Ryan Keeley

Cosmology is cool

Education

2008–2012 **B.S. Physics and History**, *California Institute of Technology*, Pasadena, CA, .

2012–2016 **Masters Physics**, *University of California, Irvine*, Irvine, CA.

2012–2018 **PhD Physics**, *University of California, Irvine*, Irvine, CA.

Academic Positions

2014–2018 **University of California, Irvine**, *Graduate Research Assistant*, Prof. Kevork N. Abazajian, PI.

2018–Present **Korea Astronomy Space Science Institute**, *Postdoctoral Researcher*, Arman Shafieloo, Supervisor.

Invited Talks and Conferences

December 2019 **6th Korea-Japan Workshop on Dark Energy**, *Transitional Dark Energy: A solution to the H0 tension*.

October 2019 **KAS Fall 2019**, *Pillars of the standard model of cosmology: dark energy and the cosmological constant*.

September 2019 **CosKASI-ICG-NAOC-YITP Workshop 2019**, *Transitional Dark Energy: A solution to the H0 tension*.

August 2019 **COSMO19 - Poster**, *Transitional Dark Energy: A solution to the H0 tension*.

July 2019 **KITP UCSB Tensions between Early and Late Universe**, *Transitional Dark Energy: A solution to the H0 tension*.

July 2019 **DESI Collaboration Meeting**, *Model independent methods in cosmology*.

April 2019 **COSKASI 19**, *Transitional Dark Energy: A solution to the H0 tension*.

February 2019 **KAS Spring Meeting**, *Model independent inference of the expansion history and implications for the growth of structure*.

November 2018 **KIAS structure formation workshop**, *Model independent inference of the expansion history and implications for the growth of structure*.

October 2018 **CosKASI-ICG-NAOC-YITP Workshop 2018**, *Model independent inference of the expansion history and implications for the growth of structure*.

August 2018 **5th Korea-Japan Workshop on Dark Energy**, *Model independent inference of the expansion history and implications for the growth of structure*.

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June 2018 **Conference on the Intersection of Particle and Nuclear Physics**, *Dark Matter Interpretation of the Galactic Center Gamma Ray Excess*.

February 2018 **Texas A&M High Energy seminar**, *What the Milky Ways Dwarfs tell us about the Galactic Center extended excess*.

August 2017 **TeV Particle Astrophysics conference**, *What the Milky Way's Dwarfs tell us about the Galactic Center extended excess*.

July 2017 **Virginia Tech**, *Summer Institute for Neutrino Theory*.

January 2017 **American Physical Society - April Meeting**, *Bright gamma-ray Galactic Center excess and dark dwarfs: Strong tension for dark matter annihilation despite Milky Way halo profile and diffuse emission uncertainties*.

Software

October 2017 **Cosmological expansion history inference using Gaussian processes**, *DOI:10.5281/zenodo.999564*.

April 2019 **Cosmological expansion history inference with a 1% forecasted H0 measurement using Gaussian processes**, *DOI:10.5281/zenodo.3116772*.

Programming Languages

Python

C

C++

C#

R

Teaching Experience

2012–2018 **Physics Teaching Assistant**, *UC, Irvine*.

Taught various classes from the standard introductory labs and courses to the more specialized classes aimed at teaching physics and astronomy to non-science majors, to teaching upper division astronomy courses.

2016–2016 **Physics Instructor**, *UC, Irvine*.

Taught one of the introductory physics courses at UCI

Service

Local Outreach

2016–2018 **Teaching through COSMOS program at UC, Irvine**.

Taught basic cosmology and particle physics to high school students, ran demonstrations for basic kinematics concepts, and designed a cloud chamber kit appropriate for the students to build themselves.

Publications

Publications

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[1] Kevork N. Abazajian, Shunsaku Horiuchi, Manoj Kaplinghat, * Ryan E. Keeley, and Oscar Macias. Strong constraints on thermal relic dark matter from Fermi-LAT observations of the Galactic Center. *arXiv e-prints*, page arXiv:2003.10416, March 2020.

[2] Kevork N. Abazajian and * Ryan E. Keeley. Bright gamma-ray Galactic Center excess and dark dwarfs: Strong tension for dark matter annihilation despite Milky Way halo profile and diffuse emission uncertainties. *Physical Review D*, 93(8):083514, Apr 2016.

[3] Shahab Joudaki, Manoj Kaplinghat, * Ryan E. Keeley, and David Kirkby. Model independent inference of the expansion history and implications for the growth of structure. *Physical Review D*, 97(12):123501, Jun 2018.

