

Julian J. Rimoli
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I. Earned Degrees

Ph.D., Aeronautics

California Institute of Technology, Pasadena, CA, 2009.

M.Sc., Aeronautics

California Institute of Technology, Pasadena, CA, 2005.

Aeronautical Engineer

Universidad Nacional de La Plata, La Plata, Argentina, 2001.

II. Employment

Associate Professor

School of Aerospace Engineering
Georgia Institute of Technology, Atlanta, GA, Feb 2017 - Present.

Assistant Professor

School of Aerospace Engineering
Georgia Institute of Technology, Atlanta, GA, Jan 2011 - Feb 2017.

Postdoctoral Associate

Department of Aeronautics and Astronautics
Massachusetts Institute of Technology, Cambridge, MA, Jun 2009 - Dec 2010.

Graduate Research Assistant

Graduate Aerospace Laboratories
California Institute of Technology, Pasadena, CA, Sep 2004 - May 2009.

Research and Development Engineer, Engineering Consultant

Applied Mechanical Testing Group
Universidad Nacional de La Plata, La Plata, Argentina, Sep 2001 - Aug 2004.

III. Honors and Awards

A. International or National Awards

2017 Grainger Foundation Frontiers of Engineering Grant

Awarded by the Grainger Foundation and the National Academy of Engineering to provide seed funding for U.S. FOE participants who are at U.S.-based institutions to enable further pursuit of important new interdisciplinary research and projects stimulated by the U.S. FOE symposia.

Selected for the National Academy of Engineering US Frontiers of Engineering Symposium

Invitation-only annual meeting that brings together 100 of the nation's outstanding young engineers (ages 30-45) from industry, academia, and government to discuss pioneering technical and leading-edge research in various engineering fields and industry sectors. Irvine, CA, 2016.

2015 National Science Foundation CAREER Award

Awarded in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations.

James Clerk Maxwell Young Writers Prize

Awarded annually to a talented young writer of a paper published in Philosophical Magazine or Philosophical Magazine Letters. Awarded by Philosophical Magazine and Philosophical Magazine Letters in partnership with the James Clerk Maxwell Foundation, Dallas, TX, 2011.

USACM Travel Award

Awarded to attend the 8th World Congress on Computational Mechanics. United States Association for Computational Mechanics, Venice, Italy, 2008.

B. Institute or School Awards

Class of 1940 Teaching Effectiveness Award

Awarded in recognition for excellence in instruction at Georgia Tech. Georgia Institute of Technology, Atlanta, GA, 2014.

Goizueta Junior Faculty Professorship

Awarded to an untenured faculty member at the Georgia Institute of Technology in recognition of potential to become an international leader in his research field. Georgia Institute of Technology, Atlanta, GA, 2014.

Lockheed Dean's Excellence in Teaching Award

Awarded in recognition of extraordinary effectiveness in classroom teaching, educational innovations, inspiration transmitted to students, direct impact and involvement with students, and impact on the postgraduate success of students. Georgia Institute of Technology, Atlanta, GA, 2014.

The Ernest E. Sechler Memorial Award in Aeronautics

Awarded to an Aeronautics student who has made the most significant contribution to the teaching and research effort of the Graduate Aerospace Laboratories. California Institute of Technology, Pasadena, CA, 2009.

Donald W. Douglas Prize Fellowship

Awarded to a first-year graduate student based on academic merit. California Institute of Technology, Pasadena, CA, 2004.

Research Fellowship

Awarded based on academic merit for research on alternative methodologies for teaching sciences. Universidad Nacional de La Plata, La Plata, Argentina, 1999-2000.

Research Initiation Fellowship

Awarded based on academic merit for development of static and dynamic testing facilities and implementation of applied mechanical tests. Universidad Nacional de La Plata, La Plata, Argentina, 1998.

IV. Research, Scholarship, and Creative Activities**A. Refereed Publications and Submitted Articles****A1. Published and Accepted Journal Articles**

- [1] G. Capuano, M. Ruzzene, and J. J. Rimoli. Modal-based finite elements for efficient wave propagation analysis. *Finite Elements in Analysis and Design*, in press.
- [2] H. Salahshoor, R. K. Pal, and J. J. Rimoli. Non-schmid effects and finite wavelength instabilities in single crystal metals. *Extreme Mechanics Letters*, 20:9 – 13, 2018.
- [3] G. Trainiti, J. J. Rimoli, and M. Ruzzene. Optical evaluation of the wave filtering properties of graded undulated lattices. *Journal of Applied Physics*, 123(9):091706, 2018.
- [4] J. J. Rimoli. A reduced-order model for the dynamic and post-buckling behavior of tensegrity structures. *Mechanics of Materials*, 116:146–57, 2018.
- [5] J. J. Rimoli and R. K. Pal. Mechanical response of 3-dimensional tensegrity lattices. *Composites Part B: Engineering*, 115:30–42, 2017.
- [6] A. M. Schinder, J. J. Rimoli, and M. L. R. Walker. Investigation of plasma material erosion under mechanical stress. *Journal of Propulsion and Power*, 33(2):433–447, 2017.
- [7] G. Trainiti, J. J. Rimoli, and M. Ruzzene. Wave propagation in undulated structural lattices. *International Journal of Solids and Structures*, 97-98:431–444, 2016.
- [8] R. K. Pal, M. Ruzzene, and J. J. Rimoli. A continuum model for nonlinear lattices under large deformations. *International Journal of Solids and Structures*, 96:300–319, 2016.
- [9] J. B. Bouquet, F. Burgaud, and J. J. Rimoli. Exploiting length-dependent effects for the design of single-material systems with enhanced thermal transport properties. *International Journal of Heat and Mass Transfer*, 101:1227–1236, 2016.
- [10] R. K. Pal, J. J. Rimoli, and M. Ruzzene. Effect of large deformation pre-loads on the wave properties of hexagonal lattices. *Smart Materials and Structures*, 25(5):054010, 2016.
- [11] F. Casadei, J. J. Rimoli, and M. Ruzzene. Multiscale finite element analysis of wave propagation in periodic solids. *Finite Elements in Analysis and Design*, 108:81–95, 2016.
- [12] A. Martowicz, M. Ruzzene, W. J. Staszewski, J. J. Rimoli, and T. Uhl. Out-of-plane elastic waves in 2D models of solids: A case study for a nonlocal discretization scheme with reduced numerical dispersion. *Mathematical Problems in Engineering*, 2015, 2015.

