CURRICULUM VITAE

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EDUCATION

Oct. 2003	**venia docendi** (no US equivalent) for *Mechanics of Materials and Structural Mechanics* (*Festigkeitslehre und Baustatik*) at the Vienna University of Technology.
Oct. 1997	**Doctor technicae** (Ph.D.) with *highest honors* from the President of the Republic of Austria (*Doktor der Technischen Wissenschaften sub auspiciis praesidentis rei publicae*) at the Vienna University of Technology, Austria. (Requirements completed by Dec. 1996.) Since 1859, only three civil engineers were graduated to Ph.D. under the auspices of the Emperor and the President of the country, respectively.
June 1991	**Diplom-Ingenieur** (M.Sc.) with *highest honors* at the Department of Civil Engineering of the Vienna University of Technology, Austria.
June 1985	**HTBLuVA Mödling** (Engineering High School) with *highest honors* (High school with engineering education in construction and design).

PROFESSIONAL EXPERIENCE

Since July 2011	**Research Associate Professor** at the Department of Civil and Environmental Engineering of the University of Washington, Seattle.
June 2012 – June 2014	**Visiting Professor** at the US Airforce Academy in Colorado Springs, CO.
Dec. 2003 – June 2011	**Research Assistant Professor** at the Department of Civil and Environmental Engineering of the University of Washington, Seattle.
Jan. 2003 – Dec. 2003	Independent research and supervision of graduate students for the Vienna University of Technology.

Jan. 1997 – Dec. 2002 **Universitätsassistent** (comparable to Assistant Professor rank in the US system), Institute for Strength of Materials, Department of Civil Engineering, **Vienna University of Technology**. Applied Research in cooperation with Continental AG. Project management and supervision of the research team. Supervision of Diploma- and Doctoral students, and teaching responsibilities as listed under Section *Teaching Experience*.
On special leave from Oct. 1998 to Oct. 2001, having obtained an Award from the Austrian Academy of Sciences on a competitive basis for a research project which was evaluated by an international panel (see section *Awards*).

Sept. 2000 – Oct. 2001 **Research Fellow** at **VTT Building and Transport**, Espoo, Finland. Cooperation for the development of a simulation model for high temperature drying of softwood.

Aug. 1999 – Sept. 2000 **Visiting Scholar** at the **University of California at Berkeley**, Department of Civil and Environmental Engineering. Modeling of viscous phenomena possessing short-term irrecoverable modes of deformation; three-dimensional surface smoothing of irregular FEM-meshes.

April 1999 – June 1999 **Research Fellow** at **VTT Building Technology**, Espoo, Finland. Experimental methods and modeling of moisture transport in wood (as an orthotropic material).

Oct. 1998 – Feb. 1999 **Research Fellow** at the Institute for Materials Science, Department of Mechanical Engineering, **Rheinisch Westfälische Technische Hochschule Aachen (RWTH)**, Aachen, Germany. Mathematical theory for the description of orthotropic and generally anisotropic constitutive functions (theory of scalar- and tensor-valued functions).

July 1991 – Dec. 1996 **Universitätsassistent** (University Assistant**,** similar to Research and Teaching Assistant at 12 months, 100% employment), Institute for Strength of Materials, Department of Civil Engineering, **Vienna University of Technology**. Applied research in cooperation with Continental AG. Theoretical work on shell formulations and stability theory (for *doctor technicae*, the Austrian equivalent to a Ph.D. in Engineering).

July – Aug. 1983–1990 Short-term projects (1-2 months) in surveying, design of hydro-electric plant for a Third World country, road design (highway class), environmental restoration, reinforced concrete design and on-site quality control.

AFFILIATIONS AND OTHER APPOINTMENTS

ACADEMIC AFFILIATIONS

Venia docendi, Department of Civil Engineering, Vienna University of Technology, Vienna, Austria.

PROFESSIONAL AFFILIATIONS

ASCE – American Society of Civil Engineers (2004-2016)

European Society for Wood Mechanics (since 2001)

GAMM – Gesellschaft für angewandte Mathematik und Mechanik (*Society for Applied Mathematics and Mechanics*) (1996-2006)

IACM/USACM – International Association for Computational Mechanics (since 2003)

SIAM - Society for Industrial and Applied Mathematics (since 2008-2010)

AWARDS AND NOMINATIONS

- **Best paper prize** awarded in 2016 for "*Carter M. Mast, Pedro Arduino, Peter Mackenzie-Helnwein, Gregory R. Miller, Simulating granular column collapse using the Material Point Method, Acta Geotechnica, Volume 10, Issue 1, pp 101–116, 2015"*. One best paper prize is awarded out of all papers published in Acta Geotechnica in 2015. With 14 cites (by Sept 1, 2016) this paper was also one of the most cited papers published in Acta Geotechnica in 2015.
- Nomination for the College of Engineering Faculty Innovator for Teaching Award, UW, Seattle (2008)
- Two Nominations for COE Distinguished Faculty award, College of Engineering, University of Washington (2005) and (2006).
- Nomination for Distinguished Teaching Award at the University of Washington: 2005.
- **APART Stipend of the *Austrian Academy of Sciences*** for the period Dec. 1998 to Nov. 2001.
  The most selective stipend in Austria, and one of the most competitive in Europe (the award is granted to 15 scholars per year nationwide typically out of approximately 300 applicants, it was granted to only one engineer over the past three years): requires doctoral thesis recognized as extraordinary, internationally refereed application procedure, offers funding for three years of national and/or international research.
- ***Würdigungspreis 1997*** of the *Bundesminister für Wissenschaft und Forschung* (Honors Award 1997 by the Secretary for Science and Research of Austria for extraordinary achievement).

PUBLICATIONS

MONOGRAPH

1. P. Helnwein. *Zur initialen Abschätzbarkeit von Stabilitätsgrenzen auf nichtlinearen Last-Verschiebungs-pfaden elastischer Strukturen mittels der Methde der Finiten Elemente*. (Doctoral thesis, Vienna University of Technology, Vienna, Austria, 1996), Dissertationen der Technischen Universität Wien, Band 79, Österreichischer Kunst- und Kulturverlag (1998). In German.

INTERNATIONAL REFEREED JOURNALS

1. Eppes, M. C., Magi, B., Hallet, B., Delmelle, E., Mackenzie-Helnwein, P., Warren, K., & Swami, S. (2016). Deciphering the role of solar-induced thermal stresses in rock weathering. *Geological Society of America Bulletin* , (9), 1315–1338. http://doi.org/10.1130/B31422.
2. V. Isvilanonda, J. M. Iaquinto, S. Pai, P. Mackenzie-Helnwein, W. R. Ledoux, (2016), Hyperelastic compressive mechanical properties of the subcalcaneal soft tissue: An inverse finite element analysis.

Journal of Biomechanics, Accepted and scheduled for the May or June issue.
http://dx.doi.org/10.1016/j.jbiomech.2016.03.003i

