

# John (Jack) Piotrowski

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## OBJECTIVE

Large-scale surveys (e.g. Vera Rubin Observatory, Roman Space Telescope, SPHEREx) require detailed spectroscopic follow-up that is more accessible from ground-based observatories now and into the future with the onset of extremely large telescopes (e.g. GMT and E-ELT). My goal is to lead a research group that designs, builds, commissions, and uses optical and infrared multi-object spectrographs to support the next generation of astronomical observatories.

## APPOINTMENTS






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



## EDUCATION

- **Johns Hopkins University** August 2020 - August 2024  
Baltimore, Maryland  
*Ph.D. Physics; M.A. in Physics*  
**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  
Rochester, New York  
*B.S. Optics; Minor Physics; Minor Astronomy*  
**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<sup>B</sup>** August 2023 - present  
  
6.5m Magellan Clay & 6.5m MMT (FOV = 2380' sq.,  $\lambda$  = 5050Å - 5950Å, and R = 15,000)  
*Deputy Instrument PI*
- **FALCON<sup>ABC</sup>** July 2022 - present  
  
6.5m Magellan Baade (FOV = 500' sq.,  $\lambda$  = 3300Å - 10500Å, R = 2,300 - 11,700, and *ugriz* imaging)  
*Instrument Scientist*
- **GMT Commissioning Camera<sup>A</sup>** June 2023 - present  
  
25.4m Giant Magellan Telescope (FOV = 36' sq.,  $\lambda$  = 3600Å - 9500Å, and *ugriz* imaging)  
*Optical Designer*
- **The Via Project: Boombox<sup>B</sup>** November 2024 - present  
  
6.5m Magellan Clay & 6.5m MMT (FOV = 2380' sq.,  $\lambda$  = 3550Å - 10100Å, and R = 1,200)  
*Optical Designer*
- **SAMOS: SOAR Adaptive-Module Optical Spectrograph<sup>AB</sup>** August 2020 - August 2025  
  
4.1m SOAR Telescope (FOV = 9' sq.,  $\lambda$  = 3550Å - 10100Å, R = 2,500 - 6,500, and *griz* imaging)  
*Graduate Research Assistant*

- **LLAMAS: Large Lenslet Array Magellan Spectrograph<sup>C</sup>** June 2019 - July 2020  
6.5m Magellan Baade (FOV = 0.38' sq.,  $\lambda$  = 3500Å - 9800Å, and R = 2,200)   
Optics Consultant (stray light analysis)
- **GMACS: GMT Multi-Object Astronomical and Cosmological Spectrograph<sup>B</sup>** August 2023 - March 2024  
25.4m Giant Magellan Telescope (FOV = 42' sq.,  $\lambda$  = 3300Å - 10000Å, and R = 700 - 10,500)   
Optics Consultant (lens design)

## 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 image - 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 ( \$100,000)** January 2020  
Co-PI - Neural Networks for Faster Optical Alignment - MIT Lincoln Laboratory
- **Research and Innovation Grant ( \$5,000)** 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 meet regularly with Carnegie's President, John Mulchaey.
- **Letters to a Pre-scientist** August 2024 - present  
Pen-pal program about STEM engagement between scientists and students (pre-scientists) for an academic year.
- **Scholastic Outreach** October 2022 - present  
Run solar viewing and spectroscopy interactive lessons at local schools to broaden student exposure to astronomy.

## PUBLICATIONS

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- [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. Simcoe, 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