CARMEL MAJIDI

ASSOCIATE PROFESSOR
CARNEGIE MELLON UNIVERSITY
Department of Mechanical Engineering
Robotics Institute (by courtesy)
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Education

University of California Berkeley, California

Ph.D. in Electrical Engineering & Computer Sciences — May 2007
Primary Focus: Controls, Robotics & Biosystems
Secondary Focus: Applied Mathematics & Mechanics
Dissertation: *Mechanics of Natural & Synthetic Gecko Adhesives*
Advisor: Ron Fearing

M.S. in Electrical Engineering & Computer Sciences — December 2004

Cornell University Ithaca, New York

B.S. in Civil & Environmental Engineering — May 2001
Focus: Structural Engineering

Employment

Carnegie Mellon University — August 2011 - Present
Assistant Professor — Department of Mechanical Engineering
Courtesy Appointment — Robotics Institute
Courtesy Appointment — Department of Civil & Environmental Engineering

Harvard University — December 2009 - July 2011
Postdoctoral Fellow — School of Engineering & Applied Sciences (SEAS)

Princeton University — December 2007 - December 2009
Postdoctoral Fellow — Princeton Institute for the Science & Technology of Materials (PRISM)

Journal Publications

(J50) Stretchable, high-k dielectric elastomers through liquid metal inclusions
M. Bartlett, A. Fassler, N. Kazem, E. Markvicka, P. Mandal, C. Majidi
Advanced Materials in press (2016). [**Back Cover**]

(J49) Artificial Skin: Soft Electronics & Sensors for Bio-Inspired Robots and Wearable Computing
C. Majidi
ASME Focus on Dynamic Systems & Control **4** 17-21 (2016). [**Front Cover**]

(J48) Enhanced Performance of Microfluidic Soft Pressure Sensors with Embedded Solid Microspheres
H.-S. Shin, J. Ryu, C. Majidi, Y.-L. Park
Journal of Micromechanics and Microengineering **26** 02511 (2016).

(J47) Nonlinear thermal parmeter estimation for embedded internal Joule heaters
A. Tutcuoglu, C. Majidi, W. Shan
International Journal of Heat and Mass Transfer **97** 412-421 (2016).

(J46) Soft Anisotropic Conductors as Electric Vias for Ga-based Liquid Metal Circuits
T. Lu, J. Wissman, Ruthika, C. Majidi
ACS Applied Materials & Interfaces **7** 26923Ð26929 (2015).

(J45) Gelation And Mechanical Response Of Patchy Rods
N. Kazem, C. Majidi, C. Maloney
Soft Matter **11** 7877-7887 (2015). [**Back Cover**]

(J44) Liquid Phase Metal Inclusions for a Conductive Polymer Composite
A. Fassler, C. Majidi
Advanced Materials **27** 1928-1932 (2015).

(J43) Methods to Pattern Liquid Metals
I. Joshipura, H. Ayers, C. Majidi, M. D. Dickey
Journal of Materials Chemistry C **3** 3834-3841 (2015). [**Front Cover**]

(J42) Rigidity-Tuning Conductive Elastomer
W. Shan, S. Diller, A. Tutcuoglu, C. Majidi
Smart Materials & Structures **24** 065001 (2015).

(J41) Flexing into Motion: A Locomotion Mechanism for Soft Robots
X. Zhou, C. Majidi, O. M. O'Reilly
International Journal of Non-Linear Mechanics **74** 7-17 (2015).

(J40) Soft hands: An analysis of some gripping mechanisms in soft robot design
X. Zhou, C. Majidi, O. M. O'Reilly
International Journal of Solids & Structures **64-65** 155-165 (2015).

(J39) High-Density Soft-Matter Electronics with Micron-Scale Line Width
B. A. Gozen, A. Tabatabai, O. B. Ozdoganlar, C. Majidi
Advanced Materials **26** 5211-5216 (2014).

(J38) Rapid Prototyping for Soft-Matter Electronics
T. Lu, L. Finkenauer, J. Wissman, C. Majidi
Advanced Functional Materials **24** 3351-3356 (2014).

(J37) Energy Harvesting with Stacked Dielectric Elastomer Transducers:

Nonlinear Theory, Optimization, and Linearized Scaling Law
A. Tutcuoglu, C. Majidi
Applied Physics Letters **205** 241905 (2014).