- [13] G. Trainiti, J. J. Rimoli, and M. Ruzzene. Wave propagation in periodically undulated beams and plates. *International Journal of Solids and Structures*, 75:260 – 276, 2015.
- [14] J. B. Bouquet and J. J. Rimoli. A length-dependent model for the thermomechanical response of ceramics. *Journal of the Mechanics and Physics of Solids*, 82:82 – 96, 2015.
- [15] J. J. Rimoli and J. J. Rojas. Meshing strategies for the alleviation of mesh-induced effects in cohesive element models. *International Journal of Fracture*, 193(1):29–42, 2015.
- [16] D. B. Hardin, J. J. Rimoli, and M. Zhou. Analysis of thermomechanical response of polycrystalline HMX under impact loading through mesoscale simulations. *AIP Advances*, 4(9):097136, 2014.
- [17] A. M. Schinder, M. L. R. Walker, and J. J. Rimoli. Three-dimensional model for erosion of a Hall effect thruster discharge channel wall. *Journal of Propulsion and Power*, 30(5):1373–1382, 2014.
- [18] F. Casadei, J. J. Rimoli, and M. Ruzzene. Multiscale finite element analysis of elastic wave scattering from localized defects. *Finite Elements in Analysis and Design*, 88:1–15, 2014.
- [19] T. Burton, A. M. Schinder, G. Capuano, J. J. Rimoli, M. L. R. Walker, and G. B. Thompson. Plasma induced erosion on ceramic wall structures in Hall effect thrusters. *Journal of Propulsion and Power*, 30(3):690–695, 2014.
- [20] M. R. Tupek, J. J. Rimoli, and R. Radovitzky. An approach for incorporating classical continuum damage models in state-based peridynamics. *Computer Methods in Applied Mechanics and Engineering*, 263:20–26, 2013.
- [21] F. Casadei, J. J. Rimoli, and M. Ruzzene. A geometric multiscale finite element method for the dynamic analysis of heterogeneous solids. *Computer Methods in Applied Mechanics and Engineering*, 263:56–70, 2013.
- [22] F. Casadei and J. J. Rimoli. Anisotropy-induced broadband stress wave steering in periodic lattices. *International Journal of Solids and Structures*, 50(9):1402–1414, 2013.
- [23] J. J. Rimoli, B. Talamini, J. J. Wetzel, K. P. Dharmasena, R. Radovitzky, and H. N. G. Wadley. Wet-sand impulse loading of metallic plates and corrugated core sandwich panels. *International Journal of Impact Engineering*, 38(10):837–848, October 2011.
- [24] J. J. Rimoli and M. Ortiz. A duality-based method for generating geometric representations of polycrystals. *International Journal for Numerical Methods in Engineering*, 86(9):1069–1081, June 2011.
- [25] L. Qiao, J. J. Rimoli, Y. Chen, C. A. Schuh, and R. Radovitzky. Nonlocal superelastic model of size-dependent hardening and dissipation in single crystal Cu-Al-Ni shape memory alloys. *Physical Review Letters*, 106(8):085504, February 2011.
- [26] J. J. Rimoli and M. Ortiz. A three-dimensional multiscale model of intergranular hydrogen-assisted cracking. *Philosophical Magazine*, 90(21):2939–2963, July 2010.
- [27] J. J. Rimoli, E. Gürses, and M. Ortiz. Shock-induced subgrain microstructures as possible homogeneous sources of hot spots and initiation sites in energetic polycrystals. *Physical Review B*, 81(1):014112, January 2010.

A2. Conference Presentation with Proceedings (Refereed)

- [1] C. V. Di Leo, B. Leon, J. Wachlin, M. Kurien, J. J. Rimoli, and M. Costello. Cable-driven four-bar link robotic landing gear mechanism: Rapid design and survivability testing. In *2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Orlando, FL, 2018.
- [2] A. M. Schinder, M. Walker, and J. J. Rimoli. Search for anomalous ridge growth during stressed material plasma erosion. In *52nd AIAA/SAE/ASEE Joint Propulsion Conference and Exhibit*, Salt Lake City, UT, 2016.
- [3] J. J. Rimoli. On the impact tolerance of tensegrity-based planetary landers. In *57th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, San Diego, CA, 2016.
- [4] A. Martowicz, M. Ruzzene, W. J. Staszewski, J. J. Rimoli, and T. Uhl. A nonlocal finite difference scheme for simulation of wave propagation in 2d models with reduced numerical dispersion. In *Proc. SPIE*, volume 9064, pages 90640F – 90640F–8, 2014.
- [5] A. M. Schinder, M. Walker, and J. J. Rimoli. 3d model for atomic sputtering of heterogeneous ceramic compounds. In *49th AIAA/SAE/ASEE Joint Propulsion Conference and Exhibit*, San Jose, CA, 2013.
- [6] G. Capuano, M. Ruzzene, and J. J. Rimoli. Modal-based finite elements for efficient wave propagation analysis. In *Proceedings of the ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Portland, OR, 2013.
- [7] F. Casadei, J. J. Rimoli, and M. Ruzzene. Multiscale analysis of wave-damage interaction in two and three dimensional isotropic plates. In *Proceedings of SPIE Smart structures/NDE*, San Diego, CA, 2013.
- [8] J. J. Rimoli, J. J. Rojas, and F. N. Khemani. On the mesh dependency of cohesive zone models for crack propagation analysis. In *53rd AIAA Structures, Structural Dynamics, and Materials and Conference*, Honolulu, HI, 2012.
- [9] C. Bjerken, J.J. Rimoli, and M. Ortiz. Stress corrosion crack growth beneath a stiff coating: Influence of chemical potential and interface toughness. In *12th International Conference on Fracture*, Ottawa, Canada, 2009.
- [10] W.P. Jackson, J. Franck, P. Ochoa, J. Maloney, J.J. Rimoli, and L.M. Rivas. Physics fundamentals, engineering design, and research: An integrated approach to the development of a three-week shortcourse. In *Proceedings of the American Society for Engineering Education Annual Conference and Exhibition*, Pittsburgh, PA, 2008.
- [11] J.J. Rimoli, A.J. Patanella, P.L. Ringegni, and M.D. Actis. Models for simulating the structural dynamics of high-tension power lines (originally in spanish). In *Mecánica Computacional, Vol. 23 (Eds. G. Buscaglia et. al.)*, Bariloche, Argentina, 2004.
- [12] N. Baade, C. Bodroga, F. Prodanoff, and J.J. Rimoli. The software campos and its didactic contribution (originally in spanish). In *Memorias Primer Simposio Iberico de Informatica Educativa. 1 SIIIE*, Aveiro, Portugal, 1999.

