LUCIA BAKER

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SUMMARY

Postdoctoral scholar researching the transport of particles in environmental fluid flows.

EDUCATION

University of Minnesota, Minneapolis, MN
- Ph.D., Aerospace Engineering and Mechanics — Jun 2021
- M.S., Aerospace Engineering and Mechanics — Dec 2018
- B.Eng., Aerospace Engineering and Mechanics — May 2016

EXPERIENCE

NSF Postdoctoral Fellow, University of Washington — Jun 2021 – present
Mentor: Prof. Michelle DiBenedetto
Experimentally studying the behavior of microplastic particles in wind-driven ocean surface turbulence

Graduate Research Assistant, University of Minnesota — May 2016 – Jun 2021
Focus: Experimental Fluid Mechanics
Advisor: Prof. Filippo Coletti
Thesis: *Experimental investigation of inertial sphere, rod, and disk particles in a turbulent boundary layer*
Explored the interactions between solid particles and turbulence in boundary layer flows

Summer Institute Participant, St. Anthony Falls Laboratory — Aug 2017
Summer Institute on Earth-Surface Dynamics: explored Earth-surface systems through theory, experiments, numerical modeling, and fieldwork

Laboratory Instructor, University of Minnesota — Sep 2016 – May 2017
Instructed AEM 4601: Instrumentation Laboratory and AEM 4602W: Aeromechanics Laboratory

Undergraduate Research Assistant, University of Minnesota — Jan 2014 – May 2016
Investigated the clustering behavior of particles in turbulence through numerical simulations

Intern, Virgin Galactic — Summer 2015
Designed engine gimbals and heat exchangers for liquid propulsion rocket engines

Intern, NASA Jet Propulsion Laboratory — Summer 2013, 2014
Mentor: Dr. Anita Sengupta
Designed and tested magnetic shielding for the ISS Cold Atom Lab research facility

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AWARDS

NSF Ocean Sciences Postdoctoral Research Fellowship	2021 – 2023
National Defense Science and Engineering Graduate Fellowship	2017 – 2021
Edward Silberman Fellowship	2019 – 2020
John A. & Jane Dunning Copper Fellowship	2017
Albert George Oswald Prize for Outstanding Research	2015
Undergraduate Research Opportunites Grant	2015

PUBLICATIONS

Baker, L. & Coletti, F. (in preparation) “Experimental investigation of inertial rod and disk particles in a turbulent boundary layer.”

Baker, L., Qiao, Y., Ghaemi, S., & Coletti, F. (2021) “Method to minimize polymer degradation in drag-reduced non-Newtonian turbulent boundary layers.” *Measurement Science and Technology, 32*, 085303.

Baker, L. & Coletti, F. (2021) “Particle–fluid–wall interaction of inertial spherical particles in a turbulent boundary layer.” *Journal of Fluid Mechanics, 908*, A39.

Baker, L. & Coletti, F. (2019) “Experimental study of negatively-buoyant finite-size particles in a turbulent boundary layer up to dense regimes.” *Journal of Fluid Mechanics*, *866*, 598-629.

Petersen, A., **Baker, L.**, & Coletti, F. (2019) “Experimental study of inertial particles clustering and settling in homogeneous turbulence.” *Journal of Fluid Mechanics, 864*, 925-970.

Baker, L., Frankel, A., Mani, A., & Coletti, F. (2017) “Coherent clusters of inertial particles in homogeneous turbulence.” *Journal of Fluid Mechanics, 833*, 364-398.

CONFERENCES

Baker, L. & Coletti, F. (2020) “Effects of shape on microplastic particle–fluid–wall interaction and transport in a turbulent boundary layer.” AGU Fall Meeting, virtual.

Baker, L. & Coletti, F. (2020) “Particle-fluid-wall interaction of anisotropic inertial particles in a turbulent boundary layer.” APS Division of Fluid Dynamics, virtual.

Sanness Salmon, H., **Baker, L.**, Kozarek, J., & Coletti, F. “Effect of size and shape on the transport of particles over the free surface of a natural stream.” APS Division of Fluid Dynamics, virtual.

Baker, L. & Coletti, F. (2019) “Experimental Investigation of the Dynamics of Resuspending Spherical Sediment Particles in a Turbulent Boundary Layer.” AGU Fall Meeting, San Francisco, CA.

Coletti, F. & **Baker, L.** (2019) “Simultaneous tracking of suspended particles and time-resolved PIV in a turbulent boundary layer.” APS Division of Fluid Dynamics, Seattle, WA.

Petersen, A., **Baker, L.**, & Coletti, F. (2017). “Laboratory Study of Air Turbulence-Particle Coupling.” AGU Fall Meeting, New Orleans, LA.

Baker, L. & Coletti, F. (2017). “Experimental study of dense suspension of large particles in a turbulent boundary layer.” APS Division of Fluid Dynamics, Denver, CO.

Petersen, A., **Baker, L.**, & Coletti, F. (2017). “Particle Plumes Falling Through Quiescent and Turbulent Environments.” APS Division of Fluid Dynamics, Denver, CO.

Petersen A., Carter D., **Baker L.**, & Coletti F. (2017) “Experimental Study of Particle-turbulence Interaction in Homogeneous Turbulence.” 10th International Symposium on Turbulence and Shear Flow Phenomena, Chicago, IL, USA.

Coletti F., Toloui M., Fong, K.O., Nemes A., & **Baker L.** (2016) “Volumetric distribution and velocity of inertial particles in a turbulent channel flow.” 18th International Symposium on Application of Laser and Imaging Techniques to Fluid Mechanics, Lisbon, Portugal.

Coletti F., Petersen A., Carter D., & **Baker L.** (2016), “Measurements of particle settling velocity in homogeneous turbulence with no mean flow.” International Conference on Multiphase Flows, Florence, Italy.

Baker L., Frankel A., Mani A., & Coletti F. (2016) “Coherent clusters of inertial particles in homogeneous turbulence.” APS Division of Fluid Dynamics, Portland, OR.

Petersen A., Carter D., **Baker L.**, & Coletti F. (2015) “Settling of inertial particles through quiescent, weakly turbulent and strongly turbulent air.” APS Division of Fluid Dynamics, Boston, MA.

SKILLS

MATLAB, Python, C++, SolidWorks, ANSYS, Latex, Particle Image Velocimetry

ORGANIZATIONS & LEADERSHIP

Women of Aeronautics and Astronautics – UMN Chapter — Sep 2017 – Jun 2021
Undergraduate Mentor

University of Minnesota Solar Vehicle Project — Sep 2012 – Jan 2015
Aerodynamics Team Lead

Gopher Science Olympiad — Sep 2014 – Jan 2016
Event Coordinator