

SEBASTIAN GOMEZ
Space Telescope Science Institute
3700 San Martin Dr, Baltimore, MD 21218, USA
sgomez@stsci.edu
www.sgomez.org

Appointments

STScI Postdoctoral Fellow - Space Telescope Science Institute <i>Prize fellowship (50% independent science + 50% work for Roman Space Telescope)</i>	2021 - present
Graduate Research Assistant - Harvard University	2015 - 2021
GROW Fellow - Netherlands Institute for Space Research	2017
LAMAT Intern - University of California, Santa Cruz	2014
MSRP Intern - Massachusetts Institute of Technology	2013
Undergraduate Research Assistant - The University of Texas at El Paso	2012 - 2014

Education

Harvard University: Ph.D. in Astronomy and Astrophysics <i>Advisor: Prof. Edo Berger</i> <i>Thesis: Exotic Transients and How to Find Them</i>	2021
Harvard University: M.A. in Astronomy and Astrophysics <i>Advisor: Prof. Jonathan Grindlay</i>	2017
The University of Texas at El Paso (UTEP): B.S. in Physics - <i>Summa Cum Laude</i> <i>Advisors: Prof. Paul Mason & Prof. Edward Robinson</i> <i>Thesis: ExThe Case for a Low Mass Black Hole in the X-ray Binary V1408 Aquilae</i>	2015
Tecnológico de Monterrey, Ciudad Juárez, México: High School	2011

Research & Professional Experience

- Research experience with optical observations of **Exotic Transients, Superluminous Supernovae, Tidal Disruption Events**, follow-up of **Gravitational Waves** sources, **Machine Learning** methods to optimize transient searches, and modeling light curves of **X-ray Binaries**.
- Professional experience working for the **Roman Space Telescope** branch at STScI on: scientific validation of **Image Simulations**, code development, and database development.
- Advising experience **Mentoring** high school and undergraduate students on research, and **Teaching** and developing workshops on observational astronomy and programming.

Selected Awards

Outstanding Teaching Award (Harvard University)	2018
NSF Graduate Research Opportunities Worldwide (GROW) grant	2017
NSF Graduate Research Fellowship (GRFP)	2015 - 2018
Academic and Research Excellence Undergraduate Student in Physics at UTEP	2015
Chambliss Astronomy Achievement Student Medal awarded by the AAS	2014
NIH Maximizing Access to Research Careers (MARC) full ride scholarship	2013
American Physical Society Minority Scholarship	2012 - 2013

Observing Experience

McDonald Observatory 82" Otto Struve / ARGOS + ProEM (**10+ nights**); MMT Observatory / Blue channel Spectrograph + MMTCam (**10+ nights**); Magellan / LDSS3c + IMACS (**8 nights**); Fred Lawrence Whipple Observatory 48" / KeplerCam (**4 nights**); Roque de los Muchachos William Hershel Telescope / ISIS + ACAM (**4 nights**); McDonald Observatory 107" Harlan J. Smith / ARGOS (**3 nights**); Fred Lawrence Whipple Observatory 60" / FAST (**2 nights**).

Telescope Proposals Accepted as PI

<u>Magellan 6.5m</u> 16 nights (6 proposals)	<u>Hubble Space Telescope</u> 7 orbits (PID: GO 15863)
<u>MMT 6.5m</u> 15 nights (4 proposals)	<u>Very Large Array</u> 2 hours (PID: 20A-409)
<u>F. L. Whipple Observatory 60"</u> 5 nights (4 proposals)	<u>Las Cumbres Observatory 1m</u> 1 night (PID: 2017B-0057)
<u>F. L. Whipple Observatory 48"</u> 12 nights (4 proposals)	<u>McDonald Observatory 82" Otto Struve</u> 5 nights (1 proposal)
<u>Gemini Observatory 8.1m</u> 6 hours (PID: GS-2021B-FT-208) 2 hours (PID: GN-2019A-DD-103) 2.7 hours (PID: GN-2019A-FT-201) 1.2 hours (PID: GN-2018A-FT-212)	<u>Neil Gehrels Swift observatory</u> 3ks (ID: 10975) 8ks (ID: 14892)

Research Mentoring

Primary advisor for undergraduate student Yao Yin <i>Harvard University - 1 peer reviewed publication</i>	2019 - present
Co-advisor for high school student Sophie von Coelln <i>Space Telescope Science Institute</i>	Summer 2022
Co-advisor for undergraduate student Kyle Dalrymple <i>Space Telescope Science Institute</i>	Summer 2022
Co-advisor for undergraduate student Natasha Abrams <i>Harvard University - 2 peer reviewed publications</i>	2018 - 2020

