

Marc Williamson

Center for Cosmology and Particle Physics (CCPP) URL: <http://www.mawilliamson.com>
New York University, Physics Department Email: mew488@nyu.edu

EDUCATION

New York University, New York, NY (2016-present)
PhD Candidate in Physics
Advisor: Prof. Maryam Modjaz

Stanford University, Stanford, CA (2011-2015)
Bachelor of Science with Honors, Physics

WORK EXPERIENCE

PhD Student at New York University (2016-present)
Conducting doctoral research with Professor Maryam Modjaz studying the explosions of massive stars. Work includes statistically analyzing one of the largest datasets of stripped supernovae optical spectra in the world and applying machine learning techniques. Research involving progenitor star chemical abundances and supernova modeling with Professor Wolfgang Kerzendorf (PI at Michigan State University).

Research Assistant at ETH Zurich (2015-2016)
Worked with PI Alexandre Refregier on simulating Dark Energy Survey (DES) images using the Ultra Fast Image Generator (UFIG). Studied sources of systematic uncertainty in DES images and organized collaboration between ETH Zurich and the Blind Cosmology Challenge simulation team lead by Professor Risa Wechsler at Stanford University.

PUBLICATIONS

1. Vasylyev, Sergiy; Filippenko, Alexei; Vogl, Christian; Brink, Thomas; Brown, Peter;...**Williamson, Marc**; et al (2022). "Early-time Ultraviolet Spectroscopy and Optical Follow-up Observations of the Type IIP Supernova 2021yja", The Astrophysical Journal Vol 934, Issue 2, Id. 134.
2. Pellegrino, Craig; Howell, D.A.; Terreran, G; Arcavi, I; Bostroem, K.A.;...**Williamson, Marc** (2022). "The Diverse Properties of Type Icn Supernovae Point to Multiple Progenitor Channels", The Astrophysical Journal, Accepted and in press.
3. Kwok, Lindsey; **Williamson, Marc**; Jha, Saurabh; Modjaz, Maryam; et al (2022). "Ultraviolet Spectroscopy and TARDIS Models of the Broad-lined Type-Ic Supernova 2014ad", The Astrophysical Journal, Accepted and in press.

4. Barna, Barnabas; Pereira, Talytha; Taubenberger, Stefan; Magee, Mark; Kromer, Markus; Kerzendorf, Wolfgang; Vogl, Christian; **Williamson, Marc**; et al (2021). "ASASSN-14lp: two possible solutions for the observed ultraviolet suppression", Monthly Notices of the Royal Astronomical Society, Vol 506.1, pp. 415-431.
5. O'Brien, John T; Kerzendorf, Wolfgang; Fullard, Andrew; **Williamson, Marc**; et al (2021). "Probabilistic Reconstruction of Type Ia Supernova SN 2002bo", The Astrophysical Journal Letters, Vol 916.2, 8 pages.
6. **Williamson, Marc**; Kerzendorf, Wolfgang; Modjaz, Maryam (2021). "Modelling Type Ic Supernovae with TARDIS: Hidden Helium in SN 1994I?", Astrophysical Journal, Vol 908.2, 11 pages.
7. Pritchard, T.A.; Bensch, Katarzyna; Modjaz, Maryam, **Williamson, Marc**; et al (2021). "The Exotic Type Ic Broad-Lined Supernova SN 2018gep: Blurring the Line Between Supernovae and Fast Optical Transients." The Astrophysical Journal, Vol 915.2, 16 pages.
8. Kerzendorf, Wolfgang E.; Vogl, Christian; Buchner, Johannes; Contardo, Gabriella; **Williamson, Marc**; van der Smagt, Patrick (2021). "Dalek—a deep-learning emulator for TARDIS." The Astrophysical Journal Letters, Vol 910.2, 5 pages.
9. Rho, J., Evans, A.; Geballe, T.R.; Banerjee, D.P.K.; Hoefflich, P.; Shahbandeh, M.; Valenti, S.; Yoon, S.-C.; Jin, H.; **Williamson, Marc**; et al (2021). "Near-Infrared and Optical Observations of Type Ic SN2020oi and broad-lined Ic SN2020bvc: Carbon Monoxide, Dust and High-Velocity Supernova Ejecta." The Astrophysical Journal, Vol 908.2, 21 pages.
10. **Williamson, Marc**; Modjaz, Maryam; Bianco, F. B. (2019). "Optimal Classification and Outlier Detection for Stripped-envelope Core-collapse Supernovae." The Astrophysical Journal Letters Vol 880.2, 11 pages.

OPEN SOURCE SOFTWARE DEVELOPMENT

GitHub Username: marxwillia

URL: <https://github.com/marxwillia>

TARDIS Development

(2019-present)

Role: Core Developer, Finances Manager

Repo URL: <https://github.com/tardis-sn/tardis>

Contribution Description: Lead developer on a project to implement new internal data structures to provide users with more flexibility in model creation and simulation. Core contributor to the TARDIS set of simulation visualization tools.

SESNspectraPCA Development

(2017-present)

Role: Lead Developer

Repo URL: <https://github.com/nyusngroup/SESNSpectraPCA>

Contribution Description: Lead developer and researcher for a classification system for stripped-envelope supernovae optical spectra based on principal component analysis and support vector machines.

GRANTS AWARDED

1. Future Investigators in NASA Earth and Space Science and Technology (FINESST) (\$90,000) (PI of grant) (2021)
2. Thomas J. Moore Fellowship (~\$30,000) (PI of grant) (2021)
3. GSAS Predoctoral Summer Fellowship (\$2,000) (2020)
4. James Arthur Graduate Award (\$37,000) (2019)
5. STScI Spring Symposium Conference Funding (\$700) (2019)
6. AAS Travel Grant ITG 2018-2 (\$872) (2018)

CONFERENCES & TALKS

1. Heidelberg Institute for Theoretical Studies (Invited Talk) (2022)
2. Massive Stars IAUS 361 (Poster Presented) (2022)
3. SuperVirtual Conference (Talk Given) (2021)
4. Caltech TAPIR astro seminar (Invited Seminar Given) (2021)
5. AAS 237th Annual Meeting (Talk Given) (2021)
6. Wuerzburg Winter SN Workshop (Talk Given) (2020)
7. Supernova Across LSST Workshop (Poster, postponed by Covid) (2020)
8. Radiative Transfer in Supernovae Conference (Talk Given) (2019)
9. STScI Spring Symposium (Poster) (2019)
10. XXX Canary Islands Winter School of Astrophysics (Poster) (2018)
11. AAS 231st Annual Meeting (Poster) (2018)

MENTORING

1. TARDIS Organization Admin for Google Summer of Code (2021-2022) and Mentor for 2 undergraduate students working on visualization tools for Monte Carlo Radiative Transfer code.
2. TARDIS Mentor for Google Summer of Code program and Mentor (2020) for 1 undergraduate student working on code restructure of the TARDIS radiative transfer code.
3. Mentor for 1 New York University undergraduate student (2019-2021) working on supernova classification. Project successfully funded through the NYU Deans Undergraduate Research Fund.