

Kaitlin C. Rasmussen

STELLAR ASTROPHYSICIST · SPECTROSCOPIST · EXOPLANETEER

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Education

Ph.D. in Physics

UNIVERSITY OF NOTRE DAME

Notre Dame, IN, USA

Jun. 2015 - May. 2020

- Thesis: I obtain elemental abundances of metal-poor (ancient) stars and use these data to learn about several facets of the early Universe.

B.S. in Physics & Astrophysics with Honors

FLORIDA STATE UNIVERSITY

Tallahassee, FL, USA

Aug. 2011 - May. 2015

- Senior Thesis: I explored the relationship between microwave and X-ray flux for a variety of active galactic nuclei and other quasi-stellar objects.

Grants & Awards

\$1,500	Conference Travel Award , University of Geneva	2019
\$1,000	Professional Development Travel Award , ND Graduate School	2019
\$200	Conference Presentation Grant , ND Graduate Student Union	2019
\$150	Conference Presentation Grant , ND Graduate Student Union	2016
3rd Prize	AWIS , Poster Competition	2018
Award	Most Outreach Performed in 2018-2019 School Year , ND Physics Outreach Committee	2018

Visiting Scholar

MIT		Cambridge, MA
FUNDING: TESS		August 2019
• Collaborated with Prof. Sara Seager and her team to begin a new survey to uncover planet candidates in TESS data.		
MIT		Cambridge, MA
FUNDING: JINA-CEE		Jun 2019
• Collaborated with Prof. Anna Frebel on <i>R</i> -Process Alliance work		
MIT		Cambridge, MA
FUNDING: JINA-CEE		Aug 2018
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Talks (selected)

Galactic Archaeology: CONTRIBUTED CONFERENCE		Geneva, Switzerland
GALACTIC ARCHAEOLOGY WITH CEMP STARS FROM THE SOUTH AFRICAN LARGE TELESCOPE		Sep. 2019
• Presented new galactic archaeology results of a sample of metal-poor stars including stellar parameters, abundances, and pipeline comparisons. Overview of statistics for various metal-poor classifications and how they will benefit from this new data set.		
Observational Astrophysics: INVITED CONFERENCE OVERVIEW		Michigan State
OBSERVATIONAL ASTROPHYSICS FOR NUCLEAR PHYSICISTS		May. 2019
• An overview talk for the Joint Institute for Nuclear Astrophysics and Center for the Evolution of the Elements (JINA-CEE) aimed at explaining the methods and results of observational astrophysics to the organization's nuclear physicists		
New CEMP Stars: CONTRIBUTED CONFERENCE		Notre Dame
NEW CEMP STARS IDENTIFIED IN THE RAVE SURVEY		May. 2018
• Presented a data release at the JINA-CEE annual conference of over 200 new metal-poor stars identified from medium-resolution spectroscopy. Projected statistics of sample, future directions of observational astrophysics.		
The Rise of Carbon: CONTRIBUTED CONFERENCE		AAS 229
THE FIRST MASS FUNCTION AND RISE OF CARBON IN THE UNIVERSE		Jan. 2017
• Presented new results at the American Astronomical Society winter meeting on how measurements of carbon in metal-poor stars can elucidate the poorly understood first mass function. Introduced new model of the rapid rise of carbon from the unique first generation of stars.		