(J36) Saddle-like deformation in a dielectric elastomer actuator embedded with liquid-phase gallium-indium electrodes
J Wissman, L Finkenauer, L Deseri, C Majidi
Journal of Applied Physics **116** 144905 (2014).

(J35) Energy Efficiency in Friction-Based Locomotion Mechanisms for Soft and Hard Robots: Slower can be Faster
X. Zhou, C. Majidi, O. M. O'Reilly
Nonlinear Dynamics **78** 2811-2821 (2014).

(J34) 3D Structures of Liquid-Phase GaIn Alloy Embedded in PDMS with Freeze Casting
A. Fassler, C. Majidi
Lab on a Chip **13** 4442-4450 (2013).

(J33) Liquid-Phase Gallium-Indium Alloy Electronics with Microcontact Printing
A. Tabatabai, A. Fassler, C. Usiak, C. Majidi
Langmuir **29** 6194-6200 (2013).

(J32) Soft Robotics – A Perspective: Current Trends and Prospects for the Future
C. Majidi
Soft Robotics **1** 5-11 (2013).

(J31) Thermal analysis and design of a multi-layered rigidity tunable composite
W. Shan, T. Lu, Z.H. Wang, C. Majidi
International Journal of Heat and Mass Transfer **66** 271-278 (2013).

(J30) Soft-matter composites with electrically tunable elastic rigidity
W. Shan, T. Lu, C. Majidi
Smart Materials and Structures **22** 085005 (2013).

(J29) Influence of Surface Traction on Soft Robot Undulation
C. Majidi, R. F. Shepherd, R. K. Kramer, G. M. Whitesides, R. J. Wood
International Journal of Robotics Research **32** 1577-1584 (2013).

(J28) Masked Deposition of Gallium-Indium Alloys for Liquid-Embedded Elastomer Conductors
R. Kramer, C. Majidi, R. J. Wood
Advanced Functional Materials **23** 5292-5296 (2013).

(J27) Bifurcations and Instability in the Adhesion of Intrinsically Curved Rods
C. Majidi, O. M. O'Reilly, J. A. Williams
Mechanics Research Communications **49** 13-16 (2013).

(J26) Soft-matter capacitors and inductors for hyperplastic strain sensing and stretchable electronics
A. Fassler and C. Majidi
Smart Materials and Structures **22** 055023 (2013).

(J25) Collapse of triangular channels in a soft elastomer
D. Tepayotl-Ramirez, Tong Lu, Y.-L. Park, C. Majidi
Applied Physics Letters **102** 044102 (2013).

(J24) Influence of cross-sectional geometry on the sensitivity and hysteresis of liquid-phase electronic pressure sensors

Y.-L. Park, D. Tepayotl-Ramirez, R. J. Wood, C. Majidi
Applied Physics Letters **101** 191904 (2012).

(J23) Nonlinear geometric effects in mechanical bistable morphing structures
Z. Chen, Q. Guo, C. Majidi, W. Chen, D. J. Srolovitz, M. P. Haataja
Physical Review Letters **109** 114302 (2012).

(J22) On the stability of a rod adhering to a rigid surface: Shear-induced stable adhesion and the instability of peeling
C. Majidi, O. M. O'Reilly, J. A. Williams
Journal of the Mechanics and Physics of Solids **60** 827-843 (2012).

(J21) A non-differential elastomer curvature sensor for softer-than-skin electronics
C. Majidi, R. Kramer, R. J. Wood
Smart Materials and Structures **20** 105017 (2011).

(J20) Tunable Helical Ribbons
Z. Chen, C. Majidi, D. J. Srolovitz, M. Haataja
Applied Physics Letters **98** 0011906 (2010).

(J19) Hyperelastic pressure sensing with a liquid-embedded elastomer
C. Majidi, Y.-L. Park (co-1st author), R. Kramer, P. Bérard, R. J. Wood
Journal of Micromechanics and Microengineering **20** 125029 (2010).

(J18) Tunable elastic stiffness with micro-confined magnetorheological domains at low magnetic field
C. Majidi, R. J. Wood
Applied Physics Letters **97** 164104 (2010).

(J17) Analysis and design principles for shear-mode piezoelectric energy harvesting with ZnO nanoribbons
C. Majidi, M. Haataja, D. J. Srolovitz
Smart Materials and Structures **19** 055027 (2010).

(J16) Adhesion and delamination boundary conditions for elastic plates with arbitrary contact shape
C. Majidi, G. G. Adams
Mechanics Research Communications **37** 214-218 (2010).

