

# Mohsen Dadfarnia, Ph.D.

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## EDUCATION

**University of Illinois**, Urbana-Champaign, IL

**PhD in Mechanical Engineering**, GPA: 4.0 / 4.0

Mar. 2009

**Dissertation:** Micromechanics of Hydrogen-Induced Crack Initiation in Pipeline Steels and Subcritical Crack Growth

**Clemson University**, Clemson, SC

**Master of Science in Mechanical Engineering**, GPA: 4.0 / 4.0

Aug. 2003

**Thesis:** Lyapunov-Based Piezoelectric Control of Hybrid Flexible Structures

**Sharif University of Technology**, Tehran, Iran

**Master of Science in Applied Mechanics**, GPA: 18.18 / 20.00

Jan. 1999

**Thesis:** Nonlinear Forced Vibration of Generally Laminated Composite Beams

**Bachelor of Science in Mechanical Engineering**, GPA: 18.23 / 20.00 (First rank)

Sep. 1996

**Senior Project:** Optimization of Spatial Truss by Nonlinear Programming

## RESEARCH INTERESTS

Mechanics of materials, material modeling, computational mechanics, hydrogen embrittlement, environmental degradation

## ACADEMIC EXPERIENCE

### Research Experience

#### **Research Scientist**

May 2014 – Aug. 2018

**Department of Mechanical Science and Engineering, University of Illinois**

- Studying high temperature hydrogen attack of steels
- Administering projects on hydrogen effects on mechanical properties of materials in Hydrogen Material Compatibility division in International Institute for Carbon Neutral Energy Research (I2CNER)
- Investigating hydrogen embrittlement of a lath martensitic steel using statistical micromechanical modeling
- Studying hydrogen uptake, bulk diffusion, and interaction with material elastoplasticity
- Development of a model for hydrogen transport in materials accounting for dislocation mode of transport
- Supervision of graduate students in Professor Sofronis group

#### **Post-Doctoral Research Associate**

Mar. 2009 – May 2014

**Department of Mechanical Science and Engineering, University of Illinois**

- Simulation of subcritical crack propagation and arrest based on critical hydrogen concentration/opening stress interaction
- Investigation of the interplay between multiple traps and their effect on hydrogen transport
- Modeling of competition between dislocation emission and brittle intergranular fracture at incipient microcrack using dislocation dynamics simulation
- Analysis of effects of hydrogen on crystalline metals using crystal plasticity model
- Modeling of material degradation under high temperature corrosive environment
- Study of the environmental similitude between the laboratory fracture specimen and real-life hydrogen gas pipeline

- Development of constitutive model for nanolayered composite materials under high strain rate
- Study of irradiation effects on material properties for 304L stainless steel base metal and welds
- Supervision of graduate students in Professor Sofronis group
- NSF proposal entitled: “Incipient microcracks: Fracture by decohesion vs. blunting” (Co-author)

#### **Research Assistant**

Jan. 2005 – Mar. 2009

##### **Department of Mechanical Science and Engineering, University of Illinois**

- Simulation of hydrogen diffusion coupled with large-strain elastoplastic deformation in pipeline steels
- Study of micromechanics of helium bubble growth in material tritides
- Identification of microstructural characteristic length for fracture of IN903 alloy in hydrogen gas environment
- Simulation of crack initiation and propagation in pipeline steels exposed to high pressure hydrogen gas (based on the thermodynamics of hydrogen-induced decohesion and hydrogen-assisted ductile processes)

#### **Research Assistant**

Jan. 2001 – Aug. 2003

##### **Department of Mechanical Engineering, Clemson University**

- Modeling of PZT patch actuator on a beam
- Design and implementation of an observer-based piezoelectric controller for a flexible robot
- Development of a new Lyapunov-based piezoelectric controller for a flexible robot

