ALEX GAGLIANO

MIT 26-648, Cambridge, MA 02139 | gaglian2@mit.edu | https://alexandergagliano.github.io/

RESEARCH INTERESTS

I develop **deep learning** models to study the explosions and progenitors of **core-collapse supernovae** with **synoptic photometric surveys** (ZTF, ATLAS, YSE, and soon LSST).

APPOINTMENTS

IAIFI Postdoctoral Fellow — Aug 2023-Present
Harvard University | Center for Astrophysics — Cambridge, MA
Massachusetts Institute of Technology — Cambridge, MA
NSF Institute for AI and Fundamental Interactions in Physics

Pre-Doctoral Fellow | CCA Flatiron — Jan 2022–June 2022
Advisors: Dan Foreman-Mackey, Gabriella Contardo

NSF Graduate Research Fellow | UIUC/Natl. Center for Supercomputing Applications — Aug 2018 – May 2023
Advisor: Gautham Narayan

Post-Baccalaureate Researcher | Los Alamos National Laboratory — Sept 2017 – Aug 2018
Advisors: Joseph Smidt, Aycin Aykutalp

EDUCATION

Ph.D., Department of Astronomy — Aug 2018 – April 2023
University of Illinois at Urbana-Champaign — Champaign, IL
Advisor: Gautham Narayan

B.S., Computational Modeling & Data Analytics — Aug 2013 – June 2017
Virginia Polytechnic Institute & State University — Blacksburg, VA
Physics Minor, Honors Scholar

FELLOWSHIPS & AWARDS

- NSF Graduate Research Fellowship ($102k) — 2020-2023
- Illinois Distinguished Fellowship ($75k) — 2018-2022
- Center for Astrophysical Surveys Fellowship ($30k) — 2019
- PDT Partners Machine Learning Conference Grant ($3k) — 2024
- Needles in Rubin's Haystack Anomaly Detection Workshop Grant ($10k) — 2023
- ASA Astrostatistics Interest Group Best Paper Award, *GHOST* — 2021
- DPS/AAS Education and Outreach Grant ($1k, astro[sound]bites) — 2020 & 2021
- SC18 Supercomputing Visualization Showcase (2^{nd}) — 2018
- Academy of Integrated Science Distinguished Senior ($1.4k) — 2017
- Mathematical Contest in Modeling, Meritorious Winner (Top 7% Globally) — 2017
- Wayne & Claire Horton Fellowship ($10k) — 2015
- International Space Olympics, Astrophysics Category (1^{st}/200) — 2012

COMPUTE PROPOSALS

Amazon AWS & Harvard Data Science Initiative | $10,000 awarded (PI) — 2025
- *SpeakYSE: An Agentic LLM for Time-Domain Astrophysics*

ACCESS | ∼12,000 GPU-hours awarded (PI) 2024
- *IAIFI Boston-Area Astrophysics and Machine Learning Hackathon*
- *An Open-Source Conversational Agent for Supernova Science*
- *Time-Domain Needles in Rubin's Haystack*

TELESCOPE PROPOSALS

LAS CAMPANAS OBSERVATORY | 13 nights awarded (PI) 2024A-2025B
- *A High-Cadence Spectroscopic Study of Transients with Magellan*
- *A Spectroscopic Study of Core-Collapse Supernovae and their Precursor Emission with Magellan*
- *Explosion Sites of Gamma-Ray Bursts and Exotic Optical Transients with the LLAMAS IFU*

MMT OBSERVATORY | 19 nights awarded (PI) 2024A-2025B
- *Linking Galaxy Mergers to Supernova Physics with Binospec*
- *A High-Cadence Spectroscopic Study of Transients with the MMT*

GEMINI OBSERVATORY | 68 hr awarded (PI) 2022A,2022B,2024B,2025B
- *Finding the Needles in Rubin's Haystack (105 hr, LLP, CoI)*
- *Setting the Stage for r-Process Nucleosynthesis in Stripped-Envelope Supernovae*
- *Probing Pre-Explosion Mass Loss Through NIR Spectroscopy of Young SNe Ib/c*
- *The Young Supernova Experiment: Creating the Reference low-z Supernova Sample for Cosmology*

CERRO TOLOLO INTER-AMERICAN OBSERVATORY | 55 nights awarded (CoI) 2025B
- *Constructing the Gold Sample of Superluminous Supernovae and Tidal Disruption Events from LSST with SOAR*

JAMES WEBB SPACE TELESCOPE | 41 hr awarded (CoI) GO Cycle 1
- *Nucleosynthesis, Astrophysics, and Cosmology with IR Observations of a Gravitational Wave Counterpart*
- *Detecting the Synthesis of the Heaviest Elements with Photometry of a Kilonova*
- *Nebular Spectroscopy of a Kilonova with JWST*

REFEREED PUBLICATIONS

Note: † Denotes equal contribution.

FIRST AUTHOR: *h=17 with 998 citations across 32 refereed papers (see NASA ADS).*

7. **Minuet: A Diffusion Autoencoder for Compact Semantic Compression of Multi-Band Galaxy Images**. **Gagliano, A.**, Shen, Y. & Villar, V. A., 2025. *in prep.*

6. **The SpeakYSE: An Open-Source LLM Agent for Supernova Science**. **Gagliano, A.**, Villar, V. A., Mazumder, M., Mandel, K., Jones, D. O., & Narayan, G., 2025. *in prep.*

