

Ryan S. Elliott

The University of Minnesota, Department of Aerospace Engineering and Mechanics
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Education

The University of Michigan, Ann Arbor, MI, 1998–2004

Sep. 2004 **Ph.D. *Aerospace Engineering & Scientific Computing***
Dissertation: Lattice-Level Instabilities in Bi-Atomic Alloys
Advisors: Nicolas Triantafyllidis and John A. Shaw

Dec. 2002 **M.S. *Mathematics***
Concentration in applied and numerical analysis

Dec. 1999 **M.S.E. *Aerospace Engineering***
Concentration in structural mechanics

Technical University of Denmark (DTU), Lyngby, Denmark
Danish Center for Applied Mathematics and Mechanics (DCAMM)

Jan. 1999 **Ph.D.-Course: *Continuum Mechanics, Finite Strain Plasticity,***
and Fracture Mechanics
Instructors: Jes Christoffersen, Viggo Tvergaard, Henrik Jensen
Working Hours: 160

Michigan State University, East Lansing, MI, 1993–1998

Dec. 1998 **B.S. *Engineering Mechanics***, with High Honor
Concentration in computational mechanics
Thesis: A method for calculating three-dimensional quasi-static canine pelvic
limb joint moments and power during gait
Advisor: Robert Wm. Soutas-Little

Employment

The University of Minnesota, Minneapolis, MN

2005–Present **Assistant Professor, Aerospace Engineering & Mechanics**

The University of Michigan, Ann Arbor, MI

Sep. 2004–Dec. 2004 **Research Fellow, Aerospace Engineering**

2000–2004 **Graduate Student Research Assistant, DOE CSGF-Fellow**

1999–2000 **Graduate Student Research Assistant**

Los Alamos National Laboratory, Los Alamos, NM

May 2001–Aug. 2001 **Computational Science Graduate Fellowship Practicum**
Group: Condensed Matter and Statistical Physics (T-11)
Supervisor: Avadh Saxena

Biomechanics Evaluation Laboratory, Michigan State University, East Lansing, MI

1995–1999 **Computer Programmer/Researcher**, part-time

Teaching Experience

The University of Minnesota, Minneapolis, MN

Jan. 2005–Present **Assistant Professor**, Department of Aerospace Engineering and Mechanics

AEM 4501 — Aerospace Structures

AEM 4502 — Computational Structural Analysis

AEM 8595 — Stability of Aerospace Structures

The University of Michigan, Ann Arbor, MI

Aug. 1999–Dec. 2004, **Graduate Student Instructor/Grader**, Department of Aerospace Engineering
five semesters

Jun. 2003–Aug. 2003 **Mentor for the NASA Summer High School Apprenticeship Program**

Michigan State University, East Lansing, MI

Aug. 1997–May 1998 **Undergraduate Teaching Assistant**, Department of Mathematics

Research and Teaching Interests

Research: Solid mechanics, multi-physics and multi-scale phenomena, active materials and structures, bifurcation and stability, numerical methods, high performance computing

Teaching: Statics, dynamics, strength of materials, vibrations, elasticity, finite element analysis, continuum mechanics, elastic stability, plasticity, wave propagation, symmetry methods in mechanics

Fellowships/Scholarships

2005 *Institute of Mathematics and its Applications: General Member*, The University of Minnesota

2000–2004 *Computational Science Graduate Fellowship (CSGF)*, Department of Energy (DOE), United States of America

Jan. 1999 *Ph.D.-Course/Advanced School Scholarship*, Danish Center for Applied Mathematics and Mechanics, Technical University of Denmark

1998–1999 *Tau Beta Pi—Matthews Fellow*, Tau Beta Pi (National Engineering Honor Society)

1998–1999 *College of Engineering Fellowship*, The University of Michigan

1995–1997 *College of Engineering Undergraduate Scholarship*, Michigan State University

Academic Awards

2005 *Frederick A. Howes Scholar in Computational Science*, Department of Energy, United States of America

2004 *Ivor K. McIvor Award in Applied Mechanics*, for outstanding scholastic and research performance by graduate students in applied mechanics

1996	<i>Tau Beta Pi (National Engineering Honor Society)</i> , Michigan Alpha (MSU) <i>Vice President:1997</i>
1996	<i>Pi Mu Epsilon (National Mathematics Honor Society)</i> , Michigan State University
1996	<i>Phi Kappa Phi</i>
1995	<i>Michigan State University College of Engineering Top 1% of Sophomores</i>
1995	<i>Phi Kappa Phi Freshman Award for 4.00 GPA</i>
1994–1998	<i>Dean’s List, 10 semesters</i> , Michigan State University

