

Sabrina Marbut Appel

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EDUCATION

- 2018 - Present **Rutgers, The State University of New Jersey**, Piscataway, NJ
Thesis Topic: Analytic Models and Simulations of Star Formation
Thesis Advisor: Dr. Blakesley Burkhardt
M.S. in Physics and Astronomy, 2022
- 2013 - 2017 **Reed College**, Portland, OR
B.A. in Physics, 2017
Senior Thesis: “Simulating the Gravitational Lensing of Massive
Particles: An Exploration of Scattering Solutions of the
Schwarzschild Metric”
Senior Thesis Advisor: Dr. Andrew Larkoski

OTHER RESEARCH EXPERIENCE

- Summer 2016 **American Museum of Natural History**
NSF Funded REU Participant, Advised by Dr. Dave Zurek
- Summer 2015 **Rutgers, The State University of New Jersey**
NSF Funded REU Participant, Advised by Dr. Andrew Baker

GRANTS, SCHOLARSHIPS, HONORS, AND AWARDS

- Fall 2023 **Noemie Koller Scholarship**, Rutgers Physics and Astronomy Department
2023 Collaborator on the **NSF Proposal** “The Untimely Deaths of Star Clusters”, submitted Fall 2022, awarded Fall 2023
- Summer 2023 **SGS Travel Award**, Rutgers School of Graduate Studies, awarded for participation in the “Olympian Symposium”
- Summer 2022 **Torrey Fellowship**, Rutgers Physics and Astronomy Department
Spring 2022 **Peter Lindenfeld Graduate Fellowship**, Rutgers Physics and Astronomy Department
- Summer 2019 **Boyd Scholarship**, Rutgers Physics and Astronomy Department
Summer 2019 **Travel Award**, Rutgers Physics and Astronomy Department, awarded for travel to the “Advancing Theoretical Astrophysics Summer School”
- 2017 **Phi Beta Kappa**, inducted to the Reed College Chapter May 15, 2017
- 2014 - 2017 **NSF Scholar**, awarded by Reed College for the 2014/15, 2015/16, and 2016/17 academic years
- 2013 - 2017 **President’s Commendation for Academic Excellence**, Reed College, awarded for academic performance in the 2013/14, 2014/15, 2015/16 and 2016/17 academic years
- 2013 - 2017 **Reed College Grant**, Reed College Financial Aid Office, awarded for the 2013/14, 2014/15, 2015/16, and 2016/17 academic years

STUDENT MENTORING

2021 - 2022 **Avery Kiihne**, undergraduate researcher, Summer 2021 - Summer 2022, Rutgers, The State University of New Jersey, Piscataway, NJ

SERVICE

2020 - Present **Leadership Roles in MiPA** (Minorities in Physics and Astronomy group), Rutgers, the State University of New Jersey, Piscataway, NJ
 Past President - Sep. 2023 to present
 President - Dec. 2022 to Sep. 2023
 Graduate Chair - Summer 2020 to Dec. 2022
 Co-Coordinator of EIJC (See below) - 2020 to 2022
 Led the creation of a MiPA Charter and Code of Conduct (2020)

2020 **Founder of the Equity and Inclusion Journal Club** (EIJC), Rutgers, the State University of New Jersey, Piscataway, NJ

2019 - 2020 **Officer in the Women in Physics and Astronomy (WiPA) group**, Rutgers, the State University of New Jersey, Piscataway, NJ
 Co-led the effort to establish weekly meetings
 Co-led the transition from Women in Physics and Astronomy to Minorities in Physics and Astronomy (Spring and Summer 2020)

2019 - 2020 **Co-President of the Physics and Astronomy Graduate Student Organization**, Rutgers, the State University of New Jersey, Piscataway, NJ

OUTREACH AND TEACHING (SELECTED)

Fall 2022 Teaching Assistant, **Computational Astrophysics**, Rutgers, The State University of New Jersey, Piscataway, NJ

Fall 2020 Teaching Assistant, **Byrne Seminar: The Rutgers Undergraduate Pipeline to Research & Education in Physics (RU-PREP)**, Rutgers, The State University of New Jersey, Piscataway, NJ
 Includes being available as a mentor for the students

Spring 2019 Teaching Assistant, **Extended Analytical Physics II**, Rutgers, The State University of New Jersey, Piscataway, NJ