3. C. Mast, P. Arduino, G. Miller, and P. Mackenzie-Helnwein, P. Arduino, (2015), Simulating granular column collapse using the Material Point Method, Acta Geotechnica, Vol. 10, Issue 1, pp 101-116.
4. C. R. McGann, P. Arduino, and P. Mackenzie-Helnwein, (2015), Stabilized single-point 8-node hexahedral element for dynamic analysis of fluid saturated porous media, Computers and Geotechnics, Vol. 66, pp 126-141.
5. C. Mast, P. Arduino, G. Miller, and P. Mackenzie-Helnwein, P. Arduino, (2014), Avalanche and landslide simulation using the material point method: flow dynamics and force interaction with structures, Computational GeoSciences, Vol. 18, Issue 5, pp 817-830.
6. C. R. McGann, P. Arduino, and P. Mackenzie-Helnwein, (2012), Stabilized single-point 4-node quadrilateral element for dynamic analysis of fluid saturated porous media, Acta Geotechnica: Vol. 7, Issue 4, 2012, pp. 297-311.
7. C. Mast, P. Mackenzie-Helnwein, P. Arduino, G. Miller, and W. Shin, (2012), Mitigating kinematic locking in the Material Point Method, Journal of Computational Physics, Vol. 231, Issue 16, June 2012, pp. 5351-5373.
8. P. Arduino, P. Mackenzie-Helnwein, G. Miller and C. Mast, (2012), Aplicación y Mejoras al Método MPM para el Análisis de Desprendimientos y Movimientos de Tierra, Revista Internacional de Desastres Naturales, Accidentes e Infraestructura Civil, Vol. 12, No. 1, Mayo 2012, pp. 5-9.
9. Ch. R. McGann, P. Arduino, P. Mackenzie-Helnwein, (2012), Simplified Procedure to Account for a Weaker Soil Layer in Lateral Load Analysis of Single Piles. *ASCE Journal of Geotechnical and Geoenvironmental Engng*., Vol. 138(9):1129-1137
10. Ch. R. McGann, P. Arduino, P. Mackenzie-Helnwein. Applicability of conventional p-y relations to the analysis of piles in laterally spreading soil. *ASCE Journal of Geotechnical Engng*. **137**(6): 557-567 (2011)
11. W. Shin, G. R. Miller, P. Arduino, and P. Mackenzie-Helnwein. Dynamic Meshing for Material Point Method Computations. *World Academy of Science, Engineering and Technology I: Mathematical and Computational Sciences* **5**:4 (2010)
12. P. Mackenzie-Helnwein, P. Arduino, W. Shin, J.A. Moore, G.R. Miller. Modeling Strategies for Multiphase Drag Interactions Using the Material Point Method. *International Journal for Numerical Methods in Engineering*. **83**(3):295-322 (2010)
13. Gregory R. Miller, Genevieve Farrar, Yinhai Wang, Peter Mackenzie-Helnwein. *Low-Cost Vehicle Detection Based on Simple Light Sensing*. Transportation Research Record: Journal of the Transportation Research Board of the National Academies, Washington, D.C."; 2009. Accepted by the TRB.
14. H.W. Müllner, J. Eberhardsteiner, P. Mackenzie-Helnwein. Constitutive characterization of rubber blends by means of capillary-viscometry. *Polymer Testing*. **28** (13–23), 2009
15. H.A. Mang, Ch. Schranz, P. Mackenzie-Helnwein. Conversion from Imperfection-Sensitive into Imperfection-Insensitive Elastic Structures I: Theory. *CMAME*, **195**(13-16):1422–1457, 2006.
16. P. Mackenzie-Helnwein, J. Eberhardsteiner, H.A. Mang. Rate-independent mechanical behavior of biaxially stressed wood: experimental observations and constitutive modeling as an orthotropic two-surface elasto-plastic material. *Holzforschung*, **59**:311–321, 2005.
17. P. Mackenzie-Helnwein, H.W. Müllner, J. Eberhardsteiner, H.A. Mang. Analysis of Layered Wooden Shells using an Orthotropic Elasto-Plastic Model for Multiaxial Loading of Clear Spruce Wood. *CMAME*, **194**:2661–2685, 2005.
18. H.A. Mang, J. Eberhardsteiner, R. Lackner, P. Mackenzie-Helnwein, C. Pichler. Constitutive Modeling and Computational Mechanics of Wood and Cement-Based Materials. *Building Research Journal*, **51**:239–269, 2003.
19. P. Mackenzie-Helnwein, J. Eberhardsteiner, H.A. Mang. A Multi-Surface Plasticity Model for Clear Wood and its Application to the Finite Element Analysis of Structural Details. *Computational Mechanics*, **31**(1–2):204–218, 2003.

20. J. Eberhardsteiner, G. Hofstetter, G. Meschke, and P. Mackenzie-Helnwein. Coupled Material Modelling and Multifield Structural Analyses in Civil Engineering. *Engineering Computations*, **20**(5/6):524–558, 2003. (Also available as on-line publication at CIMNE – International Center for Numerical Methods, FEM Class 42, May 29–31, Organizers: G. Peric, E. Oñate)
21. Hanhijärvi and P. Mackenzie-Helnwein. Computational Analysis of Quality Reduction During Drying of Lumber due to Irrecoverable Deformation – Part I: Orthotropic Viscoelastic-Mechanosorptive-Plastic Material Model for the Transverse Plane of Wood. *ASCE Journal of Engineering Mechanics*, **129**(9):996–1005, 2003.
22. P. Mackenzie-Helnwein and A. Hanhijärvi. Computational Analysis of Quality Reduction During Drying of Lumber due to Irrecoverable Deformation – Part II: Algorithmic Aspects and Practical Application. *ASCE Journal of Engineering Mechanics*, **129**(9):1006–1016, 2003.
23. P. Helnwein. Some Remarks on the Compressed Matrix Representation of Symmetric Second-Order and Fourth-Order Tensors. *Computer Methods in Applied Mechanics and Engineering*, **190**(22–23):2753–2770, 2001.
24. P. Helnwein, H.A. Mang, and B. Pichler. *Ab initio* estimates of stability limits on nonlinear load-displacement paths: potential and limitations. *Computer Assisted Mechanics and Engineering Sciences*, **6**(3/4):345–360, 1999.
25. P. Helnwein and H.A. Mang. "Der Blick über den Zaun" - Lineare Stabilitätsuntersuchungen als Träger von Informationen über nichtlineares Strukturverhalten im Vorbeulbereich. *Der Bauingenieur*, **73**(5):247–256, 1998. In German.
26. P. Helnwein and H.A. Mang. An asymptotic approach for the evaluation of errors resulting from estimations of stability limits in nonlinear elasticity. *Acta Mechanica*, **125**:235–254, 1997.
27. H.A. Mang, P. Helnwein, and R.H. Gallagher. On the Nonuniqueness of Solutions Obtained with Simplified Variational Principles. *Journal of Applied Mechanics*, **63**:820–827, 1996.
28. C.H. Liu, G. Meschke, P. Helnwein, and H.A. Mang. Tying Algorithm for Linking of Finite Element Meshes with Different Degrees of Refinement. Application to Finite Element Analyses of Tires. *Computer Assisted Mechanics and Engineering Sciences*, **2**:289–305, 1995.
29. G. Meschke and P. Helnwein. Large-strain 3D-analysis of fibre-reinforced composites using rebar elements: hyperelastic formulations for cords. *Computational Mechanics*, **13**:241–254, 1994.
30. P. Helnwein, C.H. Liu, G. Meschke, and H.A. Mang. A new 3D Finite Element Model for Cord-Reinforced Rubber Composites - Applications to analysis of Automobile Tires. *Finite Elements in Analyses and Design*, **14**:1–16, 1993.

JOURNAL PAPERS CURRENTLY UNDER REVIEW

1. Empty queue – two papers close to submission.

REFEREED CONFERENCE PROCEEDINGS (PUBLISHED IN A PEER REVIEWED INTERNATIONAL JOURNAL OR PROCEEDINGS)

1. W.C. Yang, G. Miller, P. Arduino, and P. Mackenzie-Helnwein, A new enhanced smoothing algorithm for MPM enabling the analysis of hydrodynamic impact problems involving embedded solids. First International Conference on the Material Point Method for Modelling Large Deformation and Soil-Water-Structure Interaction, 10 – 13 January 2017, Delft, The Netherlands.
2. W.C. Yang, K. Shekhar, G. Miller, P. Arduino, and P. Mackenzie-Helnwein, Modeling tsunami induced debris impacts on bridge structures using the Material Point Method. First International Conference on the Material Point Method for Modelling Large Deformation and Soil-Water-Structure Interaction, 10 – 13 January 2017, Delft, The Netherlands.

