

Primary Fields of Profession and Research

Materials Science, Mechanical Engineering, Mechanics.

Education

- Doctor of Philosophy. Materials Science and Engineering [2014]
The Ohio State University, Columbus, OH, USA.
Dissertation: *Modeling of Shape Memory Alloys: Phase Transformation/Plasticity Interaction at the Nano Scale and the Statistics of Variation in Pseudoelastic Performance.*
Dissertation advisors: Prof. Peter M. Anderson, Prof. Michael J. Mills, Prof. Yunzhi Wang.
- Master of Science. Materials Science and Engineering [2012]
The Ohio State University, Columbus, OH, USA.
- Bachelor of Technology. Metallurgical Engineering and Materials Science [2009]
Indian Institute of Technology Bombay, Mumbai, India

Professional Experience

- Research Engineer, Senior Staff [2017-present]
In Research & Development Department at Confluent Medical, Fremont, CA.
- Post-doctoral Scholar [2014-2017]
In Mechanical Engineering at Colorado School of Mines, Golden, CO.
- Post-doctoral Scholar [2014-2016]
In Mechanical Engineering at Northwestern University, Evanston, IL.

Teaching Experience

- Instructor: MEGN 517: Inelastic Constitutive Relations [Spring 2016]
Colorado School of Mines.
Developed new course curriculum to introduce graduate students to the mechanics of inelastic deformation and related experimental methods.
- Co-instructor: MEGN 510: Solid Mechanics of Materials [Autumn 2016]
Colorado School of Mines.

Awards

- Northwestern University postdoctoral travel award [2016]
- Best Student Poster Award, The Ohio State University Materials Week. [2011]

Professional Service

- Dissertation committee service:
 - Partha P. Paul, Doctor of Philosophy, August 1, 2018, Northwestern University.
- Professional society memberships: ASTM, TMS, MRS, ASME.
- Reviewer for scientific journals and national user facilities:
 - Acta Materialia
 - Scripta Materialia
 - Experimental Mechanics
 - Metallurgical and Materials Transactions A
 - Computational Materials Science
 - International Journal of Mechanical Sciences
 - Journal of Intelligent Materials Systems and Structures
 - Construction & Building Materials
 - Shape Memory and Superelasticity
 - Cornell High-energy Synchrotron Source (CHESS)
- Technical conference symposium and session organization:
 - Conference symposium organizer: *Mechanics of Shape Memory Materials- Modeling Meets Experiment*. Shape Memory and Superelastic Technologies (SMST) 2017.
 - Conference session chair: *Plasticity Transformations Interactions*. International Conference on Martensitic Transformations (ICOMAT) 2017.

Peer-reviewed Journal Publications

Google Scholar: <https://scholar.google.com/citations?user=KV6uE6UAAAAJ&hl=en>

Total Publications: 18, Invited publications: 2.

1. Paul P.P., Paranjape H. M., Amin-Ahmadi B., Pagan D. C., Chumlyakov Y. I., Brinson L. C. (2020). Heterogeneity and Inelasticity of Deformation in a Notched Martensitic NiTi Shape Memory Alloy Specimen, *Acta Materialia*.
2. Stern J.R., Cheng C.P., Colvard B.D., Paranjape H.M., Lee J.T. (In-press). The Triple-Wire Technique for Delivery of Endovascular Components in Difficult Anatomy. *Annals of Vascular Surgery*.
3. Paranjape H.M., Ng B., Ong I., Vien L., Huntley H. (2020). Transformation Volume Amplitude as a Low-cycle Fatigue Indicator in Nickel-Titanium Shape Memory Alloys. *Scripta Materialia*.
4. Paul P.P., Paranjape H.M., Tamura N., Chumlyakov Y., Brinson L. C. (2019). In-situ, microscale characterization of heterogeneous deformation around notch in martensitic Shape Memory Alloy, *Materials Science and Engineering A*.
5. Senthilnathan K., Shamimi A., Bonsignore C., Paranjape H.M., Duerig T. (2019). Effect of Prestrain on the Fatigue life of Superelastic Nitinol. *Journal of Materials Engineering and Performance*.
6. Paul P.P., Fortman M., Paranjape H.M., Anderson P. M., Stebner A. P., Brinson L. C. (2018). Influence of Structure and Microstructure on Deformation Localization and Crack Growth in NiTi Shape Memory Alloys. *Shape Memory and Superelasticity*. Special Issue: A Tribute to Prof. Jan Van Humbeeck – A Lifetime of Contributions to Understanding Martensite, Invited Paper.

