Shea Garrison-Kimmel

Postdoctoral Scholar in Numerical Astrophysics

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Professional Appointments

Caltech — *Pasadena, CA*
Postdoctoral Scholar — *Aug. 2018 - present*

Caltech — *Pasadena, CA*
Einstein Postdoctoral Fellow — *Aug 2015 - Aug 2018*

Education

University of California, Irvine — *Irvine, CA*
Ph.D. & M.S. in Physics & Astronomy — *Awarded Jun. 2015*

Haverford College — *Haverford, PA*
B.S. in Astronomy & Physics (with a concentration in Computer Science) — *Awarded May 2009*

Fellowships and Awards

Funding

2015 **Einstein Postdoctoral Fellowship**, NASA
2015 **Chancellor's Club Dissertation Fellowship**, University of California, Irvine
2014 **Price Prize for Outstanding Graduate Students**, the Ohio State University
2009 **Chancellor's Club Recruitment Fellowship**, University of California, Irvine
2009 **Summer Research Fellowship**, University of California, Irvine

Computing time (PI-ed awards)

2017 ***Simulating the Dark Matter distribution in the Local Group***, 30 million CPU hours at LANL HPC
2017 ***Galaxy Formation in the Local Group (Augmentation)***, 15 million CPU hours at NASA NAS
2017 ***Galaxy Formation in the Local Group with State of the Art Hydrodynamics***, XSEDE startup at TACC & PSC
2016 ***The Local Group: Galaxy Formation in the Nearby Universe***, 18 million CPU hours at NASA NAS

Research Interests

Galaxy formation, theoretical cosmology, and numerical simulations, including:

- Placing the Milky Way in its proper cosmological context as a member of the Local Group
- Numerical simulations of structure formation on both large and small scales
- Constraining the behavior of dark matter by comparing with local galactic properties
- The impact of environment on dwarf galaxy evolution
- The formation and evolution of the smallest galaxies in the universe
- Comparing theoretical predictions with observational data to constrain baryonic physics
- Using gravitational wave observations to probe galaxy formation and binary star evolution

Professional Service

- Created and organized inaugural GalFRESCA conference in summer 2016
- Co-organized second and third annual GalFRESCA conferences in summers of 2017 and 2018
- Two-time member of NASA Astrophysics Theory Program grant review panels
- Three-year member of the Caltech TAPIR Seminar Organizing Committee
- Member of the SOC for *Science in Our Own Backyard: Exploring the Galaxy and the Local Group with WFIRST*

Teaching and Mentoring

Teaching experience

University of California, Irvine — *Irvine, CA*

Teaching Assistant — *2009 - 2010 & 2014*

- Discussion section instructor for Basic Physics III
- Discussion section instructor for Classical Physics II
- Laboratory instructor for Classical Physics II
- Laboratory instructor for Basic Physics III
- Laboratory instructor for Fundamentals of Experimental Physics
- Discussion section instructor and occasional lecturer for Introduction to Programming and Numerical Analysis

California State Summer School for Mathematics and Science (COSMOS) — *Irvine, CA*

Teaching Assistant — *Jul. 2010, 2011, & 2012*

Haverford College — *Haverford, PA*

Physics Clinic Tutor — *Feb. 2007 - May 2009*

Mentoring and advising experience

- Mentored Jaspreet Lally, then a rising junior at University of California, Irvine, on how to run and analyze simulations of dwarf galaxies in isolation with a time varying potential to search for core formation, resulting in an authorship on Garrison-Kimmel et al., 2013. Jaspreet successfully graduated the following year.
- Mentored Kyle Lee, then a sophomore at Chapman University, on how to set up, simulate, and analyze cosmological simulations, resulting in an authorship on Garrison-Kimmel et al., 2014 and helping to secure his current position in a Ph.D. program at Stony Brook University.
- Mentored Emma Bardwell, then a rising sophomore at Case Western University, on a project exploring the relationship between halo mass and galaxy stellar mass, and the impact of scatter in that relation, resulting in an authorship on Garrison-Kimmel et al., 2016.
- Mentored Kris Burke, then a senior at University of California, Irvine, on simulating the cosmological evolution of galaxies with a central potential to explore the impact of the Milky Way disk on the substructure population with minimal CPU cost, resulting in an authorship on a paper in preparation. Kris has since continued into a M.Sc. program at Texas A&M.
- Aided Dr. Astrid Lamberts in mentoring the summer research of Kaliden Drango, then an entering undergraduate at Caltech who built the initial machinery for applying binary population synthesis models to the FIRE simulations to make gravitational wave predictions.
- Currently co-advising Ivanna Escala, a graduate student at Caltech, on a study comparing galactic evolution as inferred from one-zone chemical evolution models applied to simulated dwarf galaxies to the actual evolution of those dwarfs.

References

Philip F. Hopkins*
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Talks and Presentations

Recent Invited Presentations

Apr. 2019	**Astronomy on Tap – *What isn't dark matter?***, Der Wolfskopf	*Pasadena, CA*
Apr. 2019	**SLAC Cosmology Seminar – *Dark matter and galaxy formation in the Local Group***, Stanford University	*Palo Alto, CA*
Jan. 2019	**Lunch Talk – *Near-field cosmology with Local Group dwarf galaxies***, Carnegie Observatories	*Pasadena, CA*
Oct. 2018	**TAP Colloquium – *Near-field cosmology with Local Group dwarf galaxies***, University of Arizona	*Tucson, AZ*
May 2018	**Astro Lunch – *ELVIS on FIRE: tackling small-scale problems with baryonic physics***, UC Santa Barbara	*Santa Barbara, CA*
Mar. 2018	**Astrophysics Distinguished Seminar Series – *Probing the Universe via the Local Group***, LANL	*Los Alamos, NM*
Mar. 2018	**Physics Colloquium – *Probing the Universe via the Local Group***, Cal State LA	*Los Angeles, CA*
May 2017	**The Galaxy-Halo Connection – *The depletion of dark matter subhalos by Milky Way-like galaxies***, KITP	*Santa Barbara, CA*

Selected Contributed Presentations

Sep. 2018	**GalFRESCA 2018 – *Star formation histories of dwarf galaxies vary with mass and environment***, Caltech	*Pasadena, CA*
June 2018	**BlueWaters Symposium – *Next-generation Galaxy Formation Simulations with FIRE***, NCSA	*Sunriver, OR*
June 2018	**Swinburne-Caltech Workshop 3 – *Morphological drivers of Milky Way-mass galaxies***, Caltech	*Sunriver, OR*
Aug. 2018	**UCSC Galaxy Workshop – *ELVIS on FIRE: tackling small-scale problems with baryonic physics***, UCSC	*Santa Cruz, CA*
Sep. 2016	**The Milky Way and its environment – *Embedding galaxies in cosmological simulations***, IAP	*Paris, France*