

NADINE H. SOLIMAN

PERSONAL INFORMATION

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RESEARCH INTERESTS

I investigate how small-scale nonlinear astrophysical processes—such as **plasma physics**, **dust dynamics**, and **thermochemistry**—affect large-scale phenomena like star formation and galaxy evolution. I study numerical simulations and analytical modeling to explore how these microphysical processes influence and shape the macroscopic behavior of astrophysical systems.

EDUCATION

Exp: June 2025 CALIFORNIA INSTITUTE OF TECHNOLOGY

Thesis: *Dust in Astrophysical Systems: Impacts on Dynamics, Plasma Physics, and Thermochemistry*
Advisor: PHILIP F. HOPKINS

May 2019 NEW YORK UNIVERSITY ABU DHABI

Minors: Computer Science & Applied Mathematics
Thesis: *Post-processing Predictions of Black Holes Accretion Models in Cosmological Simulations*
Advisor: ANDREA MACCIÒ
Study Abroad: COURANT INSTITUTE OF MATHEMATICAL SCIENCES, NYU, 2017-2018

*Doctor of
Philosophy in
Astrophysics*

*Bachelor of Science
in Physics*

RESEARCH PUBLICATIONS

FIRST AUTHOR PUBLICATIONS

1. Are stars really ingesting their planets? Examining an alternative explanation

*The Astrophysical
Journal*

Authors: **Nadine H. Soliman** and Philip F. Hopkins.
Submitted to ApJ (2024). [arXiv:2408.15326](https://arxiv.org/abs/2408.15326)

2. Thermodynamics of giant molecular clouds: The effects of dust grain size

*The Astrophysical
Journal*

Authors: **Nadine H. Soliman**, Philip F. Hopkins, and Michael Y. Grudić.
Accepted to ApJ (2024). [arXiv:2407.09343](https://arxiv.org/abs/2407.09343)

3. Dust-evacuated zones near massive stars: Consequences of dust dynamics on star-forming regions

*The Astrophysical
Journal*

Authors: **Nadine H. Soliman**, Philip F. Hopkins, and Michael Y. Grudić.
Accepted to ApJ (2024). [arXiv:2406.09602](https://arxiv.org/abs/2406.09602)

4. Dust dynamics in AGN winds: A new mechanism for multiwavelength AGN variability

*Monthly Notices
of the Royal
Astronomical
Society*

Authors: **Nadine H. Soliman** and Philip F. Hopkins.
Accepted to MNRAS (2023). [525\(2\), 2668–2689](https://doi.org/10.1093/mnras/stad2689)

5. Co-evolution vs. co-existence: The effect of accretion modelling on the evolution of black holes and host galaxies

*Monthly Notices
of the Royal
Astronomical
Society*

Authors: **Nadine H. Soliman**, Andrea V. Macciò, and Marvin Blank.
Accepted to MNRAS (2023). [525\(1\), 12–23](#)

OTHER PUBLICATIONS

1. Microphysical regulation of non-ideal mhd in weakly-ionized systems: Does the hall effect matter?

*Open Journal of
Astrophysics*

Authors: Philip F. Hopkins, Jonathan Squire, Raphael Skalidis, and **Nadine H. Soliman**.
Submitted to OJAp (2024). [arXiv:2405.06026](#)

2. Dust in the Wind with Resonant Drag Instabilities: I. The Dynamics of Dust-Driven Outflows in GMCs and HII Regions

*Monthly Notices
of the Royal
Astronomical
Society*

Authors: Philip F. Hopkins, Anna L. Rosen, Jonathan Squire, Georgia V. Panopoulou, **Nadine H. Soliman**, Darryl Seligman, and Ulrich P Steinwandel.
Accepted to MNRAS (2022). [517\(1\), 1491–1517](#)

3. NIHAO - XXVII. Crossing the green valley

*Monthly Notices
of the Royal
Astronomical
Society*

Authors: Marvin Blank, Andrea V. Macciò, Xi Kang, Keri L. Dixon, and **Nadine H. Soliman**.
Accepted to MNRAS (2022). [514\(4\), 5296–5306](#)