[4] Manoj Kaplinghat, Ryan E. Keeley, Tim Linden, and Hai-Bo Yu. Tying Dark Matter to Baryons with Self-Interactions. *Physical Review Letters*, 113(2):021302, Jul 2014.

[5] * Ryan E. Keeley, Kevork N. Abazajian, Anna Kwa, Nicholas L. Rodd, and Benjamin R. Safdi. What the Milky Way's dwarfs tell us about the Galactic Center extended gamma-ray excess. *Physical Review D*, 97(10):103007, May 2018.

[6] * Ryan E. Keeley, Shahab Joudaki, Manoj Kaplinghat, and David Kirkby. Implications of a transition in the dark energy equation of state for the H_0 and σ_8 tensions. *Journal of Cosmology and Astroparticle Physics*, 2019(12):035, December 2019.

[7] * Ryan E. Keeley, Arman Shafieloo, Dhiraj Kumar Hazra, and Tarun Souradeep. Inflation Wars: A New Hope. *arXiv e-prints*, page arXiv:2006.12710, June 2020.

[8] * Ryan E. Keeley, Arman Shafieloo, Benjamin L'Huillier, and Eric V. Linder. Debiasing cosmic gravitational wave sirens. *Monthly Notices of the RAS*, 491(3):3983–3989, January 2020.

[9] Hanwool Koo, Arman Shafieloo, Ryan E. Keeley, and Benjamin L'Huillier. Model-independent constraints on Type Ia supernova light-curve hyper-parameters and reconstructions of the expansion history of the Universe. *arXiv e-prints*, page arXiv:2001.10887, January 2020.

[10] Kai Liao, Arman Shafieloo, * Ryan E. Keeley, and Eric V. Linder. A Model-independent Determination of the Hubble Constant from Lensed Quasars and Supernovae Using Gaussian Process Regression. *Astrophysical Journal, Letters*, 886(1):L23, November 2019.

[11] Kai Liao, Arman Shafieloo, * Ryan E. Keeley, and Eric V. Linder. Determining Model-independent H_0 and Consistency Tests. *Astrophysical Journal, Letters*, 895(2):L29, June 2020.

[12] Arman Shafieloo, * Ryan E. Keeley, and Eric V. Linder. Will cosmic gravitational wave sirens determine the Hubble constant? *Journal of Cosmology and Astroparticle Physics*, 2020(3):019, March 2020.