#### **Research Assistant**

Sep. 1997 – Jan. 1999

##### **Department of Mechanical Engineering, Sharif University of Technology**

- Development of a new theory for vibration of composite beams
- Formulations of 2D elasticity model for composite beams
- Performance of 3D vibrational analysis of composite beams using ANSYS Software

### **Teaching Experience**

#### **Instructor**

##### **Department of Mechanical Engineering, Seattle University**

- Advanced Engineering Methods (MEGR5210, graduate level) Spring 2019
- Engineering Project I (MEGR5990, graduate level) Spring and Fall 2019
- Engineering Project II (MEGR5991, graduate level) Fall 2019
- Machine Elements I (MEGR3710, undergraduate) Winter 2019
- Engineering Methods (MEGR2810, undergraduate) Fall 2018, Spring 2019
- Machine Shop (MEGR1060, undergraduate) Fall 2018, Winter and Fall 2019

#### **Instructor**

##### **Department of Mechanical Science and Engineering, University of Illinois**

- Solid Mechanics I (TAM551, graduate level) Falls of 2009, 2011, 2012, and 2013
- Solid Mechanics II (TAM552, graduate level) Springs of 2010, 2011, 2012, 2013, 2014, and 2015
- Fracture Mechanics (TAM555, graduate level) Falls of 2010 and 2014
  - Jointly taught courses with Prof. Sofronis

#### **Teaching Assistant**

##### **Department of Mechanical Science and Engineering, University of Illinois**

- Mechanical Design II (ME371, undergraduate class) Spring 2004
  - Instructed two sections of computer labs and evaluated/corrected lab reports
- Modeling and Analysis of Dynamic Systems (ME340, undergraduate class) Fall 2003
  - Instructed a lab section of the class and graded lab reports
  - Organized class hours for students and prepared homework solutions

#### **Teaching Assistant**

##### **Department of Mechanical Engineering, Clemson University**

- Calculus of One Variable (introductory undergraduate class) Summer 2003
  - Held problem sessions and helped instructor with in-class student assignments/discussions
- Advanced Control Engineering (graduate level) Spring 2003
  - Prepared homework solutions and graded homework

- Introduction to Dynamic Systems (undergraduate class) Spring 2003
  - Prepared homework solutions and graded homework

### **Teaching Assistant**

#### **Department of Mechanical Engineering, Sharif University of Technology**

- Machine Design II (undergraduate class) Spring 1998
  - Held problem sessions and supervised students on their course projects
- Continuum Mechanics (graduate level) Fall 1997
  - Graded homework and held office hours

### **Advising Experience**

#### **Co-advised students in Professor Sofronis group**

- Rupesh K. Mahendran (M.S. student) Aug. 2018 – present
- Zahra Hosseini (Ph.D. student) Aug. 2013 – present
- John W. Sanders (Ph.D. student) Aug. 2013 – June 2017
- Will Enowmbitang (undergraduate) Spring 2017
- Ziwei Che (M.S. student) Aug. 2015 – Aug. 2017
- Rah He (M.S. student) Spring 2015
- Jason J. Chan (M.S. student) Jan. 2010 – Dec. 2011
- Kuntay Kucukal (M.S. student) Aug. 2009 – Aug. 2011
- Gregory J. Schebler (M.S. student) Jan. 2010 – Dec. 2010
  - Taught use of ABAQUS software, formulation of constitutive material models based on finite-deformation finite element and analysis, and writing user material subroutines (UMAT)
  - Helped the students with code writing
  - Guided the students in their research

### **COMPUTER SKILLS**

**Software packages:** Abaqus, ANSYS, Matlab/Simulink, Maple, and Mathematica

**Programming languages:** Fortran, C++, and Python

**Platforms:** Windows and UNIX

**Office software:** Microsoft Office (Word, PowerPoint, and Excel)

### **INDUSTRIAL EXPERIENCE**

#### **Team member in the following projects**

A combined micromechanics/materials-science approach to understanding hydrogen attack July 2015 – July 2017

