

HEIDI P. FEIGENBAUM

CURRICULUM VITAE

Professor and Associate Chair for Graduate Programs
Department of Mechanical Engineering
Northern Arizona University
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EDUCATION

Ph.D., Civil and Environmental Engineering, with emphasis in Engineering Mechanics, University of California at Davis, March 2008. GPA: 4.0/4.0.

Major Field of Study: Solid Mechanics

Minor Fields of Study: Applied Math and Fluid Dynamics

Master of Science, Civil and Environmental Engineering, with emphasis in Engineering Mechanics, University of California at Davis, June 2005. GPA: 4.0/4.0.

Major Field of Study: Solid Mechanics

Bachelor of Science, Civil Engineering, Cornell University, Ithaca, NY, May 2002. GPA: 3.3/4.0.

Concentration: Structural Engineering

Minor: Applied Math

APPOINTMENTS

Professor: Department of Mechanical Engineering, Northern Arizona University, 2019-present

Associate Chair for Graduate Programs: Department of Mechanical Engineering, Northern Arizona University, 2018-present

Associate Professor: Department of Mechanical Engineering, Northern Arizona University, 2014-present

Assistant Professor: Department of Mechanical Engineering, Northern Arizona University, 2008-2014

Lecturer: Department of Mechanical Engineering, Northern Arizona University, 2007-2008

Research Assistant: Department of Civil Engineering, University of California at Davis, 2003-2007

Associate Instructor: Department of Civil Engineering, University of California at Davis, 2007

Teaching Assistant: Department of Civil Engineering, University of California at Davis, 2003-2007

Reader: Department of Civil Engineering, University of California at Davis, 2003-2007

Facilities Engineer: Indian Health Service, Portland, OR, 2002-2003.

Undergraduate Researcher: Department of Civil Engineering, University of New Mexico, National Science Foundation Research Experience for Undergraduates (NSF-REU) program, 2001

Cooperative Learning Facilitator: Academic Excellence Workshops, Cornell University, 2000-2001.

JOURNAL PUBLICATIONS

Constantin Ciocanel, **Heidi P. Feigenbaum**, and Glen J. D'Silva, "On the Power and Efficiency of Ni₂MnGa Magnetic Shape Memory Alloy Energy Harvesters", *Smart Materials*

and Structures, in press.

Diego R. Higuera-Ruiz, Kiisa Nishikawa, **Heidi Feigenbaum**, Michael Shafer, "What is an artificial muscle? A comparison of soft actuators to biological muscles", *Bioinspiration & Biomimetics*, 17(1), 2021, <https://iopscience.iop.org/article/10.1088/1748-3190/ac3adf>

Mohammadreza Soltany Sadrabadi, Mona Eskandari, **Heidi P. Feigenbaum**, Amirhossein Arzani, "Local and global growth and remodeling in calcific aortic valve disease and aging" *Journal of Biomechanics*, in press, <https://doi.org/10.1016/j.jbiomech.2021.110773>

Diego R. Higuera-Ruiz, Michael W. Shafer, and **Heidi P. Feigenbaum** "Cavatappi Artificial Muscles", *Science Robotics*, 6, 53, 2021, <https://doi.org/10.1126/scirobotics.abd5383>

Jan Štefan, Slavomír Parma, René Marek, Jiri Plešek, Constantin Ciocanel and **Heidi Feigenbaum** "Overview of an Experimental Program for Development of Yield Surfaces Tracing Method" *Applied Sciences*, 11, 7606, 2021, <https://doi.org/10.3390/app11167606>

Diego R. Higuera-Ruiz, Charles J. Center, **Heidi P. Feigenbaum**, Amy M. Swartz and Michael W. Shafer, "Finite Element Analysis of Straight Twisted Polymer Actuators Using Precursor Properties", *Smart Materials and Structures*, 30, 20, 025005, 2021, <https://doi.org/10.1088/1361-665x/abcaad>

Diego R. Higuera-Ruiz, **Heidi P. Feigenbaum**, and Michael W. Shafer, "Moisture's significant impact on twisted polymer actuation", *Smart Materials and Structures*, 29, 12, 125009, 2020, <https://doi.org/10.1088/1361-665X/abc061>

D'silva, G. J., **Feigenbaum, H. P.**, Ciocanel, C., "Visualization of Magnetic Domains and Magnetization Vectors in Magnetic Shape Memory Alloys Under Magneto-Mechanical Loading" *Smart Materials and Structures*, 6, 67-88, 2020, <https://doi.org/10.1007/s40830-020-00262-6>.

Eberle, J. L., **Feigenbaum, H. P.**, Ciocanel, C., "Demagnetizing Field in Single Crystal Magnetic Shape Memory Alloys" *Smart Materials and Structures*, 28(2), 025022, 2019, <https://doi.org/10.1088/1361-665x/aaf20e>.

Swartz, A. M., Higuera Ruiz, D. R., **Feigenbaum, H. P.**, Shafer, M. W., and Browder, C., "Experimental characterization and model predictions for twisted polymer actuators in free torsion" *Smart Materials and Structures*, 27 (11), 114002, 2018, <http://stacks.iop.org/0964-1726/27/i=11/a=114002>.