5. **Evidence for an Instability-Induced Binary Merger in the Double-Peaked, Helium-Rich Type IIn Supernova 2023zkd**. **Gagliano, A.**, Villar, V. A., Matsumoto, T., Jones, D. O., Ransome, C. L., Nugent, A. E., Hiramatsu, D., Auchettl, K., Tsuna, D., Dong, Y., Gomez, S., Aleo, P. D., Angus, C., de Boer, T., Bostroem, K. A., Chambers, K. C., Coulter, D. A.; Davis, K. W., Fairlamb, J. R., Farah, J., Farias, D., Foley, R. J., Gall, C., Gao, H., Gonzalez, E. P., Howell, D. A., Huber, M. E., Kilpatrick, C. D., Lin, C.-C.; MacLeod, M. E., Magnier, E. A., McCully, C., Minguez, P., Narayan, G., Newsome, M., Patra, K. C., Rest, A., Rest, S., Smartt, S., Smith, K. W., Terreran, G., Wainscoat, R. J., Wang, Q., Yadavalli, S. K., & Zenati, Y., 2025. *ApJ*, 989(2), id.182. *ADS.*

4. **Finding the Fuse: Prospects for the Detection and Characterization of Core-Collapse Precursor Emission with the LSST**. **Gagliano, A.**, Berger, E., Villar, V. A., Hiramatsu, D., Kessler, R., Matsumoto, T., Gilkis, A., & Laplace, E., 2024. *ApJ*, 978(1), id.110. *ADS.*

3. **First Impressions: Early-Time Classification of Supernovae using Host Galaxy Information and Shallow Learning**. **Gagliano, A.**, Contardo, G., Foreman-Mackey, D., Malz, A. I., & Aleo, P. D, 2023 *ApJ*, 954(1). *ADS.*

2. **An Early-Time Optical and Ultraviolet Excess in the type-Ic SN 2020oi**. **Gagliano, A.**, Izzo, L., Kilpatrick, C. D., Mockler, B., Jacobson-Galán, W. V., Terreran, G., Dimitriadis, G., Zenati, Y,. Auchettl, K., Drout, M. R., Foley, R. J., Margutti, R., Rest, A., Jones, D. O., Aganze, C., Aleo, P. D., Burgasser, A. J., Coulter, D. A., Gerasimov, R., Gall, C., Hjorth, J., Hsu, C.-C., Magnier, E. A., Mandel, K. S., Piro, A. L., Rojas-Bravo, C., Siebert, M. R., Stacey, H., Stroh, M. C., Swift, J. J., Taggart, K., Tinyanont, S., 2022. *ApJ*, 924(2), p. 55. *ADS.*

1. **GHOST: Using Only Host Galaxy Information to Accurately Associate and Distinguish Supernovae**. **Gagliano, A.**, Narayan, G., Engel, A., and Kind, M.C., 2021. *ApJ*, 908(2), p. 170. *ADS.*

SECOND AUTHOR:

3. **`reLAISS`: A Library for Flexible Similarity Searches of Supernovae and their Host Galaxies**. Reynolds, E., **Gagliano, A.**, & Villar, V. A., 2025. *RNAAS*, 9(189). *ADS.*

2. **ORACLE: A Real-Time, Hierarchical, Deep-Learning Photometric Classifier for the LSST**. Shah, V., **Gagliano, A.**, Malanchev, K., & Narayan, G., 2024. *Submitted to ApJ. ADS*.

1. **The Simulated Catalogue of Optical Transients and Correlated Hosts (SCOTCH)**. Lokken, M., **Gagliano, A.**, Narayan, G., Hložek, R., Kessler, R., Crenshaw, J. F., Salo, L., Alves, C. S., Chatterjee, D., Vincenzi, M., Malz, A. I., 2023. *MNRAS*, 520(2), 2887. *ADS.*

NTH AUTHOR:

32. **AT 2024ahzi: A Type IIP Supernova Observed by the LSST Commissioning Camera.** de Soto, K., et al. (incl. **Gagliano, A.**), 2025. *in prep.*

31. **Characterizing Supernova Host Galaxies with FrankenBlast: A Scalable Tool for Transient Host Galaxy Association, Photometry, and Stellar Population Modeling.** Nugent, A., Villar, V. A., **Gagliano, A.**, Jones, D. O., Horowicz, A., de Soto, K., Wang, B., & Margalit, B., 2025. *in prep.*

30. **The Type II SN 2025pht in NGC 1637: A Red Supergiant with Carbon-rich Circumstellar Dust as the First *JWST* Detection of a Supernova Progenitor Star**. Kilpatrick, C. D., Suresh, A., Davis, K. W., Drout, M. R., Foley, R. J., **Gagliano, A.**, Jacobson-Galán, W. V., Kaur, R., Taggart, K., & Vazquez, J., 2025. *accepted to ApJL. ADS*.

29. **Enabling Early Transient Discovery in LSST via Difference Imaging with DECam**. Dong, Y., de Soto, K., Villar, V. A., Nugent, A., **Gagliano, A.**, & Bostroem, K. A., 2025. *Submitted to ApJ. ADS*.

28. **Characterization of type Ibn SNe**. Farias, D., Gall, C., Villar, V. A., Auchettl, K., de Soto, K. M., **Gagliano, A.**, Hoogendam, W. B., Narayan, G., Sedgewick, A., Yadavalli, S. K., Zenati, Y., Angus, C. R., David, K. W., Hjorth, J., Jacobson-Galán, W. V., Jones, D. O., Kilpatrick, C. D., Bustamante Roselli, M. J., Coulter, D. A., Dimitriadis, G., Foley, R. J., Gangopadhyay, A., Gao, H., Huber, M. E., Izzo, L., Johnson, J. L., Johnson, J. L., Piro, A. L., Rest, A., Rojas-Bravo, C., Siebert, M. R., Taggart, K., & Tinyanont, S., 2025. *submitted to A&A. ADS*.

27. **SPLASH: A Rapid Host-Based Supernova Classifier for Wide-Field Time-Domain Surveys**. Boesky, A., Villar, V. A., **Gagliano, A.**, & Hsu, B., 2025. *Submitted to ApJ. ADS*.

26. **A Detection of Helium in the Bright Superluminous Supernova SN 2024rmj**. Kumar, H., Berger, E., Blanchard, P. K., Gomez, S., Hiramatsu, D., **Gagliano, A.**, Andrews, M., Bostroem, K. A., Farah, J., Howell, D. A., & McCully, C., 2025. *Submitted to ApJ. ADS*.

