

LUCIA BAKER

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SUMMARY

Postdoctoral scholar researching the transport of microplastic particles in environmental flows with experience in designing and performing fluid mechanics experiments, image processing, and data analysis.

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

Postdoctoral scholar, University of Washington

Jun 2021 – present

Mentor: Dr. 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: Dr. 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

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 Opportunities Grant	2015

PUBLICATIONS

- 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.

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- 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 Undergraduate Mentor	Sep 2017 – Jun 2021
University of Minnesota Solar Vehicle Project Aerodynamics Team Lead	Sep 2012 – Jan 2015
Gopher Science Olympiad Event Coordinator	Sep 2014 – Jan 2016