

Rana Ezzeddine

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EMPLOYMENT	Assistant Professor <i>Department of Astronomy, University of Florida Gainesville, FL</i>	Jan 2020 - present
	Postdoctoral Fellow JINA-CEE postdoctoral Fellow <i>Kavli Institute for Astrophysics and Space Research Massachusetts Institute of Technology Cambridge, MA, USA</i>	2016-2019
EDUCATION	Ph.D in Physics <i>Université de Montpellier, Montpellier, France</i>	2012-2015
	Master of Sciences in Astrophysics <i>Joint degree: Notre Dame University, Lebanon & Université de Saint Joseph, Lebanon</i>	2010-2012
	Bachelor of Sciences in Physics <i>Lebanese University, Lebanon</i>	2005-2008
AWARDS AND HONORS	Heising-Simons Physics Research Fellowship - MIT	2019
	Co-I. NASA Hubble Space Telescope - GO-15951 (\$42,721 to UF)	2019-2023
	Co-I. NASA Hubble Space Telescope - GO-15657	2018-2022
	Co-I., NASA Hubble Space Telescope - GO-14151	2016-2019
	JINA-CEE postdoctoral fellowship - MSU/MIT	2016-2019
	IAU symposium 334 poster 1st prize award	2017
	IAU travel grant for Symposium 334	2017
	MIT Spot Award	2017
	PHC CEDRE grant (France) - Project number 32919SL (3400 €)	2015
	1M CPU hours - FRANCE-GRILLES/DIRAC grid	2014-2015
	University of Montpellier PhD fellowship	2012-2015
	CNRS-Lebanon PhD fellowship	2012-2015
	Masters Graduate Fellowship - Notre Dame University, Lebanon	2011-2012
TEACHING	Teaching: Graduate level core courses	
	- AST 6245 : Radiative Transfer & Stellar Atmospheres <i>(University of Florida, Gainesville, FL)</i>	Fall 2021
	- AST 6215 : Stars and the Galaxy <i>(University of Florida, Gainesville, FL)</i>	Spring 2020, Spring 2021
	Teaching: Undergraduate level courses	
	- Astronomy 101: "Introduction to the Solar System" <i>(Notre Dame University, Louaize, Lebanon)</i>	2011-2012

- General Physics Lab Teaching Fellow 2011-2012
(Notre Dame University, Louaize, Lebanon)

- Electricity and Magnetism Physics Lab Teaching Fellow 2011-2012
(Notre Dame University, Louaize, Lebanon)

Teaching: Highschool level 2008-2012
Basic Physics grade 7 - grade 10 level classes
- Beirut Modern School, Beirut, Lebanon
- Amjad College, Beirut, Lebanon

**STUDENT
RESEARCH &
MENTORING**

Research Mentoring of Graduate Research 2020-present
- Shivani Shah (*PhD student, University of Florida*)
- Yangyang Li (*PhD student, University of Florida*)
- Nicholas Barth (*PhD student, University of Florida*)
- Francisco Mendez (*PhD student, University of Florida*)

Research Mentoring of Undergraduate & Highschool research
University of Florida, Gainesville, FL

- Jeremy Kowkabany Spring 2020 - present
- Zoe Hackshaw Spring 2020 - present
- Natalia Wolschlager Spring 2020 - Summer 2021
- Jonathan Roberts Fall 2021
- Victoria Moore Spring 2021
- Daniel Warschofsky Spring 2021 - present
- Nima Aria Summer 2021 - present

Massachusetts Institute of Technology, Cambridge, MA

- Fouad Chahrouh (*Fullbright Fellow, Germany/Harvard*) 2018 - 2019
- Subhash Kantamneni (*RSI highschool student summer research*) Summer 2019,
Final Presentation ([Link](#))
- Xinmiao (Anna) Hu (*Undergraduate exchange summer research,* Summer 2019
Imperial College London/UK)

Summer School Lectures

MIT Undergraduate Research Opportunities Program students (UROP) 2017
"Introduction to Radiative Transfer in Stellar Atmospheres"

COMPETITIVELY AWARDED **Co-Investigator** - Subaru Telescope (1 full night total) 2022
"Searching for R-Process Enhancement in Canes Venatici II"

