

# 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

INSTITUTO DE ASTROFÍSICA DE ANDALUCÍA

Granada, Spain

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

NATIONAL SPACE INSTITUTE, TECHNICAL UNIVERSITY OF DENMARK

Lyngby, 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

CARL SAGAN INSTITUTE, CORNELL UNIVERSITY

Ithaca, New York, USA

August 2020

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

### MS Astrophysics

CARL SAGAN INSTITUTE, CORNELL UNIVERSITY

Ithaca, New York, USA

May 2017

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

### BS Astrophysics, BS Physics

COLLEGE OF CHARLESTON

Charleston, South Carolina, USA

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<sub>4</sub> on the O<sub>2</sub>-O<sub>3</sub> 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<sub>2</sub>O on the O<sub>2</sub>-O<sub>3</sub> 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, 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

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  $\kappa$  And*, Astrophysical Journal Letters, 763, 32, DOI: 10.1088/2041-8205/763/2/L32

## Academic Honors & Grants

2026	<b>Marie Skłodowska-Curie Actions Seal of Excellence</b> , European Commission	Instituto de Astrofísica de Andalucía
2024-2026	<b>Severo Ochoa Postdoctoral Grant</b> , IAA-CSIC Severo Ochoa Center	Instituto de Astrofísica de Andalucía
2019	<b>NASA New York Space Grant</b> , NASA New York Space Grant Consortium	Cornell University
2016	<b>Eleanor York Prize for Academic and Outreach Excellence</b> , Astronomy and Space Sciences Department	Cornell University
2015	<b>Exemplary Poster Award</b> , Emerging Researchers in Exoplanet Science Symposium	Pennsylvania State University
2013-2014	<b>NASA New York Space Grant</b> , NASA New York Space Grant Consortium	Cornell University
2014, 2015	<b>NSF Graduate Fellowship Honorable Mention</b> , National Science Foundation	Cornell University
2013	<b>Outstanding Undergraduate Research Award</b> , South Carolina Academy of Science	College of Charleston
2013	<b>Department Honors Award</b> , Department of Physics & Astronomy	College of Charleston
2013	<b>Outstanding Student Award</b> , School of Sciences and Mathematics	College of Charleston
2012	<b>Major Academic Year Support Grant</b> , School of Sciences and Mathematics	College of Charleston
2012	<b>Summer Undergraduate Research with Faculty Grant</b> , School of Sciences and Mathematics	College of Charleston
2012	<b>Goldwater Scholarship Honorable Mention</b> , Scholarship & Excellence in Education Foundation	College of Charleston

# Presentations

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## Science and Technology for the Era of LIFE, talk

EXPLORING OZONE AS A REPLACEMENT FOR MOLECULAR OXYGEN IN MID-IR BIOSIGNATURE SEARCHES

Barcelona, Spain

November 2025

## Exoclimes VII, poster

IS OZONE A RELIABLE PROXY FOR MOLECULAR OXYGEN?

Université de Montréal, Canada

July 2025

## IAA Seminar Series, talk

IS OZONE A RELIABLE PROXY FOR MOLECULAR OXYGEN?

Instituto de Astrofísica de Andalucía, Spain

November 2024

## Biennial European Astrobiology Conference, poster

IS OZONE A RELIABLE PROXY FOR MOLECULAR OXYGEN?

La Palma, Spain

May 2023

## Exoplanets & Habitability Seminar Series, invited talk

IS OZONE A RELIABLE PROXY FOR MOLECULAR OXYGEN?

Zurich, Switzerland (online)

March 2023

## Europlanet Science Congress, talk

IS OZONE A RELIABLE PROXY FOR MOLECULAR OXYGEN?

Granada, Spain

September 2022

## MPIA-APEX Exocoffee, invited talk

IS OZONE A RELIABLE PROXY FOR MOLECULAR OXYGEN?

Heidelberg, Germany (online)

September 2022

## Latsis Origins of Life Symposium, talk

IS OZONE A RELIABLE PROXY FOR MOLECULAR OXYGEN?

Zurich, Switzerland

September 2022

## CHAMELEON retreat, invited talk

IS OZONE A RELIABLE PROXY FOR MOLECULAR OXYGEN?

