

# Vita

**Mohammad H. Elahinia**

## **Current Position**

Assistant Professor  
Department of Mechanical, Industrial, and Manufacturing Engineering  
The University of Toledo  
Toledo, OH 43606

**Education Doctor of Philosophy**, Mechanical Engineering, August 2004

Virginia Polytechnic Institute, Blacksburg, VA

Dissertation: The Effect of System Dynamics on Shape Memory Alloy Behavior and Control

Advisor: Professor Mehdi Ahmadian

**Master of Science**, Mechanical Engineering, August 2001

Villanova University, Villanova, PA

Thesis: Nonlinear Control of Shape Memory Alloy Actuated Manipulator Advisor: Professor Hashem Ashrafiuon

**Master of Science**, Mechanical Engineering, May 1999

Tehran Polytechnics, Tehran, Iran

Thesis: Fuzzy Logic Control for Drum Boiler Water Level

Advisor: Professor Majid Saffar-avval

**Bachelor of Science**, Mechanical Engineering, May 1993

KN Toosi University of Technology, Tehran, Iran

Advisor: Professor Ali Ghaffari

## **Research Interests**

Control, vibration, robotics, automation; analysis and simulation of mechanical systems; constitutive modeling and experimental characterization of shape memory alloys; applications of ionic polymers and magnetic shape memory alloys

## **Professional Employment**

Marlic Computer, Research and Development Engineer, 1997 - 1999 Tehran, Iran

Hamshahri Newspaper, Technical Co-editor, 1995 - 1997 Tehran, Iran

Tehran Traffic Control Co., Signaling Design Engineer, 1993 - 1995 Tehran, Iran

## **Publications**

### **Journal Publications**

1. Elahinia, M. H. and Ashrafiun, H., "Nonlinear control of a shape memory alloy actuated manipulator," *Journal of Vibration & Acoustics - Transactions of the ASME*, October 2002, 124(4): 566-575.

2. Elahinia, M. H. Ahmadian, M. and Ashrafiun, H., "On the Design of Kalman Filter for Rotary Shape Memory Alloy Actuators," *Journal of Smart Materials and Structures*, May 2004, 13(4): 691-697.

3. Elahinia, M. H. Seigler, T. Michael Leo, D. J. and Ahmadian, M. "Nonlinear Stress-Based Control of a Rotary SMA-Actuated Manipulator," *Journal of Intelligent Material Systems and Structures*, June 2004, 15(6): 495-508.

4. Elahinia, M. H. Ashrafiun, H. and Ahmadian, M., "A Temperature-Based Controller for a Shape Memory Alloy Actuator," submitted to *Journal of Vibration & Acoustics-Transactions of the ASME*, accepted for publication.

5. Eshraghi, M., Ashrafiun, H., and Elahinia, M. H., "Position Control of a Three-Link Shape Memory Alloy Actuated Arm," submitted to *Journal of Vibration & Acoustics-Transactions of the ASME*, in review.

6. Elahinia, M. H. and Ahmadian, M., "SMA Phenomenological Models: Where they Fail," submitted to *Journal of Dynamic Systems, Measurement and Control*, in review.

7. Elahinia, M. H. and Ahmadian, M., "Application of the Extended Kalman Filter to Control of a Shape Memory Alloy Arm," *Journal of Smart Materials and Structures*, in review.

### **Refereed Conference Publications**

1. Elahinia, M. and Ashrafiun, H. "Nonlinear Control of a Single-link Shape Memory Alloy Actuated Arm," DETC02 ASME Design Engineering Technical Conferences September 29 - October 2, 2002, Montreal, Canada.

2. Elahinia, M. H. and Ashrafiun, H., "On the Design of an Extended Kalman Filter for a Shape Memory Alloy Actuated Manipulator," DETC03 Nineteenth ASME Biennial Conference on Mechanical Vibration and Noise, ASME Design Technical Conference, September 2 - 6, 2003, Chicago, Illinois.