Professional Organizations

American Institute of Aeronautics and Astronautics (AIAA)
 Society of Engineering Science, Inc. (SES)
 American Physical Society (APS)
 The International Society for Optical Engineering (SPIE)
 American Society of Mechanical Engineers (ASME)

Professional Service Activities

University of Minnesota

October 14, 2006 **Campus Preview Day, IT Faculty Representative and Presenter**

NSF Review Panel

NSF CMS / Sandia NL, Albuquerque, NM

NSF CMS nano/bio, Washington D.C.

Journal Referee

Journal of Applied Mechanics, ASME

Continuum Mechanics and Thermodynamics, Springer Verlag

Journal of Elasticity, Springer Verlag

Metallurgical and Materials Transactions A, TMS

Special Issue of the Journal of Communications in Nonlinear Science and Numerical Simulation

Minnesota Academy of Science

2005,2006 **Judge, State Science Fair**

Refereed Journal Articles

- ▶ Ryan S. Elliott, Nicolas Triantafyllidis, John A. Shaw. “Stability of crystalline solids—I: Continuum and atomic-lattice considerations.” *Journal of the Mechanics and Physics of Solids*, 54(1):193–232, January 2006
- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Stability of crystalline solids—II: Application to temperature-induced martensitic phase transformations in bi-atomic crystals.” *Journal of the Mechanics and Physics of Solids*, 54(1):161–192, January 2006
- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Stability of thermally-induced martensitic transformations in bi-atomic crystals.” *Journal of the Mechanics and Physics of Solids*, 50(11):2463–2493, September 2002

- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Stability of pressure-dependent, thermally-induced displacive transformations in bi-atomic lattices.” *International Journal of Solids and Structures*, 39(13–14):3845–3856, June–July 2002

Technical Publications

- ▶ Matthew Dobson, Ryan S. Elliott, Ellad B. Tadmor. “A quasicontinuum for complex crystals.” In Peter Gumbsch, ed., “Third International Conference on Multiscale Materials Modeling,” pp. 889–896. Freiburg, Germany, September 2006
- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Stability of dispersive bi-atomic crystals.” In Dimitris C. Lagoudas, ed., “Smart Structures and Materials 2004: Active Materials: Behavior and Mechanics,” volume 5387 of *Proc. SPIE*, pp. 239–248. The International Society for Optical Engineering (SPIE), July 2004

Technical Presentations

(†— indicates invited presentation)

- ▶ Ryan S. Elliott. “A multiscale stability criterion for multilattice crystals.” Third International Conference on Multiscale Materials Modeling, Freiburg, Germany, September 2006
- ▶ Ryan S. Elliott. “Bifurcation and stability of multilattices with applications to martensitic transformations in shape memory alloys.” European Symposium on Martensitic Transformations, Bochum, Germany, September 2006
- † Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Stress-induced martensitic transformations in perfect bi-atomic crystals.” US National Congress of Theoretical and Applied Mechanics (USNCTAM 2006), Boulder, Colorado, June 2006
- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Bifurcation techniques for structural phase transitions.” American Physical Society (APS), Baltimore, Maryland, March 2006
- ▶ Ryan S. Elliott, Nicolas Triantafyllidis, John A. Shaw. “Martensitic transformation of bi-atomic crystals — modeling shape memory alloys.” ASME International ME2005 Congress and Exposition, Orlando, Florida, November 2005
- † Ryan S. Elliott, Nicolas Triantafyllidis, John A. Shaw. “Stability criteria for multi-atomic crystal structures.” ASME International ME2005 Congress and Exposition, Orlando, Florida, November 2005
- ▶ Ryan S. Elliott. “Computing bifurcation and stability properties of crystals.” AEM Solids seminar series, Minneapolis, MN, September 2005
- † Ryan S. Elliott. “Computing bifurcation and stability properties of crystals.” DOE Computational Science Graduate Fellowship Conference, Washington D.C., June 2005
- † Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Stability and martensitic transformation of bi-atomic crystals.” McMat 2005 Mechanics & Materials Conference, Baton Rouge, LA, June 2005
- † Ryan S. Elliott. “Multiple bifurcation of crystalline solids using projection operators.” McMat 2005 Mechanics & Materials Conference, Baton Rouge, LA, June 2005
- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Stability and bifurcation of multilattice crystals undergoing martensitic transformation.” Institute for Mathematics and its Applications, Minneapolis, MN, April 2005
- † Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Bifurcation and stability of multilattices with applications to martensitic transformations in shape memory alloys.” Institute for Mathematics and its Applications, Minneapolis, MN, March 2005

- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Stability of multi-atomic crystal structures.” 41th Annual Meeting of the Society of Engineering Science, Lincoln, NE, October 2004
- † Ryan S. Elliott. “Bifurcation and stability of multilattices with applications to martensitic transformations in shape memory alloys.” NIST, MSEL Metallurgy Division, June 2004
- † Ryan S. Elliott. “Bifurcation and stability of multilattices with applications to martensitic transformations in shape memory alloys.” Brown University, Division of Engineering, April 2004
- † Ryan S. Elliott. “Bifurcation and stability of multilattices with applications to martensitic transformations in shape memory alloys.” Harvard University, DEAS, April 2004
- † Ryan S. Elliott. “Bifurcation and stability of multilattices with applications to martensitic transformations in shape memory alloys.” The University of Illinois at Urbana-Champaign, Department of Aerospace Engineering, April 2004
- † Ryan S. Elliott. “Bifurcation and stability of multilattices with applications to martensitic transformations in shape memory alloys.” Cornell University, Department of Theoretical & Applied Mechanics, April 2004
- † Ryan S. Elliott. “Bifurcation and stability of multilattices with applications to martensitic transformations in shape memory alloys.” The University of Minnesota–Twin Cities, Department of Aerospace Engineering & Mechanics, April 2004
- † Ryan S. Elliott. “Bifurcation and stability of multilattices with applications to martensitic transformations in shape memory alloys.” The University of Notre Dame, Department of Aerospace & Mechanical Engineering, March 2004
- ▶ Ryan S. Elliott, Nicolas Triantafyllidis, John A. Shaw. “Stability of a dispersive nanoscale thermomechanical model for bi-atomic crystals.” SPIE 11th Annual International Symposium: Smart Structures and Materials, San Diego, CA, March 2004
- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Soft modes of temperature dependent multilattice crystals.” ASME International Mechanical Engineering Congress, Washington D.C., November 2003
- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Bifurcation and stability of multilattice crystals with internal shifts.” 40th Annual Meeting of the Society of Engineering Science, Ann Arbor, MI, October 2003
- ▶ Ryan S. Elliott, Nicolas Triantafyllidis, John A. Shaw. “Wavelength-dependent stability considerations for a thermomechanical model of bi-atomic crystals.” 40th Annual Meeting of the Society of Engineering Science, Ann Arbor, MI, October 2003
- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Stability concepts for thermally-induced martensitic transformations in crystals.” DOE Computational Science Graduate Fellowship Conference, Washington D.C., July 2003
- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Stability of thermally-induced martensitic transformations in bi-atomic crystals.” DOE Computational Science Graduate Fellowship Conference, Washington D.C., July 2002
- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Thermally-induced displacive transformations in bi-atomic crystals.” 14th U.S. National Congress of Theoretical and Applied Mechanics, Blacksburg, VA, June 2002

- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Stability of thermally-induced martensitic transformations in bi-atomic lattices.” International Conference on Martensitic Transformations (ICOMAT’02), Espoo, Finland, June 2002
- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Stability of thermally loaded biatomic perfect crystals.” DOE Computational Science Graduate Fellowship Conference, Washington D.C., July 2001
- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Bifurcation and stability in thermally-loaded NiTi perfect crystals.” ASME International ME2000 Congress and Exposition, Orlando, Florida, November 2000
- ▶ Ryan S. Elliott, John A. Shaw, Nicolas Triantafyllidis. “Stability of thermally-loaded NiTi perfect crystals.” International Congress of Theoretical & Applied Mechanics (ICTAM2000), Chicago, Illinois, August 2000

Relevant Skills

Software:

Unix/Linux, Mac OS X, Windows, Matlab, Octave, Mathematica, Mathcad, perl, FORTRAN, C, C++, tssh, purify, DDD, emacs, CVS, L^AT_EX, B_IB_TE_X, MetaPost, GNUplot, Xfig, xv, ANSYS, AutoCad, MPI

Activities

Ice hockey referee, computers, back-packing