- Supported by BP-ICAM

- Reviewed the existing literature on high temperature hydrogen attack (HTHA)
- Proposed a physically-based lifetime prediction model for failure of carbon steels under HTHA

Evaluating hydrogen embrittlement of line pipe steels Sep. 2015 – Sep. 2016

- Supported by Southern California Gas (SoCalGas) Company

- Analyzed growth of axial crack under cyclic loading in pipelines due to random fluctuation of internal pressure
- Evaluated the fracture resistance of the SoCalGas line pipes for transporting a mixture of hydrogen and natural gas up to 5% hydrogen concentration

Irradiation Effects on Material Properties for 304L Stainless Steel Base Metal and Welds Sep. 2011 – Sep. 2012

- Supported by Canadian Nuclear Safety Commission

- Surveyed open literature for the effect of neutron irradiation on mechanical properties of 304 and 316 steels
- Identified the pieces of information to allow for the assessment of suitability of data for the estimation of the end-of-life properties of CANDU calandria vessels after 60 years in service.

Susceptibility of the Kinder-Morgan Pipeline to Hydrogen Embrittlement Aug. 2007 – Apr. 2008  
- Supported by Kinder-Morgan

- Modeled the interaction of hydrogen transient diffusion with the material elastoplastic deformation induced by the pipeline gas pressure
- Investigated hydrogen accumulation close to notch or crack on inside or outside surfaces of a pipeline

**Design engineer at the Research Center of Iran-Khodro Company** Tehran, Iran  
([www.ikco.ir/en/](http://www.ikco.ir/en/)) Sep. 2000 – Jan. 2001

- Used MSC/Patran and MSC/Nastran software to analyze structural components of car body
- Analyzed the floor plate of a car for vibration absorber placement

**Design Review Engineer at Farab Company** ([www.farab.com](http://www.farab.com)) Tehran, Iran  
Sep. 1999 – Sep. 2000

- Reviewed the analysis of bus-duct structure and carrier
- Examined the design of structural components of power plants
- Conducted numerical analysis of butterfly valves to check their durability using ANSYS software

**Internship at Iran Heavy Die Manufacturing Company** Tehran, Iran  
Summer 1996

- Worked with Japanese Standard in die design and drawing
- Designed and manufactured a rail that allows a drilling machine to work at different positions

**Internship at Iran Alloy Steel Company** ([www.iasco.ir](http://www.iasco.ir)) Yazd, Iran  
Summer 1995

- Learned pneumatic, hydraulic circuits, and elements design and illustration
- Evaluated the design and operation of cutting and rolling machines

## **PROFESIONAL SERVICE**

### **Journal Reviewer**

- International Journal of Solids and Structures
- Journal of Applied Mechanics
- International Journal of Fracture
- Journal of ASTM International
- Physical Review Letters & Physical Review B
- Corrosion Science
- International Journal of Hydrogen Energy
- Materials Science & Engineering A
- Engineering Fracture Mechanics
- Thin Solid Films
- Journal of Testing and Evaluation
- Journal of Materials Engineering and Performance
- Journal of Strain Analysis for Engineering Design
- Journal of Phase Equilibria and Diffusion
- International Journal of Control
- Metallurgical and Materials Transactions A
- Materials

### **Conference Reviewer**

- 2012 International Hydrogen Conference: Effect of Hydrogen on Materials, September 9-12, 2012, Grand Teton National Park, Wyoming, USA
- 2008 International Hydrogen Conference: Effect of Hydrogen on Materials, September 7-10, 2008, Grand Teton National Park, Wyoming, USA
- 8<sup>th</sup> International Pipeline Conference (IPC2010), September 27 - October 1, 2010, Calgary, Alberta, Canada
- 2003 International Mechanical Engineering Congress and Exposition (IMECE'03), ASME Dynamic Systems and Control Division, November 15-21, 2003, Washington, DC, USA

## **PROFESIONAL AFFILIATIONS**

- Member, American Society of Mechanical Engineers (**ASME**)
- Member, The Minerals, Metals & Materials Society (**TMS**)

## PUBLICATIONS AND PRESENTATIONS

### Book Chapter:

Nagao, A., **Dadfarnia, M.**, Sofronis, P., and Robertson, I.M., 2016, "Hydrogen Embrittlement: Mechanisms", *Encyclopedia of Iron, Steel, and Their Alloys*. Taylor and Francis: New York, pp. 1768-1784. (10.1081/E-EISA-120049717).

