Thea **Kozakis**

Astrophysicist · Astrobiologist

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"Imagination will often carry us to worlds that never were, but without it we go nowhere." - Carl Sagan

Education & Academic Positions

Postdoctoral Researcher — *Granada, Spain*

Instituto de Astrofísica de Andalucía — *October 2024- present*

- Severo Ochoa Postdoctoral Fellow
- *Supervisor:* Luisa M. Lara
- *Main topic:* atmospheric modeling of Earth-like planets with variations in oxygen and biological fluxes

Postdoctoral Researcher — *Lyngby, Denmark*

National Space Institute, Technical University of Denmark — *September 2020 - March 2024**

- Postdoctoral fellowship with Exoplanet Group
- *Supervisors:* João M. Mendonça and Lars A. Buchhave
- *Main topic:* atmospheric modeling of Earth-like planets with variations in oxygen

PhD Astrophysics — *Ithaca, New York, USA*

Carl Sagan Institute, Cornell University — *August 2020*

- *Supervisor:* Lisa Kaltenegger
- *Thesis title:* Last Call For Life: Habitability of Terrestrial Planets Orbiting Red Giants and White Dwarfs

MS Astrophysics — *Ithaca, New York, USA*

Carl Sagan Institute, Cornell University — *May 2017*

- Partially funded by New York Space Grant
- *Supervisors:* James Lloyd and Lisa Kaltengger
- *Main topics:* UV observations of Kepler field stars, modeling of Earth-like atmospheres around different host stars

BS Astrophysics, BS Physics — *Charleston, South Carolina, USA*

College of Charleston — *May 2013*

- *Minor:* Mathematics
- *Supervisor:* Joseph Carson
- *Thesis title:* Directly Imaging Exoplanets Around High-Mass Stars

**Official medical leave from June 2023 - September 2024*

Areas of expertise

impacts of stellar host spectrum on planetary composition; climate/photochemistry modeling of planetary atmospheres; simulation of transmission/reflected light/emission planetary spectra; ozone formation and destruction; habitable zone modeling; red giant planetary systems; white dwarf planetary systems; UV photometry; direct imaging of exoplanets/disks

Publications

J. L. Grenfell, ... **T. Kozakis**, et al. 2025, *Detectability of Atmospheric Climate and Biosignatures with the Large Interferometer for Exoplanets (LIFE) for terrestrial-type Exoplanets*, Monthly Notices of the Royal Astronomical Society, staf1878
DOI: 10.1093/mnras/staf1878

T. Kozakis, J. M. Mendonça, L. A. Buchhave, L. M. Lara, 2025, *Is ozone a reliable proxy for molecular oxygen? III. The impact of CH_4 on the O_2-O_3 relationship for Earth-like atmospheres*, Astronomy & Astrophysics, 701, A254
DOI: 10.1051/0004-6361/202556015

T. Kozakis, J. M. Mendonça, L. A. Buchhave, L. M. Lara, 2025, *Is ozone a reliable proxy for molecular oxygen? II. The impact of N_2O on the O_2-O_3 relationship for Earth-like atmospheres*, Astronomy & Astrophysics, 699,

A247
DOI: 10.1051/0004-6361/202555289

G. L., Villanueva, ... **T. Kozakis**, et al. 2024, *Modeling Atmospheric Lines by the Exoplanet Community (MALBEC) Version 1.0: A CUISINES Radiative Transfer Intercomparison Project*, Planetary Science Journal, 5, 64
DOI: 10.3847/PSJ/ad2681

T. Kozakis, J. M. Mendonça, L. A. Buchhave, 2022, *Is ozone a reliable proxy for molecular oxygen? I. The O_2-O_3 relationship for Earth-like atmospheres*, Astronomy & Astrophysics, 665, A156
DOI: 10.1051/0004-6361/202244164

S. P., Quanz, ... **T. Kozakis**, et al. 2022, *Large Interferometer For Exoplanets (LIFE). I. Improved exoplanet detection yield estimates for a large mid-infrared space-interferometer mission*, Astronomy & Astrophysics, 664, A21
DOI: 10.1051/0004-6361/202140366

Z. Lin, S. Seager, S. Ranjan, **T. Kozakis**, & L. Kaltenegger, 2022, *H_2-dominated Atmosphere as an Indicator of Second-generation Rocky White Dwarf Exoplanets*, Astrophysical Journal Letters, 925, L10
DOI: 10.3847/2041-8213/ac4788

