Breannan Douglas Smith
Department of Computer Science
Columbia University
New York, NY 10027
646.775.6013 (office)
smith@cs.columbia.edu

Education

- Ph.D., Computer Science, Columbia University *(expected 2017)*.
  Advisor: Eitan Grinspun

- M.Phil., Computer Science, Columbia University, May 2012.

- M.S., Computer Science, Columbia University, May 2009.
  Cumulative GPA: 4.11

- B.S., Computer Science, University of North Carolina at Chapel Hill, with highest distinction and honors, December 2007.
  Minors: Physics and Mathematics
  Dean's List: Fall 2005 – Fall 2007
  Cumulative GPA: 3.95, Computer Science GPA: 4.0
  Thesis: *Stress Filtering in Sheared Viscoelastic Layers and Hypotheses for Biological Relevance*
  Advisor: M. Gregory Forest

- North Carolina State University (Physics and Computer Science), Fall 2003 – Spring 2005.
  Dean's List: Fall 2003 – Spring 2005
  Cumulative GPA: 4.0

Research Interests

- Computational models for physical simulation, computational contact and impact mechanics, nonlinear optimization, and computer graphics.

Honors and Awards

Scholarship and Research

- Conference on Modeling Granular Media Across Scales Junior Researcher Award (2014)
- NVIDIA Graduate Fellowship Finalist (2013)
- Columbia University Presidential Fellowship (Fall 2008 – Spring 2013)
- National Defense Science and Engineering Graduate (NDSEG) Fellowship (Fall 2008 – Summer 2011)
- Integrated Biomedical Research Training Program (IBRTP) NIH Undergraduate Research Fellowship (Spring 2007 – Fall 2007)
- Phi Beta Kappa (inducted Fall 2006)
- Golden Key Honor Society (inducted Fall 2005)
- Sigma Pi Sigma Physics Honor Society (inducted Fall 2004)

University Service

- Columbia University Computer Science Service Award, 2010, 2011, 2012, 2013, and 2014
  Awarded for exemplary service in my role as student coordinator for the department's annual Ph.D. recruitment visit, including my contributions to general Ph.D. recruitment efforts.

- Columbia University Computer Science Andrew P. Kosoresow Memorial Award for Excellence in Teaching and Service, 2011
  Awarded for both my work in developing new and innovative curriculum and course materials for COMS 4167, and for my role as student coordinator for the department's annual Ph.D. recruitment visit.

Professional Service

- Paper Reviewer, SIGGRAPH 2018
- Paper Reviewer, SIGGRAPH Asia 2017
- Paper Reviewer, SIGGRAPH 2017
- Paper Reviewer, Eurographics 2017
- Paper Reviewer, SIGGRAPH Asia 2016
- Paper Reviewer, SIGGRAPH 2016
- Paper Reviewer, Eurographics 2016
- Emerging Technologies Reviewer, SIGGRAPH Asia 2015
- Paper Reviewer, Graphics Interface 2015
- Paper Reviewer, SIGGRAPH Asia 2014
- Paper Reviewer, Eurographics 2014
- Paper Reviewer, SIGGRAPH 2013
- Paper Reviewer, CAD/Graphics 2013
- Paper Reviewer, SIGGRAPH 2012
- Paper Reviewer, ACM Transactions on Graphics
- Paper Reviewer, IEEE Transactions on Visualization and Computer Graphics (TVCG)
- Paper Reviewer, IEEE Access
- Paper Reviewer, The Visual Computer
- Paper Reviewer, ASME Journal of Computational and Nonlinear Dynamics
- Paper Reviewer, Journal of Computational Physics

Teaching Experience

- Fall 2010: **Teaching Assistant** (COMS 4167: Physically Based Computer Animation)
  Columbia University, Department of Computer Science
  Designed and implemented an 'instant-feedback' grading system tailored to Computer Science students for numerical simulation programming. Prepared new course materials and course notes; presented lectures; and held office hours.

- Spring 2010: **Teaching Assistant** (COMS 4167: Physically Based Computer Animation)
  Columbia University, Department of Computer Science
  Presented lectures on collision detection/computational geometry, cloth simulation, and hair simulation; prepared and graded theory and programming assignments; held office hours.

- Spring 2007: **Teaching Assistant** (Physics 352: Electronics II)
  University of North Carolina at Chapel Hill, Department of Physics
  Led and taught an undergraduate lab section; prepared and troubleshot labs; graded lab reports.

- Fall 2006: **Teaching Assistant** (Physics 351: Electronics I)
  University of North Carolina at Chapel Hill, Department of Physics
  Led and taught an undergraduate lab section; prepared and troubleshot labs; graded lab reports; invited guest lecturer on phasors in circuit analysis.

Research Experience and Research Internships

- Summer 2012: Research and Development Intern
  Weta Digital, Wellington, New Zealand.
  Developed a highly parallel system for computing static configurations of large hair assemblies in the presence of volumetric interaction forces.

- Summer 2009: Advanced Technology Labs Intern
  Adobe Systems Incorporated, San Jose, CA.
  Explored numerical methods for the real-time simulation of viscoelastic fluids.