**Dadfarnia, M.**, Sofronis, P., Somerday, B.P., Balch, D.K., and Schembri, P., 2012, "Degradation Models for Hydrogen Embrittlement", *Gaseous hydrogen embrittlement of materials in energy technologies*, R. P. Gangloff and B. P. Somerday, eds., Volume 2, Woodhead Publishing. pp. 326-377.

### Journal Papers:

**Dadfarnia, M.**, Martin, M.L., Moore, D.E., Orwig, S.E., Sofronis, P., 2019, "A Model for High Temperature Hydrogen Attack in Carbon Steels under Constrained Void Growth," *International Journal of Fracture*, 219, pp. 1-17. (DOI: 10.1007/s10704-019-00376-8).

**Dadfarnia, M.**, Sofronis, P., Brouwer, J., Sosa, S., 2019, "Assessment of the Resistance of Natural Gas Line Pipe Steels to Hydrogen Embrittlement," *International Journal of Hydrogen Energy*, 44(21), pp.10808-10822. (DOI: 10.1016/j.ijhydene.2019.02.216)

Martin, M.L., **Dadfarnia, M.**, Nagao, A., Wang, S., Sofronis, P., 2019, "Enumeration of the hydrogen-enhanced localized plasticity mechanism for hydrogen embrittlement in structural materials," *Acta Materialia*, 165, pp. 734-750. (DOI: 10.1016/j.actamat.2018.12.014)

Hosseini, Z.S., **Dadfarnia, M.**, Somerday, B.P., Sofronis, P., Ritchie, R.O., 2018, "On the Theoretical Modeling of Fatigue Crack Growth," *Journal of the Mechanics and Physics of Solids*, 121, pp. 341-362. (DOI: 10.1016/j.jmps.2018.07.026)

Nagao, A., **Dadfarnia, M.**, Somerday, B.P., Sofronis, P., and Ritchie, R.O., 2018, "Hydrogen-Enhanced-Plasticity Mediated Decohesion for Hydrogen-Induced Intergranular and 'Quasi-Cleavage' Fracture of Lath Martensitic Steels," *Journal of the Mechanics and Physics of Solids*, 112, pp. 403-430. (DOI: 10.1016/j.jmps.2017.12.016)

Martin, M.L., **Dadfarnia, M.**, Orwig, S., Moore, D., and Sofronis, P., 2017, "A Microstructure-Based Mechanism of Cracking in High Temperature Hydrogen Attack," *Acta Materialia*, 140, pp. 300-304. (DOI: 10.1016/j.actamat.2017.08.051)

Sanders, J.W., **Dadfarnia, M.**, Stubbins, J.F., and Sofronis, P., 2017, "On the Fracture of High Temperature Alloys by Creep Cavitation under Uniaxial or Biaxial Stress States," *Journal of the Mechanics and Physics of Solids*, 98, pp. 49-62. (DOI: 10.1016/j.jmps.2016.05.019)

**Dadfarnia, M.**, Nagao, A., Wang, S., Martin, M.L., Somerday, B.P., and Sofronis, P., 2015, "Recent Advances on Hydrogen Embrittlement of Structural Materials," *International Journal of Fracture*, 196(1-2), pp. 223-243. (DOI: 10.1007/s10704-015-0068-4)

