



Holger Marschall

Curriculum Vitæ

Personal Details

Name Holger Marschall
Date of Birth 1980-07-19
Place of Birth Schramberg, Germany
Marital Status married, two childs (2014, 2018)
Citizenship German

Professional Details

Position Head of Research Group "Computational Multiphase Flow" & Postdoctoral Research Associate (Habilitation)
Address Technische Universität Darmstadt
Thermo-Fluids & Interfaces,
Alarich-Weiss-Straße 10
64287 Darmstadt
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Career

since 01/2011

Research Group Leader & Postdoctoral Research Associate (Habilitation),
Technische Universität Darmstadt, Thermo-Fluids & Interfaces, Computational Multiphase Flow, Mathematical Modeling and Analysis (Prof. Dr. rer. nat. Dieter Bothe).

02/2007–12/2010

Scientific Assistant & PhD Student

Technische Universität München, Catalysis Research Center, Chair of Chemical Engineering (Prof. Dr.-Ing. Olaf Hinrichsen).

*Dr.-Ing. Holger Marschall – Research Group Leader
Computational Multiphase Flow – Thermo-Fluids & Interfaces
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Education

Academic Education

2007 – 2011 Doctorate

Doctoral Research Qualification

12/2011

Dr.-Ing., *Technische Universität München*, Munich, mark 1.0.

Doctor degree from Technische Universität München, Doktor-Ingenieur (predicate 'passed with distinction', 'summa cum laude'). PhD Thesis entitled 'Towards the Numerical Simulation of Multi-Scale Two-Phase Flows'.

02/2007–12/2010

Scientific Assistant & PhD Student, *Technische Universität München, Catalysis Research Center*, Chair of Chemical Engineering (Prof. Dr.-Ing. Olaf Hinrichsen).

2001 – 2006 Academic Education

Professional Qualification

11/2006

Dipl.-Ing., *Technische Universität München*, Munich, mark 1.5.

Diploma degree from Technische Universität München, Diplom-Ingenieur Univ. (predicate 'very good').

04–10/2006

Diploma Thesis, *BASF SE (Ludwigshafen)*, mark 1.0.

Diploma Thesis entitled 'Modeling of a microstructured gas-liquid distributor using Computational Fluid Dynamics'.

10/2001–11/2006

Diploma Study Course Chemical Engineering (Diplomstudiengang Chemieingenieurwesen), *Technische Universität München*, Munich.

School Education

06/2000

Abitur (A-level), *Mathematisch-Naturwissenschaftliches Gymnasium Spaichingen (maths and natural science grammar school)*, mark 1.1.

Degree with general matriculation standard, Predicate 'passed with distinction' (Allgemeine Hochschulreife, Prädikat 'mit Auszeichnung bestanden').

01/1993–06/2000

Mathematisch-Naturwissenschaftliches Gymnasium Spaichingen (maths and natural science grammar school), Baden-Württemberg.

08/1991–01/1993

Progymnasium (secondary school) in Gosheim, Baden-Württemberg.

08/1987–07/1991

Grundschule (primary school) in Wehingen, Baden-Württemberg.

Research

Research Statement

In my research, methods for the computer-aided prediction of **transport processes in multiphase flows of thermo-fluids** are developed. Simulation methods are implemented in the Open Source C++ Library **OpenFOAM®**. My research is focussed on transport processes & physicochemical phenomena at interfaces and aims at the development of high-fidelity numerical methods to cope with associated challenges.

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2 of 22

Research Topics

- *Interfacial mass transfer across fluid interfaces*
- *Complex wetting (surfactants, porous media)*
- *Multicomponent multiphase flow of miscible systems*
- *Viscoelastic two-phase flows at high Weissenberg numbers*

Methods

- Sharp & diffuse interface capturing methods
- Moving mesh interface tracking methods
- Adaptive and hybrid approaches

Collaborative Research

Scientific Roles in Research Network Programmes & Institutions

- **Priority Programme DFG SPP 1740** *Influence of Local Transport Processes on Chemical Reactions in Bubbly Flows*, www.dfg-spp1740.de; Principal Investigator.
- **Collaborative Research Centre DFG SFB 1194** *Mutual Influence of Wetting and Transport Processes*, www.sfb1194.tu-darmstadt.de; Principal Investigator.
- **Transregio Collaborative Research Centre DFG TRR-SFB 150** *Turbulent, chemically reactive, multi-phase flows near walls*, www.trr150.tu-darmstadt.de; Principal Investigator.