B. Other Publications and Creative Products

B1. Software

1. Truss Me!

Truss Me!, is an educational app that has gained traction among students and educators around the world, with over 230,000 downloads across 150 countries. The main goal of *Truss Me!* is to help students, all the way from high school to college, to build intuition on how truss structures behave. The app utilizes state of the art simulation techniques and advanced mechanics (finite deformation, plasticity, fracture) to provide the most realistic behavior for the structures, and has been adopted for teaching at ETH Zurich, Rutgers University, Vanderbilt University, the University of California at Los Angeles (UCLA), and the California Institute of Technology (Caltech), among other educational institutions. *The app is the outcome of a personal approach to bring together research interests (computational mechanics) and education.*

B2. Patents

- [1] J. J. Rimoli, F. Casadei, and M. Ruzzene. Multiphase materials for stress wave steering and methods of providing same, 08 2015.
- [2] J. J. Rimoli, C. V. Di Leo, C. Gebara, and J. Lavirgen. Articulated joint mechanism for cable-based and tensegrity structures, Patent pending.
- [3] J. J. Rimoli. Tensegrity lattices for metamaterials and structural applications, Patent pending.
- [4] C.V. Di Leo, M. F. Costello, B. Leon, J. J. Rimoli, and M. B. Ward. Cable-driven four-bar link leg mechanism, Patent pending.

B3. Other Creative Products

B3.a. Invited Articles

- [1] J. J. Rimoli. Journal club theme of august 2012: Mesh-dependence in cohesive element modeling. <http://www.imechanica.org/node/12899>. iMechanica Journal Club (by invitation only), 12012 hits as of 09/15/2014.

C. Presentations

C1. Keynote Addresses and Plenary Lectures

- [1] J. J. Rimoli. A physics-based reduced-order model for the dynamic and post-buckling behavior of tensegrity structures and metamaterials. In *23rd Congress on Numerical Methods and Applications*, La Plata, Argentina, 2017.
- [2] J. J. Rimoli. A physics-based reduced-order model for the dynamic and post-buckling behavior of tensegrity structures and metamaterials. In *14th U.S. National Congress on Computational Mechanics*, Montreal, Canada, 2017.
- [3] Lessons learned during my journey in STEM education. GoSTEM/Latin American Association Workshop on Bridging the STEM educational gap for Latinos in Georgia, Atlanta, GA, October 10, 2015.

- [4] Models for erosion mechanisms in Hall effect thrusters. 3rd Argentine Congress of Aeronautical Engineering, La Plata, Argentina, November 12, 2014.
- [5] Advanced simulations and mobile gaming in the classroom. PLTW Summit, Indianapolis, IN, November 3, 2014.

C2. Invited Conference and Workshop Presentations

- [1] Buckling-dominated tensegrity planetary landers. Workshop on Structurally Adaptive Tensegrity Robots, Pasadena, CA, July 25, 2017.
- [2] On the mechanical response of 3-dimensional tensegrity lattices. 2016 International Workshop on Multiscale Innovative Materials and Structures, Cetara, Italy, October 29, 2016.
- [3] Towards tensegrity-based metamaterials. The Future of Vibration Energy Transfer in Solids and Structures: Needs and Opportunities Workshop, Seattle, WA, October 18, 2016.
- [4] On the impact tolerance of tensegrity-based structures. First Georgia Tech Mathematics and Applications Portal Workshop on Materials, Atlanta, GA, August 17, 2016.
- [5] On the impact tolerance of tensegrity-based structures. IUTAM Symposium on Dynamic Instabilities in Solids, Madrid, Spain, May 18, 2016.
- [6] Introducing length-dependent effects at the mesoscale. 2nd Joint Sandia-Georgia Tech Materials Workshop, Albuquerque, NM, February 11, 2016.
- [7] Capturing size-effects without gradient theories: a non-local multi-scale model for the thermo-mechanical response of ceramics. 1st Joint Sandia-Georgia Tech Materials Workshop, Atlanta, GA, December 9, 2015.
- [8] A concurrent multi-scale model for the thermo-mechanical response of materials. IUTAM Symposium on Innovative Numerical Approaches for Materials and Structures in Multi-Field and Multi-Scale Problems, Attendorn, Germany, September 3, 2014.
- [9] Barycentric subdivision meshes in computational solid mechanics. NSF Workshop on Barycentric Coordinates in Geometry Processing and Finite/Boundary Element Methods Columbia University, New York, July 26, 2012.

C3. Conference and Workshop Presentations

- [1] J. J. Rimoli. Towards tensegrity-based metamaterials. In *2017 Mach Conference*, Annapolis, MD, 2017.
- [2] J. J. Rimoli and J. B. Bouquet. Size effects at the mesoscale: A non-local multi-scale model for the thermomechanical response of materials. In *12th World Congress on Computational Mechanics*, Seoul, Korea, 2016.
- [3] J. J. Rimoli and J.B. Bouquet. A concurrent multi-scale model for the thermomechanical response of ceramics. In *ASME 2015 International Mechanics/ Engineering Congress and Exposition*, Houston, TX, 2015.