OBSERVING TIME **Co-Investigator** - Keck Telescope (0.5 nights total) 2021
"New Uranium Lines for Nucleocosmochronometry"

Principal Investigator - Gran Telescopio Canarias (50 hrs total) 2019-2020
"Characterizing r-process nucleosynthesis models of enhanced r-process stars"

Co-Investigator - Gran Telescopio Canarias (12 hrs total) 2019-2020
"Characterizing Extremely Metal Poor Stars from DESI"

Co-Investigator - McDonald Observatory 2.7 m Telescope (12 nights) 2019-2020
Co-Investigator - Hubble Space Telescope (GO-15951, 17 orbits) 2020-2022
"Testing r-process nucleosynthesis models with two r-process enhanced stars"

Co-Investigator - Hubble Space Telescope (GO-15657, 37 Orbits) 2019-2021
"HD 222925: A unique opportunity to study the full range of nuclei produced by a single r-process event"

Principal Investigator - Magellan Clay Telescope (>30 nights total) 2016-2019

“*Characterizing the population of r-process stars in the Galactic Halo*”
Co-Investigator - Magellan Clay Telescope (2 nights) 2018
 “*J0023–0307: A rare second-generation star with $[Fe/H] < -6$* ”
Co-Investigator - Magellan Clay Telescope (8 nights) 2016-2017
 “*Discovering the most metal-poor stars from the SkyMapper Survey*”
Co-Investigator - Hubble Space Telescope (GO-14151, 24 Orbits) 2015-2018
 “*Constraining Pop III supernova energies and the formation of the first low-mass stars with the iron-poor star HE 1327–2326*”

INVITED
 SCIENTIFIC
 TALKS

Invited Talk (*Virtual*) (*UF HiPerGator AI Symposium, 2022*)
Astronomy Seminar (*Virtual*) (*Uppsala University, Sweden, 2022*)
Colloquium (*Virtual*) (*University of Virginia, 2021*)
Astronomy Seminar (*Virtual*) (*Lebanese Astronomical Association, 2021*)
Astronomy Seminar (*Virtual*) (*Université Libre de Bruxelles, Belgium, 2021*)
Physics Colloquium (*Virtual*) (*High Altitude Observatory, CO, 2021, [Link](#)*)
AAS Journal author Youtube series (*Virtual*) (*2020, [Link](#)*)
Astrophysics Colloquium (*Virtual*) (*University of New South Wales Sydney, 2020*)
Astrophysics Colloquium (*Virtual*) (*Carnegie Observatories, CA, 2020, [Link](#)*)
Online Webinar (*Virtual*) (*JINA-CEE, [Link](#)*)
Astrophysics Colloquium (*Massachusetts Institute of Technology, MA, 2019*)
Astronomy Seminar (*Brandeis University, MA, 2019*)
Astronomy Seminar (*University of Texas A&M, TX, 2019*)
Astronomy Seminar (*University of Notre Dame, IN, 2019*)
Astrophysics Colloquium (*University of Florida, FL, 2019*)
Lunch Seminar (*Harvard CfA, ITC, MA, 2018*)
Astrophysics Seminar (*Pontifical Catholic University of Chile, Chile, 2018*)
Eleventh International Conference on Atomic and Molecular Data and Their Applications - (*Cambridge, MA, 2017*)
The Metal poor Galaxy Meeting - (*Ringberg, Germany, 2017*)
FRIB and the GW170817 kilonova - (*Lansing, MI, 2017*)
Physics Colloquium - (*American University of Beirut, Beirut, Lebanon, 2017*)
Stellar Astrophysics Seminar - (*University of Heidelberg, Germany, 2016*)
JINA-CEE online webinar - ([Link](#))
Astrophysics Seminar - (*Michigan State University, East Lansing, MI, 2016*)
Astrophysics Seminar - (*Université Libre de Bruxelles, Belgium, 2016*)

CONTRIBUTED
 SCIENTIFIC
 TALKS

CEMP stars as probes of First stars Nucleosynthesis - *Geneva, Switzerland*
JINA-CEE 2019 Frontiers meeting - *East Lansing, MI*
Galactic Archeology as time machines to the First stars - *Tokyo, Japan*
Cool stars 20 (*plenary session, [Link](#)*) - *Boston, MA, USA*
IAU symposium 334 1st prize poster award talk - *Potsdam, Germany*
JINA-CEE Frontiers meeting (Junior workshop) - *Lansing, MI, USA*
MIT Kavli Institute postdoc symposium - *MIT, Cambridge, MA*
JINA-CEE Frontiers meeting - *South Bend, IN*
The Milky Way’s History WE-Heraeus-Seminar - *Bad Honnef, Germany*
Annual meeting of the French Society of Astronomy & Astrophysics - *Montpellier, France*