(J15) Shear-mode Contact Splitting for a Microtextured Elastomer Filme
R. Kramer, C. Majidi, R. J. Wood
Advanced Materials **22** 3700-3703 (2010).

(J14) Spontaneous Bending of Piezoelectric Nanoribbons: Mechanics, Polarization, and Space Charge Coupling
C. Majidi, Z. Chen, D. J. Srolovitz, M. Haataja
Journal of the Mechanics and Physics of Solids **58** 73-85 (2010).

(J13) Adhesion Between Thin Cylindrical Shells with Parallel Axes
C. Majidi, K. T. Wan
Journal of Applied Mechanics **77** 041013 (2010).

(J12) A Simplified Formulation of Adhesion Problems with Elastic Plates
C. Majidi, G. G. Adams
Proceedings of the Royal Society A **465** 2217-2230 (2009).

(J11) Shear Adhesion between an Elastica and a Rigid Flat Surface
C. Majidi

Mechanics Research Communications **36** 369-372 (2009).

(J10) Adhesion of an elastic plate to a sphere
C. Majidi, R. S. Fearing
Proceedings of the Royal Society A **464** 1309-1317 (2008).

(J9) Sliding-induced adhesion of stiff polymer microfiber arrays. I. Macroscale behavior
J. Lee, C. Majidi, B. Schubert, R. S. Fearing
Journal of the Royal Society Interface **5** 835-844 (2008).

(J8) Sliding-induced adhesion of stiff polymer microfiber arrays. II. Microscale behavior
B. Schubert , J. Lee, C. Majidi, R. S. Fearing
Journal of the Royal Society Interface **5** 845-853 (2008).

(J7) Analysis of Shaft-Loaded Membrane Delamination Using Stationary Principles
C. Majidi, R. E. Groff, R. S. Fearing
Mathematics & Mechanics of Solids **13** 3-22 (2008).

(J6) Ancestrally high elastic modulus of gecko setal beta-keratin
A. M. Peattie, C. Majidi, A. Corder, R. J. Full
J. Royal Society Interface **4** 1071-1076 (2007).

(J5) Remarks on formulating an adhesion problem using Euler's elastica
C. Majidi
Mechanics Research Communications **34** 85-90 (2007).

(J4) Towards Friction and Adhesion from High Modulus Microfiber Arrays
B. Schubert, C. Majidi, R. E. Groff, S. Baek, B. Bush, R. Maboudian, R. S. Fearing
Journal of Adhesion Science & Technology **21** 1297-1315 (2007).

(J3) High Friction from a Stiff Polymer using Micro-Fiber Arrays
C. Majidi, R. E. Groff, Y. Maeno, B. Schubert, S. Baek, B. Bush, R. Maboudian, N. Gravish, M. Wilkinson, K. Autumn, R. S. Fearing
Physical Review Letters **97** 076103 (2006).

(J2) Effective elastic modulus of isolated gecko setal arrays
K. Autumn, C. Majidi, R. E. Groff, A. Dittmore, R. Fearing
Journal of Experimental Biology **209** 3558-3568 (2006).

(J1) Attachment of fiber array adhesive through side contact
C. Majidi, R. E. Groff, R. S. Fearing
Journal of Applied Physics **98** 103521 (2005).

Conferences (Peer-Reviewed)

(P13) A lightweight, low-power electroadhesive clutch and spring for exoskeleton actuation
S. Diller, C. Majidi, S. Collins
IEEE International Conference on Robotics and Automation (ICRA)
Stockholm, Sweden (2016).

(P12) iSkin: Flexible, Stretchable and Visually Customizable On-Body Touch Sensors for Mobile Computing
M. Weigel, T. Lu, G. Bailly, A. Oulasvirta, C. Majidi, J. Steimle
ACM Conference on Human Factors in Computing Systems (CHI)
Seoul, Korea (2015). [*Best Paper Award*]

(P11) GeckoGripper: A soft, inflatable robotic gripper using gecko-inspired elastomer micro-fiber adhesives
S. Song, C. Majidi, M. Sitti
IEEE International Conference on Intelligent Robots and Systems (IROS)
Chicago, IL (2014).

(P10) Compliant liquid metal electrodes for dielectric elastomer actuators
L. R. Finkenauer, C. Majidi
SPIE Symposium on Electroactive Polymer Actuators and Devices
San Diego, CA (2014).

