John (Jack) Piotrowski

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Appointments

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

Education

- **Johns Hopkins University** — *Aug 2020 - Aug 2024*
  Ph.D. Physics; M.A. in Physics | ***Advisors**: Dr. S. Smee and Dr. S. McCandliss* — Baltimore, Maryland
  Dissertation: *Optical characterization of digital micromirror devices for astronomical instrumentation*
- **University of Rochester** — *Aug 2015 - Dec 2018*
  B.S. Optics; Minor Physics; Minor Astronomy | ***Advisors**: Dr. J. Pipher and Dr. C. McMurtry* — Rochester, New York
  Thesis: *Optical performance determination of the NEOCam infrared detector arrays*

References

AVAILABLE UPON REQUEST

- **Dr. Stephen Shectman** — *[🌐]*
  ***Carnegie Observatories**, Staff Scientist* — Pasadena, California
- **Dr. Daniel Fabricant** — *[🌐]*
  ***Harvard-Smithsonian Center for Astrophysics**, SAO Astrophysicist* — Cambridge, Massachusetts
- **Dr. Stephen Smee** — *[🌐]*
  ***Johns Hopkins University**, IDG Director/Principal Research Scientist* — Baltimore, Maryland

Astronomical Instruments

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

- **The Via Project: Viaspec[B]** | ***Deputy Instrument PI*** — *Aug 2023 - present*
  6.5m Magellan Clay & 6.5m MMT (FOV = 2380′ sq., λ = 5050Å - 5950Å, and **R** = 15,000) [🌐]
- **FALCON[ABC]** | ***Instrument Scientist*** — *Jul 2022 - present*
  6.5m Magellan Baade (FOV = 500′ sq., λ = 3300Å - 10500Å, **R** = 2,300 - 11,700, and *ugriz* imaging) [🌐]
- **GMT Commissioning Camera[A]** | ***Co-I, Optical Designer*** — *Jun 2023 - present*
  25.4m Giant Magellan Telescope (FOV = 36′ sq., λ = 3600Å - 9500Å, and *ugriz* imaging) [🌐]
- **The Via Project: Boombox[B]** | ***Co-I, Optical Designer*** — *Nov 2024 - present*
  6.5m Magellan Clay & 6.5m MMT (FOV = 2380′ sq., λ = 3550Å - 10100Å, and **R** = 1,200) [🌐]
- **Lightspeed[A]** | ***Co-I, Optical Designer*** — *Apr 2025 - present*
  6.5m Magellan Clay (FOV = 26′ sq., simultaneous *ugriz* imaging with qCMOS) [🌐]
- **SAMOS: SOAR Adaptive-Module Optical Spectrograph[AB]** | ***Research Assistant*** — *Aug 2020 - Aug 2024*
  4.1m SOAR Telescope (FOV = 9′ sq., λ = 3550Å - 10100Å, **R** = 2,500 - 6,500, and *griz* imaging) [🌐]
- **GMACS[B]** | ***Optical Consultant*** — *Aug 2023 - present*
  25.4m Giant Magellan Telescope (FOV = 42′ sq., λ = 3300Å - 10000Å, and **R** = 700 - 10,500) [🌐]
- **LLAMAS: Large Lenslet Array Magellan Spectrograph[C]** | ***Optical Consultant*** — *Jun 2019 - Jul 2020*
  6.5m Magellan Baade (FOV = 0.38′ sq., λ = 3500Å - 9800Å, and **R** = 2,200) [🌐]

Technical Proficiencies

Skills: *lens design • stray light analysis • diffraction grating design • optical metrology • additive manufacturing • CAD (computer-aided design) • lab testing • photography & astrophotography*
Software: *Synopsys Code V • Zemax OpticStudio • Photon Engineering FRED • Ansys Lumerical • GSolver • Zygo MetroPro • Creo Parametric • Dassault Systèmes Solidworks • Programming (MATLAB, Python, Zemax ZOS-API, LaTeX)*