**Dadfarnia, M.**, Martin, M.L., Nagao, A., Sofronis, P., and Robertson, I.M., 2015, "Modeling Hydrogen Transport by Dislocations," *Journal of the Mechanics and Physics of Solids*, 78, pp. 511-525. (DOI: 10.1016/j.jmps.2015.03.002)

**Dadfarnia, M.**, Somerday, B.P., Schembri, P.E., Sofronis, P., Foulk, J.W., III, Nibur, K. A., and Balch, D. K., 2014, "On Modeling Hydrogen Induced Crack Propagation Under Sustained Load," *JOM*, 66(8), pp. 1390-1398. (DOI: 10.1007/s11837-014-1050-8).

Nagao, A., Martin, M.L., **Dadfarnia, M.**, Sofronis, P., and Robertson, I.M., 2014, "The Effect of Nanosized (Ti,Mo)C Precipitates on Hydrogen Embrittlement of Tempered Lath Martensitic Steel," *Acta Materialia*, 74(1), pp. 244-254. (DOI: 10.1016/j.actamat.2014.04.051)

Nibur, K.A., Somerday, B.P., San Marchi, C., Foulk, J.W., III, **Dadfarnia, M.**, and Sofronis, P., 2013, "The Relationship Between Crack-tip Strain and Subcritical Cracking Thresholds for Steels in High-pressure Hydrogen Gas," *Metallurgical and Materials Transactions A*, 44(1), pp. 248-269. (DOI: 10.1007/s11661-012-1400-5).