Awards and Recognition

- 2018/19 **Visiting professor** at the Institut de Mécanique des Fluides de Toulouse (IMFT), France
- 2012 **Academic Distinction for High-Level Research Work:** Top-Three Young Researchers 2012, *Adolf-Messer-Prize 2012*
- 2001 A-level **Physics Prize – Membership in German Physics Society** (Abiturpreis Physik – Mitgliedschaft in der Deutschen Physikalischen Gesellschaft)

Memberships in Scientific Committees & Professional Bodies

Membership in Editorial Boards & Scientific Committees

- since 2019 Associate Editor of the Canadian Journal of Chemical Engineering
- since 2015 Assigned Member of the DECHEMA ProcessNet Committee Computational Fluid Dynamics
- since 2010 Member of the OpenFOAM Workshop Committee, active in organizing the world's largest community-driven OpenFOAM event

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Organization of Scientific Events

- 2019/20 Symposium "Multiscale and Multiphase Flows" (joint with Prof. Dr. Hrvoje Jasak), 14th World Congress in Computational Mechanics and ECCOMAS Congress, Paris, France
- 2019/20 HPC Asia 2020, Workshop "Multi-scale, Multi-physics and Coupled Problems on highly parallel systems(MMCP)", Fukuoka, Japan
- 2019/20 Int. Conf. on Enhanced Material and Part Optimization and Process Intensification, Aachen, Germany
- 2019 33rd IEEE Int. Parallel & Distributed Processing Symposium (IPDPS), Workshop on "Performance and Software Engineering in Scientific Computing", Rio de Janeiro, Brazil
- 2014 2nd Int. Conf. on Numerical Methods in Multiphase Flow (joint with Prof. Dr. Dieter Bothe), Darmstadt, Germany
- 2014 2nd Int. Symposium on Multiscale Multiphase Process Engineering (MMPE2), Hamburg, Germany
- 2012 7th OpenFOAM Workshop (OFW7), Darmstadt, Germany
- 2012 Symposium on Numerics for Interfacial Multiphysics with OpenFOAM
- since 2009 OpenFOAM user group meetings for Southern Germany (Munich and Darmstadt, Germany)

Membership in Professional Bodies

- since 2007 Verband Deutscher Ingenieure (The Association of German Engineers, VDI) – VDI-Gesellschaft Verfahrenstechnik und Chemieingenieurwesen (VDI Society for Process and Chemical Engineering, VDI-GVC)
- since 2007 Gesellschaft für Chemische Technik und Biotechnologie e.V. (Society for Chemical Engineering and Biotechnology, DECHEMA)
- 2000–2006 Deutsche Physikalische Gesellschaft (German Physics Society, DPG)

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Reviewer & Referee Activities

I am acting as reviewer for research grant proposals submitted to the *German Research Foundation (Deutsche Forschungsgemeinschaft, DFG)*.

Moreover, I am acting as reviewer for the following journals in my field:

- *International Journal of Computational Physics*,
- *Computers & Fluids*,
- *International Journal for Numerical Methods in Fluids*,
- *International Journal for Numerical Methods in Engineering*,
- *International Journal of Computational Fluid Dynamics*,
- *Computer Physics Communications*,
- *American Institute of Chemical Engineers (AIChE) Journal*,
- *Journal of Non-Newtonian Fluid Mechanics*,
- *Chemical Engineering Science*,
- *Canadian Journal of Chemical Engineering*,
- *International Journal of Heat and Mass Transfer*,
- *International Journal of Multiphase Flow*,
- *Applied Mathematical Modelling*,
- *SoftwareX*,
- *Microfluidics and Nanofluidics*,
- *Chemical Engineering Technology & Chemie Ingenieur Technik*,
- *Journal of Colloid and Interface Science*,
- *Oil & Gas Science and Technology*.