Committees, Proposals, White Papers & Working Groups

Organizer JINA-CEE, <i>Frontiers in Nuclear Astrophysics Annual Conference</i>	2019
Organizer JINA-CEE, <i>Frontiers in Nuclear Astrophysics Annual Conference</i>	2018
Organizer Graduate Physics Students Union, <i>Social Committee</i>	2017-2020
PI NOAO Proposal N0068, “ <i>New Worlds Around Ancient Stars: Exploring the History of Planet Formation with the SEAMSTRESS Survey</i> ”	2019
Co-I Magellan Telescope Time Proposal, “ <i>New Worlds Around Ancient Stars: Exploring the History of Planet Formation with the SEAMSTRESS Survey</i> ”	2019
Co-I McDonald Observatory Observing Time Request Mcd19-2, “ <i>Neutron-Capture Elemental Abundances in the Intermediate Halo Metallicity Domain</i> ”	2019
Co-I McDonald Observatory Observing Time Request Mcd19-1, “ <i>The nature and astrophysical site(s) of the r-process</i> ”	2019
Co-I McDonald Observatory Observing Time Request Mcd18-3, “ <i>The nature and astrophysical site(s) of the r-process</i> ”	2019
Co-I McDonald Observatory Observing Time Request Mcd18-2, “ <i>The nature and astrophysical site(s) of the r-process</i> ”	2018
Co-I South African Large Telescope Long Term Proposal 2017-1-MLT-012, “ <i>Detailed Study of CEMP Stars Identified in the RAVE Survey</i> ”	2017-2019
Principal Author Astro 2020 Decadal White Paper, “ <i>The Non-binary Fraction: Looking Towards the Future of Gender Equity in Astronomy</i> ”	2019
Observer TESS Follow-Up Observing Program (TFOP) Working Group, <i>SG1: Seeing-Limited Photometry</i>	2019
Observer TESS Follow-Up Observing Program (TFOP) Working Group, <i>SG2: Recon Spectroscopy</i>	2019
Observer TESS Follow-Up Observing Program (TFOP) Working Group, <i>SG4: Precise Radial Velocity Work</i>	2019

Outreach

Mentor STEMentorship, <i>AWIS</i>	2016-2020
Mentee Women Leaders in STEM, <i>University of Notre Dame + AWIS</i>	2018-2020
Demos Science Alive!, <i>St. Joseph County Library</i>	2016-2020
Speaker Career Day, <i>Assorted public schools</i>	2015-2020
Leader Art 2 Science, <i>STEAM Science Camp</i>	2017-2018
Leader Public Nights, <i>Morris Observatory</i>	2015-2017
Leader STEM Workshop, <i>Expanding Your Horizons</i>	2017

Teaching

Graduate Teaching Assistant

Notre Dame, IN

UNIVERSITY OF NOTRE DAME

Aug 2015 – May 2017

- General Physics I: Held weekly group classwork tutorials, biweekly help sessions, graded quarterly exams
- General Science Courses: Graded exams/homework, held review sessions, proctored exams for Descriptive Astronomy, Earth Focus, Physics II, and Elementary Cosmology
- Lecturer: Substitute for professor absences

Lead Observatory Assistant

Notre Dame, IN

UNIVERSITY OF NOTRE DAME

Aug 2015 – Jan 2017

- Observatory Duties: Set up telescopes, perform alignments to track target objects, maintain and repair 8” Celestron telescopes
- Astronomy and Cosmology Lab: Lead lab exercises, answer questions, assist students with software (Stellarium) usage
- Supervisor: Advised junior graduate student and undergraduate observatory assistants
- Outreach: Set up for Morris Observatory Public Nights, gave talks to visitors of all ages, lead tours of observatory and observing equipment

Physics Tutor

Tallahassee, FL

FLORIDA STATE UNIVERSITY

Feb 2014 – Apr 2015

- Tutored individual students and groups in Elementary Physics I and II
- Assisted students with lower-level mathematics such as trigonometry, pre-calculus
- Attained College Reading & Learning Association (CRLA) Level 1 Certification

Publications

7 refereed papers • 333 citations • h-index = 3

Rasmussen K. C., Frebel A., Ezzedine R., Ji A., Chiti A., et al. (REFEREED)

ApJ

THE *R*-PROCESS ALLIANCE: A URANIUM ABUNDANCE MEASUREMENT IN THE *r*-I STAR BD +17 3248

submitted

- We report an abundance measurement of uranium in the metal-poor *r*-process-enhanced star based on a high resolution and high S/N ($R \sim 66,000$, $S/N \sim 900$ at $4,000 \text{ \AA}$) spectrum taken with the *Magellan/Clay* telescope.

Rasmussen K. C., Zepeda J., Beers T. C., Placco V. M., Depagne E., et al. (REFEREED)

ApJ

METAL-POOR STARS FROM THE SOUTH AFRICAN LARGE TELESCOPE I. THE NIFTY FIFTY

submitted

- We present the first sub-sample of a total of ~ 200 metal-poor stars selected from the Radial Velocity Experiment (RAVE) and observed with the South African Large Telescope (SALT) ($R \sim 40,000$; $S/N \sim 30$ at 4500 \AA)

Ezzedine R., Rasmussen K. C., Frebel A., Chiti A., Hinojisa K., et al. (REFEREED)

ApJ

THE *R*-PROCESS ALLIANCE: MIKE/MAGELLAN DATA RELEASE OF *r*-PROCESS ENHANCED METAL-POOR STARS FROM THE SOUTH

submitted

- We present fundamental stellar parameters and detailed chemical abundance analysis of 141 newly 20 identified metal-poor, southern Galactic halo stars, as part of the *R*-Process Alliance (RPA) effort.

