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Dated: May 2, 2023

EMPLOYMENT AND RESEARCH EXPERIENCE

University of Warwick, Coventry, UK

Feb. 2022-Present

Research Fellow in the Mathematics Institute

Supported by the Simons collaboration on *Revisiting the Turbulence Problem using Statistical Mechanics*

EDUCATION

Massachusetts Institute of Technology (MIT), Cambridge, USA

2016-2022

PhD, Department of Earth, Atmospheric and Planetary Sciences (EAPS)

GPA: 4.9/5

Focus: Nonlinear Dynamics in Geosciences

Advisors: Glenn R. Flierl & J. Taylor Perron

École Normale Supérieure (ENS) rue d'Ulm, Paris, France

2015-2016

Masters ENS-ICFP in Macroscopic Physics and Complexity

mention *Très Bien*

Advisor: Alexandros Alexakis

The University of Texas at Austin

2010-2015

Bachelor of Science in Physics (Option: Honors Physics)

GPA: 3.9628/4

Bachelor of Science in Mathematics (Option: Honors Mathematics)

Dean's Scholars Honors Program

Graduation Distinction: Dean's Honored Graduate (Top 1%) and Highest Honors (Top 4%)

PUBLICATIONS

10. **Benavides, S. J.**, Deal, E., Venditti, J. G., Bradley, R., Zhang, Q., Kamrin, K., & Perron, J. T., "How fast or how many? Sources of sediment transport intermittency," *Geophysical Research Letters*, 50, e2022GL101919 (2023).

<https://doi.org/10.1029/2022GL101919>

9. Deal, E., Venditti, J. G., **Benavides, S. J.**, Bradley, R., Zhang, Q., Kamrin, K., & Perron, J. T., "Grain shape effects in bed load sediment transport," *Nature* **613**, 298-302 (2023).

<https://doi.org/10.1038/s41586-022-05564-6>

8. **Benavides, S. J.**, Burns, K. J., Gallet, B., & Flierl, G. R., "Effective drag in rotating, poorly conducting plasma turbulence," *The Astrophysical Journal*, **938** 92 (2022).

<https://doi.org/10.3847/1538-4357/ac9137>

7. Zhang, Q., Deal, E., Perron, J. T., Venditti, J. G., **Benavides, S. J.**, Rushlow, M., & Kamrin, K., "Fluid-driven transport of round sediment particles: from discrete simulations to continuum modeling," *JGR: Earth Surface*, 127, e2021JF006504 (2022).

<https://doi.org/10.1029/2021JF006504>

6. **Benavides, S. J.**, Burns, K. J., Gallet, B., Cho, J. Y-K. & Flierl, G. R., “Inverse cascade suppression and shear layer formation in MHD turbulence subject to a guide field and misaligned rotation,” *Journal of Fluid Mechanics*, Volume 935, A1, (2022).
<https://www.doi.org/10.1017/jfm.2021.968>
5. **Benavides, S. J.**, Deal, E., Rushlow, M., Venditti, J. G., Zhang, Q., Kamrin, K., & Perron, J. T., “The impact of intermittency on bed load sediment transport,” *Geophysical Research Letters*, 49, e2021GL096088 (2022).
<https://doi.org/10.1029/2021GL096088>
4. Alexakis, A., Pétrélis, F., **Benavides, S. J.**, & Seshasayanan, K., “Symmetry breaking in a turbulent environment,” *Phys. Rev. Fluids* **6**, 024605 (2021).
<https://doi.org/10.1103/PhysRevFluids.6.024605>
3. **Benavides, S. J.**, & Flierl, G. R., “Two-dimensional partially ionized magnetohydrodynamic turbulence,” *Journal of Fluid Mechanics*. Volume 900, A28, (2020).
<https://doi.org/10.1017/jfm.2020.500>
2. **Benavides, S. J.**, & Alexakis, A., “Critical transitions in thin layer turbulence,” *Journal of Fluid Mechanics*, Volume 822, pg. 364-385 (2017).
<https://doi.org/10.1017/jfm.2017.293>
 Mentioned in feature article: Ecke, R. E. "From 2D to 3D in Fluid Turbulence: Unexpected Critical Transitions." *Journal of Fluid Mechanics*, Volume 828, pg. 1-4 (2017).
<https://doi.org/10.1017/jfm.2017.507>
1. Seshasayanan, K., **Benavides, S. J.**, & Alexakis, A., "On the edge of an inverse cascade," *Phys. Rev. E*. Volume 90, 051003(R) (2014).
<http://dx.doi.org/10.1103/PhysRevE.90.051003>

