



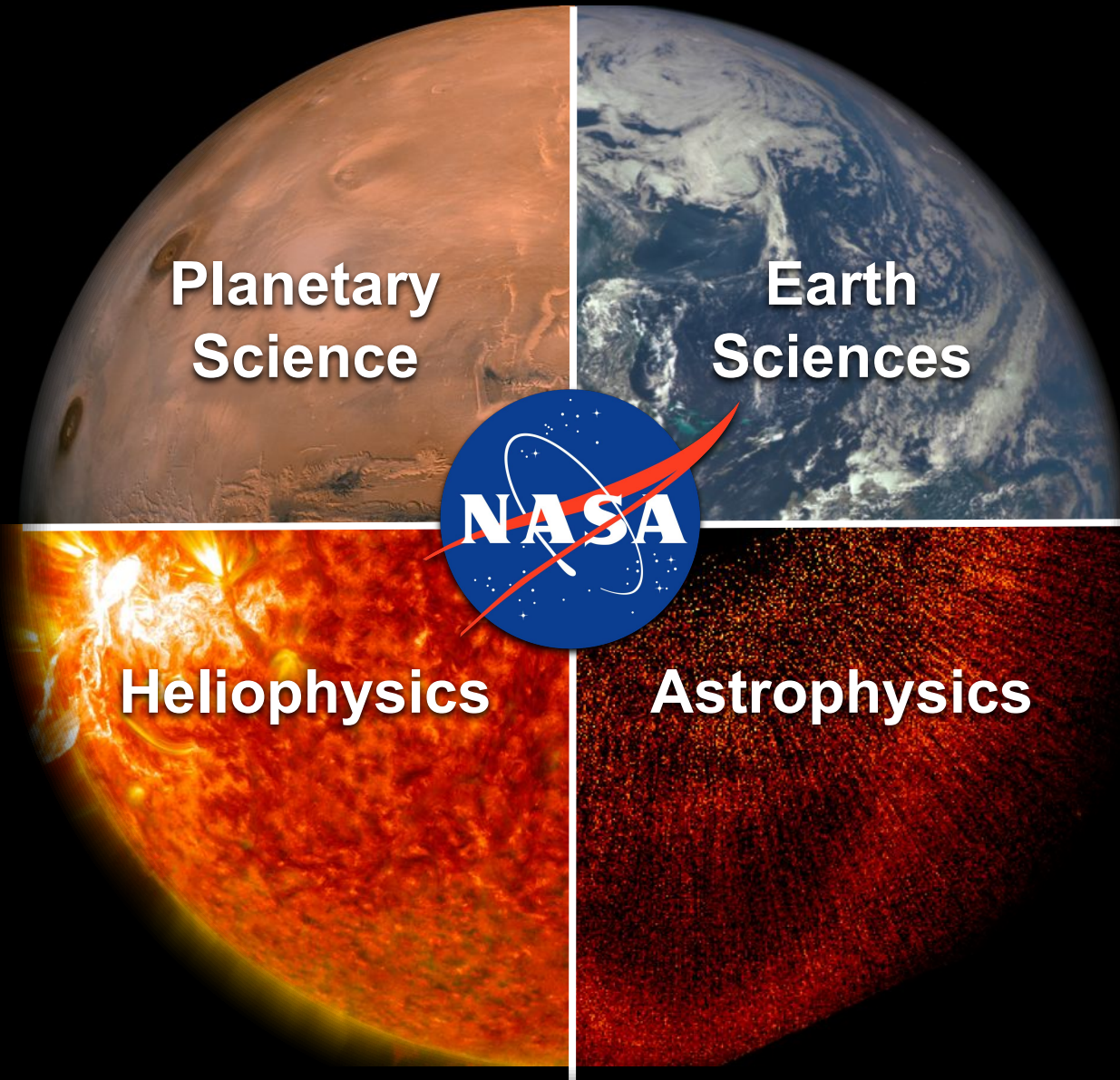
NASA's Nexus for Exoplanet System Science: *Working Together to Find Life in the Universe*

(New!) NExSS Co-Leads:
Ofer Cohen, Hilairy Hartnett,
Jessica Noviello (NPMP Postdoc),
Linda Sohl, and Rob Zellem



<https://nexss.info>

NExSS Goals: Achieved by Interdisciplinarity



- Study planetary habitability and the search for life on exoplanets
- Answer fundamental questions related to planet formation, evolution, diversity, habitability, and signs of life
- Membership is open to *any* scientists working in NExSS science areas

NExSS Science Goals

- Understand planets in context throughout their formation and coevolution with their parent star and planetary system
- Investigate the diversity of exoplanet characteristics and learn how their properties and evolution can create the conditions for life
- Understand how to identify the best exoplanet targets for life searches
- Learn how to recognize, and search for, signs of habitability and life on exoplanets.