3. P. Arduino, W.C. Yang, P. Mackenzie-Helnwein, G. Miller, Application of the Material Point Method (MPM) to the Simulation of Flow-Like Events and their Interaction with the Built Environment, 15th Panamerical Conference on Soil Mechanics and Geotechnical Engineering (PCSMGE 2015), Nov 15-18, 2015, Buenos Aires, Argentina.
4. W.C. Yang, P. Arduino, R. Wang, P. Mackenzie-Helnwein, G. Miller, Tsunami Modeling Using the Material Point Method (MPM) and Validation against Experiments, OSU Tsunami Workshop, Dec 10-12, 2014, Corvallis, OR.
5. P. Arduino, P. Mackenzie-Helnwein, G.R. Miller; "*Modeling Multiphase Granular Flow using the Material Point Method*". in *Multi-scale and Multi-physics Processes in Geomechanics*, Stanford University, June 23-25, (2011). Springer.
6. C. M. Mast, P. Mackenzie-Helnwein, P. Arduino, G.R. Miller; "*Landslide and Debris Flow-induced Static and Dynamic Loads on Protective Structures*". in *Multi-scale and Multi-physics Processes in Geomechanics*, Stanford University, June 23-25, (2011). Springer.
7. McGann, C. R., Arduino, P., and Mackenzie-Helnwein, P. *"Lateral resistance reduction for static analysis of lateral spreading."* Joint conference proceedings of the 7th International Conference on Urban Earthquake Engineering (7CUEE) & 5th International Conference on Earthquake Engineering (5ICEE), March 2010, Tokyo Institute of Technology, Tokyo, Japan, (2010).
8. G. R. Miller, G. Farrar, Y. Wang, P. Mackenzie-Helnwein. *Low-Cost Vehicle Detection Based on Simple Light Sensing*. TRB 89th Annual Meeting Compendium of Papers DVD. Paper #10-2705 (19 pages), (2010)
9. McGann, C. R., Arduino, P., and Mackenzie-Helnwein, P. "Lateral resistance reduction for static analysis of lateral spreading." Joint conference proceedings of the 7th International Conference on Urban Earthquake Engineering (7CUEE) & 5th International Conference on Earthquake Engineering (5ICEE), March 2010, Tokyo Institute of Technology, Tokyo, Japan, 2010.
10. I. P. Lam, P. Arduino, P. Mackenzie-Helnwein. OPENSEES Soil-Pile Interaction Study under Lateral Spread Loading. International Foundation Congress and Equipment Expo (IFCCE'09) 2009.
11. H.W. Müllner, J. Eberhardsteiner, P. Mackenzie-Helnwein. Konstitutives Modellieren von Fichtenholz unter biaxialer Beanspruchung mittels eines orthotropen Einflächenmodells unter Berücksichtigung von Ver- und Entfestigung. *Proceedings in Applied Mathematics and Mechanics (PAMM)*, 2005.
12. P. Helnwein. 3D Surface Smoothing for Arbitrary FE-Meshes by Means of an Enhanced Surface Description. *PAMM*, **2**:236–237, 2003.
13. P. Helnwein, M. Fleischmann, J. Eberhardsteiner. *Experimentelle Untersuchung des mechanischen Verhaltens von astfreiem Fichtenholz in radialer und tangentialer Richtung des Stamms*. PAMM, **2**:274–275, 2002.
14. P. Helnwein, J. Eberhardsteiner, and A. Hanhijärvi. Constitutive Model for the Short-Term Failure Analysis of Wood Under Multiaxial States of Stress: Effect of Radial Compression. In *Proceedings of the First International Conference of the European Society for Wood Mechanics*, editor: P. Navi, Lausanne, April 19–21 2001. Building Materials Laboratory, Material Science and Engineering Department, Swiss Federal Institute of Technology (EPFL).
15. H.A. Mang and P. Helnwein. Zur initialen Identifizierung von Verzweigungspunkten auf nichtlinearen Last-Verschiebungspfaden. *Zeitschrift für angewandte Mathematik und Mechanik*, 80:S539–S540, 2000.
16. P. Helnwein and H.A. Mang. Über die Sinnhaftigkeit der Untersuchung nichtlinearer statischer Stabilitäts-probleme mittles linearer Eigenwertprobleme. *Zeitschrift für angewandte Mathematik und Mechanik*, 79(2):347–348, 1999. In German.
17. P. Helnwein and H.A. Mang. Bewertung begleitender Eigenwertanalysen zur Abschätzung von Stabilitäts-grenzen von Problemen der nichtlinearen Elastizitätstheorie. *Zeitschrift für angewandte Mathematik und Mechanik*, 78(2):S473–474, 1998. In German.

18. P. Helnwein and H.A. Mang. Zur Eigenwertsvermehrung infolge mißbräuchlicher Modifikation eines Variationsprinzips mit Nebenbedingungen. *Zeitschrift für angewandte Mathematik und Mechanik*, 75:491–492, 1995. In German.
19. P. Helnwein and G. Meschke. On 1D Hyperelastic Material Formulations. *Zeitschrift für angewandte Mathematik und Mechanik*, 74(6):04–70, 1994.
20. H.A. Mang and P. Helnwein. Zur Untauglichkeit vereinfachter Variationsprinzipien für die Lösung von Randwertaufgaben der nichtlinearen Elastizitätstheorie. *Zeitschrift für angewandte Mathematik und Mechanik*, 73(4–5):407–410, 1993. In German.

CONFERENCE PROCEEDINGS (NON-REFEREED OR BY ABSTRACT ONLY)

1. P. Arduino, P. Mackenzie-Helnwein, G. Miller, Response Analysis of Granular Flows using MPM, Engineering Mechanics Institute (EMI) Conference 2015, June 16-19, Stanford, CA.
2. P. Mackenzie-Helnwein, P. Arduino, G.R. Miller, C.M. Mast, W. Shin. Landslide and Debris-flow Induced Static and Dynamic Loads on Protective Structures — Modeling Framework within the Material Point Method, Proceedings of 2011 NSF Engineering Research and Innovation Conference, Atlanta, Georgia
3. P.Mackenzie-Helnwein, P. Arduino, W.-K. Shin, *Modeling Rain-induced Landslide Initiation from Wetting of Dry Soil to Failure using a Multiphase MPM,* 2008 SIAM Annual Meeting, San Diego, CA. July 2008
4. P. Arduino, P. Mackenzie-Helnwein. Three-Dimensional Beam-Solid Contact Element Formulation for Analysis of Soil-Pile Interaction. Enief 2007, XVI Congreso sobre Metodos Numericos y sus Aplicaciones (XVI Congress on Numerical Methods and its Applications), October 2-5, 2007, Cordoba, Argentina.
5. P. Mackenzie-Helnwein, P. Arduino, and K.A. Petek. Frictional 3D Beam-to-Solid Contact Formulation for OpenSees, OpenSees Developer Symposium, August 16, 2006, Berkeley, CA. http://opensees.berkeley.edu/workshop/OpenSeesDays2006.html
6. K.A. Petek, P. Mackenzie-Helnwein, P. Arduino. Two and Three-Dimensional Contact Element Implementation for GeotechnicalApplications in OpenSees, *Proceedings of the McMat 2005 Joint ASME/ASCE/SES Conference on Mechanics of Materials*, June 1-3, 2005, Baton Rouge, Louisiana
7. H.W. Müllner, P. Mackenzie-Helnwein, J. Eberhardsteiner. Constitutive Modelling of Clear Spruce Wood under Biaxial Loading by Means of an Orthotropic Single-Surface Model under Consideration of Hardening and Softening Mechanisms, *Proceedings of the 2nd International Symposium on Wood Machining*, S.E. Stanzl-Tschegg, M. Gindl, G. Sinn (eds.); BOKU, Vienna, 2004, ISBN: 3-9501315-2-3, 83–90.
8. H.W. Müllner, P. Mackenzie-Helnwein, J. Eberhardsteiner. Constitutive Modelling of Biaxially Stressed Wood for the Analysis of Layered Wooden Shells, *Proceedings of the 3rd International Conference of the European Society for Wood Mechanics*, UTAD, Vila Real, 2004, 277–284.
9. J. Eberhardsteiner, P. Mackenzie-Helnwein. Biaxial Strength Tests for the Macroscopic Characterization of Clear Spruce Wood, 16th ASCE Engineering Mechanics Conference, University of Washington, Seattle, WA (2003), CD proceedings.
10. H.A. Mang, J. Eberhardsteiner, R. Lackner, P. Mackenzie-Helnwein, Ch. Pichler. Constitutive Modeling and Computational Mechanics of Wood and Cement-Based Materials, CD-ROM Proceedings of the 9th International Conference on Numerical Methods in Continuum Mechanics (NMCM 2003), V. Kompis, J. Sladek, M. Zmindak, Žilina, Slovak Republic (2003) ISBN: 80-968823-4-1.
11. P. Mackenzie-Helnwein, J. Eberhardsteiner, H.A. Mang. Multi-Surface Plasticity of Clear Spruce Wood. *VII International Conference on Computational Plasticity, COMPLAS 2003*, Editor: E. Oñate and D.R.J. Owen, CIMNE, Barcelona, 2003.
12. P. Helnwein, M. Fleischmann, and J. Eberhardsteiner. Viscous and Plastic Phenomena on Clear Spruce Wood Under Quasi-Static Cyclic Compressive Loading Perpendicular to Grain, *19th*

Danubia-Adria-Symposium on Experimental Methods in Solid Mechanics – Abstracts, Editor: J. Stupnicki, 150–151, Polonica Zdrój, Poland, September 25–28, 2002.