Guiel, R. C., **Feigenbaum, H. P.**, and Ciocanel, C., "The effect of magnetic field orientation on the open-circuit voltage of Ni-Mn-Ga based power harvesters" *Smart Materials and Structures*, 27, 095006, 2018, <https://doi.org/10.1088/1361-665X/aacfd6>.

Parma, S., Plešek, J., Marek, R., Hruby, Z., **Feigenbaum, H. P.**, Dafalias, Y. F., "Calibration of a simple directional distortional hardening model for metal plasticity," *International Journal of Solids and Structures*, 143(15): 113-124, 2018, <https://doi.org/10.1016/j.ijsolstr.2018.02.037>.

Welling, C. A., Marek, R., **Feigenbaum, H. P.**, Dafalias, Y. F., Plešek, J., Hruby, Z., Parma,

S., "Numerical Convergence in Simulations of Multiaxial Ratcheting with Directional Distortional Hardening," *International Journal of Solids and Structures*, 126-127: 105-121, 2017, <https://doi.org/10.1016/j.ijsolstr.2017.07.032>.

Feigenbaum, H. P., Ciocanel, C., Eberle, J. L., and Dikes, J. L., "Experimental Characterization and Modeling of a Three-Variant Magnetic Shape Memory Alloy" *Smart Materials and Structures*, 25(10), 104004, 2016, <http://stacks.iop.org/0964-1726/25/i=10/a=104004>.

Marek, R., Plesek, J., Hruby, Z., Parma, S., **Feigenbaum, H.P.**, and Dafalias, Y.F., "Numerical Implementation of A Model With Directional Distortional Hardening," *ASCE Journal of Engineering Mechanics*, page 04015048, 2015, [https://doi.org/10.1061/\(ASCE\)EM.1943-7889.0000954](https://doi.org/10.1061/(ASCE)EM.1943-7889.0000954).

LaMaster, D.H., **Feigenbaum, H.P.**, Ciocanel, C., and Nelson, I.D., "A 3D Thermodynamic-Based Model for Magnetic Shape Memory Alloys," *Journal of Intelligent Material Systems and Structures*, 26(6):663-679, 2015, <https://doi.org/10.1177/1045389X14546655>.

Feigenbaum, H.P., and Dafalias Y. F., "Directional Distortional Hardening at Large Plastic Deformations," *International Journal of Solids and Structures*, 51(23-24): 3904-3918, 2014, <https://doi.org/10.1016/j.ijsolstr.2014.07.011>.

LaMaster, D.H., **Feigenbaum, H.P.**, Nelson, I.D., and Ciocanel, C., "A Full Two-Dimensional Thermodynamic-Based Model for Magnetic Shape Memory Alloys," *ASME Journal of Applied Mechanics*, 81: 061003, 2014, <https://doi.org/10.1115/1.4026483>.

Feigenbaum, H.P., Dugdale, J., Dafalias, Y.F., Kourousis, K.I., and Plesek, J., "Multiaxial ratcheting with advanced kinematic and directional distortional hardening rules," *International Journal of Solids and Structures*, 49(22): 3063-3076, 2012, <https://doi.org/10.1016/j.ijsolstr.2012.06.006>.

Waldauer, A.B., **Feigenbaum, H.P.**, Ciocanel, C. and Bruno, N., "Improved thermodynamic model for magnetic shape memory alloys," *Smart Materials and Structures*, 21(9): 094015, 2012, <https://doi.org/10.1088/0964-1726/21/9/094015>.

Bruno, N., Ciocanel C., **Feigenbaum H.P.**, and Waldauer, A.B., "A theoretical and experimental investigation of power harvesting using the NiMnGa martensite reorientation mechanism," *Smart Materials and Structures*, 21(9): 094018, 2012, <https://doi.org/10.1088/0964-1726/21/9/094018>.

Nelson I., Ciocanel, C. and **Feigenbaum, H.P.**, "Reorientation curves for a Ni₅₀Mn_{28.5}Ga_{21.5} alloy," In *5th International Conference Advanced Concepts in Mechanical Engineering ACME 2012*, Iasi, Romania, June 2012.

Dafalias, Y.F., and **Feigenbaum, H.P.**, "Biaxial Ratcheting with Novel Variations of Kinematic Hardening," *International Journal of Plasticity*, 27(4): 479-491, 2011, <https://doi.org/10.1016/j.ijplas.2010.06.002>.

Dafalias, Y.F., and **Feigenbaum, H.P.**, "Directional Distortional Hardening in Plasticity within Thermodynamics," *Recent Advances in Mechanics, Dedicated to the Late Professor P.S. Theocaris*, 61-78, 2011.

Bruno, N.M., Ciocanel, C., and **Feigenbaum, H.P.**, "Numerical Predictions and Experimental Validation of the Voltage Output Induced in a Coil by Dynamically Loaded NiMnGa Specimens," *Bulletin of Polytechnic Institute of Jassy*, Materials Science and Engineering Section, published by The Technical University "Gh. Asachi" of Jassy, Tome LVII (LXI), Fasc. 4, 9-19, 2011.