I am also reviewing scientific proposals submitted to the local HPC council for resources at the university HPC cluster Lichtenberg-I/II (Tier-2).

Professional Expertise

Computer skills

CFD	OpenFOAM, OpenFVM, ANSYS CFX, Comsol Multiphysics/FEMlab.
Programming	C++, Fortran, Turbo Pascal, Delphi.
Techniques and Methods	Unified Modeling Language (UML, ISO/IEC 19501:2005), Doxygen Documentation, Waterfall, Agile(Scrum).
Scientific Libraries	gsl (GNU Scientific Library: wide range of mathematical routines), vnl (Vision Numerics Libraries: numerical containers and algorithms), eigen (C++ class library for linear algebra), blitz++ (C++ class library for scientific computing).
Scripting	Python, bash, Scilab.

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Mathematics	Maple, Scilab.
Mesher	blockMesh, Salome, snappyHexMesh, Gmsh, MeshLab.
Data Visualization	ParaView, gnuplot, Origin, Blender (sim-physics), Salome.
Process Engineering	Aspen, gPROMS, ChemCAD, Caesar II, PDS.
Other Software	Eclipse IDE, GIT, TortoiseGit, SVN, TortoiseSVN, GNU gcc, g++, LaTeX, MS Office, LibreOffice, ChemOffice, Gimp, Inkscape.
Operating Systems	Linux, Windows.

Language Skills

German	Fluent (native language)
English	Fluent
Chinese	Basics (1 year university course)
Courses	English for Technical Purposes, International Business English
Assessment	Self-assessment of language proficiency according to the <ul style="list-style-type: none"> ○ Interagency Language Roundtable (ILR) scale: German (Level 5), English (Level 5), Chinese (Level 1). ○ Common European Framework of Reference for Languages (CEFR): English (C2), Chinese (A1).

Teaching

Supervision of Ph.D. & Graduate Student Projects

Supervisor and Principal Investigator

Technische Universität Darmstadt, Thermo-Fluids & Interfaces, Computational Multiphase Flow Group

- *Numerical simulation of drop-wall film interaction of miscible liquids* (Dr. Cuicui Li)
- *Development and Application of a Direct Numerical Method for Reactive Transport Processes in Bubble Systems* (M.Sc. Dennis Hillenbrand)

Technische Universität Darmstadt, Thermo-Fluids & Interfaces, Mathematical Modeling and Analysis (Prof. Dr. Dieter Bothe)

- *Direct Numerical Simulation of Locally Coupled Interfacial Transport Processes at Contact Lines during Dynamic Wetting Processes* (M.Sc. Dirk Gründing)
- *Development and Application of a Direct Numerical Method for Reactive Transport Processes in Bubble Systems* (M.Sc. Manuel Falcone)

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Co-supervisor and Participating Investigator

Technische Universität Darmstadt, Thermo-Fluids & Interfaces, Mathematical Modeling and Analysis (Prof. Dr. Dieter Bothe)

- *Numerical Simulation of Multicomponent Surfactant Transport on Fluidic Interfaces with OpenFOAM* (M.Sc. Chiara Pesci & Dipl.-Ing. Kathrin Dieter-Kissling)
- *Advanced Volume-of-Fluid Methods on Unstructured Meshes in OpenFOAM with Applications to Fluid Interfaces* (M.Sc. Tomislav Marić)
- *Modeling and Numerical Simulation of Multi-component Two-Phase Fluid Systems with Ionic Species* (M.Sc. Paul Weber)
- *Interfacial Mass Transfer for implicit algebraic Volume-of-Fluid methods* (Dipl.-Ing. Daniel Deising)
- *Numerical Simulation of Viscoelastic Two-Phase Flows* (M.Sc. Matthias Niethammer)

Technische Universität München, Department of Mechanical Engineering, Chair of Plant and Process Engineering (Prof. Dr. Harald Klein)

- *Interfacial Mass Transfer into Liquid Films in Complex Geometries* (M.Sc. Simon Hill)