13. Hanhijärvi, P. Helnwein, and A. Ranta-Maunus. Two-Dimensional Material Model for Structural Analysis of Drying Wood as Viscoelastic-Mechanosorptive-Plastic Material. In *3rd Workshop on Softwood Drying to Specific End-Uses*, Espoo, Finland, 11–13 June 2001. COST Action E15, Advances in the Drying of Wood (1999–2003), VTT Building and Transport.
14. P. Helnwein, A. Hanhijärvi, and J. Eberhardsteiner. Long-term behavior of wood under multiaxial states of stress and simulation of structural details. In *Proceedings of the World Conference on Timber Engineering*, Whistler Resort, British Columbia, Canada, July 31 - August 3, 2000.
15. H.A. Mang and P. Helnwein. Second-Order A-Priori Estimates of Bifurcation Points on Geometrically Nonlinear Prebuckling Paths. In T.A. Cruse S.N. Atluri, G. Yagawa, editor, *Proceedings of the International Conference of Computational Engineering Science*, volume II, 1511–1515. Hawaii, USA, 30 July – 3 August 1995; Springer-Verlag, Berlin, 1995.
16. H.A. Mang and P. Helnwein. A Priori Estimates of Stability Limits on Nonlinear Load-Displacement Paths. In *Proceedings of the International Conference on Lightweight Structures in Civil Engineering*, editor: J.B. Obreski, 25-29 September 1995, Warschau, Poland; volume II, 811–821. Magat Warschau, 1995.
17. G. Meschke, H.J. Payer, C.H. Liu, P. Helnwein, and H.A. Mang. 3D-FE Simulations of Automobile Tires. In *Proceedings of the International Conference of Computational Engineering Science*, volume I, 290–295, Hawaii, USA, 30 July – 2 August, 1995. Springer-Verlag, Berlin.
18. J. Murin, G. Meschke, P. Helnwein, and H.A. Mang. A Study on Solution Algorithms for Geometrically and Physically Nonlinear 1D Finite Elements. In *Proceedings of the International Conference on Numerical Methods in Continuum Mechanics*, 118–127, 19–22 September 1994, Stará Lesná, Slowak Republic.
19. P. Helnwein and H.A. Mang. Parasitic Natural Frequencies of Circular Plates in Consequence of a Simplified Variational Principle. In *Proceedings of the International Conference on Computational Methods in Structural and Geotechnical Engineering*, volume III, 924–929. Department of Civil and Structural Engineering, The University of Hong Kong, Hong Kong, 12–14 December 1994.
20. H.A. Mang and P. Helnwein. Falsche Stabilitätsgrenze eines Druckstabes als Konsequenz der Verwendung eines sogenannten Vereinfachten Variationsprinzips. In *Festschrift anläßlich des 65. Geburtstages von Prof. Dr.-Ing.habil. G. Zumpe*, 105–111, Institut for Mechanics and Information, Faculty of Civil Engineering, Technical University of Dresden, 1994. In German.
21. H.A. Mang and P. Helnwein. Lower and Upper Bounds for Stability Limits on Geometrically Nonlinear Prebuckling Paths. In *Proceedings of the Second Asian-Pacific Conference on Computational Mechanics*, 157–164. 3-6 August 1993, Sydney, Australia, Balkema, Rotterdam-Boston, 1993.
22. H.A. Mang and P. Helnwein. On the Nonuniqueness of Solutions of Boundary Value Problems of the Theory of Elasticity on the Basis of Simplified Variational Principles. In *Proceedings of the First National Congress on Computational Mechanics of the Greek Association of Computational Mechanics*, volume 1, 201–211. 3-4 September 1992, Athens, Greece, University of Patras Press, 1992.
23. C.H. Liu, P. Helnwein, G. Hofstetter, and H.A. Mang. 3D-Finite Element Analysis of Automobile Tires. In *Computational Mechanics '92 - Proceedings of the International Conference on Computational Engineering Science*, 490ff, Hong-Kong, 17–22 December 1992.

OTHERS

1. P. Helnwein. *Rubber-like Materials - Constitutive Equations and Finite Element Implementation.*, Proceedings of the Summer School Analysis of Elastomers and Creep and Flow of Glass and Metals – Computer modeling. V. Kompis, M. Zmindák; published by the University of Transport and Communications, Zilina, Slovak Republic, CEEPUS, Zilina, 19–30 August 1996.

2. P. Helnwein. *Begleitende lineare Eigenwertanalysen für Stabilitätsprobleme mit geometrisch nichtlinearem Vorbeulpfad – Eine numerische Untersuchung mittels der FEM (Accompanying Linear Eigenvalue Analysis for Stability Problems with Geometrically Nonlinear Prebuckling Paths – A Numerical Investigation by Means of the FEM)*. Dipl.-Ing.-thesis (Master's thesis), Vienna University of Technology, Austria, June 1991.

TECHNICAL REPORTS

1. C. McGann, P. Arduino, and P. Mackenzie-Helnwein, "Development of Simplified Analysis Procedure for Piles in Laterally Spreading Layered Soils", PEER Report 2012/05.
2. I.P. Lam, P. Mackenzie-Helnwein, P. Arduino. *OpenSees Soil-Pile Interaction Study under Lateral Spread Loading*. PEER, U.C. Berkeley Agreement No. SA5628-23584, Purchase Order No. 1291149. November 2007
3. J.F. Stanton, C.W. Roeder, P. Mackenzie-Helnwein, C. Kuester, B.A. Craig. *Rotational Limits for Elastomeric Bearings*. NCHRP 12-68, FY 2004. Final Report. 2006
4. P. Mackenzie-Helnwein. *Constitutive Modeling of Biaxially Stresses Clear Spruce Wood at Constant and Varying Moisture Content as an Orthotropic Viscoelastic-Plastic Material*, Habilitation thesis, Vienna University of Technology, Austria, 2003.
5. P. Helnwein. Development of an Anisotropic Hygro-Thermo-Elasto-Viscoplastic Material Model for Biaxially Stressed Wood and its Application to Finite Element Analysis of Wooden Structures. **3 Annual Reports** (Dec. 1999 in German, Nov. 2000 in English, Dec. 2001 in English), Austrian Academy of Sciences, Ignaz Seipl Platz 1, A-1010 Vienna, Austria
6. P. Helnwein, T. Huemer, and J. Eberhardsteiner. Numerische Untersuchung betreffend eine neue Probenform zur Untersuchung der Druckabhängigkeit des Reibungsbeiwertes von Gummi. (Numerical study regarding a new geometric shape for test specimens for the experimental investigation of the pressure dependency of the friction coefficient of rubber). Institute for Strength of Materials, Vienna University of Technology, June 1998. 20 Pages. In German.
7. P. Helnwein, T. Huemer, W.N. Liu, H.-J. Payer, G. Meschke, and H. Mang. Numerische Untersuchungen des Traktionsverhaltens von Profilstollen auf schneebedeckten Fahrbahnen. (Numerical Analyses of the Traction Mechanism of Tread Patterns on Snow-Covered Road Surfaces). Final report, Institute for Strength of Materials, Vienna University of Technology, September 1998. 80 Pages. In German.
8. H.A. Mang, J. Eberhardsteiner, and P. Helnwein. Finite Elemente Untersuchung eines Fachwerksknotens der Stahleisenbahnbrücke über die Traun bei Kleinmünchen: Variantenstudie. (Finite Element Analysis of a Welded Joint of a Truss Girder of the Steel Railroad Bridge over River Traun at Kleinmünchen: Survey on Design Variants). Institute for Strength of Materials, Vienna University of Technology, Vienna, Austria, December 1997. In German.
9. G. Meschke, P. Helnwein, C.-H. Liu, H.A. Mang. Traktionssverhalten von Autoreifen auf Schnee- und Eisbedeckter Fahrbahn. (Traction Mechanisms of Automobile Tires on Snow- and Ice-Covered Surfaces). **Part I**: Structural modeling of the rubber composite structure (1991). **Part II**: Pressure distributions of realistic tread geometries (1992).