7. Paranjape H. M., Stebner A. P., Bhattacharya K. (2018). A Macroscopic Strain-Space Model of Anisotropic, Cyclic Plasticity with Hardening. *International Journal of Mechanical Sciences*. Special Issue in honor of Romesh Batra's 70th birthday. Invited Paper.
8. Paranjape H. M., Paul P., Amin-Ahmadi B., Sharma H., Dale D., Ko J. Y. P., Chumlyakov Y. I., Brinson L. C., Stebner A. P. (2018). In situ, 3D characterization of the deformation mechanics of a superelastic NiTi shape memory alloy single crystal under multiscale constraint. *Acta Materialia*.
9. Paul P., Paranjape H. M., Amin-Ahmadi B., Dunand D. C., Stebner A. P., Brinson L. C. (2017). Effect of Machined Feature Size Relative to the Microstructural Size on the Superelastic Performance in Polycrystalline NiTi Shape Memory Alloys. *Materials Science and Engineering A*.
10. Paranjape H. M., Bowers M. L., Mills M. J., Anderson P. M. (2017). Mechanisms for Phase Transformation Induced Slip in Shape Memory Alloy Micro-crystals. *Acta Materialia*.
11. Paranjape H. M., Paul P., Sharma H., Kenesei P., Park J-S., Brinson L. C., Stebner A. P. (2017). The Influence of Granular Constraints and Surface Effects on the Mechanical Response of Shape Memory Alloys. *Journal of the Mechanics and Physics of Solids*.
12. Paranjape H. M., Manchiraju S., Anderson P. M. (2016). A Phase Field/Finite Element Approach to Model Coupled Phase Transformation and Plasticity in Shape Memory Alloys, *International Journal of Plasticity*.
13. Bucsek A. N., Paranjape H. M., Stebner A. P. (2016). Myths and Truths of Nitinol Mechanics: Elasticity and Tension–Compression Asymmetry. *Shape Memory and Superelasticity*.
14. Stebner A. P., Paranjape H. M., Clausen B., Brinson L. C., Pelton A. R. (2015). In-Situ Neutron Diffraction Studies of Large Monotonic Deformations of Superelastic Nitinol, *Shape Memory and Superelasticity*.
15. Paranjape H. M., Anderson P. M. (2014). Texture and Grain Neighborhood Effects on Ni-Ti Shape Memory Alloy Performance, *Modeling and Simulation in Materials Science and Engineering*.
16. Ebersole G. C., Paranjape H. M., Anderson P. M., Powell H. M. (2012). Influence of hydration on fiber geometry in electrospun scaffolds. *Acta Biomaterialia*.
17. Raveendra S., Kanjarla A., Paranjape H. M., Mishra S., Delannay L., Samajdar I., Van Houtte P. (2011). Strain Mode Dependence of Deformation Texture Developments: Microstructural Origin. *Metallurgical and Materials Transactions A*.
18. Raveendra S., Paranjape H. M., Mishra S., Weiland H., Doherty R. D., Samajdar I. (2009). Relative Stability of Deformed Cube in Warm and Hot Deformed AA6022: Possible Role of Strain-Induced Boundary Migration. *Metallurgical and Materials Transactions A*.

Presentations and Posters at Peer-Reviewed Symposia/Conferences

Invited talks and symposia: 6

1. Paranjape H.M., *A Microstructural Mechanism for Low-cycle Fatigue in NiTi Shape Memory Alloy*. TMS Annual Meeting, San Diego, CA. February 24, 2020.