- [4] J. J. Rimoli. On the post buckling behavior of tensegrity structures. In *52nd Annual Technical Meeting of the Society of Engineering Science*, College Station, TX, 2015.
- [5] J. J. Rimoli and J.B. Bouquet. A concurrent multi-scale model for the thermo-mechanical response of materials. In *13th U.S. National Congress for Computational Mechanics*, San Diego, CA, 2015.
- [6] J. J. Rimoli. Developing mobile educational apps: a teacher's perspective. In *Society of Experimental Mechanics Annual Conference and Exposition*, Costa Mesa, CA, 2015.
- [7] J. J. Rimoli, A. Mota, J. Foulk, and J. Ostien. Conjugate-directions meshes for cohesive element models: the 3-dimensional case. In *51st Annual Technical Meeting of the Society of Engineering Science*, West Lafayette, IN, 2014.
- [8] J. J. Rimoli, J. J. Rojas, and R. Quinn. Meshing strategies for the alleviation of mesh-induced effects in cohesive element models. In *11th World Congress on Computational Mechanics*, Barcelona, Spain, 2014.
- [9] T. Burton, G. B. Thompson, M. Walker, J. J. Rimoli, A. M. Schinder, and G. Capuano. Microstructural characterization of eroded m26 het thruster wall. In *143rd TMS Annual Meeting and Exhibition*, San Diego, CA, 2014.
- [10] A. Mota, J. Ostien, J. Foulk, J. Thunes, J. Rojas, and J. J. Rimoli. Topology manipulation for fracture and failure in albañy. In *Albany Users Meeting*, Albuquerque, NM, 2014.
- [11] D. B. Hardin, J. J. Rimoli, and M. Zhou. Thermomechanical response of hmx polycrystals to simulated impact loading. In *18th Biennial International Conference of the APS Topical Group on Shock Compression of Condensed Matter*, Seattle, WA, 2013.
- [12] J. J. Rimoli and J. J. Rojas. Meshing strategies for the alleviation of mesh-induced effects in cohesive element models. In *12th U.S. National Congress for Computational Mechanics*, Raleigh, NC, 2013.
- [13] T. Burton, A. M. Schinder, G. Capuano, J. J. Rimoli, M. Walker, and G. B. Thompson. Erosion characteristics in a composite bn-sio2 hall effect thruster chamber wall. In *37th Annual Conference on Composites, Materials, and Structures*, Cocoa Beach, FL, 2013.
- [14] J. J. Rimoli and J. J. Rojas. Conjugate direction meshes for crack propagation analysis. In *Society of Hispanic Professional Engineers Conference 2012*, Dallas, TX, 2012.
- [15] J. J. Rimoli and J. J. Rojas. Conjugate direction meshes for crack propagation analysis. In *ASME 2012 International Mechanical Engineering Congress & Exposition*, Houston, TX, 2012.
- [16] D. B. Hardin, M. Zhou, and J. J. Rimoli. Crystalline plasticity as a source of hot spots in energetic molecular polycrystals. In *49th Annual Technical Meeting of the Society of Engineering Science*, Atlanta, GA, 2012.
- [17] J. J. Rimoli, J. J. Rojas, and P. Gautam. Application of conjugate-directions meshes to crack propagation analysis. In *49th Annual Technical Meeting of the Society of Engineering Science*, Atlanta, GA, 2012.
- [18] J. J. Rimoli and J. J. Rojas. Conjugate direction meshes for crack propagation analysis. In *10th World Congress on Computational Mechanics*, Sao Paulo, Brazil, 2012.

- [19] J. J. Rimoli, B. Reichard, L. Guidoni, and M. Ruzzene. Guiding of high amplitude stress waves through stress-induced domain switching in multiphase materials. In *APS March Meeting*, Boston, MA, 2012.
- [20] F. Casadei, J. J. Rimoli, and M. Ruzzene. Anisotropy-induced wave steering in periodic linear and nonlinear lattices. In *APS March Meeting*, Boston, MA, 2012.
- [21] J. J. Rimoli, M. Ruzzene, and F. Casadei. Guiding of high amplitude stress waves through stress-induced domain switching in periodic multiphase materials. In *12th Pan American Congress of Applied Mechanics*, Port of Spain, Trinidad, 2012.
- [22] F. Casadei, J. J. Rimoli, and M. Ruzzene. Guiding of high amplitude stress waves through stress-induced domain switching in periodic multiphase materials. In *48th Annual Technical Conference of Society of Engineering Sciences*, Evanston, IL, 2011.
- [23] J. J. Rimoli and M. Ortiz. The relaxed dual complex method: A powerful tool for generating geometric representations of polycrystals. In *11th U.S. National Congress for Computational Mechanics*, Minneapolis and St. Paul, MN, 2011.
- [24] L. Qiao, J. J. Rimoli, Y. Chen, C. Schuh, and R. Radovitzky. Nonlocal superelastic model of size-dependent hardening and dissipation in single crystal Cu-Al-Ni shape memory alloys. In *11th U.S. National Congress for Computational Mechanics*, Minneapolis and St. Paul, MN, 2011.
- [25] J. J. Rimoli, E. Gurses, and M. Ortiz. Shock-induced subgrain microstructures as possible homogenous sources of hot spots and initiation sites in energetic polycrystals. In *2010 TMS Annual Meeting & Exhibition*, Seattle, WA, 2010.
- [26] J. J. Rimoli, E. Gurses, and M. Ortiz. Multiscale modeling of high energetic materials under impact loads. In *10th U.S. National Congress for Computational Mechanics*, Columbus, OH, 2009.
- [27] J. J. Rimoli and M. Ortiz. A multiscale and multiphysics model for stress corrosion cracking. In *8th World Congress on Computational Mechanics*, Venice, Italy, 2008.
- [28] A. C. Van Duin, M-J Cheng, W. A. Goddard, S. Serebrinsky, J. J. Rimoli, and M. Ortiz. Application of reaxff reactive force fields to stress corrosion cracking: a link from quantumchemistry to finite element simulations. In *2007 TMS Annual Meeting & Exhibition*, Orlando, FL, 2007.