Waldauer, A.B., **Feigenbaum, H.P.** and Ciocanel, C., "Magnetic Shape Memory Alloys under Complex Load Paths," *Bulletin of the Polytechnic Institute of Jassy*, 60(4): 559-566, 2010.

Pleseck, J., **Feigenbaum, H. P.**, and Dafalias, Y.F., "Convexity of yield surfaces with directional distortional hardening," *ASCE Journal of Engineering Mechanics*, 136(4): 477-484, 2010, [https://doi.org/10.1061/\(ASCE\)EM.1943-7889.0000077](https://doi.org/10.1061/(ASCE)EM.1943-7889.0000077).

Ciocanel C., and **Feigenbaum, H.P.**, "Analysis of Geometry Effects on the Magneto-Mechanical Behavior of Magnetic Shape Memory Alloys," *Bulletin of Polytechnic Institute of Jassy*, 55(3): 149-156, 2009.

Feigenbaum, H.P., and Dafalias Y. F., "Simple Model for Directional Distortional Hardening in Metal Plasticity within Thermodynamics," *ASCE Journal of Engineering Mechanics*, 134 (9): 730-738, 2008, [https://doi.org/10.1061/\(ASCE\)0733-9399\(2008\)134:9\(730\)](https://doi.org/10.1061/(ASCE)0733-9399(2008)134:9(730)).

Feigenbaum, H. P., and Dafalias Y. F., "Directional distortion in metal plasticity within thermodynamics," *International Journal of Solids and Structures*, 44: 7526-7542, 2007, <https://doi.org/10.1016/j.ijsolstr.2007.04.025>.

BOOKS AND CHAPTERS

René Marek, Slavomír Parma, and **Heidi Feigenbaum**, "Distortional hardening cyclic plasticity: Experiments and Modeling" *Cyclic Plasticity of Metals*, edited by Hamid Jahed and Ali Roostaei, Elsevier, 2021.

CONFERENCE PUBLICATIONS

Eberle, J. L., **Feigenbaum, H. P.**, Ciocanel, C., "Magnetic Field within a Magnetic Shape Memory Alloy and an Equivalent Uniform Applied Magnetic Field for Model Input", *Proceedings of the ASME 2017 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Snowbird, UT, USA, September 2017, <https://doi.org/10.1115/SMASIS2017-3909>.

Shafer, M. W., **Feigenbaum, H. P.**, Ruiz, D. R. H., "A Novel Biomimetic Torsional Actuator Design Using Twisted Polymer Actuators," *Proceedings of the ASME 2017 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Snowbird, UT, USA, September 2017.

Shafer, M., **Feigenbaum, H.**, Pugh, D., and Fisher, M. "First Steps in Modeling Thermal Actuation of Twisted Polymer Actuators Using Virgin Material Properties" *Proceedings of the ASME 2016 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Stowe, VT, USA, September 2016, <https://doi.org/10.1115/SMASIS2016-9292>.

Dikes, J., **Feigenbaum, H.P.**, Ciocanel, C., and Guiel, R., "Experimental Investigation and Model Predictions of a NiMnGa Alloy's Response to Three Dimensional Magneto-

Mechanical Loading," *Proceedings of the ASME 2015 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Colorado Springs, CO, USA, September 2015, <https://doi.org/10.1115/SMASIS2015-9076>.

Guiel, R., Dikes, J., Ciocanel, C., and **Feigenbaum, H.P.**, "Further Insight on the Power Harvesting Capabilities of Magnetic Shape Memory Alloys," *Proceedings of the ASME 2015 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Colorado Springs, CO, USA, September 2015.

Dikes, J., **Feigenbaum, H.P.**, and Ciocanel, C., "An investigation of the material and model parameters for a constitutive model for MSMAs", *Proc. SPIE 9435, Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2015*, 943539, April 2015 (doi: 10.1117/12.2084359).

Dikes, J., **Feigenbaum, H.P.**, Ciocanel, C., and Nelson, I.D., "A constitutive model for magnetic shape memory alloys that includes a tilted magnetic easy axis," *Proceedings of the ASME 2014 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Newport, Rhode Island, USA, September 2014.

Dikes, J., **Feigenbaum, H.P.**, and Ciocanel, C., "Predictions of MSMA response under bi-axial mechanical loading," *Proceedings of the ASME 2014 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Newport, Rhode Island, USA, September 2014.

Nelson, I., Dikes, J., **Feigenbaum, H.P.**, and Ciocanel, C., "Numerical Predictions versus Experimental Findings on the Power Harvesting Output of a NiMnGa Alloy," *Proc. SPIE 9058, Behavior and Mechanics of Multifunctional Materials and Composites 2014*, 905815, March 2014 (doi:10.1117/12.2046337).

LaMaster, D., **Feigenbaum, H.P.**, Nelson, I., and Ciocanel, C., "A Memory Variable Approach to Modeling the Magneto-Mechanical Behavior of Magnetic Shape Memory Alloys" *Proceedings of the ASME 2013 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Snowbird, Utah, USA, September 2013.

Nelson, I., Ciocanel, C., LaMaster, D., and **Feigenbaum, H.P.**, "The impact of Boundary conditions on the Response of NiMnGa samples in actuation and power harvesting applications" *Proceedings of the ASME 2013 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Snowbird, Utah, USA, September 2013.

