

ALISON C. (RENNIE) DUNN

CURRICULUM VITAE 08/2014

Assistant Professor
Department of Mechanical Science and Engineering
University of Illinois at Urbana-Champaign
acd@illinois.edu

RESEARCH INTEREST

- Soft Materials Interface Interactions
- Biological and Biomimetic Material Lubricity
- In Situ Instrumentation Design

EDUCATION

PhD Mechanical Engineering August 2013
Dissertation: *Soft Hydrated Surfaces Engineered for Lubricity*
Committee Chair: Prof. W. Gregory Sawyer
Department of Mechanical and Aerospace Engineering, University of Florida, Gainesville, Florida

MS Mechanical Engineering August 2006
Thesis: *Friction and Wear of Polyethylene in Multi-directional Motion*
Committee Chair: Prof. W. Gregory Sawyer
Department of Mechanical and Aerospace Engineering, University of Florida, Gainesville, Florida

BS Mechanical Engineering December 2004
Honors Thesis: *Friction Coefficient of Soft Contact Lenses: Measurement and Modeling*
Department of Mechanical Engineering, University of Florida, Gainesville, Florida

PROFESSIONAL EXPERIENCE

Assistant Professor 2014 - present
Mechanical Science and Engineering, University of Illinois, Urbana, Illinois

Collegiate Teaching Scholar and Tribology Laboratory Supervisor 2013 - 2014
Tribology Laboratory, University of Florida, Gainesville, Florida

Graduate Research Assistant 2009 - 2013
Tribology Laboratory, University of Florida, Gainesville, Florida

University English Teacher 2007 - 2009
U.S. Peace Corps Volunteer
Department of Foreign Languages, Tianshui Teachers University, Gansu Province, PR China

Undergraduate/Graduate Research Assistant 2004 - 2007
Tribology Laboratory, University of Florida, Gainesville, Florida

Summer Intern Summer 2003
Naval Research Enterprise Internship Program
Coastal Systems Station, Panama City Beach, Florida

ARCHIVAL JOURNAL PUBLICATIONS (16)

Submitted through August 2014

1. Zehnder SM, **Dunn AC**, Urueña JM, Sawyer WG, Angelini TE, "Cytoskeletal contractions, cell volume fluctuations, and intercellular fluid pumping," *Nature Communications* (under review)
2. Pitenis AA, Urueña JM, Schulze KD, Nixon RM, **Dunn AC**, Sawyer WG, Angelini TE, "Polymer Fluctuation Lubrication in pNIPAM Gemini Interfaces," *Soft Matter* (under review)
3. Rowe KG, Harris K, Schulze KD, *et al*, "Lessons from the lollipop: Biotribology, Tribocorrosion, and Irregular Surfaces," *Tribology Letters* (accepted)

Published

4. **Dunn AC**, Sawyer WG, Angelini TE, "Gemini Interfaces in Aqueous Lubrication with Hydrogels," *Tribology Letters* 54:59-66, 2014.
*Featured in *Tribology and Lubrication Technology* column "Sliding Soft Surfaces" by Tysoe WT and Spencer ND, June 2014.
5. **Dunn AC**, Tichy JA, Urueña JM, Sawyer WG, "Lubrication regimes in contact lens wear during a blink," *Tribology International* 63:45-50, 2013.
6. **Dunn AC**, Urueña JM, Puig E, Perez VL, Sawyer WG, "Friction Coefficient Measurement of an *In Vivo* Murine Cornea," *Tribology Letters* 49(1):145-149, 2013.
7. **Dunn AC**, Urueña JM, Huo Y, Angelini TE, Perry SS, Sawyer WG, "Lubricity of Surface Hydrogel Layers," *Tribology Letters* 49:371-378, 2012.
8. Sawyer WG, Burris DL, **Dunn AC**, Angelini TA, "Cell Friction," *Faraday Discussions* 156:31-39, 2012.
9. Urueña JM, **Dunn AC**, Sawyer WG, "Contact Lens Boundary Lubrication and Friction Reduction with Hyaluronic Acid," *Tribology & Lubrication Technology*, 67(12):14-15, Dec 2011.
10. Colbert RS, Krick BA, **Dunn AC**, Vail JR, Argibay N, Sawyer WG, "Uncertainty in Pin-On-Disk Wear Volume Measurements Using Surface Scanning Techniques," *Tribology Letters* 42(1):129-131, Apr 2011.
11. Cobb JA, **Dunn AC**, Kwon J, Sarntinoranont M, Sawyer WG, Tran-Son-Tay R, "A Novel Method for Low Load Friction Testing on Living Cells," *Biotechnology Letters* 30(5):801-806, May 2008.
12. **Dunn AC**, Cobb J, Kantzios AN, Lee SJ, Sarntinoranont M, Tran-Son-Tay R, Sawyer WG, "Friction Coefficient Measurement of Hydrogel Materials on Living Epithelial Cells," *Tribology Letters* 30(1):13-19, Apr 2008.
13. **Dunn AC**, Steffens JG, Burris DL, Banks SA, Sawyer WG, "Spatial Geometric Effects on the Friction Coefficients of UHMWPe," *Wear* 264(7-8):648-653, Mar 2008.
14. **Dunn AC**, Zaveri TD, Keselowsky BG, Sawyer WG, "Macroscopic Friction Coefficient Measurements on Living Endothelial Cells," *Tribology Letters* 27(2):233-238, Aug 2007.
15. Chen X, **Dunn AC**, Sawyer WG, Sarntinoranont M, "A Biphasic Model for Micro-Indentation of a Hydrogel-Based Contact Lens," *Journal of Biomechanical Engineering* 129:156-163, Apr 2007.
16. **Rennie AC**, Dickrell PL, Sawyer WG, "Friction Coefficient of soft contact lenses: measurements and modeling," *Tribology Letters* 18(4):499-504, Apr 2005.

