Michael A. Gully-Santiago

Kavli Institute for Astronomy and Astrophysics
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gully

Education

Ph. D., Astronomy University of Texas at Austin· Austin, TX · 8/2008–5/2015

Advisor: D.T. Jaffe (Chair, Department of Astronomy)

Dissertation: "Innovative Technologies for and Observational Studies of Star and Planet Formation"

B. A., Astronomy & Physics Boston University · Boston, MA · 9/2003–5/2007

College Prize for Excellence in Astronomy

Awards

University of Texas at Austin Department of Astronomy, David Benfield Memorial fellowship, 2014

NASA Graduate Student Research Program Fellowship, JPL Microdevices Lab, 2010-2013

University of Texas at Austin Dean's Prestigious Fellowship Supplement, 2010 & 2011

Research Experience and Technical Skills

Postdoctoral Research Kavli Institute for Astronomy and Astrophysics · Beijing, China · 10/2015–10/2016

Forward modeling IGRINS spectra: Analysis of high resolution, high bandwidth near-IR spectroscopy of young stars with collaborator G. Herczeg

Si diffractive optics group, Dept. of Astronomy University of Texas at Austin · Austin, TX · 9/2008–6/2014

Microelectronics Research Center · Austin, TX · 9/2008–6/2013
Center for Nano and Molecular Science · Austin, TX · 9/2008–9/2013

Optical metrology experience: Zygo interferometry, polychromatic spectrophotometry for optical/IR throughput, visible and IR laser metrology for PSF characterization, 2D non-contact profilometry, IR imaging, optical microscopy

Project management: Assembled task book of 35 projects to guide our internal resource allocation. Managed cross-platform lab computing resources, networking and remote management, hardware interfacing, and data curation

Silicon processing: Class-100 cleanroom training, Scanning electron microscopy, reactive ion etching, anisotropic chemical wet etching, ellipsometry, spin coating, atomic force microscopy, collaboration with MIT nanoruler

E-beam group, Microdevices Laboratory NASA Jet Propulsion Lab · Pasadena, CA · 9/20010–9/2013

High precision electron beam lithography, nanometer-scale pattern design, experimental design

Magellan Telescope Las Campanas Observatory · La Serena, Chile · 2010–2012

7 nights over three years on IMACS and FIRE instruments

First Author Publications

[1] **Gully-Santiago, M.**, D. T. Jaffe, and V. White, "Optical characterization of gaps in directly bonded Si compound optics using infrared spectroscopy," *Applied Optics*, vol. 54, p. 10177, Dec. 2015.

[2] **Gully-Santiago, M. A.**, D. T. Jaffe, C. B. Brooks, D. W. Wilson, and R. E. Muller, "High performance Si immersion gratings patterned with electron beam lithography," in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, ser. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, vol. 9151, Jul. 2014, p. 5.

[3] **Gully-Santiago, M.**, W. Wang, C. Deen, and D. Jaffe, "Near-infrared metrology of high-performance silicon immersion gratings," in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, ser. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, vol. 8450, Sep. 2012.

[4] **Gully-Santiago, M. A.**, K. N. Allers, and D. T. Jaffe, "Confirmation and Characterization of Young Disk-Bearing Brown Dwarfs and sub-Brown Dwarfs," in *16th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun*, ser. Astronomical Society of the Pacific Conference Series, C. Johns-Krull, M. K. Browning, and A. A. West, Eds., vol. 448, Dec. 2011, p. 633.

[5] **Gully-Santiago, M.**, W. Wang, C. Deen, D. Kelly, T. P. Greene, J. Bacon, and D. T. Jaffe, "High-performance silicon grisms for 1.2-8.0 μm: detailed results from the JWST-NIRCam devices," in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, ser. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, vol. 7739, Jul. 2010.

Contributing Author Publications

[1] S. Kendrew, C. Deen, N. Radziwill, S. Crawford, J. Gilbert, **Gully-Santiago, M.**, and P. Kubánek, "The first SPIE software Hack Day," in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, ser. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, vol. 9152, Jul. 2014, p. 2.