LaMaster, D., **Feigenbaum, H.P.**, Nelson, I., and Ciocanel, C., "Magnetization in MSMA : 2D modeling and experimental characterization," *Proceedings of SPIE - Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring International Symposium*, 8689, 1-11, 2013.

Nelson, I., Ciocanel, C., LaMaster, D., and **Feigenbaum, H.P.**, "Three Dimensional Experimental Characterization of a NiMnGa Alloy," *Proceedings of SPIE - Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring International Symposium*, 8689, 1-8, 2013 (doi:10.1117/12.2024874).

Pleseck, J., Hruby, Z., Parma, S., **Feigenbaum, H.P.**, Dafalias, Y.F., "Calibration of a distortional hardening model of plasticity." In *XI Comp. Struct. Technol.*, paper 264, Ed.

Topping, B.H.V., Civil-Comp Press, Kippen 2012, CD-ROM, pp. 1-11, September 2012.

Feigenbaum, H.P., Ciocanel, C. and Waldauer, A.B., "Predicting the magneto- mechanical behavior of MSMA's subject to complex load paths," In *Proceedings of the ASME 2012 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Stone Mountain, Georgia, USA, September 2012.

Ciocanel, C., and **Feigenbaum, H.P.**, "Experimental results for the behavior of MSMA's subjected to loads seen in power harvesting applications an complex loads," *Proceedings of SPIE - Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring International Symposium*, 8324, 1-8, 2012.

Waldauer, A.B., **Feigenbaum, H.P.** and Ciocanel, C., "Improvements to the Kiefer and Lagoudas Model for Prediction of the Magneto-Mechanical Behavior of Magnetic Shape Memory Alloys," *Proceedings of The Smart Materials, Adaptive Structures and Intelligent Systems Conference*, Phoenix, AZ, September 18-21, 2011.

Bruno, N.M., Ciocanel, C., **Feigenbaum, H.P.**, and Waldauer, A.B., "A Theoretical and Experimental Study on the Dynamic Response of NiMnGa Specimens for Energy Harvesting," *Proceedings of The Smart Materials, Adaptive Structures and Intelligent Systems Conference*, Phoenix, AZ, September 18-21, 2011.

Waldauer, A.B., **Feigenbaum, H.P.** and Ciocanel, C., "A Refined model for the magneto-mechanical behavior of magnetic shape memory alloys," *Proceedings of ASME Early Career Technical Conference*, Fayetteville, AR, March 31-April 2, 2011.

Bruno, N.M., Ciocanel, C. and **Feigenbaum, H.**, "Electromotive Force Generation using the Dynamic Response of Ni₅₀Mn_{28.5}Ga_{21.5} Magnetic Shape Memory Alloy," *Proceedings of SPIE - Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring International Symposium*, 7978, 1-11, 2011.

Denzine, G.M., **Feigenbaum, H.P.**, Hewes, J., Wang, E, Venkatraman, N. and Palmer, J., "'I Can Do It': Understanding and Measuring College Students' Engineering Self-Efficacy," *Turkey's Vision 2023 Conference Series, International Engineering Education Conference*, Anatalya, Turkey, November 2010.

Waldauer, A.B., **Feigenbaum, H.P.** and Ciocanel, C., "The Challenges of Modling Magnetic Shape Memory Alloys Under Complex Load Paths," *Proceedings of The Smart Materials, Adaptive Structures and Intelligent Systems Conference*, Philadelphia, PA, September 28-October 1, 2010.

Feigenbaum, H.P., and Ciocanel, C., "Experiments and Modeling of the Magneto-Mechanical Response of Magnetic Shape Memory Alloys" *Proceedings of the ASME 2009 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Oxnard, California, September 21-23, 2009.

Ciocanel, C., and **Feigenbaum, H.P.**, "A Preliminary Look at How the Geometry Influences the Magneto-Mechanical Behavior of Magnetic Shape Memory Alloys" *SPIE Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring 16th Annual International Symposium*, San Diego, CA, March 2009.

Feigenbaum, H.P., and Ciocanel, C., “Experiments and Modeling of Magnetic Shape Memory Alloys,” *International Workshop Smart Materials and Structures*, Montreal, Quebec, Canada, October 2009.

Malvick, E. J., Kutter, B. L., Boulanger, R. W., and **Feigenbaum, H. P.**, “Post-shaking failure of sand slope in centrifuge test,” *Proc. 11th International Conf. on Soil Dynamics & Earthquake Eng., & 3rd International Conf. on Earthquake Geotech. Eng.*, Berkeley, CA, January 2004.

ABSTRACTS, PRESENTATIONS and POSTERS

Diego Ricardo Higuera-Ruiz, Michael Shafer, **Heidi Feigenbaum**, “Cavatappi Artificial Muscles” *ASME’s Smart Materials, Adaptive Structures and Intelligent Systems Conference*, SMASIS 2021-68322, Virtual, Online, September 14-15, 2021.

