Chris Nagele PhD: Postdoctoral Fellow

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Work Experience

Johns Hopkins, Baltimore, MD — Postdoctoral Fellow: 2024-present

Education

University of Tokyo, Tokyo, JP — PhD in Astronomy: 2021-2024
University of Tokyo, Tokyo, JP — MA in Astronomy: 2019-2021
Haverford College, Haverford, PA — BS in Physics and BA in Astronomy: 2012-2016

Skills

Coding: high performance computing, Python, Fortran, C, Slurm, Git, MPI, OpenMP
Physics: spectral radiation transfer**,** Compton scattering, ionization balance, general relativity, magnetohydrodynamics, weak reactions, nucleosynthesis, stellar evolution
Analysis: generative modeling, Bayesian statistics, time series

Academic Awards

Graduate Research Abroad in Science Program (GRASP) at UTokyo: September 2022

- Grant for visiting foreign Universities.
- Spent three weeks at the Max Planck Institute for Gravitational Physics (AEI) in Potsdam.
- Working on the development and application of a multi-dimensional BSSN neutrino transport code.
- Worth approximately ¥515,000.

MEXT Scholar: April 2019 - Present

- Scholarship from MEXT (Ministry of Education, Culture, Sports, Science and Technology) to conduct graduate studies at a Japanese University, in this case, University of Tokyo.
- Includes travel, tuition, tax exemption, and a monthly stipend of ¥145,000

NYU Shanghai, Recitation Instructor: June 2016- May 2017

- Position at NYU Shanghai for one year, involving teaching and research
- Salary of approximately $35,000

KINSC Summer Scholar: University of Exeter Summer 2015

- Haverford College program which gives funding to students who secure unpaid, significant natural science positions to work at during the summer.
- I used this funding to travel to the University of Exeter, and work with Sean P. Matt on analyzing magnetohydrodynamical simulations (see below).
- Worth approximately $5400 including travel and stipend.

Conferences

Texas Astrophysics 2025: Presentation December 2025
XRISM 2025: Presentation October 2025
Spin workshop@ Wake Forrest University: Poster September 2025
ML at HEP workshop 2024 @ KEK: Presentation January 2024
First Light @ MIT: Poster June 2023
AAS 242: Presentation June 2023
AAS 241: Presentation January 2023
Exploring the Transient Universe @ UTokyo: Presentation December 2022
EANAM9: Presentation September 2022
NPA-X: Poster September 2022
ngVLA 2022 @ CCA: Presentation June 2022
JINA Frontiers 2022: Poster May 2022
JINA Frontiers 2022 Junior Researchers WS: Presentation May 2022
Neutrino 2022: Virtual Poster May 2022
SCMA VII: Virtual Poster June 2021
First Star/Galaxy Study Group 2019 @ Nagoya: Presentation November 2019

Research Experience

Postdoctoral Fellow, JHU, with Julian Krolik July 2024 - present

- Spectral radiation transfer modeling of black hole accretion flows

Masters/PhD Program, UTokyo, with Hideyuki Umeda, Koh Takahashi, Takashi Yoshida, and Kohsuke Sumiyoshi

April 2019-March 2024

- Research on Supermassive Star transients.
- Simulating observables, such as photonic and neutrino lightcurves, nucleosynthetic yields
- Research on PISN, SNIc/b, LGRB progenitors

Generative Learning Zeminar, with Tilman Hartwig April 2020-August 2020

- Zoom Seminar organized by Tilman Hartwig (UTokyo).

- On techniques of generative learning and applications to astronomy.
- Included a research project using a Variational Autoencoder to analyze galaxy/AGN residual images. This research has been continued with Tilman Hartwig and John Silverman.

Research Assistant, Matthew Kleban, New York University June 2018-February 2024

- Research on Lattice Schwinger Model related to flux unwinding phenomenon.
- Research on Lattice Schwinger Model related to simulations of decoherence.

Senior Research Associate, New York University Shanghai June 2017-May 2018

- Conducted physics research with Tim Byrnes computing the electric field time dynamics of the Schwinger model motivated by the unwinding inflation model.
- Conducted physics research with Tim Byrnes into quantum mechanics and special relativity, considering the relativity of an entangled quantum state.
- Conducted philosophy of physics research with Brad Weslake regarding recent developments relating to the quantum measurement problem.

Research Assistant, Kevin Setter, Haverford College Fall 2015

- Part of the half credit course Research in Theoretical and Computational Physics.
- Read Figueroa-O'Farrill (1998) and Fulton and Harris (2004) to get a better understanding of electromagnetic duality.
- Began to write a paper explaining this phenomenon in a language accessible to undergraduate students, showing the mathematics explicitly for the SU(2), SO(3) case.

Research Assistant, Sean P. Matt, University of Exeter Summer 2015

- Extended a law predicting Alfven Radius for dipolar stellar magnetic fields to arbitrary axisymmetric stellar magnetic fields using ideal MHD stellar wind simulations.
- Presented Findings at KINSC Summer Undergraduate Research Symposium.
- Project was eventually turned into Senior Thesis

Research Assistant, Daniel J. Cross, Haverford College Summer 2014

- Searched for and found singularities in magnetic fields produced by simple planar current loops.
- Presented Findings at KINSC Summer Undergraduate Research Symposium.

Professional Experience

Peer Reviewer for A&A, ApJ
Panel Reviewer for NASA

Teaching Experience

Course Grader, New York University Shanghai June 2017-May 2018

- Graded for two introductory physics courses per semester.

