] Smuda, M., Kummer, F., Oberlack, M., Zrnić, D., Brenn, G.: From weakly to strongly nonlinear viscous drop shape oscillations: an analytical and numerical study, *Phys. Rev. Fluids*, vol. 9, pp. 063601, (2024)

[157] Stegmayer, V., Görtz, S., Akbari, S., Oberlack, M.: On the Lundgren hierarchy of helically symmetric turbulence, *Fluid Dyn. Res.*, vol. 56, pp. 041402, (2024) (honored as an FDR Highlight 2024)

[158] Nguyen, C.T., Oberlack, M.: Analysis of a turbulent round jet based on direct numerical simulation data at large box and high Reynolds number, *Phys. Rev. Fluids*, vol. 9, pp. 074608, (2024)

[159] Mohamed, A., Delache, A., Godeferd, F. S., Liu, J., Oberlack, M., Wang, Y.: Maximization of inertial waves focusing in linear and nonlinear regimes, *Phys. Rev. Fluids*, vol. 9, pp. 094605, (2024)

[160] Hoyas, S., Oberlack, M., Vinuesa, R., Fernández de Córdoba, P., Isidro, J. M., Pérez-Quiles, M. J.: Unfolding wall turbulence, *RINENG*, vol. 24, pp. 103181, (2024)

[161] Ben Gozlen, H., Wang, Y., Oberlack, M.: A mixture theory formulation for active suspensions, *Proc. Appl. Math. Mech. (PAMM)*, vol. 24(2), pp. 1-9, (2024)

[162] Nguyen, C.T., Oberlack, M.: Comparative Study of Turbulent Round Jet Flows through Direct Numerical Simulation at Medium-High Reynolds Numbers, *Phys. Fluids*, vol. 36, pp. 115145, (2024)

[163] Dokoza, T., Hennigs de Lara, J.V., Oberlack, M.: Diminishing effect of a pressure gradient on large-scale rolls of plane Couette flow: A singular value analysis, *Phys. Rev. Fluids*, vol. 10, pp. 024601, (2025)

[164] De Broeck, L., Görtz, S., Alter, P., Hennings de Lara, J., Oberlack, M.: Instability damping and amplification of compressible boundary layers via acoustic wall impedance, *J. Fluid Mech.*, vol. 1007, pp. A46-1–A46-42, (2025)

[165] Nguyen, C.T., Oberlack, M.: Passive scalar statistics in a turbulent round jet: symmetry theory and direct numerical simulation, *J. Fluid Mech.*, vol. 1013, pp. A33-1–A33-28, (2025)

[166] Ben Gozlen, H., Oberlack, M., Wang, Y.: Continuum Modeling and Simulation of Active Suspensions in Curved Channels: Effect of Curvature and Aspect Ratio, *Theoret. Comput. Fluid Dyn.*, vol. 39:32, (2025)

[167] Rieckmann, M., Erbach, A., Oberlack, M.: Stokes flow in a converging-diverging channel gap: Eigenvalues, vortices and complex branching, *J. Fluid Mech.*, vol. 1020, pp. A19-1–A19-17, (2025)

[168] Nguyen, C.T., Benedikt, N., Oberlack, M.: Hidden intermittency in turbulent jet flows, in press with *FTaC*, vol. 115, pp. 1497-1518, (2025)

[169] Oberlack, M., Wilhelm, K.V., Görtz, S., Conrad, J., Yalcin, A., De Broeck, L., Wang, Y.: New subcritical oblique modes - on an extension of Squire's theorem for spatio-temporally evolving modes, in press with *Phys. Rev. Fluids*, (2025)

[170] Conrad, J., Oberlack, M.: A General Approach to the Linear Stability of Viscoelastic Shear-Flows, in press with *ZAMM*, (2025)

[171] De Broeck, L., Görtz, S., Alter, P., Oberlack, M.: Parametric study of porous-wall effects on compressible boundary layer stability, under review with *J. Fluid Mech.*, (2025)

[172] Laux, J., Klingenberg, D., Zimmerman, Sp., Egerer, M., Bellaini, G., Klewicki, J., Talamelli, A., Oberlack, M.: Experimental evaluation of high-moment symmetry-induced scaling laws in turbulent pipe flow, under review with *Phys. Rev. Fluids*, (2025)

[173] Görtz, S., De Broeck, L., Hollmann, P., Oberlack, M.: Acoustic theory of compressible shear layers. Part 1. Instability-induced radiating modes, under review with *J. Fluid Mech.*, (2025)