R. Marek, **H. Feigenbaum**, J. Stefan, S. Parma, J. Plešek, “New geometry-based model of directional distortional hardening for multiaxial ratcheting predictions” *XVI International Conference on Computational Plasticity. Fundamentals and Applications*, Barcelona, Spain, September 7-9, 2021.

S. Parma, C. Ciocanel, J. Štefan, **H. Feigenbaum**, R. Marek, R. Halama, J. Plešek, “Experimental Investigation of Yield Surface Evolution and Strain Hardening of Boiler Steel under Biaxial Loading” *XVI International Conference on Computational Plasticity. Fundamentals and Applications*, Barcelona, Spain, September 7-9, 2021.

V. Klepac, S. Parma, R. Marek, **H. Feigenbaum**, J. Plešek, “FE Simulation of Ratcheting Using Advanced Kinematic Hardening Rules” *XVI International Conference on Computational Plasticity. Fundamentals and Applications*, Barcelona, Spain, September 7-9, 2021.

Diego Ricardo Higuera-Ruiz, Michael Shafer, **Heidi Feigenbaum**, “Moisture Driven Actuation in Twisted Polymers Actuators and Moisture Dependence of Thermal and Mechanical Properties Used to Predict Thermal Driven Actuation of Twisted Polymer Actuators” *ASME’s Smart Materials, Adaptive Structures and Intelligent Systems Conference*, SMASIS 2020-2228, Virtual, Online, September 15, 2020.

D’Silva, G., **Feigenbaum, H. P.**, and Ciocanel, C., “Visualization of Ni₂MnGa Alloy’s Magnetic Microstructure under Magneto-Mechanical Loading to Inform Constitutive Modeling Refinements”, *ASME’s Smart Materials, Adaptive Structures and Intelligent Systems Conference*, SMASIS2019-5719, Louisville, KY, September 2019.

Feigenbaum, H. P., Eberle, J. L., Ciocanel, C., and D’Silva, G. J. , “The Effect of Various Model Features on Predicting the Macro-Scale Magneto-Mechanical Behavior of Magnetic Shape Memory Alloys”, *International Conference on Ferromagnetic Shape Memory Alloys*, Prague, Czech Republic, June 2-7, 2019.

Feigenbaum, H. P., D’Silva, G. J., and Ciocanel, C., “Evolution of Magnetic Domains during Magneto-Mechanical Loading of Ni-Mn-Ga”, *International Conference on Ferromagnetic Shape Memory Alloys*, Prague, Czech Republic, June 2-7, 2019.

Feigenbaum, H. P., Eberle, J. L., Ciocanel, C., and D’Silva, G. J., “The Effect of Various Model features on Predicting the Macro-Scale Magneto-Mechanical Behavior of Magnetic

Shape Memory Alloys”, **invited talk**, International Union of Theoretical and Applied Mechanics (IUTAM) Symposium on Phase transformation in shape memory materials (SMAs): modeling and applications, Austin, TX, USA, April 28- May 2, 2019.

Eberle, J. L., **Feigenbaum, H. P.**, Ciocanel, C., and D’Silva, G. J., “Ni-Mn-Ga Constitutive Models – on the Effect of Thermodynamic Assumptions on Model Predictions”, *ASME’s Smart Materials, Adaptive Structures and Intelligent Systems Conference*, SMASIS2018-8109, San Antonio, TX, September 10-12, 2018.

D’Silva, G. J., Ciocanel, C., and **Feigenbaum, H. P.**, “On the effect of mechanical loading on the evolution of magnetic domains in Ni₂MnGa”, *ASME’s Smart Materials, Adaptive Structures and Intelligent Systems Conference*, SMASIS2018-8100, San Antonio, TX, September 10-12, 2018.

Eberle, J. L., **Feigenbaum, H. P.**, Ciocanel, C., “Insights on Constitutive Modeling of Magnetic Shape Memory Alloys”, *13th World Congress in Computational Mechanics*, New York, NY, USA, July 2018.

Feigenbaum, H. P., Welling, C. A., Marek, R., “Simulating Multiaxial Ratcheting Using Directional Distortional Hardening Models”, **invited talk**, *13th World Congress in Computational Mechanics*, New York, NY, USA, July 2018.

Feigenbaum, H. P., “Modeling the Mechanics of Active Materials: Twisted Polymer Actuators and Magnetic Shape Memory Alloys”, **invited talk**, Carnegie Mellon University, Mechanics Seminar, March 2018.

D’Silva, G., Ciocanel, C., **Feigenbaum, H. P.**, “Real-time Mapping of the Effect of Mechanical Stress on Magnetic Domains Evolution in Ni₂MnGa”, *2018 Smart Structures and Nondestructive Evaluation Conference*, Denver, CO, March 2018.

Eberle, J. L., **Feigenbaum, H. P.**, and Ciocanel, C., “Three-Variant Magnetic Shape Memory Alloys,” poster presented at the *Northern Arizona Planetary Science Alliance (NAPSA)*, Flagstaff, AZ, September 2017.

Guiel, R., Ciocanel, C., and **Feigenbaum, H. P.**, “An overview of Power Harvesting with Ni₂MnGa Magnetic Shape Memory Alloys,” *ASME 2017 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Snowbird, UT, USA, September 2017.

