

Joshua B. Bostwick

- CONTACT INFORMATION** Mechanical Engineering *Phone: (864) 656-5625*
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Clemson, SC 29634 USA *Website: <https://cecas.clemson.edu/~jbostwi/>*
- CURRENT POSITION** Assistant Professor
Department of Mechanical Engineering
Clemson University
- PREVIOUS POSITION** Golovin Assistant Professor 2013-2015
Department of Engineering Science and Applied Mathematics
Northwestern University
- Postdoctoral Research Scholar 2011-2013
Department of Mathematics
North Carolina State University
- RESEARCH INTERESTS** theoretical fluid mechanics, surface tension, hydrodynamic instability, wetting and spreading, elastocapillarity, soft fracture mechanics, dynamical systems, constrained variational principles, symmetry methods.
- EDUCATION** **Cornell University**, Ithaca, NY USA
Ph.D., Theoretical and Applied Mechanics, May 2011
• Dissertation Title: “Stability of constrained capillary interfaces”
- University of Wisconsin-Milwaukee**, Milwaukee, WI USA
B.S.E., Civil Engineering and Mechanics, May 2005
B.A., Physics, May 2005
• Minor: Mathematics
- PUBLICATIONS**
1. X. Shao, J.R. Saylor, and **J.B. Bostwick** “Extracting the surface tension of soft gels from elastocapillary wave behavior”. *Soft Matter*. **14**, 7347-7353 (2018) [Back cover image].
 2. **J.B. Bostwick** and P.H. Steen, “Instability of static rivulets: varicose and sinuous modes.” *Journal of Fluid Mechanics*. **837**, 819-838 (2018).
 3. S.J. Park, **J.B. Bostwick** and J.H. Je, “Self-spreading of wetting ridge during stick-slip on viscoelastic surface.” *Soft Matter* **13**, 8331-8336 (2017).
 4. M. Grezlka, **J.B. Bostwick** and K.E. Daniels “Capillary fracture of ultrasoft gels: variability and delayed nucleation.” *Soft Matter* **13**, 2962-2966 (2017). [Back cover image]
 5. **J.B. Bostwick**, J.A. Dijkstra and M. Shearer, “Wetting dynamics of a collapsing fluid hole.” *Physical Review Fluids*, **2**, 014006 (2017).
 6. **J.B. Bostwick** and P.H. Steen, “Response of driven sessile drops with contact-line dissipation.” *Soft Matter*, **12**, 8919 - 8926 (2016).
 7. **J.B. Bostwick**, M.J. Miksis and S.H. Davis, “Elastic membranes in confinement” *Journal of the Royal Society Interface*, **13**(120), (2016).
 8. **J.B. Bostwick** and P.H. Steen, “Stability of constrained capillary surfaces” *Annual Review of Fluid Mechanics*, **47**, 539-568, (2015).

9. **J.B. Bostwick** and P.H. Steen, "Liquid bridge shape stability by energy bounding" *IMA Journal of Applied Mathematics*, **80**(6), 1759-1775, (2015)
10. C.T. Chang, **J.B. Bostwick**, S. Daniel and P.H. Steen, "Dynamics of sessile drops. Part 2. Experiment" *Journal of Fluid Mechanics*, **768**, 442-467, (2015).
11. **J.B. Bostwick** and P.H. Steen, "Dynamics of sessile drops. Part 1. Inviscid theory" *Journal of Fluid Mechanics*, **760**, 5-38, (2014).
12. **J.B. Bostwick**, M. Shearer and K.E. Daniels, "Elastocapillary deformations on partially-wetting substrates: rival contact-line models" *Soft Matter*, **10**, 7361-7369, (2014).
13. **J.B. Bostwick** and K.E. Daniels, "Capillary fracture of soft gels" *Physical Review E*, **88**, 042410, (2013).
14. **J.B. Bostwick**, "Spreading and bistability of droplets on differentially heated substrates" *Journal of Fluid Mechanics*, **725**, 566-587, (2013).
15. C.T. Chang, **J.B. Bostwick**, P.H. Steen and S. Daniel, "Substrate constraint modifies the Rayleigh spectrum of vibrating sessile drops" *Physical Review E*, **88**, 023015, (2013).
16. **J.B. Bostwick** and P.H. Steen, "Coupled oscillations of deformable spherical-cap droplets. Part 1. Inviscid motions." *Journal of Fluid Mechanics*, **714**, 312-335, (2013).
17. **J.B. Bostwick** and P.H. Steen, "Coupled oscillations of deformable spherical-cap droplets. Part 2. Viscous motions." *Journal of Fluid Mechanics*, **714**, 336-360, (2013).
18. **J.B. Bostwick** and P.H. Steen, "Stability of constrained cylindrical interfaces and the torus lift of Plateau-Rayleigh." *Journal of Fluid Mechanics*, **647**, 201-219, (2010).
19. **J.B. Bostwick** and P.H. Steen, "Constrained capillary oscillations of a spherical fluid drop." *Physics of Fluids*, **21**, 032108, (2009).