[174] Görtz, S., De Broeck, L., Hollmann, P., Oberlack, M.: Acoustic theory of compressible shear layers. Part 2. Wave scattering, resonant over reflection and wave absorption, under review with *J. Fluid Mech.*, (2025)

[175] Akbari, S., Wilhelm, K.V., Plümacher, D., Kummer, F., Wang, Y., Oberlack, M.: Modal coupling of non-linear inviscid axisymmetric droplet shape oscillations, under review with *Phys. Rev. Fluids*, (2025)

[176] Görtz, S., De Broeck, L., Hollmann, P., Oberlack, M.: On a new spectrally converging eigenvalue solver for singular ODEs exemplified by the Pridmore-Brown equation, under review with *Phys. Rev. Fluids*, (2025)

[177] Conrad, J.H., Görtz, S., Oberlack, M.: On the Kinetic Equations of Elastic Turbulence and their Implications, under review with *Phys. Rev. E*, (2026)

[178] Oberlack M., Peters N., Kivotides D.: Solutions of the von Kármán-Howarth Equation by Gradient Flux Approximations, *Proc. of the Eighth Symposium on Turbulent Shear Flows, München*, (1991)

[179] Oberlack M., Peters N.: Closure of the Dissipation Tensor and the Pressure-Strain Tensor Based on the Two-Point Correlation Equation, *Proc. of the Ninth Symposium on Turbulent Shear Flows, Kyoto/Japan*, (1993)

[180] Oberlack M.: Self-Similar Mean Velocity Profiles in Plane Parallel Turbulent Shear Flows, *Turbulence, Heat and Mass Transfer 2*, eds. K. Hanjalic and T.W.J. Peeters, Delft University Press, (1997)

[181] Oberlack M.: Generalized Theory for Symmetries in Inhomogeneous Turbulent Shear Flows, *Proc. of the 11th International Conference on Turbulent Shear Flows, Grenoble/France*, (1997)

[182] Oberlack M., Cabot W. H., Rogers M. M.: Turbulent Channel Flow with Streamwise Rotation: Lie Group Analysis, DNS and Modeling, *Proc. of the 1st International Conference on Turbulence and Shear Flow Phenomena, Santa Barbara/USA*, (1999)

[183] Arlitt R. G. H., Oberlack M., Peters N.: Compressible Turbulent Flow: Symmetries and Scaling laws, *Proc. of the 1st International Conference on Turbulence and Shear Flow Phenomena, Santa Barbara/USA*, (1999)

[184] Oberlack M., Barakat M.: Reduction and Long Time Behaviour of Homogeneous Turbulence under Spatially Constant Mean-Velocity Gradient, *Proc. of the Eights European Turbulence Conference, Barcelona/Spanien*, (2000)

[185] Oberlack M., Wenzel H., Peters N.: Symmetries and Averaging of the *G*-Equation for Premixed Combustion, *Proc. of the 2nd International Conference on Turbulence and Shear Flow Phenomena, Stockholm/Schweden*, (2001)

[186] Khujadze G., Oberlack M.: DNS and Scaling Laws from New Symmetry Groups of Turbulent Boundary Layer with Zero Pressure Gradient, *Proc. of the Ninth European Turbulence Conference, Southampton/UK*, (2002)

[187] Oberlack M., Guenther S.: New Scaling Laws of Shear-Free Turbulent Diffusion and Diffusion-Waves, *IUTAM Symposium on Reynolds Number Scaling in Turbulent Flow, Princeton/USA*, (2002)

[188] Oberlack, M., Guenther, S.: Vibrating Grid Turbulence Scaling Laws in Inertial and Rotating Systems, *Proc. of the 5th EUROMECH Fluid Mechanics Conference, Toulouse/Frankreich*, (2003) (*Best Poster Award*)

[189] Khujadze, G., Oberlack, M.: Symmetries, Scaling Laws and DNS of Turbulent Boundary Layer Flow, *Proc. of the Int. Symposium on Turbulence, Heat and Mass Transfer 4, Antalya/Türkei*, (2003)

[190] Oberlack M., Guenther S.: Two-Point Similarity Solutions of Shear-Free Turbulent Diffusion, Diffusion-Waves and its Implications for RANS Models, *Proc. of the 3nd International Conference on Turbulence and Shear Flow Phenomena, Sendai/Japan*, (2003)

[191] Guenther, S., Oberlack, M., Brethouwer, G., Johansson, A.V.: Lie Group Analysis, LES and Modeling of Shear-Free Turbulent Diffusion in a Rotating Frame, *Advances in Turbulence X, Proc. of the 10th European Turbulence Conference, Trondheim/Norwegen*, (2004)