T. Kozakis & L. Kaltenegger, 2020, *High resolution Spectra of Earth-Like Planets Orbiting Red Giant Host Stars*, Astronomical Journal, 160, 225
DOI: 10.3847/1538-3881/abb9ac

L. Kaltenegger, R. J. MacDonald, **T. Kozakis**, et al., 2020, *The White Dwarf Opportunity: Robust Detections of Molecules in Earth-like Exoplanet Atmospheres with the James Webb Space Telescope*, Astrophysical Journal Letters, 901, L1
DOI: 10.3847/2041-8213/aba9d3

T. Kozakis, Z. Lin, L. Kaltenegger, 2020, *Planetary Spectra and Biosignatures of Earth-like Planets Orbiting in the White Dwarf Habitable Zone*, Astrophysical Journal Letters, 894, L6
DOI: 10.3847/2041-8213/ab6f6a

T. Kozakis & L. Kaltenegger, 2019, *Atmospheres and UV Environments of Earth-like Planets throughout Post-main-sequence Evolution*, Astrophysical Journal, 875, 99
DOI: 10.3847/1538-4357/ab11d3

T. Kozakis, L. Kaltenegger, & D.W. Hoard, 2018, *UV Surface Environments and Atmospheres of Earth-like Planets Orbiting White Dwarfs*, Astrophysical Journal, 862, 69
DOI: 10.3847/1538-4357/aacbc7

T. Boyajian, ... **T. Kozakis**, et al., 2016, *Planet Hunters X. KIC 8462852: Where's the flux?*, Monthly Notices of the Royal Astronomical Society, 457, 3988
DOI: 10.1093/mnras/stw218

J. Carson, C. Thalmann, M. Janson, **T. Kozakis**, et al., 2013, *Direct Imaging Discovery of a 'Super-Jupiter' Around the late B-Type Star κ And*, Astrophysical Journal Letters, 763, 32
DOI: 10.1088/2041-8205/763/2/L32

Academic Honors & Grants

2026 **Marie Skłodowska-Curie Actions Seal of Excellence**, European Comission — *Instituto de Astrofísica de Andalucía*

2024-2026 **Severo Ochoa Postdoctoral Grant**, IAA-CSIC Severo Ochoa Center — *Instituto de Astrofísica de Andalucía*

2019 **NASA New York Space Grant**, NASA New York Space Grant Consortium — *Cornell University*

2016 **Eleanor York Prize for Academic and Outreach Excellence**, Astronomy and Space Sciences Department — *Cornell University*

2015 **Exemplary Poster Award**, Emerging Researchers in Exoplanet Science Symposium — *Pennsylvania State University*

2013-2014 **NASA New York Space Grant**, NASA New York Space Grant Consortium — *Cornell University*

2014, 2015 **NSF Graduate Fellowship Honorable Mention**, National Science Foundation — *Cornell University*

2013 **Outstanding Undergraduate Research Award**, South Carolina Academy of Science — *College of Charleston*

2013 **Department Honors Award**, Department of Physics & Astronomy — *College of Charleston*

2013 **Outstanding Student Award**, School of Sciences and Mathematics — *College of Charleston*

2012 **Major Academic Year Support Grant**, School of Sciences and Mathematics — *College of Charleston*

2012 **Summer Undergraduate Research with Faculty Grant**, School of Sciences and Mathematics — *College of Charleston*

2012 **Goldwater Scholarship Honorable Mention**, Scholarship & Excellence in Education Foundation — *College of Charleston*

Presentations

Science and Technology for the Era of LIFE, talk — *Barçelona, Spain*

Exploring ozone as a replacement for molecular oxygen in mid-IR biosignature searches — *November 2025*

Exoclimes VII, poster — *Université de Montréal, Canada*

Is ozone a reliable proxy for molecular oxygen? — *July 2025*

IAA Seminar Series, talk — *Instituto de Astrofísica de Andalucía, Spain*

Is ozone a reliable proxy for molecular oxygen? — *November 2024*

Biennial European Astrobiology Conference, poster — *La Palma, Spain*

Is ozone a reliable proxy for molecular oxygen? — *May 2023*

Exoplanets & Habitability Seminar Series, invited talk — *Zurich, Swtizerland (online)*