PRESENTATIONS

INVITED SEMINAR AND CONFERENCE PRESENTATIONS

1. *3D Simulation of Granular Flows using an Enhanced Material Point Method. University of Utah, Salt Lake City, UT, June 17, 2009*

2. *3D Simulation of Landslides and Debris Flows. Vienna University of Technology, Vienna, Austria, May 13, 2009*
3. *Modeling Clear Softwood by Mapping Micromechanical Failure Mechanisms to a Multi-surface Plasticity Model, ECCOMAS 2004, 24–28 July 2004, Jyväskylä, Finland*
4. *Nonlinear Numerical Analysis in Engineering Research – Benefit and Risk, University of Massachusetts, Amherst, May 2, 2006*

OTHER ORAL CONFERENCE PRESENTATIONS

1. *Locking Phenomena in the Material Point Method*, 6th MPM Workshop, August 9-10, 2010, University of New Mexico, Albuquerque, NM
2. *The 3-D challenge for thermo-hygro-viscoelastic-plastic modeling of wood: availability of and need for experimental evidence,* Workshop "Experimental and computational methods in wood micromechanics", Vienna, Austria, May 11-12, 2009
3. *Modeling drag force interaction for multi-phase flow using MPM with distinct phases*, 5th MPM Workshop, April 2-3, 2009, University of Oregon, Corvallis, OR
4. *3D simulation of landslides and debris flows using the material point method (MPM).* GeoFlows09, University of Washington, Seattle, WA, March 9, 2009
5. *Modeling Rain-induced Landslide Initiation from Wetting of Dry Soil to Failure using a Multiphase MPM,* 2008 SIAM Annual Meeting, San Diego, CA, July 7-11, 2008
6. *Nonlinear Numerical Analysis of Two-Phase Porous Media with the Material Point Method*, Landslides / Debris flow Workshop, University of Washington, Seattle, WA. October 12, 2007.
7. *Modeling Interaction of Phases in Mixtures using a Multi-field Material Point Method*, 9th US National Congress on Computational Mechanics, July 23–26, 2007, San Francisco, CA, United States
8. *Frictional 3D Beam-to-Solid Contact Formulation for OpenSees*, OpenSees Developer Symposium, August 16, 2006, Berkeley, CA.
9. *3-D Beam-to-Solid Contact Formulation for the Simulation of Soil-Pile Structure Interaction Problems,* Petek, K.; Mackenzie, P.; Arduino, P., 7th World Congress on Computational Mechanics (WCCM VII), July 16-22, 2006, Loas Angeles, United States
10. *Numerical Stabilization of the Return Mapping Algorithm for Strain Softening Material*; 8th US National Congress on Computational Mechanics, July 25–27, 2005, Austin, TX, United States
11. *Modeling Clear Softwood by Mapping Micromechanical Failure Mechanisms to a Multi-surface Plasticity Model*; ECCOMAS 2004, July 24–28, 2004, Jyväskylä, Finland
12. *Biaxial Strength Tests for the Macroscopic Characterization of Clear Spruce Wood*; 16th ASCE Engineering Mechanics Conference, July 16–18, 2003, University of Washington, Seattle, United States
13. *Modeling of Biaxially Stressed Wood Under Plane Stress Conditions as an Orthotropic Multi-Surface Elasto-Plastic Material*; 5th World Congress on Computational Mechanics (WCCM V), July 7-12, 2002, Vienna, Austria
14. *Short-term Mechanical Behavior of Biaxially Stressed Wood: Experimental Observations and Constitutive Modeling as Orthotropic Multi-Surface Elasto-Plastic Material*; 14th US National Congress of Theoretical and Applied Mechanics (USNCTAM14), June 23-28, 2002, Blacksburg, VA, United States
15. *3d Surface Smoothing for Arbitrary FE-Meshes by Means of an Enhanced Surface Description*; Annual conference 2002 of the Gesellschaft für angewandte Mathematik und Mechanik (GAMM; *Society for Applied Mathematics and Mechanics*), March 25-28, 2002, Augsburg, Germany

16. *Research Activities on Solid Wood and Wood Based Materials at the Institute for Strength of Materials of the Vienna University of Technology*; K_{net}-Fachseminar *Holzeigenschaften und Strukturhierarchien: Nano – Micro – Macro*, February 22-23, 2002, Hotel Panhans, Semmering, Austria
17. *Modeling the Mechanical Behavior of Biaxially Stressed Wood as an Orthotropic Multi-Surface Elasto-Plastic Material*; 13th Inter Institute Seminar for Young Researchers, October 26-28, 2002, Vienna, Austria
18. *Two-Dimensional Material Model for Structural Analysis of Drying Wood as Viscoelastic-Mechanosorptive-Plastic Material*; COST Action E15: Advances in Drying of Wood; 3rd Workshop on Softwood Drying to Specific End-Uses, June 11-13, 2001, Helsinki, Finland
19. *Constitutive Model for the Short-Term Failure Analysis of Wood Under Multiaxial States of Stress: Effect of Radial Compression*; First International Conference of the European Society of Wood Mechanics, April 19-21, Lausanne, Switzerland
20. *Long-Term Behavior of Wood under Multiaxial States of Stress and Simulation of Structural Details*; World Conference on Timber Engineering 2000, July 30 – August 3, 2000, at Whistler Resort, British Columbia, Canada
21. *Development of a Material Model for Biaxially Stressed Wood – Experimental Investigation and Basic Mathematical Description* ; Wood-Water Relations Seminar at Sjökulla, Finland, 17 June 1999
22. *Über die Sinnhaftigkeit der Untersuchung nichtlinearer statischer Stabilitätsprobleme mittels linearer Eigenwertprobleme*; Annual Meeting of GAMM 1998 at Bremen, Germany, Section 2.3, 6–9 April 1998. In German
23. *On the Assessibility of Static Stability Limits on Nonlinear Load-Displacement Paths of Elastic Structures Undergoing Large Displacements and Rotations*; Cracow University of Technology (Politechnika Krakowska im. Tadeusza Kosciuszki), 4 December 1997
24. *Bewertung begleitender Eigenwertanalysen zur Abschätzung von Stabilitätsgrenzen von Problemen der nichtlinearen Elastizitätstheorie*; Annual Meeting of GAMM 1997 at Regensburg, Germany, Section 2.1, 24–27 March 1997. In German
25. *Course on Rubber-like Materials*; Summer school Zilina 1996, Slovak Republic, CEEPUS-Network, 19-30 August 1996
26. *Numerische Untersuchung des Traktionsverhaltens von Autoreifen auf schnee- und eisbedeckter Fahrbahn*, Presentation of the Institute for Strength of Materials, organized by the Außeninstitut der TU-Wien, 6 June 1994. In German
27. *Finite Strain FE-Analyses of Fibre-Reinforced Composites: 1-D Hyperelastic Formulations*; Annual Meeting of GAMM 1993 at Dresden, Germany, Section 7.7, 12–16 April 1993

POSTER PRESENTATIONS AT CONFERENCES

1. *Landslide and Debris-flow Induced Static and Dynamic Loads on Protective Structures*, NSF CMMI Research and Innovation Conference 2011, 4-7 January 2011, Atlanta, GA
2. *Lateral Spreading Analysis for Single Piles*. Pacific Earthquake Engineering Research Center - 2009 PEER Annual Meeting, , October 2009, San Francisco, CA. 2009
3. *Incorporating on-line activities and group work to enhance student learning and in class participation,* Peter Mackenzie, Greg Miller, and Bayta Maring; 2007 UW Teaching and Learning Symposium, April 24, 2007
4. *Viscous and Plastic Phenomena on Clear Spruce Wood under Quasi-Static Cyclic Loading Perpendicular to Grain*; 19th Danubia-Adria-Symposium on Experimental Methods in Solid Mechanics, Polanica Zdrój, Poland, 26–28 Sept. 2002

GRADUATE STUDENTS (ADVISING)