[192] Schneider, E., Sadiki, A., Kurenkov, A., Janicka, J., Oberlack M.: Modelling of Premixed Combustion Using *G*-Equation in RANS Context, *Advances in Turbulence X, Proc. of the*

*10th European Turbulence Conference, Trondheim/Norwegen*, (2004)

[193] Khujadze, G., Oberlack, M.: Similarity of Two-Point Correlations in Turbulent Boundary Layer Flow, *Advances in Turbulence X, Proc. of the 10th European Turbulence Conference, Trondheim/Norwegen*, (2004)

[194] Schaffner, J., Oberlack, M., Kirchheim, N.: The Application of Numerical Modeling (3-D) for the Calculation of Flush Waves in Sewer Channels, *Proc. of the 6th International Conference on Urban Drainage Modelling - UDM'04, Dresden*, (2004)

[195] Kirchheim, N., Oberlack, M.: 3D Modelling of a Converge Side Weir to Describe the Discharge of a Combined Sewer Overflow, *Proc. of the Workshop on Integrated Water Research and Water Management, Kloster Haydau, Kassel*, (2004)

[196] Schaffner, J., Oberlack, M.: Numerical Calculation of Shear Stress Created by Flushwaves in Sewers: Presentation of Testsides in Offenbach/Germany and Lyon/France, *Proc. of the Workshop on Integrated Water Research and Water Management, Kloster Haydau, Kassel*, (2004)

[197] Wendling, I., Oberlack, M.: On the Investigation of a Strain and Rotation Dependent Subgrid-Scale Model Using the Dynamic Procedure, *Proc.* $4^{th}$ *International Conference on Turbulence and Shear Flow Phenomena*, (2005)

[198] Kirchheim, N., Schaffner, J., Oberlack, M.: Parameter study of a flush wave using numerical modeling, *Proc.* $10^{th}$ *International Conference on Urban Drainage* (2005)

[199] Weller T., Schneider K., Oberlack M., Farge M.: DNS and Wavelet Analysis of a Turbulent Channel Flow Rotating about the Streamwise Direction, *Proc.* $5^{th}$ *International Symposium on Turbulence, Heat and Mass Transfer*, (2006)

[200] Schaffner, J., Oberlack, M., Kirchheim, N.: Numerical investigations on flush waves in sewer channels using computational fluid dynamics, *Proc.* $7^{th}$ *International Conference on Hydroinformatics*, (2006)

[201] Weller T., Oberlack M.: DNS of a Turbulent Channel Flow with Streamwise Rotation at Different Reynolds Numbers, *Proc. Conference on Turbulence and Interactions*, (2006)

[202] Oberlack M., Khujadze G.: Symmetry methods in turbulent boundary layer theory, in: G.E.A. Meier and K.R. Sreenivasan (eds.), *IUTAM Symposium on One Hundred Years of Boundary Layer Research*, 39-48, Springer (2006)

[203] Razafindralandy D., Oberlack M.: A new class of symmetry preserving and thermodynamically consistent SGS models, *Proc.* $11^{th}$ *European Turbulence Conference*, (2007)

[204] Razafindralandy D., Oberlack M.: New turbulence models preserving symmetries, *Proc.* $5^{th}$ *International Symposium on Turbulence and Shear Flow Phenomena*, (2007)

[205] Khujadze G., Oberlack M.: New Scaling Laws in ZPG Turbulent Boundary Layer Flow *Proc.* $5^{th}$ *International Symposium on Turbulence and Shear Flow Phenomena*, (2007)

[206] Weller T., Schneider K., Oberlack M., Farge M.: Studying Streamwise Rotation Variations of a Turbulent Channel Flow using DNS and CVE, *Proc.* $5^{th}$ *International Symposium on Turbulence and Shear Flow Phenomena*, (2007)

[207] Kinzel M., Holzner M., Lüthi B., Tropea C., Kinzelbach W., Oberlack M.: Scaling Laws of Turbulent Diffusion - An Experimental Validation, *Proc.* $14^{th}$ *International Symposium on Applications of Laser Techniques to Fluid Mechanics*, (2008)

[208] Oberlack M., Khujadze G.: New One-and Two-Point Scaling Laws in Zero Pressure Gradient Turbulent Boundary Layer Flow, in: *Proc. of IUTAM Symposium on Computational Physics and New Perspectives in Turbulence*, 255-260 Springer (2008)

