

Prof. Dr.-Ing. Rainer Helmig

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Academic Career

- 1988 – 1992 Research assistant, Institute of Fluid Mechanics, University of Hannover
- 1993 – 1997 Research assistant (Postdoc, Docent), Institute of Hydraulic Engineering, University of Stuttgart
- 1997 – 1998 Acting Professor for Numerical Methods and Information Processing, Technical University Braunschweig, Germany
- 1998 – 2000 Full Professor for Numerical Methods and Information Processing, Institute of Computer Applications in Civil Engineering, Technical University Braunschweig
- since 2000 Full Professor for Hydromechanics and Modelling of Hydrosystems; Director, Institute for Modelling Hydraulic and Environmental Systems, University of Stuttgart

Academic Degrees

- 1981 Graduation in Civil Engineering (Dipl.-Ing.), University of Applied Sciences, Münster
- 1986 Graduation in Civil Engineering (Dipl.-Ing.), University of Hannover
- 1993 Doctoral degree (Dr.-Ing.), University of Hannover
- 1996 Habilitation degree (Dr.-Ing. habil.), University of Stuttgart

Research Experience

Research covers groundwater hydrology, multi-phase flow in porous media, numerical modeling, and the analysis of coupled processes between the unsaturated zone and the atmosphere. Special focus is on coupling hydrosystem compartments and complex flow and transport processes, as well as integrating data and models. Emphasis is on fundamental questions about physical and mathematical modeling of multi-phase processes, developing algorithms accounting for fluid phase changes and structural media heterogeneities, thereby forming a basis for various model concepts (e.g. pre-dimensioning decontamination strategies and analyses of energy storage (gas, heat), including their effects on groundwater). Recent research focuses on understanding and modeling mass- and heat-flux processes across the land/atmosphere interface as controlled by dynamic interactions between the atmospheric boundary layer and the land surface. Contributes to developing new model concepts to enhance understanding of land-atmosphere interactions, evaporation and evapotranspiration processes, climate modelling, and salt precipitation.

Awards and Recognitions

- 1995 Dresden Prize for Groundwater Research
- 2008 Teaching award for lectures in Hydromechanics, University of Stuttgart
- since 2010 Elected member of the Heidelberg Academy of Sciences and Humanities
- 2012 NOW-von Humboldt Stiftung award

- 2013 Shell lecture 2013, Rice University, Houston, USA
- 2013 InterPore-Rosette, International Society for Porous Media
- 2015 Henry Darcy Distinguished Lecturer, National Groundwater Association (NGWA); over 60 lectures in 14 countries
- since 2017 Elected member of the German Academy of Science and Engineering
- 2019 Honorary Lifetime Membership Award, International Society for Porous Media (InterPore)
- 2019 – 2022 Magne Espedal Honorary Professor at the University of Bergen, Norway
- 2020 AGU Fellow 2020, American Geophysical Union
- 2021 – 2024 Research Professorship, University of Stuttgart

Associate Editorships

Advances in Water Resources (since 1999), Computational Geosciences (since 2007); Journal of Geomathematics (2009 – 2017); Water Resources Research (2011 – 2016)

Membership in Professional Organisations

American Geophysical Union, International Society for Porous Media, Society for Industrial and Applied Mathematics, Society of Petroleum Engineers

Service to the Community (selected)

- since 2001 Course Coordinator at the University of Stuttgart of 5 different study programs, including of the International Doctoral Program Environment Water
- 2002 – 2006 Vice-Spokesperson of the Collaborative Research Centre (SFB) 404 “Multifield Problems in Continuum Mechanics”, German Research Foundation (DFG)
- 2003 – 2006 Elected Member of the Senate Commission on Water Research, German Research Foundation (DFG)
- 2006 – 2011 Elected Chair of the Senate Commission on Water Research, German Research Foundation (DFG)
- 2007–2015 German Spokesman of the International Research Training Group (ITRG) 1398 “Non-linearities and upscaling in porous media” (NUPUS (DFG)) in cooperation with the Dutch universities in Delft, Eindhoven, Utrecht and Wageningen, and the Norwegian University of Bergen
- 2007 – 2018 Principal Investigator and member of the Executive Board of the Cluster of Excellence EXC 310 “Simulation Technology” (Simtech) at the University of Stuttgart
- 2008 – 2015 Member of the joint steering committee of the GEOTECHNOLOGIEN research program of the German Federal Ministry of Education and Research
- 2009 – 2011 President of the International Society for Porous Media, InterPore
- 2011–2012 Member of the expert committee on Information and dialogue process initiated by ExxonMobil on the safety and environmental impact of fracking in natural-gas production
- 2012 – 2013 Chair of committee to develop a water-research network for the federal state of Baden-Württemberg
- 2018 – 2021 Member of the Executive Board of the Cluster of Excellence EXC 2075 “Data-integrated Simulation Science” (Simtech) at the University of Stuttgart
- since 2018 Principal investigator of the Cluster of Excellence EXC 2075 “Data-integrated Simulation Science” (Simtech) at the University of Stuttgart

since 2018 Spokesperson and Principal Investigator of the Collaborative Research Centre (SFB) 1313 “Interface-Driven Multi-Field Processes in Porous Media: Flow, Transport and Deformation”, University of Stuttgart

Peer reviewer for, among others, the German Research Foundation (DFG), the German Federal Ministry of Education and Research, the European Union, the Research Council of Norway, the Dutch National Science Foundation, the Danish Council for Strategic Research, the Swiss National Science Foundation, USA National Science Foundation

Supervision of Doctoral and Habilitation Theses

- Main supervisor to over 42 doctoral students (past, present) and 8 habilitation candidates
- Member of more than 117 doctoral committees (in Germany, Canada, Denmark, France, Greece, Italy, Netherlands, Norway, Switzerland, Tunisia and the UK) and 12 habilitation committees (in Germany, France and Switzerland)

Organization and/or Membership of Scientific Committees (selected)

- Organizer of special sessions for AGU, EGS/EGU, CMWR, Geo-SIAM, InterPore
- Chair of program committee and annual meetings of InterPore: Rotterdam (2017), New Orleans (2018); Valencia (2019), Qingdao (2020)
- Gordon Research Conference on Flow and Transport in Permeable Media: Chair (Girona, 2016), Vice-Chair (Lewiston, 2014)
- Computational Methods in Water Resources, CMWR: Urbana-Champaign (2012), Stuttgart (2014)
- Non-linearities and Upscaling in Porous Media, Stuttgart Research Partnership, NUPUS (Stuttgart, 2009; Bergen, 2013)
- Workshop on Numerical Models for Carbon Dioxide Storage in Geological Formations (Stuttgart, 2008)

<https://scholar.google.de/citations?user=Orxr8ksAAAAJ&hl=de&oi=ao&cstart=20&pagesize=20>