- Spring 2007 – Summer 2008: NIH Undergraduate Research Fellow
  University of North Carolina at Chapel Hill, Department of Applied Mathematics
  Worked with Professor M. Gregory Forest and his research team on the modeling of nonlinear-viscoelastic fluids and biologically-relevant applications; developed numerical simulation software; mentored undergraduate student working with the team during summer 2007.

Publications

- **Breannan Smith**, Fernando de Goes, Theodore Kim. 2018. "Stable Neo-Hookean Flesh Simulation." *ACM Transactions on Graphics*. To appear.
- Etienne Vouga, **Breannan Smith**, Danny M. Kaufman, Rasmus Tamstorf, Eitan Grinspun. 2017. "All's Well That Ends Well: Guaranteed Resolution of Simultaneous Rigid-Body Impact." *ACM Transactions on Graphics*. 36, 4, (July), 151:1-151:19.
- Yonghao Yue, **Breannan Smith**, Christopher Batty, Changxi Zheng, and Eitan Grinspun. 2015. "Continuum Foam: A Material Point Method for Shear-Dependent Flows." *ACM Transactions on Graphics*. 34, 5 (November), 160:1-160:20.
- Danny M. Kaufman, Rasmus Tamstorf, **Breannan Smith**, Jean-Marie Aubry, and Eitan Grinspun. 2014. "Adaptive Nonlinearity for Collisions in Complex Rod Assemblies." *ACM Transactions on Graphics* 33, 4 (July), 123:1-123:12.
- **Breannan Smith**, Danny M. Kaufman, Etienne Vouga, Rasmus Tamstorf, and Eitan Grinspun. 2012. "Reflections on simultaneous impact." *ACM Transactions on Graphics* 31, 4 (July), 106:1-106:12.
- David Harmon, Etienne Vouga, **Breannan Smith**, Rasmus Tamstorf, and Eitan Grinspun. 2012. "Asynchronous contact mechanics." *Communications of the ACM* (April), 102-109.
- Brandon S. Lindley, M. Gregory Forest, **Breannan D. Smith**, Sorin M. Mitran, and David B. Hill. 2012. "Spatial stress and strain distributions of viscoelastic layers in oscillatory shear." *Mathematics and Computers in Simulation* 82, 7, 1249-1257.
- David Harmon, Etienne Vouga, **Breannan Smith**, Rasmus Tamstorf, and Eitan Grinspun. 2009. "Asynchronous contact mechanics." *ACM Transactions on Graphics* 28, 3 (July), 87:1-87:12.
- Brandon Lindley, Eddie Lee Howell, **Breannan D. Smith**, Gregory J. Rubinstein, M. Gregory Forest, Sorin M. Mitran, David B. Hill, and Richard Superfine. 2009. "Stress communication and filtering of viscoelastic layers in oscillatory shear." *Journal of Non-Newtonian Fluid Mechanics* 156, 1, 112-120.

Lectures

- **Breannan Smith**. "*Grains, Manes, and Shaving Cream: Modeling Virtual Motion*." Presentation at Disney Research Zürich, Zürich, Switzerland, May 2015.
- **Breannan Smith**. "*Reflections on Simultaneous Impact*." Presentation at Modeling Granular Media Across Scales 2014, Montpellier, France, July 2014. Recipient of the "Junior Researcher Prize."
- **Breannan Smith**. "Collision Response Algorithms for Rigid and Deformable Bodies." Presentation at The Institute of Science and Technology Austria, Klosterneuburg, Austria, June 2014.
- **Breannan Smith**. "*Reflections on Simultaneous Impact*." Presentation at Computational Contact Mechanics: Advances and Frontiers in Modeling Contact, Banff International Research Station, Banff, Alberta, Canada, February 2014.
- **Breannan Smith**. "*Reflections on Simultaneous Impact*." Presentation at the New England Workshop on the Mechanics of Materials and Structures, Brown University, Providence, Rhode Island, November, 2012.
- **Breannan Smith**. "*Generalized Reflections for Impact Resolution*." Presentation at the Bellairs Workshop on Computer Animation, Holetown, Barbados, February 2011.
- **Breannan Smith**. "*Reverse Hairdo*." Presentation at the Bellairs Workshop on Computer Animation, Holetown, Barbados, February 2010.

Film Credits

- *Coco.* Research. Directed by Lee Unkrich and Adrian Molina. 2017; Pixar Animation Studios.
- *Dawn of the Planet of the Apes.* Production Engineering & Research & Development. Directed by Matt Reeves. 2014; Chernin Entertainment and TSG Entertainment.

- *The Hobbit: An Unexpected Journey.* Research & Development. Directed by Peter Jackson. 2012; New Line Cinema and Metro-Goldwyn-Mayer (MGM).

Poster Presentations

- **Breannan Smith**. "*Stress Communication in Sheared Viscoelastic Layers: Selection Mechanisms and Redundancy*." Presentation at the Southeastern Atlantic Mathematical Sciences Workshop (Cha-Cha Days), National Institute of Aerospace. Hampton, VA, October 2007.

Foreign Language Proficiency

- German: Proficient reading and writing
  Excellent conversational German