25. **Seeing the Outer Edge of the Infant Type Ia Supernova 2024epr in the Optical and Near-Infrared**. Hoogendam, W. B., Jones, D. O., Ashall, C., Shappee, B. J., Foley, R. J., Tucker, M. A., Huber, M. E., Auchettl, K., Desai, D. D., Do, A., Hinkle, J. T., Romagnoli, S., Shi, J., Syncatto, A., Angus, C. R., Chambers, K. C., Coulter, D. A., Davis, K. W., de Boer, T., **Gagliano, A.**, Kong, M., Lin, C.-C., Lowe, T. B., Magnier, E. A., Minguez, P., Pan, Y.-C., Patra, K. C., Severson, S. A., Taggart, K., Wasserman, A. R., Yadavalli, S. K., 2025. *OJA*, 8, id.120. *ADS*.

24. **A Wide Field Map of Ultra-Compact Dwarfs in the Coma Cluster**. Pomeroy, R. T., Matrid, J. P., O'Neill, C. R., & **Gagliano, A.**, 2025. *ApJ*, 988(1). *ADS*.

23. **An Updated Detection Pipeline for Precursor Emission in Type II Supernova 2020tlf.** Jacobson-Galán, W. V., Gonzalez, S., Patel, S., Dessart, L., Jones, D. O., Coppejans, D. L., Dimitriadis, G., Foley, R. J., Kilpatrick, C. D., Matthews, D. J., Rest, S., Terreran, G., Aleo, P. D., Auchettl, K., Blanchard, P. K., Coulter, D. A., Davis, K. W., de Boer, T. J. L., DeMarchi, L., Drout, M. R., Earl, N., **Gagliano, A.**, Gall, C., Hjorth, J., Huber, M. E., Ibik, A. L., Milisavljevic, D., Pan, Y. -C., Rest, A., Ridden-Harper, R., Rojas-Bravo, C., Siebert, M. R., Smith, K. W., Taggart, K., Tinyanont, S., Wang, Q., Zenati, Y., 2025. *RNAAS*, 9(1), id.5. *ADS*.

22. **The Impact of Host-galaxy Properties on Supernova Classification with Hierarchical Labels.** Villar, V. A., Gomez, S., Berger, E., & **Gagliano, A.**, 2024. *ApJS*, 276(3). *ADS.*

21. **Maven: A Multimodal Foundation Model for Supernova Science**. Zhang, G.†, Helfer, T.†, **Gagliano, A.**, Mishra-Sharma, S., & Villar, V., A., 2024. *Journal of Machine Learning Science and Technology.*, 5(4), id.045069. *ADS.*

20. **The Type I superluminous supernova catalogue I: light-curve properties, models, and catalogue description**. Gomez, S., Nicholl, M., Berger, E., Blanchard, P. K., Villar, V. A., Rest, S., Hosseinzadeh, G., Aamer, A., Ajay, Y., Athukoralalage, W., Coulter, D. C. Eftekhari, T., Fiore, A., Franz, N., Fox, O., **Gagliano, A.**, Hiramatsu, D., Howell, D. A., Hsu, B., Karmen, M., Siebert, M. R., Könyves-Tóth, R., Kumar, H., McCully, C., Pellegrino, C., Pierel, J., Rest, A., & Wang, Q., 2024. *MNRAS*, 535(1), p. 471. *ADS.*.

19. **Blast: a Web Application for Characterizing the Host Galaxies of Astrophysical Transients**. Jones, D. O., McGill, P., Manning, T. A., **Gagliano, A.**, Wang, B., Coulter, D. A., Foley, R. J., Narayan, G., Villar, V. A., Braff, L., Engel, A. W., Farias, D., Lai, Z., Loertscher, K., Kutcka, J., Thorp, S., & Vazquez, J., 2024. *submitted to PASP*. *ADS.*

18. **Find the haystacks, then look for needles: The rate of strongly lensed transients in galaxy-galaxy strong gravitational lenses**. Sainz de Murieta, A., Collett, T. E., Magee, M. R., Pierel, J. D. R., Enzi, W. J. R., Lokken, M., **Gagliano, A.**, Ryczanowski, D., 2024. *MNRAS*, 535(3). *ADS*.

17. **Probabilistic Forward Modeling of Galaxy Catalogs with Normalizing Flows**. Crenshaw, J. F., Kalmbach, J. B., **Gagliano, A.**, Ziang, Y., Connolly, A. J., Malz, A. I., Schmidt, S. J., on behalf of The LSST Dark Energy Science Collaboration, 2024. *ApJ, 168(2)*. *ADS.*

16. **Multi-filter UV to NIR Data-driven Light Curve Templates for Stripped Envelope Supernovae**. Khakpash, S., Bianco, F. B., Modjaz, M., Fortino, W. F., **Gagliano, A.**, Larison, C. , & Pritchard, T. A, 2024. *ApJSS*, 275(2). *ADS.*

15. **Keck Infrared Transient Survey. I. Survey Description and Data Release 1**. Tinyanont, S., Foley, R. J., Taggart, K., Davis, K. W., LeBaron, N., Andrews, J. E., Bustamante-Rosell, M. J., Camacho-Neves, Y., Chornock, R., Coulter, D. A., Galbany, L., Jha, S. W., Kilpatrick, C. D., Kwok, L. A., Larison, C., Pierel, J. R., Siebert, M. R., Aldering, G., Auchettl, K., Bloom, J. S., Dhawan, S., Filippenko, A. V., French, K. D., **Gagliano, A.**, Grayling, M., Howell, D. A., Jacobson-Galán, W. V., Jones, D. O., Le Saux, X., Macias, P., Mandel, K. S., McCully, C., Padilla Gonzalez, E., Rest, A., Rho, J., Rojas-Bravo, C., Skrutskie, M. F., Thorp, S., Wang, Q., Ward, S. M., 2024. *PASP*, 136(1). *ADS.*

