

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

Current Research Activities

- Studying high temperature hydrogen attack of steels
In collaboration with Prof. Sofronis (UIUC) and Prof. Kubota (Kyushu University)
- Understanding hydrogen effect on cyclic deformation
In collaboration with Prof. Sofronis, Dr. Somerday (UIUC), Prof. Kubota (Kyushu University), and Dr. Nagao
- Investigating effect of hydrogen on creep deformation
In collaboration with Prof. Sofronis, Dr. Somerday (UIUC), and Prof. Kubota (Kyushu University)
- Analyzing hydrogen embrittlement of steels in hydrogen gas with low CO concentration
In collaboration with Prof. Sofronis (UIUC), Profs. Kubota and Staykov (Kyushu University)
- Developing a microstructurally informed constitutive model for austenitic steels in the presence of hydrogen
In collaboration with Prof. Sofronis and Dr. Somerday (UIUC)
- Understanding oxygen electrode/electrolyte interface degradation in Solid oxide electrolysis cells
In collaboration with Prof. Sofronis (UIUC)

WPI Visiting Assistant Professor, I2CNER (Kyushu University)

Aug. 2020 – present

Research Scientist

May 2014 – Aug. 2018

Department of Mechanical Science and Engineering, University of Illinois

- Study of high temperature hydrogen attack in steels
- Administration of projects on hydrogen effects on mechanical properties of materials in Hydrogen Material Compatibility division in International Institute for Carbon Neutral Energy Research (I2CNER)

- Investigation of hydrogen embrittlement of a lath martensitic steel using statistical micromechanical modeling
- Study of 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) 2019SQ, 2020SQ
- Engineering Project I/II (MEGR5990/5991, graduate level) 2019SQ&FQ, 2020SQ&FQ
- Machine Elements I (MEGR3710, undergraduate) 2019WQ, 2020WQ
- Engineering Methods (MEGR2810, undergraduate) 2018FQ, 2019SQ, 2020SQ&FQ
- Machine Shop (MEGR1060, undergraduate) 2018FQ, 2019WQ&FQ, 2020WQ

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

- Kshitij Vijayvargia (Ph.D. student) Aug. 2019 – present
- Rupesh K. Mahendran (M.S. student) Aug. 2018 – Aug. 2020
- Zahra Hosseini (Ph.D. student) Aug. 2013 – May 2020
- 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, SolidWorks, 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/)

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)

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

- Worked with Japanese Standard in die design and drawing

Summer 1996

- Designed and manufactured a rail that allows a drilling machine to work at different positions

Internship at Iran Alloy Steel Company (www.iasco.ir)

Yazd, Iran

- Learned pneumatic, hydraulic circuits, and elements design and illustration

Summer 1995

- Evaluated the design and operation of cutting and rolling machines

PROFESIONAL SERVICE

Journal Reviewer

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

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
- 8th 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

PROFESSIONAL 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:

Sanders, J.W., **Dadfarnia, M.**, Sehitoglu, H., Stubbins, J., Sofronis, P., 2020, "On the Stress Field Ahead of a Stationary Crack Tip During the Transition from Primary to Secondary Creep," *International Journal of Solids and Structures*, 193-194, pp. 455-473. (DOI: 10.1016/j.ijsolstr.2020.02.040).

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:

Nan, Z., Komoda, R., Yamada, K., Volkert, C. A., Tian, L., Kirchheim, R., Sofronis, P., Hosseinsarani, Z., **Dadfarnia, M.**, Kubota, M., Staykov, A., "Effect of Ammonia Impurity on Hydrogen Embrittlement of SCM440 Low-Alloy Steel in Hydrogen Gas," *The 30th International Ocean and Polar Engineering Conference*, virtual, 11-16 October, 2020, ISOPE-I-20-4120.

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*, 20th 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 12th 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.

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