MANUSCRIPTS IN
SUBMISSION

1. **J.B. Bostwick** and P.H. Steen, "Sessile-drop oscillations fill a symmetry-breaking periodic table." *Nature*
2. **J.B. Bostwick**, "Energetics of the walking droplet instability." *Physical Review Fluids*

MANUSCRIPTS IN
PREPARATION

1. **J.B. Bostwick** "Geometry of wetting ridges"

PAPERS IN
CONFERENCE
PROCEEDINGS

1. C. Papadopoulos, **J.B. Bostwick** and A. Dressel "Promoting Holistic Problem-Solving in Mechanics." *Proceedings of the ASEE Annual Conference and Exposition*, (2007).
2. C. Papadopoulos, A. Rahman and **J.B. Bostwick** "Assessing Critical Thinking in Mechanics in Engineering Education." *Proceedings of the ASEE Annual Conference and Exposition*, (2006).
3. C. Papadopoulos, A. Rahman and **J.B. Bostwick** "Assessing Critical Thinking in Mechanics in Engineering Education." *ASEE North Midwest Conference* (2004) **Best Paper Award**.

INVITED TALKS

1. "Geometry of wetting ridges" *SES 2016 Conference*. College Park, MD, October 2016.
2. "Sessile drop dynamics" *ME Seminar*. Clemson University, May 2015.
3. "Sessile drop dynamics" *Math Colloquium*. University of British Columbia, February 2015.
4. "Elastocapillarity: soft wetting and fracture" *Seminar*. Exxon Mobil Research Center, December 2014.
5. "Sessile drop oscillations: contact-line dynamics and symmetry breaking" *ME Seminar*. Oklahoma State University, March 2014.
6. "Sessile drop oscillations: contact-line dynamics and symmetry breaking" *Applied Math Seminar*. UC-Merced, February 2014.
7. "Sessile drop oscillations: contact-line dynamics and symmetry breaking" *ME Seminar*. Georgia Tech, February 2014.

8. "Sessile drop oscillations: contact-line dynamics and symmetry breaking" *Math Colloquium*. University of Kentucky, January 2014.
9. "Sessile drop oscillations: contact-line dynamics and symmetry breaking" *Math Colloquium*. University of South Carolina, December 2013.
10. "Capillary fracture of soft gels" *ME Seminar*. University of Rochester, March 2013.
11. "Capillary fracture of soft gels" *ESAM Seminar*. Northwestern University, February 2013.
12. "Capillary fracture of soft gels" *CMB Seminar*. NC State University, February 2013.
13. "Capillary fracture of soft gels" *Workshop on Thin Liquid Films and Fluid Interfaces: Models, Experiments and Applications*. Banff, AB, Canada December 2012.
14. "Spreading and bistability of droplets driven by thermocapillary and centrifugal forces." *Complex Fluid Seminar at Max Planck Institute for Dynamics and Self-Organisation*. Göttingen, Germany April 2012.
15. "Spreading and bistability of droplets driven by thermocapillary and centrifugal forces." *Workshop on Surfactant Driven Thin Film Flows*. Toronto, ON February 2012.
16. "Sessile-drop oscillations: contact line dynamics and symmetry breaking." *NC State Differential Equations Seminar* Raleigh, NC September 2010.
17. "Constrained capillary oscillations of a spherical fluid drop." *Fluid Mechanics Seminar Dortmund Universität*. Dortmund, Germany September 2007.