3. Elahinia, M. H. Ashrafiuon, H. Ahmadian, M., "Application of the Extended Kalman Filter to Control of a Shape Memory Alloy Arm," ASME International Mechanical Engineering Congress and RD&D Expo, November 16 - 21, 2003, Washington, D.C.
4. Elahinia, M. H. and Ahmadian, M., "Application of Time-Domain Identification Techniques for Evaluating Heavy Truck Dynamics," 2003 SAE Truck & Bus Meeting & Exhibition, November 10 - 12, Fort Worth, Texas.
5. Elahinia, M. H. "Teaching Smart Materials to Engineering Undergraduate Students: A Problem Solving Approach," 2004 ASEE Annual Conference and Exposition, June 20-23, 2004, Slat Lake City, Utah.
6. Elahinia, M. H. Koo, J. and Ahmadian, M. "Improving Robustness of Tuned Vibration Absorbers Using Shape Memory Alloys," ASME International Mechanical Engineering Congress, November 13-19, 2004, Anaheim, California, in review.
7. Eshraghi, M., Ashrafiuon, H., and Elahinia, M. H., "Variable Structure Control of a Three-Link SMA-Actuated Robot," DETC2004 ASME International 2004 DETC/CIE, Sept. 28-Oct. 2, 2004, Salt Lake City, Utah, in review.
8. Koo, J. Elahinia, M. H. Woolsey, C. and Ahmadian, M. "Model-Based Nonlinear Control of an SMA-Actuated Robotic Arm," ASME International Mechanical Engineering Congress, November 13-19, 2004, Anaheim, California, in review.
9. Koo, J. Elahinia, M. H. Ahmadian, M. and Woolsey, C. "Model-Based Nonlinear Control of an SMA-Actuated Robotic Arm: An Experimental Study," Tenth Conference on Nonlinear Vibrations, Stability, and Dynamics of Structures, July 25-29, 2004, Blacksburg, Virginia, in review.
10. Elahinia, M. H. and Ahmadian, M. "On the Shortcomings of Shape Memory Alloy Phenomenological Models," ASME International Mechanical Engineering Congress, November 13-19, 2004, Anaheim, California, in review.
11. Elahinia, M. H. "Combined Sensing and Actuation: A New Control Laboratory Experiment," ASME International Mechanical Engineering Congress, November 13-19, 2004, Anaheim, California, in review.

### **Conference Publications**

1. Elahinia, M. H. Seigler, M. Leo, D. and Ahmadian, M., "Sliding Mode Control of a Shape Memory Alloy Actuated Manipulator," Proceedings of the 5th International Conference on Intelligent Materials, June 2003, Pennsylvania State University, State College, Pennsylvania.
2. Seigler, M. Elahinia, M. H. Leo, D. and Ahmadian, M., "Stress Based Control of a Single-degree-of-freedom SMA-actuated Arm," Proceedings of the 5th International Conference on Intelligent Materials, June 2003, Pennsylvania State University State College, Pennsylvania.

3. Elahinia, M. H., and Ahmadian, M., "Stress-Based Sliding Mode Control of a Rotary SMA-Actuated Manipulator," 2004 SPIE Smart Structures and Materials, March, 14-18, 2004, San Diego, California.

### **Proposals and Reports**

1. Ahmadian, M. Saraf, R. Leo, D. and Elahinia, M. "Radiometric Infrared Camera with Thermal Imaging Software," equipment proposal, submitted to State Council of Higher Education for Virginia (SCHEV), August 2003. Status: Declined.

2. Ashrafiuon, H. Elahinia, M., "SMA Actuated Arm Modeling and Control," A Technical Report to Concurrent Technology Corporation, May 2001.

### **Teaching Experience**

System Dynamics, Instructor, Fall and Spring 2002. Senior Laboratory, Designed and lectured an SMA control experiment, Fall 2003. Active Materials and Smart Structures II, Co-developer and -instructor, Fall 2004.

### **Service**

1. Reviewer for:

- ASME Journal of Dynamic Systems, Measurement, and Control
- IEEE Control Systems Magazine
- Journal of Intelligent Material Systems and structures
- ASME International Design Engineering Technical Conference, 2003
- Shock and Vibration Journal
- ASME International Mechanical Engineering Congress, 2003
- ASEE Annual Conference, 2004

2. 2003 Judge for Torgersen Graduate Research Excellence Award College of Engineering Virginia Polytechnic Institute.

3. 2002-2004 Co-chair of Graduate Students committee, College of Engineering Virginia Polytechnic Institute.

4. 2002 Member of student search committee for new dean of the college of engineering, Virginia Polytechnic Institute.

5. 2001 Advisor for FIRST robotic competition for Agnes Irwing high school students, Villanova, PA.

## Awards

1. 2004 Recipient of the Torgersen Graduate Research Excellence Award, College of Engineering Virginia Polytechnic Institute.
2. 2004 Recipient of the Outstanding Lecture Presenter Award, Graduate Student Assembly, Graduate School Virginia Polytechnic Institute. 2001-present
3. 2001 - 2004 Advanced Vehicle Dynamics Laboratory Fellowship

## References

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