(P9)Soft-matter electronics with stencil lithography
J. Wissman, C. Majidi
IEEE Conference on Sensors
Baltimore, MD (2014).

(P8) Soft-Matter Capacitive Sensor for Measuring Shear and Pressure Deformation
P. Roberts, D. D. Damian, W. L. Shan, T Lu, C Majidi
IEEE International Conference on Robotics and Automation (ICRA)
Karlsruhe, Germany (2013).

(P7) Active modular elastomer sleeve for soft wearable assistance robots
Y.-L. Park, B.-R. Chen, C. Majidi, R. J. Wood, R. Nagpal, E. Goldfield
IEEE International Conference on Intelligent Robots and Systems (IROS)
Vilamoura, Portugal (2012).

(P6) Soft Curvature Sensors for Joint Angle Proprioception
R. Kramer, C. Majidi, R. Sahai, R. J. Wood
IEEE International Conference on Intelligent Robots and Systems (IROS)
San Francisco, CA (2011).

(P5) Wearable Tactile Keypad with Stretchable Artificial Skin
R. Kramer, C. Majidi, R. J. Wood
IEEE International Conference on Robotics and Automation (ICRA)
Shanghai, China (2011).

(P4) Mechanics of a Novel Shear-activated Microfiber Array Adhesive
C. Majidi, R. S. Fearing
MRS 2008 Spring Meeting San Francisco, CA (2008).

(P3) Foot design and integration for bioinspired climbing robots
M. Spenko, M. Cutkosky, C. Majidi, R. S. Fearing, R. E. Groff, K. Autumn
Proc. of SPIE, Unmanned Systems Tech. VIII **623019** (2006).

(P2) Compressive Properties of Dense Vertically Aligned Multi-walled Carbon Nanotube Arrays
T. Tong, Y. Zhao, L. Delzeit, C. Majidi, R. E. Groff, P. Reddy, A. Majumdar, A. Kashani, M. Meyyappan
ASME NANO Conference Berkeley, CA (2005).

(P1) Clumping and Packing of Hair Arrays Manufactured by Nanocasting
C. Majidi, R. E. Groff, R. S. Fearing
ASME IMECE Conference Anaheim, CA (2004).

Conference Abstracts

(C33) Liquid-Phase GaIn Inclusions for Stretchable Conductive and Dielectric Polymer Composites
A. Fassler, M. D. Bartlett, N. Kazem, C. Majidi
MRS 2015 Fall Meeting Boston, MA (2015).

(C32) Soft, Multi-Functional Materials Created through Rapid Prototyping
M. D. Bartlett, E. J. Markvicka, C. Majidi
MRS 2015 Fall Meeting Boston, MA (2015).

(C31) Gelation and Mechanical Response of Patchy Rods
N. Kazem, C. Majidi, C. Maloney
MRS 2015 Fall Meeting Boston, MA (2015).

(C30) Modeling of curved cantilever dielectric elastomer actuator using universal solution in finite bending
L. Finkenauer, J. Wissman, L. Deseri, C. Majidi
Society of Engineering Science Annual Meeting West Lafayette, IN (2014).

(C29) Nonlinear deflection of a fixedÐfixed hyperelastic beam under extreme stretch
J. Wissman, C. Majidi
Society of Engineering Science Annual Meeting West Lafayette, IN (2014).

(C28) Embedding frozen 3D structures of GaIn alloy in Elastic Polymer for the creation of Microfluidic Electronics
A. Fassler, C. Majidi
MRS Spring Meeting San Francisco, CA (2014).

(C27) Stiffness Tuning Materials for Wearable Robots
C. Majidi
International Human-Centered Robotics Symposium Cincinnati, OH (2013).

(C26) Adhesion and Peeling Instability of an Elastic Rod
C. Majidi, O. M. O'Reilly
Society of Engineering Science Annual Meeting Providence, RI (2013).

(C25) Electrically Powered Soft-Matter Composites with Tunable Elastic Rigidity
W. Shan, T. Lu, C. Majidi
Society of Engineering Science Annual Meeting Providence, RI (2013).

(C24) Reversible Rigidity Control Using Low Melting Temperature Alloys
W. Shan, T. Lu, C. Majidi
APS March Meeting Baltimore, MD (2013).

(C23) Soft-Matter Resistive Sensor for Measuring Shear and Pressure Stresses
D. Tepayotl-Ramirez, P. Roberts, C. Majidi
APS March Meeting Baltimore, MD (2013).