NExSS: Bringing the Community Together

NExSS builds community and advances our science with:

- **Interdisciplinary, inter-RCN Workshops and Conferences**, e.g. HabWorlds, Biosignatures, exoplanetary space weather, Technoclimes, EiOBY
- **Collaborative Exoplanet Observing Communities**, e.g., JWST ERS proposals, TRAPPIST-1 JWST Community Initiative, community contributions to Astro2020, OWL 2022 Decadal Surveys
- **Science Working Groups**, e.g. intermodel comparisons, habitability quantification, technosignatures and science communications
- **Quarterly Steering Committee (PI) meetings**, Slack Workspace w/ working group/early career channels
- **NExSS Newsletter, Website, Publication Bulletin, email lists**

AASTCS 8: Habitable Worlds
Overview

HABITABLE WORLDS
VIRTUALLY ANYWHERE, 22 - 26 FEBRUARY 2021

Meeting Overview →
Meeting Schedule
Important Dates
Presenter Instructions
Meeting Policies & Conduct
Abstract Submission
Pre-Meeting Activities

Join us 22-26 February 2021

The Habitable Worlds 2021 workshop will be fully virtual! Join the astronomy and planetary science communities for this dynamic online experience happening 22-26 February 2021.

→ View the Meeting Schedule
→ Registration is open!
→ Registrant List

NExSS NEWSLETTER
THE LATEST IN NExSS AND EXOPLANETARY NEWS

IN THIS ISSUE
Summer 2023

Page 2
Upcoming
Deadlines
& Events

Page 7
Attending AAS
242 in
Albuquerque

Page 12
Interview with
Rob Zelle:
New NExSS
Co-Lead

Page 15
Celebrating
NExSS Success
Stories

Page 16
Thank you,
Dawn!

Brought to you by
the NExSS SCWG

CUISINES model intercomparisons



The CHAMPs Team

Consortium on Habitability and Atmospheres of M-dwarf Planets

- Overarching Science Question
 - Can M-dwarf planets support life, and if so, how do we best observe and characterize them?
- Four Core Tasks
 1. M-dwarf Planetary Processes
 2. M-dwarf Planetary Atmospheres
 3. M-dwarf Star-Planet Interactions
 4. M-dwarf Exoplanet Observations
- Deliverables from one task are used as inputs into the next tasks
- JWST observations will yield quantitative constraints that feed back into models

Strange New Worlds:

Characterizing Nearby *M*-dwarf Habitable Zone Planets

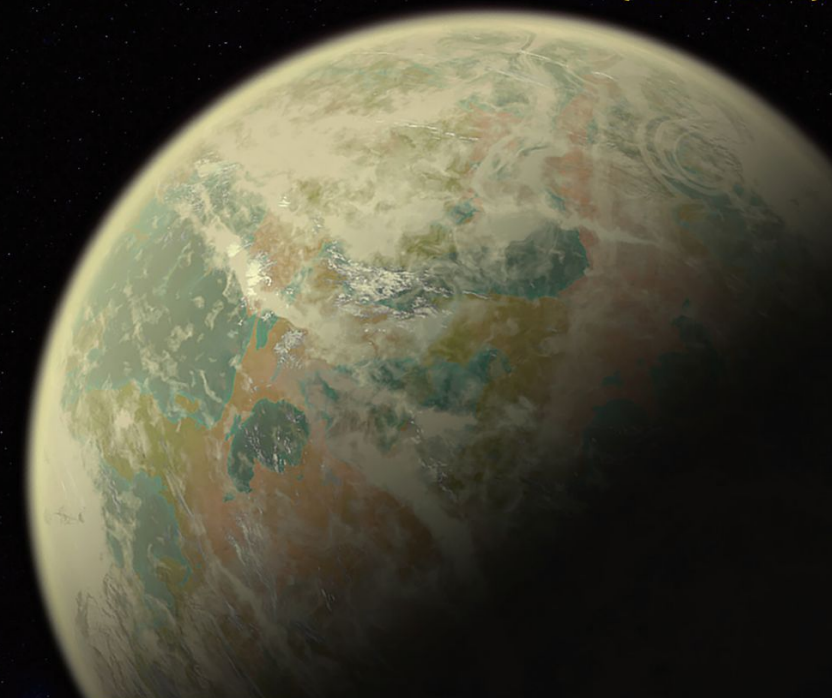


Program PI

Kevin Stevenson
(Johns Hopkins APL)