Fall 2018 Teaching Assistant, **Extended Analytical Physics I**, Rutgers, The State University of New Jersey, Piscataway, NJ

Fall 2017 - Summer 2018 Volunteer, Physics Lab & Featured Exhibits, **Oregon Museum of Science and Industry**, Portland, OR

Fall 2014 - Spring 2017 Teaching Assistant, **Introductory Physics Laboratory**, Reed College, Portland, OR

CONFERENCE ORGANIZATION

2022 Head of the SOC and LOC for the **Torch Regional Meeting**, Center Computational Astrophysics, Flatiron Institute, New York, NY, (October 21, 2022)

2022 Head of the SOC and LOC for the **Torch Workshop**, Center Computational Astrophysics, Flatiron Institute, New York, NY, (August 17-19, 2022)

TALKS (SELECTED)

- Jun. 28, 2023 “How the Gas Dynamics Set the Star Formation Rate of Molecular Clouds,” The 2023 Northeast Star and Planet Formation Meeting, Center for Astrophysics (CfA), Cambridge, MA
- Jun. 2, 2023 “How the Gas Dynamics Set the Star Formation Rate of Molecular Clouds,” The Olympian Symposium, Paralia Katerini, Mt. Olympus, Greece
- May 26, 2023 **Invited Talk:** “How the Gas Dynamics Set the Star Formation Rates of Molecular Clouds,” Young MMF talk at the Midwest Magnetic Fields Workshop 2023, Online
- Apr. 20, 2023 **Invited Talk:** “How the Gas Dynamics Set the Star Formation Rates of Molecular Clouds,” Princeton Thunch Series, Princeton University, Princeton, NJ,
- Mar. 21, 2023 **Invited Talk:** “How the Gas Dynamics Set the Star Formation Rates of Molecular Clouds,” KITP: Conference on Galaxy Formation and Evolution in the Data Science Era, UC Santa Barbara, Santa Barbara, CA
- Aug. 23, 2022 “The Impact of Stellar Feedback on the Dynamics and Evolution of Star Forming Regions ,” the Clusters Workshop at McMaster University, Hamilton, Ontario, Canada
- Aug. 17-19, 2022 “Implementing Protostellar Outflows in TORCH,” the Summer 2022 TORCH Workshop, Center Computational Astrophysics, Flatiron Institute, New York, NY
- Jul. 21, 2022 “The Impact of Stellar Feedback on the Dynamics and Evolution of Star Forming Regions,” With Two Eyes: A three week scientific session of the Interstellar Institute, Institut Pascal, Paris-Saclay, France
- Dec. 9, 2022 “The Impact of Stellar Feedback on the Density PDF in Star Forming Regions,” VICO-CICO Fall 2021 Workshop, University of Virginia, Charlottesville, VA
- Dec. 3, 2021 “The Impact of Stellar Feedback on the Density PDF in Star Forming Regions,” The Mid-Atlantic Section of the APS Meeting, Rutgers, The State University of New Jersey, Piscataway, NJ
- 2019 - 2021 “Women in Physics: A Case Study of Equity Issues in Physics,” Student Seminar in Physics and Astronomy, Rutgers, The State University of New Jersey, Piscataway, NJ (joint talk with Charlotte Olsen)
Gave the same talk Mar. 14, 2019, Nov. 21, 2019, Oct. 22, 2020, and Dec. 2, 2021 (Online)
- Jul. 26, 2021 “Towards an Analytic Model of Star Formation: What Makes Star Formation Inefficient?” Interstellar Institute’s program “The Grand Cascade”, Paris-Saclay University’s Institut Pascal, Online
- Dec. 14, 2020 “Towards an Analytic Model of Star Formation: What Makes Star Formation Inefficient?” CICO-VICO Fall 2020 Workshop, Online
- Sep. 6, 2019 “Investigating the Impact of Stellar Feedback on Models of Star Formation,” Gotham Fest 2019, Simons Foundation Center for Computational Astrophysics, New York, NY
- May 2, 2017 “Simulating Gravitational Lensing,” Senior Thesis Oral Examination, Reed College, Portland, OR
2-hour exam before an interdisciplinary, 4-person board of faculty

