Professor Huseyin Sehitoglu

Professional Preparation

The City University, London Mechanical Engineering BSc. 1979 (FCHonors)
University of Illinois at Urbana- Champaign, Theoretical and Applied Mechanics MS 1981
University of Illinois at Urbana- Champaign, Theoretical and Applied Mechanics PhD 1983

Appointments

John, Alice and Sarah Nyquist Chair, Department of Mechanical Science and Engineering, UIUC, 2009-
C.J.Gauthier Professor, Department of Mechanical Science and Engineering, UIUC, 2005-2009
Head, Department of Mechanical Science and Engineering, UIUC, 2005-2009
Grayce Wicall Gauthier Professor, Department of Mechanical and Industrial Engineering, UIUC, 2000-2005
Associate Head, Department of Mechanical and Industrial Engineering, UIUC, 1996-99
Professor, Department of Mechanical and Industrial Engineering, UIUC, 1992-date
Visiting Professor, The Johns Hopkins University, Baltimore, MD, 1993-94
Director, Mechanics and Materials, National Science Foundation, Washington, DC, 1991-93
Associate Professor, Department of Mechanical and Industrial Engineering, UIUC, 1987-92
Assistant Professor, Department of Mechanical and Industrial Engineering, UIUC, 1983-87

b2. Honors (only major awards listed)
Marcus Grossman Award, American Society for Metals International, 1998
Editor, ASME, Journal of Engineering Materials and Technology, 2003-2008
Nadai Medal, American Society of Mechanical Engineers, 2007
Fatigue Lecture, American Society of Testing Materials (ASTM) International Meeting, Vancouver, Canada, 2009.
University of Illinois Campus Award for Excellence in Graduate Mentoring , University of Illinois Urbana, 2012
Editor (select), SMST/ASM journal on Shape Memory and Superelasticity

Publications

Journal papers in the last two years (2012-2014)

Ojha. A. and H.Sehitoglu, Twinning Stress Prediction in bcc Metals and Alloys, to appear in Philosophical Magazine Letters, 2014

Pataky, G. and H. Sehitoglu, "Experimental methodology for studying strain heterogeneity with microstructural data from high temperature deformation," to appear in Experimental Mechanics, 2014.

Chowdhury,P., H. Sehitoglu, R. Rateick, Fatigue Threshold Determination in the Presence of Microstructural Barriers- Part 2, International Journal of Fatigue, 68, 292-301, 2014

Chowdhury,P., H. Sehitoglu, R. Rateick, Fatigue Threshold Determination in the Presence of Microstructural Barriers- Part 1, International Journal of Fatigue, 68, 277-291, 2014

Wang, J., H. Sehitoglu, Martensite Modulus Dilemma in Monoclinic NiTi-Theory and Experiments, I. J. Plasticity, 61, 17–31, 2014

Wang, J., H. Sehitoglu, Modeling of Pseudotwinning in Fe3Ga, Modeling and Simulation in Materials Science and Engineering, 22, 055008, 2014

Wang, J., H. Sehitoglu, Modeling of Martensite Slip and Twinning in NiTiHf Alloys, Philosophical Magazine, 94,20, 2297-2317, 2014

Wang, J., H. Sehitoglu, Dislocation Slip and Twinning in Ni-based L12 type Alloys, Intermetallics, 52, 20-31, 2014

Ohja, A., H. Sehitoglu, L. Patriarca, H.J. Maier, Twin Migration in Fe-based BCC Crystals-Theory and Experiments, Philosophical Magazine, 94, 16, 1816-1840, 2014

Wang, J., H. Sehitoglu, Modeling of Pseudoelasticity via Reversible Slip in Fe3Ga" , Computational Materials Science, 87,34-42, 2014

Chen, Q., Andrawes, B. Sehitoglu, H., Thermomechanical Testing of FeNiCoTi Shape Memory Alloy for Active Confinement in Concrete, Smart Materials and Structures, 23, 1, 2014

Caspersen, M., J. Carroll, J.Lambros, H. Sehitoglu, R. Dodds, Investigation of thermal effects on fatigue crack closure using muti-scale digital image correlation, I. J. Fatigue, 61, 2014, 10-20