CONTRIBUTED
PRESENTATIONS

1. "Mechanically-excited surface waves on soft agarose gels" *APS March Meeting*. Los Angeles, CA March 2018.
2. "Mechanically-excited surface waves on soft agarose gels" *APS Division of Fluid Dynamics Meeting*. Denver, CO November 2017.
3. "Elastic membranes in confinement" *APS Division of Fluid Dynamics Meeting*. San Francisco, CA November 2014.
4. "The walking droplet instability" *APS Division of Fluid Dynamics Meeting*. Pittsburgh, PA November 2013.
5. "Capillary fracture of soft gels" *SIAM Materials*. Philadelphia, PA June 2013.
6. "Surfactant-driven fracture of gels: Initiation" *APS Division of Fluid Dynamics Meeting*. San Diego, CA November 2012.
7. "Contact-line dynamics, bifurcation and bistability of droplets driven by thermal gradients." *APS Division of Fluid Dynamics Meeting*. Baltimore, MD November 2011.
8. "Contact-line dynamics, bifurcation and bistability of spreading droplets." *Thin Fluids Day*. Raleigh, NC June 2011.
9. "Stability of constrained capillary interfaces: contact-line dynamics and symmetry-breaking of the sessile drop." *NC State AMGSS Seminar*. Raleigh, NC January 2011.
10. "Sessile-drop oscillations fill a symmetry-breaking periodic table." *APS Division of Fluid Dynamics Meeting*. Long Beach, CA November 2010.
11. "Oscillations of a viscous drop under spherical-belt constraint." *APS Division of Fluid Dynamics Meeting* Minneapolis, MN November 2009.

ACADEMIC
SUPERVISION

Ph.D.

Current: Xingchen Shao, Saiful Tamim, Jennifer Shaffer (co-advised with H. Choi)

M.S.

Current: Jesse Bergen, Taylor Nichols, Philip Wilson, Caleb Wilson

Undergraduate Honor's

Current: Michael Furgeson

Previous: Ken Maassen (May 2018)

TEACHING
EXPERIENCE

- Clemson University (Clemson, SC):
 1. Modeling and Analysis of Dynamic Systems (Spring 2018, Fall 2017, Summer 2017, Spring 2017, Spring 2016, Fall 2016) [Instructor of record]
 2. Internship in Engineering Design (Spring 2018, Spring 2017) [Instructor of record]
- Northwestern University (Evanston, IL):
 1. Vector Calculus (Winter 2014, Spring 2014, Winter 2015, Spring 2015) [Instructor of record]
- North Carolina State University (Raleigh, NC):
 1. Calculus I (Spring 2013) [Instructor of record]
 2. Applied Differential Equations I (Fall 2011) [Instructor of record]
- Cornell University (Ithaca, NY):
 1. Calculus I (Fall 2005) [TA]
 2. Differential Equations (Spring 2006, Summer 2006, Fall 2006, Spring 2008, Spring 2009) [TA]
 3. Linear Algebra and Applications (Spring 2007, Fall 2008) [TA]
 4. Academic Excellence Workshop (AEW) Content Liaison (2006-2009)
- Dortmund Universität (Dortmund, Germany):
 1. Advanced Transport Phenomenon (Fall 2007) [TA]
- University of Wisconsin-Milwaukee (Milwaukee, WI):
 1. Statics [Undergraduate grader]
 2. Dynamics [Undergraduate grader]
 3. Strength of Materials [Undergraduate grader]

SPONSORED
RESEARCH

1. "Ultrasonic soldering", Harris Corporation
2. "CAREER: Elastocapillary fluid mechanics: spreading, splashing and instability", NSF,

AWARDS AND
HONORS

- Dean's Faculty Fellow (Clemson University), 2018.
- Eastman Award (Clemson University), 2018.
- OPA Professional Development Award (North Carolina State University), 2011.
- H.D. Block Award for teaching excellence (Cornell University), 2010.
- NSF IREE Award, 2007.
- Outstanding Student Award (University of Wisconsin-Milwaukee), 2005.
- ASEE North Midwest Edward F. Mikol best paper award, 2004.
- REU Award (University of Wisconsin-Milwaukee), 2004.

REVIEWER

Nature, Journal of Fluid Mechanics, Physics of Fluids, Soft Matter, SIAM Applied Math, Chemical Engineering Science, IMA Applied Math, PRE, Microgravity Science and Technology, Journal of Fluids and Structures, Physics Letters A, Interfacial Phenomenon and Heat Transfer, Journal of Mathematical Fluid Mechanics, Experimental Thermal and Fluid Science