C4. Invited Seminar Presentations

- [1] Towards tensegrity-based metamaterials. Harvard University Applied Mechanics Colloquium, Cambridge, MA, September 27, 2017.
- [2] A new class of discontinuous compression metamaterials. Massachusetts Institute of Technology, Cambridge, MA, September 26, 2017.
- [3] Towards tensegrity-based metamaterials. HRL Laboratories, Malibu, CA, June 12, 2017.
- [4] Towards tensegrity-based metamaterials. University of California Irvine, Irvine, CA, January 6, 2017.
- [5] On the impact tolerance of tensegrity-based structures. Texas A&M University, College Station, TX, June 7, 2016.

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- [6] Learning to design structures through gaming and advanced simulations. ETH Zurich, Zurich, Switzerland, June 1, 2016.
 - [7] Size effects at the mesoscale: A concurrent multi-scale model for the thermo-mechanical response of materials. Stanford University, Palo Alto, CA, April 21, 2016.
 - [8] Size effects at the mesoscale: A concurrent multi-scale model for the thermo-mechanical response of materials. University of Alabama, Tuscaloosa, AL, April 15, 2016.
 - [9] Size effects at the mesoscale: A concurrent multi-scale model for the thermo-mechanical response of materials. Northwestern University Colloquium in Theoretical and Applied Mechanics, Evanston, IL, March 31, 2016.
 - [10] A concurrent multi-scale model for the thermo-mechanical response of ceramics. IMDEA Materials Institute, Getafe, Madrid, Spain, December 1, 2015.
 - [11] Tensegrity structures for planetary landing. SENER Aerospace, Tres Cantos, Madrid, Spain, November 30, 2015.
 - [12] A concurrent multi-scale model for the thermomechanical response of ceramics. MIT Distinguished Seminar Series in Computational Science and Engineering, Cambridge, MA, September 25, 2015.
 - [13] A length-dependent model for the thermomechanical response of ceramics. Rutgers University, New Brunswick, New Jersey, December 10, 2014.
 - [14] Modeling deformation and fracture of boundary materials for electric propulsion applications. University of California, Los Angeles, CA, August 28, 2014.
 - [15] Developing mobile educational apps: A teacher's perspective. ETH Zurich, Zurich, Switzerland, May 28, 2014.
 - [16] Mesoscale models for heterogeneous ceramic compounds under extreme environments. ETH Zurich, Zurich, Switzerland, May 27, 2014.
 - [17] Meshing strategies for the alleviation of mesh-induced effects in cohesive element models. Sandia National Laboratories, Albuquerque, NM, August 12, 2013.
 - [18] On the mesh dependency of cohesive zone models for crack propagation analysis. Massachusetts Institute of Technology, Cambridge, MA, February 28, 2012.
 - [19] On the mesh dependency of cohesive zone models for crack propagation analysis. Sandia National Laboratories, Livermore, CA, September 1, 2011.
 - [20] Wave propagation in nonlinear structured materials with adaptive topologies. University of Virginia, Charlottesville, VA, April 7, 2011.
 - [21] Multiscale modeling of materials and structures. Universidad Nacional del Noroeste de la Provincia de Buenos Aires, Junin, Argentina, November 9, 2010.
 - [22] Foreign object impact damage: mitigation strategies through advanced modeling and simulation. Massachusetts Institute of Technology, Cambridge, MA, May 4, 2010.
 - [23] Foreign object impact damage: mitigation strategies through advanced modeling and simulation. Georgia Institute of Technology, Atlanta, GA, April 27, 2010.

- [24] Decoupled 3-dimensional simulations of wet sand blast on aluminum plates and corrugated panels. University of Virginia, Charlottesville, VA, April 8, 2010.
- [25] Large scale 3-dimensional simulations of blast and ballistic tests. University of Virginia, Charlottesville, VA, April 7, 2010.
- [26] Modeling of intergranular stress corrosion cracking. Universidad Nacional de La Plata, Argentina, May 28, 2009.
- [27] Computational models for assessing failure by stress-corrosion cracking. Exponent Failure Analysis, Menlo Park, CA, July 25, 2008.
- [28] A multiscale model for intergranular stress corrosion cracking. University of California, Los Angeles, CA, June 23, 2008.
- [29] A computational model of gun barrel erosion. GALCIT Research Conference, Pasadena, CA, January 23, 2007.
- [30] Atomistically-informed continuum level calculations of crack propagation by hydrogen embrittlement. University of Southern California, Los Angeles, CA, October 31, 2007.

D. Grants and Contracts

D1. As Principal Investigator

1. Title of Project: Guiding of high amplitude stress waves through stress-induced domain switching in multiphase materials
Agency/Company: Army Research Office
Total Dollar Amount: \$382,774
Role: PI
Collaborators: Massimo Ruzzene (co-PI)
Period of Contract: 09/2012 – 08/2015
Candidate's Share: ~50% (\$191,387)
2. Title of Project: Three-Dimensional Conjugate Directions Meshes for Crack Propagation Analysis
Agency/Company: Sandia National Laboratories
Total Dollar Amount: \$119,296
Role: PI
Collaborators: N/A
Period of Contract: 01/2012 – 9/2014
Candidate's Share: 100% (\$119,296)
3. Title of Project: CAREER: Modeling Materials Across the Length Scales to Achieve Enhanced Thermomechanical Properties
Agency/Company: National Science Foundation
Total Dollar Amount: \$500,000
Role: PI
Collaborators: N/A
Period of Contract: 08/2015 – 07/2020
Candidate's Share: 100% (\$500,000)