SCIENTIFIC EXPERIENCE

Participant in summer school at the Center for Computational Astrophysics

The Flatiron Institute (Simons Foundation), New York, New York

Theme: “Multiscale Modeling of Astrophysical and Space Plasmas”

Summer 2019

Participant and speaker at workshop of Les Houches School of Physics, France

Theme: “New Challenges in Turbulence Research V”

April 2019

Guest Student at Geophysical Fluid Dynamics Summer School

WHOI, Woods Hole, Massachusetts

Theme: Atmosphere, Ocean, and Climate Fluid Dynamics

Summer 2014

HONORS AND AWARDS

Marie Skłodowska-Curie European Postdoctoral Fellowship

2023-2025

“Elucidating the bidirectional energy cascade of geophysical turbulence in time, space, and scale”
 at Universidad Politécnica de Madrid

Future Investigators in NASA Earth

2020-2021

and Space Science and Technology (FINESST) fellowship (\$45,000)

MIT

Jule Charney Prize (\$12,000) **2016-2019**

Robert R Shrock Graduate Fellowship (\$78,350) **2016**

ENS

ENS-ICFP Scholarship (\$10,000) **2015-2016**

TEACHING EXPERIENCE**Teaching Assistant at Massachusetts Institute of Technology**

12.810: “Dynamics of the Atmosphere” (Graduate) **Spring 2021**

Overall rating in subject evaluation: 6.6/7

Mentor for MIT’s Undergraduate Research Opportunities Program

Directly mentoring two undergraduates on original research projects **Summer 2020**

Teaching Assistant at Massachusetts Institute of Technology

12.820: “Turbulence in the Atmosphere and Ocean” (Graduate Course) **Spring 2020**

Teaching Assistant at Massachusetts Institute of Technology

12.800: “Fluid Dynamics of the Atmosphere and Ocean” (Graduate) **Fall 2019**

Overall rating in subject evaluation: 6.7/7

Undergraduate Teaching Assistant at the University of Texas at Austin

P S 303: “Introductory Physical Science I: Mechanics and Heat.” **Fall 2013**

SERVICES AND OUTREACH**Participant in the Application Mentorship Program (EAPS, MIT)**

Fall 2020-Fall 2022

Mentoring future applicants, e.g. with personal statements.

<https://sites.google.com/view/eaps-student-advisory-council/application-assistance>

Member of Graduate Student Advisory Committee (GSAG) to the faculty search committee

Spring 2020

Member of the Diversity Council (EAPS, MIT)

Department-wide committee, including faculty and staff **Fall 2019-Fall 2020**

Creator and runner of Student Seminar (EAPS, MIT)

Department wide, weekly seminar for students **Fall 2018-Spring 2020**

Seminars given:

How can we study extreme events efficiently? **Fall 2020**

Epidemic processes in complex networks **Spring 2020**

Atmospheric Predictability **Fall 2019**

Knots and their surprising connections to fluids and turbulence **Spring 2019**

Collective and critical phenomena in living systems **Fall 2018**

ADDITIONAL SKILLS

Programming: Python, Fortran, git. Languages: Spanish (fluent), French (fluent, but limited), Russian (limited)