Ciocanel, C., **Feigenbaum, H. P.**, “On the Orientation of the Magnetic Field for Maximization of the Voltage Output with Magnetic Shape Memory Alloys,” **invited talk** at the *International Conference on Martensitic Transformations*, Chicago, IL, USA, July 2017.

Feigenbaum, H. P., Ciocanel, C., Eberle, J. L., “Three-Variant Magnetic Shape Memory Alloys,” poster presented at the *International Conference on Martensitic Transformations*, Chicago, IL, USA, July 2017.

Guiel, R., Ciocanel, C., and **Feigenbaum, H. P.**, “Optimal orientation of the magnetic field for maximum power harvesting output from a magnetic shape memory alloy,” *ASME 2016 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Stowe, VT, USA, September 2016.

Feigenbaum, H. P., Ciocanel, C., Eberle, J. L., and Dikes, J., "Experimental Characterization and Modeling of a Three-Variant Magnetic Shape Memory Alloy," *ASME 2016 Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, Stowe, VT, USA, September 2016.

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Feigenbaum, H. P., Shafer, M. W., Pugh, D. and Fisher, M., "The Mechanics of Biomimetic Polymer Artificial Muscles," *Engineering Mechanics Institute Conference 2016 & Probabilistic Mechanics & Reliability Conference 2016*, Nashville, TN, USA, May 22-25, 2016.

Guiel, R., Ciocanel, C., and **Feigenbaum, H. P.**, "Investigation on the effect of bi-axial bias magnetic field on the voltage output of a MSMA based power harvester", *Proceedings of SPIE - Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring International Symposium*, 9800, Las Vegas, NV, USA, March 20-24, 2016.

Feigenbaum, H. P., and Dafalias, Y. F., "Directional Distortional Hardening at Large Plastic Deformations," *4th International Conference on Material Modeling*, Berkeley, California, USA, May 27-29, 2015.

Feigenbaum, H. P., LaMaster, D., and Ciocanel, C., "A Thermodynamics-Based 3D Model for the Magneto-Mechanical Behavior of Magnetic Shape Memory Alloys," *4th International Conference on Material Modeling*, Berkeley, California, USA, May 27-29, 2015.

Parma, S., Hrubý, Z., Marek, R., Plešek, J., **Feigenbaum, H. P.**, and Dafalias, Y. F., "Identification of Parameters of a Directional Distortional Hardening Model," *4th International Conference on Material Modeling*, Berkeley, California, USA, May 27-29, 2015.

Hrubý, Z., Plešek, J., Parma, S., Marek, R., Stepanek, I., Prevorovsky, Z., Korec, L., **Feigenbaum, H. P.**, and Dafalias, Y. F., "Influence of the Yield Offset Definition on Calibration and Numerical Implementation of Directional Distortional Hardening Model," *4th International Conference on Material Modeling*, Berkeley, California, USA, May 27-29, 2015.

Plešek, J., Marek, R., Hrubý, Z., Parma, S., **Feigenbaum, H. P.**, and Dafalias, Y. F., "Implementation of Directional Distortional Hardening Models for Metal Plasticity," *4th International Conference on Material Modeling*, Berkeley, California, USA, May 27-29, 2015.

Marek, R., Plešek, J., Hrubý, Z., Parma, S., **Feigenbaum, H. P.**, and Dafalias, Y. F., "Study of Benefits and Limitations Linked to Implementation of Directional Distortional Hardening Models," *4th International Conference on Material Modeling*, Berkeley, California, USA, May 27-29, 2015.

LaMaster, D., **Feigenbaum, H.P.**, Nelson, I., Ciocanel, C. and Nelson, I. "A full 2D thermodynamics based model for magnetic shape memory alloys," *17th U.S. National Congress on Theoretical and Applied Mechanics Michigan State University*, June 15-20, 2014.

LaMaster, D., **Feigenbaum, H.P.**, Kiefer, B., Ciocanel, C. and Nelson, I. "Thermodynamic-Based Model for Magnetic Shape Memory Alloys with Modified Magnetic Domains," *Fourth International Conference on Ferromagnetic Shape Memory Alloys*, Boise, ID, USA, June 3-7, 2013.

LaMaster, D. and **Feigenbaum, H.P.**, "Characterization of Magnetic Shape Memory Alloys in 3 Dimensions," Undergraduate Research and Design Symposium, 19th Annual, Northern Arizona University, College of Engineering, Forestry and Natural Sciences, Flagstaff, AZ, April 2012.

Pleseck, J., Hruby, Z., **Feigenbaum, H.P.** and Dafalias, Y.F., "Parameter Fitting for a Class of Models with Directional Distortional Hardening," In E. Onate, D. Owen, D. Peric and B Suarez (Eds.) *Proceedings from COMPLAS XI: XI International Conference on Computational Plasticity Fundamentals and Applications*, Barcelona, Spain, September 7-9, 2011.

Waldauer, A.B., **Feigenbaum, H.P.** and Ciocanel, C., "Modeling the Magneto-Mechanical Behavior of Magnetic Shape Memory Alloys Under Complex Loading," *Applied Mechanics and Materials Conference*, Chicago, IL, May 30-June 1, 2011.

