Gal Shmuel

Curriculum Vitae

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Academic Degrees

2009-2012 **Ph.D.**, *Mechanical Engineering, Ben-Gurion University*, Beer-Sheva, Israel.

2007-2009 **M.Sc.**, *direct program, Mechanical Engineering, Ben-Gurion University*, Beer-Sheva, Israel.
Graduation **Magna Cum Laude**

2004–2008 **B.Sc.**, *Mechanical Engineering, Ben-Gurion University*, Beer-Sheva, Israel.
Graduation **Summa Cum Laude**

Academic Appointments

2014- **Assistant Professor**.
Faculty of Mechanical Engineering, Technion, Haifa, Israel

2012-2014 **Postdoctoral scholar**.
Division of Engineering and Applied Science, California Institute of Technology, CA, USA

2010 **Visiting Scientist**.
Department of Mechanical and Structural Engineering, University of Trento, Italy

Research Interests

- Smart materials: dielectric and magnetorheological elastomers; shape-memory alloys
- Polycrystalline plasticity
- Composites in finite elasticity
- Wave propagation and elastic band-gaps
- Wavelet analysis in solid mechanics

Professional Experience

2009 **External consultant**, *SigNexT Wireless Ltd*, kinematic analysis of adjustable antennas.

Teaching Experience

2007-2012 **Teaching assistant**, *Dynamics, Theory of vibrations, Strength of materials*.
Department of Mechanical Engineering, Ben-Gurion University

2007-2009 **Teaching assistant**, *Strength of materials*.
Department of Biomedical Engineering, Ben-Gurion University

Additional Teaching Experience

2013 **Mentor in SURF**.
Summer undergraduate research program, California Institute of Technology

Membership in Professional Societies

- **SES**- Society of Engineering Science
- **ESNAM**- European Scientific Network for Artificial Muscles

Reviewer for Journals

Journal of the Mechanics and Physics of Solids, Mathematics and Mechanics of Solids, Mechanics of Materials.

Awards and Scholarships

2012 ICME Award for outstanding oral presentations by Ph.D. students.

2012 Ehud Ben-Amity prize.

2010 European EM ECW doctoral scholarship.

2010 Paran doctoral fellowship.

2009 Faculty of Engineering Excellence Prize for best project.

2006-2009 Dean Excellence Prize for B.Sc. achievements (2009), Chairman Excellence Prize for B.Sc. achievements (2007, 2009), Certificate of Excellence for B.Sc. achievements (2006-2009).

Publications

Theses

- Ph.D., *Wave propagation in multi-phase finitely deformed dielectric elastomers*
  Mechanical Engineering, Ben-Gurion University, 2012
  Supervisor: Prof. Gal deBotton
- M.Sc., *Anisotropic composites in finite elasticity*
  Mechanical Engineering, Ben-Gurion University, 2009
  Supervisor: Prof. Gal deBotton

Papers

- Shmuel, G., Thorgeirsson, A.T., Bhattacharya, K., "Wavelets analysis of microscale strains", *Acta Mater.*, 76:118Ð126, 2014
- Shmuel, G., "Electrostatically tunable band gaps in finitely extensible dielectric elastomer fiber composites", *Int. J. Solids Struct.*, 50:680-686, 2013
- Shmuel, G., deBotton, G., "Axisymmetric wave propagation in finitely deformed dielectric elastomer tubes", *Proc. R. Soc. A*, 469, 2013
- Shmuel, G., deBotton, G., "Band-gaps in electrostatically controlled dielectric laminates subjected to incremental shear motions", *J. Mech. Phys. Solids*, 60:1970-1981, 2012
- Shmuel, G., Gei, M., deBotton, G., "The Rayleigh-Lamb wave propagation in dielectric elastomer layers subjected to large deformations", *Int. J. Nonlinear Mech.*, 47:307-316, 2012
- Shmuel, G., deBotton G., "Out-of-plane shear of fiber composites at moderate stretch level", *J. Eng. Math.*, 68:85-97, 2010
- deBotton, G., Shmuel, G., "A new variational estimate for the effective response of hyperelastic composites", *J. Mech. Phys. Solids*, 58:466-483, 2010

- deBotton, G., Shmuel, G., "Mechanics of composites with two families of finitely extensible fibers undergoing large deformations", *J. Mech. Phys. Solids*, 57:1165-1181, 2009

Conferences

Speaker is underlined.