Rasmussen K. C., Maier, E., Strauss, B. E., Durbin, M., Riesbeck L., et al.

Astro2020: Decadal Survey

THE NON-BINARY FRACTION: LOOKING TOWARD THE FUTURE OF GENDER EQUITY IN ASTRONOMY

2019

- This paper presents a summary of past and current studies of gender in astronomy, most of which either fail to acknowledge the existence of nonbinary people or intentionally omit us from statistical analyses. We then offer a series of recommendations to correct this issue and incorporate a more complex understanding of gender in space science.

Placco, V. M., Beers, T. C., Santucci, R., Chanamé, Julio, Seúlveda, María Paz, et al. (REFEREED)

AJ

THE *R*-PROCESS ALLIANCE: SPECTROSCOPIC FOLLOW-UP OF LOW-METALLICITY STAR CANDIDATES FROM THE BEST & BRIGHTEST SURVEY

2019

- We present results from a medium-resolution ($R \sim 2000$) spectroscopic follow-up campaign of 1694 bright ($V < 13.5$), very metal-poor star candidates from the RAdial Velocity Experiment (RAVE).

Placco, V. M., Beers, T. C., Santucci, R., Chanamé, Julio, Seúlveda, María Paz, et al. (REFEREED)

AJ

SPECTROSCOPIC VALIDATION OF LOW-METALLICITY STARS FROM RAVE

2018

- We present results from a medium-resolution ($R \sim 2000$) spectroscopic follow-up campaign of 1694 bright ($V < 13.5$), very metal-poor star candidates from the RAdial Velocity Experiment (RAVE).

Rasmussen, K. C., Beers, T. C., Placco, V. M., Yoon, J., Dietz, S.

IAU Symposium Proceedings 334

MEASUREMENT OF [Fe/H] AND [C/Fe] FOR METAL-POOR STARS FROM THE RAVE SURVEY

2018

- We present an analysis of the distribution of carbon-enhancement in the relatively local volume of the Galaxy as a function of metallicity, location, and kinematics.

Yoon, J., Whitten, D. D., Beers, T. C., Placco, V. M., Lee, Y. S., et al.

IAU Symposium Proceedings 334

LIFTING THE VEIL ON ULTRA METAL-POOR STARS IN THE OUTERMOST HALO

2018

- We present identifications of several new EMP/UMP stars and introduce a survey to expedite discovering hundreds to thousands of EMP/UMP stars in the outermost halo.

Drout, M. R., Piro, A. L., Shappee, B. J., Kilpatrick, C. D., Simon, J. D., et al. (REFEREED)

Science

LIGHT CURVES OF THE NEUTRON STAR MERGER GW170817/SSS17A: IMPLICATIONS FOR *r*-PROCESS NUCLEOSYNTHESIS

2017

- We constrain the radioactively powered transient resulting from the ejection of neutron-rich material. The fast rise of the light curves, subsequent decay, and rapid color evolution are consistent with multiple ejecta components of differing lanthanide abundance.

Rasmussen K. C., Beers, T. C., Placco, V. M., Yoon, J.

AAS Meeting 229

THE FIRST MASS FUNCTION AND RISE OF CARBON IN THE EARLY UNIVERSE

2017

- We investigate the impact of the First Mass Function (FMF) of stars on the distribution of stellar carbon abundances in the early Universe.

Yoon, J., Beers, T. C., Placco, V. M., Rasmussen K. C., Carollo, D., et al. (REFEREED)

ApJ

OBSERVATIONAL CONSTRAINTS ON FIRST-STAR NUCLEOSYNTHESIS. I. EVIDENCE FOR MULTIPLE PROGENITORS OF CEMP-NO

STARS

2016

- We investigate anew the distribution of absolute carbon abundance, $A(C) = \log_{\epsilon}(C)$, for carbon-enhanced metal-poor (CEMP) stars in the halo of the Milky Way, based on high-resolution spectroscopic data for a total sample of 305 CEMP stars.