Dafalias, Y.F., and **Feigenbaum, H.P.**, "Biaxial Ratchetting with Novel Variations of Kinematic Hardening Models," *16th US National Congress of Theoretical Applied Mechanics*, State College, PA, July 2010.

Waldauer, A.B., **Feigenbaum, H.P.**, and Ciocanel, C., "Simulation of Magnetic Shape Memory Alloy Behavior under Complex Load Paths," *16th US National Congress of Theoretical Applied Mechanics*, State College, PA, July 2010.

Feigenbaum, H.P., Plesek, J., and Dafalias, Y.F., "A Simple Model for Directional Distortional Hardening in Metal Plasticity with a Convex Yield Surface," *16th US National Congress of Theoretical Applied Mechanics*, State College, PA, July 2010.

Denzine, G.M., Palmer, J., Venkatraman, N., and Feigenbaum H.P., "College Students' Self-Efficacy in Mechanical Engineering, Electrical Engineering, and Computer Science," *Northern Arizona University Assessment Fair*, Flagstaff, AZ, April 2010.

Pleseck, J., **Feigenbaum, H.P.**, and Dafalias, Y.F., "Convexity and numerical integration of metal plasticity models with directional distortional hardening," *10th US National Congress on Computation Mechanics*, Columbus, OH, July 2009.

Feigenbaum, H.P., Plesek, J., and Dafalias, Y.F., "A Simple Model for Directional Distortional Hardening in Metal Plasticity with a Convex Yield Surface," *22nd Canadian Congress of Applied Mechanics*, Halifax, NS, Canada, June 2009.

Feigenbaum, H.P., and Ciocanel, C., "Experiments and Modeling of Magnetic Shape Memory Alloys," *22nd Canadian Congress of Applied Mechanics*, Halifax, NS, Canada, June 2009.

Feigenbaum, H.P., and Dafalias, Y.F., "A Directional Distortional Hardening Model based on Thermodynamics and its Applications to Cyclic Plasticity," *First American Academy of Mechanics*, New Orleans, LA, June 2008.

Feigenbaum, H.P., and Dafalias, Y.F., "A simple model for directional distortional hardening in metal plasticity within thermodynamics," *14th International Symposium on Plasticity*, Kailua-Kona, HI, January 2008.

Feigenbaum, H.P., and Dafalias, Y.F., "Cyclic plasticity simulated by a thermodynamically based directional distortional hardening model," *ASME Applied Mechanics and Materials Conference*, Austin, TX, June 2007.

Feigenbaum, H.P., and Dafalias, Y.F., "Thermodynamically based directional distortion in plasticity," *15th National Congress on Theoretical and Applied Mechanics, keynote lecture*, Boulder, CO, June 2006.

Feigenbaum, H.P., "The effects of liquefaction induced void redistribution on hydraulic fill dams," poster presented at EERI Annual Meeting, Los Angeles, CA, February 2004.

FUNDED GRANTS

Principal investigator, "Modeling the Mechanics of Multiaxial Ratcheting," Army Research Office, \$544,758, February 2019-January 2022.

Principal investigator, "Initial Data Collection for Structural-Mechanical Modeling of Biomimetic Twisted Polymer Actuators," Research and Development Grants, \$25,000, July 2017-June 2018.

Principal investigator, "Power Harvesting with Magnetic Shape Memory Alloys: Understanding the Mechanisms and Predicting Voltage Output," National Science Foundation, \$400,000, May 2016-April 2021.

Principal investigator, "Predicting Ratcheting with Directional Distortional Hardening," Lucking Family Faculty Award, \$5,426, July 2014-May 2015.

Co-principal investigator, "Three-Dimensional Modeling of Magnetic Shape Memory Alloys," National Science Foundation, \$332,453, September 2011-August 2014 (amount to Dr. Feigenbaum ~50% of the total).

Principal investigator, "Computational Models in Phenomenological Plasticity," National Science Foundation, International Research and Education: Planning Visits, \$19,118, September 2010-August 2012.

Principal investigator, "Plasticity Models", Northern Arizona University, Faculty Grants Program, \$8,490, July 2010-June 2011.

Co-principal investigator, "Acquisition of a Multi-axial Dynamic Testing System for Characterization of Novel Materials and Systems," National Science Foundation, Major Research Instrumentation Program, \$270,208, August 2009-July 2012 (100% of funds towards instrumentation).

Co-principal investigator, "Characterization of Magnetic Shape Memory Alloys for Power Harvesting Applications," Northern Arizona University, Intramural Grant Program, \$16,000, July 2008-June 2009 (amount to Dr. Feigenbaum ~50% of the total).

PATENTS

Title, "Novel Artificial Muscle Mechanical Actuator," Inventors: Michael Shafer, Heidi Feigenbaum, Diego Higuera Ruiz. Provisional applications, 2020.

