John (Jack) Piotrowski

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Objective

I work on developing optical instruments that push the boundary of our observational capabilities and enable science in an era of massive astronomical surveys. My objective is to lead an academic research group that designs, builds, commissions, and uses spectrographs to support the current and next generation of astronomical observatories.

Appointments

- **Carnegie Observatories [🌐]** *September 2024 - present*
  Matt Johns Instrumentation Fellow Pasadena, California
  Advisors: Dr. Stephen Shectman and Dr. Jeffrey Crane
- **JP Optical Design [🌐]** *October 2023 - present*
  Optical Designer Pasadena, California
  Founded a consulting practice specializing in lens design, athermalization, and fabrication support.
- **MIT Lincoln Laboratory [🌐]** *January 2019 - July 2020*
  Optical Engineer Lexington, Massachusetts
  Advisors: Dr. Christopher Semisch and Mr. Keith Hinrichs

Education

- **Johns Hopkins University** *August 2020 - August 2024*
  Ph.D. Physics; M.A. in Physics Baltimore, Maryland
  Advisors: Dr. Stephen Smee and Dr. Stephan McCandliss
  Dissertation: *Optical characterization of digital micromirror devices for astronomical instrumentation*
- **University of Rochester** *August 2015 - December 2018*
  B.S. Optics; Minor Physics; Minor Astronomy Rochester, New York
  Advisors: Dr. Judith Pipher, Dr. William Forrest, and Dr. Craig McMurtry
  Thesis: *Optical performance determination of the NEOCam infrared detector arrays*

Astronomical Instruments

A=IMAGER, B=MULTI-OBJECT SPECTROGRAPH, C=INTEGRAL FIELD SPECTROGRAPH

- **The Via Project: Viaspec^{B}** *August 2023 - present*
  6.5m Magellan Clay & 6.5m MMT (FOV = 2380′ sq., λ = 5050Å - 5950Å, and **R** = 15,000) [🌐]
  Deputy Instrument PI
- **FALCON^{ABC}** *July 2022 - present*
  6.5m Magellan Baade (FOV = 500′ sq., λ = 3300Å - 10500Å, **R** = 2,300 - 11,700, and *ugriz* imaging) [🌐]
  Instrument Scientist
- **GMT Commissioning Camera^{A}** *June 2023 - present*
  25.4m Giant Magellan Telescope (FOV = 36′ sq., λ = 3600Å - 9500Å, and *ugriz* imaging) [🌐]
  Optical Designer
- **The Via Project: Boombox^{B}** *November 2024 - present*
  6.5m Magellan Clay & 6.5m MMT (FOV = 2380′ sq., λ = 3550Å - 10100Å, and **R** = 1,200) [🌐]
  Optical Designer
- **SAMOS: SOAR Adaptive-Module Optical Spectrograph^{AB}** *August 2020 - August 2025*
  4.1m SOAR Telescope (FOV = 9′ sq., λ = 3550Å - 10100Å, **R** = 2,500 - 6,500, and *griz* imaging) [🌐]
  Graduate Research Assistant
- **GMACS: GMT Multi-Object Astronomical and Cosmological Spectrograph^{B}** *August 2023 - March 2024*
  25.4m Giant Magellan Telescope (FOV = 42′ sq., λ = 3300Å - 10000Å, and **R** = 700 - 10,500) [🌐]
  Optical Design Consultant (lens design)
- **LLAMAS: Large Lenslet Array Magellan Spectrograph^{C}** *June 2019 - July 2020*
  6.5m Magellan Baade (FOV = 0.38′ sq., λ = 3500Å - 9800Å, and **R** = 2,200) [🌐]
  Optical Design Consultant (stray light analysis)