14. **Double "acct": a distinct double-peaked supernova matching pulsational pair-instability models**. Angus, C. R., Woosley, S. E., Foley, R. J., Nicholl, M., Villar, V. A., Taggart, K., Pursiainen, M., Ramsden, P., Srivastav, S., Stevance, H. F., Moore, T., Auchettl, K., Hoogendam, W. B., Khetan, N., Yadavalli, S. K., Dimitriadis, G., **Gagliano, A.**, Siebert, M. R., Aamer, A., de Boer, T., Chambers, K. C., Clocchiatti, A., Coulter, D. A., Drout, M. R., Farias, D., Fulton, M. D., Gall, C., Gao, H., Izzo, L., Jones, D. O., Lin, C. -C., Magnier, E. A., Narayan, G., Ramirez-Ruiz, E., Ransome, C. L., Rest, A., Smartt, S. J., & Smith, K. W., 2024. *submitted to ApJL*. *ADS.*

13. **SN 2021foa: The 'Flip-Flop' Type IIn/Ibn supernova**. Farias, D., Gall, C., Narayan, G., Rest, S., Villar, V. A., Angus, C. R., Auchettl, K., Davis, K. W., Foley, R., **Gagliano, A.**, Hjorth, J., Izzo, L., Kilpatrick, C. D., Perkins, H . M. L., Ramirez-Ruiz, E., Ransome, C. L., Sarangi, A., Yarza, R., Coulter, D. A., Jones, D. O., Khetan, N., Rest, A., Siebert, M. R., Swift, J. J., Taggart, K., Tinyanont, S., Wrubel, P., de Boer, T. J. L., Clever, K. E., Dhara, A., Gao, H., Lin, C. -C., 2024. *ApJ*, 977(2), id.152. *ADS.*

12. **SN 2023ixf in Messier 101: Photo-ionization of Dense, Close-in Circumstellar Material in a Nearby Type II Supernova**. Jacobson-Galán, W. V., Dessart, L., Margutti, R., Chornock, R., Foley, R. J., Kilpatrick, C. D., Jones, D. O., Taggart, K., Angus, C. R., Bhattacharjee, S., Braff, L. A., Brethauer, D., Burgasser, A. J., Cao, F., Carlile, C. M., Chambers, K. C., Coulter, D. A., Dominguez-Ruiz, E., Dickinson, C. B., de Boer, T., **Gagliano, A.**, Gall, C., Gao, H., Gates, E. L., Gomez, S., Guolo, M., Halford, M. R. J., Hjorth, J., Huber, M. E., Johnson, M. N., Karpoor, P. R., Laskar, T., LeBaron, N., Li, Z., Lin, Y., Loch, S. D., Lynam, P. D., Magnier, E. A., Maloney, P., Matthews, D. J., McDonald, M., Miao, H. -Y., Milisavljevic, D., Pan, Y. -C., Pradyumna, S., Ransome, C. L., Rees, J. M., Rest, A., Rojas-Bravo, C., Sandford, N. R., Ascencio, L. Sandoval, Sanjaripour, S., Savino, A., Sears, H., Sharei, N., Smartt, S. J., Softich, E. R., Theissen, C. A., Tinyanont, S., Tohfa, H., Villar, V. A., Wang, Q., Wainscoat, R. J., Westerling, A. L., Wiston, E., Wozniak, M. A., Yadavalli, S. K., Zenati, Y., 2023. *ApJL*, 954(2). *ADS.*

11. **SN 2023ixf in Messier 101: A Variable Red Supergiant as the Progenitor Candidate to a Type II Supernova**. Kilpatrick, C. D., Foley, R. J., Jacobson-Galán, W. V., Piro, A. L., Smartt, S. J., Drout, M. R., **Gagliano, A.**, Gall, C., Hjorth, J., Jones, D. O., Mandel, K. S., Margutti, R., Ramirez-Ruiz, E., Ransome, C. L., Villar, V. A., Coulter, D. A., Gao, H., Matthews, D. J., Taggart, K., Zenati, Y., 2023. *ApJL*, 952(1). *ADS.*

10. **Supernova 2020wnt: An Atypical Superluminous Supernova with a Hidden Central Engine**. Tinyanont, S., Woosley, S. E., Taggart, K., Foley, R. J., Yan, L., Lunnan, R., Davis, K. W., Kilpatrick, C. D., Siebert, M. R., Schulze, S., Ashall, C., Chen, T.-W., De, K., Dimitriadis, G., Dong, D. Z., Fremling, C., **Gagliano, A.**, Jha, S. W., Jones, D. O., Kasliwal, M. M., Miao, H.-Y., Pan, Y.-C., Perley, D. A., Ravi, V., Rojas-Bravo, C., Sfaradi, I., Sollerman, J., Alarcon, V., Angulo, R., Clever, K. E., Crawford, P., Couch, C., Dandu, S., Dhara, A., Johnson, J., Lai, Z, & Smith, C., 2023. *ApJ*, 951(1). *ADS.*

