

Raj Vaidyanathan (raj@ucf.edu)

A. PROFESSIONAL PREPARATION:

Lafayette College, Easton PA	Chemical Engineering (Honors)	BS (Summa Cum Laude), 1994
Stanford University, Stanford CA	Materials Science & Engineering	MS, 1995
MIT, Cambridge MA	Materials Science & Engineering	PhD, 1999
MIT, Cambridge MA	Materials Science & Engineering	Postdoctoral Associate, Nov 1999- Jan 2001

B. APPOINTMENTS:

1. Professor, Materials Science and Engineering Department (formerly Mechanical, Materials and Aerospace Engineering Department) and Advanced Materials Processing and Analysis Center (AMPAC), University of Central Florida, Orlando, FL (August 2014 - present): Teaching, research and advisement duties (Assistant Professor February 2001 - July 2005; Associate Professor August 2005 – July 2014)
2. Postdoctoral Associate (advisor: Prof. Subra Suresh), Laboratory for Experimental and Computational Micromechanics, Massachusetts Institute of Technology, Cambridge, MA (November 1999 - January 2001): Mechanical characterization using nano-, micro-, and macroindentation; experimental and computational micromechanics of shape-memory materials and bulk metallic glasses.
3. Doktorand, DaimlerChrysler AG, Research and Technology, Munich, Germany (August 1997 - February 1998): Research and development of shape-memory actuators and superelastic devices for Mercedes-Benz, Airbus and the European Space Agency; participant in the MIT-Germany program.

C. PRODUCTS (representative list over last five years):

1. M.P. Ulmer, M. Jalilvand, N.A. Marks, D. B. Buchholz, B. Fujishima, N. Guerra, J. Cao, Y-W. Chung, T.B. Baturalp, V. L. Coverstone, S. P. Stagon, G. DeVita, J.H. Dugard and Raj Vaidyanathan, The prospects for applying magnetic smart materials combined with shape memory alloys to produce correctable and deployable space telescopes, Proc. SPIE 11451, Advances in Optical and Mechanical Technologies for Telescopes and Instrumentation IV, 114511X (16 December 2020) doi: 10.1117/12.2564726
2. D.E. Nicholson, S.A. Padula II, O. Benafan., J.R. Bunn, E.A. Payzant, K. An, D. Penumadu and R. Vaidyanathan, Mapping of Texture and Phase Fractions in Heterogeneous Stress States during Multiaxial Loading of Biomedical Superelastic NiTi, Advanced Materials, (20 December 2020) <https://doi.org/10.1002/adma.202005092>
3. R. Puchaty, G. DeVita and R. Vaidyanathan, Load–Displacement Behavior of Helical Shape Memory Alloy Spring Actuators with Small Spring Diameter to Wire Diameter Ratios, Shape. Mem. Superelasticity, (2020) <https://doi.org/10.1007/S40830-020-00295-X>
4. J. M. Jennings, A. Kar and R. Vaidyanathan, “Measurement of Induced Currents in Radio Frequency Magnetic Fields based on near Field Antenna Perturbations”, AIP Advances (2020) 10, 065202.
5. J. M. Jennings, A. Kar and R. Vaidyanathan, “Theoretical and Experimental Studies of Electrical Conductivity for Functionally Graded, Heterogeneous Surfaces”, J App Phys (2019) 125, 035106.
6. D. E. Nicholson, S. A. Padula II, O. Benafan and R. Vaidyanathan, “Loading Path and Control Mode Effects During Thermomechanical Cycling of Polycrystalline Shape Memory NiTi”, Shape. Mem. Superelasticity (2018) 4:143.