Astro 2020

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[13] Keith Bechtol, Alex Drlica-Wagner, Kevork N. Abazajian, Muntazir Abidi, Susmita Adhikari, Yacine Ali-Haïmoud, James Annis, Behzad Ansarinejad, Robert Armstrong, Jacobo Asorey, Carlo Baccigalupi, Arka Banerjee, Nilanjan Banik, Charles Bennett, Florian Beutler, Simeon Bird, Simon Birrer, Rahul Biswas, Andrea Biviano, Jonathan Blazek, Kimberly K. Boddy, Ana Bonaca, Julian Borrill, Sownak Bose, Jo Bovy, Brenda Frye, Alyson M. Brooks, Matthew R. Buckley, Elizabeth Buckley-Geer, Esra Bulbul, Patricia R. Burchat, Cliff Burgess, Francesca Calore, Regina Caputo, Emanuele Castorina, Chihway Chang, George Chapline, Eric Charles, Xingang Chen, Douglas Clowe, Johann Cohen-Tanugi, Johan Comparat, Rupert A. C. Croft, Alessandro Cuoco, Francis-Yan Cyr-Racine, Guido D'Amico, Tamara M. Davis, William A. Dawson, Axel de la Macorra, Eleonora Di Valentino, Ana Díaz Rivero, Seth Digel, Scott Dodelson, Olivier Doré, Cora Dvorkin, Christopher Eckner, John Ellison, Denis Erkal, Arya Farahi, Christopher D. Fassnacht, Pedro G. Ferreira, Brenna Flaugher, Simon Foreman, Oliver Friedrich, Joshua Frieman, Juan García-Bellido, Eric Gawiser, Martina Gerbino, Maurizio Giannotti, Mandeep S. S. Gill, Vera Gluscevic, Nathan Golovich, Satya Gontcho A. Gontcho, Alma X. González-Morales, Daniel Grin, Daniel Gruen, Andrew P. Hearin, David Hendel, Yashar D. Hezaveh, Christopher M. Hirata, Renee Hložek, Shunsaku Horiuchi, Bhuvnesh Jain, M. James Jee, Tesla E. Jeltema, Marc Kamionkowski, Manoj Kaplinghat, Ryan E. Keeley, Charles R. Keeton, Rishi Khatri, Sergey E. Koposov, Savvas M. Koushiappas, Ely D. Kovetz, Ofer Lahav, Casey Lam, Chien-Hsiu Lee, Ting S. Li, Michele Liguori, Tongyan Lin, Mariangela Lisanti, Marilena LoVerde, Jessica R. Lu, Rachel Mandelbaum, Yao-Yuan Mao, Samuel D. McDermott, Mitch McNanna, Michael Medford, P. Daniel Meerburg, Manuel Meyer, Mehrdad Mirbabayi, Siddharth Mishra-Sharma, Moniez Marc, Surhud More, John Moustakas, Julian B. Muñoz, Simona Murgia, Adam D. Myers, Ethan O. Nadler, Lina Necib, Laura Newburgh, Jeffrey A. Newman, Brian Nord, Erfan Nourbakhsh, Eric Nuss, Paul O'Connor, Andrew B. Pace, Hamsa Padmanabhan, Antonella Palmese, Hiranya V. Peiris, Annika H. G. Peter, Francesco Piacentni, Andrés Plazas, Daniel A. Polin, Abhishek Prakash, Chanda Prescod-Weinstein, Justin I. Read, Steven Ritz, Brant E. Robertson, Benjamin Rose, Rogerio Rosenfeld, Graziano Rossi, Lado Samushia, Javier Sánchez, Miguel A. Sánchez-Conde, Emmanuel Schaan, Neelima Sehgal, Leonardo Senatore, Hee-Jong Seo, Arman Shafieloo, Huanyuan Shan, Nora Shipp, Joshua D. Simon, Sara Simon, Tracy R. Slatyer, Anže Slosar, Srivatsan Sridhar, Albert Stebbins, Oscar Straniero, Louis E. Strigari, Tim M. P. Tait, Erik Tollerud, M. A. Troxel, J. Anthony Tyson, Cora Uhlemann, L. Arturo Urenña-López, Aprajita Verma, Ricardo Vilalta, Christopher W. Walter, Mei-Yu Wang, Scott Watson, Risa H. Wechsler, David Wittman, Weishuang Xu, Brian Yanny, Sam Young, Hai-Bo Yu, Gabrijela Zaharijas, Andrew R. Zentner, and Joe Zuntz. Dark Matter Science in the Era of LSST. *Bulletin of the AAS*, 51(3):207, May 2019.

[14] Simone Ferraro, Michael J. Wilson, and et al. Inflation and Dark Energy from spectroscopy at z $>$ 2. *Bulletin of the AAS*, 51(3):72, May 2019.

[15] Daniel Green, Mustafa A. Amin, Joel Meyers, Benjamin Wallisch, Kevork N. Abazajian, Muntazir Abidi, Peter Adshead, Zeeshan Ahmed, Behzad Ansarinejad, Robert Armstrong, Carlo Baccigalupi, Kevin Bandura, Darcy Barron, Nicholas Battaglia,