PROFESSIONAL
ACTIVITIES

Conference Organizing Committees

SOC (chair) - <i>GTC Science meeting</i>	2022
SOC (member) - <i>Cool Stars 21 Machine Learning Splinter session</i>	2022
Working group organizer - <i>JINA-Horizons on Nuclear Astrophysics</i>	2021
LOC - <i>JINA-CEE frontiers meeting</i>	2019
LOC - <i>JINA-CEE frontiers meeting</i>	2018
LOC - <i>Cool stars 20</i>	2018

Panel Review Committees

External Reviewer - <i>Hubble Space Telescope</i>	2021-2022
Review Panelist - <i>NASA TCAN</i>	2020
External Reviewer - <i>NASA Postdoctoral Program</i>	2019-2020
Review Panelist - <i>Hubble Space Telescope Cycle 28</i>	2020
Review Panelist - <i>NASA Astrophysical Theory Program</i>	2019
Review Panelist - <i>Hubble Space Telescope Cycle 27</i>	2019
External Reviewer - <i>NASA FINESST</i>	2019
Reviewer - <i>Heising Simmons Physics Research Fellows, MIT</i>	2018
External Reviewer , <i>Canada-France-Hawaii Telescope</i>	2017

Publication Refereeing

2017-present

Astronomy & Astrophysics
Nature Astronomy
The Astrophysical Journal
Monthly Notices of the Royal Astronomical Society

Department and University Service

(*University of Florida*) -

Graduate Mentoring committee (chair)	present
GTC Users committee (member)	2020-present
Faculty Hiring committee (co-chair)	2021
Graduate Admission committee (member)	2020-2021

(*Massachusetts Institute of Technology*) -

Seminar organizer - <i>Brown Bag Lunch talk series, MIT</i>	2017-2019
Organizer - <i>Postdoc lunch series, MIT</i>	2016-2017
Co-Organizer - <i>MIT Independent Activities Period</i>	2017
Co-organizer - <i>MIT Kavli Institute postdoc symposium</i>	2016

OUTREACH &
SCIENCE
COMMUNICATION

Leading Roles

Co-creator, organizer - <i>Astronomy on Tap, Boston Series</i>	2017-present
Co-creator - <i>Lebanese Astronomical Society</i>	2020-present
Organizer - <i>Solar eclipse and astronomy day (France)</i>	2014
Co-creator - <i>Lebanese Astronomy group</i>	2006-present
Co-organizer - <i>Beirut Science Days</i>	2006-2012
Organizer - <i>International year of Astronomy 2009 (Lebanon)</i>	2009
Organizer - <i>100 hours of Astronomy (Lebanon)</i>	2009

Events/ Public Talks/ Media

Speaker - <i>World Space Week, Women in Space, Lebanon (virtual)</i>	2021
Panelist, Speaker - <i>STEM FOR HER Morocco workshop (virtual)</i>	2021
Panelist, Speaker - <i>Celebrating Lebanese Women in Astronomy (virtual)</i>	2021
Panelist - <i>JINA-Horizons Junior Workshop (virtual)</i>	2021
<i>“Transitioning to an assistant professor position”</i>	
Speaker, Lecturer - <i>Western Pines Middle Astronomy (virtual)</i>	2021
Speaker - <i>“Galactic Getaway“, Science in Every Florida School (virtual)</i>	2020
Panelist, Speaker - <i>Festival d’Astronomie de Fleurance (Fleurance, France)</i>	2020
<i>(virtual, Link)</i>	
Speaker - <i>Moon Shots: Apollo 11th 50th anniversary (MIT Museum)</i>	2019
<i>“Insights into the lives (and deaths) of the oldest stars”</i>	
Speaker - <i>“Exciting Astronomy Questions” (Tokyo, Japan)</i>	2018
Speaker - <i>Science Café (Beirut, Lebanon)</i>	2017
<i>“Where do elements in the Universe come from?”</i>	
Speaker - <i>Astronomy on Tap (Cambridge, MA)</i>	2017
<i>“How to find the oldest stars in the Universe?”</i>	
Speaker - <i>“How to become a scientist?” (Potomac High school MIT visit)</i>	2017
Speaker - <i>Astronomy on Tap (Boston, MA)</i>	2017
<i>“How is gold (and other heavy elements) made in stars?”</i>	