(C22) Highly Deformable Liquid Embedded Soft-Matter Capacitors and Inductors for Stretchable Electronics
A. Fassler, C. Majidi
APS March Meeting Baltimore, MD (2013).

(C21) Manufacturing of Liquid-Embedded Elastomers for Stretchable Electronics
R. Kramer, C. Majidi, J. Weaver, R. Wood
APS March Meeting Baltimore, MD (2013).

(C20) Collapse of Non-Rectangular Microchannels in an Elastic Halfspace: Theory, Simulation, and Experiment

D. Tepayotl-Ramirez, T. Lu, C. Majidi
Society of Engineering Science Annual Meeting, Atlanta, GA (2012).

(C19) Continuum Elasticity Theory Approach for Spontaneous Bending and Twisting of Ribbons Induced by Mechanical Anisotropy
Z. Chen, C. Majidi, D. J. Srolovitz, M. Haataja
Society of Engineering Science Annual Meeting Atlanta, GA (2012).

(C18) Bistable Morphing Structures: Geometric and Mechanical Determinations
Z. Chen, Q. Guo, C. Majidi, W. Chen, D. J. Srolovitz, M. Haataja
Society of Engineering Science Annual Meeting Atlanta, GA (2012).

(C17) Soft Robots: Manipulation, Mobility, and Fast Actuation
R. F. Shepherd, F. Ilievski, W. Choi, A. Stokes, S. Morin, A. D. Mazzeo, R. Kramer, C. Majidi, R. J. Wood, G. M. Whitesides
APS March Meeting Boston, MA (2012).

(C16) Liquid-Embedded Elastomer Electronics
R. Kramer, C. Majidi, Y.-L. Park, J. Paik, R. J. Wood
APS March Meeting Boston, MA (2012).

(C15) Engineering Shapes in Nanotechnology: Helicity on Demand
Z. Chen, C. Majidi, D. J. Srolovitz, M. Haataja
TMS Annual Meeting & Exhibition San Diego, CA (2011).

(C14) Theory for the Spontaneous Bending and Helicity of Ribbons
Z. Chen, Q. Guo, C. Majidi, W. Chen, D. J. Srolovitz, M. Haataja
Society of Engineering Science Annual Meeting Evanston, IL (2011).

(C13) Ultrasoft Electronics for Hyperelastic Strain, Pressure, and Direct Curvature Sensing
C. Majidi, R. Kramer, R. J. Wood
APS March Meeting, Dallas TX (2011).

(C12) Highly Compliant Pressure Sensor Using Conductive Fluid in an Elastomeric Sheet
R. Kramer, Y.-L. Park, C. Majidi, P. Bérard, R. J. Wood
MRS 2010 Fall Meeting Boston, MA (2010).

(C11) Elastomers Embedded with Liquid Filled Microchannels for Robotics and Sensing
C. Majidi, Y.-L. Park, P. Bérard, R. J. Wood
Society of Engineering Science Annual Meeting Ames, IA (2010).

(C10) Adhesion Boundary Conditions for Elastic Plates
C. Majidi, G. G. Adams
The Adhesion Society Annual Meeting Daytona Beach, FL (2010).

(C9) Adhesion of Compliant Cylinders
J. Shi, S. Muftu, C. Majidi, K. T. Wan
The Adhesion Society Annual Meeting Daytona Beach, FL (2010).

(C8) Design Principles for Nanopiezoelectric Energy Harvesting
C. Majidi, M. Haataja, D. J. Srolovitz
MRS 2009 Fall Meeting Boston, MA (2009).

(C7) Energy Harvesting with Piezoelectric Nanobrushes: Analysis & Design Principles
C. Majidi, M. Haataja, D. J. Srolovitz
ASME/STLE Int. Joint Tribology Conf. (IJTC) Memphis, TN (2009).

(C6) Adhesion Between Similar and Dissimilar Thin-Walled Micro-Structures

C. Majidi, K. T. Wan
ASME Int. Conf. on Micro- and Nanosystems (MNS) San Diego, CA (2009).

(C5) A Simplified Formulation of Adhesion Problems with Elastic Plates (poster accepted)
C. Majidi, G. G. Adams
Gordon Conf. on the Science of Adhesion New London, NH (2009).

(C4) Theoretical Analysis for the Spontaneous Bending of Piezoelectric Nanoribbons (poster)
C. Majidi, D. J. Srolovitz, M. P. Haataja
MRS 2008 Fall Meeting Boston, MA (2008).

