National Aeronautics and Space Administration

Cosmic Origins Program Analysis Group (COPAG) Report to Astrophysics Advisory Committee (APAC) March 29-30 2023

Dr. Shouleh Nikzad
Chair, COPAG Executive Committee
Member, COPAG UVSTIG

COPAG EC Overview
- Charge
- Membership & Staffing; SIG/STIG Structure

COPAG Activities
- Community Engagement: AAS
- SIG and STIG Activities

Exploring New SIGs
- Student SIG
- CGM/IGM/ISM SIG

UV Working Group
- Objective
- Planned Activities

Strategic Plan for the next two years and beyond

COSMIC ORIGINS EXECUTIVE COMMITTEE: Review of charge and organization

COPAG EC lead analysis and coordinate PAG activities; members should span breadth of COR science, technology

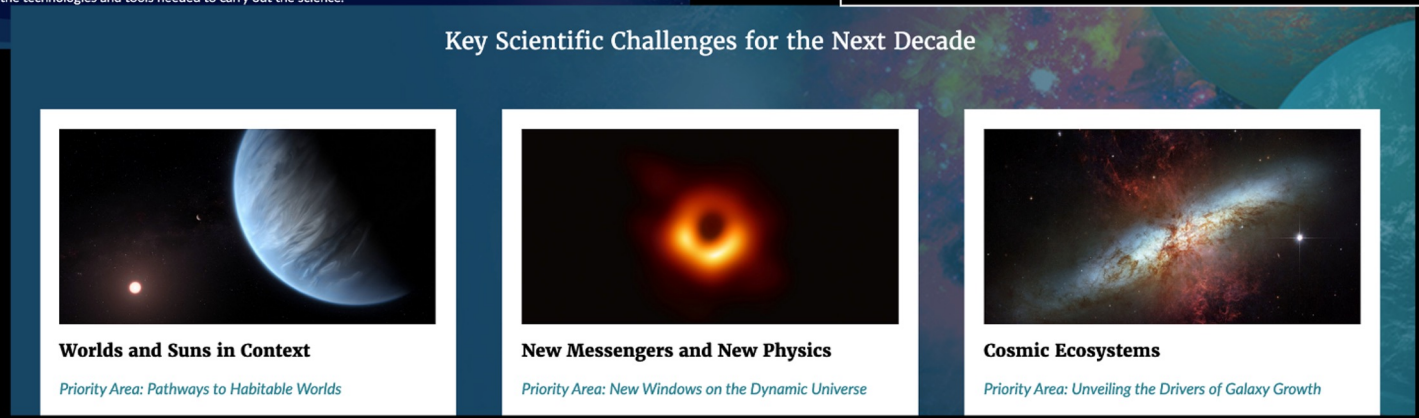
Program Support Manager: Stephanie Clark

COR Chief Scientist: Peter Kurczynski

Program Scientist: Manuel Bautista

Get involved to represent your communities:

NASA Program Analysis Groups (PAGs) serve as community-based, interdisciplinary forums for soliciting and coordinating community analysis and input in support of NASA SMD Science Program objectives and of their implications for architecture planning, activity prioritization, for future exploration. It provides findings of analyses to the NASA Astrophysics Division Director.



Exoplanet Exploration Executive Committee (ExoPAG EC)
Chair: Ilaria Pascucci

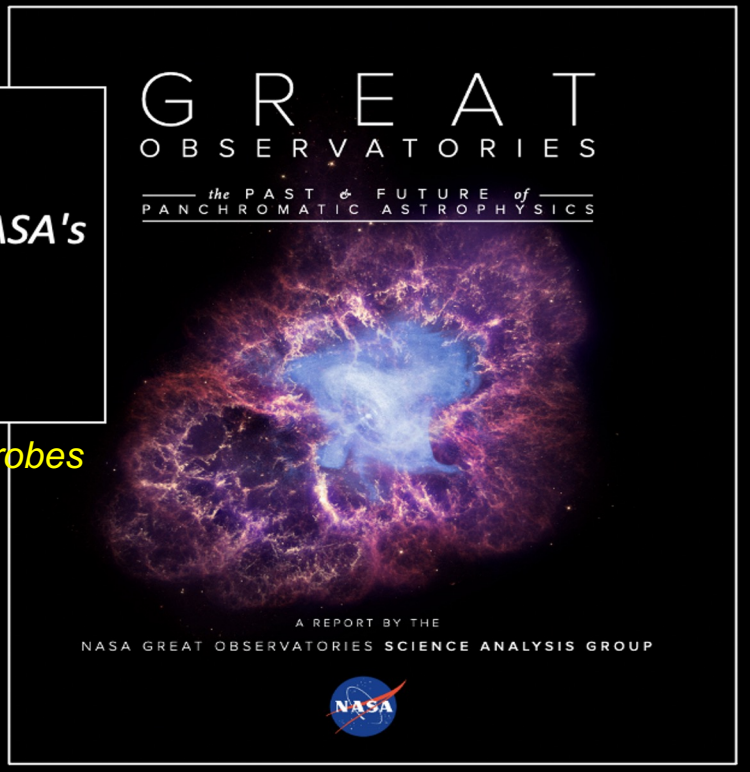
Physics of the Cosmos Executive Committee (PhysPAG EC)
Chair: Justin Finke