Karlsruhe Institute for Technology, Institute of Catalysis Research and Technology (Dr. Martin Wörner); BOSCH GmbH, Corporate Sector for Research and Advance Engineering (Dr. Thomas Kiedrowski); Technische Universität Dresden, Institute of Manufacturing Science and Engineering (Prof. Dr. Andrés F. Lasagni)

- *Positive effect on performance by means of active lubricant transport in laser textured surfaces* (M.Sc. Tobias Stark)

Supervision of M.Sc. & Undergraduate Student Projects

Co-supervisor – Numerical Studies

Karlsruhe Institute for Technology, Institute of Fluid Mechanics & Institute of Catalysis Research and Technology (Prof. Dr. Bettina Frohnappel & Dr. Martin Wörner); BOSCH GmbH, Corporate Sector for Research and Advance Engineering (Dr. Alexander Eifert)

- *Direct numerical simulation of transient wetting processes in complex sealing gap geometries using phaseFieldFoam/OpenFOAM* (B.Sc. Daniel Hagg)

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7 of 22

Technische Universität Darmstadt, Thermo-Fluids & Interfaces, Nano- and Microfluidics
(Prof. Dr. Steffen Hardt)

- *Description of Marangoni-induced Flow Patterns through Photo-switchable Surfactants by means of Direct Numerical Simulation using OpenFOAM* (cand. ing. Maximilian Hartmann)

Co-supervisor – Numerical Studies

Technische Universität München, Department of Chemistry, Chair of Chemical Engineering
(Prof. Dr. Olaf Hinrichsen)

- *Numerical Simulation of Viscoelastic Free-Surface Flows using Computational Fluid Dynamics* (cand. ing. Florian Habla)
- *Thermo-fluiddynamic Simulation of Vapour/Steam-Liquid Mixture in Stratified Flow Systems in Horizontal Channels with CFD* (cand. ing. Claude Labonte)
- *Development and Implementation of the Volume-of-Fluid Method with Geometric Interface Reconstruction on Arbitrary Unstructured Meshes for Incompressible Free-Surface Flows using OpenFOAM* (cand. ing. Tomislav Marić)
- *Numerical Simulation of Dispersed Gas-Liquid Flows in Bubble Columns at High Gas Fractions* (German: *Numerische Simulation disperser Gas-Flüssig-Strömungen in Blasensäulen bei hohen Gasphasenanteilen*) (cand. ing. Robert Mornhinweg)
- *Numerical Simulation of Polydisperse Bubbly Flows with Averaged Bubble Number Density and Interfacial Area Concentration Concepts* (cand. ing. Sebastian Oberhauser)
- *Numerical Simulation of Fluidized Beds using the Two-Fluid Model* (Christian Albert)
- *Numerical Simulation of Free-Surface Flows in OpenFOAM with Focus on Validation and Verification* (Thomas Bartsch)
- *Critical Review and Scientific Assessment of Piecewise Linear Interface Calculation on Polyhedral Meshes* (Bruno Beban)
- *Numerical Modeling of Chemical Reactors with OpenFOAM* (Johanna Hable)
- *Numerical Simulation of Bubble Dynamics in Pure and Contaminated Systems with OpenFOAM* (Korbinian Hinterberger)
- *Simulation and Modeling of Fluid Dynamics in Bubble Swarms in the Two-Fluid Model framework using Computational Fluid Dynamics* (German: *Simulation und Modellierung der Fluidodynamik in Blasenschwärmen auf Basis des Zwei-Fluid-Modells mittels der Computational Fluid Dynamics*) (Andreas Kossmann)
- *Analysis of the Object-Oriented Programme and Data Structure of OpenFOAM as Exemplified in the Top-Level Flow Solver *simpleFoam** (German: *Untersuchung zur objekt-orientierten Programm- und Datenstruktur von OpenFOAM am Beispiel des Strömungslösers *simpleFoam**) (Georg Rauch)

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- *Numerical Simulation and Modeling of Species Transfer across Fluid Interfaces using Computational Fluid Dynamics* (Christian Schüler)