CHAIRED DOCTORAL DEGREES

Student Name	**Dissertation Title**	**Completed (Year)**	**Current Employer**
Wen-Chia Yang	Tsunami-forced Fluid-Structure interaction with debris using the Material Point Method	June 2016	In transition
Carter Mast (co-chair Greg R. Miller & P. Arduino)	Modeling Landslide-Induced Flow Interactions with Structures using the Material Point Method	June 2013	unknown
Chris McGann (co-chair P. Arduino)	Numerical Evaluation of Forces on Piled-Bridge Foundations in Laterally Spreading Soil	June 2013	Postdoc, University of Canterbury, NZ
Woo Kuen Shin (co-chair with Pedro Arduino)	Nonlinear Numerical Analysis of Two-Phase Porous Media with the Material Point Method	2009	Shannon & Wilson

CHAIRED MASTERS DEGREES

Student Name	**Level of Supervision** ("thesis," "project" or "coursework only")	**Thesis/Paper Title**	**Completed (Year)**	**Current Employer**
Smit Kamal	Master's Thesis	Thermal Breakdown of Rock on Mars (Part of NASA's Curiosity Mission)	In progress	UW
Jian (Edison) Shi	Thesis	Thermal Cracking of Rocks in Landscape Formation (NSF)	2011	
Jordan Hague	Thesis	Development of software for Load Rating of Concrete and Steel Bridges based on LRFR (WSDOT project)	2011	
Chris McGann (co-chair Pedro Arduino)	Thesis	Analysis and Evaluation of piles in liquefiable layers based on a 3D soil-structure interaction model	2009	University of Canterbury, NZ
Carter Mast (co-chair Greg R. Miller and Pedro	Thesis	General boundaries for dynamic analysis with the Material Point Method	2008	

Arduino)				
Chia-So Chuang (co-chair Greg R. Miller)	Thesis	Distributed sensor network for weigh-in-motion systems	2009	unknown
Brianne Craig	Thesis	Numerical Simulation and Analysis of Rotational Limits for Elastomeric Bearings	In progress	unknown
John A. Moore (co-chair Greg R. Miller and Pedro Arduino)	Thesis	Extension of the Material Point Method for Modeling Interaction of Distinct Phases in Porous Continua	2007	Aerojet, Redmond, WA
Ian McFarlane	Thesis	Numerical Analysis of Concrete Filled Steel Tubes under Cyclic Loading	2006	unknown
Colin Kuester (co-chir John F. Stanton and Charles W. Roeder)	Thesis	Rotational Limits of Elastomeric Bearings	2006	unknown
Christoph Kohlhauser (co-chair with Josef Eberhardsteiner at the Vienna University of Technology),	Thesis	A multi-surface plasticity model with strain softening for failure mechanisms of clear spruce wood under plain stress conditions and stabilization of its numerical implementation for large characteristic lengths	2005	Vienna University of Technology, Austria
Christopher J. White	Thesis	Rotational Limits of Elastomeric Bearings	2005	unknown

OTHER SIGNIFICANT STUDENT SUPERVISION

Student Name	**Level of Supervision** ("thesis," "project" or "coursework only")	**Thesis/Paper Title** (if applicable)	**Completed** (Year)
Tianye Yang	Master's thesis committee, UW CEE	Characterization of Beam Vibration	2016
Vara Isvilanonda	Ph.D. committee, UW ME	Finite element modeling of the foot	2015
Jihwan Kim	Ph.D. committee, Department for Applied Mathematics	Multilayer shallow water equations for the simulation of underwater landslides	2014

Jaewon Jang	Dissertation Reading committee	Characterization of Live Modeling Performance Boundaries for Computational Structural Mechanics	2007
Hyung-Suk Shin	Dissertation Reading committee	Experimental and numerical study on seismic response of pile-supported structures	2007
Kathryn Ann Petek	Dissertation Advising and Reading committee	Development and Application of Mixed Beam-Solid Models for Analysis of Soil-Pile Interaction Problems	2006
Nilanjan Mitra	Dissertation Reading committee	Analytical Models for the Seismic Behavior of Joints in RC structures	2006
Angela Kingsley	Advising FEA analysis part; Master's thesis reading committee	Design and testing of Concrete Filled High-Strength Vanadium Alloyed Steel Tubes	2005
Adam Christopulos	Master's thesis reading committee	Improved Seismic Performance of Buckling Restrained Braced Frames	2005
Jonathan Wacker	Master's thesis reading committee	Design of Precast Concrete Piers for Rapid Bridge Construction in Seismic Regions	2005
Hans Lund	Master's thesis reading committee	Rotational Stiffness of Elastomeric Bearings	2004
Throstor Hrafnkelson	Modeling support; Master's thesis reading committee	Effect of Grain Size Distribution on Compressive Strength of Horizontally Fiber Reinforced Soil	2004
Kari Hankins	Undergraduate research	Thermal crack formation and crack patterns in desert landscape formation	2009
Simon Hachey	Undergraduate research	Visualization of n-dimensional functions	2006/2007

SELECTED TOPICS OF SUPERVISED OR SUPPORTED DIPLOMA AND DOCTORAL THESES AT THE VIENNA UNIVERSITY OF TECHNOLOGY (1991-2003):

- Nonlinear structural stability in the context of the FEM.
- Linear and nonlinear theory of shells (partially in cooperation with the Institute for Steel Constructions).
- Geotechnical problems by means of explicit dynamic analyses (in cooperation with the Institute for Engineering Geology).
- Experimental investigations of non-linear phenomena in clear spruce wood at special modes of loading.

- Mechanics and thermodynamics of cooking potatoes (in cooperation with the Institute of Food Technology of the University of Agriculture, Vienna, Austria).
- Simulation of tunneling in soft ground.
- Algorithmic treatment and numerical implementation of two-dimensional and three-dimensional constitutive plasticity models.

RESEARCH ACTIVITIES

FUNDED RESEARCH (IN PRESENT POSITION)

Funding Source	**Amount (my part)**	**Period**	**Project title, PI and Co-PIs**
NCHRP 12-68, FY 2004	$ 350,000 ($100,000)	6/16/2005-9/15/2007	Rotational Limits of Elastomeric Bearings, PI: John F. Stanton, Co-PI's: Charles W. Roeder and Peter Mackenzie-Helnwein.
CoE UW	$ 65,000 ($15,000)	2005	Anytime Anywhere, (Pilot on distance learing and web-based class management systems) PI: Gregory R. Miller. Contributions by: Peter Mackenzie-Helnwein
CoE UW	$ 55,000 ($10,000)	2006	Anytime Anywhere II, (college implementation) PI: Gregory R. Miller. Contributions by: Peter Mackenzie-Helnwein
US Army, Vanadium Steel Consortium	$ 1,160,000 ($45,000)	2001-2007 (project year 3: 2004/2005)	High Strength Vanadium Alloyed Steel Tubes in Army Engineering Applications, PI: Charles W. Roeder, Co-PI's: Dawn E. Lehman and Gregory R. Miller. Consultant: Peter Mackenzie-Helnwein.
Royalty Research Fund, UW	$ 39,000 ($19,500)	9/16/2007-9/15/2008	Two-Phase Material Modeling with the Material Point Method; PI: Pedro Arduino, Co-PI: Peter Mackenzie-Helnwein
TransNOW	$109,000 ($55,000)	7/1/2008-6/30/2009	Distributed Sensor-Based Weigh-in-Motion System; PI: Gregory R. Miller, Co-PI: Peter Mackenzie-Helnwein, Yinhai Wang
NSF	$85,870	5/1/2009-4/31/2012	Collaborative Research: Determining the role of

