

# CARMEL MAJIDI

ASSOCIATE PROFESSOR

CARNEGIE MELLON UNIVERSITY

Department of Mechanical Engineering

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**Research Area:** “Soft-Matter Engineering” for Bio-Inspired Robotics & Wearable Computing

*Disciplines: Solid Mechanics, Soft Microfluidics, Microfabrication, Bio-Inspiration*

*Applications: Soft Robotics, Wearable Computing, Wireless Biomonitoring, Human-Machine Interaction*

## 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**

*Associate Professor (Untenured)*

August 2011 - Present  
Department of Mechanical Engineering

**Harvard University**

*Postdoctoral Fellow*

December 2009 - July 2011  
School of Engineering & Applied Sciences (SEAS)  
Supervisor: Robert Wood

**Princeton University**

*Postdoctoral Fellow*

December 2007 - December 2009  
Princeton Institute for the Science & Technology of Materials (PRISM)  
Supervisor: Mikko Haataja

# Peer-Reviewed Publications

## Published Journal Papers

- (J78) An autonomously electrically self-healing liquid metal-elastomer composite for robust soft-matter robotics and electronics  
E. J. Markvicka, M. D. Bartlett, X. Huang, C. Majidi  
*Nature Materials* **17** 618-624 (2018).
- (J77) EGaIn-Assisted Room Temperature Sintering of Silver Nanoparticles for Stretchable, Inkjet-Printed, Thin-Film Electronics  
M. Tavakoli, M. H. Malakooti, H. Paisana, Y. Ohm, D. G. Marques, P. A. Lopes, A. P. Piedade, A. T. de Almeida, and C. Majidi  
*Advanced Materials* **30** 1801852 (2018).
- (J76) Extreme Toughening of Soft Materials with Liquid Metal  
N. Kazem, M. D. Bartlett, C. Majidi  
*Advanced Materials* **30** 1706594 (2018).
- (J75) Untethered Soft Robotics  
S. I. Rich, R. J. Wood, C. Majidi  
*Nature Electronics* **1** 102 (2018).
- (J74) EGaIn-Metal Interfacing for Liquid Metal Circuitry and Microelectronics Integration  
KB Ozutemiz, J Wissman, OB Ozdoganlar, C Majidi  
*Advanced Materials Interfaces* **5** 1701596 (2018).
- (J73) Visually Imperceptible Liquid Metal Circuits for Transparent, Stretchable Electronics with Direct Laser Writing  
C. Pan, K. Kumar, J. Li, E. J. Markvicka, P. R. Herman, C. Majidi  
*Advanced Materials* **30** 1706937 (2018).
- (J72) Mechanics of fluid-elastomer systems in soft robotics  
C. Majidi  
*Robotic Systems and Autonomous Platforms*, Woodhead Publishing, 425-448 (2018).
- (J71) The effects of electroadhesive clutch design parameters on performance characteristics  
S. B. Diller, S. H. Collins, C. Majidi  
*Journal of Intelligent Material Systems and Structures* **29** 3804-3828 (2018).
- (J70) Fabrication and Characterization of Bending and Pressure Sensors for a Soft Prosthetic Hand  
R. Rocha, P. Lopes, A. de Alemeida, M. Tavakoli, C. Majidi  
*Journal of Micromechanics & Microengineering* **28** 034001 (2018).
- (J69) Deformation of Microchannels Embedded in an Elastic Medium  
V. I. Ramachandran, C. Majidi  
*Journal of Applied Mechanics & Microengineering* in press (2018).
- (J68) Hydroprinted Electronics: Ultrathin Stretchable Ag-In-Ga E-Skin for Bioelectronics & Human-Machine Interaction  
P. F. A. Lopes, H. Paisana, A. T. de Almeida, C. Majidi, M. Tavakoli  
*ACS Applied Materials & Interfaces* in press (2018).
- (J67) Controllable and reversible tuning of material rigidity for robot applications  
L. Wang, Y. Yang, Y. Chen, C. Majidi, F. Iida, E. Askounis, Q. Pei  
*Materials Today* **21** 563-576 (2018).
- (J66) Bio-inspired soft robotics: Material selection, actuation, and design  
S. Coyle, C. Majidi, P. LeDuc, K. J. Hsia  
*Extreme Mechanics Letters* **22** 51-59 (2018).
- (J65) Liquid Metal Actuator Driven by Electrochemical Manipulation of Surface Tension  
L. K. Russell, J. Wissman, C. Majidi