Co-supervisor – Experimental Studies

Technische Universität München, Department of Chemistry, Chair of Chemical Engineering (Prof. Dr. Olaf Hinrichsen)

- *Design and Installation of a Videometrical Measurement System for Capturing Transient Polydispersed Multiphase Flows in Bubble Columns using a High-Speed Camera* (German: *Entwicklung und Implementierung eines videometrischen Messsystems zur Erfassung transienter, polydispenser Mehrphasenströmungen in Blasensäulen mittels High-Speed-Kamera*) (cand. ing. Florian Kraus)
- *Design and Installation of a Measurement System for Capturing Transient Polydispersed Multiphase Flows in Bubble Columns using Modern Pressure Sensors* (German: *Entwicklung und Implementierung eines Messsystems zur Erfassung transienter, polydispenser Mehrphasenströmungen in Blasensäulen mittels moderner Drucksensorik-Verfahren*) (Anna Reif)

Keynotes & Invited Talks

- 2019 **Scale-bridging interface-resolving simulation of reactive bubble flow**, Invited Keynote at the joint workshop on "Recent advances in bubble columns" of the EFCE Working Party "Multiphase Fluid Flow" and the SFGP (Societe française de Génie des Procédés, France) Working Group "Reactor and Reactor Intensification", November 5, 2019, Paris, France.
- 2018 **Sharp and Diffuse Interface Methods for DNS of Interfacial Transport Processes**, Seminar Lecture during visiting professorship at the Institut de Mécanique des Fluides de Toulouse (IMFT), November 21, 2018, Toulouse, France.
- 2018 **Development of Sharp and Diffuse Interface Methods in OpenFOAM**, Invited Talk at the 2nd German OpenFOAM User meeting, February 21–22, 2018, Braunschweig, Germany.
- 2017 **Direct Numerical Simulation of Bubbly Flow**, Invited Keynote at the 3rd International Conference on Numerical Methods in Multiphase Flows, June 26–29, 2017, Tokyo, Japan.
- 2016 **Numerical Simulation of Bubble Flows**, Symposium FERMaT-SPP1740 "Non-Invasive Measuring Tools and Numerical Methods for the Investigation of Non-Reactive and Reactive Gas-Liquid Flows", June 6–7, 2016, Toulouse, France.
- 2015 **Numerical methods for Direct Numerical Simulations of Transport Processes at Fluidic Interfaces**, Lecture at Summer School on 'Frontiers in Modeling of Multiphase Flows', September 2–4, 2015, Hamburg-Harburg, Germany.
- 2014 **HPC Deployment of OpenFOAM for Direct Numerical Simulations of Two-Phase Interfacial Flows**, Opening Talk at High Performance Computing Hessen (HiPerCH) Workshop, September 22–24, 2014, Darmstadt, Germany.

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9 of 22

- 2014 **Numerical Simulation of Interfacial Flows using OpenFOAM – Fundamentals and Capabilities with application to Computational Interfacial Heat and Mass Transfer**, IWR-Colloquium on Computational Methods in Sciences, Interdisciplinary Center for Scientific Computing, May 28, 2014, Heidelberg, Germany.
- 2013 **Numerical Simulation of Interfacial Flows using OpenFOAM – Fundamentals and Capabilities with application to Computational Interfacial Heat and Mass Transfer**, International Topical Team Workshop on Two-Phase Systems for Ground and Space Applications (ITTW2013), September 16–19, 2013, Bremen, Germany.
- 2012 **Numerical Simulation of Interfacial Flows using OpenFOAM – Fundamentals and Capabilities**, Plenary Talk, Jahrestreffen des ProcessNet-Fachausschusses CFD, March 12–14, 2012, Weimar, Germany.
- 2012 **Direct Numerical Simulation of Species Transfer across fluidic Interfaces using OpenFOAM**, Colloquium at the Collaborative Research Centre 578, January 30, 2012, Braunschweig, Germany.

