

Key Dates:

- **January 6-11** AAS Meeting
- **April 2024** IRSTIG talk
- **June 2024** SPIE Meeting
- **Late 2024** APEX Step 1 selection

Project Updates:

- **PRIMA Step 1 proposal is submitted!** Thanks to the tremendous efforts of the proposal team, engineering team, science team, science working groups, and the community, PRIMA's stage 1 proposal was successfully submitted to the APEX 2023 call. See our fact sheet for a summary of the exciting science planned for the mission (P. 4).
- **PRIMA is publishing:** Our General Observer Science Book is now on ArXiv and our science and technical working groups are continuing to work on pathfinder studies (P. 2).
- **PRIMA welcomes new Co-Is:** Carlotta Gruppioni (INAF-OAS), Ana Di Giorgio (INAF-IAPS), Thomas Henning (MPIA) and Oliver Krause (MPIA) are contributing to making PRIMA an international effort!
- **PRIMA leadership is evolving:** Margaret Meixner and Klaus Klaus Pontoppidan have joined JPL as PRIMA's Deputy PI and Deputy Project Scientist! Tiffany Kataria (JPL) is PRIMA's new Deputy Science Lead and Cara Battersby (UConn) is also PRIMA's new IDEA Lead (P. 3).



PI
Jason Glenn



PS
Matt Bradford



Science Lead
Alex Pope



New Deputy PI!



New Deputy PS!



New Deputy Science Lead!

PRIMA at AAS 243

Monday

9:00 - 10:00 AM iPoster 106.18

PRIMA: Planetary System Formation

Tuesday

9:00 -10:30 AM Splinter Session

GO Science with a FIR Probe

Meet up with the PRIMA community at AAS! Join us at the New Orleans Social House at 8:30 pm Tuesday!

Wednesday

9:00 - 10:00 AM iPoster 306.07

PRIMA: Revealing The Evolution of Galactic Ecosystems

5:30 - 6:30 PM iPoster 360.30

The PRIMA Guest Observer Science Book

Thursday

1:00 - 2:00 PM iPoster 457.02

PRIMA: Studying the Rise of Dust and Metals Throughout Cosmic Times

iPoster 457.11

FIRESS: Unlocking Sensitive Far-IR Spectroscopy with PRIMA

iPoster 457.13

PRIMA: PRIMAgger, a Hyperspectral and Polarimetric Instrument

2:10 - 2:20 PM Oral 450.02

PRIMA: the PProbe far-Infrared Mission for Astrophysics

New Orleans January 6-11



Find a PRIMA member or visit the IPAC booth for stickers, pins, and other PRIMA swag!

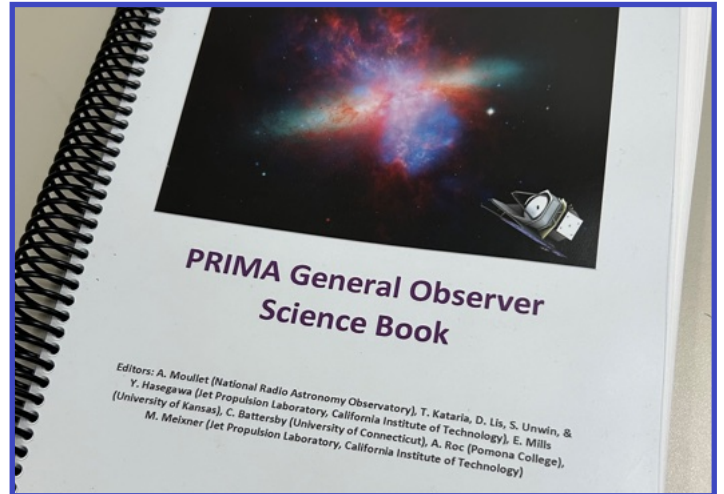
PRIMA General Observer Science Book

We are excited to announce the PRIMA GO Science Book has been published on the ArXiv!

<https://arxiv.org/abs/2310.20572>

Following our community outreach workshop in March 2023, members of the international community submitted 76 science cases for publication in a 399-page volume that captures and characterizes the community's interest towards the far-infrared wavelength regime in general, and towards the PRIMA concept in particular. Each case articulates a scientific advance that is enabled by PRIMA's massive sensitivity improvement and broad spectral coverage. The science cases span areas from dust mineralogy to transient phenomena. At least 75% of PRIMA's 5-year mission will be devoted to experiments like these proposed by members of the astronomy community. Although the cases collected in the GO Science Book represent only a snapshot of possible proposals, they already total about 21,000 hours of observations, or about 80% of the expected time available for GO observations in the nominal 5-year mission. The community is eager for the science enabled by PRIMA's capabilities!

The PRIMA GO Science Book is also available in its entirety on our webpage, and we will have display copies available at AAS.



