Curriculum vitae

January 2024

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 Research identifier | E-mail | www

https://orcid.org/0000-0002-9240-3688 | manfred.ulz@tugraz.at | www.staff.tugraz.at/manfred. ulz

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 io	n detector
Doktor der technischen Wissenschaften	Oct. 2005 – Mar. 2009
(with distinction) in Mechanical Engineering, Graz University of Technolo	ogy, Austria
Doctoral Thesis	Mar. 2009
supervisor Prof. Christian Celigoj – "A Green-Naghdi approach to finite a	nisotropic rate-independent and rate-
dependent thermo-plasticity in logarithmic Lagrangean strain-entropy spa	ce"
Scientific Assistant	Oct. 2005 - Oct. 2009
at the Institute of Strength of Materials, Graz University of Technology, A	Austria
Post-Doctoral Fellow	Feb. 2010 - Dec. 2010
at the Department of Mechanical Engineering, University of California at E	Berkeley, USA (group of Prof. Panayi-
otis Papadopoulos)	
Assistant Professor	Jan. 2011 – Jun. 2016
at the Institute of Strength of Materials, Graz University of Technology, A	Austria
Deputy Head	since Jan. 2011
of the Institute of Strength of Materials, Graz University of Technology, A	Austria
Research stay	Sep. 2014
at the Courant Institute of Mathematical Sciences, New York University, N	IY, USA (group of Prof. Eric Vanden-
Eijnden)	
Habilitation	Jan. 2011 – May 2016
in the field "mechanics", Graz University of Technology, Austria; Habilitat	ion Thesis - "Atomistic-on-continuum
coupling with applications to spatial averaging of atomistic stress and hie	rarchical multiscale methods"
Associate Professor	since Jul. 2016
at the Institute of Strength of Materials, Graz University of Technology, A	Austria

Research stay

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

Research stay

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. Viscoelasticviscoplastic 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 U	Jniversity 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 13 Master's thesis

Scientific community

Referee for: Applied Mechanics Reviews, Computer Methods in Applied Mechanics and Engineering, Engineering with Computers, 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, Modelling and Simulation in Materials Science and Engineering, Powder Technology, Technische Mechanik, Soft Matter

Peer-reviewed journal papers of the last 5 years

 Loidolt, P., Ulz, M.H., Khinast, J.: Prediction of the anisotropic mechanical properties of compacted powders. Powder Technology 345, 589 – 600 (2019). doi: 10.1016/j.powtec.2019.01.048

Jan. 2019

Dec. 2019

- 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). doi: 10.1016/j.mechmat.2019.04.012
- 3. Ulz, M.H.: A continuum-on-atomistic framework with bi-stable elements for the computation of minimum free energy paths. Mechanics of Solids 54, 975–994 (2019). doi: 10.3103/S0025654419060128
- 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, 103,849 (2020). doi: 10.1016/j.jmps.2019.103849
- Ulz, M.H., Celigoj, C.C.: A uniquely defined multiplicative elasto-plasticity model with orthotropic yield function and plastic spin. Computer Methods in Applied Mechanics and Engineering 374, 113,565 (2021). doi: 10.1016/j.cma.2020.113565
- Wurm, P., Ulz, M.H.: A hybrid static–dynamic continuum approach for concurrent atomistic-tocontinuum methods. International Journal for Numerical Methods in Engineering 122(21), 6405– 6424 (2021). doi: 10.1002/nme.6797
- 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, 103,672 (2021). doi: 10.1016/j. mechmat.2020.103672
- 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, 104,743 (2022). doi: 10.1016/j.jmps.2021.104743
- 9. 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**, 115,567 (2022). doi: 10.1016/j.cma.2022.115567
- 10. Brunner, F., Seidlhofer, T., Ulz, M.H.: A numerical model for chemo-thermo-mechanical coupling at large strains with an application to thermoresponsive hydrogels. Computational Mechanics **accepted** (2024)