[209] Mehdizadeh A., Oberlack M.: A study of turbulent Poiseuille-Ekman flow at different rotation rates using DNS, *Proc.* $12^{th}$ *European Turbulence Conference*, (2009)

[210] Khujadze K., Oberlack M.: DNS of vibrating grid turbulence, *Proc.* $12^{th}$ *European Turbulence Conference*, (2009)

[211] Oberlack M., Khujadze K.: Fractal-generated turbulent scaling laws from a new scaling group of the multi-point correlation equation, *Proc.* $12^{th}$ *European Turbulence Conference*, (2009)

[212] Khujadze G., Chagelishvili G., Oberlack M., Tevzadze A., Bodo G.: Aerodynamic sound generation by turbulence in shear flows, *Proc.* $12^{th}$ *European Turbulence Conference*, (2009)

[213] Oberlack M., Khujadze G.: Fractal-generated turbulent scaling laws from a new scaling group of the multi-point correlation equation, *Proc.* $6^{th}$ *International Symposium on Turbulence and Shear Flow Phenomena*, (2009)

[214] Khujadze G., Oberlack M.: DNS of Vibrating Grid Turbulence, *Proc.* $6^{th}$ *International Symposium on Turbulence and Shear Flow Phenomena*, (2009)

[215] Mehdizadeh A., Oberlack M., Hosseinzadeh A.: DNS and modeling of turbulent channel flow with wall-normal rotation, *Proc.* $6^{th}$ *International Symposium on Turbulence and Shear Flow Phenomena*, (2009)

[216] Vigdorovich I., Oberlack M.: Turbulent Poiseuille flow with wall transpiration, *Proc.* $6^{th}$ *International Symposium on Turbulence, Heat and Mass Transfer*, (2009)

[217] Kummer F., Emamy N., Teymouri R.M.B., Oberlack M.: Report on the development of a generic discontinuous Galerkin framework in .NET, *ParCFD 2009, 21st International Conference on Parallel Computational Fluid Dynamics*, 383-397 (2009)

[218] Khujadze G., Oberlack M., Chagelishvili G.: Stochastically Forced Plane Couette Flow: DNS and Non-Modal Analysis, *Proc.* $16^{th}$ *U.S. National Congress of Theoretical and Applied Mechanics*, (2010)

[219] Rosteck A.M., Oberlack M.: New Turbulent Scaling Laws Arising from New Statistical Symmetries of the Multi-Point Equations, *Proc.* $16^{th}$ *U.S. National Congress of Theoretical and Applied Mechanics*, (2010)

[220] Khujadze G., Oberlack M.: DNS and Scaling Laws of Turbulence Generated by a Vibrating Grid, *Proc.* $16^{th}$ *U.S. National Congress of Theoretical and Applied Mechanics*, (2010)

[221] Oberlack M.: Turbulent Scaling Laws and What we Can Learn from the Multi-point Correlation Equations, *Proc.* $7^{th}$ *International Symposium on Turbulence and Shear Flow Phenomena*, (2011)

[222] Aldudak F., Oberlack M.: Dissipation Element Analysis of Scalar Fields in Wall-bounded Turbulent Flow, *Proc.* $7^{th}$ *International Symposium on Turbulence and Shear Flow Phenomena*, (2011)

[223] Khujadze G., Nguyen van yen R., Schneider K., Oberlack M., Farge M.: Coherent Vorticity Extraction in Turbulent Boundary Layers Using Orthogonal Wavelets, *Proc.* $7^{th}$ *International Symposium on Turbulence and Shear Flow Phenomena*, (2011)

[224] Aldudak A., Oberlack M.: Length scale analysis in wall-bounded turbulent flow by means of Dissipation Elements, *Proc.* $13^{th}$ *European Turbulence Conference*, (2011); appeared in: Journal of Physics: Conference Series 318 (2011) 022001

[225] Wacławczyk M., Oberlack M.: Invariant closure proposals for the interface tracking in two-phase turbulent flows, *Proc.* $13^{th}$ *European Turbulence Conference*, (2011); appeared in: Journal of Physics: Conference Series 318 (2011) 042025

[226] Oberlack M., Rosteck A.: Applications of the new symmetries of the multi-point correla-

tion equations, *Proc.* $13^{th}$ *European Turbulence Conference*, (2011); appeared in: Journal of Physics: Conference Series 318 (2011) 042011

