

Ryan Kozlowski, Ph.D.

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Assistant Professor of Physics, College of the Holy Cross

Aug. 2022 – present

Visiting Professor of Physics, Berea College

Aug. 2021 – July 2022

Physics Ph.D., Duke University

2016 – 2021

Mesoscale forces and grain motion in granular media exhibiting stick-slip dynamics: effects of friction and grain shape

Advisors: Joshua E. S. Socolar & Karen E. Daniels

Physics BS with Honors, Davidson College, *Summa cum laude*

2012 – 2016

Honors thesis advisor: Daniel Boye

Courses taught

College of the Holy Cross

PHYS 116: Introductory Physics II

Spring 2023, Spring 2024

PHYS 225: Modern Physics Lab

Spring 2023, Spring 2024

PHYS 115: Introductory Physics I

Fall 2022, Fall 2023

PHYS 344: Thermal Physics

Fall 2022, Fall 2023

Berea College

GSTR 332: Scientific Origins

Spring 2022

PHY 127: General Physics I with Algebra + lab

Fall 2021, Spring 2022

PHY 341: Advanced General Laboratory

Fall 2021

PHY 481: Classical Mechanics

Fall 2021

Duke University

Physics 264L: Optics and Modern Physics

Spring 2020

Research with undergraduates

“Granular flow in a quasi-2D hopper with asymmetric boundaries”

Spring 2024

Holy Cross student **Levi Cass**

Independent research course

“Flow fields and discharge rates of granular materials flowing out of a tilted silo”

Summer 2023

Holy Cross student **Christine Xiao** and Tufts University student **Trevor Wallace**

Funded by the *Weiss Summer Research* program

“Granular flow from a tilted hopper”

Summer 2022

Berea students **Carter Luketich** and **Elijah Oshatz**

Funded by the *Undergraduate Research and Creative Projects Program*.

“Drag of a granular material on conical and spheroidal impactors”

Spring 2022

Berea student **Faisal Kimbugwe**

Capstone research project in physics department

Active grants

ACS Petroleum Research Fund, Undergraduate Research (UR), \$70,000 7/1/2025 – 8/31/2028
“Effects of particle-scale mixtures on intermittent dense granular flow: clogging and grain shape”
Co-PI: Cacey Bester, Swarthmore College

Publications and preprints

J. Montero, **R. Kozlowski**, L. A. Pugnaloni, “[Dimensional analysis for clogging of grains in two and three dimensions](#) [preprint],” submitted to *Physical Review E*, August 2025.

R. Kozlowski and L. A. Pugnaloni, “[Flow rate from a vertical silo with a tilted orifice](#),” *Powder Technology* 465, 121189 (2025).

C. M. Carlevaro, **R. Kozlowski**, and L. A. Pugnaloni, “[Flow rate in 2D silo discharge of binary granular mixtures: the role of ordering in monosized systems](#),” *Front. Soft Matter* 4, 1340744 (2024).

R. Basak, **R. Kozlowski**, L. A. Pugnaloni, M. Kramar, J. E. S. Socolar, C. M. Carlevaro, and L. Kondic, “[Evolution of force networks during stick-slip motion of an intruder in a granular material: Topological measures extracted from experimental data](#),” *Phys. Rev. E* **108**, 054903 (2023).

R. Kozlowski, J. C. Luketich, E. Oshatz, D. J. Durian, and L. A. Pugnaloni, “[Average outpouring velocity and flow rate of grains discharged from a tilted quasi-2D silo](#),” *Granul. Matter* **25**, 19 (2023).

R. Kozlowski, H. Zheng, K. E. Daniels, and J. E. S. Socolar, “[Stick-slip in a granular material with varying grain angularity](#),” *Front. Phys.* **10**, 916190 (2022).

L. A. Pugnaloni, C. M. Carlevaro, **R. Kozlowski**, H. Zheng, L. Kondic, and J. E. S. Socolar, “[Universal features of the stick-slip dynamics of an intruder moving through a confined granular medium](#),” *Phys. Rev. E* **105**, L042902 (2022).

R. Kozlowski, H. Zheng, K. E. Daniels, and J. E. S. Socolar, “[Stress propagation in locally loaded packings of disks and pentagons](#),” *Soft Matter* **17**, 10120 (2021).

R. Basak, C. M. Carlevaro, **R. Kozlowski**, C. Cheng, L. A. Pugnaloni, M. Kramár, H. Zheng, J. E. S. Socolar, and L. Kondic, “[Two approaches to quantification of force networks in particulate systems](#),” *J. Eng. Mech.* **147**, 11 (2021).

R. Kozlowski, H. Zheng, K. E. Daniels, and J. E. S. Socolar, “[Particle dynamics in two-dimensional point-loaded granular media composed of circular or pentagonal grains](#),” *EPJ Web Conf.* **249**, 06010 (2021).

C. M. Carlevaro, **R. Kozlowski**, L. A. Pugnaloni, H. Zheng, J. E. S. Socolar, and L. Kondic, “[Intruder in a two-dimensional granular system: Effects of dynamic and static basal friction on stick-slip and clogging dynamics](#),” *Phys. Rev. E* **101**, 012909 (2020).