Is ozone a reliable proxy for molecular oxygen? — *March 2023*

Europlanet Science Congress, talk — *Granada, Spain*

Is ozone a reliable proxy for molecular oxygen? — *September 2022*

MPIA-APEx Exocoffee, invited talk — *Heidelberg, Germany (online)*

Is ozone a reliable proxy for molecular oxygen? — *September 2022*

Latsis Origins of Life Symposium, talk — *Zurich, Switzerland*

Is ozone a reliable proxy for molecular oxygen? — *September 2022*

CHAMELEON retreat, invited talk — *Copenhagen, Denmark*

Is ozone a reliable proxy for molecular oxygen? — *September 2022*

Danish Annual Astronomy Meeting, talk — *Fredericia, Denmark*

Is ozone a reliable proxy for molecular oxygen? — *May 2022*

Astrobiology Science Conference, talk — *Atlanta, Georgia, USA*

Is ozone a reliable proxy for molecular oxygen? — *May 2022*

Exoplanets IV, poster — *Las Vegas, Nevada, USA*

Is ozone a reliable proxy for molecular oxygen? — *May 2022*

Cambridge Exoplanet Seminar, invited talk — *Cambridge University, Cambridge, UK (online)*

Life After (Stellar) Death: Habitability Around White Dwarfs — *June 2021*

Annual Danish Astronomy Meeting, talk — *Online*

Life After (Stellar) Death: Habitability Around White Dwarfs — *May 2021*

STScI Exoplanets, Star and Planet Formation Seminar, invited talk — *Space Telescope Science Institute, Maryland, USA (online)*

Life After (Stellar) Death: Habitability Around White Dwarfs — *May 2021*

Valparaiso University Physics & Astronomy Colloquium, invited talk — *Valparaiso University, Valparaiso, Indiana, USA (online)*

Life After (Stellar) Death: Habitability Around White Dwarfs — *March 2021*

AAS Winter Meeting, talk — *Online*

Life After (Stellar) Death: Habitability Around White Dwarfs — *January 2021*

MIT Exoplanet Tea, invited talk — *MIT, Cambridge, Massachusetts, USA (online)*

Life After (Stellar) Death: Habitability Around White Dwarfs — *October 2020*

Exoplanets III, talk — *Heidelberg, Germany (online)*

Life After (Stellar) Death: Atmospheres and Biosignatures of Earth-like Planets Orbiting in the Habitable Zones of White Dwarfs — *July 2020*

AAS Winter Meeting, dissertation talk — *Honolulu, Hawai'i, USA*

Planetary Habitability and Biosignatures Throughout Stellar Evolution — *January 2020*

Extreme Solar Systems IV, poster — *Reykjavík, Iceland*

Dying to Live: Post-Main Sequence Habitability — *August 2019*

Exoclimes V, poster — *University of Oxford, Oxford, UK*

Dying to Live: Post-Main Sequence Habitability — *August 2019*

Astrobiology Graduate Conference, talk — *Salt Lake City, Utah, USA*

Atmospheres and UV Environments of Planets Throughout Post-Main Sequence Evolution — *July 2019*

Emerging Researchers in Exoplanet Science Symposium, talk — *Cornell University, Ithaca, New York, USA*

Atmospheres and UV Environments of Planets Throughout Post-Main Sequence Evolution — *June 2019*

AAS Winter Meeting, talk — *Seattle, Washington, USA*

Habitability of Post-Main Sequence Planetary Systems — *January 2019*

Planetary Lunch Talk Series, talk — *Cornell University, Ithaca, New York, USA*

Life After (Stellar) Death: Habitability Around White Dwarfs — *August 2018*

Graduate Student/Post-Doctorate Seminar, talk — *Cornell University, Ithaca, New York, USA*

Dying to Live: Post-Main Sequence Habitability — *August 2018*

Cool Stars 20, poster — *Boston, Massachusetts, USA*

Atmospheres and UV Ground Environment for Planets Orbiting Red Giants — *August 2018*

University of St Andrews, invited talk — *University of St Andrews, St Andrews, UK*

UV Surface Environments and Atmospheres of Earth-like Planets Orbiting White Dwarfs — *July 2018*

University of Edinburgh, invited talk — *University of Edinburgh, Edinburgh, UK*

UV Surface Environments and Atmospheres of Earth-like Planets Orbiting White Dwarfs — *July 2018*

Exoplanets II, poster — *Cambridge University, Cambridge, UK*

UV Surface Environments and Atmospheres of Earth-like Planets Orbiting White Dwarfs — *July 2018*

Graduate Student/Post Doctorate Seminar, talk — *Cornell University, Ithaca, New York, USA*