MEDIA & PRESS RELEASES

Podcastor - PBS NOVA NOW , <i>Interview w/ Dr. Alok Patel</i>	2021
<i>“How to make a Milky Way: the ultimate galactic recipe’ (Link)</i>	
BBC’s PBS NOVA documentary	Oct. 2021
<i>“Universe Unveiled: The Milky Way”, (Link)</i>	
BBC’s PBS NOVA documentary	Oct. 2021
<i>“Universe Unveiled: Age of Stars”, (Link)</i>	
Florida Museum of Natural History –	2020
<i>Indiana Jones of the Galaxy Teaches Students About the Wonders of the Night Sky</i>	
FOX 5 –	2019
<i>Evidence of 14B year-old ‘time machine’ star found 35,000 light-years from Earth</i>	
Pour La Science –	2019
<i>Des jets puissants pour la mort des premières étoiles</i>	
Science et Vie –	2019
<i>Astrophysique : l’explosion des premières étoiles a nourri l’Univers</i>	
Scientific American –	2019
<i>The Universe’s First Stars Exploded in Strange Ways</i>	
IPMU Press Release –	2019
<i>Explosions of universes first stars spewed powerful jets</i>	
SyfyWIRE –	2019
<i>When the first stars in the Universe exploded, they *really* exploded</i>	
Newsweek –	2019
<i>The Universe’s First Stars Exploded, Sending Out Powerful Jets That Produced New Ones</i>	
TechTimes –	2019
<i>First Stars In The Universe Were Short-Lived And Ejecting Giant Jets Of Matter</i>	
Astronomy Magazine –	2019
<i>The universe’s first supernovae spewed jets of material into nearby galaxies</i>	
MIT Press Release –	2019
<i>Explosions of universes first stars spewed powerful jets</i>	
“Cosmic Front: Next Generation” documentary series - Interviewee	2017

LANGUAGES

Arabic (native): read, written, spoken
English (quadrilingual): read, written, spoken
French (quadrilingual): read, written, spoken
German (quadrilingual): read, written, spoken
Spanish (intermediate): read and spoken

LIST OF PUBLICATIONS

Full list of publications can be accessed at the links below:

- 35 total, 9 first and second author, 20 co-authored publications, 6 proceeding and white papers
- NASA ADS ([Link](#)) citations = 452, h-index= 12
- Google Scholar ([Link](#)) citations = 506, h-index= 14, i10-index=16

9 First and Second author published and submitted papers

(asterisk denotes papers written with underlined Graduate or Undergraduate students)

- 9- Kowkabany J., Ezzeddine R., Charbonnel, C., Hackshaw Z. et al. 2022, **In prep.** - “*Discovery of an Ultra Li-rich Red Giant Metal-poor Star*”*
- 8- Hackshaw Z., Ezzeddine R., Kowkabany J., Shah S., et al. 2022, **In prep.** - “*The R-Process Alliance : Evidence of accretion of a highly enhanced r-process star from a satellite of the LMC*”*
- 7- Li Y., Ezzeddine R., 2022 **ApJ submitted** - “*LOTuS: a non-LTE Optimizing Tool for derivations of atmospheric Stellar parameters*”*
- 6- Ezzeddine R., Rasmussen K., Chiti A., Frebel A., et al. 2020, **ApJ**, 898, 150E - “*The R-Process Alliance : High resolution Magellan/MIKE data release from the Southern search for r-process enhanced stars in the Galactic Halo*”*
- 5- Ezzeddine R., Frebel A., Roederer I. U., Tominaga T., Tumlinson J., Ishigaki M., Nomoto K., Placco V. M., Aoki W., 2019, **ApJ**, 876, 97E - “*Evidence for an aspherical Population III supernova explosion inferred from the Hyper-Metal-Poor star HE 1327–2326*”
- 4- Ezzeddine, R., Merle T., Plez, B. et al. 2018, **A&A**, 618, A141 - “*An empirical recipe for inelastic hydrogen-atom collisions in non-LTE calculations*”
- 3- Ezzeddine R. & Frebel A., 2018, **ApJ**, 863, 168E - “*Revisiting the Iron Abundance in the Hyper Iron-poor Star HE 1327–2326 with UV COS/HST Data*”
- 2- Ezzeddine R., Frebel A. and Plez B., 2017, **ApJ**, 847, 142E - “*Ultra-metal-poor Stars: Spectroscopic Determination of Stellar Atmospheric Parameters Using Iron Non-LTE Line Abundances*”
- 1- Ezzeddine R., Merle T. and Plez B., 2016, **AN**, 337, 850E - “*Non-LTE iron abundances in cool stars: The role of hydrogen collisions*”