BOOK CHAPTERS (2)

1. **Dunn AC**, Sawyer WG (2013), "Tribology of an Epithelial Cell Monolayer," in Wang QJ & Chung Y-W (Eds.), *Encyclopedia of Tribology* (1st Edition, pp. 3846-3850). Springer.
2. **Dunn AC**, Sarntinoranont M, Sawyer WG, Tran-Son-Tay R (2011), "Mechanical Response of Living Cells to Contacting Shear Forces" in Gefen A (Ed.), *Cellular and Biomolecular Mechanics and Mechanobiology* (1st Edition, pp. 125-141). Berlin: Springer-Verlag.

CONFERENCE PODIUM PRESENTATIONS (16)

Accepted/Presented through August 2014

1. Schulze KD, Uruña JM, **Dunn AC**, Angelini TE, Sawyer WG, "Wear of Hydrogels in Constant Contact with Surfaces," STLE Annual Meeting, Orlando, FL (USA), May 2014
2. **Dunn AC**, Angelini TE, Sawyer WG, "Weeping Lubrication Mechanisms in Hydrogel Lubricity," STLE Annual Meeting, Orlando, FL (USA), May 2014
3. Pitenis AA, Uruña JM, **Dunn AC**, Schulze KD, Krick BA, Angelini TE, Sawyer WG, Krick BA, "The Role of Permeability in the Lubricity of Biomaterials," STLE Annual Meeting, Orlando, FL (USA), May 2014
4. Pitenis AA, Uruña JM, **Dunn AC**, Krick BA, Nixon RM, Angelini TE, Sawyer WG, "Gemini interfaces in aqueous lubrication with hydrogels," 2nd International Conference on BioTribology, Toronto, ON (Canada), May 2014
5. Sawyer WG, Angelini TE, **Dunn AC**, Uruña JM, "Slippery Physics and Squishy Hydrogels," 5th World Tribology Congress, Torino, Italy, September 2013
6. Krick BA, Pitenis AA, **Dunn AC**, Sawyer WG, "Slippery When Wet: Surface Functionalization of Hydrogels for Lubricity Control," Society for Biomaterials Annual Meeting, Boston, MA (USA), April 2013
7. **Dunn AC**, Uruña JM, Keselowsky BG, Sawyer WG, "Analysis Techniques in Biotribology," STLE Annual Meeting, Atlanta, GA (USA), May 2011
8. Vail JR, Krick BA, **Dunn AC**, Sawyer WG, Persson BNJ, Rodriguez N, Mangiagalli P, "In Situ Tribology of Soft Contacts," STLE Annual Meeting, Atlanta, GA (USA), May 2011
9. **Dunn AC**, Dickrell III DJ, Sawyer WG, "Corneal Tribology: The Eyes Have It. Epithelial Cell Response to Applied Friction Forces," STLE Annual Meeting, Las Vegas, NV (USA), May 2010
10. Dickrell III DJ, **Dunn AC**, Perry SS, Keselowsky BG, Sawyer WG, "Tribological Stimulation of Living Cells," STLE Annual Meeting, Cleveland, OH (USA), May 2008
11. **Dunn AC**, Chiu P, Sinnott SB, Sawyer WG, "Micro-friction measurement and analysis of oriented UHMWPe," STLE Annual Meeting, Philadelphia, PA (USA), May 2007
12. **Dunn AC**, Banks SA, Burris DL, Sawyer WG, "Multidirectional Sliding Friction with UHMWPe," ORS Annual Meeting, San Diego, CA (USA), Feb 2007
13. **Dunn AC**, Burris DL, Banks SA, Sawyer WG, "Multidirectional Wear of UHMWPe and PEEK/PTFE Composite in Bovine Serum," STLE Annual Meeting, Calgary, AB (Canada), May 2006
14. **Rennie AC**, Sarntinoranont M, Sawyer WG, "Biotribology of Contact Lenses," STLE Annual Meeting, Las Vegas, NV (USA), May 2005
15. **Rennie AC**, Dickrell PL, Sawyer WG, "Friction Coefficient of Soft Contact Lenses: Measurements and Modeling," IJTC, Long Beach, CA (USA), October 2004
16. **Rennie AC**, Dickrell PL, Sawyer WG, "Friction Coefficient of Soft Contact Lenses: Measurements and Modeling," STLE Annual Meeting, Toronto, ON (Canada), May 2004