Science PI

Ravi Kopparapu
(NASA GSFC)





Habitability Space: Exploring a New Frontier via Climate Models & Planetary Statistics

Michael Way
Goddard Institute for Space Studies
ROCKE-3D Team

Theme 1 Solar System Planetary Atmospheres Through Time

A series of nine circular images showing the evolution of planetary atmospheres from the early solar system to the present. The sequence starts with a hot, molten planet, moves through various stages of atmospheric development, and ends with a clear blue sky over a green planet. To the right is a large image of a star with a solar flare.

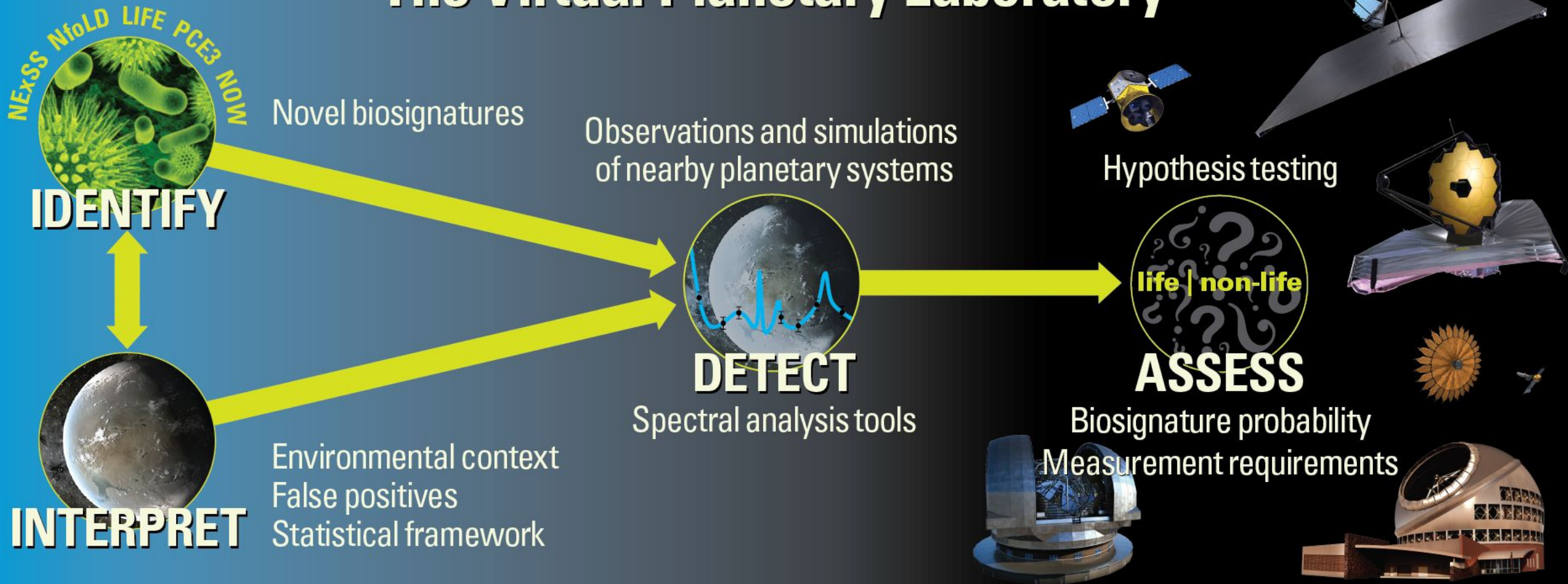
Theme 2 Defining Planetary Characteristics

Two diagrams illustrating planetary characteristics. The left diagram shows a central orange star with several elliptical orbits in different colors. The right diagram shows a globe with a color gradient from blue to red, with arrows pointing to five smaller globes representing different states of the planet's atmosphere.

Theme 3 PPE Subsampling, PSG Spectra, Linking to Telescope Data

A flow diagram showing the process from data collection to analysis. It starts with a grid of many small planet images labeled "LHC subsampling". An arrow points to a circular inset showing a spectral plot with peaks labeled "H2O" and "CH4", labeled "PSG model spectra". A second arrow points to a 3D rendering of a telescope instrument labeled "JWST data".