POSTERS AND OTHER PRESENTATIONS

- Jun. 20-24, 2022 “The Impact of Stellar Feedback on the Dynamics and Evolution of Star Forming Regions,” Poster, **From Stars to Galaxies II**, Chalmers University, Gothenberg, Sweden
- Jun. 1-3, 2020 “Investigating the Impact of Stellar Feedback on Models of Star Formation,” iPoster, The **236th AAS Meeting**, Online
- Jan. 6, 2017 “From the Ultraviolet to the Infrared: The Stars of M70,” Poster, **229th AAS Meeting**, Grapevine, TX
- Jan 6, 2016 “Star Formation in Nearby Analogues of Lyman Break Galaxies,” Poster, **227th AAS Meeting**, Kissimmee, FL

OTHER MEMBERSHIPS AND ACTIVITIES (SELECTED)

- 2015 - Present **American Astronomical Society (AAS)**
Junior Member Fall 2015 to Fall 2017 *and* February 2020 to Present
- 2015 - 2018 **American Physical Society (APS)**, Member Fall 2015 to Fall 2018

OTHER CONFERENCES, SUMMER SCHOOLS, AND WORKSHOPS

- Apr. 5, 2023 Spring 2023 **TORCH Regional Meeting**, American Museum of Natural History, New York, NY
- Oct. 21, 2022 Fall 2022 **TORCH Regional Meeting**, Center Computational Astrophysics, Flatiron Institute, New York, NY
- Aug. 22-24, 2022 **Clusters Workshop at McMaster University**, Hamilton, Ontario, Canada
- Aug. 17-19, 2022 Summer 2022 **TORCH Workshop**, Center Computational Astrophysics, Flatiron Institute, New York, NY
- Jun 7-9, 2021 The **238th AAS Meeting**, Virtual
- Jan. 17, 2020 **New England Star Formation Meeting**, University of Connecticut, Storrs, CT
- Aug. 28-30, 2019 **Torch Open Source Workshop: Introduction to Structure and Use**, Simons Foundation Center for Computational Astrophysics, New York, NY
- Jul. 15-26, 2019 **Advancing Theoretical Astrophysics Summer School**, University of Amsterdam, Amsterdam, The Netherlands

PUBLICATIONS

† - indicates an undergraduate student mentee

†Kiihne, A., **Appel, S. M.**, Burkhart, B., Semenov, V. A., Federrath, C., “*Fitting Probability Distribution Functions in Turbulent Star-Forming Molecular Clouds*”, 2023, arXiv e-prints, arXiv:2305.11218, doi: 10.48550/arXiv.2305.11218

Appel, S. M., Burkhart, B., Semenov, V. A., Federrath, C., Rosen, A. L. Tan, J. C., “*What Sets the Star Formation Rate of Molecular Clouds? The Density Distribution as a Fingerprint of Compression and Expansion Rates*”, 2023, ApJ, 954, 93, doi: 10.3847/1538-4357/ace897

Cournoyer-Cloutier, C., Sills, A., Harris, W. E., **Appel, S. M.**, Lewis, S. C., Polak, B., Tran, A., Wilhelm, M. J. C., Mac Low, M.-M., McMillan, S. L. W., Zwart, S. P., “*Early evolution and three-dimensional structure of embedded star clusters*”, 2023, MNRAS, 521, 1338, doi: 10.1093/mnras/stad568

Appel, S. M., Burkhart, B., Semenov, V. A., Federrath, C., Rosen, A. L., “*The Effects of Magnetic Fields and Outflow Feedback on the Shape and Evolution of the Density Probability Distribution Function in Turbulent Star-forming Clouds*”, 2022, ApJ, 927, 75, doi: 10.3847/1538-4357/ac4be3

B. Burkhart, **S. Appel**, S. Bialy, J. Cho, A. J. Christensen, D. Collins, C. Federrath, D. Fielding, D. Finkbeiner, A. S. Hill, J. C. Ibanez-Mejia, M. R. Krumholz, A. Lazarian, M. Li, P. Mocz, M.-M. Mac Low, J. Naiman, S. K. N. Portillo, B. Shane, Z. Slepian, Y. Yuan, “*The Catalogue for Astrophysical Turbulence Simulations (CATS)*”, 2020, ApJ, 905, 14, doi: 10.3847/1538-4357/abc484