(C3) Effect of Surface Roughness on Adhesion and Friction of Microfibers in Side Contact
M. Teodorescu, C. Majidi, H. Rahnejat, R. S. Fearing
ASME/STLE Int. Joint Tribology Conf. (IJTC) Miami, FL (2008).

(C2) Friction and Adhesion of Micro-Fiber Arrays (poster)
C. Majidi, R. Groff, S. S. Baek, B. Schubert, R. S. Fearing
Gordon Conference on the Science of Adhesion Tilton, NH (2009).

(C1) Design and construction of a wildfire instrumentation system using networked sensors (poster)
M. M. Chen, C. Majidi, D. M. Doolin, S. Glaser, N. Sitar
Network Embedded Systems Technology Retreat Oakland, CA (2003).

Invited Talks

Materials, Mechanics, and Prototyping Methods for Softer-than-Skin Electronics
Department of Mechanical Engineering
University of Minnesota, October 2015.

Materials, Mechanics, and Prototyping Methods for Softer-than-Skin Electronics
Department of Mechanical Engineering
University of California, Santa Barbara, April 2015.

Materials, Mechanics, and Prototyping Methods for Softer-than-Skin Electronics
Department of Mechanical Engineering
University of California, Los Angeles, April 2015.

Soft Multifunctional Materials for Soft Robotics
Topics in Bioengineering Seminar Series
Harvard University, February 2015.

Soft Multifunctional Materials for Soft Robotics
Soft Robotics Technology Group of New York
New York, NY, January 2015.

Soft Multifunctional Materials for Soft Robotics
Microsoft Research
Redmond, WA, December 2014.

Elastically Soft Electronics with Rapid Prototyping
ASME IMECE
Montreal, QC, November 2014.

Soft Multifunctional Materials for Soft Robotics
Department of Mechanical Engineering
University of Maryland, October 2014.

Soft Machines & Multifunctional Materials for Soft Robotics
Department of Mechanical Engineering
University of Florida, September 2014.

Soft-Matter Electronics, Multifunctional Materials, and Fabrication Methods for Soft Robots
RSS Workshop on Advances in Soft Robotics
Berkeley, CA, July 2014.

Soft-Matter Electronics, Multifunctional Materials, and Fabrication Methods for Soft Robots
NSF MRSEC
NC State, January 2014.

Stiffness Tuning Materials for Wearable Robots
IROS Workshop on Soft Technologies for Wearable Robots
Tokyo, Japan, November 2013.

Soft-Matter Electronics, Multifunctional Materials, and Fabrication Methods for Soft Robots
Department of Mechanical Engineering
Yale University, September 2013.

Soft-Matter Electronics, Multifunctional Materials, and Fabrication Methods for Soft Robots
International Workshop on Soft Robotics and Morphological Computation
Ascona, Switzerland, July 2013.

Adhesion and Spontaneous Deformation of Thin Elastic Sheets
New England Complex Fluids Symposium
New Haven, CT, March 2013.

Extreme Mechanics in Soft Pneumatic Robots and Soft Microfluidic Electronics and Sensors
APS March Meeting
Boston, MA, March 2012.

Mechanics of Soft Robots
ETH-Zurich Robotics Summer School
Zurich, Switzerland, June 2012.

Soft Multifunctional Materials for Electronics, Robotics, & Medicine
Department of Mechanical Engineering
Carnegie Mellon University, February 2011.

Soft Active Materials for Electronics, Robotics, & Medicine
Department of Mechanical Science & Engineering
University of Illinois at Urbana-Champaign, January 2011.

Functionality of Active Micro/Nanostructured materials through Mechanics and Surface Effects
Department of Engineering Science & Mechanics
Virginia Tech, February 2010.

Functionality of Active Micro/Nanostructured materials through Mechanics and Surface Effects
Department of Mechanical Engineering
Johns Hopkins University, January 2010.

Bio-inspired Grasping and Locomotion on Rough Surfaces
Machines & Organisms Seminar
Cornell University, September 2009.

Nanostructured Surfaces and Interfaces for Smart Adhesion and Energy Harvesting
Department of Mechanical Engineering

University of British Columbia, September 2009.

Nanostructured Surfaces and Interfaces for Smart Adhesion and Energy Harvesting
Department of Mechanical & Industrial Engineering
Northeastern University, July 2009.