- Nagao, A., Smith, C.D., **Dadfarnia, M.**, Sofronis, P., and Robertson, I.M., 2012, "The Role of Hydrogen in Hydrogen Embrittlement Fracture of Lath Martensitic Steel," *Acta Materialia*, 60(13-14), pp. 5182-5189. (DOI: 10.1016/j.actamat.2012.06.040).
- Briceño, M., Fenske, J., **Dadfarnia, M.**, Sofronis, P., and Robertson, I.M., 2011, "Effect of Ion Irradiation-Produced Defects on the Mobility of Dislocations in 304 Stainless Steel," *Journal of Nuclear Materials*, 409(1), pp. 18-26. (DOI: 10.1016/j.jnucmat.2010.12.026).
- Dadfarnia, M.**, Sofronis, P., and Thirumalai, N.S., 2011, "Hydrogen Interaction with Multiple Traps: Can It be Used to Mitigate Embrittlement?" *International Journal of Hydrogen Energy*, 36(16), pp. 10141-10148. (DOI: 10.1016/j.ijhydene.2011.05.027).
- Dadfarnia, M.**, Sofronis, P., Somerday, B.P., Balch, D.K., Schembri, P., and Melcher, R.J., 2011, "On the Environmental Similitude for Fracture in the SENT Specimen and a Cracked Hydrogen Gas Pipeline," *Engineering Fracture Mechanics*, 78(12), pp. 2429-2438. (DOI:10.1016/j.engfracmech.2011.06.002).
- Dadfarnia, M.**, Novak, P., Ahn, D.C., Liu, J.B., Sofronis, Johnson, D.D., and Robertson, I.M., 2010, "Recent Advances in the Study of Structural Materials Compatibility with Hydrogen," *Advanced Materials*, 22(10), pp. 1128-1135. (DOI: 10.1002/adma.200904354).
- Somerday, B.P., Balch, D.K., **Dadfarnia, M.**, Nibur, K.A., Cadden, C.H., and Sofronis, P., 2009, "Hydrogen-Assisted Crack Propagation in Austenitic Stainless Steel Fusion Welds," *Materials and Metallurgical Transactions*, 40(10), pp. 2350-2362. (DOI: 10.1007/s11661-009-9922-1).
- Dadfarnia, M.**, Somerday, B.P., Sofronis, P., Robertson, I.M., and Stalheim, D., 2009, "Interaction of Hydrogen Transport and Material Elastoplasticity in Pipeline Steels," *Journal of Pressure Vessel and Technology, Transactions of the ASME*, 131, 041404:1-13. (DOI: 10.1115/1.3027497).
- Dadfarnia, M.**, Sofronis, P., Somerday, B.P., and Robertson, I.M., 2008, "On the Small Scale Character of the Stress and Hydrogen Concentration Fields at the Tip of an Axial Crack in Steel Pipeline: Effect of Hydrogen-Induced Softening on Void Growth," *International Journal of Materials Research*, 99(5), pp. 557-570. (DOI: 10.3139/146.101674).
- Dadfarnia, M.**, Sofronis, P., Somerday, B.P., and Robertson, I.M., 2008, "Hydrogen/Plasticity Interaction at an Axial Crack in Pipeline Steel," *Journal of ASTM International*, 5(6), Paper ID JAI101531, www.astm.org. (DOI: 10.1520/JAI101531).
- Dadfarnia, M.**, Jalili, N., and Esmailzadeh, E., 2005, "A Comparative Study of the Galerkin Approximation Utilized in Timoshenko Beam Theory," *Journal of Sound and Vibration*, 280(3-5), pp. 1132-1142.
- Dadfarnia, M.**, Jalili, N., Xian, B., and Dawson, D.M., 2004, "An Investigation of Damping Mechanisms in Translational Euler-Bernoulli Beams using a Lyapunov-Based Stability Approach," *Journal of Vibration and Control*, 10(7), pp. 933-961.
- Dadfarnia, M.**, Jalili, N., Xian, B., and Dawson, D.M., 2004, "A Lyapunov-Based Piezoelectric Controller for Flexible Cartesian Robot Manipulators," *Journal of Dynamic Systems, Measurement and Control, Transactions of the ASME*, 126(2), pp. 347-358.
- Jalili, N., **Dadfarnia, M.**, and Dawson, D.M., 2004, "A Fresh Insight into the Microcantilever-Sample Interaction Problem in Non-Contact Atomic Force Microscopy," *Journal of Dynamic Systems, Measurement and Control, Transactions of the ASME*, 126(2), pp. 327-335.
- Dadfarnia, M.**, Jalili, N., Liu, Z., and Dawson, D.M., 2004, "An Observer-based Piezoelectric Control of Flexible Cartesian Robot Arms: Theory and Experiment," *Control Engineering Practice*, 12(8), pp. 1041-1053.
- Nassirharand, A., Karimi, H., and **Dadfarnia, M.**, 2003, "A New Software Tool for Synthesis of Linear PID Controllers," *Advances in Engineering Software*, 34(9), pp. 551-557.
- Jalili, N., Wagner, J., and **Dadfarnia, M.**, 2003, "A Piezoelectric Driven Ratchet Actuator Mechanism with Application to Automotive Engine Valves," *Mechatronics*, 13(8-9), pp. 933-956.