Teaching

Teaching Fellow : Methods of Observational Astronomy <i>Harvard University (Prof. Edo Berger)</i>	Spring 2019
Teaching Fellow : Methods of Observational Astronomy <i>Harvard University (Prof. Edo Berger)</i>	Spring 2018
Teaching Fellow : The Unity of Science, From the Big Bang to the Brontosaurus <i>Harvard University (Prof. Irwin Shapiro)</i>	Spring 2017
Course designer and Instructor : The UNIX Command Line <i>Banneker Institute, Harvard University</i>	Summer 2016

Outreach and Service

Referee for: *Nature Astronomy, MNRAS, A&A, and PASP*

Member of STScl Fellowship Selection Committee 2022

Peer Review Facilitator during Chandra Cycle 18 & 21 2016, 2019

Mentor and Instructor - Banneker Institute 2016 - 2018

A program at Harvard University designed to prepare undergraduate students of color for graduate programs.

Member of Application Review Committee for the MIT Summer Research Program 2016 - 2019

Leader for the Harvard Observing Project 2016 - 2020

A project to get local undergraduates involved in doing real astronomical observations.

Mentor for Transmountain Early College High School Distinguished Achievement Program 2012

Trained five high achieving students on research and observational techniques

Physics Circus Volunteer 2011 - 2014

Participated in over a dozen Physics Circus, an outreach activity designed by the Society of Physics Students to spread the knowledge of physics in El Paso, Texas.

Presentations

Invited Outreach Talk Mars Generation, ITESM, Ciudad Juárez, Mexico, 2021 (virtual)

Invited Outreach Talk JPL Solar System Ambassadors, Las Cruces, NM, 2021 (virtual)

Invited Outreach Talk Harmony High School, El Paso, TX, 2021 (virtual)

Invited Talk Compact Objects and Supernovae Journal Club, STScl, 2020

Talk Lunch Talk, Carnegie Observatories, 2020

Talk Science Happy Hour, Northwestern University, 2020

Talk BigBoom Meetings, University of Arizona, 2020

Talk Astro Lunch, University of Washington, 2020

Talk Galread Extragalactic Discussion Group, Princeton University, 2020

Talk Center for Theory and Computation Seminar, University of Maryland, 2020

Invited Colloquium SRON Colloquia, Utrecht, Netherlands., 2020

Invited Talk ITC Luncheon, Harvard University, Cambridge, MA., 2019

Conference Talk Hotwiring the Transient Universe Conference, Evanston, IL., 2019

Refereed Publications (9 First Author + 27 nth Author)

*** Undergraduate Mentee**

36 **Gomez, S.**, Berger, E., Nicholl, M., Blanchard, P.K., and Hosseinzadeh, G., Luminous Supernovae: Unveiling a Population Between Superluminous and Normal Core-collapse Supernovae. 2022, Submitted to ApJ, arXiv: 2204.08486

35 Welch, B., et al. (incl. **Gomez, S.**) JWST Imaging of Earendel, the Extremely Magnified Star at Redshift $z=6.2$. Submitted to ApJ, arXiv: 2208.09007

34 Zenati, Y., et al. (incl. **Gomez, S.**) Evidence for Extended Hydrogen-Poor CSM in the Three-Peaked Light Curve of Stripped Envelope Ib Supernova. Submitted to ApJ, arXiv: 2207.07146

33 Cendes, Y., Berger, E., Alexander, K., **Gomez, S.**, et al. A Mildly Relativistic Outflow Launched Two Years after Disruption in the Tidal Disruption Event AT2018hyz. Accepted to ApJ, arXiv: 2206.14297

32 Hosseinzadeh, G., et al. (incl. **Gomez, S.**) Weak Mass Loss from the Red Supergiant Progenitor of the Type II SN 2021yja. 2022, ApJ, 935, 31.

31 Fox, O. D., et al. (incl. **Gomez, S.**) The Candidate Progenitor Companion Star of the Type Ib/c SN 2013ge. 2022, ApJ, 929, 15.