Selected Talks

- **Magellan: The Twin Southern Explorers** *July 2025*
  Contributed Talk - CASSI Research Talk Series - Carnegie Observatories
- **Boombox Instrument Design** *June 2025*
  Invited Talk - Boombox Science Meeting - Stanford University
- **FALCON: a Next-generation, Optical Multi-object Spectrograph for Magellan** *May 2025*
  Invited Talk - Magellan Science Meeting - Carnegie Earth & Planets Laboratory
- **Viaspec Instrument Update** *April 2025*
  Invited Talk - Via Collaboration Meeting - Yale University
- **FALCON Instrument Overview** *March 2025*
  Invited Talk - FALCON Science Workshop - University of Chicago
- **Digital Micromirror Devices: from the Silver Screen to Spectroscopy** *February 2025*
  Invited Talk - Caltech/Carnegie Brown Bag Lunch Series - Carnegie Observatories
- **Learning from Light: How Spectroscopy Enables Astrophysics** *October 2024*
  Invited Talk - Public Lecture Series - Pasadena City College
- **On-sky performance of SAMOS** *July 2024*
  Contributed Talk - Ground-based and Airborne Instrumentation for Astronomy X - SPIE
- **Digital Micromirror Devices: from Movie Projectors to Multi-Object Spectrographs** *September 2023*
  Invited Talk - Lunch Seminar Series - Carnegie Observatories
- **Optical Simulation of Device Efficiency and Contrast Ratio for a Digital Micromirror Device** *January 2023*
  Contributed Talk - Emerging Digital Micromirror Device Based Systems and Applications XV - SPIE
- **Optical Diffraction Simulation of a Digital Micromirror Device** *January 2022*
  Contributed Talk - Emerging Digital Micromirror Device Based Systems and Applications XIV - SPIE
- **Stray Light** *October 2021*
  Contributed Talk - No PhDs Lecture Series - Johns Hopkins University

Awards & Grants

- **Magellan 2025B Observing** *September 2025*
  Co-I - Commissioning of the "Lightspeed" High-speed Imager - Magellan Clay 6.5m Telescope
- **Magellan 2024B Observing** *November 2024*
  Co-I - Characterizing the Effects of Cosmic-Ray Diffusion in NGC 1532 - Magellan Baade 6.5m Telescope
- **MIT Lincoln Laboratory Biomedical Line Program for the United States Air Force** *January 2020*
  Co-PI - Neural Networks for Faster Optical Alignment - MIT Lincoln Laboratory
- **Research and Innovation Grant** *April 2015*
  PI - Field-deployable Laser Communication Concept - University of Rochester

Service & Outreach

- **Lunch Seminar Committee** *July 2025 - present*
  Solicit nominations, select speakers, and coordinate the Lunch Seminar Series at Carnegie Observatories.
- **Mount Wilson STEM Program** *April 2025 - present*
  Co-facilitate astronomy lessons for school groups in the Snow Solar (1905), 60" (1908), & Hooker 100" (1917) telescopes.
- **Carnegie Postdoc Representative** *January 2025 - present*
  Advocate for postdoc interests, delegate roles, and regularly meet with Carnegie's president, John Mulchaey.
- **Letters to a Pre-scientist** *August 2024 - present*
  Pen-pal in a STEM engagement program between scientists and students (pre-scientists) during the academic year.
- **Scholastic Outreach** *October 2022 - present*
  Conduct solar viewing and interactive spectroscopy lessons at local schools to broaden students' exposure to astronomy.

PUBLICATIONS

[15] C. Lee, T.E. Woods, & **J.J. Piotrowski**, **Optical performance simulation of a digital micromirror device in far- to near- ultraviolet wavelengths**. In *OPTO: Optoelectronics and Integrated Photonics*. SPIE. January 2026, San Francisco, California, USA. Accepted; in prep.

[14] S.A. Smee, R.H. Barkhouser, **J.J. Piotrowski**, & M. Robberto, **Precision optical alignment and bonding of Volume Phase Holographic (VPH) grisms for SAMOS**. In *Astronomical Telescopes + Instrumentation*. SPIE. August 2024, Yokohama, Japan. DOI: 10.1117/12.3020662

[13] R. Content, Y. Wang, M. Robberto et al. [28 additional authors including **J.J. Piotrowski**], **SIRMOS: NIR spectroscopy of 131,000,000 galaxies over 1 < z < 4 and R 1300**. In *Astronomical Telescopes + Instrumentation*. SPIE. August 2024, Yokohama, Japan. DOI: 10.1117/12.3017865