## **Conference Proceedings:**

- Nagao, A., Wang, S., Nygren, K.E., **Dadfarnia, M.**, Sofronis, P., and Robertson, I.M., 2017, "Effect of Hydrogen on Fatigue-Crack Growth of a Ferritic-Pearlitic Low Carbon Steel," *Proceedings of the ASME 2017 Pressure Vessels and Piping Conference*, Waikoloa, Hawaii, July 16-20, 2017, PVP2017-66273.
- Dadfarnia, M.**, Nagao, A., Somerday, B.P., Schembri, P.E., Foulk, J.W., III, Nibur, K. A., Balch, D.K., Ritchie, R.O., and Sofronis, P., 2017, "Modeling Hydrogen-induced Fracture and Crack Propagation in High Strength Steels," *2016 International Hydrogen Conference: Materials Performance in Hydrogen Environments*, B. P. Somerday, and P. Sofronis, eds., ASME Press, New York, NY, Proceedings of the 2016 International Hydrogen Conference, Grand Teton National Park, Wyoming, September 11-14, 2016, pp. 572-580.
- Hosseini, Z.S., **Dadfarnia, M.**, Nibur, K.A., Somerday, B.P., Gangloff, R.P., and Sofronis, P., 2017, "Trapping Against Hydrogen Embrittlement," *2016 International Hydrogen Conference: Materials Performance in Hydrogen Environments*, B. P. Somerday, and P. Sofronis, eds., ASME Press, New York, NY, Proceedings of the 2016 International Hydrogen Conference, Grand Teton National Park, Wyoming, September 11-14, 2016, pp. 71-80.
- Nagao, A., Wang, S., Nygren, K.E., **Dadfarnia, M.**, Sofronis, P., and Robertson, I.M., 2017, "Microstructural Change of Low Carbon and Low-Alloy Steels Caused by Hydrogen-Induced Fatigue-Crack Growth," *2016 International Hydrogen Conference: Materials Performance in Hydrogen Environments*, B. P. Somerday, and P. Sofronis, eds., ASME Press, New York, NY, Proceedings of the 2016 International Hydrogen Conference, Grand Teton National Park, Wyoming, September 11-14, 2016, pp. 228-234.
- Nygren, K.E., Nagao, A., **Dadfarnia, M.**, Sofronis, P., and Robertson, I.M., 2015, "Effect of Hydrogen on Fatigue-Crack Growth Behavior of Types 316L and 304 Austenitic Stainless Steels," *The 169th Iron and Steel Institute of Japan (ISIJ) Meeting*, Tokyo, Japan, March 18-20, 2015, CAMP-ISIJ, Vol. 28, pp. 301.
- Nagao, A., Nygren, K.E., **Dadfarnia, M.**, Sofronis, P., and Robertson, I.M. , 2015, "Effect of Hydrogen on Tensile and Fatigue-Crack Growth Behaviors of Types 316L and 304 Austenitic Stainless Steels," *Joint HYDROGENIUS and I2CNER International Workshop*, Kyushu, Japan, February 4, 2015, pp. 124-133.
- Sofronis, P., Nagao, A., **Dadfarnia, M.**, Wang, S., Martin, M.L., Somerday, B.P., Ritchie, R.O., and Robertson, I.M., 2014, "Micromechanics of Hydrogen-Induced Fracture: From Experiments and Modelling to Prognosis," *The 4th International Symposium on Steel Science (ISSS 2014)*, Kyoto, Japan, Nov. 3-6, 2014, pp. 43-50.
- Nagao, A., Smith, C.D., Martin, M.L., **Dadfarnia, M.**, Sofronis, P., and Robertson, I.M., 2014, "The Role of Plasticity in Hydrogen Embrittlement Fracture of Lath Martensitic Steel," *The 4th International Symposium on Steel Science (ISSS 2014)*, Kyoto, Japan, Nov. 3-6, 2014, pp. 87-90.
- Nagao, A., Smith, C.D., **Dadfarnia, M.**, Sofronis, P., and Robertson, I.M., 2014, "Interpretation of Hydrogen-Induced Fracture Surface Morphologies for Lath Martensitic Steel," *Procedia Materials Science*, 20<sup>th</sup> European Conference on Fracture (ECF20), Trondheim, Norway, June 30-July 4, 2014, Vol. 3, pp. 1700-1705. (DOI: 10.1016/j.mspro.2014.06.274).
- Nagao, A., Eftink, B.P., **Dadfarnia, M.**, Somerday, B.P., and Sofronis, P., 2014, "The Effect of Nano-Sized TiC Precipitates on Hydrogen Embrittlement of Tempered Lath Martensitic Steel," *2012 International Hydrogen Conference: Hydrogen-Materials Interactions*, B. P. Somerday, and P. Sofronis, eds., ASME Press, New York, NY, Proceedings of the 2012 International Hydrogen Conference, Grand Teton National Park, Wyoming, September 9-12, 2012, pp. 127-135.
- Sofronis, P., **Dadfarnia, M.**, Novak, P., Yuan, R., Somerday, B.P., Robertson, I.M., Ritchie, R.O., Kanezaki, T., and Murakami, Y., 2009, "A Combined Applied Mechanics/Materials Science Approach Toward Quantifying the Role of Hydrogen on Material Degradation," *Proceedings of the 12<sup>th</sup> International Conference on Fracture*, Ottawa, Ontario, Canada, July 12-17, 2009.
- Dadfarnia, M.**, Sofronis, P., Somerday, B.P., Robertson, I.M., Liu, J.B., and Johnson, D.D., 2009, "Modeling Issues on Hydrogen-Induced Intergranular Cracking Under Sustained load," *Effect of Hydrogen on Materials*, B.P. Somerday, P. Sofronis, and R. Jones, eds., ASM International, Materials Park, OH, Proceedings of the 2008 International Hydrogen Conference, Grand Teton National Park, Wyoming, September 7-10, 2008, pp. 613-621.
- Dadfarnia, M.**, Sofronis, P., Somerday, B.P., and Robertson, I.M., 2009, "Effect of Remote Hydrogen Boundary Conditions on the Near Crack-Tip Hydrogen Concentration Profiles in a Cracked Pipeline: Fracture Toughness Assessment," *Materials Innovations in an Emerging Hydrogen Economy: Ceramic Transactions, Vol. 202*, G.

