

Brent Tan

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SUMMARY

I am a Research Scientist and a Computational Astrophysicist. I combine numerical experiments and analytic theory to model galactic atmospheres and weather, often drawing on multidisciplinary connections. I heavily leverage computational methods to probe and understand the physics of the complex multiscale systems that drive galaxy evolution.

TECHNICAL SKILLS

Programming Languages: Python, C++, Linux/Bash

Deep Learning Frameworks: JAX, PyTorch

Libraries & Tools: NumPy, SciPy, Git, LaTeX

Skills: High Performance Computing, Fluid Dynamics, MHD Simulations, Neural Differential Equations

EXPERIENCE

Flatiron Research Fellow, Center for Computational Astrophysics, New York, NY <i>Flatiron Institute, Simons Foundation</i>	2023 – 2024
Graduate Researcher, University of California Santa Barbara, Santa Barbara, CA	2017 – 2023

EDUCATION

University of California, Santa Barbara <i>Ph.D. in Physics/Astronomy</i>	Santa Barbara, CA 2017 – 2023
Carnegie Mellon University <i>B.S. in Physics (Astrophysics Concentration) with Computer Science Minor</i>	Pittsburgh, PA 2013 – 2017

PROJECTS

Neural Infalling Cloud Equations <i>Scientific Machine Learning Project</i> Increasing the accuracy of subgrid models and scientific equation discovery using Neural ODEs and Symbolic Regression. Accepted to NeurIPS 2024 Machine Learning and the Physical Sciences Workshop (Click for Preprint)	2024 <i>Python, JAX, Diffrax, Equinox, PySR</i>
Cool Things That Matter (Thesis topic spanning research publications) <i>High Performance Computing, Physical Modelling</i> Used simulations and analytic theory to investigate the multiphase dynamics of galactic atmospheres.	2017-2023 <i>Python, C++</i>
Extended Townsend Algorithm <i>Magnetohydrodynamic Fluid Simulation, Algorithm Design</i> Designed and implemented a novel algorithm for a fast and accurate radiative cooling/heating module in the MHD code Athena++	2022 <i>C++</i>

SELECTED PUBLICATIONS

- **Brent Tan**, Drummond B Fielding, Cloud atlas: navigating the multiphase landscape of tempestuous galactic winds, *Monthly Notices of the Royal Astronomical Society*, Volume 527, Issue 4, February 2024, Pages 9683–9714, <https://doi.org/10.1093/mnras/stad3793>
- **Brent Tan**, S Peng Oh, Max Gronke, Cloudy with a chance of rain: accretion braking of cold clouds, *Monthly Notices of the Royal Astronomical Society*, Volume 520, Issue 2, April 2023, Pages 2571–2592, <https://doi.org/10.1093/mnras/stad236>
- **Brent Tan**, S Peng Oh, A model for line absorption and emission from turbulent mixing layers, *Monthly Notices of the Royal Astronomical Society: Letters*, Volume 508, Issue 1, November 2021, Pages L37–L42, <https://doi.org/10.1093/mnrasl/slab100>
- **Brent Tan**, S Peng Oh, Max Gronke, Radiative mixing layers: insights from turbulent combustion, *Monthly Notices of the Royal Astronomical Society*, Volume 502, Issue 3, April 2021, Pages 3179–3199, <https://doi.org/10.1093/mnras/stab053>