The Virtual Planetary Laboratory



The VPL team focuses on the search for life on exoplanets, and will:

- create a “network of networks” with five RCNs to **identify** novel biosignatures in the context of early Earth environments
- understand environmental context and develop statistical frameworks to **interpret** biosignatures
- obtain JWST observations and simulate observations of planetary systems to **detect** terrestrial planetary characteristics, and
- use simulations and frameworks developed in the **identify**, **interpret** and **detect** tasks to **assess** to how well we can discriminate a living from a non-living local solar neighborhood using 25 HZ planet spectra from the Habitable Worlds Observatory.

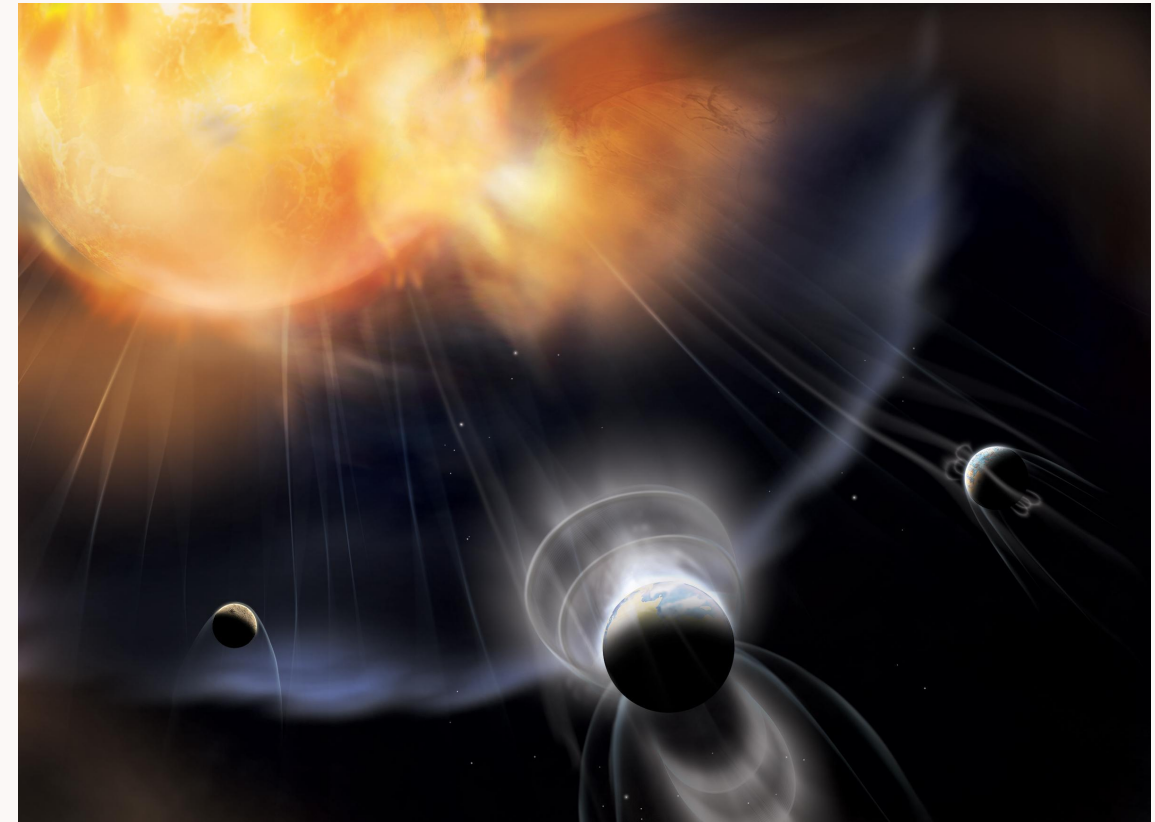
Retention of Habitable Atmospheres in Planetary Systems

PI: Dave Brain (CU Boulder)



How do the properties of a planet and its host star influence its ability to retain an atmosphere?