[2] C. B. Brooks, **Gully-Santiago, M.**, M. Grigas, and D. T. Jaffe, "New metrology techniques improve the production of silicon diffractive optics," in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, ser. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, vol. 9151, Jul. 2014, p. 1.

[3] D. T. Jaffe, S. Barnes, C. Brooks, **Gully-Santiago, M.**, S. Pak, C. Park, and I. Yuk, "GMTNIRS (Giant Magellan Telescope Near-Infrared Spectrograph): optimizing the design for maximum science productivity and minimum risk," in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, ser. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, vol. 9147, Jul. 2014, p. 22.

[4] C. Park, D. T. Jaffe, I.-S. Yuk, M.-Y. Chun, S. Pak, K.-M. Kim, M. Pavel, H. Lee, H. Oh, U. Jeong, C. K. Sim, H.-I. Lee, H. A. Nguyen Le, J. Strubhar, **Gully-Santiago, M.**, J. S. Oh, S.-M. Cha, B. Moon, K. Park, C. Brooks, K. Ko, J.-Y. Han, J. Nah, P. C. Hill, S. Lee, S. Barnes, Y. S. Yu, K. Kaplan, G. Mace, H. Kim, J.-J. Lee, N. Hwang, and B.-G. Park, "Design and early performance of IGRINS (Immersion Grating Infrared Spectrometer)," in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, ser. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, vol. 9147, Jul. 2014, p. 1.

[5] V. Joergens, G. Herczeg, Y. Liu, I. Pascucci, E. Whelan, J. Alcalá, K. Biazzo, G. Costigan, **Gully-Santiago, M.**, T. Henning, A. Natta, E. Rigliaco, M. V. Rodríguez-Ledesma, A. Sicilia-Aguilar, J. Tottle, and S. Wolf, "Disks, accretion and outflows of brown dwarfs," *Astronomische Nachrichten*, vol. 334, p. 159, Feb. 2013.

[6] J.-Y. Han, I.-S. Yuk, K. Ko, H. Oh, J. Nah, J. S. Oh, C. Park, S. Lee, K.-M. Kim, M.-Y. Chun, D. T. Jaffe, S. Pak, and **Gully-Santiago, M.**, "Alignment based on a no adjustment philosophy for the Immersion Grating Infrared Spectrometer (IGRINS)," in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, ser. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, vol. 8550, Dec. 2012.

[7] W. Wang, **Gully-Santiago, M.**, C. Deen, D. J. Mar, and D. T. Jaffe, "Manufacturing of silicon immersion gratings for infrared spectrometers," in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, ser. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, vol. 7739, Jul. 2010.

[8] S. Lee, I.-S. Yuk, H. Lee, W. Wang, C. Park, K.-J. Park, M.-Y. Chun, S. Pak, J. Strubhar, C. Deen, **Gully-Santiago, M.**, J. Rand, H. Seo, J. Kwon, H. Oh, S. Barnes, J. Lacy, J. Goertz, W.-K. Park, T.-S. Pyo, and D. T. Jaffe, "GMTNIRS (Giant Magellan Telescope near-infrared spectrograph): design concept," in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, ser. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, vol. 7735, Jul. 2010.

[9] I.-S. Yuk, D. T. Jaffe, S. Barnes, M.-Y. Chun, C. Park, S. Lee, H. Lee, W. Wang, K.-J. Park, S. Pak, J. Strubhar, C. Deen, H. Oh, H. Seo, T.-S. Pyo, W.-K. Park, J. Lacy, J. Goertz, J. Rand, and **Gully-Santiago, M.**, "Preliminary design of IGRINS (Immersion GRating INfrared Spectrograph)," in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, ser. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, vol. 7735, Jul. 2010.

[10] T. Greene, C. Beichman, **Gully-Santiago, M.**, D. Jaffe, D. Kelly, J. Krist, M. Rieke, and E. H. Smith, "NIRCam: development and testing of the JWST near-infrared camera," in *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, ser. Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, vol. 7731, Jul. 2010.