Spontaneous Bending of Piezoelectric Nanoribbons
Department of Engineering Science & Mechanics
Virginia Tech, April 2009.

Spontaneous Bending of Piezoelectric Nanoribbons
Computational Materials Science Network
Princeton University, September 2008.

Shear-Activated Array Adhesive
Lindbergh Lecture, Department of Mechanical Engineering
University of Wisconsin at Madison, February 2007.

Unpublished Works

Enhanced Friction and Adhesion with Biologically Inspired Fiber Arrays
C. Majidi, Ph.D. Thesis, University of California, Berkeley, May 2007

Mechanics of Gecko Adhesion
C. Majidi, M.S. Thesis, University of California, Berkeley, May 2005

Grants (Single PI)

(G13) Energy Harvesting for Soft-Matter Machines and Electronics
AFOSR 2013 Young Investigator Program, **360k**, 5/1/13-4/30/16.

(G12) Soft Active Materials and Electronics for Bioinspired & Biomechanically-Compatible Robotics
ONR 2012 Young Investigator Program, **510k**, 4/1/12-3/31/15..

(G11) Soft Machines and Electronics for Bio-inspired Robots and Wearable Assistive Technologies
DARPA Young Faculty Award, **300k**, 7/1/12-6/30/14.

(G10) Multi-Purpose Artificial Muscle and Sensor Array for Untethered Soft Robots
NASA Early Career Faculty Award, **600k**, 9/1/14-8/31/17.

(G9) Fabrication and Testing Tools for the Development of Soft Multifunctional Materials
ONR Defense University Research Instrumentation Program (DURIP), **308k**, 9/1/14.

(G8) Soft-Matter Sensors and Tactile Skin for Underwater Robot Grippers
ONR Bioinspired Autonomous Systems, **400k**, 3/1/16-2/28/19.

Grants (co-PI)

(G7) Advanced Manufacturing for Wearable Soft-Matter Devices
Burak Ozdoganlar, Carmel Majidi, Gary Fedder, Burak Kara
Krzysztof Matyjaszewski, Yong-Lae Park, Lee Weiss
Siemens Future of Advanced Manufacturing, **80k** awarded to Majidi Lab, 9/1/14-8/31/15.

(G6) MaRFlex - Compliant Robotics Hands with Integrated Soft MEMS Skin

Carmel Majidi, Mahmoud Tavakoli
CMU Information and Communications Technologies (ICT) Early Bird Projects,
13.8k awarded to Majidi Lab, 9/1/14-8/31/15.

(G5) Wearable Pulse Oximetry & Motion Sensing with 3D Printed Soft Electronics
Carmel Majidi, Adam Feinberg
CMU Disruptive Health Technology Institute (DHTI), **262k**, 7/1/15-6/30/17.

(G4) Soft Artificial Muscle with Rigidity Tuning Elastomer
Carmel Majidi, Yong-Lae Park
Samsung Global Research Outreach Program, **100k**, 9/1/15-8/31/16.

(G3) Nonlinear Dynamics and Distributed Control for Soft Robot Locomotion
Carmel Majidi, Derek Paley, Oliver OÕReilly
Army Research Office, **360k** awarded to Majidi Lab, 5/1/16-4/30/19.

(G2) UNIVERSAL ELECTROMAGNETIC SURFACE: Exploiting active electronics and active origami to generate a programmable electromagnetic response
Kaushik Battacharya, Carmel Majidi, Sergio Pellegrino, Ali Hajimiri, Richard James Kaushik Sengupta
AFOSR MURI, **917k** awarded to Majidi Lab, 8/1/16-7/30/21.

(G1) Soft and Stretchable Mechatronics for Wearable Devices: Fabrication, Implementation and Applications
Carmel Majidi, Anibal Almeida
CMU-Portugal ERI, **610k** awarded to Majidi Lab, 5/1/16-4/30/20.

Patents

(X6) Enhanced Friction of Micropatterned Surfaces Immersed in Magnetorheological Fluid
C. Majidi, R. J. Wood
US Patent & Trademark Office **8,579,842** November 12, 2013.

(X5) Stretchable Two-Dimensional Pressure Sensor
C. Majidi, Y.-L. Park, R. J. Wood
US Patent & Trademark Office **8,316,719** November 27, 2012.

(X4) Symmetric, Spatular Attachments for Enhanced Adhesion of Micro- and Nano-fibers
C. Majidi, R. E. Groff, R. S. Fearing
US Patent & Trademark Office **8,309,201** November 13, 2012.