[227] Avsarkisov V.S., Oberlack M., Khujadze G.: Turbulent Poiseuille Flow with Wall Transpiration: Analytical Study and Direct Numerical Simulation, *Proc.* $13^{th}$ *European Turbulence Conference*, (2011); appeared in: Journal of Physics: Conference Series 318 (2011) 022004

[228] Khujadze G., Nguyen van yen R., Schneider K., Oberlack M., Farge M.: Coherent vorticity extraction in turbulent boundary layers using orthogonal wavelets, *Proc.* $13^{th}$ *European Turbulence Conference*, (2011); appeared in: Journal of Physics: Conference Series 318 (2011) 022011

[229] Gampert M., Goebbert J.H., Schaefer P., Gauding M., Peters N., Aldudak F., Oberlack M.: Compressive and extensive strain along gradient trajectories, *Proc.* $13^{th}$ *European Turbulence Conference*, (2011); appeared in: Journal of Physics: Conference Series 318 (2011) 052029

[230] Chagelishvili G.D., Hau J.N., Khujadze G., Oberlack M.: The basic physics of the linear transient growth in plane shear flows, *Proc.* $14^{th}$ *European Turbulence Conference* (2013)

[231] Avsarkisov V., Oberlack M., Hoyas S., Khujadze G.: New mean velocity scaling laws for turbulent Poiseuille flow with wall transpiration, *Proc.* $14^{th}$ *European Turbulence Conference* (2013)

[232] Rosteck A., Oberlack M.: New turbulent scaling laws from the multi-point correlation equations, *Proc.* $14^{th}$ *European Turbulence Conference* (2013)

[233] Oberlack, M.; Rosteck, A.; Avsarkisov, V.: Can we obtain first principle results for turbulence statistics, in: *Proc.* $10^{th}$ *International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics* (2014)

[234] Hoyas H., Kraheberger S.V., Oberlack M.: Turbulent plane Couette flow with wall-transpiration, *Proc.* $15^{th}$ *European Turbulence Conference* (2015)

[235] Avsarkisov V., Oberlack M., Hoyas S., Rosteck A., Garcia-Galache J.P., Frank A.: Plane turbulent Couette flow: DNS, large scale structures and symmetry induced scaling laws, *Proc.* $9^{th}$ *International Symposium on Turbulence and Shear Flow Phenomena* (2015)

[236] Avsarkisov V., Oberlack M., Hoyas S., Rosteck A., Garcia-Galache J.P., Frank A.: Plane turbulent Couette flow: DNS, large scale structures and symmetry induced scaling laws, *Proc.* $9^{th}$ *International Symposium on Turbulence and Shear Flow Phenomena* (2015)

[237] Calotoiu, A., Geisenhofer, M., Kummer, F., Weber, J., Hoefler, T., Oberlack, M., Wolf, F.: Empirical Modeling of Spatially Diverging Performance,s *IEEE, 2020 IEEE/ACM International Workshop on HPC User Support Tools (HUST) and Workshop on Programming and Performance Visualization Tools, (ProTools), Virtual Conference* (2020)

**Book Chapters**

[238] Oberlack M., Peters N.: Closure of the Two-Point Correlation Equation in Physical Space as a Basis for Reynolds-Stress Models, in: *Near-Wall Turbulent Flows*, eds. R.M.C. So, C.G. Speziale, B.E. Launder, Elsevier Verlag, (1993)

[239] Oberlack M.: Closure of the Dissipation Tensor and the Pressure-Strain Tensor Based on the Two-Point Correlation Equation, in: *Turbulent Shear Flows 9*, eds. F. Durst, N. Kasagi, B.E. Launder, F.W. Schmidt, J.H. Whitelaw, Springer Verlag, (1994)

[240] Oberlack M.: Symmetries in Turbulent Flows, in: *Modern Group Analysis VII*, eds. N. N. Ibragimov, K. R. Naqvi, E. Straume, Norwegian University of Science and Technology (NTNU) Trondheim, (1998)

[241] Oberlack M.: Symmetries of the Navier-Stokes Equations and their Implications for Subgrid-Models in Large-Eddy Simulation of Turbulence, in: *Fundamental Problematic Issues in Turbulence*, eds. A. Gyr, W. Kinzelbach, A. Tsinober, Trends in Mathematics, Birkhäuser Verlag, (1999)

[242] Oberlack M.: Symmetries and invariant solutions of turbulent flows and their implications for turbulence modeling, in: *Theories of Turbulence*, eds. M. Oberlack, F.-H. Busse, Springer Wien New York, (2002)

