Curriculum vitae — January 2026

Assoc.Prof. Dipl.-Ing. Dr.techn. Manfred Ulz

Personal details

Affiliation

Institute of Strength of Materials, Graz University of Technology, Kopernikusgasse 24/I, 8010 Graz, Austria

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Academic milestones

Diplom-Ingenieur — Oct. 2000 – Sep. 2005

(with distinction) in Mechanical Engineering-Economics, Graz University of Technology, Austria

Diploma Thesis — Aug. 2004 – Feb. 2005

"Vibration control of plate-like structures" at the Victoria University of Technology, Melbourne, Australia; a self-organised exchange programme

Internship — Jul. 2005 – Sep. 2005

in ALICE group at CERN, Geneva, Switzerland - Structural building of ion detector

Doktor der technischen Wissenschaften — Oct. 2005 – Mar. 2009

(with distinction) in Mechanical Engineering, Graz University of Technology, Austria

Doctoral Thesis — Mar. 2009

supervisor Prof. Christian Celigoj – "A Green-Naghdi approach to finite anisotropic rate-independent and rate-dependent thermo-plasticity in logarithmic Lagrangean strain-entropy space"

Scientific Assistant — Oct. 2005 – Oct. 2009

at the Institute of Strength of Materials, Graz University of Technology, Austria

Post-Doctoral Fellow — Feb. 2010 – Dec. 2010

at the Department of Mechanical Engineering, University of California at Berkeley, USA (group of Prof. Panayiotis Papadopoulos)

Assistant Professor — Jan. 2011 – Jun. 2016

at the Institute of Strength of Materials, Graz University of Technology, Austria

Deputy Head — since Jan. 2011

of the Institute of Strength of Materials, Graz University of Technology, Austria

Research stay — Sep. 2014

at the Courant Institute of Mathematical Sciences, New York University, NY, USA (group of Prof. Eric Vanden-Eijnden)

Habilitation — Jan. 2011 – May 2016

in the field "mechanics", Graz University of Technology, Austria; Habilitation Thesis - "Atomistic-on-continuum coupling with applications to spatial averaging of atomistic stress and hierarchical multiscale methods"

Associate Professor — since Jul. 2016

at the Institute of Strength of Materials, Graz University of Technology, Austria

Research stay Jan. 2019

at the Department of Applied Mechanics, Indian Institute of Technology Madras, Chennai, India (group of Prof. Pijush Ghosh)

Research stay Dec. 2019

at the Department of Mechanical Engineering, University of California at Berkeley, USA (group of Prof. Panayiotis Papadopoulos)

Main areas of research

Atomistic-to-continuum coupling in solid mechanics

Application of molecular dynamics on the atomistic level and finite element method on the continuum level in concurrent and hierarchical multiscale settings. Speed-up of the information transfer in the multiscale coupling. Researching the choice of the spatial averaging domain in atomistic definitions of continuum quantities (stress, heat flux, etc.).

Plasticity

Researching the multiplicative and additive approach to thermo-plasticity including the plastic spin concept.

Paper mechanics

Developing of a complete model capable to describe all aspects of a pulp fibre's material behaviour. Viscoelastic-viscoplastic model, deformation-diffusion coupling for modelling paper curl. Model calibration with data from DMA, AFM and BLS experiments.

Additional academic research achievements

Award for excellent teaching Oct. 2014

in the category "Young Teachers" – Graz University of Technology, Austria

Invitation as a lecturer Oct. 2016

on "Statistical Mechanics" at COMMAS Summer School 2016 October 10th-14th at the University of Stuttgart, Germany

Project 2018-2021

"DST-BMWFW Joint Call for Proposals: India-Austria Scientific & Technological Cooperation Programme" (in cooperation with Assoc.Prof. P. Ghosh, IIT Madras), No. IN 24/2018

Research guidance

Successful supervision of 2 dissertations and 16 Master's theses

Scientific community

Active reviewer for: Applied Mechanics Reviews, Computer Methods in Applied Mechanics and Engineering, Engineering with Computers, International Journal of Engineering Science, International Journal of Solids and Structures, Journal of Mining and Metallurgy - Section B: Metallurgy, Journal of Physical Chemistry, Journal of the Mechanics and Physics of Solids, Mechanics of Materials, Modelling and Simulation in Materials Science and Engineering, Powder Technology, Soft Matter, Technische Mechanik

Ten most important academic publications

1. Celigoj, C.C., Ulz, M.H.: A covariant formulation for finite strain modelling of orthotropic elasticity and orthotropic plasticity with plasticity-induced evolution of orthotropy: Application to natural fibres. Journal of the Mechanics and Physics of Solids 193, 105846 (2024), https://doi.org/10.1016/j.jmps.2024.105846
2. Czibula, C., Ulz, M.H., Wagner, A., Elsayad, K., Hirn, U., Koski, K.J.: The elastic stiffness tensor of cellulosic viscose fibers measured with Brillouin spectroscopy. Journal of Physics: Photonics 6, 035012 (2024), https://doi.org/10.1088/2515-7647/ad4cc6
3. Ulz, M.H., Celigoj, C.C.: An orthotropic plasticity model at finite strains with plasticity-induced evolution of orthotropy based on a covariant formulation. Computer Methods in Applied Mechanics and Engineering 401, 115567 (2022), https://doi.org/10.1016/j.cma.2022.115567
4. Seidlhofer, T., Hirn, U., Teichtmeister, S., Ulz, M.H.: Hygro-coupled viscoelastic viscoplastic material model of paper. Journal of the Mechanics and Physics of Solids 160, 104743 (2022), https://doi.org/10.1016/j.jmps.2021.104743
5. Seidlhofer, T., Czibula, C., Teichert, C., Hirn, U., Ulz, M.H.: A compressible plasticity model for pulp fibers under transverse load. Mechanics of Materials 153, 103672 (2021), https://doi.org/10.1016/j.mechmat.2020.103672
6. Wurm, P., Ulz, M.H.: Demand-based coupling of the scales in concurrent atomistic-to-continuum models at finite temperature. Journal of the Mechanics and Physics of Solids 137, 103849 (2020), https://doi.org/10.1016/j.jmps.2019.103849
7. Seidlhofer, T., Czibula, C., Teichert, C., Payerl, C., Hirn, U., Ulz, M.H.: A minimal continuum representation of a transverse isotropic viscoelastic pulp fibre based on micromechanical measurements. Mechanics of Materials 135, 149-161 (2019), https://doi.org/10.1016/j.mechmat.2019.04.012
8. Wurm, P., Ulz, M.H.: A stochastic approximation approach to improve the convergence behavior of hierarchical atomistic-to-continuum multiscale models. Journal of the Mechanics and Physics of Solids 95, 480-500 (2016), https://doi.org/10.1016/j.jmps.2016.05.024
9. Ulz, M.H.: A multiscale molecular dynamics method for isothermal dynamic problems using the seamless heterogeneous multiscale method. Computer Methods in Applied Mechanics and Engineering 295, 510-524 (2015), https://doi.org/10.1016/j.cma.2015.07.019
10. Ulz, M.H.: Coupling the finite element method and molecular dynamics in the framework of the heterogeneous multiscale method for quasi-static isothermal problems. Journal of the Mechanics and Physics of Solids 74, 1-18 (2015), https://doi.org/10.1016/j.jmps.2014.10.002