

Kara A. Ponder

Curriculum Vitae

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📄 <https://kponder.github.io>

RESEARCH INTERESTS

Dark Energy, Supernova Cosmology, Statistical Methods, Artificial Intelligence.

Employment

- Aug 2020– **Research Associate**, *Machine Learning Initiative*, SLAC National Accelerator Laboratory, Stanford University.
- Sept 2017–Aug 2020 **Berkeley Center for Cosmological Physics Computational Data Science Fellow**, *Department of Physics*, University of California, Berkeley.

Education

- 2012–2017 **Ph.D. Physics**, *Department of Physics and Astronomy*, University of Pittsburgh, Pittsburgh, PA, USA.
Advisors: Professors Michael Wood-Vasey and Andrew Zentner
- 2012–2014 **M.S. Physics**, *Department of Physics and Astronomy*, University of Pittsburgh, Pittsburgh, PA, USA.
- 2009–2012 **B.S. Physics and Astronomy**, *Department of Physics and Astronomy*, University of Georgia, Athens, GA, USA.

AWARDS AND FELLOWSHIPS

- 2019 **LSST Dark Energy Science Collaboration (DESC) Travel grant.**
DESC Collaboration Meeting at APC, Paris, France
- 2017 **LSST Dark Energy Science Collaboration (DESC) Travel grant.**
DESC Collaboration Meeting at SLAC National Accelerator Laboratory, Menlo Park, CA
- 2016 **University of Pittsburgh School of Arts & Sciences Fellowship**, *For Fall 2016 and Summer 2017.*
Pitt PACC, Department of Physics and Astronomy - University of Pittsburgh
- 2016 **LSST DESC Travel grant.**
DESC Collaboration Meeting in Oxford, England, UK
- 2016 **Supernova Through the Ages: Understanding the Past to Prepare for the Future (SN2016) Conference Student Travel grant.**
SN2016 Conference, Easter Island, Chile
- 2015 **Zaccheus Daniels Fellowship**, *For Summer 2016.*
Department of Physics and Astronomy - University of Pittsburgh
- 2014 **Department of Energy (DOE) Office of Science Graduate Student Research (SCGSR) Awardee.**
Department of Energy, Office of Science
- 2012 **Kenneth P. Dietrich School of Arts & Sciences Fellowship**, *For Spring and Summer 2013.*
Kenneth P. Dietrich School of Arts & Sciences - University of Pittsburgh
- 2012 **Physics and Astronomy Award.**
Department of Physics and Astronomy - University of Georgia
- 2011 **Linville L. Hendren Memorial Scholarship for Outstanding Proficiency in Physics.**
Department of Physics and Astronomy - University of Georgia

COLLABORATIONS

- Aug 2019 – **COIN: Cosmostatistics Initiative.**
- Sept 2017 – **The Nearby Supernova Factory.**

March 2014 – **Large Synoptic Survey Telescope Dark Energy Science Collaboration (LSST DESC).**

Member of Supernova Working Group

Member of Collaboration Council: November 2015–2017, 2018–2020

Pipeline Scientist: Sept 2020–

Feb 2014 – **Sloan Digital Sky Survey (SDSS) III and IV.**

2017 SDSS III replaced by SDSS IV in June 2014. Officially Joined SDSS IV in March 2016

Accepted Proposals

2019–2020 **Hubble Space Telescope**, 51 Orbits in Cycle 27.

Supernovae in the Infrared avec Hubble (SIRAH)

PI: Saurabh Jha, Col: KAP

2019–2020 **Hubble Space Telescope**, Snapshot.

Confirming Strong Galaxy Gravitational Lenses in the DESI Legacy Imaging Surveys

PI: Xiaosheng Huang, Col: KAP

Spring/Summer **VLT 8.2 m**, 99 hours in Period 99, Multi Unit Spectroscopic Explorer (MUSE): Optical IFS.

2017 All-weather MUSE Supernova Integral field Nearby Galaxies (AMUSING) survey IV

PI: Lluís Galbany, Col: KAP

Fall **VLT 8.2 m**, 45 hours in Period 98, Multi Unit Spectroscopic Explorer (MUSE): Optical IFS.