[243] Khujadze G., Oberlack M.: DNS and Scaling Laws from New Symmetry Groups of ZPG Turbulent Boundary Layer Flow, in: *New Results in Numerical and Experimental Fluid Mechanics IV*, eds. C. Breitsamter etc, Springer Wien New York, (2003)

[244] Oberlack M., Guenther S.: New Scaling Laws of Shear-Free Turbulent Diffusion and Diffusion-Waves, in: *Reynolds Number Scaling in Turbulent Flow*, ed. A. J. Smits, Kluwer Academic Publishers (2003)

[245] Khujadze G., Oberlack M.: DNS and Scaling Laws from the New Symmetry Groups of ZPG Turbulent Boundary Layer, in: *New Results in Numerical and Experimental Fluid Mechanics IV, Notes on Numerical Fluid Mechanics and Multidisciplinary Design, Vol. 87*, eds. Chr. Breitsamter, B. Laschka, H.-J. Heinemann, R. Hilbig, Springer-Verlag (2004)

[246] Oberlack M., Khujadze G.: Symmetry Methods in Turbulent Boundary Layer Theory (New Wake Region Scaling Laws and Boundary Layer Growth), in: *Proc. of the IUTAM-Symposium 'One Hundred Years of Boundary layer Research'*, ed. H.-J. Heinemann, Springer-Verlag (2005)

[247] Guenther, S., Oberlack, M.: Modeling of the Pressure-Strain and Diffusion-Term in Rotating Flows, in: *Progress in Turbulence*, eds. J. Peinke, A. Kittel, S. Barth, M. Oberlack, Springer-Verlag (2005)

[248] Khujadze G., Oberlack M.: DNS and New Scaling Laws of ZPG Turbulent Boundary Layer Flow, in: *Progress in Turbulence*, eds. J. Peinke, A. Kittel, S. Barth, M. Oberlack, Springer-Verlag (2005)

[249] Weller T., Oberlack M.: DNS of a Turbulent Channel Flow with Streamwise Rotation-Investigation on the Cross Flow Phenomena, in: *Direct and Large-Eddy Simulation VI*, eds. E. Lamballais etc., Springer (2006)

[250] Weller T., Oberlack M.: DNS and Scaling Laws of a Turbulent Channel Flow with Streamwise Rotation, in: *Progress in Turbulence*, eds. M. Oberlack et al., Springer-Verlag (2007)

[251] Guenther, S., Oberlack, M.: Consistent invariant modelling of axially rotating pipe flow, in: *Progress in Turbulence*, eds. M. Oberlack et al., Springer-Verlag (2007)

[252] Wendling I., Oberlack, M.: On the Investigation of a Dynamic Nonlinear Subgrid-Scale Model, in: *Complex Effects in Large Eddy Simulations*, eds. S.C. Kassinos, Springer Berlin Heidelberg (2007)

[253] Nold, A., Oberlack, M., Cheviakov, A.: Applications of Symmetry Analysis in Stability Theory, in: *New Results in Numerical and Experimental Fluid Mechanics VII, Series: Notes on Numerical Fluid Mechanics and Multidisciplinary Design*, eds. A. Dillmann et al., Springer-Verlag (2009)

[254] Khujadze G., Oberlack M.: Fractal-generated turbulent scaling laws from a new scaling group of the multi-point correlation equation, in: *Progress in Turbulence*, eds. J. Peinke et al., Springer-Verlag (2010)

[255] Khujadze G., Oberlack M., Chagelishvili G.: Stochastically forced laminar plane Couette flow: Non-normality and hydrodynamic fluctuations, in: *Progress in Turbulence*, eds. J. Peinke et

al., Springer-Verlag (2010)

[256] Mehdizadeh A., Oberlack M.: Study of effects of wall-normal rotation on the turbulent channel flow using DNS, in: *Progress in Turbulence*, eds. J. Peinke et al., Springer-Verlag (2010)

[257] Oberlack, M., Kummer, F.: Discontinuous Galerkin Methods for Premixed Combustion Multiphase Problems, in: *Flow and Combustion in Advanced Gas Turbine Combustors, Series: Volume 1581 of the series Fluid Mechanics and Its Applications*, eds. J. Janicka et al., Springer-Verlag (2012)

[258] Kelbin O., Cheviakov A.F., Oberlack M.: Conservation laws of helically symmetric flows and their importance for turbulence theory, in: *Progress in Turbulence and Wind Energy*, eds. M. Oberlack et al., Springer-Verlag (2012)

[259] Rosteck A.M., Oberlack M.: New statistical symmetries of the two-point correlation equations for turbulent flows. in: *Progress in Turbulence and Wind Energy*, eds. M. Oberlack et al., Springer-Verlag (2012)

