

Katia Bertoldi

Personal Data

Place and Date of Birth: Trento, Italy, May 26th, 1978
Citizenship: Italian
Address: School of Engineering and Applied Sciences, Harvard University, Cambridge, MA 02138, USA
E-mail: bertoldi@seas.harvard.edu

Education

- Feb. 2006 *University of Trento, Department of Mechanical and Structural Engineering*
Ph.D. in Mechanics of Materials and Structures
Thesis: *Non-Local Structural Interfaces*
Ph.D. advisors: Prof. Davide Bigoni and Prof. Walter J. Drugan
- Feb. 2003 *Chalmers University of Technology (Goteborg, Sweden)*
International Masters in Structural Engineering
Thesis: *A Boundary Element Method for Incremental Non-Linear Elasticity*
Thesis Supervisors: Prof. Davide Bigoni and Prof. Odd Tullberg
Thesis Co-Supervisor: Ing. Michele Brun
- Oct. 2002 *University of Trento (Italy)*
Laurea Degree in Civil Engineering (5-year degree, equivalent to U.S. Undergraduate + Master's Degree), with specialization in **Structural Engineering**
Thesis: *A Boundary Element Method for Incremental Non-Linear Elasticity*
Thesis Supervisors: Prof. Davide Bigoni and Prof. Odd Tullberg
Thesis Co-Supervisor: Ing. Michele Brun
Score: 110/110 cum laude
- Jul. 1997 *Liceo classico Giovanni Prati, Trento (Italy)*
High school degree; score 58/60

Professional Appointments

- Jan 2010 – *Harvard University (Cambridge, USA),
School of Engineering and Applied Sciences*
Assistant Professor
- June 2008 – Dec. 2009 *University of Twente (Netherlands),
Faculty of Engineering Technology – Multi Scale Mechanics*
Assistant Professor
- Mar. 2006 – May 2008 *Massachusetts Institute of Technology (M.I.T., Boston, USA)
Department of Mechanical Engineering*
Postdoctoral Associate
Advisor: Prof. Mary C. Boyce
- Feb. 2005 – Jul. 2005 *University of Wisconsin–Madison (USA), Department of
Engineering Physics*
Visiting Researcher with Professor W. J. Drugan

Professional activities

- Oct. 2009 Organizer (with Holger Steeb, Stefan Luding, Marc Geers and Erik van der Giessen), **Workshop on Scale transitions in space and time for materials.**
Lorentz Center, Leiden, the Netherlands.
- Jul. 2009 Organizer (with Holger Steeb), **Symposium on Acoustic band gaps in micro-structured materials**
10th US National Congress on Computational Mechanics – Columbus - OH

Fellowships

- Feb. 2009 *Institute for Multiscale materials systems, UC Santa Barbara*
Visiting Researcher
- Jul. 2003 - Aug. 2003 *Riken, The Japanese Center of Chemical and Physical Research, Tokyo, Japan*
JISTEC-REES Fellowship: Visiting Researcher
Project title: *Finite Element Modeling of Deep-Drawing Processes*
- Aug.1999 – Jun. 2000 *Chalmers University of Technology (Goteborg, Sweden)*
Erasmus grant: Exchange student

Awards

- Aug. 2008 **Award for outstanding presentation by younger scientists in Solid Mechanics**
ICTAM 2008, Australia
- Sept. 2006 **Award for outstanding Thesis**
University of Trento, Italy

Patents

- Boyce, Mullin, Bertoldi, Deschanel **Materials Design for deformation triggered transformation**
New provisional patent application n. 60/943 and U.S. provisional application n. 60/889
- Boyce, Mullin, Deschanel, Bertoldi **Pattern production and recovery by transformation**
New provisional patent application n. 60/113 and U.S. provisional application n. 60/345

Publications

- S. Singamaneni, K. Bertoldi, S. Chang, J.H. Jang, S.L. Young, E.L. Thomas, M.C. Boyce, V.V. Tsukruk.
"Bifurcated Mechanical Behavior of Deformed Periodic Porous Solids".
Advanced Functional materials, 19, **2009**, 1426-1436.