Wicks and J. Simons, eds., Proceedings of Materials Innovations in an Emerging Hydrogen Economy Conference, Cocoa Beach, Florida, February 24-27, 2008, pp. 187-200.

**Dadfarnia, M.**, Somerday, B.P., Moody, N.R., Sofronis, P., and Robertson, I.M., 2007, "A Combined Materials Science/Applied Mechanics Approach Toward Understanding the Role of Microstructure in Hydrogen Embrittlement of Materials," *Proceedings of the International Hydrogen Energy Development Forum*, Kyushu University, Fukuoka, Japan, February 1-2, 2007, pp. 58-67.

**Dadfarnia, M.**, Sofronis, P., Robertson, I., Somerday, B.P., Muralidharan, G., and Stalheim, D., 2007, "Micromechanics of Hydrogen Transport and Embrittlement in Pipeline Steel," *Proceedings of the Materials Division, the ASME Non-Destructive Evaluation Division and the ASME Pressure Vessels and Piping Division*, Proceedings of the 2006 International Mechanical Engineering Congress and Exposition (IMECE'06), Chicago, Illinois, November 5-10, 2006, pp. 741-750.

**Dadfarnia, M.**, Sofronis, P., Robertson, I.M., Somerday, B.P., Muralidharan, G., and Stalheim, D., 2007, "Numerical Simulation of Hydrogen Transport at a Crack Tip in a Pipeline steel," *Proceedings of the 6<sup>th</sup> ASME International Pipeline Conference, IPC 2006, Vol. 3A*, Calgary, Alberta, Canada, September 26-29, 2006, pp. 193-199.

**Dadfarnia, M.**, Dawson, D.M., and Jalili, N., 2003, "An Investigation of Damping Mechanisms in Translational Euler-Bernoulli Beams Using a Lyapunov-Based Stability Approach," *Proceedings of the ASME Dynamic Systems and Control Division*, Washington, DC, November 15-21, 2003, pp. 3-11.

Jalili, N., **Dadfarnia, M.**, and Dawson, D.M., 2003, "Distributed-Parameters Base Modeling and Vibration Analysis of Micro-Cantilevers Used in Atomic Force Microscopy," *Proceedings of the ASME Design Engineering Technical Conference, Vol. 5: 19<sup>th</sup> Biennial Conference on Mechanical Vibration and Noise*, Chicago, Illinois, September 2-6, 2003, pp. 1643-1651.

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