- 30 Fiore, A., et al. (incl. **Gomez, S.**). Close, bright and boxy: the superluminous SN 2018hti. *MNRAS*, 512, 4484.
- 29 * **Yin, Y., Gomez, S.**, et al. Optical Observations and Modeling of the Superluminous Supernova 2018lfe. 2022, *ApJ*, 931, 32.
- 28 Hosseinzadeh, G., Berger, E., Metzger, B. D., **Gomez, S.**, et al. Bumpy Declining Light Curves are Common in Hydrogen-poor Superluminous Supernovae. 2022, *ApJ*, 933, 14.
- 27 Blanchard, P. K, Berger, E., Nicholl, M., Chornock, R., **Gomez, S.**, and Hosseinzadeh, G. Late-Time Hubble Space Telescope Observations of a Hydrogen-Poor Superluminous Supernova Reveal the Power-Law Decline of a Magnetar Central Engine. 2021, *ApJ*, 921, 64.
- 26 Álvarez-Hernández, A. et al. (incl. **Gomez, S.**) The intermediate polar cataclysmic variable GK Persei 120 years after the nova explosion: a first dynamical mass study. 2021, *MNRAS*, 507, 4
- 25 Hajela, A. et al. (incl. **Gomez, S.**). Evidence for X-Ray Emission in Excess to the Jet-afterglow Decay 3.5 yr after the Binary Neutron Star Merger GW 170817: A New Emission Component. 2022, *ApJ*, 927, 17.
- 24 **Gomez, S.**, Berger, E., Hosseinzadeh, G., Blanchard, P.K., Nicholl, M., Villar, V. A. The Luminous and Double-Peaked Type Ic Supernova 2019stc: Evidence for Multiple Energy Sources. 2021, *ApJ* 913, 143
- 23 Alexander, K. D. Et al. (incl. **Gomez, S.**). A Late-Time Galaxy-Targeted Search for the Radio Counterpart of GW190814. 2021, *ApJ*, 923, 66.
- 22 **Gomez, S.**, M.A.P., Torres, Jonker, G. P., et al. Dynamical Modeling of CXOGBS J175553.2-281633: A 10 Hour Long Orbital Period Cataclysmic Variable. 2021, *MNRAS*, 502, 48
- 21 **Gomez, S.** and Grindlay, E. J. Optical Analysis and Modeling of HD96670, a Black Hole X-ray Binary Candidate in a Triple System. 2021, *ApJ*, 913, 48.
- 20 **Gomez, S.**, Berger, E., Blanchard, P.K., Hosseinzadeh, G., Nicholl, M., Villar, V. A., Yin, Y. FLEET: A Redshift-Agnostic Machine Learning Pipeline to Rapidly Identify Hydrogen-Poor Superluminous Supernovae. 2020, *ApJ*, 904, 74
- 19 Eftekhari, T. et al. (incl. **Gomez, S.**). Late-time Radio and Millimeter Observations of Superluminous Supernovae and Long Gamma-Ray Bursts: Implications for Central Engines, Fast Radio Bursts, and Obscured Star Formation. 2021, *ApJ*, 912, 21
- 18 Nicholl, M., et al. (incl. **Gomez, S.**). An outflow powers the optical rise of the nearby, fast-evolving tidal disruption event AT2019qiz. 2020, *MNRAS*, 499, 1
- 17 Jacobson-Galán et al. (incl. **Gomez, S.**). SN 2019ehk: A Double-peaked Ca-rich Transient with Luminous X-Ray Emission and Shock-ionized Spectral Features. 2020, *ApJ*, 898, 166.
- 16 Nicholl, M., Blanchard, P. K., Berger, E., Chornock, R., Margutti, R., **Gomez, S.**, et al. An extremely energetic supernova from a very massive star in a dense medium. 2020, *Nature Astronomy*, 10.1038 in the news: [Space.com](https://www.space.com), [Science Magazine](https://www.sciencemagazine.com), [CNN](https://www.cnn.com)
- 15 Short, P. Nicholl, M., Lawrence, A., **Gomez, S.** et al. The Tidal Disruption Event AT 2018hyz I: Double-peaked emission lines and a flat Balmer decrement. 2020, *MNRAS*, 498, 3
- 14 **Gomez, S.** et al. The Tidal Disruption Event AT 2018hyz II: Light Curve Modeling of a Partially Disrupted Star. 2020, *MNRAS*, 497, 1925.
- 13 * **Abrams, N. S.**, Bieryla, A., and **Gomez, S.** Measured Lightcurves and Rotational Periods of (16579) 1992 GO (25660) 2000 AO88, And (37652) 1994 JS1. 2020, *MPBu*, 47, 168.
- 12 * **Abrams, N. S.**, Bieryla, A., **Gomez, S.** et al. Measured Lightcurves and Rotational Periods of 3122 Florence, 3830 Trelleborg, and (131077) 2000 YH105. 2020, *MPBu*, 47, 3.
- 11 Hajela, A. et al. (incl. **Gomez, S.**). Two years of non-thermal emission from the binary neutron star merger GW170817: rapid fading of the jet afterglow and first constraints on the kilonova fastest ejecta. 2019, *ApJ*, 886, 17.