- Objective 1:** Compute inputs for atmospheric escape for an ensemble of star-planet scenarios
stellar EUV, stellar wind and magnetic field
- Objective 2:** Improve and link models for atmospheric escape from any planet
12 redundant models for upper atmosphere and escape
- Objective 3:** Construct a multi-dimensional model library for atmospheric escape
public web interface to entire library and synthesis
- Objective 4:** Apply the model library to understand the connection between atmospheric escape, habitability, and observations
Atmospheric lifetimes, scaling laws, transit predictions

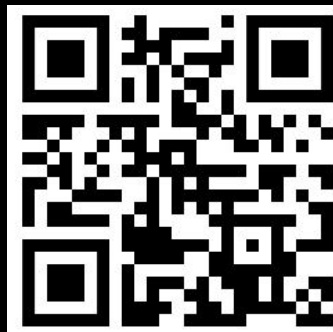


Future Plans and Upcoming Events

- Habitable Worlds 3 workshop: seeking leadership committee members now (date TBD)
- Venus workshops in late October in Albuquerque, NM will have a strong NExSS presence
 - VExAG meeting: October 30–31
 - Venus as a System Conference, Chapter 3: November 1–3
- Re-starting the webinar series
- NExSS recently underwent a programmatic review in early 2023; now assessing and incorporating recommendations
- We are hoping for more interdisciplinary involvement, particularly from the heliophysics division
- New grand challenge to catalyze broad community collaboration across the data-model divide for exoplanets

Professional Advancement Workshop Series (PAWS)

- For early-career researchers to explore different career paths and hone new skills
- Space to network and learn together
- **Open to all members of the RCNs within the NASA Astrobiology Program**
- Fully virtual, monthly meetings
- Week-long workshop being planned for Jan. 2024
- Resources and recordings hosted on the PAWS webpage and NExSS YouTube
 - <https://nexss.info/paws/>



PAWS Team

Lead: Jessica Noviello
NExSS NASA Postdoctoral
Management Fellow



Co-leads: Shawn Domagal-Goldman
(NASA GSFC) and Melissa Kirven-Brooks
(NASA Ames Exobiology Branch & the
NASA Astrobiology Program)

Update: NExSS Leadership is Changing

HQ Reps

Mary Voytek (PSD)
Richard Eckman (ESD)
Doug Hudgins (APD)
Jared Leisner (HPD)

Co-Leads

Daniel Apai (U. Arizona)
Dawn Gelino (IPAC/NExSci)
Victoria Meadows (U. Washington)
Shawn Domagal-Goldman (GSFC)

NExSS NASA Postdoc

Jessica Noviello (GSFC)

2023-2024

HQ Reps

TBD (PSD)
Richard Eckman (ESD)
Doug Hudgins (APD)
Hannah Jang-Condell (APD)
Jared Leisner (HPD)

Co-Leads

Ofer Cohen (U. Massachusetts, Lowell)
Hilairy Hartnett (Arizona State U.)
Linda Sohl (Columbia/NASA GISS)
Rob Zelle (JPL/Caltech)

NExSS NASA Postdoc (until 2/2024)

Jessica Noviello (GSFC)



Get Involved in NExSS!

1. Be a member of a relevant, accepted NASA proposal
2. Participate in our workshops, conferences, and other community activities
3. Join as a NExSS Affiliate
 - nexss.info/about/nexss-affiliates



Exoplanets in Our Backyard 2 (Albuquerque, NM; Nov. 2022)

You Can Get Involved in NExSS!

- Three mechanisms:

- Be a member of a relevant, accepted NASA proposal
- Participate in our workshops, conferences and other community activities
- Join as a NExSS affiliate:

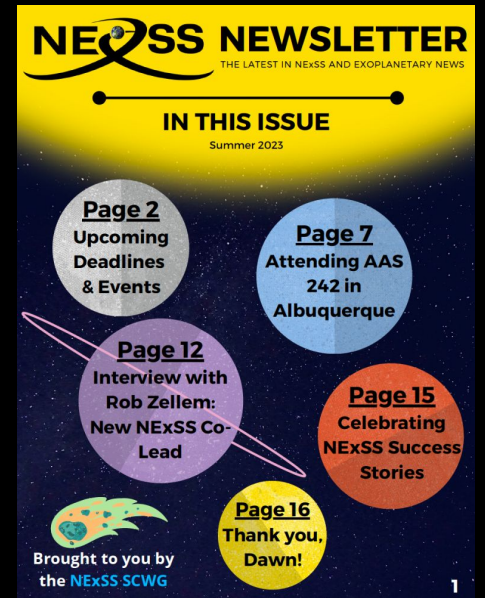
<https://nexss.info/about/nexss-affiliates/>

- Join NExSS to get access to:

- Email Announcements
- Publication bulletins
- Newsletters
- Slack workspace access



^From the Exoplanets in Our Backyard 2 meeting in Albuquerque, NM. November 2022



<https://nexss.info/>
[@nexssinfo](https://t.me/nexssinfo)

<https://manyworlds.space/>