co-Authored papers

- 20- Roederer I., Lawler J., Den Hartog E., Placco V., Surman R., Beers, T., **Ezzeddine R.**, et al. 2022 **ApJ** **accepted** - “*The R-Process Alliance: A Nearly Complete R-Process Abundance Template Derived from Ultraviolet Spectroscopy of the R-Process-Enhanced Metal-Poor Star HD 222925*”
- 19- Judge P., Rempel M., **Ezzeddine, R.**, Kleint L., Egeland, R. et al., 2021, **ApJ**, 917, 27J - “*Measuring the magnetic origins of solar flares, CMEs and Space Weather*”
- 18- Gudin D., Shank D., Beers T., including **Ezzeddine, R.**, 2021, **ApJ**, 908, 79G - “*The R-Process Alliance: Chemodynamically Tagged Groups of Halo r-process-enhanced Stars Reveal a Shared Chemical-evolution History*”
- 17- Roederer I. U., Lawler, J., Holmbeck, E., Beers, T., **Ezzeddine, R.** et al., 2020, **ApJ**, 902L, 24R - “*Detection of Pb II in the Ultraviolet Spectra of Three Metal-poor Stars* ”
- 16- Holmbeck, E. M., Hansen, T. T. et al. including Ezzeddine, R., 2020, **ApJS**, 249, 30H - “*The R-Process Alliance: Fourth Data Release from the Search for R-process-enhanced Stars in the Galactic Halo*”
- 15- Rasmussen K.C., Frebel A., **Ezzeddine R.**, Ji A.P., Chiti A, Beers T., Hansen T.T., Placco V.M., Roederer I.U., Sakari C., **ApJ** submitted - “*The R-Process Alliance: A Uranium abundance measurement in the r-I star BD+17° 3248*”
- 14- Cain M., Frebel A. , Ji A.P., Placco V. M., **Ezzeddine R.**, Roederer I. U., Hattori K., Beers T., Meléndez J., Hansen, T., Sakari C., 2020, **ApJ**, 898, 40C - “*The R-Process Alliance: J1521–3538, A very metal-poor extremely r-process enhanced star with $[Eu/Fe] = +2.2$, and the class of r-III stars*”
- 13- Placco, V. M., Santucci, R. M. et al. including **Ezzeddine, R.**, 2020, **ApJ**, 897, 78P - “*The R-process Alliance: The Peculiar Chemical Abundance Pattern of RAVE J183013.5–455510*”
- 12- Nidever, D. L., Price-Whelan, A. M., Choi, Y.; Beaton, R. L., Hansen, T. T., Boubert, D., Aguado, D., **Ezzeddine R.**, Oh, S., Evans, N. W., 2019, **ApJ**, 887, 115N - “*Spectroscopy of the Young Stellar Association Price-Whelan 1: Origin in the Magellanic Leading Arm and Constraints on the Milky Way Hot Halo*”
- 11- Nordlander T., Bessell M.S., Da Costa G.S., Mackey A.D., Asplund M., Casey A.R., Chiti A, **Ezzeddine R.**, Frebel A., Lind K., Marino A.F., Murphy S.J., Norris J.E., Schmidt B.P. and Yong D., **MNRAS**, 488L, 109N - “*The lowest detected stellar Fe abundance: The halo star SMSS J160540.18–44323.1*”
- 10- Sitnova T., Mashonkina L., **Ezzeddine R.**, Frebel A. 2019, **MNRAS**, 485, 3527S - “*Ultra metal-poor stars: improved atmospheric parameters and NLTE abundances of magnesium and calcium*”
- 9- Sakari C., Roederer I., Placco V., Beers T., **Ezzeddine R.** et al. 2019, **ApJ**, 874, 148S - “*The R-Process Alliance : Discovery of a low α , r-process enhanced metal-poor star in the Galactic halo*”
- 8- Frebel A., Ji, A., **Ezzeddine R.**, et al. 2019, **ApJ**, 871, 146F - “*Chemical abun-*