- 10 **Gomez, S.** et al. A Galaxy-Targeted Search for the Optical Counterpart of the Candidate NS-BH Merger S190814bv with Magellan. 2019, ApJ, 884, 55.
in the news: [Gizmodo](#)
- 9 Nicholl, M., Blanchard, P. K., Berger, E., **Gomez, S.**, et al. The tidal disruption event AT2017eqx: spectroscopic evolution from hydrogen rich to poor suggests an atmosphere and outflow. 2019, MNRAS, 488, 1878
- 8 **Gomez, S.**, Berger, E., Nicholl, M., Blanchard, P. K., Villar, V.A., Patton, L., Chornock, R., Leja, J., Hosseinzadeh, G., Cowperthwaite, P. S. SN 2016iet: The Pulsational or Pair Instability Explosion of a Low-metallicity Massive CO Core Embedded in a Dense Hydrogen-poor Circumstellar Medium. 2019, ApJ, 881, 87
in the news: [Quanta Magazine](#), [Discover](#), [National Geographic](#), [Astronomy.com](#), [Gizmodo](#)
- 7 Hosseinzadeh, G., Cowperthwaite, P. S., **Gomez, S.**, Villar, V. A., Nicholl, M., Margutti, R. Follow-up of the Neutron Star Bearing Gravitational-wave Candidate Events S190425z and S190426c with MMT and SOAR. 2019, ApJ, 880, 4
- 6 Blanchard, P. K. et al. (*incl. Gomez, S.*). A Hydrogen-poor Superluminous Supernova with Enhanced Iron-group Absorption: A New Link between SLSNe and Broad-lined Type Ic SNe. 2019, ApJ, 872, 90
- 5 Nicholl, M., Berger, E., Blanchard, P. K., **Gomez, S.**, Chornock, R. Nebular-phase Spectra of Superluminous Supernovae: Physical Insights from Observational and Statistical Properties. 2019, ApJ, 871, 102
- 4 Scott, S., Nicholl, M., Blanchard, P. K., **Gomez, S.**, Berger, E. Bright Type IIP Supernovae in Low-metallicity Galaxies. 2019, ApJ, 870, 16
- 3 Nicholl, M., et al. (*incl. Gomez, S.*). One Thousand Days of SN2015bn: HST Imaging Shows a Light Curve Flattening Consistent with Magnetar Predictions. 2018, ApJ, 866, 24
- 2 Villar, V. A., Cowperthwaite, P. S., Berger, E., Blanchard, P. K., **Gomez, S.**, et al. Spitzer Space Telescope Infrared Observations of the Binary Neutron Star Merger GW170817. 2018, ApJ, 862, 11
- 1 **Gomez, S.**, Mason, P. A., Robinson, E. L. The Case for a Low Mass Black Hole in the Low Mass X-ray Binary V1408 Aquilae (= 4U 1957+115). 2015, ApJ, 809, 9

Other Publications / Proceedings

- 6 **Gomez, S.**, Coe, D., Chen, W., et al. Detection of possible supernova in JWST images of Galaxy Cluster WHL0137-08. 2022, TNS AstroNote 2022-152
 - 5 Engesser, M. ; Brammer, G. ; Gould, K. ; Pierel, J. ; **Gomez, S.**, et al. Discovery of Possible Transient in JWST NIRCam Images of SDSS J141930.11+525159.3. 2022, TNS AstroNote 2022-145
in the news: [Quanta Magazine](#), [IFLS](#)
 - 4 **Gomez, S.**, Berger, E., Blanchard, P.K., Hosseinzadeh, G., Nicholl, M., Villar, V. A., Yin, Y. FLEET: Finding Luminous and Exotic Extragalactic Transients. 2021, Zenodo.4013965
 - 3 Chornock, R., et al. (*incl. Gomez, S.*) Multi-Messenger Astronomy with Extremely Large Telescopes. 2019, Decadal Survey on Astronomy and Astrophysics, science white papers, no. 237
 - 2 Mason, P. A., Robinson, E. L., **Gomez, S.** Optical Photometry of LMXBs: UW CrB and V1408 Aql (=4U 1957+115). *Acta Polytechnica CTU, 2015, Vol 2, No. 1.*
 - 1 Mason, P. A., Zhilkin, A. G., Bisikalo, D. V., **Gomez, S.**, Morales, J. Robinson, E. L., Ustyugov, V. A. Photometry and Multipolar Magnetic Field Modeling of Polars BY Camelopardalis and FL Ceti. *Acta Polytechnica CTU, 2015, Vol 2, No. 1.*
- First author of **56** Astronomer's Telegrams, GCN Circulars, and AstroNotes
 - Co-author of **40** Astronomer's Telegrams, GCN Circulars, and AstroNotes

Technical Skills

Software

Data analysis: IRAF, PyRAF, ISIS, PHOEBE, Molly
Other Software: LaTeX, Adobe Creative Suite.
Programming languages: Python, S-Lang, HTML

Languages

Spanish (Native proficiency)
English (Bilingual proficiency)
ASL (Limited working proficiency)

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