J.H. Jang, C.Y. Koh, K. Bertoldi, M.C. Boyce, E.L. Thomas.
"Combining Pattern Instability and Shape-Memory Hysteresis for Phononic Switching"
Nano Letters, 9, **2009**, 2113-2119

S. Singamaneni, K. Bertoldi, S. Chang, J.H. Jang, E.L. Thomas, M.C. Boyce, V.V. Tsukruk.
"Instabilities and Pattern Transformation in Periodic, Porous Elastoplastic Solid Coatings"
Applied Materials and Interfaces, 1, **2009**, 42-47.

S. Deschanel, B. P. Grevskes, K. Bertoldi, S. S. Sarva, W. Chen, S. L. Samuels, R. E. Cohen and M. C. Boyce
"Rate dependent finite deformation stress-strain behavior of an ethylene methacrylic acid copolymer and an ethylene methacrylic acid butyl acrylate copolymer"
Polymer, 50, **2009**, 227-235.

Katia Bertoldi, Mary C. Boyce
"Wave Propagation and Instabilities in Monolithic and Periodically Structured Elastomeric Materials Undergoing Large Deformations"
Physical Review B, 77, **2008**, 184107

Katia Bertoldi, Mary C. Boyce, Stephanie Deschanel, Sharon M. Prange, Tom Mullin
"Mechanics of deformation-triggered pattern transformations and superelastic behavior in periodic elastomeric structures"
Journal of the Mechanics and Physics of Solids, **2008**, 56, 2642-2668.

Katia Bertoldi, Davide Bigoni, Walter J. Drugan
"Nacre: an orthotropic and bimodular elastic material"
Composites Science and Technology, 68, **2008**, 1363-1375.

Katia Bertoldi, Mary C. Boyce
"Mechanically-Triggered Transformations of Phononic Band Gaps in Periodic Elastomeric Structures"
Physical Review B, 77, **2008**, 052105

Tom Mullin, Stephanie Deschanel, Katia Bertoldi, Mary C. Boyce
"Pattern Transformation Triggered by Deformation"
Physical Review Letters 99, **2007**, 084301

Katia Bertoldi, Mary C. Boyce
"Mechanics of hysteretic large strain behavior of mussel byssus threads"
Journal of Materials Science 42, **2007**, 8943-8956.

Katia Bertoldi, Davide Bigoni, Walter J. Drugan
"A discrete-fibers model for bridged cracks and reinforced elliptical voids"
Journal of the Mechanics and Physics of Solids 55, **2007**, 1016-1035.

Katia Bertoldi, Davide Bigoni, Walter J. Drugan
"Structural interfaces in linear elasticity. Part I: Nonlocality and gradient approximations"
Journal of the Mechanics and Physics of Solids 55, **2007**, 1-34.

Katia Bertoldi, Davide Bigoni, Walter J. Drugan
"Structural interfaces in linear elasticity. Part II: Effective properties and neutrality"
Journal of the Mechanics and Physics of Solids 55, **2007**, 35-63.

Katia Bertoldi, Michele Brun, Davide Bigoni
"A new boundary element technique without domain integrals for elastoplastic solids"
International Journal for Numerical Methods in Engineering 64, **2005**, 877-906.