Do You Believe in Life After (Stellar) Death?: White Dwarf Habitability — *June 2018*

Emerging Researchers in Exoplanet Science Symposium, poster — *Pennsylvania State University, State College, Pennsylvania, USA*

Atmospheres and UV Ground Environment for Planets Orbiting Red Giants — *June 2018*

Emerging Researchers in Exoplanet Science Symposium, talk — *Pennsylvania State University, State College, Pennsylvania, USA*

Biosignatures and UV Environments of Earth-Like Planets Orbiting White Dwarfs — *June 2017*

Astrobiology Graduate Conference, talk — *Charlottesvile, Virginia, USA*

Biosignatures and UV Environments of Earth-Like Planets Orbiting White Dwarfs — *June 2017*

Astrobiology Science Conference, poster — *Mesa, Arizona, USA*

Biosignatures and UV Environments of Earth-Like Planets Orbiting White Dwarfs — *April 2017*

Astrobiology Science Conference, poster — *Chicago, Illinois, USA*

Age Rotation-Activity Relationship of Kepler Field Stars — *June 2015*

Emerging Researchers in Exoplanet Science Symposium, poster — *Pennsylvania State University, State College, Pennsylvania, USA*

Age Rotation-Activity Relationship of Kepler Field Stars — *May 2015*

South Carolina Academy of Science Conference, talk — *Columbia, South Carolina, USA*

Direct Imaging Discovery of a 'Super-Jupiter' Around a Late B-Type Star — *April 2013*

AAS Winter Meeting, poster — *Long Beach, California, USA*

The Subaru SEEDS Imaging Search for Exoplanets Around High-Mass Stars — *January 2013*

AAS Winter Meeting, poster — *Austin, TX, USA*

The Subaru SEEDS Imaging Search for Exoplanets Around High-Mass Stars — *January 2012*

Teaching

Teaching Assistant: From New Worlds to Black Holes — *Cornell University, Ithaca, NY, USA*

Lecturer: Dr Lisa Kaltenegger — *Fall 2015 (Head TA), 2018*

Team of 6 teaching assistants, total class ~200 students, recitation sections: ~60 students

- Introductory astronomy class focusing on the Universe as a whole
- Organized other teaching assistants, managed course website, and dealt with logistical issues
- Assisted in writing and grading homework assignments and exams
- Taught recitation sections and held office hours

Teaching Assistant: Our Solar System — *Cornell University, Ithaca, NY, USA*

Lecturers: Drs Steve Squyres and Phil Nicholoson — *Spring 2015*

Team of 6 teaching assistants, total class ~250 students, recitation sections: ~40 students

- Introductory astronomy class focusing on the Solar System
- Taught recitation sections and lab sections and held office hours
- Assisted in writing and grading homework assignments and exams

Teaching Assistant: A Spacecraft Tour of the Solar System: Science, Policy and Exploration — *Cornell University, Ithaca, NY, USA*

Lecturer: Dr Alexander Hayes — *Fall 2014*

~30 students

- Writing class focused on exploration of the Solar System
- Assisted in teaching students how to write popular science articles
- Graded written work and gave feedback and held office hours
- Managed course website

Teaching Assistant: Introductory Astronomy Lab — *College of Charleston, SC USA*

Lab Manager: Christopher True — *Fall 2010-Spring 2011*

~40 students

- Introductory astronomy class
- Assisted instructor in running labs and teaching the students
- Set up telescopes and taught students how to operate them

Physics Lab Manager's Assistant

College of Charleston, SC USA

Lab Manager: Kathleen Low

Fall 2009-Spring 2013

Labs per week: ∼10, students tutored each week: 5-10

- Held office hours for students in introductory physics classes
- Helped prepare equipment for physics labs and assist lab instructors
- Organized lab materials and equipment

Selected Outreach

Kvinder i Fysik (*English: Woman in Physics*)

Denmark

Board member

October 2021-2023

∼10 board members total

- Representative of Denmark's women in physics society
- Attend board meetings and assist in decisions for women in physics events
- Coordinated social media posts highlighting women in physics
- Helped organize film series at Copenhagen theater to showcase women in science

Astronomy on Tap - Copenhagen chapter

Copenhagen, Denmark

Organizing team/speaker

2021-2022

Team of ∼10 organizers, ∼6 events per year, ∼40 attendees per event, typically ages 20-40

- Monthly outreach event where professional astronomers give public talks in a local pub
- Planned event themes and invited relevant speakers
- Helped facilitate/host events and ensured that speakers had proper equipment and addressing problems as they arose