R. Kozlowski, C. M. Carlevaro, K. E. Daniels, L. Kondic, L. A. Pugnaloni, J. E. S. Socolar, H. Zheng, and R. P. Behringer, “[Dynamics of a grain-scale intruder in a two-dimensional granular medium with and without basal friction](#),” *Phys. Rev. E* **100**, 032905 (2019). *Editor’s Suggestion*.

Seminars and invited research presentations

Invited talk: “Granular stick-slip dynamics across scales: How friction and grain shape influence collective grain-scale motion, force transmission, and bulk stability”

APS Global Physics Summit	March 2025
Seminars: “Stick-slip dynamics in granular materials: the role of grain shape and friction”	
Swarthmore College	October 2024
Mount Holyoke College	April 2024
Clark University	November 2023
Universidad Nacional de La Pampa	August 2023

Contributed talks (in-person or virtual) and posters

“Flow of granular material through an upright 2D silo with a tilted orifice: effects of vertically offset bottom boundaries”	
Northeastern Granular Materials Workshop 2025, poster	2025
American Physical Society Global Physics Summit 2025, poster	2025
“Flow rate in 2D silo discharge of binary granular mixtures: ordering in monosized systems”	
American Physical Society March Meeting 2024, contributed talk	2024
“Average outpouring velocity and flow rate of grains discharged from a tilted quasi-2D silo”	
19 th Annual Northeastern Granular Materials Workshop, contributed talk	2023
APS NES 2023 Fall Meeting, contributed talk	2023
“Stick-slip dynamics generated by granular materials with varying grain angularity”	
American Physical Society March Meeting 2021, virtual contributed talk	2021
Sand and Sound Symposium 2021, virtual contributed talk	2021
“Stick-slip dynamics in point-loaded granular media comprised of disks or polygonal grains”	
American Physical Society March Meeting 2022, virtual contributed talk	2022
Powders and Grains 2021, proceeding & virtual poster	2021
American Physical Society Division of Fluid Dynamics, virtual contributed talk	2020
“Dynamics of a grain-scale intruder with and without basal friction”	
American Physical Society March Meeting 2020, virtual contributed talk	2020
91 st Annual Meeting of the Society of Rheology, poster	2019
11 th Northeastern Complex Fluids and Soft Matter Workshop, contributed talk	2019
American Physical Society March Meeting 2019, contributed talk	2019
Granular Materials Gordon Research Conference, poster	2018
American Physical Society March Meeting 2018, contributed talk	2018
“Shear jamming and cyclic shear response in a 3D granular medium in microgravity”	
American Physical Society March Meeting 2019, contributed talk	2019

Service

Committee on Distinguished Fellowships and Graduate Studies	AY 2023-24 – present
Physics department web-master	AY 2023-24
Crompton gold medal award selection committee	Spring 2023
Physics department digital signage, lab safety committee	2022 – 2024
Referee service	

Research article for journal <i>Granular Matter</i>	Spring 2025
Research article for MDPI journal <i>Fluids</i>	Spring 2025
Research article for AIP journal <i>Physics of Fluids</i>	Fall 2022

Awards & honors

Weiss Summer Research Grant, Holy Cross	2023
Undergraduate Research & Creative Projects Program (URCPP) grant, Berea	2022
Preparing Future Faculty Fellow, Duke	2020 – 2021
Anne T. and Robert M. Bass Instructional Fellow, Duke	2019 – 2020
Mary Creason Memorial Award for Undergraduate Teaching, Duke	2017
James B. Duke Fellowship, Duke	2016 – 2020

Pedagogical training and development

American Associate of Physics Teachers	
Physics & Astronomy Faculty Teaching Institute, Washington, D.C.	Nov. 7 – 10, 2024
College of the Holy Cross	
HHMI workshop on inclusive excellence in STEM	July 18 – 20, 2023
Physics department discussions of electives in curriculum (Hewlett-Mellon)	June 5 & 7, 2023
New Faculty Orientation	Aug. 9, 2022
Berea College	
Student-Faculty Partnership with student Amy Sutter	Spring 2022
New faculty seminar / discussions	Fall 2021 – Spring 2022
American Association of Physics Teachers (AAPT) Winter Meeting 2022	Jan. 6 – 8, 2022
New Faculty Orientation	Aug. 5 – 6, 2021
AAPT New Faculty Workshop	June 28 – July 1, 2021
Duke University	Fall 2021
Certificate in College Teaching, Duke Graduate School	2018 – 2021
Preparing Future Faculty with Kyle Altmann of Elon University	Fall 2020 – Spring 2021
Duke University Bass Instructor of Record Fellowship	Spring 2020

Professional associations

American Physical Society: Division of Soft Matter, Division of Fluid Dynamics
 American Association of Physics Teachers
 Honor Societies: *Sigma Pi Sigma*, *Phi Beta Kappa*, *Omicron Delta Kappa*