	(80%)		insolation in the mechanical breakdown of rock PI: B. Hallet (Dept. of ESS, U of Washington) Co-PI: P. Mackenzie-Helnwein and J. Putkonnen (U of ND)
NSF, CMMI	$439,700	7/1/2009-6/31/2012	Landslide and Debrisflow-Induced Static and Dynamic Loads on Protective Structures. PI: P.Mackenzie-Helnwein, Co-PI: P. Arduino and G.R. Miller
PEER	$72,506 ($36,253)	1/1/2009-6/31/2010	Simplified Design Procedure for Piles Affected by Lateral Spreading based on 3D Nonlinear FEA using OpenSees PI: P. Arduino Co.-PI: P. Mackenzie-Helnwein
WSDOT	$260,000	2/1/2010-3/31/2011	Update of the BRIDG Software Package to Current LRFD / LRFR Recommendation PI: P. Mackenzie-Helnwein
WSDOT	$30,000	4/1/2011-6/31/2011	Extension to Update of the BRIDG Software Package to Current LRFD / LRFR Recommendation PI: P. Mackenzie-Helnwein
Royalty Research Fund, UW	$37,993	2/1/2012-1/31/2013	Shock-capturing particle method for simulation of seismic or blast waves in granular materials PI: P. Mackenzie-Helnwein
US Air Force Academy	$112,000	6/24/2012-6/21/2013	Visiting Professor; Curriculum Development; Training
US Air Force Academy	$118,000	9/1/2013-6/21/2014	Visiting Professor; Curriculum Development; Training
NASA Mars Science Laboratory mission	~$100,000 to $150,000	2015-2018	Solar induced stresses in rock on Mars. PI: Bernard Hallet and Ron Sletten. My position: senior researcher. These funds also support my Master's student, Smit Kamal.
WSDOT	$244,118	1/1/2016-12/31/2016 extended to 3/31/2017	Update of the Steel BRIDG software package for bridge rating. This is a continuation project linked to the 2010/11 project
NSF NHERI	~$300,000	10/1/2016-9/30/2021	NHERI SimCenter; Senor Personal with 25 months of salary provided over five years. PI: Stephen Mahin (UC-Berkeley), Co-PIs: Laura Lowes,

WSF	$175,000	7/1/2017-6/30/2019 pending (very likely)	Scour Study of the Kinston Ferry Terminal

PENDING PROPOSALS

Funding Source	**Amount (my part)**	**Period**	**Project title, PI and Co-PIs**
NIH	~1 month	2017-2020	Reducing Internal Stresses in Deformed Diabetic Feet PI: William Ledoux
NASA ROSES–2016 NRA NNH16ZDA001N-PSTAR: Planetary Science and Technology Through Analog Research	~1 month	2017/18	Soil shear Properties Assessment, Resistance, Thermal, and Triboelectric Analysis multitool (SPARTTA) for Geotechnical Measurements on Planetary Surfaces PI: Robert C. Anderson (Jet Propulsion Laboratory, Pasadena, CA)
Department of Veterans Affairs	~1 month	2017-2019	Reducing Internal Stresses in Deformed Diabetic Feet PI: William Ledoux

UNSPONSORED (OR NO FINANCIAL RECORDS) RESEARCH.

- Development of an alternative simulation model for multi-phase material within the framework of the Material Point Method. 2006-2008. This research resulted in 2 Master's thesis' and one Ph.D. thesis. This laid the ground work for the funded NSF project on Landslides.
- Simulation of Soil-Pile interaction using the Finite Element Method. 2005-2007. Development of various components needed for the simulation of 3D soil-pile interaction. This development resulted in one preliminary consulting project and funding for the listed PEER project.
- Modeling the pediatric spine. 2005-2007. Establishing cooperation with researchers in Biomechanics and preparation of two NIH proposals. No funding resulted from this effort.
- Texture development of potatoes during food processing (cooking kinetics). 1998. Proof of concept in cooperation with the University of Agriculture, Vienna, Austria.
- Stress concentrations in welded three-dimensional joints of railroad bridges. 1997-1998. Consulting and proof of concept for the Austrian Federal Railroads.
- Traction mechanisms of automobile tires on road and snow surfaces. 1991-1996. Cooperation with Continental AG, Hannover, Germany

DOCUMENTATION OF TEACHING EFFECTIVENESS

COURSES TAUGHT AT THE UNIVERSITY OF WASHINGTON & STUDENT EVALUATIONS

Course	Title	Quarter	Credit Hrs	Enrollment	Evaluations? Response	Item 1	Item 3	Item 4	Avg. Items 1-4
CEE 220	Mechanics of Materials	Wi 2004	3	85	Yes, 48/85	4.1	4.7	4.3	4.3
CEE 599F	Nonlinear FEA	Au 2004	3	3	Yes, 3/3	4.3	5.0	5.0	4.8
CEE 220	Mechanics of Materials	Wi 2005	3	85	Yes, 46/85	4.5	5.1	4.9	4.8
CEE 220	Mechanics of Materials	Wi 2006	3	80	Yes, 49/80	4.2	4.8	4.5	4.4
CEE 379	Structures I	Wi 2006	3	39	Yes, 28/39	3.4	3.6	3.2	3.4
CEE 220	Mechanics of Materials	Sp 2006	3	147	Yes, 73/147	4.0	4.2	3.9	4.0
H A&S 220	Science for non-science majors: How Structures Work	Au 2006	4	16	Yes, 14/16	4.1	4.7	4.1	4.2
CEE 220	Mechanics of Materials	Wi 2007	3	61	Yes, 42/61	4.3	4.6	4.3	4.3
CEE 503	Material Modeling	Wi 2007	3	14	Yes, 14/14	4.0	4.5	4.4	4.3
CEE 506	Nonlinear Analysis	Sp 2007	3	10	Yes, 10/10	4.3	4.7	4.3	4.3
CEE 220	Mechanics of Materials	Su 2007	3	24	Yes, 19/24	3.9	4.2	3.8	3.9
CEE 599A	Fundamentals of Nonlinear Continuum Mechanics	Su 2007	3	8	Yes, 8/8	4.2	4.7	4.3	4.2
CEE 501	Structures I & Continuum Mechanics	Au 2007	6	26	Yes, 20/26	4.2	4.4	4.0	4.2

H A&S 220	How Structures Work	Au 2007	4	18	No	-	-	-	-
CEE 504	Finite Elements	Wi 2008	3	18	Yes, 17/18	4.1	4.8	4.2	4.2
CEE 220	Mechanics of Materials	Sp 2008	3	158	Yes, 95/158	4.3	4.8	4.6	4.5
CEE 599A	Fundamentals of Nonlinear Continuum Mechanics	Su 2008	3	8	No	-	-	-	-
CEE 501	Structures I & Continuum Mechanics	Au 2008	6	29	Yes, 26/29	3.8	4.4	3.8	3.9
CEE 503	Material Modeling	Wi 2009	3	9	Yes, 8/9	4.6	4.8	4.8	4.7
CEE 505	Engineering Computing	Sp 2009	3	21	Yes, 19/21	4.3	4.8	4.6	4.5
ESS 427	Hillslope Geomorphology	Sp 2009	Four 3 hours each	17	No (I was not the primary instructor)	-	-	-	-
CEE 504	Finite Elements	Wi 2011	3	30	Yes, 25/29	3.8	4.1	3.5	3.8
CEE 220	Mechanics of Materials	Su 2011	3	20	Yes, 14/21	4.4	4.9	4.6	4.6
CEE 599D	Mathematical foundation of Nonlinear Continuum Mechanics	Su 2011	3	8	Yes, 8/8	4.8	5.0	4.9	4.9
ESS 427	Hillslope Geomorphology	Au 2011	Four 3 hours each	~15	No (I was not the primary instructor)	-	-	-	-
CEE 504	Finite Elements	Wi 2012	3	28	Yes, 23/29	4.3	4.9	4.6	4.6
CEE 220	Mechanics of Materials	Su 2013	3	14	Yes, 9/14	4.4	4.9	4.7	4.6
CEE 599	Mathematical foundation of Nonlinear Continuum Mechanics	Su 2013	3	5	No	-	-	-	-

CEE 220	Mechanics of Materials	Su 2014	3	24	Yes, 21/24	4.0	4.8	4.6	4.3
CEE 505	Engineering Computing	Au 2014	3	20	Yes, 15/18	4.1	4.2	4.0	4.1
CEE 248	Concrete Mix Design/Concrete Canoe	Au 2014	3	9	No	-	-	-	-
CEE 220	Mechanics of Materials	Wi 2015	3	168	Yes, 64/168	4.6	5.1	5.0	4.9
CEE 220	Mechanics of Materials	Sp 2015	3	240	Yes,	4.8	5.2	5.1	5.0
CEE 220	Mechanics of Materials	Su 2015	3	12	Yes, 7/12	5.0	5.1	5.1	5.0
CEE 503	Material Modeling	Su 2015	3	7	No	-	-	-	-
CEE 505	Engineering Computing	Au 2015	3	27	Yes, 22/27	4.4	4.7	4.4	4.5
CEE 248	Concrete Mix Design/Concrete Canoe	Au 2015	3	15	No	-	-	-	-
CEE 505	Engineering Computing	Au 2016	3	55	In progress	-	-	-	-
CEE 248	Concrete Mix Design/Concrete Canoe	Au 2016	3	12	No	-	-	-	-

