Dr. İzzet Özdemir

RESEARCH INTERESTS

Computational solid, structural and contact mechanics. Constitutive and multi-scale modeling of engineering materials. Microstructural topology optimization.

EDUCATION

- **Ph.D.** [2009]
  Eindhoven University of Technology (TU/e), Eindhoven, the Netherlands
  Materials Technology Institute
  - Thesis Title: Multi-scale modelling of thermal shock damage in refractory materials
    Promotors: Prof.Dr.Ir. M.G.D. Geers, Dr.ir. W.A.M. Brekelmans
- **M.Sc.** [2003]
  Stuttgart University, Stuttgart, Germany
  - Thesis Title: An approach to contact in computational structural dynamics
    Advisor: Prof.Dr.-Ing. E. Ramm, Institute of Structural Mechanics
- **B.Sc. in Civil Engineering** [1999]
  Middle East Technical University (METU), Ankara, Turkey

EXPERIENCE

- **İzmir Institute of Technology**, Ankara, Turkey
  Assistant Professor
  Civil Engineering Department [July 2014 -]
- **Atılım University**, Ankara, Turkey
  Assistant Professor [January 2011 - June 2014]
- **Atılım University**, Ankara, Turkey
  Instructor [September 2009 - December 2010]
- **Eindhoven University of Technology (TU/e)**, Eindhoven, the Netherlands
  Ph.D. Researcher at Materials Technology Institute [February 2005 - July 2009]
- **Technical University of Munich (TUM)**, Munich, Germany
  Research associate at the
  Chair of Computational Mechanics [September 2003 - May 2004]
- **Stuttgart University**, Stuttgart, Germany
  Graduate student assistant at the
  Institute of Structural Mechanics [February 2002 - September 2003]
- **Middle East Technical University**, Ankara, Turkey
  Research and teaching assistant at the Civil Engineering Department
  Structural Mechanics Lab. [December 1999 - August 2001]

Publications

Theses

- An approach to contact in computational structural dynamics, M.Sc. Thesis, Stuttgart University, 2003.
- Multi-scale modelling of thermal shock damage in refractory materials, Ph.D. Thesis, ISBN:978-90-386-1892-0, Eindhoven University of Technology, 2009.

Journal Publications

1. Özdemir I., Brekelmans W.A.M., Geers M.G.D., Computational homogenization for heat conduction in heterogeneous solids, International Journal for Numerical Methods in Engineering, Vol:73/2, 185-204, 2008.
2. Özdemir I., Brekelmans W.A.M., Geers M.G.D., FE^2 Computational homogenization for the thermo-mechanical analysis of heterogenous solids, Computer Methods in Applied Mechanics and Engineering, Vol:198(3-4), 602-613, 2008.
3. Özdemir I., Brekelmans W.A.M., Geers M.G.D., Modelling thermal shock damage in refractory materials via direct numerical simulation (DNS), Journal of the European Ceramics Society, Vol:30, 1585-1597, 2010.
4. Özdemir I., Brekelmans W.A.M., Geers M.G.D., A thermo-mechanical cohesive zone model, Computational Mechanics, Vol. 46(5), 735-745, 2010.
5. Özdemir I., Topological derivative based optimization of 3D porous elastic microstructures, Computational Materials Science, Vol. 81, 319-325, 2014.
6. Özdemir I., Yalcinkaya T., Modeling of dislocation-grain boundary interactions in a strain gradient crystal plasticity framework, Computational Mechanics, Vol. 54, 255-268, 2014.
7. Özdemir I., Grain Statistics Induced Size Effect in the Expansion of Metallic Micro Rings, International Journal of Mechanical Sciences, Vol. 87, 52-59, 2014.