4. Title of Project: Tensegrity Structures for Planetary Landing
Agency/Company: NASA/JPL – GATech/CSTAR
Total Dollar Amount: \$25,000
Role: PI
Collaborators: N/A
Period of Contract: 06/2016 – 07/2016
Candidate's Share: 100% (\$25,000)
5. Title of Project: Tensegrity Damping Strategies for Controlled Hopping on Small Solar System Bodies
Agency/Company: National Academy of Engineers – Grainger Foundation
Total Dollar Amount: \$30,000
Role: PI
Collaborators: Marco Pavone, Stanford University (co-PI)
Period of Contract: 06/2017 – 06/2018
Candidate's Share: 50% (\$15,000)
6. Title of Project: Plume-Surface Interaction Simulation of High-Mass Mars Lander
Agency/Company: NASA
Total Dollar Amount: \$82,117
Role: PI
Collaborators: N/A
Period of Contract: 08/2017 – 05/2018
Candidate's Share: 100% (\$82,117)
7. Title of Project: Computation of Wind Loads and Stress Levels in Portman's Georgia Tech Sculpture
Agency/Company: Portman Architecture
Total Dollar Amount: \$63,915
Role: PI
Collaborators: Marylin Smith (co-PI)
Period of Contract: 09/2017 – 08/2018
Candidate's Share: 82% (\$52,822)
8. Title of Project: Modeling tensegrity landers for icy terrains
Agency/Company: NASA/JPL
Total Dollar Amount: \$21,150
Role: PI
Collaborators: N/A
Period of Contract: 01/2018 – 08/2018
Candidate's Share: 100% (\$21,150)

D2. As Co-Principal Investigator

1. Title of Project: Computational and Experimental Multiscale Analysis of Heterogeneous Solids and Metamaterials
Agency/Company: National Science Foundation
Total Dollar Amount: \$300,000
Role: co-PI
Collaborators: Massimo Ruzzene (PI)
Period of Contract: 09/2011 – 08/2015
Candidate's Share: ~50% (\$150,000)
2. Title of Project: Comprehensive Study of Plasma-Wall Sheath Transport Phenomena
Agency/Company: Air Force Office for Scientific Research
Total Dollar Amount: \$2,500,000
Role: co-PI
Collaborators: Mitchell Walker (PI), Jud Ready (co-PI, GTRI), Michael Keidar (co-PI, GWU), Gregory Thompson (co-PI, UA)
Period of Contract: 01/2011 – 12/2015
Candidate's Share: ~9% (\$280,000)
3. Title of Project: Independent Evaluation of Super Puma EC225 Failure Analysis
Agency/Company: Eurocopter France
Total Dollar Amount: \$210,000
Role: co-PI
Collaborators: Krish Ahuja (PI), George Kardomateas (co-PI), Massimo Ruzzene (co-PI)
Period of Contract: 03/2013 – 09/2013
Candidate's Share: ~25% (\$42,000)
4. Title of Project: Development of Robotic Landing Gear for Rotorcraft
Agency/Company: DARPA
Total Dollar Amount: \$1,000,000
Role: co-PI
Collaborators: Mark Costello (PI)
Period of Contract: 10/2015 – 09/2016
Candidate's Share: ~22% (\$221,528)
5. Title of Project: High-Fidelity Coupling of Predictive Plasma-Wall Models
Agency/Company: AFOSR
Total Dollar Amount: \$1,050,000
Role: co-PI
Collaborators: Mitchell Walker (PI), Michael Keidar (co-PI, GWU)
Period of Contract: 07/2016 – 06/2019
Candidate's Share: ~33% (\$350,000)

6. Title of Project: Model Based Life Extending Control for Rotorcraft (Vertical Lift Center of Excellence task)
 Agency/Company: ARO
 Total Dollar Amount: \$675,046
 Role: co-PI
 Collaborators: J. V. R. Prasad (PI)
 Period of Contract: 08/2016 – 07/2021
 Candidate's Share: ~33% (\$225,000)
7. Title of Project: Evacuated Airship for Mars Missions
 Agency/Company: NASA
 Total Dollar Amount: \$123,739
 Role: co-PI
 Collaborators: J. P. Clarke (PI)
 Period of Contract: 08/2017 – 05/2018
 Candidate's Share: ~50% (\$61,869)

V. Teaching

A. Courses Taught

Semester, Year	Course Number	Course Title	Enrolled Students
Spring 2017	COE 2001	Statics	59
Fall 2016	AE 6114	Fundamentals of Solid Mechanics	37
Spring 2016	COE 2001	Statics	53
Spring 2016	AE 3145	Undergraduate Structures Laboratory	140
Spring 2016	AE 2610	Intr. to Exp. Methods in Aerospace	92
Fall 2015	AE 6114	Fundamentals of Solid Mechanics	22
Fall 2014	AE 3145	Undergraduate Structures Laboratory	77
Fall 2014	AE 8803	Fundamentals of Solid Mechanics	18
Spring 2014	COE 2001	Statics	46
Fall 2013	AE 8803	Fundamentals of Solid Mechanics	21
Spring 2013	AE 6104	Computational Mechanics	21
Spring 2013	COE 2001	Statics	50
Fall 2012	AE 8803	Fundamentals of Solid Mechanics	17
Spring 2012	AE 3145	Undergraduate Structures Laboratory	71
Fall 2011	AE 3145	Undergraduate Structures Laboratory	67
Fall 2011	COE 2001	Statics	39
Spring 2011	COE 2001	Statics	41

B. Individual Student Guidance

B1. Ph.D. Students

1. Aaron Schinder. Start Date: January 2012. Research topic: Experimental and computational assessment of plasma-induced sputtering and erosion in heterogeneous ceramic compounds. Progression: student graduated in August 2016. Co-advisor: Prof. Mitchell Walker

2. Jean-Baptiste Bouquet. Start Date: January 2012. Research topic: Multiscale and multiphysics modeling of thermal damage in heterogeneous ceramic compounds. Progression: student graduated in December 2016.
3. German Capuano. Start date: May 2011. Research topic: Computational methods for multiscale analysis of heterogeneous materials and structures. Progression: student passed the Ph.D. qualifying exams during Fall 2013.
4. Amirhossein Salahshoor. Start Date: August 2013. Research topic: 5-parameter grain boundary energy models for direct numerical simulations of polycrystalline materials. Progression: student passed the Ph.D. qualifying exams during Fall 2014.
5. Hernan Javier Logarzo. Start Date: August 2016. Research topic: Plasma-material interaction. Progression: preparing for qualifying exams.

B2. M.S. Students

1. Juan Javier Rojas Carrillo. M.S. special problem topic: Conjugate direction meshes for crack propagation analysis. Graduation date: Summer 2011.
2. Puri Gautam. M.S. special problem topic: Effect of mesh topology on FEA simulation of crack propagation using cohesive elements. Graduation date: Spring 2012.
3. Ruiming Lu. M.S. special problem topic: Profiling and optimization of a parallel code for modeling fracture. Graduation date: Spring 2015.
4. Kate Gunderson. M.S. special topic: Reduced-order component-level structural models. Progression: preparing special topic report.