Daniel Baumann, Keith Bechtol, Charles Bennett, Bradford Benson, Florian Beutler, Colin Bischoff, Lindsey Bleem, J. Richard Bond, Julian Borrill, Elizabeth Buckley-Geer, Cliff Burgess, John E. Carlstrom, Emanuele Castorina, Anthony Challinor, Xingang Chen, Asantha Cooray, William Coulton, Nathaniel Craig, Thomas Crawford, Francis-Yan Cyr-Racine, Guido D'Amico, Marcel Demarteau, Olivier Doré, Duan Yutong, Joanna Dunkley, Cora Dvorkin, John Ellison, Alexander van Engelen, Stephanie Escoffier, Tom Essinger-Hileman, Giulio Fabbian, Jeffrey Filippini, Raphael Flauger, Simon Foreman, George Fuller, Marcos A. G. Garcia, Juan García-Bellido, Martina Gerbino, Vera Gluscevic, Satya Gontcho A. Gontcho, Krzysztof M. Górski, Daniel Grin, Evan Grohs, Jon E. Gudmundsson, Shaul Hanany, Will Handley, J. Colin Hill, Christopher M. Hirata, Renée Hložek, Gilbert Holder, Shunsaku Horiuchi, Dragan Huterer, Kenji Kadota, Marc Kamionkowski, Ryan E. Keeley, Rishi Khatri, Theodore Kisner, Jean-Paul Kneib, Lloyd Knox, Savvas M. Koushiappas, Ely D. Kovetz, Benjamin L'Huillier, Ofer Lahav, Massimiliano Lattanzi, Hayden Lee, Michele Liguori, Tongyan Lin, Marilena Loverde, Mathew Madhavacheril, Kiyoshi Masui, Jeff McMahon, Matthew McQuinn, P. Daniel Meerburg, Mehrdad Mirbabayi, Pavel Motloch, Suvodip Mukherjee, Julian B. Munõz, Johanna Nagy, Laura Newburgh, Michael D. Niemack, Andrei Nomerotski, Lyman Page, Francesco Piacentni, Elena Pierpaoli, Levon Pogosian, Clement Pryke, Giuseppe Puglisi, Radek Stompor, Marco Raveri, Christian L. Reichardt, Benjamin Rose, Graziano Rossi, John Ruhl, Emmanuel Schaan, Michael Schubnell, Katelin Schutz, Neelima Sehgal, Leonardo Senatore, Hee-Jong Seo, Blake D. Sherwin, Sara Simon, Anže Slosar, Suzanne Staggs, Albert Stebbins, Aritoki Suzuki, Eric R. Switzer, Peter Timbie, Matthieu Tristram, Mark Trodden, Yu-Dai Tsai, Caterina Umiltà, Eleonora Di Valentino, M. Vargas-Magaña, Abigail Vieregg, Scott Watson, Thomas Weiler, Nathan Whitehorn, W. L. K. Wu, Weishuang Xu, Zhilei Xu, Siavash Yasini, Matias Zaldarriaga, Gong-Bo Zhao, Ningfeng Zhu, and Joe Zuntz. Messengers from the Early Universe: Cosmic Neutrinos and Other Light Relics. *Bulletin of the AAS*, 51(3):159, May 2019.

[16] Pieter Daniel Meerburg, Daniel Green, Raphael Flauger, Benjamin Wallisch, M. C. David Marsh, Enrico Pajer, Garret Goon, Cora Dvorkin, Azadeh Moradinezhad Dizgah, Daniel Baumann, Guilherme L. Pimentel, Simon Foreman, Eva Silverstein, Elisa Chisari, Benjamin Wandelt, Marilena Loverde, and Anze Slosar. Primordial Non-Gaussianity. *Bulletin of the AAS*, 51(3):107, May 2019.

[17] Antonella Palmese, Or Graur, James T. Annis, Segev BenZvi, Eleonora Di Valentino, Juan Garcia-Bellido, Satya Gontcho A. Gontcho, Ryan Keeley, Alex Kim, Ofer Lahav, Samaya Nissanke, Kerry Paterson, Masao Sako, Arman Shafieloo, and Yu-Dai Tsai. Gravitational wave cosmology and astrophysics with large spectroscopic galaxy surveys. *Bulletin of the AAS*, 51(3):310, May 2019.

[18] Daniel Scolnic, Saul Perlmutter, Greg Aldering, Dillon Brout, Tamara Davis, Alex Filippenko, Ryan Foley, Renée Hložek, Rebekah Hounsell, David Jones, Pat Kelly, David Rubin, Adam Riess, Steven Rodney, Justin Roberts-Pierel, Yun Wang, Jacobo Asorey, Arturo Avelino, Chetan Bavdhankar, Peter J. Brown, Anthony Challinor, Christophe Balland, Asantha Cooray, Suhail Dhawan, Georgios Dimitriadis, Cora Dvorkin, Julien Guy, Will Handley, Ryan E. Keeley, Jean-Paul Kneib, Benjamin

L'Huillier, Massimiliano Lattanzi, Kaisey Mandel, James Mertens, Mickael Rigault, Pavel Motloch, Suvodip Mukherjee, Gautham Narayan, Andrei Nomerotski, Lyman Page, Levon Pogosian, Giuseppe Puglisi, Marco Raveri, Nicolas Regnault, Armin Rest, César Rojas-Bravo, Masao Sako, Feng Shi, Srivatsan Sridhar, Aritoki Suzuki, Yu-Dai Tsai, W. M. Wood-Vasey, Yannick Copin, Gong-Bo Zhao, and Ningfeng Zhu. The Next Generation of Cosmological Measurements with Type Ia Supernovae. *Astro2020: Decadal Survey on Astronomy and Astrophysics*, 2020:270, May 2019.

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