SERVICE

- *Commission on the Status of Women*: Northern Arizona University
 - *Co-chair*: 2015-2017.
 - *Commissioner*: 2010-present
- *International Conference Organizing Committee*:
 - International Conference on Ferromagnetic Shape Memory Alloys (ICFSMA), 2016-present
- *Active and Multifunctional Materials Technical Committee Member*: Fall 2014 - present
- *Search Committee Chair*:
 - ME tenured or tenure-track biomechanics position, Spring 2017
- *Search Committee Member*:
 - Tenure-track faculty: 2021(x2), 2020, 2017, 2016
 - Lecturer: 2014, 2012
 - Instructor: 2013
 - Staff: 2019, 2021
- *Upward Bound – Engineering Panel*: Northern Arizona University, 2017.
- *Best Student Paper Competition for Smart Materials, Adaptive Structures and Intelligent Systems Conference*
 - *Chair*: 2015-2016
 - *Co-Chair*: 2013-2014
 - *Reviewer*: 2010-2013, 2017
- *NSF Panel Reviewer*: National Science Foundation, Spring 2014, Spring 2016, Fall 2017, Fall 2018, Fall 2019.
- *College Based Learning Communities Faculty Liaison*: Northern Arizona University, 2013-2016.
- *Residential Learning Communities Faculty Liaison*: Northern Arizona University, 2008-2015.
- *College Curriculum Committee*: Northern Arizona University, 2007-2013.
- *Conference Session chair, co-chair, or co-organizer*: Chaired, co-chaired, or co-organized sessions at the following conferences:
 - *6th International Conference on Ferromagnetic Shape Memory Alloys*, Prague, Czech Republic, June 2-7, 2019
 - *International Conference on Martensitic Transformations*, Chicago, IL, July 9-14, 2017
 - *Smart Materials, Adaptive Structures and Intelligent Systems Conference*, Stowe, VT, September 27-30, 2016
 - *Smart Materials, Adaptive Structures and Intelligent Systems Conference*, Colorado Springs, CO, September 21-23, 2015
 - *Smart Materials, Adaptive Structures and Intelligent Systems Conference*, Snowbird, UT, September 16-18, 2013
 - *17th US National Congress of Theoretical Applied Mechanics*, East Lansing, MI, June 2014
 - *Smart Materials, Adaptive Structures and Intelligent Systems Conference*, Philadelphia, PA, September 28-October 1, 2010
 - *16th US National Congress of Theoretical Applied Mechanics*, State College, PA, July 2010
 - *First American Academy of Mechanics*, New Orleans, LA, June 2008

- **Reviewer:** Reviewed articles for journals, including, but not limited to:
 - *Science Robotics,*
 - *International Journal of Plasticity,*
 - *Smart Materials and Structures,*
 - *Internal Journal of Solids and Structures,*
 - *Journal of Intelligent Material Systems and Structures,*
 - *Journal of Engineering Mechanics,*
 - *Sensors and Actuators,*
 - *European Journal of Mechanics / A Solids,*
 - *International Journal of Mechanical Sciences,*
 - *Advanced Engineering Materials,*
 - *Mechanics Research Communications*
- **Search Committee Member:**
 - ME tenured or tenure-track biomechanics position, Spring 2016
 - ME lecturer, Spring 2014
 - ME instructor, Spring 2013
 - ME lecturer, Spring 2012
- *Girls in Science Summer Day Camp:* Northern Arizona University, July 2008.
- *Summer Technology & Engineering Program and University Preview:* Northern Arizona University, July 2008.
- *Junkyard Generator Competition:* Northern Arizona University, February 2008.
- **Mentor:**
 - Diversity in Engineering Leadership, University of California at Davis, Spring 2007.
 - Women's Engineering Link, University of California at Davis, Spring 2005 and Spring 2006. Association for Retarded Citizens (ARC) of Multnomah County, October 2002-May 2003.

HONORS AND AWARDS

- NAU's nominee for the 2020 Blavatnik Award for Young Scientists
- Nominated for the Sia Nemat-Nasser Early Career Medal from ASME Materials Division.
- Honorable mention for Zuhair A. Munir Award for the Best Doctoral Dissertation of the 2007-2008 academic year.
- UC Davis Dissertation Year Fellowship.
- Travel Award from the Consortium for Women in Research.
- Student Travel Award from National Congress on Theoretical and Applied Mechanics.
- 2004 Summer Research Award from the Office of Graduate Studies at UC Davis.
- Chi Epsilon, Civil Engineering Honors Society.
- National Society of College Scholars.

PROFESSIONAL SOCIETY MEMBERSHIPS

- Member of American Society of Engineering Educators (ASEE).
- Member of American Society of Mechanical Engineers (ASME).
- Member of MSMNet

STUDENTS ADVISED

- Shreya Shipad-Kaduskar: PhD expected 2023
- Nana Kwame Okwae: MEng 2022
- Md Esharuzzaman Emu: MS 2020
- Charles Center: MS 2020
- J. Lance Eberle: MS 2018

- Christine Welling: MS 2016
- Doug LaMaster: MS 2014
- Joel Dugdale: MS 2012
- Alex Waldauer: MS 2011

STUDENTS CO-ADVISED

- Glen Dsilva: MS 2019, PhD expected 2023
- Amy Swartz: MS May 2019
- Diego Higuera Ruiz: MS 2018
- Roger Guiel: MS 2017
- Jason Dikes: MS 2015
- Isaac Nelson: MS 2014
- Nick Bruno: MS 2011