POSTER PRESENTATIONS (15)

1. Zehnder SM, **Dunn AC**, Urueña JM, Sawyer WG, Angelini TE, "The Cell as a Pump: Cytoskeletal Contractions Drive Intercellular Fluid Flow," BMES Annual Meeting, San Antonio, TX (USA), October 2014
2. Niemi S, Webber A, Hart S, **Dunn AC**, McCluskey M, Hayes G, Sawyer WG, "Effects of Fillers on the Variation in Modulus and Wear of Polymer Coatings," STLE Annual Meeting, Orlando, FL (USA), May 2014
3. Hart S, Niemi S, **Dunn AC**, McCluskey M, Hayes G, Sawyer WG, "Wear of Oil and Gas Pipeline Coatings," STLE Annual Meeting, Orlando, FL (USA), May 2014
4. **Dunn AC**, Angelini TE, Pruitt J, Sawyer WG, "Gemini Interfaces in Aqueous Lubrication of Hydrogels," ARVO, Orlando, FL (USA), May 2014
5. Zehnder SM, **Dunn AC**, Urueña JM, Sawyer WG, Angelini TE, "The cell as a pump: cytoskeleton driven intercellular flow," Gordon Research Conference for Soft Condensed Matter Physics, New London, NH (USA), August 2013
6. **Dunn AC**, Urueña JM, Angelini TE, Sawyer WG, "Migrating versus Stationary Pressure Experiments in Lubricity Measurements of Hydrogels," ARVO, Seattle, WA (USA), May 2013
7. Sawyer WG, Angelini TE, Perry SS, **Dunn AC**, Urueña JM, "Lubricity of High Water Content Surface Gel Layers," American Academy of Optometry Annual Meeting, Phoenix, AZ (USA), October 2012
8. Zehnder SM, Breaux JA, **Dunn AC**, Sawyer WG, Angelini TE, "Intercellular force transmission via cell-generated pressure driven flow," University of Florida Graduate Student Research Day, Gainesville, FL (USA), October 23, 2012
9. **Dunn AC**, Urueña JM, Ketelson HA, Sawyer WG, "In Vivo Frictional Measurements of Lubricity on Murine Corneas," ARVO, Fort Lauderdale, FL (USA), May 2012
10. Sawyer WG, **Dunn AC**, Urueña JM, Ketelson HA, "Robust Contact Lens Lubricity Using Surface Gels," ARVO, Fort Lauderdale, FL (USA) May 2012
11. Angelini TE, **Dunn AC**, Urueña JM, Ketelson HA, Sawyer WG, "Stress-induced Frictional Transitions in Cross-linked Surface Gels," ARVO, Fort Lauderdale, FL (USA) May 2012
12. Urueña, JM, **Dunn AC**, Sawyer WG, "Contact Lens Boundary Lubrication and Friction Reduction with Hyaluronic Acid," STLE Annual Meeting, Atlanta, GA (USA) May 2011
13. **Dunn AC**, Dickrell III DJ, Ketelson HA, Sawyer WG, "Micro-Friction of Hydrogel Contact Lenses: Solutions Matter," ARVO, Fort Lauderdale, FL (USA), May 2010
14. **Dunn AC**, Banks SA, Sawyer WG, "Tribological Investigation of Porcine Articular Cartilage," WTC, Washington, DC (USA), October 2005
15. **Rennie AC**, Dickrell PL, Sawyer WG, "Experiments on Soft Curved Surfaces with Low Contact Pressure Reciprocating Sliding," IJTC, St. Augustine, FL (USA), October 2003