[260] Khujadze G., Chagelishvili G., Oberlack M., Tevzadze A., Bodo G.: Aerodynamic sound generation by turbulence in shear flows, in: *Progress in Turbulence and Wind Energy*, eds. M. Oberlack et al., Springer-Verlag (2012)

[261] Moradi, S., Wang, Y., Oberlack, M.: Modeling of channel flows with transition interface separating free surface and pressurized channel flows, in: *Mathematical Optimization of Water Networks*, eds. A. Martin et al., Birkhäuser Verlag (2012)

[262] Staffolani N., Wacławczyk M., Oberlack M., Friedrich R, Wilczek M.: Lie symmetries of the Lundgren-Monin-Novikov hierarchy, in: *Progress in Turbulence*, eds. A. Talamelli et al., Springer-Verlag (2014)

[263] Khujadze G., Chagelishvili G., Oberlack M.: Turbulence control in plane Couette flow by spanwise reflection symmetry breaking, in: *Progress in Turbulence*, eds. A. Talamelli et al., Springer-Verlag (2014)

[264] Hau J.-N., Chagelishvili G., Khujadze G. Oberlack M., Tevzadze A.: Sound Generation in Plane Couette Flow: A Failure of Lighthill's Analogy, in: *Progress in Turbulence*, eds. A. Talamelli et al., Springer-Verlag (2014)

[265] Utz T., Kallendorf C, Kummer F., Müller M., Oberlack M.: An extended discontinuous Galerkin framework for multiphase flows, in: *Transport Processes at Fluidic Interfaces*, eds. D. Bothe, A. Reusken, Springer/Birkhäuser series: Advances in Mathematical Fluid Mechanics (2017)

[266] Oberlack M., Wacławczyk M., Grebenev V.: Statistical symmetries of turbulence, in: *Nonlinear Systems and Their Remarkable Mathematical Structures*, ed. N. Euler, CRC Press / Taylor & Francis (2018)

[267] Klingenberg D., Oberlack M., Pluemacher D.: Symmetry-based turbulence modeling. in: *Progress in Turbulence*, eds. R. Örlü et al., Springer-Verlag (2019)

[268] Zimmerman S., Klewicki J., Oberlack, M.: Experimental Assessment of Symmetry Induced Higher-Moment Scaling Laws in Turbulent Pipe Flow, in: *Progress in Turbulence*, eds. R. Örlü et al., Springer-Verlag (2021)

[269] Oberlack M., Klingenberg, D.: Symmetries, Subgrid-Scale Modeling, and Coarse Graining, in: *Coarse Graining Turbulence, Modeling and Data-Driven Approaches and their Applications*, eds. F. F. Grinstein, F. S. Pereira, and M. Germano, Cambridge University Press (2024)

[270] Nguyen C.T., Oberlack, M.: Symmetry theory and turbulent jet scaling laws of a spatially evolving turbulent round jet, in: *Progress in Turbulence*, eds. R. Örlü et al., Springer-Verlag (2024)

[271] Putz F.C., Oberlack, M.: Statistical symmetries in second order turbulence modeling, in: *Progress in Turbulence*, eds. R. Örlü et al., Springer-Verlag (2024)

[272] Dokoza T., Oberlack, M.: Reynolds Number Induced Growth of Large-scale Rolls in Plane Couette Flow and Invariant Scaling Laws for Added Wall-transpiration Using Resolvent Analysis, in: *Progress in Turbulence*, eds. R. Örlü et al., Springer-Verlag (2024)

[273] Görtz S., Plümacher D., Conrad J.H., Oberlack, M.: Infinite Lundgren Hierarchy of Turbulence: Isotropy, Super-isotropy and a Finite Dimensional Eigenvalue Problem, in: *Progress in Turbulence*, eds. R. Örlü et al., Springer-Verlag (2024)

**Reports and Miscellaneous**

[274] Oberlack M., Rogers M. M., Reynolds W. C.: Modeling the Two-Point Correlation of the Vector Stream Function, *Studying Turbulence Using Numerical Databases – V, Center for Turbulence Research, Stanford University/NASA Ames*, (1994)

[275] Oberlack M.: Analysis of the Two-Point Velocity Correlations in Turbulent Boundary Layer Flows, *Center for Turbulence Research, Stanford University/NASA Ames, Annual research briefs*, (1995)

[276] Oberlack M.: Symmetries in Turbulent Boundary Layer Flows, *Center for Turbulence Research, Stanford University/NASA Ames, Annual research briefs*, (1996)