dance Signature of J0023+0307 – A Second-Generation Main-Sequence Star with $[Fe/H] < -6$

7- Placco V. M et al. including **Ezzeddine, R.** 2019, **ApJ**, 870, 122P - “*The R-Process Alliance: Spectroscopic Follow-up of 857 Low-Metallicity Star Candidates from the Best & Brightest Survey*”

6- Sakari C., Placco V., Farrell E., Roederer I., Wallerstein G., Beers T., **Ezzeddine R.** et al. 2018, **ApJ**, 68, 110S - “*The R-Process Alliance: First Release from the Northern Search for r-Process Enhanced Metal-Poor Stars in the Galactic Halo*”

5- Roederer I., Sakari C., Placco, V., Beers, T., **Ezzeddine, R.** et al. 2018, **ApJ**, 865, 129R - “*The R-Process Alliance: A Comprehensive Abundance Analysis of HD 222925, a Metal-Poor Star with an Extreme R-Process Enhancement of $[Eu/H] = -0.14$* ”

4- Cain M., Frebel A., Gull M., Ji A., Placco V., Beers T., Meléndez J., **Ezzeddine R.**, et al. 2018, **ApJ**, 864, 43C - “*The R-Process Alliance: Chemical Abundances for a Trio of r-process-enhanced Stars One Strong, One Moderate, and One Mild*”

3- Gull, M., Frebel A., Cain M., Placco V., Ji A., Abate C., **Ezzeddine R.** et al. 2018, **ApJ**, 862, 174G - “*The R-Process Alliance: Discovery of the First Metal-poor Star with a Combined r- and s-process Element Signature*”

2- Placco V., Holmbeck E., Frebel A., Beers T., Surman R., Ji A., **Ezzeddine R.** 2017, **ApJ**, 844, 18P - “*RAVE J203843.2-002333: The First Highly R-process-enhanced Star Identified in the RAVE Survey*”

1- Ji A., Frebel A., **Ezzeddine R.** & A. Casey, 2017, **ApJ**, 832L, 3J - “*Chemical Diversity in the Ultra-faint Dwarf Galaxy Tucana II*”

PROCEEDING &
WHITE PAPER
PUBLICATIONS

6- Schatz H. incl. **Ezzeddine, Rana** et al. - **White paper** on the status of Nuclear Astrophysics in prep. to be submitted to the AAS Journal of Physics - “*Horizons: Nuclear Astrophysics in the 2020s and Beyond*”

5- Roederer I. U., Beers T. C., **Ezzeddine, Rana** et al., **Astro2020: Decadal Survey on Astronomy and Astrophysics**, 2019, Vol. 51, Issue 3, id. 136 - “*The astrophysical r-process and the origin of the heaviest elements*”

4- Aprahamian A. et al. including **Ezzeddine R.**, 2018, Proceedings for the FRIB Theory Alliance workshop, arXiv:1809.00703 - “*FRIB and the GW170817 kilonova*”

3- **Ezzeddine R.**, Sitnova T., Frebel A., Mashonkina L., Plez B., 2018, IAU symposium 334 Conference proceeding, 259E - “*Mega (metal-poor) not so much: Non-LTE spectroscopic stellar parameters and abundance determination of Ultra metal-poor stars*”

2- **Ezzeddine, R.**, Merle T. & Plez B., 2013, “New Advances in Stellar Physics: From Microscopic To Macroscopic Processes” EAS conference proceedings, 63, 407E - “*NLTE Iron abundance determination in Red Giants*”

1- **Ezzeddine, R.**, Merle T., Plez B., 2013, Proceedings of the Annual meeting of the French Society of Astronomy and Astrophysics, 119E - “*Non-LTE Iron abundance determination of a sample of Kepler Red Giants*”