HONORS

Collegiate Teaching Scholar, Department of Mechanical and Aerospace Engineering UF	2013 - 2014
College of Engineering Attributes of a Gator Engineer Award for Professional Excellence	2013 - 2014
University of Florida Alumni Fellowship	2009 - 2013
Society of Women Engineers Caterpillar Scholarship	2005
University Scholars Summer Research Grant, University of Florida	2003
Eglin Air Force Base Spouses Club Scholarship	2000

INVITED TALKS

1. "No longer stuck between a rock and a hard place: soft probes," October 2013, BioInterface
2. "Lubricity: Soft Microtribology and the Importance of Boundary Lubrication," June 2013, Materials Today and CSM Instruments Webinar
3. "Contacting Friction on A Living Cell Monolayer," June 2010, Experimental Soft Condensed Matter Group, Harvard University, Cambridge, Massachusetts

CONFERENCE ACTIVITY

Conference Session Moderation/Chairship

- Society of Tribologists and Lubrication Engineers (STLE)
Outreach Event Coordinator (3 experiments) May 2014
Supervised the planning, setup, and execution of 3 outreach experiments for high school students at the "STLE STEM Outreach" Program
Paper Solicitation Chair, "Biotribology," STLE Annual Meeting May 2012
Session Chair, "Biotribology I," STLE Annual Meeting May 2011
- U.S. Peace Corps, P.R. China
Session Chair, "Women in Development, Gender and Diversity," 2008-2009
Member, In-service Training Conference Planning Committee 2008-2009
Session Facilitator, "Introduction to Model School & Developing a Teaching Syllabus for Model School" July 2008

TEACHING AND MENTORING

Collegiate Teaching Scholar (Instructor of Record)

Department of Mechanical and Aerospace Engineering, University of Florida, Gainesville, FL

- Mechanics of Materials Laboratory Fall 2013 – Spring 2014

Graduate Teaching Assistant

Department of Mechanical and Aerospace Engineering, University of Florida, Gainesville, FL

- Dynamics and Controls System Design Laboratory (3 sections) Spring 2010
- Senior Mechanical Design (~100 students/semester) Fall 2005 – Fall 2006

University English Teacher

Department of Foreign Languages, Tianshui Teachers University, Gansu Province, PR China

- Freshman Spoken English (4 sections) Fall 2007 – Fall 2008
- Sophomore Spoken English (1 section) Spring 2008 – Spring 2009
- Sophomore Writing (13 sections) Spring 2008 – Spring 2009
- Sophomore Listening (8 sections) Fall 2008 – Spring 2009

Research Mentor

- Department of Mechanical and Aerospace Engineering, University of Florida, Gainesville, FL
- Samuel Hart, Undergraduate Research Assistant 2013 – 2014
 - Alex Webber, Undergraduate Research Assistant 2013 – 2014
 - Kyle Schulze, Graduate Research Assistant 2013 – 2014
 - Angela Pitenis, Graduate Research Assistant 2012 – 2014
 - William Vann, Undergraduate Research Assistant 2012 – 2013
 - Juan M. Urueña, Graduate Research Assistant 2009 – 2011
- College of Engineering, University of Florida, Gainesville, FL
- 6 undergraduate engineering majors (Engineering Freshman Transition Program) 2004 - 2005

PROFESSIONAL SOCIETIES

- Society for Biomaterials (SFB) 2012 – present
- Society of Tribologists and Lubrication Engineers (STLE) 2005 – present
- American Society for Engineering Education (ASEE) 2012 – present
- Association for Research in Vision and Ophthalmology (ARVO) 2009 – present
- Pi Tau Sigma, Mechanical Engineering Honor Society 2003 – present
UF Student Chapter Secretary 2004 – 2005

PROFESSIONAL SERVICE

Manuscript Review

- *Wear of Materials* 2012 – present
- *Tribology Transactions* 2012 – present

MEDIA COVERAGE

1. Teaching Fellows Profile, University of Florida Mechanical and Aerospace Engineering Departmental Newsletter, April 2013.
2. “Surface Science: UF engineers apply the little-known science of tribology to sticky problems” by Cindy Spence, *Explore: Research at the University of Florida* Summer 2013 Edition
3. “Tribology In Biology” STLE Compass Blog Podcast, September 9, 2010 [link](#)

LANGUAGES

English (native speaker)
Spanish (intermediate)
Mandarin Chinese (basic)