

Neil T. Zimmerman

Curriculum Vitae

Contact	Space Telescope Science Institute Instruments Division – Telescopes Group 3700 San Martin Drive, Baltimore, MD 21218	NTZ@stsci.edu (410) 338 6756
Education	<p>Ph.D., Astronomy Columbia University <i>High Contrast Observations with an Integral Field Spectrograph</i> Advisor: Rebecca Oppenheimer</p> <ul style="list-style-type: none">• Discovery and confirmation of Alcor's M-dwarf companion through a novel relative astrometry method.• Led the design and implementation of data extraction and calibration algorithms for Project 1640, a coronagraphic integral field spectrograph at Palomar Observatory.• First observation to combine sparse aperture mask interferometry with integral field spectroscopy.	Oct 2011
	<p>M.Phil., Astronomy Columbia University</p>	May 2008
	<p>M.E., Electrical Engineering Cooper Union for the Advancement of Science and Art</p>	May 2006
	<p>B.E., Electrical Engineering Cooper Union for the Advancement of Science and Art</p>	May 2004
Professional Experience	<p>Support Scientist Telescopes Group, Space Telescope Science Institute Supervisor: Rémi Soummer</p>	Aug 2015— present
	<p>JWST</p> <ul style="list-style-type: none">• Task lead on target selection for Optical Telescope Element (OTE) commissioning.• Participant in ground tests of OTE mirror controls through the Wavefront Sensing Subsystem. <p>WFIRST</p> <ul style="list-style-type: none">• Key contributor to Coronagraph Instrument (CGI) data post-processing study subcontracted to STScI by JPL.• Developing dynamical optical simulations of WFIRST CGI images, building on the WebbPSF package for JWST.• Ongoing liaison role between nascent STScI WFIRST Science Center and CGI Science Investigation Teams + Adjutant Scientist.	

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- Technical lead of segmented coronagraph design study at STScI sponsored by the NASA Exoplanet Exploration Program, applying my expertise in optimization and modeling.
- Optical laboratory experiments on STScI's HiCAT testbed, aiming to demonstrate high-contrast segmented aperture coronagraphy.

Postdoctoral Research Associate

Princeton University
Supervisor: Jeremy Kasdin

Jan 2014—
Aug 2015

- Devised a novel mask architecture for the WFIRST Coronagraph shaped pupil mode with an improved inner working angle. My design was manufactured by JPL and used to successfully demonstrate a project technology milestone.
- Formulated a new method to sense low-order, differential wavefront errors entering a coronagraph. Under my supervision, a graduate student simulated and published the concept, and assembled a demonstration testbed.

Postdoctoral Fellow

Max Planck Institute for Astronomy, Heidelberg, Germany
Supervisor: Thomas Henning

Oct 2011—
Dec 2013

- Delivered first verification of post-processed sensitivity limits for the LEECH project, a thermal infrared exoplanet imaging survey at the Large Binocular Telescope. Through additional observations, I measured the spectral energy distribution of GJ 504 b, one of the faintest and coldest substellar companions imaged to date.
- Analyzed commissioning data and planned the scientific survey strategy for PRIMA, a high-precision astrometry instrument at the VLT Interferometer.
- Calibrated and integrated a deformable mirror on the wavefront sensor testbed based at MPA, for ESO's GRAVITY instrument.
- As a member of the SPHERE Near-Infrared Survey Data Analysis Group, I carried out the first demonstration of PCA-based post-processing on laboratory data acquired by the integral field spectrograph team.

Selected Publications

- 2016 Lyot coronagraph design study for large, segmented space telescope apertures
Zimmerman, N. T.; N'Diaye, M.; St. Laurent, K.; Soummer, R.; Pueyo, L.; Stark C.; Sivaramakrishnan, A.; Perrin, M.; Vanderbei, R. J.; Kasdin, N. J.; Shaklan, S.; Carlotti, A.
Proceedings of the SPIE, Volume 9904, Exoplanets II, 99041Y (2016)
- Shaped pupil Lyot coronagraphs: high-contrast solutions for restricted focal planes
Zimmerman, N. T.; Riggs, A. J. E.; Kasdin, N. J.; Carlotti, A.; Vanderbei, R. J.
Journal of Astronomical Telescopes, Instruments, and Systems 2(1), 011012 (2016)
- The LEECH Exoplanet Imaging Survey: Characterization of the Coldest Directly Imaged Exoplanet, GJ 504 b, and Evidence for Superstellar Metallicity
Skemer, A. J.; Morley, C. V.; **Zimmerman, N. T.**; Skrutskie, M. F.; 38 additional authors
The Astrophysical Journal, Volume 817, Issue 2, article id. 166, 10 pp. (2016)
- 2015 Shaped pupil Lyot coronagraph designs for WFIRST/AFTA
Zimmerman, N. T.; Riggs, A. J. E.; Kasdin, N. J.; Carlotti, A.; Vanderbei, R. J.
Proceedings of the SPIE, Volume 9605, Techniques and Instrumentation for Detection of Exoplanets VII, 96050A (2015)
- Coronagraph-Integrated Wavefront Sensing with a Sparse Aperture Mask
Subedi, H.; **Zimmerman, N. T.**; Kasdin, N. J.; Cavanagh, K.; Riggs, A. J. E.
Journal of Astronomical Telescopes, Instruments, and Systems, 1(3), 039001 (2015)
- 2014 Technology development towards WFIRST-AFTA coronagraph
Poberezhskiy, I.; Zhao, F.; 38 additional authors; **Zimmerman, N.**,
Proc. SPIE, Volume 9143, id. 91430P 13 pp. (2014)
- 2013 Reconnaissance of the HR 8799 Exosolar System. I. Near-infrared Spectroscopy
Oppenheimer, B. R.; Baranec, C.; Beichman, C.; Brenner, D.; Burruss, R.; 26 additional authors; **Zimmerman, N.**
The Astrophysical Journal, Volume 768, Issue 1, article id. 24, 16 pp. (2013)
- The ESPRI project: astrometric exoplanet search with PRIMA. I. Instrument description and performance of first light observations
Sahlmann, J.; Henning, T.; Queloz, D.; Quirrenbach, A.; 40 additional authors;
Zimmerman, N.
Astronomy & Astrophysics, Volume 551, id.A52 (2013)
- 2012 Aperture mask interferometry with an integral field spectrograph
Zimmerman, N.; Sivaramakrishnan, A.; Bernat, D.; Oppenheimer, B. R.; Hinkley, S.; Lloyd, J. P.; Tuthill, P. G.; Brenner, D.; Parry, I. R.; Simon, M.; Krist, J. E.; Pueyo, L.
Proceedings of the SPIE, Volume 8445, article id. 84452G, 15 pp. (2012)
- 2011 A Data-Cube Extraction Pipeline for a Coronagraphic Integral Field Spectrograph
Zimmerman, N.; Brenner, D.; Oppenheimer, B. R.; Parry, I. R.; Hinkley, S.; Hunt, S.; Roberts, R.
Publications of the Astronomical Society of the Pacific, Volume 123, issue 904, pp.746-763 (2011)
- 2010 Parallactic Motion for Companion Discovery: An M-Dwarf Orbiting Alcor
Zimmerman, N.; Oppenheimer, B. R.; Hinkley, S.; Brenner, D.; Parry, I. R.; 14 additional authors.
The Astrophysical Journal, Volume 709, Issue 2, pp. 733-740 (2010)