Recent PRIMA Publications

- Banzatti, Pontoppidan, et al. 2023: *JWST Reveals Excess Cool Water near the Snow Line in Compact Disks, Consistent with Pebble Drift*: <https://ui.adsabs.harvard.edu/abs/2023ApJ...957L..22B/abstract>
- Fischer, Battersby, Johnstone, et al. 2024: *Far-Infrared Luminosity Bursts Trace Mass Accretion onto Protostars*: <https://arxiv.org/abs/2310.12867>
- Dabironezare et al. 2024: *Lens Absorber Coupled MKIDs for Far Infrared Imaging Spectroscopy*: <https://arxiv.org/abs/2310.18161>
- Foote et al. 2024: *High-sensitivity Kinetic Inductance Detector Arrays for the Probe Far-Infrared Mission for Astrophysics*: <https://arxiv.org/abs/2311.02175>

Introducing PRIMA's IDEA lead

Cara Battersby
(University of Connecticut)



PRIMA IDEA

Cara Battersby (Associate Professor at UConn), brings a strong background in Inclusion, Diversity, Equity and Accessibility (IDEA) to the PRIMA team. She has successfully founded and led three major IDEA-focused outreach programs. The UConn-STARs and CU-STARs programs improve recruitment and retention of undergraduate physics majors from historically excluded groups, while BiteScis connects practicing scientists with K-12 teachers to develop lesson plans to bring modern science research into the K-12 classroom. Cara is also Science Objective Lead for PRIMA's Protostellar Disks science case and is an internationally-recognized expert in the field of star formation with a recent NSF-CAREER grant and 61 invited talks in the last decade. As part of PRIMA's IDEA plan, a deputy IDEA lead and advisory board will both be appointed in the future and will rotate regularly through members of PRIMA's science, management, and engineering teams.

Stay tuned this year for PRIMA webpage updates and more exciting news and events!



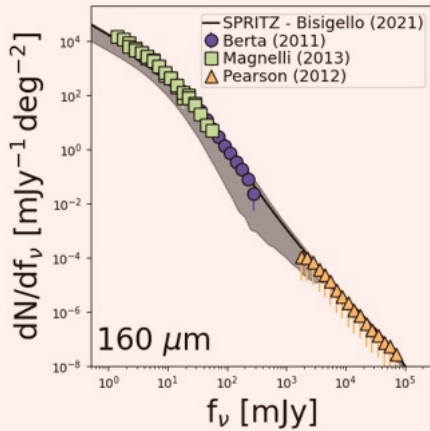
PRIMA spotlight Highlighting the people who make PRIMA happen!



Laura Bisigello (INAF-IRA)

Constructing simulated catalogs of galaxies and AGN to explore PRIMA capabilities

Laura is a science working group member and the developer of SPRITZ, a phenomenological simulation built from observed infrared galaxy luminosity functions to be consistent with observations of number counts (*pictured*) from X-ray to radio wavelengths. SPRITZ will be key to understanding and analyze observations of dusty galaxies with current and future observatories.

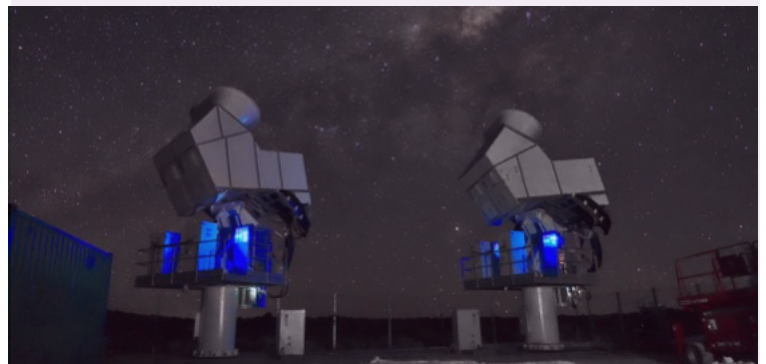


Tom Essiger-Heilman (GSFC)

Developing kinetic inductance detector readout electronics for PRIMA

Tom develops technologies for future instruments and is an observational cosmologist who studies the cosmic microwave background and star formation over cosmic time using ground-based and balloon-borne instruments.

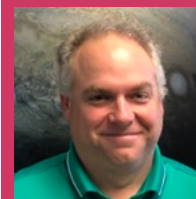
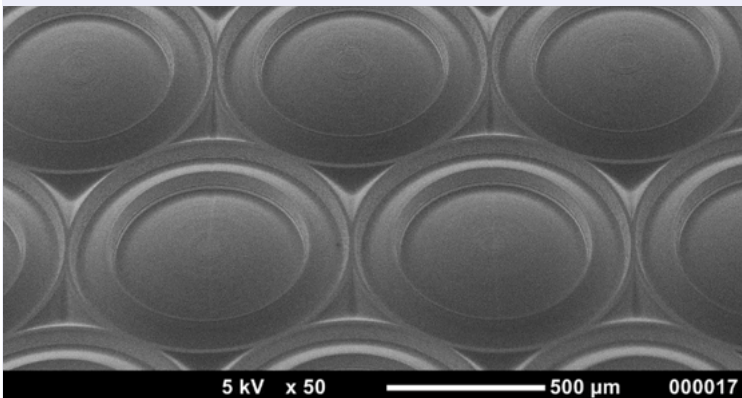
Pictured: the CLASS telescopes in Chile



