

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 NWO-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
2022	Honorary Degree of Doctor of Engineering, Heriot-Watt University, United Kingdom
2022	Elected member of the Academia Europaea, The Academy of Europe

Associate Editorships

Academia Europaea, 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 48 doctoral students (past and present) and 9 habilitation candidates
- Member of more than 126 doctoral committees (in Germany, Canada, Denmark, France, Greece, Italy, Netherlands, Norway, Switzerland, Tunisia and the UK) and 14 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>