Copenhagen, Denmark

September 2022

## Danish Annual Astronomy Meeting, talk

IS OZONE A RELIABLE PROXY FOR MOLECULAR OXYGEN?

Fredericia, Denmark

May 2022

## Astrobiology Science Conference, talk

IS OZONE A RELIABLE PROXY FOR MOLECULAR OXYGEN?

Atlanta, Georgia, USA

May 2022

## Exoplanets IV, poster

IS OZONE A RELIABLE PROXY FOR MOLECULAR OXYGEN?

Las Vegas, Nevada, USA

May 2022

## Cambridge Exoplanet Seminar, invited talk

LIFE AFTER (STELLAR) DEATH: HABITABILITY AROUND WHITE DWARFS

Cambridge University, Cambridge, UK

(online)

June 2021

## Annual Danish Astronomy Meeting, talk

LIFE AFTER (STELLAR) DEATH: HABITABILITY AROUND WHITE DWARFS

Online

May 2021

## STScI Exoplanets, Star and Planet Formation Seminar, invited talk

LIFE AFTER (STELLAR) DEATH: HABITABILITY AROUND WHITE DWARFS

Space Telescope Science Institute,

Maryland, USA (online)

May 2021

## Valparaiso University Physics & Astronomy Colloquium, invited talk

LIFE AFTER (STELLAR) DEATH: HABITABILITY AROUND WHITE DWARFS

Valparaiso University, Valparaiso, Indiana,

USA (online)

March 2021

## AAS Winter Meeting, talk

LIFE AFTER (STELLAR) DEATH: HABITABILITY AROUND WHITE DWARFS

Online

January 2021

## MIT Exoplanet Tea, invited talk

LIFE AFTER (STELLAR) DEATH: HABITABILITY AROUND WHITE DWARFS

MIT, Cambridge, Massachusetts, USA

(online)

October 2020

## Exoplanets III, talk

LIFE AFTER (STELLAR) DEATH: ATMOSPHERES AND BIOSIGNATURES OF EARTH-LIKE PLANETS ORBITING IN THE HABITABLE ZONES OF WHITE DWARFS

Heidelberg, Germany (online)