- Applied Physics Letters* **111** 254101 (2017).
- (J64) Field-Controlled Electrical Switch with Liquid Metal  
J. Wissman, M. D. Dickey, C. Majidi  
*Advanced Science* **4** 1700169 (2017).
- (J63) LM-cTPE Integration for Low-Voltage Stiffness Tuning  
S. Rich, S. H. Jang, Y. L. Park, C. Majidi  
*Advanced Materials Technologies* **2** 1700179 (2017).
- (J62) A Soft Gripper with Rigidity Tunable Elastomer Strips as Ligaments  
A. Mohammadi Nasab, A. Sabzehzar, M. Tatari, C. Majidi, W. Shan  
*Soft Robotics* **4** 411-420 (2017).
- (J61) Analysis of the Efficiency of Surfactant-Mediated Stabilization Reactions of EGaIn Nanodroplets  
L. R. Finkenauer, Q. Lu, I. F. Hakem, C. Majidi, M. R. Bockstaller  
*Langmuir* **33** 9703-9710 (2017).
- (J60) Soft-Matter Printed Circuit Board with UV Laser Micropatterning  
T. Lu, E. Markvicka, Y. Jin, C. Majidi  
*ACS Applied Materials and Interfaces* **9** 22055-22062 (2017).
- (J59) Controllable load sharing for soft adhesive interfaces on three-dimensional surfaces  
S. Song, D. M. Drotlef, C. Majidi, M. Sitti  
*Proceedings of the National Academy of Sciences* **114** E4344-E4353 (2017).
- (J58) Soft Multifunctional Composites and Emulsions with Liquid Metals  
N. Kazem, T. Hellebrekers, C. Majidi  
*Advanced Materials* **19** 1605985 (2017).
- (J57) High thermal conductivity in soft elastomers with elongated liquid metal inclusions  
M. D. Bartlett, N. Kazem, M. J. Powell-Palm, X. Huang, W. Sun, J. A. Malen, and C. Majidi  
*Proceedings of the National Academy of Sciences* **114** 2143-2148 (2017).
- (J56) Autonomous Selection of Closing Posture of a Robotic Hand through Embodied Soft Matter Capacitive Sensors  
M. Tavakoli, P. Lopes, J. Lourenco, R. P. Rocha, L. Giliberto, A. T. de Almeida, C. Majidi  
*IEEE Sensors Journal* **17** 5669-5677 (2017).
- (J55) Carbon doped PDMS: Conductance stability over time and implications on additive manufacturing of stretchable electronics  
M. Tavakoli, R. Rocha, L. Osorio, M. Almeida, A. de Almeida, V. Ramachandran, A. Tabatabai, T. Lu, C. Majidi  
*Journal of Micromechanics and Microengineering* **27** 035010 (2017).
- (J54) Role of Nonlinear Elasticity in Mechanical Impedance Tuning of Annular Dielectric Elastomer Membrane  
A. Cugno, S. Palumbo, M. Fraldi, L. Deseri, C. Majidi  
*Extreme Mechanics Letters* **13** 116-125 (2017).
- (J53) Soft Bionics Hands with a Sense of Touch Through an Electronic Skin  
M. Tavakoli, R. P. Rocha, J. Lourenco, T. Lu, C. Majidi  
*Soft Robotics: Trends, Applications and Challenges* 5-10 (2017).
- (J52) Rapid Fabrication of Soft, Multilayered Electronics for Wearable Bio-Monitoring  
M. D. Bartlett, E. Markvicka, C. Majidi  
*Advanced Functional Materials* **26** 8496-8504 (2016).
- (J51) Elastic Instabilities of a Ferroelastomer Beam for Soft Reconfigurable Electronics  
V. Ramachandran, M. D. Bartlett, J. Wissaman, C. Majidi  
*Extreme Mechanics Letters* **9** 282-290 (2016).
- (J50) Stretchable, high-k dielectric elastomers through liquid metal inclusions  
M. D. Bartlett, A. Fassler, N. Kazem, E. Markvicka, P. Mandal, C. Majidi

- Advanced Materials* **28** 3726-3731 (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 parameter 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** 26923-26929 (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 Galn 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-1<sup>st</sup> 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).

## Archived Conference Proceedings

- (P17) Liquid-Metal Microelectronics Integration for a Sensorized Soft Robot Skin  
T. Hellebrekers, K. B. Ozutemiz, J. Yin, C. Majidi  
*IEEE International Conference on Intelligent Robots and Systems (IROS)*  
Madrid, Spain (2018).
- (P16) Low-cost wearable human-computer interface with conductive fabric for STEAM education  
E. Markvicka, S. Rich, J. Liao, H. Zaini, C. Majidi  
*IEEE Integrated STEM Education Conference (ISEC)*  
Princeton, NJ (2018).
- (P15) Echinoderm-inspired Tube Feet for Robust Locomotion and Adhesion  
M. Bell, I. Pestovski, W. Scott, K. Kumar, M. K. Jawed, D. Paley, C. Majidi, J. Weaver, R. J. Wood  
*IEEE International Conference on Robotics and Automation (ICRA)*  
Brisbane, Australia (2018).
- (P14) Soft-matter sensor for proximity, tactile and pressure detection  
R. Rocha, P. F. A. Lopes, M. Tavakoli, A. de Almeida, C. Majidi  
*IEEE International Conference on Intelligent Robots and Systems (IROS)*  
Vancouver, BC (2017).
- (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).

## Issued Patents

- (X7) Non-differential elastomer curvature sensor  
 C. Majidi, R. K. Kramer, R. J. Wood  
*US Patent & Trademark Office* **9,228,822** January 5, 2016.
- (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.

## Awards, Prizes, & Honors

- 2018 Clarence Adamson Career Development Professorship (CMU)
- 2016 CIT Dean's 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

- Peter Holley, "Terminator skin: Researchers create 'self-healing' material for robots," Washington Post, May 2018.
- Hari Sreenivasan, "Engineering Smart Tattoos," PBS SciTech, April 2017.
- 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.
- Adam Hadhzy, "Soft Bots," Popular Science, March 2013.
- 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.
- "High-Friction Microfibers," Physics Today, October 2006.