9. **The Young Supernova Experiment Data Release 1 (YSE DR1): Light Curves and Photometric Classification of 1975 Supernovae**. Aleo, P. D., Malanchev, K., Sharief, S., Jones, D. O., Narayan, G., Foley, R. J., Villar, V. A., Angus, C. R., Baldassare, V. F., Bustamante-Rosell, M. J., Chatterjee, D., Cold, C., Coulter, D. A., Davis, K. W., Dhawan, S., Drout, M. R., Engel, A., French, K. D., **Gagliano, A.**, Gall, C., Hjorth, J., Huber, M. E., Jacobson-Galán, W. V., Kilpatrick, C. D., Langeroodi, D., Macias, P., Mandel, K. S., Margutti, R., Matasić, F., McGill, P., Pierel, J. D. R., Ramirez-Ruiz, E., Ransome, C. L., Rojas-Bravo, C., Siebert, M. R., Smith, K. W., de Soto, K. M., Stroh, M. C., Tinyanont, S., Taggart, K., Ward, S. M., Wojtak, R., Auchettl, K., Blanchard, P. K., de Boer, T. J. L., Boyd, B. M., Carroll, C. M., Chambers, K. C., DeMarchi, L., Dimitriadis, G., Dodd, S. A., Earl, N., Farias, D., Gao, H., Gomez, S., Grayling, M., Grillo, C., Hayes, E. E., Hung, T., Izzo, L., Khetan, N., Kolborg, A. N., Law-Smith, J. A. P., LeBaron, N., Lin, C. -C., Luo, Y., Magnier, E. A., Matthews, D., Mockler, B., O'Grady, A. J. G., Pan, Y. -C., Politsch, C. A., Raimundo, S. I., Rest, A., Ridden-Harper, R., Sarangi, A., Schrøder, S. L., Smartt, S. J., Terreran, G., Thorp, S., Vazquez, J., Wainscoat, R. J., Wang, Q., Wasserman, A. R., Yadavalli, S. K., Yarza, R., Zenati, Y., Young Supernova Experiment, 2023. *ApJSS*, 266(1). *ADS.*

8. **Relative Intrinsic Scatter in Hierarchical Type Ia Supernova Sibling Analyses: Application to SNe 2021hpr, 1997bq, and 2008fv in NGC 3147**. Ward, Sam M., Thorp, S., Mandel, K. S., Dhawan, S., Jones, D. O., Taggart, K., Foley, R. J., Narayan, G., Chambers, K. C., Coulter, D. A., Davis, K. W., de Boer, T., de Soto, K., Earl, N., **Gagliano, A.**, Gao, H., Hjorth, J., Huber, M. E., Izzo, L., Langeroodi, D., Magnier, E. A., McGill, P., Rest, A., Rojas-Bravo, C., Wojtak, R., for the Young Supernova Experiment, 2023. *ApJ*, 956(2). *ADS.*

7. **Evidence for Extended Hydrogen-Poor CSM in the Three-Peaked Light Curve of Stripped Envelope Ib Supernova**. Zenati, Y., Wang, Q., Bobrick, A., DeMarchi, L., Glanz, H., Rozner, M., Rest, A., Metzger, B. D., Margutti, R., Gomez, S., Smith, N., Toonen, S., Bright, J. S., Norman, C., Foley, R. J., **Gagliano, A.**, Krolik, J. H., Smartt, S. J., Villar, V. A., Narayan, G., Fox, O., Auchettl, K., Brethauer, D., Clocchiatti, A., Coelln, S. V., Coppejans, D. L., Dimitriadis, G., Doroszmai, A., Drout, M., Jacobson-Galan, W., Gao, B., Ridden-Harper, R., Kilpatrick, C. D., Laskar, T., Matthews, D., Rest, S., Smith, K. W., McKenzie Stauffer, C., Stroh, M. C., Strolger, L.-G., Terreran, G., Pierel, J. D. R., Piro, A. L., 2022. *submitted to ApJ,*. *ADS.*

6. **DELIGHT: Deep Learning Identification of Galaxy Hosts of Transients Using multi-resolution images**. Förster, F., Muñoz Arancibia, A. M., Reyes-Jainaga, I., **Gagliano, A.**, Britt, D., Cuellar-Carrillo, S., Figueroa-Tapia, F., Polzin, A., Yousef, Y., Arredondo, J., Rodríguez-Mancini, D., Correa-Orellana, J., Bayo,

Amelia, B., Franz E., C., Márcio, C.-V., Guillermo, Dastidar, R.,, Estévez, P. A., Pignata, G., Hernández-García, L., Huijse, P., Reyes, E., Sánchez-Sáez, P., Ramírez, M., Grandón, D., Pineda-García, J., Chabour-Barra, F., & Silva-Farfán, J., 2022. *AJ*, 164(5). *ADS.*

5. **AT 2020neh: A fast rising tidal disruption event from an intermediate mass black hole**. Angus, C. R., Baldassare, V. F., Mockler, B., Foley, R. J., Ramirez-Ruiz, E., Raimundo, S. I., French, K. D., Auchettl, K., Pfister, H., Gall, C., Hjorth, J., Drout, M. R., Alexander, K. D., Dimitriadis, G., Hung, T., Jones, D. O., Rest, A., Siebert, M. R., Taggart, K., Terreran, G., Tinyanont, S., Carroll, C. M., DeMarchi, L., Earl, N., **Gagliano, A.**, Izzo, L., Villar, V. A., Zenati, Y., Arendse, N., Cold, C., de Boer, T. J. L., Chambers, K. C., Coulter, D. A., Khetan, N., Lin, C. C., Magnier, E. A., Rojas-Bravo, C., Wainscoat, R. J., & Wojtak, R., 2022. *NatAs,* 6, p. 1452. *ADS.*

4. **Final Moments I: Precursor Emission, Envelope Inflation, and Enhanced Mass loss Preceding the Luminous Type II Supernova 2020tlf**. Jacobson-Galán, W. V., Dessart, L., Jones, D. O., Margutti, R., Coppejans, D. L., Dimitriadis, G., Foley, R. J., Kilpatrick, C. D., Matthews, D. J., Rest, S., Terreran, G., Aleo, P. D., Auchettl, K., Blanchard, P. K., Coulter, D. A., Davis, K. W., de Boer, T. J. L., DeMarchi, L., Drout, M. R., Earl, N., **Gagliano, A.**, Gall, C., Hjorth, J., Huber, M. E., Ibik, A. L., Milisavljevic, D., Pan, Y. -C., Rest, A., Ridden-Harper, R., Rojas-Bravo, C., Siebert, M. R., Smith, K. W., Taggart, K., Tinyanont, S., Wang, Q., Zenati, Y., 2021. *ApJ*, 924(1), p. 15. *ADS.*