Recitation Instructor, New York University Shanghai August 2016-May 2017

- Assisted NYU Shanghai faculty by teaching recitation sections and doing grading and background work.
- Assisted the teaching and grading of the introductory mechanics laboratory.

Public Observing Telescope Lead, Haverford College Public Observing August 2015-May 2016

- Prepared detailed observing plans for each event (6 per year).
- Maintained 16'' and 12'' Telescopes and observatory facilities.
- Educated people of all ages about the objects that they observed during the events.

Teaching Assistant, Haverford College Astronomy Department August 2014-May 2016

- Taught and supervised students using a Meade 12'' Telescope.

Publications (refereed) with author contribution statements

For an updated list: https://ui.adsabs.harvard.edu/public-libraries/c9C6AK6hSGqqnTtftM_R0Q

A. Agarwal, D. M. Siegel, B. D. Metzger, and C. Nagele, "Ignition of Weak Interactions and r-process Outflows In Supercollapsar Accretion Disks, ", vol.998, p.57, Feb.2026.

- Performed stellar structure calculations and instability analysis.

S.Ebihara, M.S.Fujii, T.R.Saitoh, and 4 more, "Nitrogen enhancement of GN-z11 by metal pollution from supermassive stars, ", arXiv:2601.04344, Jan.2026.

- Performed stellar evolution and explosive general relativistic hydrodynamics simulations.

C.Nagele, J.H.Krolik, R.Liu, and 2 more, "Simulation-Based Prediction of Black Hole Spectra: From 10M⊙ to 10^8 M⊙, ", arXiv:2601.03349, Jan.2026. (accepted to APJ)

- Performed spectral radiation transfer simulations of black hole accretion flows. Primary writer.

R.Liu, C.Nagele, J.H.Krolik, and 2 more, "Simulation-based Prediction of Black Hole X-Ray Spectra and Spectral Variability, ", vol.982, p.128, Apr.2025.

- Performed spectral radiation transfer simulations of black hole accretion flows. Contributed to writing.

C. Nagele, H. Umeda, and K. Takahashi, "Evolution and explosions of metal-enriched supermassive stars: proton rich general relativistic instability supernovae," , vol. 523, pp. 1629–1640, Aug. 2023.

- Performed hydrodynamical simulations, post processing, and majority of analysis. Primary writer.

C. Nagele and H. Umeda, "Multiple Channels for Nitrogen Pollution by Metal-enriched Supermassive Stars and Implications for GN-z11," , vol. 949, p. L16, May 2023.

- Performed hydrodynamical simulations, post processing, and majority of analysis. Primary writer.

C. Nagele, J. D. Silverman, T. Hartwig, J. Li, C. Bottrell, X. Ding, and Y. Toba, "A Machine-learning Approach to Assessing the Presence of Substructure in Quasar-host Galaxies Using the Hyper Suprime-cam Subaru Strategic Program," , vol. 947, p. 30, Apr. 2023.

- Performed machine learning coding, training and majority of analysis. Primary writer except for Sec. 2.

C. Nagele, H. Umeda, K. Takahashi, and K. Maeda, “Pulsations of primordial supermassive stars induced by a general relativistic instability; visible to JWST at z > 12,” , vol. 520, pp. L72–L77, Mar. 2023.

- Performed hydrodynamical and radiation hydro simulations, and majority of analysis. Primary writer.

C. Nagele, O. Janssen, and M. Kleban, “Decoherence: a numerical study,” Journal of Physics A Mathematical General, vol. 56, p. 085301, Feb. 2023.

- Performed all quantum field theory lattice simulations and contributed to analysis and writing.

C. Nagele, H. Umeda, K. Takahashi, T. Yoshida, and K. Sumiyoshi, “Stability analysis of supermassive primordial stars: a new mass range for general relativistic instability supernovae,” , vol. 517, pp. 1584–1600, Dec. 2022.

- Performed hydrodynamical simulations and majority of analysis. Primary writer.

C. Nagele, H. Umeda, K. Takahashi, T. Yoshida, and K. Sumiyoshi, “Neutrino emission from the collapse of 10^4 M⊙ Population III supermassive stars,” , vol. 508, pp. 828–841, Nov. 2021.

- Performed hydrodynamical simulations and majority of analysis. Primary writer.

H. Umeda, T. Yoshida, C. Nagele, and K. Takahashi, “Pulsational Pair-instability and the Mass Gap of Population III Black Holes: Effects of Overshooting,” , vol. 905, p. L21, Dec. 2020.

- Contributed to analysis and writing.

C. Nagele, H. Umeda, K. Takahashi, T. Yoshida, and K. Sumiyoshi, “The final fate of supermassive M ~ 5 × 10^4 M⊙ Pop III stars: explosion or collapse?,” , vol. 496, pp. 1224–1231, Aug. 2020.

- Performed hydrodynamical simulations and majority of analysis. Primary writer.

C. Nagele, E. O. Ilo-Okeke, P. P. Rohde, J. P. Dowling, and T. Byrnes, “Relativity of quantum states in entanglement swapping,” Physics Letters A, vol. 384, p. 126301, May 2020.

- Contributed substantially to theoretical work and analysis. Primary writer.

C. Nagele, J. E. Cejudo, T. Byrnes, and M. Kleban, “Flux unwinding in the lattice Schwinger model,” , vol. 99, p. 094501, May 2019.

- Performed all quantum field theory lattice simulations and contributed to analysis.