B3. Undergraduate Students

1. Farah Khemani (Summer 2011)
2. Brett Reichard (Fall 2011, Spring 2012 - **PURA Award**)
3. Luca Guidoni (Fall 2011, Spring 2012, Summer 2012)
4. Johnny Lee Worthy III (Fall 2012)
5. Evan Zinner (Summer 2013)
6. Ryan Quinn (Fall 2013, Fall 2014)
7. Ulises Nunes Garzon (Spring 2014)
8. Tiffany Davis (Spring 2014)
9. Harleen Kaur Brar (Summer 2014)
10. Kevin J. Okseniuk (Fall 2014 - **PURA Award**)
11. Sergio Alfonso Sandoval Escobedo (Fall 2014, Spring 2015, Fall 2015, Spring 2016)
12. Michael Marshall (Fall 2014)

13. Christine Gebara (Fall 2015 - **PURA Award**, Spring 2016, Fall 2016 - **PURA Award**)
14. Eric Stewart (Spring 2016, Fall 2016, Fall 2017)
15. Benjamin Rahm (Spring 2017)
16. Abhinav Jha (Spring 2017, Fall 2017 - **PURA Award**)
17. Hayden Bartsch (Summer 2017)
18. Miriam Rath (Summer 2017, Fall 2017)
19. Isaac del Valle (Summer 2017, Fall 2017)
20. Christopher Williamson (Fall 2017)

B4. Service on thesis or dissertation committees

B4.a. Internal (Student, School, Advisor, Date)

1. Roussislava Zaharieva, AE, Sathya Hanagud, Summer 2011
2. Filippo Casadei, AE, Massimo Ruzzene, Summer 2012
3. Kevin Manktelow, ME, Michael Leamy, Spring 2013
4. Benjamin Adair, ME, W. Steven Johnson and Stephen D. Antolovich, Summer 2013
5. Pezhman Mardanpour, AE, Dewey Hodges, Summer 2013
6. William D. Musinski, ME, David L. McDowell, Spring 2014
7. Jeffrey Lloyd, ME, David L. McDowell, Spring 2014
8. Phillip Richards, AE, Dewey Hodges, Fall 2014
9. Barrett Hardin, ME, Min Zhou, Spring 2015
10. Kalyana C. Gottiparthi, AE, Suresh Menon, Spring 2015
11. Ravi Kumar Kovvali, AE, Dewey Hodge, Summer 2015
12. Siddharth Avachat, ME, Min Zhou, Fall 2015
13. Matteo Carrara, AE, Massimo Ruzzene, Fall 2015
14. Jeremy Hill, AE, Robert D. Braun, Spring 2016
15. Seokpum Kim, ME, Min Zhou, Summer 2016
16. Eric Smith, ME, Aldo Ferri, Summer 2016
17. Souhayl Sadik, CE, Arash Yavari, Fall 2016
18. Marshall Schaeffer, ME, Massimo Ruzzene, Fall 2016
19. Yen-Po Lin, AE, Minfeng Yu, Spring 2017

20. Balaji Muralidharan, AE, Suresh Menon, Spring 2017
21. Rodcheuy Nunthadech, AE, George Kardomateas, Spring 2017
22. Matthew S. Bopp, AE, Stephen Ruffin, Fall 2017
23. Murali Gopal, AE, Vigor Yang, in progress
24. Amirebrahim Darabi, ME, Michael Leamy, in progress
25. Zhangxian Yuan, AE, George Kardomateas, in progress
26. Giuseppe Trainiti, AE, Massimo Ruzzene, in progress
27. Hanif Hoseini, AE, Dewey Hodges, in progress
28. Adam Sidor, AE, Robert Braun, in progress
29. Alexandra Long, AE, Glenn Lightsey, in progress
30. Ashkan Golgoon, CE, Arash Yavari, in progress
31. Mostafa Faghih Shojaei, CE, Arash Yavari, in progress
32. Kaikai Che, ME, Julien Meaud, in progress

B4.b. External (Student, University, Advisor, Date)

1. Javier Vila, Universidad Carlos III, Madrid, Spain, Ramón Zaera Polo and José Fernández-Sáes, Summer 2016
2. Thomas Burton, University of Alabama, Gregory Thompson, Fall 2016

B5. Mentoring of postdoctoral fellows or visiting scholars

1. Dr. Raj Kumar Pal, Postdoctoral Scholar, Spring 2015–present.
2. Dr. Claudio V. Di Leo, Postdoctoral Scholar, Fall 2015–Fall 2016.
3. Juan Lavirgen, Visiting Scholar, Fall 2015.

C. Other Teaching Activities

C1. Courses Development

1. **AE 6114/Fundamentals of Solid Mechanics:** graduate level class covering, in a cohesive way, fundamental aspects of solid mechanics ranging from nonlinear continuum mechanics to linear elasticity and energy methods. This course is required for the qualifying exams.
2. **AE 2610/Introduction to Experimental Methods in Aerospace:** co-developed this introductory undergraduate course on experimental methods in aerospace engineering. The course is part of the newly introduced AE curriculum.

C2. Course Improvement

1. **AE 3145/Undergraduate Structures Laboratory:** Adapted course activities, including required labs, lab format, reporting scheme, and lecture content to match the requirement of a one credit class.

C3. Other Teaching Activities

1. **AE 1601/Introduction to Aerospace Engineering:** Developed a 1 1/2 hour introductory lecture to aerospace structural design. The class includes a 30-minute theoretical introduction to the topic, 30 minutes of guided hands-on activities on structural design, and 30 minutes of a structural design competition in which students design a planetary lander using *Truss Me!*, an educational iOS/Android app I developed. This activity has been implemented on each of the three sections of this course on the following semesters: Fall 2014, Spring and Fall 2015, and Spring 2016.

