

April 20, 2012

Curriculum Vitae
J. Scott Bunch

ECME 226 (office)
Department of Mechanical
Engineering
University of Colorado
Boulder, CO 80309-0427

tel. 303 492-6802
email: jbunch@colorado.edu
web: <http://spot.colorado.edu/~jbunch/>

Current Research Interests

Experimental Nanomechanics

- Adhesion in graphene
- Gas separation and defect engineering of graphene membranes
- Graphene nanomechanical switches
- Mechanical properties of ultrathin films

Education

Cornell University
Ph.D. in Physics, 2008.
M.S. in Physics, 2004.

Florida International University
B.S. in Physics Magna Cum Laude, 2000

Employment

8/2008-present	Assistant Professor, Department of Mechanical Engineering, University of Colorado at Boulder
5/2008–7/2008	Postdoctoral Research Associate, Advisor: Professor Harold Craighead and Professor Jeevak Parpia, LASSP, Cornell University
12/2007-8/2008	Adjunct Assistant Professor, Department of Mechanical Engineering, University of Colorado, Boulder
8/2000–5/2008	Graduate Research Assistant, Advisor: Professor Paul McEuen, Department of Physics, Cornell University
6/2000 - 8/2000	Senior Technical Associate, Advisor: Dr. Nikolai Zhitenev, Lucent Technologies Bell Laboratories

6/1999 - 8/1999 Undergraduate Research, Advisor: Professor Ward Plummer,
University of Tennessee at Knoxville and Oak Ridge National Lab

1999–2000 Undergraduate Research, Advisor: Professor Nongjian Tao,
Department of Physics, Florida International University

Awards and Honors

2011 NSF CAREER Award

2010 University of Colorado Department of Mechanical Engineering
Outstanding Graduate Education Award (2009-2010)

2008 DARPA MTO Young Faculty Award

2000 Lucent Technologies Bell Laboratories Graduate Fellowship

Languages:

Fluent in English and Spanish.

Publications (1254 citations - ISI):

J. S. Bunch and M.L. Dunn, *Adhesion Mechanics of Graphene Membranes*
(invited review article), (accepted), Solid State Communications

S. P. Koenig, N.G. Boddeti, M. L. Dunn, and **J. S. Bunch**, *Ultrastrong adhesion*
of graphene membranes, Nature Nanotechnology **6**, 543-546 (2011).

J. S. Bunch, *Putting a damper on nanoresonators (News and Views)*, Nature
Nanotechnology **6**, 331-332 (2011).

C.-C. Lee, G. Acosta, **J. S. Bunch**, and T. R. Schibli, *Ultra-Short Optical Pulse*
Generation With Single Layer Graphene, Journal of Nonlinear Optical Physics &
Materials **19**, 767-771 (2010).

J. S. Bunch, S. S. Verbridge, J.S. Alden, A. M. van der Zande, J. M. Parpia, H. G.
Craighead, and P. L. McEuen, *Impermeable Atomic Membranes from Graphene*
Sheets, Nano Letters **8**, 2458-2462 (2008).

P. Sundqvist, F. J. Garcia-Vidal, F. Flores, M. Moreno-Moreno, C. Gomez-
Navarro, **J. S. Bunch**, and J. Gomez-Herrero, *Voltage and Length-Dependent*
Phase Diagram of the Electronic Transport in Carbon Nanotubes, Nano Letters **7**,
2568-2573 (2007).

J. S. Bunch, A. M. van der Zande, S. S. Verbridge, I. W. Frank, D. M. Tanenbaum, J. M. Parpia, H. G. Craighead, and P. L. McEuen, *Electromechanical Resonators from Graphene Sheets*, *Science* **315**, 490-493 (2007).

J. S. Bunch, Y. Yaish, M. Brink, K. Bolotin, and P. L. McEuen, *Coulomb oscillations and Hall effect in quasi-2D graphite quantum dots*, *Nano Letters* **5**, 287-290 (2005).

J. S. Bunch, T. N. Rhodin, and P. L. McEuen, *Noncontact-AFM imaging of molecular surfaces using single-wall carbon nanotube technology*, *Nanotechnology* **15**, S76-S78 (2004).