2. Paranjape H.M., *A Test Method Proposal for the Calibration and Uncertainty Quantification of Nitinol Material Properties in Finite Element Models*. ASTM International Workshop on Medical Device Standards Utilizing Computational Modeling, Houston, TX. November 5, 2019.
3. Paranjape H. M. *Relation between Strain Localization Front Movement and Fatigue Lifetime in NiTi Shape Memory Alloys*. Shape Memory and Superelastic Technology Conference and Exposition (SMST 2019), Konstanz, Germany. May 16, 2019.
4. Paranjape H. M., Duerig T. W. *Recent Findings on the Effect of Aging under Stress on Springback and Transformation Behavior of NiTi Shape Memory Alloys*. Shape Memory and Superelastic Technology Conference and Exposition (SMST 2019), Konstanz, Germany. May 16, 2019.
5. Paranjape H. M., Bonsignore C., Shamimi A., Duerig T. *Present and Future of Nitinol Constitutive Modeling*. Office of Science and Engineering Laboratories, U.S. Food & Drug Administration, Silver Springs, MD. December 11, 2018. Invited.
6. Paranjape H. M., Paul P. P., Stebner A. P. *In-situ Characterization of Grain-scale Deformation Mechanics in Shape Memory Alloys using High-energy X-ray Diffraction Microscopy*. 18th International Conference on the Strength of Materials (ICSMA), Columbus, OH. July 16, 2018. Invited.
7. Paranjape H. M., Stebner A. P., Bhattacharya K. *A Robust Macroscopic Finite Element Model Implementation for Coupled Phase Transformation and Plastic Deformation in Shape Memory Alloys*. Confluent Medical, Fremont, CA. August 27, 2017. Invited.
8. Paranjape H. M., Stebner A. P., Bhattacharya K. *A Robust Macroscopic Finite Element Model Implementation for Coupled Phase Transformation and Plastic Deformation in Shape Memory Alloys*. Cardiac and Vascular Group at Medtronic Inc, Minneapolis, MN. July 2017. Invited.
9. Paranjape H. M., Bucsek A. N., Kappes B., Sharma H., Bernier J. V., Dale D., Ko P., Anderson P. M., Stebner A. P. *Predictive Characterization of the Inelastic Deformation in NiTi Shape Memory Alloys at the Microstructural Length-scales*. International Conference on Martensitic Transformation (ICOMAT 2017), Chicago, IL, July, 9-14, 2017. Invited.
10. Paranjape H. M., Stebner A. P., Bhattacharya K. *A Robust Macroscopic Finite Element Model Implementation for Coupled Phase Transformation and Plastic Deformation in Shape Memory Alloys*. Shape Memory and Superelastic Technology Meeting, San Diego, CA. May 15-19, 2017.
11. Paranjape H. M. *Predictive Characterization of the Inelastic Deformation in Shape Memory Alloys at the Microstructural Length-scales*. University of Buffalo. Buffalo, NY. March 17, 2017. Invited.
12. Paranjape H. M., Paul P. P., Sharma H., Park J. S., Kenesei P., Stebner A. P., Brinson L. C. *Role of Granular Constraint and Surface Effects on the Phase Transformation Mechanics in Shape Memory Alloys*. TMS 2017 Annual Meeting, San Diego, CA. February 26-March 2, 2017.
13. Paranjape H. M., Bucsek A. N., Kappes B., Bernier J. V., Dale D., Stebner A. P., Brinson L. C. *An Integrated High-energy X-ray Diffraction and Forward Modeling Approach to Characterize Deformation and Microstructure Evolution in Shape Memory Alloys*. MRS Fall 2016 Meeting, Boston, MA, November 27-December 1, 2016.

