

**Santiago José BENAVIDES**  
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Dated: October 17, 2022

## **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**

11. **Benavides, S. J.**, Deal, E., Venditti, J. G., & Perron, J. T., "Intermittency properties of a novel lattice model of bed load sediment transport," (*In Preparation*).

10. **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>

9. **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," (*Submitted to Geophysical Research Letters*).

8. 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," (*Accepted at Nature*).

<https://doi.org/10.31223/X55033>

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**

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)