COURSES TAUGHT AT THE UNITED STATES AIR FORCE ACADEMY, COLORADO SPRINGS, CO

- ***Engr 101: Introduction to Engineering***. Engineering method, ballistics, rocket design, aerodynamics basics, glider design, statics, truss design, learning through doing & testing. Offered 2012-2014.
- ***CEE 379: Geotechnical Engineering Fundamentals (Lesson & Lab).*** Engineering geology, basic soil mechanics, soil exploration, soil classification, consolidation, foundation design, slope stability. Offered 2013 and 2014.
- ***Field Exploration and Research Lab – FERL***: 3 weeks field course including hands-on experience in all fields of civil & environmental engineering. Offered June 2013 and June 2014.
- ***Co-advising the USAFA Concrete Canoe Team*** for the 2013 and the 2014 ASCE Concrete Canoe Competition
- ***USAFA Rocket Club*** – not an actual course but regular student interaction and design assistance

COURSES TAUGHT AT THE VIENNA UNIVERSITY OF TECHNOLOGY, AUSTRIA

- ***Strength of Materials(UE)***: three-dimensional continuum mechanics, large deformation theory, stress and deformation analysis for beams. Offered 1991–1994, 1996.

- ***Linear Finite Element Analysis (UE)***: basic theory of solid mechanics and potential problems in two and three dimensions, practical training on commercial software packages. Offered 1992–1994, 1996–1998.
- ***Nonlinear Finite Element Analysis (UE)***: large deformation analysis, stability of shells, simulation of reinforced concrete, training on commercial as well as academic software, including basic implementation of software extensions. Offered 1992–1994, 1996–1998, 2001–2002.
- ***Theory of Plates and Shells (VO)***: plate theories, small deformation shell theory, stability of plates and shells, analytical solutions for plates and shells. Offered 1996–1998.
- ***Training on Plates and Shells (UE)***: training on analytical methods for the solution of problems on shell structures. Offered 1993–1994, 1996–1998.
- ***Plates and Shells II – Numerical Aspects (VO)***: special course on non-linear shell theory, algorithmic treatment and numerical implementation, nonlinear analysis including path following methods and structural stability. Offered 1997/1998.
- ***Continuum Mechanics Background (VO)***: taught in English, advanced mathematical treatment of finite deformation continuum mechanics based on the theory of manifolds. Offered 2002.

OTHER INTERNATIONAL COURSES TAUGHT

- ***Special Course on Rubber-like Materials***: taught in English. Held at the Technical University of Žilina, Slovak Republic (1996). Organized by the CEEPUS network, as part of an initiative to revitalize technical education in the former Eastern Bloc.

SUPERVISION OF INDEPENDENT STUDY (DESIGN PROJECTS AND RESEARCH).

DESIGN PROJECTS AND NATIONAL COMPETITIONS

- Advising the FEM analysis for the ASCE Concrete Canoe Competitions 2007, 2008, 2009, and 2010. This is an all year project, usually starting during the summer quarter and culminating with the Regional competition in late April of the following year. Our team won the Regional competition in all of the years I was involved in advising and had to represent the NW Region at the respective national competitions.

INDEPENDENT STUDY

Total credit hours are estimates since some students where Ph.D. students who did not require credit

Course	**Title or Student Name**	**Quarter**	**# of Students (Total Credit Hrs)**
CEE 599	Finite Deformation Continuum Mechanics	SU+AU 2005	2 (6)
CEE 499	Finite Element Studies	WI, 2007	3 (9)
CEE 599	Contact Mechanics	WI+SP 2004	2 (10)
CEE 499	Multidimensional Visualization	WI+SP 2006	1 (4)
CEE 600	The Discontinuous Galerkin Method	SP 2012	2 (2)

CEE 599	Nonlinear Foundation of Finite Deformation Solid Mechanics	Su 2014	2 (3)

TUTORING AT THE UNIVERSITY OF WASHINGTON

CEE 220: Mechanics of Materials at CLUE. This is offered in support of the lecture listed above.

LIST OF OTHER TEACHING CONTRIBUTIONS

- Introduction of a course management system (moodle) for on-line support of undergraduate and graduate level education.
- Development of on-line grading and feedback support, electronic guidance through reading quizzes, and interactive lectures using tablet PC technology for the required CEE220 - Intro to Mechanics of Materials course (a prerequisite for CEE, ME, AA, IE with ~300 students per academic year)

SERVICE

DEPARTMENTAL SERVICE

1. Computing Committee (2005/07)
2. Tutoring for ***CEE 220: Mechanics of Materials*** at CLUE. This was offered in support of the lecture in 2005.
3. Maintaining a department software license with MSC.software and supporting students and faculty using MSC.marc/MSC.mentat (2005-2013).
4. Department Affairs Committee (2014-present)
5. ASCE Faculty Adviser / UW Concrete Canoe Team Faculty Adviser

COLLEGE SERVICE

1. Representing the Department of Civil and Environmental Engineering in the UW Math Academy for AP Students in Summer 2011. This involves 3 lecture/lab sessions of 2 hours each and close interaction with visiting students.
2. Representing the Department of Civil and Environmental Engineering and active contribution to the Engineering BRIDGE program in September 2007. This program is an outreach activity for minority students and underrepresented groups and is designed to attract students from underrepresented groups to sciences in general and engineering in particular.
3. Creation and operation of the Center for Computational Biomechanics (a shared teaching and research computing facility)
4. College-wide support for instructors using the COE Anytime-Anywhere server (moodle). This includes department introduction and seminars for CEE, EE, ME, AA, ChemE, IE.

PROFESSIONAL SOCIETY AND OTHER SERVICE

1. **Seminar Organization**: support for *GeoFlows2009- Symposium on Mathematical and Computational Aspects of Modeling Hazardous Geophysical Mass Flows*, University of Washington, Seattle, March 9-11, 2009
2. **Minisymposium Organization:** Co-organizer of minisymposium *Mechanical and Physical Properties of Wood and Wood Based Materials* at the WCCM VII, to be held in Los Angeles, 2006
3. **Minisymposium Organization:** Co-organizer of minisymposium *Computational Mechanics of Wood and Wood-Based Materials* at the 8th National Congress on Computational Mechanics in Austin, TX. July 25-27, 2005.
4. **Conference Organization:** Co-organization of the WCCM V, July 7–13, 2002, Vienna, Austria. In charge of Program Organization, paper and web-publication of the program, abstracts and full papers (see http://wccm.tuwien.ac.at).

JOURNAL REVIEWS

Multiple reviews for conferences and the following international journals:

1. Acta Mechanica
2. International Journal for Numerical Methods in Engineering
3. ASCE Journal of Engineering Mechanics
4. Computers and Structures
5. Computer Methods in Applied Mechanics and Engineering
6. Mechanics of Time-Dependent Materials
7. Holz als Roh- und Werkstoff
8. Wood Science and Technology
9. Journal of Engineering Mechanics
10. Communications in Computational Physics
11. Journal of Biomechanics

Review for the following agencies:

1. Council for Earth and Life Sciences (ALW) of the Netherlands Organization for Scientific Research (NWO)

OTHER PROFESSIONAL SKILLS

COMPUTING

- Extraordinary experience with solving non-linear problems by means of the FEM, with particular expertise in MSC-MARC/MSC-Mentat, ABAQUS, FEAP.
- Special knowledge of handling and programming of mathematical software packages Matlab, Mathematica, Maple.
- Software development in FORTRAN, C/C++, Pascal, Perl, Unix shell-scripting (bash, ksh, awk), Python.
- Database and web-programming (postgreSQL, Perl, CGI, DBI).
- Handling and administration of medium size Unix systems (HPUX, Linux) in heterogeneous environments (PC/Windows, Apple, Linux).
- Text processing using $\LaTeX$, PostScript, MS-Office.

LANGUAGES

German: native speaker.

English: near-native fluency.

OTHER PERSONAL INFORMATION

CITIZENSHIP

- United States (since November 2008)
- Austria (by birth)