Conference Publications

1. Ramm, E., Gee M., Özdemir I., Wall W.A., 'Transient impact of shells based on a three dimensional formulation', U.S. National conference on computational mechanics, Albuquerque, U.S.A., 2003.
2. Gee M., Özdemir I., Ramm E., Wall W.A.,'Kontakt in schalendynamik', Forschungskolloquium baustatik & baupraxis, München, Deutschland, 2003.
3. Özdemir I., Brekelmans W.A.M., Geers M.G.D., 'Computational thermo-mechanical homogenization for heterogenous solids', 7^{th} World conference on computational mechanics, Los Angeles, U.S.A., 2006.
4. Özdemir I., Brekelmans W.A.M., Geers M.G.D., 'Towards computational thermo-mechanical homogenization', 9^{th} National engineering mechanics symposium, Lunteren, the Netherlands, 2006.
5. Özdemir I., Brekelmans W.A.M., Geers M.G.D., 'Micro-macro thermo-mechanical modeling of heterogeneous materials', ECCOMAS Thematic conference on modeling of heterogeneous materials with applications in construction and biomedical engineering, Prague, Czech Republic, 2007.

6. Özdemir I., Brekelmans W.A.M., Geers M.G.D.,'Two-scale modeling of thermal shock failure in heterogeneous solids', 8^{th} World conference on computational mechanics, Venice, Italy, 2008.

7. Geers M.G.D., Özdemir I., Brekelmans W.A.M., 'Computational homogenization for thermo-mechanical analysis of heterogeneous solids', 22^{nd} International congress of theoretical and applied mechanics, Adelaide, Australia, 2008.

8. Geers M.G.D.,Kouznetsova V.G, Massart T.J., Özdemir I., Coenen E.W.C., Brekelmans W.A.M., Peerlings R.H.J. 'Multi-scale computational homogenization: trends and challenges', 4^{th} International conference on advanced computational methods in engineering, Liege, Belgium, 2008.

9. Geers M.G.D.,Kouznetsova V.G., Massart T.J., Özdemir I., Coenen E.W.C., Brekelmans W.A.M., Peerlings R.H.J. 'Computational homogenization of structures and materials', Neuvieme colloque national en Calcul des structure; Editors: Michel Raous, Philippe Pasquet, Christian Rey, Giens, France, 2009.

10. Geers M.G.D.,Coenen E., Özdemir I., V.K. Kouznetsova, Brekelmans W.A.M. 'Scale transitions for localized and thermo-mechanical damage', European Solid Mechanics Society, 7^{th} EUROMECH Solid Mechanics Conference, Lisbon, Portugal, 2009.

11. Özdemir I., Göktepe S., 'A thermomechanically coupled constitutive model for shape memory polymers at finite strains', 6^{th} MIT Conference on Computational Fluid and Solid Mechanics, Boston, U.S.A., 2011.

12. Yalcinkaya T., Özdemir I., Nilsson K.F., 'Non-local polycrystal plasticity modeling of generation IV nuclear reactor components with special focus on grain boundaries', XI International Conference on Computational Plasticity, Fundamentals and Applications, Barcelona, Spain, 2011.

13. Tamer M.E., Music O., Özdemir I., Baranoglu B., Sakin A., Durgun I., 'Simulation for Incremental Sheet Forming Process: a Comparison of Implicit and Explicit Finite Element Analysis with Experimental Data', 7th International Conference and Exhibition on Design and Production of Machines and Dies/Molds, Antalya, Turkey, 2013.

14. Tamer M.E., Music O., Özdemir I., Baranoglu B., Sakin A., Durgun I., 'Artımlı sac şekillendirme yönteminin sayısal analizinde açık ve kapalı adım sonlu eleman yöntemi çözümlerinin karşılaştırmalı analizi', XVIII. Ulusal Mekanik Konferansı, Manisa, Türkiye, 2013.

15. Özdemir I., Göktepe S., 'A microstructurally based constitutive model for shape memory polymers formulated in the logarithmic strain space', 11^{th} World Conference on Computational Mechanics, Barcelona, July 2014.