[12] **J.J. Piotrowski**, M. Robberto, S.A. Smee, et al., **On-sky performance of SAMOS: a DMD-based multiobject spectrograph and imager for the SOAR 4.1 meter telescope**. In *Astronomical Telescopes + Instrumentation*. SPIE. July 2024, Yokohama, Japan. DOI: 10.1117/12.3020796

[11] **J.J. Piotrowski**, S.A. Smee, S. Hope, & M. Robberto, **In-situ evaluation of DMD contrast ratio using SAMOS: a DMD-based multi-object spectrograph and imager**. In *Astronomical Telescopes + Instrumentation*. SPIE. July 2024, Yokohama, Japan. DOI: 10.1117/12.3020820

[10] **J.J. Piotrowski**, S.A. Shectman, & J.D. Crane, **Optical design of FALCON: a wide-field spectrograph and imager for the Magellan Baade 6.5-meter telescope**. In *Astronomical Telescopes + Instrumentation*. SPIE. July 2024, Yokohama, Japan. DOI: 10.1117/12.3020832

[9] H. Tailor, R.M. Anche, G.G. Williams, **J.J. Piotrowski**, & J.D. Crane, **Investigating the polarimetric capabilities for the Giant Magellan Telescope**. In *Astronomical Telescopes + Instrumentation*. SPIE. July 2024, Yokohama, Japan. DOI: 10.1117/12.3020667

[8] **J.J. Piotrowski**, D. Vorobiev, & S.A. Smee, **Optical simulation of device efficiency and contrast ratio for a digital micromirror device**. In *OPTO: Optoelectronics and Integrated Photonics*. SPIE. March 2023, San Francisco, California, USA. DOI: 10.1117/12.2650595

[7] **J.J. Piotrowski**, R. Barkhouser, S.A. Smee, A. Harding, D. Vorobiev, & M. Robberto, **Stray light analysis of SAMOS: a DMD-based multiple object spectrograph and imager**. In *Astronomical Telescopes + Instrumentation*. SPIE. August 2022, Montreal, Canada. DOI: 10.1117/12.2630618

[6] **J.J. Piotrowski**, D. Vorobiev, M. Robberto, & S.A. Smee, **Simulation of a digital micromirror device to characterize optical performance in SAMOS: a DMD-based spectrograph**. In *Astronomical Telescopes + Instrumentation*. SPIE. August 2022, Montreal, Canada. DOI: 10.1117/12.2630651

[5] **J.J. Piotrowski**, D. Vorobiev, M. Robberto, & S.A. Smee, **Optical diffraction simulation of a digital micromirror device**. In *OPTO: Optoelectronics and Integrated Photonics*. SPIE. March 2022, San Francisco, California, USA. DOI: 10.1117/12.2608767

[4] D. Frostig, **J.J. Piotrowski**, K. Clark, D. Coppeta, M. Egan, G. Fűrész, M. Gabutti, R. Masterson, A. Malonis, R.A. Simcoe, **Stray light analysis and reduction for IFU spectrograph LLAMAS**. In *Astronomical Telescopes + Instrumentation*. SPIE. December 2020, Online only. DOI: 10.1117/12.2562999

[3] G. Fűrész, R.A. Simoce, et al. [17 additional authors including **J.J. Piotrowski**], **Status update of LLAMAS: a wide field-of-view visible passband IFU for the 6.5m Magellan telescopes**. In *Astronomical Telescopes + Instrumentation*. SPIE. December 2020, Online only. DOI: 10.1117/12.2562803

[2] K. Hinrichs & **J.J. Piotrowski**, **Neural networks for faster optical alignment**. In *Optical Engineering, Vol. 59, Issue 7*. SPIE. July 2020. DOI: 10.1117/1.OE.59.7.074107

[1] J.R. Rosvold, L.A. Castañeda, et al. [14 additional authors including **J.J. Piotrowski**], **Comparing optical design complexity of high zoom ratio lenses within the VIS, SWIR, and LWIR**. In *Astronomical Telescopes + Instrumentation*. SPIE. September 2019, San Diego, California, USA. DOI: 10.1117/12.2528875