2016/Spring All-weather MUSE Supernova Integral field Nearby Galaxies (AMUSING) survey IV

2017 PI: Lluís Galbany, Col: KAP

Fall 2016 **Calar Alto 3.5 m**, Backup targets in service mode, Potsdam MultiAperture Spectrophotometer (PMAS): Optical IFS.

PI: Lluís Galbany, Col: KAP

Fall 2015 **WIYN 3.5 m**, 4 nights, Proposal ID: 2015B-0347, WHIRC: NIR imaging camera and HexPak: optical IFU mounted on bench spectrograph.

PI: W. Michael Wood-Vasey, Col: KAP

Experience

Feb 2019– **Referee for Physics Review D and AAS Journals.**

Aug 2016–Aug **Co-President of the Association of Physics and Astronomy Graduate Students.**

2017 Department of Physics and Astronomy, University of Pittsburgh

Observing

Oct 2016 **Magellan 6.5 m**, 3 telescope nights, Low Dispersion Survey Spectrograph 3 (LDSS-3): Slit spectrograph in Optical and Folded-port InfraRed Echellette (FIRE): Echelle mode NIR spectrograph.

Nov 2013 – **WIYN 3.5 m**, 59.5 telescope nights, WHIRC: NIR imaging camera.

May 2017 SweetSpot survey (PI: W. Michael Wood-Vasey, Col: KAP)

Nov 2015 **WIYN 3.5 m**, 2 telescope nights, HexPak: integral field unit mounted on bench spectrograph.

SweetSpot survey follow up (PI: W. Michael Wood-Vasey, Col: KAP)

May 2014 **Bok 2.3 m**, 4.5 telescope nights, 90prime: optical imaging camera.

Reverberation Mapping project in SDSS III

Additional Research

Jan – June **Visiting student at the SLAC National Accelerator Laboratory.**

2015 Funded through DOE SCGSR

June – Aug **Research Experience for Undergraduates (REU)**, Purdue University.

2011 Simulated different alignments to optimize the Very Energetic Radiation Imaging Telescope Array System (VERITAS)

Advisors: Professor John Finley and Dr. Glenn Sembroski

Jan – May **Undergraduate Researcher**, University of Georgia.

2011 Simulations of High Velocity Cloud Mixing with the Milky Way Halo

Advisor: Professor Robin Shelton

Publication from work: 'Mixing between High Velocity Clouds and the Galactic Halo'

Gritton, Jeffrey A., Shelton, Robin L., Kwak, Kyujin, The Astrophysical Journal, Volume 795, Issue 1, article id. 99, 9 pp. (2014)

Organized Conferences

Feb 2019 **LSST DESC Winter Meeting**, LOC, Berkeley, CA.

- Feb 2019 **LSST DESC Broker Workshop**, *LOC*, Berkeley, CA.
- April 2018 **New advances in NIR type Ia supernova science**, *SOC*, Pittsburgh, PA.
- Nov 2016 **Preparing for SN science in the LSST era: A kick-off workshop**, *LOC*, Pittsburgh, PA.
- Teaching**
- Aug - Dec 2012 **Teaching Assistant**, *Department of Physics and Astronomy*, University of Pittsburgh.
Course: Astronomy 0089