Plenary, keynote or invited talks

- Shmuel, G., deBotton, *On the propagation and manipulation of waves in soft electroactive tubes*, SES 50th Annual Technical Meeting and ASME-AMD Annual Summer Meeting (SES/ASME-AMD 2013), Brown University, Providence, USA, 2013, keynote lecture

Refereed papers in conference proceedings

- Shmuel, G., Thorgeirsson, A., Bhattacharya, K., "Applications of wavelets in the representation and prediction of transformation in shape-memory polycrystals", TMS 2014 143rd Annual Meeting and Exhibition: Supplemental Proceedings, 527-534, 2014, TMS 2014 143rd annual meeting and exhibition, San Diego, CA, USA, 2014

Lectures in conferences

- Shmuel, G., Thorgeirsson, A., Bhattacharya, K., 2014, *Wavelet Analysis of Microscale Strains,* Continuum Models Discrete Systems (CMDS) 13, University of Utah, USA
- Shmuel, G., Thorgeirsson, A., Bhattacharya, K., 2014, *Applications of Wavelets in the Representation and Prediction of Transformation in Shape-memory Polycrystals,* TMS 2014 143rd annual meeting and exhibition,, San Diego Convention Center, San Diego, CA, USA
- Shmuel, G., Bhattacharya, K., 2013, *Adaptive wavelet-based approach for predicting the mechanical behavior of polycrystals,* SES 50th Annual Technical Meeting and ASME-AMD Annual Summer Meeting (SES/ASME-AMD 2013), Brown University, Providence, USA
- Shmuel, G., deBotton, G., 2013, *On the propagation and manipulation of waves in soft electroactive tubes,* SES 50th Annual Technical Meeting and ASME-AMD Annual Summer Meeting (SES/ASME-AMD 2013), Brown University, Providence, USA
- deBotton, G., Shmuel, G., Rudykh, S., Oren, T., 2013, *Hyperelastic fiber composites - homogenization and macroscopic stability,* SES 50th Annual Technical Meeting and ASME-AMD Annual Summer Meeting (SES/ASME-AMD 2013), Brown University, Providence, USA
- Shmuel, G., Thorgeirsson, A., and Bhattacharya, K., 2013, *Wavelet analysis for modeling the behavior of polycrystals,* ICMR Summer School on Materials in 3D: Modeling and Imaging at Multiple Length Scales (poster presentation), University of California, Santa Barbara, USA
- Shmuel, G., 2012, *Electroelastic wave annihilation via actuation of 2D dielectric elastomer composites,* the 32nd Israeli Conference on Mechanical Engineering (ICME 2012), Tel-Aviv, Israel
- Shmuel, G., and deBotton, G., 2012, *On the thickness vibrations and stop-bands in actuated dielectric elastomer laminates,* the 32nd Israeli Conference on Mechanical Engineering (ICME 2012), Tel-Aviv, Israel