Talks and Conference Participation

Talk, Measuring Fundamental Properties of Young Stars, KIAA Beijing, China, 9/2016

Talk, Python for astronomy, Beijing Python Meetup, China, 8/2016

Poster, Measurement of starspot properties, Cool Stars 19, Uppsala, Sweden 6/2016

Talk, High Resolution Spectroscopy with IGRINS, Seoul, Korea, 11/2015

Attendee, Astro Data Hack Week, Seattle, WA, 9/2014

Poster, SPIE Astronomical Telescopes and Instrumentation, Montreal, QC, 6/2014

Poster, PPVI, Heidelberg, Germany, 7/2013

Talk, Star Formation Lunch, Jet Propulsion Lab, Pasadena, CA, 6/2013

Poster, Award winner- 3^{rd}**/45**, Nano Night, Center for Nano- and Molecular Science, Austin, TX, 3/2013

Poster, McDonald Observatory Board of Visitors meeting, Austin, TX, 2/2013

Invited Talk, SPIE Astronomical Telescopes and Instrumentation, Amsterdam, NL, July, 2012

Poster, Cool Stars 17, Barcelona, Spain, June 2012

Attendee, American Astronomical Society meeting, Austin, TX, Jan, 2012

Talk, Very Low Mass Stars and Brown Dwarfs, ESO, Garching, Germany, 10/2011

Attendee, National Society of Black and Hispanic Physicists, Austin, TX, 9/2011

Poster, Cool Stars 16, Seattle, WA, 9/2010

Poster, SPIE Astronomical Telescopes and Instrumentation, San Diego, CA, 6/2010

Service and Leadership Activities

Graduate Student Representative University of Texas at Austin Department of Astronomy · 6/2011–6/2012

Elected by majority vote of peers · Served on graduate admissions committee

Liaison to faculty, attended faculty meetings · Delegate for University-wide Graduate Student Assembly

Teaching and Mentorship

Statistical computing tutorial leader Kavli Institute for Astronomy & Astrophysics · Beijing, China · 2015–2016

Mentor for undergraduate student, Amanda Turbyfill University of Texas at Austin · Austin, TX · 2013–2014

Lab experience, pair coding (IDL and Excel), tutorials in optical physics

Faculty member Clay Center Observatory at the Dexter & Southfield Schools · Brookline, MA · 6/2007–6/2008

Adult and continuing education instructor Brookline Adult Education · Brookline, MA · 6/2005–6/2008

Night lab teaching assistant Boston University · Boston, MA · 2006–2007

Public Outreach and Media Appearances

Guest, They Blinded Me with Science, a science podcast KVRX, 91.7FM · Austin, TX· 12/2012

"Discovery and characterization of brown dwarfs"

Host, They Blinded Me with Science, a science podcast KVRX, 91.7FM · Austin, TX· 5/2013–5/2014

Successfully procured seed funding from College of Natural Sciences to establish podcast

Produced 30 original podcasts with > 3000 collective downloads and plays

Recruited guests, conducted interviews, edited audio files, managed digital content, authored descriptions

Public talks

Invited talk, McDonald Observatory Board of Visitors meeting, Austin, TX, 2/2012
"High resolution infrared spectroscopy with IGRINS"

Science Under the Stars, Brackenridge Field Lab, Austin, TX, 12/2012
"Exploring birth-sites of our Galactic neighborhood"

Interactive museum-style educational installation Department of Astronomy · Austin, TX· 7/2013–9/2014

Unique coursework or independent study

Statistical Modeling II, Prof. James Scott Statistics Department· 1/2014–5/2014

Statistics, Data Mining and Machine Learning in Astronomy Independent study· 1/2014–8/2014

Computer Skills

Languages IDL, Python, IPython Notebook, Shell, Excel

Version Control and Writing git, GitHub, LaTeX, markdown, HomeBrew

OS Mac OS X, Unix/Linux

Educational Audacity, Starry Night Pro

Familiarity with HTML, CSS, D3.js, Labview, R

Evangelist for Open Science, Reproducibility, Data Curation