7. Surface modified materials for tailoring responses to electromagnetic fields, US Patent No 10,876,197 B2, Issued Dec 29, 2020
8. Imaging device with loop bolometer array and related methods, US Patent No 10,788,373 B2, Issued Sept 29, 2020
9. D. E. Nicholson, S. A. Padula II, O. Benafan and R. Vaidyanathan, "Texture evolution during isothermal, isostrain, and isobaric loading of polycrystalline shape memory NiTi", Appl. Phys. Lett. 110, (2017) 251903.
10. B. Dhakal, D. E. Nicholson, A. F. Saleeb, S. A. Padula II and R. Vaidyanathan, "Three-dimensional deformation response of a NiTi shape memory helical-coil actuator during thermomechanical cycling: experimentally validated numerical model", Smart Mater Struct. 25 (2016) 095056.
11. O. Benafan, D. J. Gaydos, R. D. Noebe, S. Qiu and R. Vaidyanathan, "In Situ Neutron Diffraction Study of NiTi–21Pt High-Temperature Shape Memory Alloys", Shap. Mem. Superelasticity (2016) 2:337–346.
12. T. Wickramasooriya, R. Vaidyanathan and A. Kar, (2016) Laser Non-Uniform Heating of Moving Thin Wires Below the Biot Number Criterion of Uniform Temperature, Lasers in Manufacturing and Materials Processing, (2016) 3 2 pp 111-130.
13. O. Benafan, A. Garg, R.D. Noebe, G.S. Bigelow, S.A. Padula II, D.J. Gaydos, R. Vaidyanathan, B. Clausen and S.C. Vogel, "Thermomechanical behavior and microstructural evolution of a Ni(Pd)-rich Ni_{24.3}Ti_{49.7}Pd₂₆ high temperature shape memory alloy", J Alloy Compd. 643 (2015) 275.
14. O. Benafan, S.Y. Chen, A. Kar and R. Vaidyanathan, "Laser surface modification of medical grade alloys for reduced heating in a magnetic resonance imaging environment", Rev Sci Instrum. (2015) 86(12):123903.

D. SYNERGISTIC ACTIVITIES:

1. Los Alamos National Laboratory and Oak Ridge National Laboratory: Experimental research partnership with Los Alamos Neutron Science Center at Los Alamos National Laboratory; User Partnership Proposal for Sample Environment for Spectrometer development at Oak Ridge National Laboratory; program that includes students performing experiments at Los Alamos National Laboratory, Oak Ridge National Laboratory and studying at the DOE sponsored National School on Neutron and X-ray Scattering at Argonne National Laboratory; 9 graduate students and 3 undergraduate have spent a total of over 9 months over 60 trips
2. NASA Kennedy Space Center and Los Alamos National Laboratory: Partnership to build a unique cryogenic loading capability during neutron diffraction at Los Alamos National Laboratory to test spaceport materials for NASA
3. School students mentored: Isabella Damiani (Satellite High School) "SMAs: The Key to Quieter Airport Neighborhoods"; Eddie Goude (Satellite High School) "DMA Testing of Shape-Memory Alloys"; 1st Place Senior Physics (Orlando Science Center Science Challenge); 1st place at Florida Regional Science Fair; Leslie Spahr (Satellite High School) "Bulk Metallic Glass" 1st place at the Florida State Science Fair, 3rd place at the International Science Fair; Ted Artz (Satellite High School); Mario Mistretta (Satellite High School) "Cyclic Performance of Shape-Memory Alloys - SMA: The Shape of Things to Come" 1st place at the Florida State Science Fair, 3rd place at the International Science Fair; Catherine Bewerse (Satellite High School) "Nanoindentation Studies on Cryogenically Treated Metals - Super Cool Super Strong" 1st place at the Florida State Science Fair, 4th place at the International Science Fair, 3rd place at the International Science Fair
4. Lectures and demonstrations in materials science and engineering to over 1050+ middle and high school students over 25+ sessions
5. Active participant in the Consortium for the Advancement of Shape Memory Alloy Research and Technology (CASMAART) (members include Boeing, NASA, GM, GE, FortWayne, TAMU, etc)