Y. G. Li, Y. D. Tseng, S. Y. Kwon, L. D'Espaux, **J. S. Bunch**, P. L. McEuen, and D. Luo, *Controlled assembly of dendrimer-like DNA*, *Nature Materials* **3**, 38-42 (2004).

C. Shu, C. Z. Li, H. X. He, A. Bogozi, **J. S. Bunch**, and N. J. Tao, *Fractional conductance quantization in metallic nanoconstrictions under electrochemical potential control*, *Physical Review Letters* **84**, 5196-5199 (2000).

C. Z. Li, H. X. He, A. Bogozi, **J. S. Bunch**, and N. J. Tao, *Molecular detection based on conductance quantization of nanowires* *Applied Physics Letters* **76**, 1333-1335 (2000).

Invited Scientific Presentations (31 total):

Upcoming

none

2012

1. Ultrastrong Adhesion, Semipermeable Atomic Membranes, and other Graphene Mechanical Wonders” – Seminar at the 26th International Winterschool on Electronic Properties of Novel Materials (IWEPNM), Kirchberg, Austria.
2. Ultrastrong Adhesion, Semipermeable Atomic Membranes, and other Graphene Mechanical Wonders” – Seminar in the Department of Mechanical Engineering, Boston University, Boston, Massachusetts.
3. Ultrastrong Adhesion, Semipermeable Atomic Membranes, and other Graphene Mechanical Wonders” – Seminar at McMaster University, Ontario, Canada.

2011

4. “Ultrastrong Adhesion, Semipermeable Atomic Membranes, and other Graphene Mechanical Wonders” – Seminar at Naval Research Laboratory, Washington DC.
5. “Ultrastrong Adhesion, Semipermeable Atomic Membranes, and other Graphene Mechanical Wonders” – James Edward West Symposium, Department of Electrical and Computer Engineering, Johns Hopkins University, Baltimore, Maryland.
6. “Ultrastrong Adhesion, Semipermeable Atomic Membranes, and other Graphene Mechanical Wonders” – Seminar at NIST, Gaithersberg, MD.
7. “Ultrastrong Adhesion, Semipermeable Atomic Membranes, and other Graphene Mechanical Wonders” – Liquid Crystal MRSEC Seminar Series, Department of Physics, University of Colorado, Boulder, Colorado.
8. “Ultrastrong Adhesion, Semipermeable Atomic Membranes, and other Graphene Mechanical Wonders” – Seminar at Cornell University, Ithaca, NY.
9. “Ultrastrong Adhesion, Impermeable Atomic Membranes, and other Graphene Mechanical Wonders” – Seminar at Columbia University, New York, NY.
10. “Ultrastrong Adhesion, Impermeable Atomic Membranes, and other Graphene Mechanical Wonders” – Seminar at GE Research, Albany, NY.
11. “Impermeable Atomic Membranes, Ultrastrong van der Waals Adhesion, and other Graphene Mechanical Wonders” – Seminar at Ball Aerospace, Boulder, CO.
12. “Impermeable Atomic Membranes, Ultrastrong van der Waals Adhesion, and other Graphene Mechanical Wonders” – Seminar in the Department of Mechanical Engineering at University of Colorado, Boulder, CO.
13. “Graphene Membranes and Switches” – Seminar at Rocky Mountain MRS Meeting, Boulder, Colorado.
14. “Impermeable Atomic Membranes, Ultrastrong van der Waals Adhesion, and other Graphene Mechanical Wonders” – Seminar in the Department of Chemistry and Biochemistry (Physical Chemistry Seminar Series) at University of Colorado, Boulder, Colorado.

2010

15. “Graphene Membranes” – Seminar at the Fifth International Meeting on Polymer Derived Ceramics and Related Materials, at University of Colorado, Boulder, Colorado.

16. “Graphene NEMS” – Seminar in the Department of Mechanical and Nuclear Engineering at Kansas State University, Manhattan, Kansas.
17. “Graphene NEMS” – Mechanics of Solids, Structures and Materials Seminar, at University of Texas, Austin, Texas.