- deBotton, G., Shmuel, G., and Rudykh, S., 2012, *Electroactive polymer composites - mechanical response, stability, wave propagation and band-gap,* The XXIII ICTAM, Beijing, China
- deBotton, G., Shmuel, G., Oren, T., 2012, *A micromechanics approach for estimating the behavior of soft collagenous tissues*, the 8^{th} European Solid Mechanics Conference (ESMC 2012), Graz, Austria
- Shmuel, G., 2012, *Electrostatically controlled band-gaps in fiber-reinforced dielectric elastomers,* EuroEAP 2012, Second International conference on Electromechanically Active Polymer (EAP) transducers and artificial muscles, Potsdam, Germany
- Shmuel, G., deBotton, G., 2011, *Tunable band-gaps in finitely deformed periodic laminates composed of dielectric elastomers,* 48th Annual Technical Conference of Society of Engineering Sciences (SES11), Northwestern University Evanston, Illinois, USA
- Shmuel, G., Gei, M., deBotton, G., 2011, *Finitely strained dielectric elastomer layers as waveguides for electroelastic waves,* 48th Annual Technical Conference of Society of Engineering Sciences (SES11), Northwestern University Evanston, Illinois, USA
- Shmuel, G., deBotton, G., 2011, *Adjustable band-gaps in dielectric elastomer laminates subjected to finite strains,* EuroEAP 2011 First International conference on Electromechanically Active Polymer (EAP) transducers and artificial muscles, Pisa, Italy
- Shmuel, G., Gei, M., deBotton, G., 2011, *Generalized Rayleigh-Lamb wave propagation in finitely deformed dielectric elastomers*, EuroEAP 2011 First International conference on Electromechanically Active Polymer (EAP) transducers and artificial muscles, Pisa, Italy
- deBotton, G., Shmuel, G.,Oren, T., Goldenberg, Y., 2011, *Soft composites attaining the Hashin-Shtrikman bounds at the referential state,* ISTAM Symposium 25, Tel Aviv University, Israel
- deBotton, G., Shmuel, G., Oren, T., 2010, *A new variational procedure for estimating the behaviors of soft composites*, SES 2010 conference, Iowa state university, USA
- deBotton, G., Shmuel, G., 2010, *A new variational procedure for estimating the macroscopic behavior of soft collagenous tissues*, The I6th US National Congress on Theoretical and Applied Mechanics (USNCTAM), 2010, State College, PA, USA
- Shmuel, G., deBotton, G., 2009, *Mechanics of composites with two families of finitely extensible fibers undergoing large deformations*, The 2009 Joint ASCE-ASME-SES Conference on Mechanics and Materials, Virginia, U.S.A
- deBotton, G., Shmuel, G., 2009, *Hyperelastic fiber composites - homogenization and application to biological tissues*, International workshop on Continuum Biomechanics of Biological Tissue, Castro Urdiales, Spain
- deBotton, G., Shmuel, G., Rudykh, S., 2009, *Fiber composites in finite elasticity*, The 4th International Symposium On Defect And Material Mechanics (ISDMM09), University of Trento, Italy
- deBotton, G., Shmuel, G., 2008, *Nonlinear composites with one and two families of fibers*, The 45th Annual Technical Meeting of the Society of Engineering Science (SES08), University of Illinois at Urbana-Champaign, USA
- Shmuel, G., deBotton, G., 2008, *Homogenization of nonlinear fiber-reinforced composites in finite deformations*, Modeling and Computation in Biomechanics, Graz University of Technology, Austria

Selected Talks

- Shmuel, G., deBotton, G., 2014, *Tunable stop-bands in soft electroactive composites*, Mechanical Engineering department, University of California, San Diego (UCSD), USA
- Shmuel, G., 2014, *Wavelet analysis of microscale strains*, Department of Mathematics, University of Utah, USA
- Shmuel, G., deBotton, G., 2013, *Tunable stop-bands in soft electroactive composites*, Mechanical Engineering department, University of California, Berkeley, USA
- Shmuel, G., deBotton, G., 2011, *On the propagation of waves in soft dielectric plates undergoing finite strains*, Department of mechanical engineering at the Ben-Gurion University, Israel
- Shmuel, G., deBotton, G., 2010, *The Rayleigh-Lamb wave propagation in a dielectric layer subjected to large deformations*, Department of Mechanical and Structural Engineering, University of Trento, Italy
- Shmuel, G., deBotton, G., 2010, *Applications of a new micromechanical-based variational method for estimating the behavior of soft tissues*, Department of Mechanical and Structural Engineering, University of Trento, Italy
- Shmuel, G., deBotton, G., 2009, *Mechanics of composites with two families of finitely extensible fibers undergoing large deformations*, Department of mechanical engineering at the Ben-Gurion University, Israel

Sessions Chaired

- *Mechanics of Phase Transforming and Multifunctional Materials*, SES 50th Annual Technical Meeting and ASME-AMD Annual Summer Meeting (SES/ASME-AMD 2013), Brown University, Providence, USA, 2013