Invited Lectures at Advanced Doctorate Schools

- 2017 **Numerical Description of Wetting Processes**, Short Course on Complex Wetting, Darmstadt, Germany
- 2017 **High Resolution Schemes in OpenFOAM® – Rationale and Design Principles**, Invited seminar lecture delivered at the *Oberwolfach Seminar on 'Compressible and Incompressible Multiphase Flows: Modelling, Analysis, Numerics'*, Oberwolfach Research Institute for Mathematics, Oberwolfach, Germany.
- 2015 **Numerical Methods for Direct Numerical Simulation of Transport Processes at Fluidic Interfaces**, Summer School "Frontiers in Modeling of Multiphase Flows", Hamburg-Harburg, Germany.
- 2013 **Taylor Bubbles and Taylor Flow – A Survey Lecture**, Summer School lecture within the framework of *Priority Programme DFG-SPP 1506 "Transport Processes at Fluidic Interfaces"*, <http://www.dfg-spp1506.de>, Aachen, Germany.

Courses

I designed and taught

- since 2016 **Numerical Methods for Direct Numerical Simulations of Two-Phase Flows** (Numerische Methoden zur Direkten Numerischen Simulation von Zweiphasenströmungen), designed as a course supplement to *Advanced Methods in Computational Fluid Dynamics (Weiterführende Methoden der Strömungssimulation)*, taught jointly with Prof. Dr. rer. nat. Michael Schäfer & Dr. rer. pol. Markus Lazanowski
- 2012–2014 **Numerical Modeling of Fluid Interfaces** (Numerische Modellierung fluider Grenzflächen) designed as a course supplement to *Mathematical Modeling of Fluid Interfaces*, taught jointly with Prof. Dr. rer. nat. Dieter Bothe
- 2009–2010 **Computer-Aided Design of Chemical Reactors** (Reaktordesign – Betrieb und Auslegung chemischer Reaktoren, Rechnergestütztes Praktikum)

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10 of 22

- 2009–2010 **Computational Fluid Dynamics with OpenFOAM – An Introduction with Tutorials for Chemical and Process Engineers** (Rechnergestütztes Praktikum)
- 2007–2010 **Heat and Mass Transfer in Chemical Processes** (Wärme- und Stofftransport bei chemischen Prozessen, Zentral-/Rechenübung)

Trainings

- 06/2016 **Design and Rationale of High Resolution Schemes in OpenFOAM®**, training lecture given at the *11th OpenFOAM Workshop*, Guimarães, Portugal, June 26–30, 2016
- 08/2012 **Introductory Course to OpenFOAM® for Two-Fluid Modeling**, 3-day training lecture within the framework of BMBF network project *Chemical Processes – Multiscale Modeling of Multiphase Reactors (FKZ: 01RC1102)*, August 15–17, 2012
- 06/2011 **Integrated Development Environment (IDE) Eclipse for OpenFOAM® – Assessing the Performance of bubbleFoam**, Training lecture given jointly with Astrid Mahrla at the *6th OpenFOAM Workshop*, PennState University, USA, June 13–16, 2011

Theses

- 2011 **PhD Thesis**
in fulfilment of the requirements for the degree of doctor of engineering (Dr.-Ing.) to the Faculty of Chemistry of Technische Universität München

Title *Towards the Numerical Simulation of Multi-Scale Two-Phase Flows*

Doctoral Adviser Prof. Dr.-Ing. Olaf Hinrichsen

Manuscript available online

- URL: mediatum.ub.tum.de/?id=1080878
- URN (citable URL): <http://nbn-resolving.de/urn/resolver.pl?urn:nbn:de:bvb:91-diss-20111222-1080878-1-7>

Scientific Highlights

- Unified two-fluid modeling framework for multiscale two-phase flows including flow-regime transitions, entitled 'Hybrid Interface RESolving Two-Fluid Model' (HIRES-TFM)
- Consistent single-field model formulation for interfacial species transfer, entitled 'Continuous Species Transfer' (CST) Model

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11 of 22

Defense 2011-12-22

Committee Members

Chair Univ.-Prof. Dr. Karsten Reuter

Examiners

1. Univ.-Prof. Dr.-Ing. Kai-Olaf Hinrichsen, Technische Universität München
2. Univ.-Prof. Dr.-Ing. Harald Klein, Technische Universität München
3. Prof. Dr. sc. Hrvoje Jasak, University of Zagreb / Croatia

2007 **Diploma Thesis**

in fulfilment of the requirements for the diploma degree of engineering (Dipl.-Ing.)