14. Paul P. P., Paranjape H. M., Stebner A. P., Dunand D. C., Anderson P. M., Brinson L. C.. *The Role of Microstructural and Structural Constraints in Determining Local Superelastic Response in Planar Shape Memory Alloy Specimens with Micro-holes*. MRS Fall 2016 Meeting, Boston, MA, November 27-December 1, 2016.
15. Paranjape H. M., Mabe J. M., Calkins F. T., Bhattacharya K., Stebner A. P.. *A Robust Finite Element Model Implementation for Multi-axial Mechanical Response in Shape Memory Alloys*. ASME SMASIS 2016, Stowe, VT, September 28-30, 2016.
16. Paranjape H. M., Paul P. P., Park J. S., Sharma H., Dunand D. C., Stebner A. P., Brinson L. C.. *Constraint Effects on the Grain-scale Transformation Kinematics of Shape Memory Alloys Studied using High Energy Diffraction Microscopy*. TMS 3D Materials Science Congress, St. Charles, IL, July 10-13, 2016.
17. Paranjape H. M., Paul P. P., Park J. S., Sharma H., Dunand D. C., Stebner A. P., Brinson L. C.. *Constraint Effects on the Grain Scale Deformation in Shape Memory Alloys (Poster)*. Midwest Mechanics Seminar, Evanston, IL, June 15, 2016.
18. Paranjape H. M., Bucsek A., Paul P. P., Park J. S., Sharma H., Dale D., Stebner A. P., Dunand D., Brinson L. C., *A Grain Scale Analysis of Phase Transformation in Shape Memory Alloys – A Coupled Synchrotron X-ray Diffraction and Micromechanical Modeling Study*, ESOMAT 2015, Antwerp, Belgium, September 13-17, 2015
19. Paranjape H. M., Park J-S., Sharma H., Stebner A. P., Brinson L. C., *Effect of Granular Constraints on Phase Transformation in Shape Memory Alloys – A Coupled Synchrotron X-ray Diffraction and Micromechanical Modeling Study*, Denver X-ray Conference, Denver CO, August 6, 2015.
20. Paranjape H. M., Anderson P. M., *A Phase Field/Finite Element Approach to Model Phase Transformation and Plasticity in Shape Memory Alloys*, US National Congress on Theoretical and Applied Mechanics, East Lansing, MI, June 17, 2014
21. Paranjape H. M., Anderson P. M., *A Phase Field/Finite Element Approach to Model Coupled Phase Transformation and Plasticity in Shape Memory Alloys*, Shape Memory Science and Technology Annual Meeting, Monterey, CA, May 16-20, 2014.
22. Paranjape H. M., Manchiraju S., Anderson P. M., *A Phase Field/Finite Element Model to Simulate Plasticity and Martensitic Phase Transformation in Shape Memory Alloys*, TMS Annual Meeting, San Diego CA, February 16-20, 2014.
23. Paranjape H. M., Anderson P. M., *A Phase Field/Finite Element Model to Simulate Martensitic Phase Transformation in Shape Memory Alloys*, Physical Metallurgy Gordon Research Conference, Biddeford ME, July 28-August 3, 2013.
24. Paranjape H. M., Manchiraju S., Gao Y., Wang Y., Anderson P. M., *A Finite Element/Phase Field Approach to Study Martensitic Phase Transformation in Shape Memory Alloys*, TMS Annual Meeting, San Antonio TX, March 3-7, 2013.
25. Paranjape H. M., Anderson P. M., *Effect of Grain Neighborhood on Pseudoelastic Performance of Polycrystalline Shape Memory Alloys*. TMS Annual Meeting, Orlando, FL, March, 11-15, 2012.

26. Paranjape H. M., Anderson P. M., *Plasticity Enhanced Martensitic Transformation in NiTi Shape Memory Alloys*, TMS Annual Meeting, San Diego, CA, February 27, March 3, 2011.

Preprints and Non Peer-Reviewed Contributions

1. Aycock K., Weaver J.D., Paranjape H.M., Senthilnathan K., Bonsignore C., Craven B.A. (2020). Full-Field Microscale Strain Measurements of a Nitinol Medical Device Using Digital Image Correlation. *engrXiv preprint*. <https://doi.org/10.31224/osf.io/a3twm>
2. Paranjape H.M., Aycock K.I., Bonsignore B., Weaver J.D., Craven B.A., Duerig T.W. (2019). A Method for Superelastic Constitutive Properties Calibration Using Full-field Surface Strain Data. *engrXiv preprint*. <https://doi.org/10.31224/osf.io/k2dt5>