VI. Service

A. Professional Contributions

A1. Editorial Board Membership

- Associate Editor, ASME Journal of Vibration and Acoustics, 2017 – 2020.

A2. Society Offices, Activities, and Membership

A2.a. Offices and Activities

- Technical Discipline Liaison (Structures), Survivability Committee, American Institute of Aeronautics and Astronautics, 2017 – present.
- Technical Discipline Conference Chair, Survivability Committee, American Institute of Aeronautics and Astronautics, 2014 – 2016.
- Technical Discipline Conference Deputy, Survivability Committee, American Institute of Aeronautics and Astronautics, 2012 – 2014.

A2.b. Membership

- Associate Fellow, American Institute of Aeronautics and Astronautics, 2017 – present.
- Senior Member, American Institute of Aeronautics and Astronautics, 2014 – 2017.
- Member, American Institute of Aeronautics and Astronautics, 2011 – 2014.
- Member, American Society of Mechanical Engineers, 2011 - -present.
- Member, United States Association for Computational Mechanics, 2011 – present.
- Member, Society of Engineering Science, 2011 – present.

A3. Organization and Chairmanship of Technical Sessions, Workshops and Conferences

1. Advances in Computational Methods for Heterogeneous Materials, 12th World Congress on Computational Mechanics, Seoul, Korea, 2016.
2. Advances in Computational Methods for Heterogeneous Materials, 13th United States National Congress on Computational Mechanics, San Diego, CA, 2015.
3. Issues in computational modeling of damage, fracture and fragmentation of solid materials, 51st Annual Technical meeting of the Society of Engineering Science, West Lafayette, IN, 2014.
4. Advances in Computational Solid Mechanics. Conference of the Society of Hispanic Professional Engineers, Indianapolis, IN, 2013.
5. Computational Modeling of Damage and Fracture in Solids, 49th Annual Technical meeting of the Society of Engineering Science, Atlanta, GA, 2012.
6. Composites Structures. 53rd AIAA Structures, Structural Dynamics, and Materials Conference, Honolulu, HI, 2012.
7. Simulations, synthesis, characterization and manufacturing. USC-DOE Conference on Materials Genome, Rancho Palos Verdes, CA, 2012.
8. Multiscale modeling & simulation of complex materials and systems. 12th Pan American Congress of Applied Mechanics, Port of Spain, Trinidad, 2012.
9. Multiscale constitutive modeling of materials. 11th United States National Congress on Computational Mechanics, Minneapolis, MN, 2011.
10. Multiscale polycrystal mechanics of complex microstructures. Material Research Society Fall Meeting, Boston, MA, 2009.

A4. Technical Journal or Conference Referee Activities

1. AIAA Journal
2. Acta Mechanica
3. Advances in Civil Engineering Materials
4. Composites Part A: Applied Science and Manufacturing
5. Composites Part B: Engineering
6. Computational Mechanics
7. Computer Methods in Applied Mechanics and Engineering
8. Computers and Structures
9. Engineering Computations
10. Engineering Fracture Mechanics
11. Engineering Structures

12. European Journal of Mechanics - A: Solids
13. Extreme Mechanics Letters
14. Finite Elements in Analysis and Design
15. International Journal for Numerical Methods in Engineering
16. International Journal of Fracture
17. International Journal of Mechanical Sciences
18. International Journal of Plasticity
19. International Journal of Solids and Structures
20. Journal of Aerospace Engineering
21. Journal of Applied Mechanics
22. Journal of Engineering Mechanics
23. Journal of Fluids and Structures
24. Journal of Mechanics of Materials and Structures
25. Journal of the American Ceramics Society
26. Journal of the Mechanics and Physics of Solids
27. Mechanics of Materials
28. Mechanics Research Communication
29. Proceedings of the National Academy of Sciences
30. Proceedings of the Royal Society - A

A5. Proposal and Panels Reviews

- Panels: National Science Foundation, European Research Area – Materials (M-ERA)
- Individual proposals: National Science Foundation, Army Research Office, American Chemical Society Petroleum Research Fund, ETH Zurich (Switzerland), Jönköping University (Sweden).

A6. Other Involvement

1. Member of the Scientific Committee, Area of Mechanics, Materials and Structures. Third Argentinean Congress on Aeronautical Engineering, La Plata, Argentina, 2014.
2. Member of the Consulting Board, Engineering 2010 World Congress and Exhibition, Buenos Aires, Argentina, 2010.
3. Member of the Scientific Committee, Area of Mechanics, Materials and Structures. First Argentinean Congress on Aeronautical Engineering, La Plata, Argentina, 2008.

B. Public and Community Service

1. Moderator of the mechanics blog *iMechanica.org*, 2007-Present.
2. Invited Panelist. First International Meeting on Academic, Scientific and Technological Policies, Universidad del Noroeste Bonaerense, Junin, Argentina, November 2010.

C. Institute Contributions**C1. Institute Committee Service**

1. Member, College of Engineering Diversity and Inclusion Committee, Fall 2017 – Present
2. Member, College of Engineering Dean Search Committee, Spring 2017.
3. Member and COE representative, School of Computational Science and Engineering School Chair Search Committee, Spring 2013.

C2. School Committee Service

1. Member, School of Aerospace Engineering School Chair Search Committee, Spring 2018.
2. Member, Academic Council, Fall 2017 – Present.
3. Member (elected), Faculty Advisory Committee, Fall 2016 – Present.
4. Member, Seminars Committee, Fall 2014 – Present.
5. Member, Faculty Search Committee in Mechanics of Solids and Structures, Spring 2016.
6. Member, Integrated Faculty Search Committee, Fall 2014 – Spring 2015.
7. Member, Strategic Planning Committee, Spring 2013 – Fall 2014.
8. Member, Faculty Search Committee in Mechanics of Solids and Structures, Fall 2011.

C3. Other Institute Service Contributions

1. Member, GoSTEM Faculty Advisory Board, Fall 2012 – Present.
2. Academic Advisor for over 80 undergraduate students, Spring 2011 – Present.
3. Chair, Brown Bag Seminar, Fall 2012 – Fall 2016.
4. Member, SHPE Xerox Scholarship Selection Committee, Spring 2013.