Wang, J., H. Sehitoglu, H.J.Maier, Dislocation Slip Stress Prediction in Shape Memory Alloys, I. J. Plasticity, 54, 247-266, 2013

Patriarcha, L., W. Abuzaid, H. Sehitoglu, H.J. Maier, "Slip Transmission in bcc FeCr Polycrystal," Materials Science and Engineering, A 588, 308-317, 2013

Wang, J., H. Sehitoglu, "Twinning Stress in Shape Memory Alloys-Theory and Experiments," 61, Acta Materialia, 6790-6801, 2013

Pataky, G., H. Sehitoglu, H.J. Maier, Creep deformation and mechanisms in Haynes 230 at 800 °C and 900 °C, J. Nuclear Materials, 443 (1), 484-490, 2013

Carroll, Jay D. ; Abuzaid, Wael Z.; Lambros, John; Sehitoglu, Huseyin, On the interactions between strain accumulation, microstructure, and fatigue crack behavior, International Journal of Fracture, 180, 2, 223-241, 2013

Swaminathan, B., J. Lambros, H. Sehitoglu, Digital Image Correlation Study of Mechanical Response of Nickel Superalloy Hastelloy X Under Thermal and Mechnical Cycling: Uniaxial and Biaxial Stress States, The Journal of Strain Analysis for Engineering Design, 2013

Gross, D., K. Nygren, G.J. Pataky, J. Kacher, H. Sehitoglu, I.M. Robertson, The evolved microstructure ahead of an arrested fatigue crack in Haynes 230, Acta Materialia, 61, 15, 5768–5778, 2013

Chowdhury,P., H. Sehitoglu, H.J.Maier, R. Rateick, Modeling Fatigue Crack Growth Resistance of Nanocrystalline Alloys, Acta Materialia, 61, 7, 2531-2547, 2013

Abuzaid, A., A.Oral, H. Sehitoglu, J. Lambros, H.J.Maier, Fatigue Crack Initiation in Hastelloy X – The Role of Boundaries, Fatigue and Frature of Engineering Materials and Structures, 2013

Patriarca,L., W. Abuzaid , H. Sehitoglu, H. J. Maier, Y. Chumlyakov, "Twin nucleation and migration in FeCr single crystals", Materials Characterization, 75, 165-175, 2013

Ezaz, T., J. Wang, H. Sehitoglu, H.J. Maier, Plastic deformation of NiTi shape memory alloys, Acta Materialia, 61, 1, 67–78, 2013

Pataky, G., H. Sehitoglu, H.J. Maier, Very High Temperature Fatigue Crack Growth in Haynes 230", Materials Characterization, 75, 69-78, 2012

Abuzaid, W., H. Sehitoglu, J. Lambros, , Plastic Strain Localization and Fatigue Micro-crack Formation in Hastelloy X, Materials Science and Engineering, 561, 507-519, 2013

Wang, J., H. Sehitoglu, Resolving Quandaries Surrounding NiTi, Applied Physiscs Letters, 101, 8, 2012

Ezaz, T.., H.Sehitoglu, W. Abuzaid, H.J.Maier, Higher Order Twin Modes in Martensitic NiTi- The (201) Case, Materials Science and Engineering A, 558, 422-430, 2012

Carroll, J.D., W. Abuzaid, J. Lambros, and H. Sehitoglu, “High Resolution Digital Image Correlation Measurements of Strain Accumulation in Fatigue Crack Growth,” International Journal of Fatigue, 37,134-145,2012

Sehitoglu, H., J. Wang, and H. J. Maier, "Transformation and Slip Behavior of Ni2FeGa," International J. Plasticity, 39, 61-74, 2012

Pataky, G., H. Sehitoglu, R. Hamilton, M. Sangid, H.J.Maier and P. Sofronis, "Mixed Mode Fatigue Crack Growth in 316 Stainless Steel," Engineering Fracture Mechanics, 94, 13-28, 2012

Canadinc, D., H. Sehitoglu, and Y. Jiang, "Investigation of Fatigue Crack Initiation due to Rolling Contact," Fatigue & Fracture of Engineering Materials & Structures, 30 (9), 1678-1689, 2012.

