

Kara A. Ponder

Curriculum Vitae

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RESEARCH INTERESTS

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

Employment

- Aug 2020– **Research Associate**, *Machine Learning Initiative and Kavli Institute for Particle Astrophysics and Cosmology (KIPAC)*, 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 – **Vera C Rubin Observatory Legacy Survey of Space and Time (LSST) Dark Energy Science Collaboration (DESC).**
Member of Supernova Working Group
Member of Collaboration Council: November 2015–2017, 2018–2020
Pipeline Scientist: Sept 2020–
Co-lead of the Supernova Machine Learning Topical Team: March 2021–
- 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

- 2019–2021 **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 2017 **VLT 8.2 m**, 99 hours in Period 99, Multi Unit Spectroscopic Explorer (MUSE): Optical IFS.
All-weather MUse Supernova Integral field Nearby Galaxies (AMUSING) survey IV
PI: Lluís Galbany, Col: KAP
- Fall 2016 **VLT 8.2 m**, 45 hours in Period 98, Multi Unit Spectroscopic Explorer (MUSE): Optical IFS.
All-weather MUse Supernova Integral field Nearby Galaxies (AMUSING) survey IV
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

- Oct 2020– **Organizing the AI-at-SLAC Seminar.**
Machine Learning Initiative at SLAC
- Feb 2019– **Referee for Physics Review D, AAS Journals, Astronomy and Computing.**
- Aug 2016–Aug 2017 **Co-President of the Association of Physics and Astronomy Graduate Students.**
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 - May 2017 **WIYN 3.5 m**, 59.5 telescope nights, WHIRC: NIR imaging camera.
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 2015 **Visiting student at the SLAC National Accelerator Laboratory.**
Funded through DOE SCGSR
- June - Aug 2011 **Research Experience for Undergraduates (REU)**, Purdue University.
Simulated different alignments to optimize the Very Energetic Radiation Imaging Telescope Array System (VERITAS)
Advisors: Professor John Finley and Dr. Glenn Sembroski

Jan - May 2011 **Undergraduate Researcher**, University of Georgia.
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 2021 **SLAC Science + Stanford AI: Bridging the Farm**, SOC/LOC, Virtual, Menlo Park, CA.
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

May 2021 **"Using Machine Learning to Prepare for Photometric Supernova Cosmology"**, Invited Talk.
Cosmic Physics Center Seminar at Fermi National Accelerator Laboratory, Virtual

Feb 2021 **"Building a DESC Transient Broker System: The Next Phase of PLAsTiCC"**, Invited Plenary.
LSST DESC Collaboration Meeting, Virtual

Oct 2020 **"Dark Energy Science Collaboration Needs from Alerts and Brokers"**, Invited Talk.
LSSTC enabling science 2020 broker workshop. Part I, Virtual

Feb 2020 **"PLAsTiCC: Convincing other people to solve your problems"**, 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

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

July 2015 **"Accounting for Multiple Populations of Type Ia Supernovae"**, Contributed Talk.
Santa Fe Cosmology Workshops, St. John's College, Santa Fe, NM

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

- Apr 2021 **Rose, B. M. and 28 other authors including Ponder, K. A., endorsed by the Roman Supernova Science Investigation Teams LSST DESC Supernova Working Group**, “*Synergies between Vera C. Rubin Observatory, Nancy Grace Roman Space Telescope, and Euclid Mission: Constraining Dark Energy with Type Ia Supernovae*”, DOE/NASA Request for Information, arXiv:2104.01199.
Contribution: Writing.
- Dec 2020 **Hložek, R., Ponder, K. A., and 20 other authors, LSST DESC, LSST TVS**, “*Results of the Photometric LSST Astronomical Time Series Classification Challenge (PLAsTiCC)*”, Submitted to AAS Journals, arXiv:2012.12392.
Contribution: Validation, visualization, writing - editing, writing - original draft.
- Oct 2020 **Kenamer, Noble, Ishida, Emille E. O., Gonzalez-Gaitan, Santiago; de Souza, Rafael S., Ihler, Alexander, Ponder, Kara, Vilalta, Richardo, Moller, Anais, Jones, David O., Dai, Mi, Krone-Martins, Alberto, Quint, Bruno, Sreejith, Sreevarsha, Malz, Alex I., Galbany, Lluís (LSST DESC and COIN)**, “*Active learning with RESSPECT: Resource allocation for extragalactic astronomical transients*”, 2020 IEEE Symposium Series on Computational Intelligence, arXiv: 2010.05941.
Contribution:
- 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 2021 **Boone, K, and 43 additional authors including Ponder, K. A.**, “*The Twins Embedding of Type Ia Supernovae. II. Improving Cosmological Distance Estimates*”, *The Astrophysical Journal*, Volume 912, Issue 1, article id. 71, arXiv:2105.02204.
Contribution: Reduced the data from the Nearby Supernova Factory, writing: editing.
- May 2021 **Boone, K, and 43 additional authors including Ponder, K. A.**, “*The Twins Embedding of Type Ia Supernovae. I. The Diversity of Spectra at Maximum Light*”, *The Astrophysical Journal*, Volume 912, Issue 1, article id. 70, arXiv:2105.02676.
Contribution: Reduced the data from the Nearby Supernova Factory, writing: editing.
- 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 α and H β 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.