[277] Oberlack M.: Invariant Modelling in Large-Eddy Simulation of Turbulence, *Center for Turbulence Research, Stanford University/NASA Ames, Annual research briefs*, (1997)

[278] Oberlack M., Cabot W. H., Rogers M. M.: Group Analysis, DNS and Modeling of a Turbulent Channel Flow with Streamwise Rotation, *Studying Turbulence Using Numerical Databases – VII, Center for Turbulence Research, Stanford University/NASA Ames*, pp. 221-242 (1998)

[279] Oberlack M.: Generalized Symmetries of the *G*-Equation without Underlying Flow Field, *Center for Turbulence Research, Stanford University/NASA Ames, Annual research briefs*, (2001)

[280] Oberlack M., Khujadze G.: Skalengesetze zur Beschreibung turbulenter wandnaher Strömungen, in: *thema FORSCHUNG, Panta rhei - alles fließt*, vol. 2, pp. 64-71, (2003)

[281] Schaffner J., Oberlack M.: Hydromechanische Modellierung einer Spülwelle in einem Stauraumkanal, in: *thema FORSCHUNG, Panta rhei - alles fließt*, vol. 2, pp. 72-77, (2003)

[282] Guenther S., Oberlack M.: Vibrating Grid Turbulence Scaling Laws in Inertial and Rotating Systems, *EUROMECH newsletter*, vol. 27, (2004)

[283] Knudsen E., Kurenkov O., Kim S., Oberlack M., Pitsch H.: Modeling Flame Brush Thickness in Premixed Turbulent Combustion, in: *Studying Turbulence Using Numerical Databases – IX, Center for Turbulence Research, Stanford University/NASA Ames*, (2006)

[284] Khujadze G., Nguyen van yen R., Schneider K., Oberlack M., Farge M.: Coherent vorticity extraction in turbulent boundary layers using orthogonal wavelets, in: *Studying Turbulence Using Numerical Databases – XIII, Center for Turbulence Research, Stanford University/NASA Ames*, (2010)

[285] Oberlack M., Khujadze G., Avsarkisov V., Wang Y.: Direkte numerische Simulation der Turbulenz. Forschen, Nr. 2, 32–35 (2011)

**Books**

[286] Oberlack M., Busse F.-H. (eds.): Theories of Turbulence, Springer Wien New York, (2002)

[287] Peinke J., Kittel A., Barth St., Oberlack M.(eds.): Progress in Turbulence, Springer Berlin Heidelberg New York, (2005)

[288] M. Oberlack, G. Khujadze, S. Guenther, A. Osman, T. Weller, M. Frewer, S. Barth, J. Peinke (eds.): Progress in Turbulence II, Springer Berlin Heidelberg New York, (2007)

[289] Peinke, J., Oberlack, M., Talamelli, A. (eds.): Progress in Turbulence III, Springer Berlin Heidelberg New York, (2009)

[290] Oberlack, M., Peinke, J., Talamelli, A., Castillo, L., Hölling, M. (eds.): Progress in Turbulence and Wind Energy IV, Springer Berlin Heidelberg New York, (2012)

[291] Talamelli, A., Oberlack, M., Peinke, J.: Progress in Turbulence V, Springer Berlin Heidelberg New York, (2014)

[292] Peinke, J., Kampers, G., Oberlack, M., Wacławczyk, M., Talamelli, A. (Eds.): Progress in Turbulence VI, Springer Berlin Heidelberg New York, (2016)

[293] Örlü, R. Talamelli, A., Oberlack, M., Peinke, J. (Eds.): Progress in Turbulence VII, Springer Berlin Heidelberg New York, (2017)

[294] Örlü, R. Talamelli, A., Oberlack, M., Peinke, J. (Eds.): Progress in Turbulence VIII, Springer Berlin Heidelberg New York, (2019)

[295] Örlü, R. Talamelli, A., Peinke, J., Oberlack, M., (Eds.): Progress in Turbulence IX, Springer Berlin Heidelberg New York, (2021)

[296] Örlü, R. Talamelli, A., Peinke, J., Oberlack, M., (Eds.): Progress in Turbulence X, Springer Berlin Heidelberg New York, (2024)

## Patents

[297] Patent US 2007209979 (A1), Helbig, T., Higgins, M. L., Brown, E., Oberlack, M., Schaffner, J., Bremerich, M., Fitzke, J.-M., *Urine diverter with end of life cycle indicator*, 2007-09-13