3. **Progenitor and Close-In Circumstellar Medium of Type II Supernova 2020fqv from High-Cadence Photometry and Ultra-Rapid UV Spectroscopy**. Tinyanont, S., Ridden-Harper, R., Foley, R. J., Morozova, V., Kilpatrick, C. D., Dimitriadis, G., DeMarchi, L., **Gagliano, A.**, Jacobson-Galán, W. V., Messick, A., Pierel, J. D. R., Piro, A. L., Ramirez-Ruiz, E., Siebert, M. R., Chambers, K. C., Clever, K. E., Coulter, D. A., De, K., Hankins, M., Hung, T., Jha, S. W., Jimenez Angel, C. E., Jones, D. O., Kasliwal, M. M., Lin, C. -C., Marques-Chaves, R., Margutti, R., Moore, A., Pérez-Fournon, I., Poidevin, F., Rest, A., Shirley, R., Smith, C. S., Strasburger, E., Swift, J. J., Wainscoat, R. J., Wang, Q., & Zenati, Y., 2021. *MNRAS*, 512(2). *ADS.*

2. **The Young Supernova Experiment: Survey Goals, Overview, and Operations**. Jones, D. O., Foley, R. J., Narayan, G., Hjorth, J., Huber, M. E., Aleo, P. D., Alexander, K. D., Angus, C. R., Auchettl, K., Baldassare, V. F., Bruun, S. H., Chambers, K. C., Chatterjee, D., Coppejans, D. L., Coulter, D. A., DeMarchi, L., Dimitriadis, G., Drout, M. R., Engel, A., French, K. D., **Gagliano, A.**, Gall, C., Hung, T., Izzo, L., Jacobson-Galán, W. V., Kilpatrick, C. D., Korhonen, H., Margutti, R., Raimundo, S. I., Ramirez-Ruiz, E., Rest, A., Rojas-Bravo, C., Siebert, M. R., Smartt, S. J., Smith, K. W., Terreran, G., Wang, Q., Wojtak, R., Agnello, A., Ansari, Z., Arendse, N., Baldeschi, A., Blanchard, P. K., Brethauer, D., Bright, J. S., Brown, J. S., de Boer, T. J. L., Dodd, S. A., Fairlamb, J. R., Grillo, C., Hajela, A., Hede, C., Kolborg, A. N., Law-Smith, J. A. P., Lin, C. -C., Magnier, E. A., Malanchev, K., Matthews, D., Mockler, B., Muthukrishna, D., Pan, Y. -C., Pfister, H., Ramanah, D. K., Rest, S., Sarangi, A., Schrøder, S. L., Stauffer, C., Stroh, M. C., Taggart, K. L., Tinyanont, S., & Wainscoat, R. J., for the Young Supernova Experiment, 2021. *ApJ*, 908(2), p. 143. *ADS.*

1. **A Wide-field Map of Intracluster Globular Clusters in Coma**. Madrid, J.P., O'Neill, C.R., **Gagliano, A.** and Marvil, J.R., 2018. *ApJ*, 867(2), p. 144. *ADS.*

WORKSHOP & CONFERENCE PROCEEDINGS

9. **Diffusion Autoencoders with Perceivers for Long, Irregular and Multimodal Astronomical Sequences.** Shen, Y., & **Gagliano, A.**, 2025. *submitted to Machine Learning for the Physical Sciences Workshop, ICML 2025.*

8. **Hierarchical Simulation-Based Inference of Supernova Power Sources and their Physical Properties.** Vidal, E., **Gagliano, A.**, & Cuesta-Lazaro, C., 2025. *submitted to Machine Learning for the Physical Sciences Workshop, ICML 2025.*

7. **Mixture-of-Expert Variational Autoencoders for Cross-Modality Embedding of Type Ia Supernova Data**. Shen, Y.†, & **Gagliano, A.**†, 2025. *Machine Learning for Astrophysics Workshop **(spotlight oral)**, ICML co-located workshop. ADS.*

6. **Variational diffusion transformers for conditional sampling of supernovae spectra**. Shen, Y., & **Gagliano, A.**, 2025. *Frontiers in Probabilistic Inference & Advances of Approximate Bayesian Inference Workshops, ICLR. ADS.*

5. **Maven: A Multimodal Foundation Model for Supernova Science**. Zhang, G.†, Helfer, T.†, **Gagliano, A.**, Mishra-Sharma, S., & Villar, V., A., 2024. *Foundation Models for Science, Time Series in the Age of Large Models **(spotlight oral)**, and Self-Supervised Learning Workshops, NeurIPS.* ADS.

4. **Hierarchical Cross-entropy Loss for Classification of Astrophysical Transients**. Villar, V. A., de Soto, K, & **Gagliano, A.**, 2023. *Machine Learning for the Physical Sciences Workshop, NeurIPS.* ADS.

3. **A Physics-Informed Variational Autoencoder for Rapid Galaxy Inference and Anomaly Detection**. **Gagliano, A.** & Villar, V. A., 2023. *Machine Learning for the Physical Sciences, NeurIPS.* ADS.