Selected Invited Talks

- March 2009 K. Bertoldi
The use of instabilities to create materials with tunable properties
Department of Mechanical Eng – MIT
- March 2009 K. Bertoldi
The use of instabilities to create materials with tunable properties
Department of Mechanical Eng – EPFL – Lausanne - CH
- Feb. 2009 K. Bertoldi
The use of instabilities to create materials with tunable properties
School of Engineering and Applied Science – Harvard University
- Febr. 2009 K. Bertoldi
Non Local Structural Interfaces
Institute for Multiscale materials systems, *UC Santa Barbara*
- Febr. 2009 K. Bertoldi
Using Material Instabilities to Tune Material Properties
Institute for Multiscale materials systems, *UC Santa Barbara*
- Febr. 2009 K. Bertoldi
Mechanism of Deformation-Triggered Pattern Transformation in Periodic Structures
Institute for Multiscale materials systems, *UC Santa Barbara*
- March 2008 K. Bertoldi
Microstructures in solids: their critical role in governing material mechanical behavior
Department of Mechanical Engineering, McGill, Montreal.
- March 2008 K. Bertoldi
Microstructures in solids: their critical role in governing material mechanical behavior
Department of Mechanical Engineering, Northwestern, Evanston.
- March 2008 K. Bertoldi
Microstructures in solids: their critical role in governing material mechanical behavior
Department of Mechanical Engineering, UC Santa Barbara, Santa Barbara
- March 2008 K. Bertoldi
Microstructures in solids: their critical role in governing material mechanical behavior
Mechanical Engineering and Applied Mechanics, UPenn, Philadelphia
- Jan. 2008 K. Bertoldi
Mechanics of Deformation-Triggered Pattern Transformation in Periodic Structures
University of Twente, Enschede, Holland
- Jan. 2008 K. Bertoldi
Discrete/continuum transitions in solids Applications to biomechanics, fracture mechanics and optimal materials
EPFL, Lausanne, Switzerland.
- Nov. 2007 K. Bertoldi
Mechanics of Deformation-Triggered Pattern Transformation in Periodic Structures
MIT, Mechanical Engineering Department, Cambridge.
- April 2007 K. Bertoldi
Discrete/continuum transitions in solids: Applications to biomechanics, fracture mechanics and optimal materials
Department of Mechanical Engineering, University of Michigan, Ann Arbor, US

March 2007 K. Bertoldi
*Discrete/continuum transitions in solids:
Applications to biomechanics, fracture mechanics and optimal materials*
Division of Engineering, Brown University, Providence, US

Jan. 2007 K. Bertoldi
*Discrete/continuum transitions in solids:
Applications to biomechanics, fracture mechanics and optimal materials*
Department of Engineering, University of Cambridge, Cambridge, U.K.

Selected Conference Presentations

Sep. 2009 K. Bertoldi
Non local structural interfaces
1st International Conference on Material Modeling – Dortmund - Germany

Sep. 2009 K. Bertoldi
The use of instabilities to create materials with tunable properties
7th EuroMech Solid Mechanics Conference, Lisbon (Portugal)

July 2009 K. Bertoldi
Mechanically-Triggered Transformations of Phononic Band Gaps in Periodic Structures

July 2009 K. Bertoldi
The use of instabilities to create materials with tunable properties
ISDMM09 4th International Symposium on Defect and Material Mechanics.
Trento –Italy.

April 2009 M.C. Boyce and K. Bertoldi
Mechanics of pattern transformation and phononic band gaps in periodic elastomers
DYFP 2009, 14th International Conference on Deformation, Yield and Fracture of Polymers. Kerkrade, the Netherlands.

Aug. 2008 K. Bertoldi
Mechanics of Deformation-Triggered Pattern Transformation in Periodic Structures
ICTAM 2008, Adelaide, Australia.

Oct. 2007 Katia Bertoldi, Mary C. Boyce
Mechanics of the hysteretic large strain behavior of mussel byssus threads
44th Annual Technical Meeting Society of Engineering Science, College Station, Texas.

Jun. 2007 Katia Bertoldi, Mary C. Boyce, Stephanie Deschanel, Tom Mullin
Mechanics of Deformation-Triggered Pattern Transformation in Periodic Structures
2007 ASME Applied Mechanics and Materials Conference (McMat 2007), University of Texas at Austin, Austin, US.

Jun. 2007 Katia Bertoldi, Mary C. Boyce
Mechanics of the hysteretic large strain behavior of mussel byssus threads
2007 ASME Applied Mechanics and Materials Conference (McMat 2007), University of Texas at Austin, Austin, US.

Sep. 2006 Katia Bertoldi, Mary C. Boyce
Mechanics of hysteretic large strain behavior of mussel byssus threads
International conference on New trends in Biomechanical modelling: from molecular statistics to continuum mechanics, Castro Urdiales, Cantabria, Spain.

Sep. 2005 K. Bertoldi, D. Bigoni, W. J. Drugan
Nonlocal structural interfaces
XVII Congresso AIMETA (Italian Association of Theoretical and Applied Mechanics), Firenze, Italy.

Jun. 2004 K. Bertoldi, D. Bigoni, W. J. Drugan
Nonlocal structural interfaces
XVI Congresso GIMC (Italian Group of Computational Mechanics), Genova,
Italy.

Languages

Italian (native), English (very good), Dutch (basic), German (basic).