SELECTED CONFERENCES AND TALKS

- Feb 2020 **"PLAsTiCC: Convincing other people to solve your problems"**, *Kara Ponder*, Invited Talk.
Artificial Intelligence at SLAC Seminar, SLAC National Accelerator Lab, Menlo Park, CA
- Oct 2019 **"The Nearby Supernova Factory - Science and Data Overview"**, Contributed Plenary Talk.
SNIa-Cosmology Analysis Meeting, University of Chicago, Chicago, IL
- Jan 2019 **"Validating the PLAsTiCC Simulations"**, *Kara Ponder for the PLAsTiCC Team*, Contributed Talk.
American Astronomical Society Meeting 233, Seattle, WA
- June 2018 **"The Nearby Supernova Factory: Efforts in Optimization and Visualization"**, Contributed Plenary.
Data Visualization and Exploration in the LSST Era, University of Illinois at Urbana-Champaign, IL
- April 2018 **"SweetSpot Survey: Overview and Early Results"**, Invited Plenary Talk.
New Advances in NIR type Ia Supernova Science Workshop, Pittsburgh, PA
- March 2018 **"Are Type Ia Supernovae in Restframe H-band Brighter in More Massive Galaxies?"**, Invited Talk.
Cosmology and Astronomy Seminar, UC Davis, Davis, CA
- Feb 2018 **"Utilizing SweetSpot Host Galaxies for LSST"**, Contributed Talk.
LSST DESC Collaboration Meeting, SLAC National Accelerator Lab, Menlo Park, CA
- Nov 2016 **"Utilizing SweetSpot Host Galaxies for LSST"**, Contributed Plenary Talk.
Preparing for SN science in the LSST era: A kick-off workshop, University of Pittsburgh, Pittsburgh, PA
- Aug 2016 **"SweetSpot: A Near Infrared Survey of Type Ia Supernovae in the Nearby Hubble Flow"**, Contributed Plenary Talk.
Supernova Through the Ages: Understanding the Past to Prepare for the Future, Easter Island, Chile
- May 2016 **"SweetSpot: NOAO Near-Infrared Survey of Type Ia Supernovae in the Nearby Hubble Flow"**.
NOAO FLASH talk, National Optical Astronomy Observatory, Tucson, AZ
- July 2015 **"Accounting for Multiple Populations of Type Ia Supernovae"**, Contributed Talk.
Santa Fe Cosmology Workshops, St. John's College, Santa Fe, NM
- May 2015 **"Incorporating Astrophysical Systematics into a Generalized Likelihood"**, Invited Talk.
KIPAC Tea Talk, SLAC National Accelerator Lab, Menlo Park, CA
- Feb 2015 **"Incorporating Astrophysical Systematics into a Generalized Likelihood"**, Contributed Talk.
LSST DESC Collaboration Meeting, SLAC National Accelerator Lab, Menlo Park, CA
- Oct 2014 **"Incorporating Astrophysical Systematics into a Generalized Likelihood"**, Invited Talk.
CMU Astrostatistics meeting, Carnegie Mellon University, Pittsburgh, PA
- May 2011 **"The Mixing of High Velocity Clouds"**, Invited Talk.
Undergraduate Award's Day Colloquium - University of Georgia, Athens, GA

Public/Outreach Lectures

- Sept 2019 **"Exploring Dark Energy with the Large Synoptic Survey Telescope"**.
Chabot Space and Science Center, Oakland, CA
- June 2019 **"Exploring Dark Energy through Supernova Cosmology"**.
Physics in and Through Cosmology, Lawrence Berkeley National Lab, Berkeley, CA
- Jan 2017 **"Exploring Dark Energy with the Large Synoptic Survey Telescope"**.
Allegheny Observatory Public Lecture Series, Pittsburgh, PA