Expanding Your Horizons

Cornell University, Ithaca, NY, USA

Workshop designer/organizer

2015-2020

Team of ∼10 volunteers, ∼40 attendees yearly, ages 12-16

- Yearly outreach event attended by middle school girls from New York to learn about the different STEM fields
- Part of the original astronomy workshop design team, team leader for the past 2 years
- Wrote yearly applications for event approval, recruit/train volunteers and run event

Mental Health Counselor Training (EARS)

Ithaca, NY, USA

Certified mental health counselor/trainer

2015-2020

Team of ∼10 trainers, weekly training sessions during academic year, ∼150 trainees total for lectures, ∼10-15 trainees for individual small group training

- Semester long training offered by EARS (Empathy Assistance and Referral Service), a walk-in mental health counseling program
- Give presentations on empathetic listening and communication skills to Cornell students of all levels
- Small group teaching of Cornell graduate students and post doctoral researchers skills of mental health counseling

Cornell's Ask an Astronomer

Ithaca, NY, USA

Team member

2013-2020

Team of ∼20 volunteers, ∼2-4 questions answered per month

- Answered questions from the general public submitted to Cornell's Ask an Astronomer webpage
- Helped update the website with new question answers
- Recruited new team members

Museum in the Dark

Ithaca, NY, USA

Organizer

2014-2017

Team of ∼15 volunteers, ∼150-200 attendees yearly of all ages

- Halloween-themed outreach event at a local museum with astronomy related demos
- Liaison between the museum and the astronomy department
- Recruited/trained volunteers to run science demos and obtained/organized all materials for the event

4-H Focus for Teens Workshop

Cornell University, Ithaca, NY, USA

Organizer

2014-2017

Team of ∼10 volunteers, ∼20 students yearly, ages 14-18

- Summer outreach event for high school students in the New York 4-H program to attend STEM related workshops
- Helped design/modify the 3 day workshop
- Visited local schools to teach about astronomy/being an astronomer

Astronomy night — *College of Charleston, SC, USA*

Organizer — *2010-2013*

Team of ∼15 volunteers, ∼6 events per year, ∼100-200 attendees per event of all ages

- Helped organize monthly event where the general public could visit the observatory
- Set up/ran physics and astronomy demonstration
- Recruited/trained new volunteers

Astronomy Graduate Network — *Cornell University, Ithaca, NY, USA*

Fall 2014 - Spring 2015 (Vice President), Fall 2015 - Spring 2016 (Treasurer) — *2013-present*

Total members: ∼30

- Organized meetings and social events to foster community in the astronomy department
- Handled organization finances and wrote yearly budgets
- Part of Cornell's Ask an Astronomer Team answering weekly questions from the general public
- Volunteered at local schools to teach about careers in astronomy and STEM

Computer Skills

Programming Languages Expert with Python, proficient with IDL and Bash, comfortable with Fortran and HTML

Operating Systems Skilled with Linux, Windows, and MAC OS X

Tools and Systems Expert with LaTeX and Mathematica, familiar with ArcGIS

Academic Service

Organizer — *Instituto de Astrofísica de Andalucía*

IAA Seminar Series — *June 2025 - present*

SOC — *Fredericia, Denmark*

Annual Danish Astronomy Meeting — *June 2023*

Organizer — *Technical University of Denmark*

Astronomy & Astrophysics Seminar — *September 2021 - June 2023*

SOC/session chair — *Fredericia, Denmark*

Annual Danish Astronomy Meeting — *May 2022*

SOC/VOC/session chair — *Online*

Emerging Researchers in Exoplanet Science Symposium — *June 2021*

Session chair — *Online*

AAS Winter Meeting — *January 2021*

Session chair — *Honolulu, Hawai'i*

AAS Winter Meeting — *January 2020*

SOC/LOC/session chair — *Cornell University*

Emerging Researchers in Exoplanet Science Symposium — *June 2019*

SOC/session chair — *Yale University*

Emerging Researchers in Exoplanet Science Symposium — *June 2017*

SOC/LOC/session chair — *Cornell University*

Emerging Researchers in Exoplanet Science Symposium — *June 2016*

Organizer — *Cornell University*

Cornell Planetary Lunch Seminar — *August 2015 - May 2016*

Reviewer

Nature Astronomy

Reviewer

Astronomy & Astrophysics

Reviewer

Royal Society Open Science, Astrophysical Journal