Sangid,M., Ezaz,T., Sehitoglu, H., Energetics of residual dislocations associated with slip-twin and slip-GBs interactions, Materials Science And Engineering A, 542, 21-30, 2012

Abuzaid,W., Sangid,M., Carroll,J., Sehitoglu, H., Lambros,J., Slip Transfer and Plastic Strain Accumulation across Grain Boundaries in Hastelloy X, Journal of the Mechanics and Physics of Solids, 60 (6), 1201-1220, 2012

Sangid, M., G.J. Pataky, H. Sehitoglu, R.F. Hamilton, H. J. Maier, High resolution analysis of opening and sliding in fatigue crack growth, I. J. Fatigue, 37, 134-145, 2012

Ezaz, T., H. Sehitoglu, H.J. Maier, Energetics of (114) Twinning in B2 NiTi under Coupled Shear and Shuffle, Acta Materialia, 60, 1, 339-348, 2012

Previous significant papers (out of 210 journal papers)

Fatigue Crack Closure:

McClung, R. C. and H. Sehitoglu, "On the Finite Element Analysis of Crack Closure, Part I: Basic Modeling Issues, Part 2 : Numerical Results," *Engineering Fracture Mechanics*, 33:2, 237-272, 1989 (cited 315 times based on Google Scholar).

Thermo-mechanical Fatigue:

Neu, R. and H. Sehitoglu, "Thermo-mechanical Fatigue Oxidation, Creep Part I: Experiments and Part 2: Life Prediction," *Metallurgical Transactions*, 20A, 1755-1767, 1989 (cited 232 times).

Shape Memory Materials:

Gall, K. and H. Sehitoglu, "The Role of Texture in Tension/Compression Asymmetry in Polycrystalline NiTi," *International Journal of Plasticity*, 15, 69-92, 1999 (cited 203 times).

Gall, K., H. Sehitoglu, Y. Chumlyakov, and I. Kireeva, "Tension-Compression Asymmetry of the Stress-Strain Response of Aged Single Crystal and Polycrystalline NiTi," *Acta Materialia*, 47:4, 1203-1217, 1999 (cited 215 times).

Plasticity in Metals

Jiang, Y. and H. Sehitoglu, "Modeling of Cyclic Ratchetting Plasticity: Part 1 Development of Constitutive Relations," ASME Journal of Applied Mechanics, 63, 720 725, 1996 (cited 291 times)

Slip and Twinning In Metals:

Karaman, I., H. Sehitoglu, A. J. Beaudoin, Y. Chumlyakov, H. J. Maier, and C. N. Tomé, "Modeling the Deformation Behavior of Hadfield Steel Single and Polycrystals due to Twinning and Slip," Acta Materialia, 48, 2031-2047, 2000 (cited 149 times)

Kibey, S., J.B. Liu, D.D. Johnson, H. Sehitoglu , Predicting twinning stress in fcc metals: linking twin-energy pathways to twin nucleation, *Acta Materialia*, 55, 20, 6843-6851, 2007 (cited 103 times)

Collaborators

(Faculty in other institutions and at Illinois)
E. Alaca, Koc University, Turkey, (former grad. student)
D. Canadinc , Koc University, Turkey, (former grad. student)
Y. Chumlyakov, Siberian Physico-Technical Institute, Russia
K. Gall, Georgia Tech. (former grad. student)
R. Hamilton, Penn State (former grad. student)
Y. Jiang, U. Nevada (former grad. student)
D. Johnson, Iowa State University
I. Karaman, Texas A&M (former grad. student)
H. J. Maier, U. Hannover, Germany
N. Miller, University of Illinois
R. Neu, Georgia Tech. (former grad. student)
I.M. Robertson, U. of Illinois
T. Saif, University of Illinois
M. Sangid, Purdue University (former graduate student)

Graduate Advisor: JoDean Morrow, University of Illinois at Urbana- Champaign

Current Graduate Students (research assistants)
P. Chowdury, G. Pataky, A.Ohja, L.Patriarca (post-doc), S. Alkan, George Li, Yan Wu

Visiting Scholars:
Pietro Luccarelli, Guowu Ren