PUBLICATIONS

PUBLICATIONS AS LEAD AUTHOR OR MAIN SCIENCE TEAM

- Jun 2020 **Ponder, K., Wood-Vasey, Weyant, A., Barton, N. T., Galbany, L., Garnavich, P., Matheson, T.,** “*Are Type Ia Supernovae in Restframe H Brighter in More Massive Galaxies?*”, Submitted to AAS Journals, arXiv:2006.13803 .
Contribution: Lead author.
- Nov 2019 **Malz, A., Hložek, R., and 20 other authors including Ponder, K., LSST DESC, LSST TVS,** “*The Photometric LSST Astronomical Time-series Classification Challenge (PLAsTiCC): Selection of a performance metric for classification probabilities balancing diverse science goals*”, Astrophysical Journal, Volume 158, Issue 5, article id 171, arXiv:1809.11145.
Contribution: Visualization and editing.
- Sept 2019 **Kessler R., Narayan G., and 27 other individual authors including Ponder, K. A.,** “*Models and Simulations for the Photometric LSST Astronomical Time Series Classification Challenge (PLAsTiCC)*”, Publications of the Astronomical Society of the Pacific, Volume 131, Issue 1003, pp. 094501, arXiv:1903.11756.
Contribution: Validating the models and simulations, writing, and editing.
- Oct 2018 **The PLAsTiCC team, LSST DESC, LSST TVS, and 22 individual authors including Ponder, K.,** “*The Photometric LSST Astronomical Time-series Classification Challenge (PLAsTiCC): Data set*”, arXiv:1810.00001.
Contribution: Validating the models and simulations, writing, and editing.
- Aug 2019 **Holoien, T. W.-S., Huber, M. E., Shappee, B. J., and 35 other authors including Ponder, K.A.,** “*PS18kh: A New Tidal Disruption Event with a Non-Axisymmetric Accretion Disk*”, The Astrophysical Journal, Volume 880, Issue 2, article id. 120, 21 pp., arXiv:1808.02890.
Contribution: Provided special SNIFS data reductions with the Nearby Supernova Factory pipeline.
- May 2018 **Weyant, A., Wood-Vasey W. M., Joyce, R., Allen, L., Garnavich, P., Jha S.W., Kroboth, J.R., Matheson, T., Ponder, K.A.,** “*The First Data Release from SweetSpot: 74 Supernovae in 36 Nights on WIYN+WHIRC*”, The Astronomical Journal, Volume 155, Issue 5, article id. 201, arXiv:1703.02402.
Contribution: I was the lead graduate student on this project after A. Weyant. Observations with the WIYN 3.5 m telescope, writing, and editing.
- Feb 2018 **L. Galbany, J. P. Anderson, 17 more authors including K. A. Ponder,** “*PISCO: The Pmas/ppak Integral-field Supernova hosts COmpilation*”, The Astrophysical Journal, Volume 855, Issue 2, article id. 107, arXiv:1802.01589.
Contribution: Proposal submission and editing.
- Nov 2017 **Shivvers, I., Zheng, W., 25 more authors including Kara A. Ponder,** “*The Nearby Type Ibn Supernova 2015G: Signatures of Asymmetry and Progenitor Constraints*”, Monthly Notices of the Royal Astronomical Society, Volume 471, p. 4381–4397, arXiv:1704.04316.
Contribution: Provided near infrared observations with the WIYN 3.5 m telescope and data, writing, editing.
- Aug 2017 **Ponder, K. A.,** “*Fitting and Phenomenology in Type Ia Supernova Cosmology: Generalized Likelihood Analyses for Multiple Evolving Populations and Observations of Near-Infrared Lightcurves Including Host Galaxy Properties*”, ProQuest Dissertations And Theses. Publication Number: AAT 10692580; ISBN: 9780355410532, ADS link.
Contribution: Lead author.
- June 2016 **Ponder, K., Wood-Vasey, W.M., Zentner, A.,** “*Incorporating Astrophysical Systematics into a Generalized Likelihood for Cosmology with Type Ia Supernova*”, Astrophysical Journal, Volume 825, Issue 1, article id 35, arXiv:1511.04647.
Contribution: Lead author.

PUBLICATIONS AS MEMBER OF COLLABORATION

- May 2020 **Aldering, G., and 43 additional authors including Ponder, K. A.,** “*The SNEMO and SUGAR Companion Data Sets*”, Research Notes of the AAS, Volume 4, Issue 5, id.63, arXiv:2005.03462.
Contribution: Reduced the data from the Nearby Supernova Factory.
- Apr 2020 **Leget, P.-F., and 43 additional authors including Ponder, K. A.,** “*SUGAR: An improved empirical model of Type Ia Supernovae based on spectral features*”, Astronomy & Astrophysics, Volume 636, id.A46, 24 pp., arXiv:1909.11239.
Contribution: Reduced the data from the Nearby Supernova Factory.
- Dec 2019 **Sloan Digital Sky Survey - Reverberation Mapping Project (34 authors including Kara A. Ponder),** “*The Sloan Digital Sky Survey Reverberation Mapping Project: Initial CIV Lag Results from Four Years of Data*”, The Astrophysical Journal, Volume 887, Issue 1, article id. 38, arXiv:1904.03199.
Contribution: Observing on the Bok 2.3 m telescope.