Title *Modeling of a microstructured gas-liquid distributor using CFD* (Modellierung eines mikrostrukturierten Gas-Flüssig-Verteilers mit Hilfe der Computational Fluid Dynamics (CFD)), at BASF SE (Ludwigshafen, Germany)

Supervisors

- Prof. Dr. techn. Johannes Lercher, Technische Universität München
- Dr.-Ing. Axel Schimpf and Dr. rer. nat. Wolfgang Gerlinger, BASF SE

Scientific Highlights

- Numerical modeling of outlet boundary condition preserving overall continuity of the considered gas-liquid distributor
- Adaptive time-stepping procedure according to residual level of a prescribed set for multiple equations

2005 **Term Thesis**

Title *Residence Time Distribution in a Reactive Plate Column: Experimental Investigation and System-Theoretical Modeling* (Verweilzeitmessung in einer reaktiven Bodenkolonnen: Experimentelle Untersuchung und Systemtheoretische Modellierung)

Supervisors

- Prof. Dr.-Ing. Johann Stichlmair, Technische Universität München
- Dr.-Ing. Tobias Dörrhöfer, Technische Universität München

2005 **Term Thesis**

Title *Modeling of Reaction Kinetics of the Homogeneously Catalyzed Methyl Acetate Synthesis* (Modellierung der Reaktionskinetik der homogenkatalysierten Methylacetat-Synthese)

Supervisors

- Prof. Dr.-Ing. Johann Stichlmair, Technische Universität München
- Dr.-Ing. Tobias Dörrhöfer, Technische Universität München

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12 of 22

References

Book Chapters

- [1] H. Marschall, C. Falconi, C. Lehrenfeld, R. Abiev, M. Wörner, A. Reusken, and D. Bothe. *Transport Processes at Fluidic Interfaces*, chapter Direct Numerical Simulations of Taylor Bubbles in a Square Mini-Channel: Detailed Shape and Flow Analysis with Experimental Validation, page 689. *Advances in Mathematical Fluid Mechanics*. Springer International Publishing – Birkhäuser Basel, 2017. ISBN 978-3-319-56601-6.
- [2] C. Pesci, K. Dieter-Kissling, H. Marschall, and D. Bothe. *Computational Methods for Complex Liquid-Fluid Interfaces*, chapter Finite Volume/Finite Area Interface-Tracking Method for Two-Phase Flows with Fluid Interfaces Influenced by Surfactant, page 538. *Progress in Colloid and Interface Science*. CRC Press, Taylor & Francis Group, 2015. ISBN 978-1-4987-2208-7.

Papers

Peer-Reviewed Journal Contributions

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- [5] M. Niethammer, H. Marschall, and D. Bothe. Robust Direct Numerical Simulation of viscoelastic flows. *Chem. Ing. Tech.*, 91(4):522–528, 2019.
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- [7] F. Jamshidi, H. Heimel, M. Hasert, Xuan Cai, H. Marschall, and M. Wörner. On suitability of phase-field and algebraic Volume-Of-Fluid OpenFOAM solvers for gas–liquid microfluidic applications. *Comput. Phys. Commun.*, 236:72–85, 2019.
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13 of 22

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14 of 22

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15 of 22

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16 of 22

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17 of 22

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18 of 22

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20 of 22

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Survey Lectures

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- [93] H. Marschall. Taylor Bubbles and Taylor Flow – A Survey Lecture. In *PhD Workshop within the framework of DFG SPP 1506 – Transport Processes at Fluidic Interfaces*, Aachen, Germany, July 17, 2013.
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21 of 22

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Community Activities

- since 2018 **Assigned Member** within the official OpenFOAM Governing Structure by ESI
- **Chair** of the Technical Committee on Multiphase Flows.
 - **Representative** of Technische Universität Darmstadt in the OpenFOAM Steering Committee
 - **Website:** www.openfoam.com/governance

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