2. **From Data to Software to Science with the Rubin Observatory LSST**. Breivik, Katelyn, Connolly, Andrew J., Ford, K. E. Saavik, Jurić, Mario, Mandelbaum, Rachel, Miller, Adam A., Norman, Dara, Olsen, Knut, O'Mullane, William, Price-Whelan, Adrian, Sacco, Timothy, Sokoloski, J. L., Villar, Ashley, Acquaviva, Viviana, Ahumada, Tomas, AlSayyad, Yusra, Alves, Catarina S., Andreoni, Igor, Anguita, Timo, Best, Henry J., Bianco, Federica B., Bonito, Rosaria, Bradshaw, Andrew, Burke, Colin J., Rodrigues de Campos, Andresa, Cantiello, Matteo, Caplar, Neven, Chandler, Colin Orion, Chan, James, Nicolaci da Costa, Luiz, Danieli, Shany, Davenport, James R. A., Fabbian, Giulio, Fagin, Joshua, **Gagliano, Alexander**, Gall, Christa, Garavito Camargo, Nicolás, Gawiser, Eric, Gezari, Suvi, Gomboc, Andreja, Gonzalez-Morales, Alma X., Graham, Matthew J., Gschwend, Julia, Guy, Leanne P., Holman, Matthew J., Hsieh, Henry H., Hundertmark, Markus, Ilić, Dragana, Ishida, Emille E. O., Jurkić, Tomislav, Kannawadi, Arun, Kosakowski, Alekzander, Kovačević, Andjelka B., Kubica, Jeremy, Lanusse, François, Lazar, Ilin, Levine, W. Garrett, Li, Xiaolong, Lu, Jing, Luna, Gerardo Juan Manuel, Mahabal, Ashish A., Malz, Alex I., Mao, Yao-Yuan, Medan, Ilija, Moeyens, Joachim, Nikolić, Mladen, Nikutta, Robert, O'Dowd, Matt, Olsen, Charlotte, Pearson, Sarah, Villicana Pedraza, Ilhuiyolitzin, Popinchalk, Mark, Popović, Luka C., Pritchard, Tyler A., Quint, Bruno C., Radović, Viktor, Ragosta, Fabio, Riccio, Gabriele, Riley, Alexander H., Rożek, Agata, Sánchez-Sáez, Paula, Sarro, Luis M., Saunders, Clare, Savić, Đorđe V., Schmidt, Samuel, Scott, Adam, Shirley, Raphael, Smotherman, Hayden R., Stetzler, Steven, Storey-Fisher, Kate, Street, Rachel A., Trilling, David E., Tsapras, Yiannis, Ustamujic, Sabina, van Velzen, Sjoert, Vázquez-Mata, José Antonio, Venuti, Laura, Wyatt, Samuel, Yu, Weixiang, & Zabludoff, Ann, 2022. *White paper;* arXiv:2208.02781. ADS.

1. **Astro[sound]bites: a New Audio Resource for Conveying Recent Astronomy Research**. **Gagliano, A.**, Rice, M. & Saunders, W.R., 2021. *ASP2020: Embracing the Future*, p. 111. ADS.

SEMINARS & COLLOQUIA

Sys2025: Systematic and Measurement Errors Across the Sciences	Nov 2025
Rutgers University Transient Soirée	July 2025
Harvard CfA Machine Learning in Astrophysics Lecture	April 2024
IAIFI Colloquium	March 2024
University of Michigan Astronomy Colloquium	Nov 2023
Five Colleges Astronomy Colloquium	Oct 2023
LSST Transient and Variable Science Colloquium	Aug 2023
Caltech Time-Domain Astronomy Center	Sept 2022
UC Berkeley Astronomy Department	Sept 2022
Lancaster University Seminar	May 2022
Dark Energy Science Collab. Time Domain Working Group	Feb 2022
Tri-State Cosmology x Data Science	Jan 2022
Dark Energy Science Collab. Analysis Seminar	Sept 2021
UIUC ASTR596: AI in Astronomy Lecture	Sept 2021
LSST Transient and Variable Science Plenary	June 2021
DESC Photo-z Working Group	April 2021
National Center for Supercomputing Applications	March 2020

ACADEMIC SERVICE

NASA Cosmic Origin Program | AI Interest Group Leadership Council	Ongoing
ICML ML4Astro 2025 (Co-Located) | SOC Lead	March 2025 - July 2025

IAIFI Summer School and Workshop | Tutorial Lead, Organizer — Aug 2023, 2024
Reviewer for NOIRLab Observatories — Ongoing
National Science Foundation | Grant Panelist — Fall 2024
MIT Leadership and Professional Strategies Program (8.396/8.397) | Co-Facilitator — Spring 2024
Time-Domain Needles in Rubin's Haystack Hackathon | Organizer — April 2024
IAIFI Speaker Selection Committee | Member — Ongoing
IAIFI Community-Building Committee | Member — Jan-June 2024
LSST/DESC Virtual Meeting | Science Organizing Committee — Feb 2024
Boston Astrophysics x ML Hackathon | Local Organizing Committee — Jan 2024
LSST ISSC Executive Council | Co-Lead — Ongoing
LSST ISSC Membership Committee | Executive Council Liaison — Ongoing
LSST DESC Machine Learning (MaLTS) Topical Team | Co-Lead — Ongoing
Reviewer for ICML, NeurIPS Workshops; RASTI, JOSS, MNRAS, PRD & AAS Journals — Ongoing
LSST BOOM 2022 | Local Organizing Committee — July 2022
UIUC Astronomy Graduate Admissions | PhD Representative — Oct 2021–March 2022
- Scored ∼100 applications and selected students for admission

DESC Sprint Week | Local Organizing Committee — Sept 2021–Oct 2021
- Designed hack schedule and coordinating logistics for ∼100 attendees in team of 16

IAU Junior Member Working Group | Associate Member — July 2021–Aug 2021
- Drafted official UNESCO position paper on youth engagement on behalf of 400 NGOs

VT Wayne & Claire Horton Fellowship | Selection Committee Member — March 2020
VT Honors Odyssey Fellowships | Selection Committee Member — March 2018

CONFERENCE TALKS

INVITED:

IDEaS Institute AI for Science Tutorial — Oct 2025
IAIFI Summer Workshop (talk & panel) — Aug 2025
Boombox Science Meeting — June 2025
American Astronomical Society Meeting #246 (talk & panel) — June 2025
Bites of Foundation Models for Science Workshop — June 2025
Foundation Models for Astronomy, Flatiron Institute — May 2025
Superluminous (talk & panel) — May 2025
The Revolutionary Impact of Generative AI, Harvard/MIT — Jan 2024
ASA Joint Statistical Meeting 2021 — Aug 2021
LSSTC Enabling Science Broker Workshop II — Apr 2021
LSST DESC Plenary — Feb 2021

CONTRIBUTED:

AI4Science Slovenia — Sept 2025
AI-STAR Workshop at the MIT Kavli Institute — Nov 2024
Machine Learning for Transient Science, University of Warwick — Dec 2023
Cosmic Streams in the Era of Rubin — Dec 2023
Rubin Project and Community Workshop — Aug 2023
Transient and Variable Universe — June 2023
Rubin Observatory LSST @ Europe4 — Oct 2022
BOOM! An LSSTC Workshop — July 2022
Exploring the Transient Universe with the Nancy Grace Roman Space Telescope — Feb 2022
Research Byte, LSST DESC February Meeting — Feb 2022
Caltech Astroinformatics 2021 — Nov 2021
Rubin Project and Community Workshop — Aug 2021
Illinois Astrofest #2 — May 2021
Rubin Project and Community Workshop — Aug 2020
European Astronomical Society 2020 — July 2020
LSST DESC Meeting — Jan 2020
Illinois Astrofest #1 — Apr 2019

American Astronomical Society Meeting #233 Jan 2019

TEACHING & MENTORING

GRADUATE STUDENTS

Mark Mazumder (Harvard) 2025-Present
- Constructing an LLM benchmark for supernova science

Edgar Vidal (Tufts) 2025-Present
- Using flow-matching and SBI to infer supernova explosion properties from light curves

Ved Shah (Northwestern) 2024-Present
- Designing a hierarchical classifier/anomaly detection engine for Vera Rubin Obs.

Yunyi Shen (MIT) 2024-Present
- Exploring strategies for multi-modal embedding of time-domain datasets

Anna Tartaglia (Harvard) 2025-Present
- Building a neural network to predict the ages of astronomical transients

Emmanuel Garcia Berrios (UIUC), Sloan Peer Mentor 2021–2022
- Provided weekly guidance on research and career options in STEM
- Currently Lead Data Scientist at Nagnoi

UNDERGRADUATE STUDENTS

Joaquin de Castro (Harvard) 2025-Present
- Training an SN Ibn classifier with 2D gaussian process regression

David Cao (Harvard) 2025
- Pixel-level inference of galaxy properties with convolutional network

Wendy Sun (MIT) 2025
- Training a mixture-of-experts, multi-modal supernova classifier

Jesus Caraballo Anaya (MIT) 2025-Present
- Re-designing the DASH spectroscopic classifier

Samuel Gebresenbet (MIT) 2025
- Characterizing the diversity of nuclear transients with GPs

Joost van Asperen (Harvard), Junior Thesis Advisor Fall 2023
- Automated identification of spiral arms in supernova host galaxies and compared offsets by class

Zimo Qu (UIUC), Graduate Mentor 2021–2022
- Provided guidance in undergraduate coursework, research
- Currently undergraduate at UC Berkeley

Kunal Bhatia (UIUC), Graduate Mentor 2019–2021
- Held bi-weekly meetings to revise application materials for graduate school
- Master's Student at Heidelberg University

Rubin Observatory Summer Data Summit | Guest Lecturer July 2023

UIUC Graduate College Mentoring Certification Jan 2022

GC 500: Graduate Mentor Practicum Jan 2022 – May 2022

Undergraduate Research Apprenticeship Program | Mentor Aug 2021–May 2022

La Serena School for Data Science | Teaching Assistant Aug 2021

INTERNAL TALKS

INVITED:

Harvard CfA ITC Luncheon March 2024

University of California, Santa Cruz FLASH Talk Sept 2022

Center for Computational Astrophysics Machine Learning Journal Club July 2022

MIT Brown Bag Lunch May 2022

Caltech Tea March 2022
Princeton Thunch Feb 2022
Yale Galaxy Lunch March 2021

SELECTED OUTREACH

Career Panel, US AI Olympiad April 2025
Guest Lecture, Astronomy on Tap Boston October 2023
Astro[Sound]Bites | Founder and Co-Host Nov 2019–July 2023
- Founded bi-weekly astronomy podcast; >20k downloads, 200 listeners in >70 countries

Astronomical Society of the Pacific | Design Tester March 2019 – May 2020
- Evaluated strategies for improving audience engagement in STEM events

Education Justice Project | Workshop Coordinator Jan 2019 – Jan 2020
- Designed data science workshops at Danville Correctional Center for 30 incarcerated students

Universe Awareness | Astronomy Ambassador Jan 2017 – Jun 2018
- Coordinated stargazing events in Los Alamos among local high school students

The Story Of Foundation | Exhibit Researcher Dec 2016 – Dec 2017
- Spearheaded sound-based astronomy exhibit in Goa, India using Python, Arduino; viewed by >2k students

Computational Modeling Club | Vice President Aug 2016 – May 2017
- Coordinated 3-day hackathon of 100 students

IAU Office of Astronomy for Development | Intern Aug 2016 – Sept 2016
- Led secondary school science activities for Science Week with SAAO, reaching >1.2k students

REFERENCES

- **Gautham Narayan** | University of Illinois, Urbana-Champaign/SkAI gsn@illinois.edu
- **V. Ashley Villar** | Harvard University ashleyvillar@cfa.harvard.edu
- **Edo Berger** | Harvard University eberger@cfa.harvard.edu
- **Ryan Foley** | University of California, Santa Cruz foley@ucsc.edu
- **Dan Foreman-Mackey** | Google Deepmind foreman.mackey@gmail.com
- **Renée Hložek** | University of Toronto/Dunlap Institute hlozek@dunlap.utoronto.ca
- **Josh Speagle** | University of Toronto/Dunlap Institute j.speagle@utoronto.ca

MEDIA COVERAGE

Why the death of this star is very, very strange. Patel, K., 2025, *The Washington Post.*

A Peculiar Supernova Prompts New Theories About the Cosmos. Santucci, J., 2025, *USA Today.*

New type of supernova detected as black hole causes star to explode. Dunham, W., 2025, *Reuters.*

AI Helps Astronomers Discover New Type of Supernova. Edmonds, P., 2025, *Harvard CfA.*

Catching Core-Collapse Supernovae Before They Happen. Gault, L., 2025, *AAS Nova.*