2009

18. “Graphene NEMS” – Seminar in the Department of Physics and Astronomy at University of Manitoba, Winnipeg, Canada.
19. “Graphene NEMS” – Seminar at the Nanoelectronic Devices for Defense and Security Conference, Ft. Lauderdale, Florida.
20. “Graphene NEMS” – Seminar in the Department of Physics (Condensed Matter Lunch Series) at University of Colorado, Boulder, Colorado.
21. “Graphene NEMS” – Seminar at the 10th US National Congress on Computational Mechanics, Columbus, Ohio.
22. “Graphene NEMS” – Seminar in the Department of Applied Sciences at Delft University of Technology, Delft, the Netherlands.
23. “Graphene NEMS” – Seminar in the Department of Engineering at Cambridge University, Cambridge, England.
24. “Graphene NEMS” – Seminar at Graphene Week Conference for the European Science Foundation, Innsbruck, Austria.
25. “Graphene NEMS” – Seminar in the Division of Engineering at Brown University, Providence, RI.

2008

26. “Graphene NEMS” – Seminar at Nanoelectronics Conference for the Canadian Institute for Advanced Research, Halifax, Nova Scotia.
27. “Graphene NEMS” – Seminar in the Department of Mechanical Engineering at University of Colorado, Boulder, CO.
28. “Graphene NEMS” – Seminar in the Department of Mechanical Engineering at University of Wyoming, Laramie, WY.

Before 2008

29. “Electromechanical Resonators from Graphene Sheets” – Seminar in the Department of Mechanical Engineering at University of Colorado, Boulder, CO (2007).
30. “Electromechanical Resonators from Graphene Sheets” – Seminar in the Department of Physics at Columbia University, New York, NY (2007).
31. “Carbon Nanoelectronics” – Seminar in the Department of Physics at the Universidad Autonoma de Madrid, Madrid, Spain (2006).

Department Service:

Member of the Undergraduate Committee (Fall 2008 – Fall 2010, Fall 2011 – present)
 Co-Advisor for the University of Colorado at Boulder chapter of the American Society of Mechanical Engineers (Fall 2009 – present)
 Member of the Faculty Search Committee (Fall 2010 – Spring 2011)
 Chair of MEMS Prelim Exam Committee (Fall 2009 – present)
 Member of MEMS Prelim Exam Committee (Fall 2008 – present)

Consulting:

PDC Energy, LLC, Louisville, Colorado (3/2009 – 12/2009)

Courses Taught:

MCEN 4045	ME Design Project (3 Teams)	Fall 2010, Spring 2011, Fall 2011, Spring 2012
MCEN 5636	MEMS 1	Fall 2009, Fall 2010
GEEN 1400	First Year Engineering Projects	Fall 2010, Spring 2011, Fall 2011

Postdocs Supervised:

Guillermo Acosta	AGEP Fellow jointly with Steve George	8/2008 – 10/2010
------------------	--	------------------

Students Supervised:

<u>Ph. D.</u>		
Steven Koenig	Mechanical Engineering	8/2008 – present
Xinghui Liu	Mechanical Engineering	8/2008 – present
Luda Wang	Mechanical Engineering	8/2009 – present

Lauren Cantley	Mechanical Engineering	8/2011 – present
<i><u>Undergraduate</u></i>		
Phi Pham	Physics (UROP)	8/2008 – 12/2012
Samantha Kelly	Mechanical Engineering (Independent Study/UROP)	1/2009 – 5/2011
Xu Zhou	Engineering Physics (UROP/Honor's Thesis)	5/2009 – 7/2011
Joseph Duggan	Mechanical Engineering (Independent Study)	1/2010 – 12/2010
Michael Tanksalvala	Physics (UROP)	1/2010 – present
Sean Wiese	Mechanical Engineering	5/2010 – 8/2010
Lauren Cantley	NNIN REU Intern	6/2010 – 8/2010
Andrew Bour	Chemical Engineering	6/2010 – 1/2011
Brook Beyene	Undeclared Major	1/2011 – 5/2011
Miguel Rodriguez	SMART Program Intern	6/2011 – 8/2011
Mariah Szpunar	NNIN REU Intern	6/2011 – 8/2011
Peter Musso	Physics (UROP)	9/2011 – present
<i><u>High School</u></i>		
Vaughan Andrews		8/2010 – 5/2011
Jason West		8/2010 – 5/2011
Akil Bhagat		6/2011 – 7/2011