4. NIHAO XXVI: Nature versus nurture, the star formation main sequence, and the origin of its scatter

*Monthly Notices
of the Royal
Astronomical
Society*

Authors: Marvin Blank, Liam E. Meier, Andrea V. Macciò, Aaron A. Dutton, Keri L. Dixon, **Nadine H. Soliman**, and Xi Kang.
Accepted to MNRAS (2021). [500\(1\), 1414–1420](#)

PRESENTATIONS

*Dissertation
Conference Talk*

Jan 2025 245th Meeting of the American Astronomical Society — National Harbor, MD

Symposium Talk

Sep 2024 Galaxy Formation & Evolution in Southern California (GalFRESCA) — Carnegie Observatories

Invited Seminar

Jun 2024 Galaxy Journal Club at STScI — Space Telescope Science Institute (STScI)

Conference Poster

Mar 2024 The Physics and Impact of Astrophysical Dust: From Star Formation Through Cosmology — Aspen Center for Physics

*Public Outreach
Talk*

Mar 2024 Astronomy on Tap — Los Angeles

Conference Poster

Dec 2023 2023 Salpeter Workshop on the Interstellar Medium — Cornell University

Invited Seminar

Nov 2023 NASA-Goddard AGN Seminar — Remote

DEI Outreach Talk

Sep 2023 FUTURE of Physics Conference — Caltech

Conference Talk

Jun 2023 AGN Winds on the Chesapeake — Catholic University of America

FELLOWSHIPS & AWARDS

<i>Aspen Center for Physics</i>	<i>Jan 2024</i> Block Award	Chosen by the conference organizers as a promising young physicist with an excellent poster.
<i>Caltech</i>	<i>Jan 2023</i> Keck Institute for Space Studies Affiliate	Nominated by the Caltech faculty as part of an ongoing cohort of graduate students and postdocs seen as the next generation of space exploration leaders.
<i>NYU Abu Dhabi</i>	<i>Sep 2019</i> Post-Graduate Research Fellowship	Selected out of NYUAD's graduating class of 2019 for one of two competitive Research Fellowship positions across the science division.
<i>NYU</i>	<i>May 2019</i> University Honors Scholar / NYU Founders' Day Award	Awarded for academic excellence during undergraduate studies.

TEACHING & MENTORING

<i>Co-organizer</i>	<i>2021, 2023, 2024</i> Astronomy Mentorship Program — Caltech	Matched incoming astronomy graduate students with upperclassmen mentors to facilitate their transition into graduate school. Organized social events to foster a supportive community within the Astronomy department at Caltech.
<i>Volunteer</i>	<i>2022–2024</i> FUTURE of Physics — Caltech	Facilitated workshops focused on CV development, writing a personal statement and graduate school applications for undergraduate students that identify as gender minorities.
<i>Teaching Assistant (Graduate Level)</i>	<i>Fall 2022</i> Radiative Processes - AY 121 — Caltech	
<i>Teaching Assistant (Graduate Level)</i>	<i>Winter 2022</i> Structure and Evolution of Stars - AY 123 — Caltech	
<i>Teaching Assistant (Graduate Level)</i>	<i>Fall 2021</i> Radiative Processes - AY 121 — Caltech	
<i>Student Mentor</i>	<i>2018–2019</i> Women Empowerment in STEM — NYU Abu Dhabi	Advised students on major selection, course planning, and securing research opportunities and internships. Served as a panelist on managing undergraduate research.

SKILLS

<i>Programming Languages</i>	Over 5000 lines: C, Python, Java Over 1000 lines: Haskell, JavaScript, Matlab, Coq Over 500 lines: HTML, CSS
<i>Scientific Tools</i>	GIZMO simulation code, SLURM, UNIX, Linux, Miriad Data Reduction Software, Karma Visualization Suite, GASOLINE2 N-body Code, Pynbody Analysis Package, Scikit-learn
<i>Languages</i>	English: Fluent Arabic: Native

October 6, 2024