Selected Talks

- **Astronomy: Cosmic Photography** *Oct 2025*
  Invited Talk - Annual Open House - Carnegie Observatories
- **Learning from Light: How Spectroscopy Enables Astrophysics** *Apr 2026, Sep 2025, Oct 2024*
  Invited Talk - Public Lecture Series - Pasadena City College/Glendale Community College
- **Boombox Instrument Design** *Jun 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** *Apr 2025*
  Invited Talk - Via Collaboration Meeting - Yale University
- **Digital Micromirror Devices: from the Silver Screen to Spectroscopy** *Feb 2025*
  Invited Talk - Caltech/Carnegie Brown Bag Lunch Series - Carnegie Observatories
- **On-sky performance of SAMOS** *Jul 2024*
  Contributed Talk - Ground-based and Airborne Instrumentation for Astronomy X - SPIE
- **Digital Micromirror Devices: from Movie Projectors to Multi-Object Spectrographs** *Sep 2023*
  Invited Talk - Lunch Seminar Series - Carnegie Observatories
- **Optical Simulation of Device Efficiency and Contrast Ratio for a Digital Micromirror Device** *Jan 2023*
  Contributed Talk - Emerging Digital Micromirror Device Based Systems and Applications XV - SPIE
- **Optical Diffraction Simulation of a Digital Micromirror Device** *Jan 2022*
  Contributed Talk - Emerging Digital Micromirror Device Based Systems and Applications XIV - SPIE

Awards & Grants

- **Brinson Early Career Fellowship** *Jul 2026*
  "Dark Matter, Galaxy Formation, and Spectroscopic Innovation" - 5-year/$600,000 postdoctoral fellowship
- **Magellan 2025B Observing** *Sep 2025*
  Co-I - Commissioning of the "Lightspeed" High-speed Imager - Magellan Clay 6.5m Telescope
- **Magellan 2024B Observing** *Nov 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** *Jan 2020*
  Co-PI - Neural Networks for Faster Optical Alignment - MIT Lincoln Laboratory

Service & Outreach

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

Publications

[28] **J.J. Piotrowski** et al., Optical design of the Via Instrument: a wide-field radial velocity survey spectrograph on dual-hemisphere 6.5-meter telescopes. Accepted in *Astronomical Telescopes + Instrumentation*. SPIE. Jul. 2026. Paper No. 14149-383

[27] **J.J. Piotrowski** et al., Optical design of Boombox: a high-throughput optical spectrograph on dual-hemisphere 6.5-meter telescopes. Accepted in *Astronomical Telescopes + Instrumentation*. SPIE. Jul. 2026. Paper No. 14149-384

[26] G.D. Wirth et al., [additional authors including **J.J. Piotrowski**], The SIRMOS mission concept: a space-based near-IR spectroscopic survey of 100 million galaxies in the Euclid Wide Survey footprint. Accepted in *Astronomical Telescopes + Instrumentation*. SPIE. Jul. 2026. Paper No. 14145-51

[25] R. Content et al., [additional authors including **J.J. Piotrowski**], SIRMOS optical design and science: NIR spectroscopy of 100,000,000 galaxies at $1 < z < 4$ and R 1300. Accepted in *Astronomical Telescopes + Instrumentation*. SPIE. Jul. 2026. Paper No. 14145-147

[24] M. Robberto et al., [additional authors including **J.J. Piotrowski**], Operational capabilities and performance of SAMOS at the end of Science Commissioning Phase. Accepted in *Astronomical Telescopes + Instrumentation*. SPIE. Jul. 2026. Paper No. 14149-13

[23] G. Furesz et al., [additional authors including **J.J. Piotrowski**], First year into operations of LLAMAS, the Large Lenslet Array Magellan spectrograph: design, build and commissioning overview, results and performance, lessons learned. Accepted in *Astronomical Telescopes + Instrumentation*. SPIE. Jul. 2026. Paper No. 14149-57

[22] D. Frostig et al., [additional authors including **J.J. Piotrowski**], Boombox: high-throughput, broad-band spectrographs for time-domain astronomy on 6.5-m telescopes. Accepted in *Astronomical Telescopes + Instrumentation*. SPIE. Jul. 2026. Paper No. 14149-80