July 2020

## AAS Winter Meeting, dissertation talk

PLANETARY HABITABILITY AND BIOSIGNATURES THROUGHOUT STELLAR EVOLUTION

Honolulu, Hawai'i, USA

January 2020

## Extreme Solar Systems IV, poster

DYING TO LIVE: POST-MAIN SEQUENCE HABITABILITY

Reykjavík, Iceland

August 2019

## **Exoclimes V, poster**

DYING TO LIVE: POST-MAIN SEQUENCE HABITABILITY

*University of Oxford, Oxford, UK*

*August 2019*

## **Astrobiology Graduate Conference, talk**

ATMOSPHERES AND UV ENVIRONMENTS OF PLANETS THROUGHOUT POST-MAIN SEQUENCE EVOLUTION

*Salt Lake City, Utah, USA*

*July 2019*

## **Emerging Researchers in Exoplanet Science Symposium, talk**

ATMOSPHERES AND UV ENVIRONMENTS OF PLANETS THROUGHOUT POST-MAIN SEQUENCE EVOLUTION

*Cornell University, Ithaca, New York, USA*

*June 2019*

## **AAS Winter Meeting, talk**

HABITABILITY OF POST-MAIN SEQUENCE PLANETARY SYSTEMS

*Seattle, Washington, USA*

*January 2019*

## **Planetary Lunch Talk Series, talk**

LIFE AFTER (STELLAR) DEATH: HABITABILITY AROUND WHITE DWARFS

*Cornell University, Ithaca, New York, USA*

*August 2018*

## **Graduate Student/Post-Doctorate Seminar, talk**

DYING TO LIVE: POST-MAIN SEQUENCE HABITABILITY

*Cornell University, Ithaca, New York, USA*

*August 2018*

## **Cool Stars 20, poster**

ATMOSPHERES AND UV GROUND ENVIRONMENT FOR PLANETS ORBITING RED GIANTS

*Boston, Massachusetts, USA*

*August 2018*

## **University of St Andrews, invited talk**

UV SURFACE ENVIRONMENTS AND ATMOSPHERES OF EARTH-LIKE PLANETS ORBITING WHITE DWARFS

*University of St Andrews, St Andrews, UK*

*July 2018*

## **University of Edinburgh, invited talk**

UV SURFACE ENVIRONMENTS AND ATMOSPHERES OF EARTH-LIKE PLANETS ORBITING WHITE DWARFS

*University of Edinburgh, Edinburgh, UK*

*July 2018*

## **Exoplanets II, poster**

UV SURFACE ENVIRONMENTS AND ATMOSPHERES OF EARTH-LIKE PLANETS ORBITING WHITE DWARFS

*Cambridge University, Cambridge, UK*

*July 2018*

## **Graduate Student/Post Doctorate Seminar, talk**

DO YOU BELIEVE IN LIFE AFTER (STELLAR) DEATH?: WHITE DWARF HABITABILITY

*Cornell University, Ithaca, New York, USA*

*June 2018*

## **Emerging Researchers in Exoplanet Science Symposium, poster**

ATMOSPHERES AND UV GROUND ENVIRONMENT FOR PLANETS ORBITING RED GIANTS

*Pennsylvania State University, State College, Pennsylvania, USA*

*June 2018*

## **Emerging Researchers in Exoplanet Science Symposium, talk**

BIOSIGNATURES AND UV ENVIRONMENTS OF EARTH-LIKE PLANETS ORBITING WHITE DWARFS

*Pennsylvania State University, State College, Pennsylvania, USA*

*June 2017*

## **Astrobiology Graduate Conference, talk**

BIOSIGNATURES AND UV ENVIRONMENTS OF EARTH-LIKE PLANETS ORBITING WHITE DWARFS

*Charlottesville, Virginia, USA*

*June 2017*

## **Astrobiology Science Conference, poster**

BIOSIGNATURES AND UV ENVIRONMENTS OF EARTH-LIKE PLANETS ORBITING WHITE DWARFS

*Mesa, Arizona, USA*

*April 2017*

## **Astrobiology Science Conference, poster**

AGE ROTATION-ACTIVITY RELATIONSHIP OF KEPLER FIELD STARS

*Chicago, Illinois, USA*

*June 2015*

## **Emerging Researchers in Exoplanet Science Symposium, poster**

AGE ROTATION-ACTIVITY RELATIONSHIP OF KEPLER FIELD STARS

*Pennsylvania State University, State College, Pennsylvania, USA*

*May 2015*

## **South Carolina Academy of Science Conference, talk**

DIRECT IMAGING DISCOVERY OF A 'SUPER-JUPITER' AROUND A LATE B-TYPE STAR

*Columbia, South Carolina, USA*

*April 2013*

## **AAS Winter Meeting, poster**

THE SUBARU SEEDS IMAGING SEARCH FOR EXOPLANETS AROUND HIGH-MASS STARS

*Long Beach, California, USA*

*January 2013*

## **AAS Winter Meeting, poster**

THE SUBARU SEEDS IMAGING SEARCH FOR EXOPLANETS AROUND HIGH-MASS STARS

*Austin, TX, USA*

*January 2012*

# Teaching

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## 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 SQUIRES AND PHIL NICHOLSON

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

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## 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**

ANNUAL DANISH ASTRONOMY MEETING

*Fredericia, Denmark*

*May 2022*

**SOC/VOC/session chair**

EMERGING RESEARCHERS IN EXOPLANET SCIENCE SYMPOSIUM

*Online*

*June 2021*

**Session chair**

AAS WINTER MEETING

*Online*

*January 2021*

**Session chair**

AAS WINTER MEETING

*Honolulu, Hawai'i*

*January 2020*

**SOC/LOC/session chair**

EMERGING RESEARCHERS IN EXOPLANET SCIENCE SYMPOSIUM

*Cornell University*

*June 2019*

**SOC/session chair**

EMERGING RESEARCHERS IN EXOPLANET SCIENCE SYMPOSIUM

*Yale University*

*June 2017*

**SOC/LOC/session chair**

EMERGING RESEARCHERS IN EXOPLANET SCIENCE SYMPOSIUM

*Cornell University*

*June 2016*

**Organizer**

CORNELL PLANETARY LUNCH SEMINAR

*Cornell University*

*August 2015 - May 2016*

**Reviewer**

*Nature Astronomy*

**Reviewer**

*Astronomy & Astrophysics*

**Reviewer**

*Royal Society Open Science, Astrophysical Journal*