16. Yalcinkaya T., Özdemir I., 'Modelling of grain boundries in a strain gradient crystal plasticity framework', 11^{th} World Conference on Computational Mechanics, Barcelona, July 2014.

17. Tamer M.E., Music O., Özdemir I., Baranoglu B., Sakin A., Durgun I., 'Finite element analysis of incremental sheet metal forming with successive tool paths for use in prototype manufacturing of car body components', 11^{th} World Conference on Computational Mechanics, Barcelona, July 2014.

18. Duran D., Özdemir I., Yilkiran T., Behrens B.-A., 'Surface enlargement in cold extrusion: A generalized calculation scheme and experimental validation', Metform 2014, 2^{nd} International Conference on Metal Forming, Ankara, September, 2014.

19. Tamer M.E., Music O., Özdemir I., Baranoglu B., Sakin A., Durgun I., 'Numerical and experimental investigation of incremental sheet forming', Metform 2014, 2^{nd} International Conference on Metal Forming, Ankara, September, 2014.

Research Project Experience

- BTW: Betere temperatuurwissel bestendigheid, 2005-2009, TNO-TU/e-Gouda VV-Corus CRC joint project: Researcher as the part of TU/e (Eindhoven University of Technology) group
- Development of a crystal plasticity based simulation framework for microforming-Atılım University BAP, Principal Investigator, September 2010 - September 2012.
- A novel experimental technique based on simultaneous temperature and strain field measurement to determine the yield locus in sheet metal forming, TUBITAK 1001 project, Researcher, April 2011 - November 2012.
- Optimization of process parameters in aluminum extrusion, TUBITAK TEYDEB Project with CANSAN A.Ş. (Bursa), Atılım University group, July 2011 - June 2013.
- Experimental and numerical analysis of incremental sheet forming (ISF), SANTEZ Project with TOFAŞ, Researcher, July 2012 - March 2014.

Teaching

- CE 321 Introduction to Structural Mechanics
- CE 539 Advanced Strength of Materials
- MFGE 104 Computer Aided Engineering Drawing
- MFGE 156 Computer Aided Engineering Drawing (for MATE students)
- MFGE 203 Engineering Mechanics (for MATE students)
- MFGE 212 Solid Mechanics
- MFGE 301 Numerical Methods
- MFGE 401 Capstone I : Product and Process Design
- MFGE 402 Capstone II : Manufacturing System Design
- MFGE 407 Finite Element Method
- MFGE 506 Practical Finite Elements

Skills

- Programming Languages : Fortran, C
- Scientific computing tools : Matlab, Mathcad
- FE softwares : Abaqus (including user subroutines UMAT, UEL), MSC Marc (including user subroutines), FEAP (including user subroutines)

Supervised Students

- Johan van den Eynden, Internship student (10 weeks)
  Project: Microstructural characterization of refractory materials.
- Nicholas Feld, Internship student (12 weeks)
  Project: Multi-scale analysis of thermally induced damage in refractory materials.
- Hakan Kalkan, M.Sc. student, defended his thesis in April 2011, jointly supervised with Ass. Prof. Dr. Besim Baranoglu (co-supervisor).
  Thesis Title : A Combined Numerical-Experimental Investigation on Aluminium Extrusion
- Levent Murat, M.Sc. student, defended his thesis in April 2013, jointly supervised with Ass. Prof. Dr. C. Merih Şengönül (co-supervisor).
  Thesis Title : A Combined Numerical-Experimental Investigation on Micro-Extrusion
- Deniz Duran, M.Sc. student, defended his thesis in April 2014, jointly supervised with Ass. Prof. Dr. Celalettin Karadogan (supervisor).
  Thesis Title : An Analysis of Cold Extrusion
- M.E. Tamer, M.Sc. student, defended his thesis in May 2014,, jointly supervised with Ass. Prof. Dr Besim Baranoglu (supervisor).
  Thesis Title : Experimental and Numerical Analysis of Incremental Sheet Forming