Jennette Mateo (GSFC)

Developing microlens fabrication technology for PRIMA

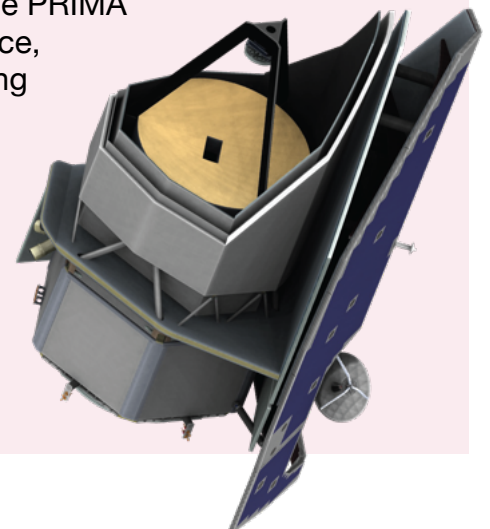
Jennette is an electronics engineer working on fabrication and coatings for the PRIMA microlens arrays. Her expertise includes grayscale lithography and deep reactive ion etching.
Pictured: Scanning Electron Microscope image of the Band 4 Fresnel microlens array.



Matt Johnson (JPL)

Lead systems engineer for PRIMA

Matt is the lead systems engineer of the PRIMA proposal, where he is responsible for all technical aspects of the proposal. His focus areas include making sure that the spacecraft and ground system designs are compatible with the PRIMA payload and science, while also managing the technical requirements and resources to assure that PRIMA will be able to deliver on its scientific potential.



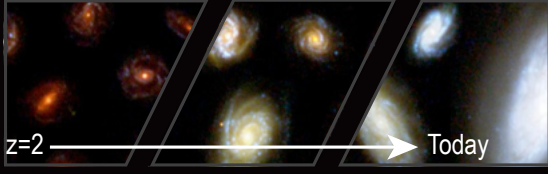
PRIMA

PRobe far-Infrared Mission for Astrophysics

PRIMA provides broad continuous spectral coverage from 24 to 261 μm , a critical region of the spectrum that reveals the origins of planetary atmospheres, evolution of galactic ecosystems, and the buildup of dust and metals over cosmic time.

UNVEILING OUR COSMIC ORIGINS IN THE FAR INFRARED

Decadal Goal: Probe the co-evolution of galaxies and their supermassive black holes across cosmic time.



EVOLUTION OF GALACTIC ECOSYSTEMS

PRIMA Objective: Provide a simultaneous measurement of black hole and galaxy growth from the peak of their development at $z=2$ (cosmic noon) up to the present day, and determine if winds in luminous galaxies quench star formation.



Decadal Goal: Trace the astrochemical signatures of planet formation.



ORIGINS OF PLANETARY ATMOSPHERES

PRIMA Objective: Determine abundances in protoplanetary disks for comparison with exoplanet atmospheres and reveal whether water is essential to planet assembly.



Decadal Goal: Measure the buildup of heavy elements and interstellar dust from early galaxies to today.



BUILDUP OF DUST AND METALS

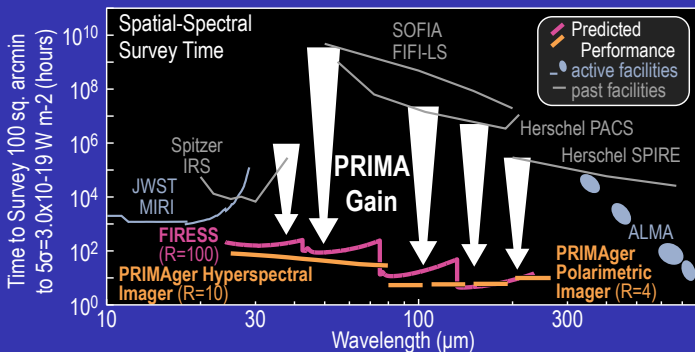
PRIMA Objective: Compare the dust properties and metal content of dusty galaxies from cosmic noon to the present day and quantify the diversity of dust environments in the local universe.

ALL PI-SCIENCE DATASETS WILL BE RAPIDLY AVAILABLE TO THE COMMUNITY



GENERAL OBSERVER SCIENCE

PRIMA's 3-5 orders of magnitude gain in spectral mapping speed unlocks science discovery space between JWST and ALMA. With 75% of observing time dedicated to GO science, PRIMA can obtain spectra of hundreds more protoplanetary disks, young stars, and distant galaxies than Herschel. See the PRIMA GO Science Book (<https://arxiv.org/abs/2310.20572>) for cases already identified by the community.



In 1200 hours: PRIMA can measure the D/H isotopic ratio of water in a statistically-significant sample of solar system comets - a key constraint to the origin of water on Earth



In 100 hours: PRIMA can map magnetic fields in the diffuse gas in many local galaxies, revealing their role in how star-forming clouds are born



In 5000 hours: PRIMA can survey the entire sky to a sensitivity 100x deeper than IRAS and Akari that would engender a legacy of discovery