(X3) Actively switchable nano-structured adhesive
R. S. Fearing, A. Bachrach, R. E. Groff, C. Majidi
US Patent & Trademark Office **7,914,912** March 29, 2011

(X2) Nanostructured friction enhancement using fabricated microstructure
C. Majidi, R. E. Groff, R. S. Fearing
US Patent & Trademark Office **7,799,423** Sept. 21, 2010.

(X1) Compliant base to increase contact for micro- or nano-fibers
C. Majidi, R.E. Groff, R.S. Fearing, S. D. Jones
US Patent & Trademark Office **7,709,087** May 4, 2010.

Professional Activities

Journal Editorial Board Soft Robotics; Mary Ann Liebert, Inc.; 2013 - present

Conference Organizer APS March Meeting; 2012, 2013

Journal Reviewer Advanced Materials; Advanced Functional Materials; ACS Applied Materials & Interfaces; Applied Physics Letters; ASME Journal of Mechanisms & Robotics; Biosensors; IEEE Transactions on Robotics; IEEE Transaction on Robotics; IEEE Transactions on Systems, Man and Cybernetics; International Journal of Robotics Research; International Journal of Solids and Structures; Journal of Applied Mechanics; Journal of Applied Physics; Journal of the Mechanics & Physics of Solids; Journal of the Royal Society Interface; Langmuir; Proceedings of the National Academy of Sciences; Proceedings of the Royal Society A; Sensors; Sensors and Actuators; Science Advances; Smart Materials & Structures; Soft Robotics

Conference Reviewer IEEE International Conference on Intelligent Robots and Systems; IEEE International Conference on Robotics and Automation; Dynamic Systems and Control Conference; IEEE International Conference on Intelligent Robots and Systems

Grant Reviewer National Science Foundation; American Chemical Society; Department of Energy; Fond de recherche Nature Quèbec – Nature et technologies; National Science Foundation of China; Human Frontier Science Program; ETH-Zurich Fellowship; Army Research Office

Awards, Prizes, & Honors

2016 CIT DeanÕs Early Career Fellow (CMU)
2015 George Tallman Ladd Award (CMU)
2015 ACM CHI 2015 Best Paper Award
2014 National Aeronautics and Space Administration (NASA) Early Career Faculty Award
2014 National Academy of Engineering (NAE), Frontiers of Engineering; Session Organizer
2014 CTO Forum, Rethink Disruption; Panelist
2013 PopTech Science Fellow
2013 National Academy of Engineering (NAE), Frontiers of Engineering; Invited Attendee
2013 Air Force Office of Scientific Research (AFOSR), Young Investigator Program
2012 Defense Advanced Research Projects Agency (DARPA), Young Faculty Award
2012 Office of Naval Research (ONR), Young Faculty Award
2001 Merrill Presidential Scholar, Cornell University
Awarded to seniors with a GPA in the top 1 percentile of the graduating class.
2001 Banner Bearer, Cornell University Graduation Ceremony
Honor bestowed to seniors with a GPA among the top 3 in the College of Engineering.

Media Interviews and Articles

Edd Gent, “Shape-Shifting Drones Could Be Made from Metal-Foam Hybrid,” Livescience (online), April 2016.

Ari Daniel, “Softer, More Human Robots,” PBS NOVA (Online), July 2015.

Ben Gruber, “The future of cuddly robots,” Reuters (Online), May 2015.

Alexandra Ossola, “Control your Smartphone with Stickers on your Skin,” Popular Science (Online), March 2015.

David Templeton, “Soft robotic arm developed at CMU inspires Disney’s animated feature” Pittsburgh Post-Gazette, November 2014.

Katherine Harmon, “A Tentacled, Flexible Breakthrough” New York Times, July 2014.

Helen Knight, “Squishy Robots” MIT Press, July 2014.

Katherine Harmon, "Will the Robot Uprising Be Squishy?" Scientific American Online, July 2013.

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Neil Savage, “Soft Robots for Hard Problems,” IEEE Spectrum, May 2012.

Jennifer Hicks, “Soft Robotics Takes Shape,” Forbes, April 2012.

Bruce Sterling, “Soft Robotic Grippers,” Wired, April 2012.

Denise Brehm, “Buckle In” MIT Press, March 2012.

Alicia Chang, “Gumby-like flexible robot crawls in tight spaces,” Associated Press, November 2011.

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