[21] C. Layden et al., [additional authors including **J.J. Piotrowski**], Lightspeed: ultra-fast multicolor imaging and polarimetry on the Magellan Clay Telescope. Accepted in *Astronomical Telescopes + Instrumentation*. SPIE. Jul. 2026. Paper No. 14149-89

[20] J.D. Crane et al., [additional authors including **J.J. Piotrowski**], The preliminary design of the Giant Magellan Telescope commissioning camera. Accepted in *Astronomical Telescopes + Instrumentation*. SPIE. Jul. 2026. Paper No. 14149-271

[19] M. Werneken et al., [additional authors including **J.J. Piotrowski**], Defining system requirements and science drivers for boombox, twin high-throughput spectrographs on 6.5m MMT and Magellan Telescopes. Accepted in *Astronomical Telescopes + Instrumentation*. SPIE. Jul 2026. Paper No. 14152-112

[18] C. Lee, **J.J. Piotrowski**, T.E. Woods at al., Optical performance simulation of a digital micromirror device in far- to near- ultraviolet wavelengths. Accepted in *OPTO: Optoelectronics and Integrated Photonics*. SPIE. Mar 2026.

[17] F. Beutler et al., [63 additional authors including **J.J. Piotrowski**], Illuminating the Physics of Cosmic Origin and Evolution: A UK Space Frontiers 2035 White Paper. Jan 2026. DOI: 10.48550/arXiv.2601.16761

[16] C. Layden et al., [11 additional authors including **J.J. Piotrowski**], proto-Lightspeed: a high-speed, ultra-low read noise imager on the Magellan Clay Telescope. Submitted to *Publications of the Astronomical Society of the Pacific*. Jan 2026. DOI: 10.48550/arXiv.2601.16268

[15] E. T. Chickles et al., [36 additional authors including **J.J. Piotrowski**], An eclipsing 8.56 minute orbital period mass-transferring binary. Accepted in *The Astrophysical Journal*. Jan 2026. DOI: 10.48550/arXiv.2601.07925

[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. *Astronomical Telescopes + Instrumentation*. SPIE. Aug 2024, DOI: 10.1117/12.3020662

[13] R. Content et al., [30 additional authors including **J.J. Piotrowski**], SIRMOS: NIR spectroscopy of 131,000,000 galaxies over 1 < z < 4 and R 1300. *Astronomical Telescopes + Instrumentation*. SPIE. Aug 2024, 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. *Astronomical Telescopes + Instrumentation*. SPIE. Jul 2024, 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. *Astronomical Telescopes + Instrumentation*. SPIE. Jul 2024, 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. *Astronomical Telescopes + Instrumentation*. SPIE. Jul 2024, 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. *Astronomical Telescopes + Instrumentation*. SPIE. Jul 2024, 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. *OPTO: Optoelectronics and Integrated Photonics*. SPIE. Mar 2023, DOI: 10.1117/12.2650595

[7] **J.J. Piotrowski**, R. Barkhouser, S.A. Smee, et al., Stray light analysis of SAMOS: a DMD-based multiple object spectrograph and imager. *Astronomical Telescopes + Instrumentation*. SPIE. Aug 2022, 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. *Astronomical Telescopes + Instrumentation*. SPIE. Aug 2022, DOI: 10.1117/12.2630651

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

[4] D. Frostig, **J.J. Piotrowski**, K. Clark, D. et al., Stray light analysis and reduction for IFU spectrograph LLAMAS. *Astronomical Telescopes + Instrumentation*. SPIE. Dec 2020, Online only. DOI: 10.1117/12.2562999

[3] G. Fűrész et al., [18 additional authors including **J.J. Piotrowski**], Status update of LLAMAS: a wide field-of-view visible passband IFU for the 6.5m Magellan telescopes. *Astronomical Telescopes + Instrumentation*. SPIE. Dec 2020, Online only. DOI: 10.1117/12.2562803

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

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