- Oct 2019 **Taubengerger, S., and 42 additional authors including Ponder, K. A.**, “*SN 2012dn from early to late times: 09dc-like supernovae reassessed*”, Monthly Notices of the Royal Astronomical Society, Volume 488, Issue 4, p.5473-5488, arXiv:1907.06753.
Contribution: Reduced the data from the Nearby Supernova Factory.
- Dec 2017 **Sloan Digital Sky Survey - Reverberation Mapping Project (39 authors including Kara A. Ponder)**, “*The Sloan Digital Sky Survey Reverberation Mapping Project: $H\alpha$ and $H\beta$ Reverberation Measurements From First-Year Spectroscopy and Photometry*”, The Astrophysical Journal, Volume 851, Issue 1, article id. 21, arXiv:1711.03114.
Contribution: Observing on the Bok 2.3 m telescope.
- Aug 2017 **LSST Science Collaborations (104 authors including Kara A. Ponder)**, “*Science-Driven Optimization of the LSST Observing Strategy*”, arXiv:1708.04058.
Contribution: I worked on a figure of merit for how many lightcurve points were needed to determine its fit parameters that balances quantity and quality.
- Jan 2015 **Sloan Digital Sky Survey III- Reverberation Mapping Project (39 authors including Kara Ponder)**, “*The Sloan Digital Sky Survey Reverberation Mapping Project: Technical Overview*”, Astrophysical Journal Supplement, Volume 216, Issue 1, article id. 4.
Contribution: Observing on the Bok 2.3 m telescope.

Abstracts

- Jan 2020 **Ponder, Kara for the PLAsTiCC Team**, “*The Photometric LSST Astronomical Time Series Classification Challenge (PLAsTiCC): Final Results*”, American Astronomical Society Meeting 235.
- Jan 2020 **Ponder, Kara for the Nearby Supernova Factory**, “*The Nearby Supernova Factory – Data and Science Overview*”, American Astronomical Society Meeting 235.
- Jan 2019 **Ponder K. A. for the PLAsTiCC Team**, “*Validating the PLAsTiCC Simulations*”, American Astronomical Society Meeting Abstracts 233.
- Jan 2019 **Ponder K. A. for the Nearby Supernova Factory**, “*Survey Statistics for the Nearby Supernova Factory Data Release*”, American Astronomical Society Meeting Abstracts 233.
- June 2016 **Ponder K. A., Wood-Vasey W. M., Weyant A., Allen L., Garnavich P. M., Jha S.W., Joyce R. R., Matheson T., Rest A.**, “*IFU Spectroscopy of 32 SweetSpot Supernova Host Galaxies*”, American Astronomical Society Meeting Abstracts 228.

Codes and Data

- July 2019 **Malz, A. and 9 other authors including K. Ponder**, “*aimalz/proclam: Journal Submission*”, Zenodo, DOI: 10.5281/zenodo.3352639 .
Contribution: Data visualization.
- Jan 2019 **PLASTICC Team and PLASTICC Modelers**, “*Unblinded Data for PLAsTiCC Classification Challenge*”, Zenodo, DOI: 10.5281/zenodo.2539456.
Contribution: Data validation.
- Nov 2016 **Galbany, L., D’Andrea, C., Prajs, S., Smith, M., Sullivan, M., Ponder, K., and 46 other authors**, “*Classification of DES16C2nm as a SLSN at $z=1.998$* ”, The Astronomer’s Telegram, Volume 9700.
Contribution: Observing on the Magellan 6.5 m telescope.

Electronic Records

Click for link: **Google Scholar, inSPIRE HEP, Research Gate, LinkedIn.**

REFERENCES

Michael Wood-Vasey, email: wmwv@pitt.edu.

Saul Perlmutter, email: saul@lbl.gov.

Renee Hložek, email: hlozek@dunlap.utoronto.ca.