Chris Nagele PhD: Postdoctoral Fellow

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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

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

Sylvia Glickman Chamber Music Award: May 2016
- Prize awarded for excellence in Chamber Music.
- Participated in the chamber music program at Haverford College for eight semesters playing Mozart, Ginastera, and Tchaikovsky among others.

2nd Place, KINSC Scientific Imaging Contest: April 2016
- Picture showing the magnetic field lines for a stellar magnetic field in the l=3, m=2 spherical harmonic.

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

ML at HEP workshop 2024 @ KEK	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
- Research on binary supermassive black hole systems

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.

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.

Skills

Coding: python, fortran, C, html, mathematica, slurm, git
Physics: General relativity, hydrodynamics, weak reactions, nucleosynthesis, stellar evolution
Analysis: Generative learning (VAE, GAN, diffusion), Bayesian/frequentist statistics, time series

Leadership and Activities

Co President: Haverford Outdoors Club
Musician: 8 semesters of orchestra and chamber music at Haverford College, Member of Shanghai City Symphony Orchestra (上海城市交响乐团)
Member (Haverford College): Varsity Men's Tennis, Men's Club Soccer, Men's Club Rugby, Club Badminton, Choom Boom (Dance)
Member: Haverford College Problem Solving Group (weekly meetings in preparation for the William Lowell Putnam Mathematical Competition)

Publications (refereed) with author contribution statements

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

[1] 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.

[2] 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.

[3] 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.

[4] 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.

[5] 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.

[6] 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.

[7] C. Nagele, H. Umeda, K. Takahashi, T. Yoshida, and K. Sumiyoshi, "Neutrino emission from the collapse of 10^4 M$\odot$ Population III supermassive stars," , vol. 508, pp. 828–841, Nov. 2021.
- Performed hydrodynamical simulations and majority of analysis. Primary writer.

[8] 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.

[9] C. Nagele, H. Umeda, K. Takahashi, T. Yoshida, and K. Sumiyoshi, "The final fate of supermassive M ~ 5 × 10^4 M$\odot$ Pop III stars: explosion or collapse?," , vol. 496, pp. 1224–1231, Aug. 2020.
- Performed hydrodynamical simulations and majority of analysis. Primary writer.

[10] 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.

[11] 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.