Cosmic Origins Executive Committee (COPAG EC)
Chair: Shouleh Nikzad

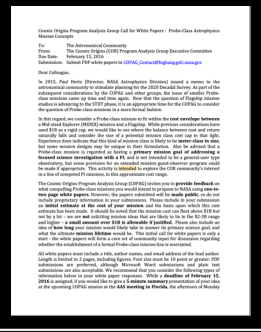
COPAG prior activities of note

SAG-10: Great Observatories 2019 Report

- identify gaps in wavelength coverage and scientific capabilities anticipated over next 10–20 years as NASA's current space observatories age/decommission (2) analyze how this will affect progress in a rapidly changing scientific landscape.



COPAG Response to Charge on Probes



COVID Impact on NASA Cosmic Origins Research: Request for Input on ADAP

The NASA Cosmic Origins Program Analysis Group Executive Committee (COPAG EC; https://cor.gsfc.nasa.gov/copag/), is soliciting input on the impacts of COVID-19 on NASA astrophysics research, with special focus on the preparation and submission of proposals for the Astrophysics Data Analysis Program (A

The goal of this 5-1(the Astrophysics Div the survey data will the ExoPAG and Phy community.

This survey deadline

The plan is to prese (https://science.nas schedule for June 2

* Required

Astrophysics Data Analysis Program (ADAP)

COVID Impact on NASA Cosmic Origins Research: Request for Input on ADAP
Janice C. Lee & Misty Bentz on behalf of COPAG EC

Main Results:

"Overall, on a scale from 1 to 5, how do you think the change in ADAP solicitation cadence impact your research. (1=negative impact; 3=no impact; 5=positive impact)."

Demographic	N	Net Negative	Net Positive	Neutral
All	169	59%	11%	30%
Male	68%	53%	11%	36%
Female	32%	76%	9%	15%
Early career/ non-tenured	27% (44% female)	64%	11%	25%

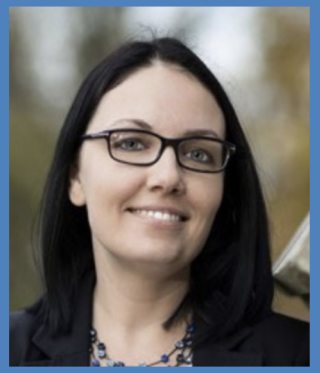
Majority response is that change in solicitation cadence will negatively affect resea **women, early-career researchers, and those without job security expect to be ev negatively impacted** than the general population of ADAP proposers.

COVID/ADAP 2020 Community Survey

- Indicated women and early-career scientists may be disparately impacted by COVID shutdown
- Helped guide decision to reverse cancellation of FY21 ADAP solicitation

COSMIC ORIGINS EXECUTIVE COMMITTEE:
Review of charge and organization

Member	Term	Institution
Shouleh Nikzad (Chair)	April 2022–October 2024	Jet Propulsion Laboratory
Stephan McCandliss	November 2018–October 2024	Johns Hopkins University
Christine Chen	November 2020–January 2024	Space Telescope Science Institute
Chris Hayward	November 2020–January 2024	Flatiron Institute
Sabrina Stierwalt	November 2020–January 2024	Occidental College
Hsiao-Wen Chen	April 2022–October 2024	Univeristy of Chicago
Enrique Lopez Rodriguez	April 2022–October 2024	Stanford University
Rachael Beaton	January 2023–October 2025	Space Telescope Science Institute
Sanchayeeta Borthakur	January 2023–October 2025	Arizona State University



Nov' 20 - Jan '24




Apr' 22 - Oct '24

New members

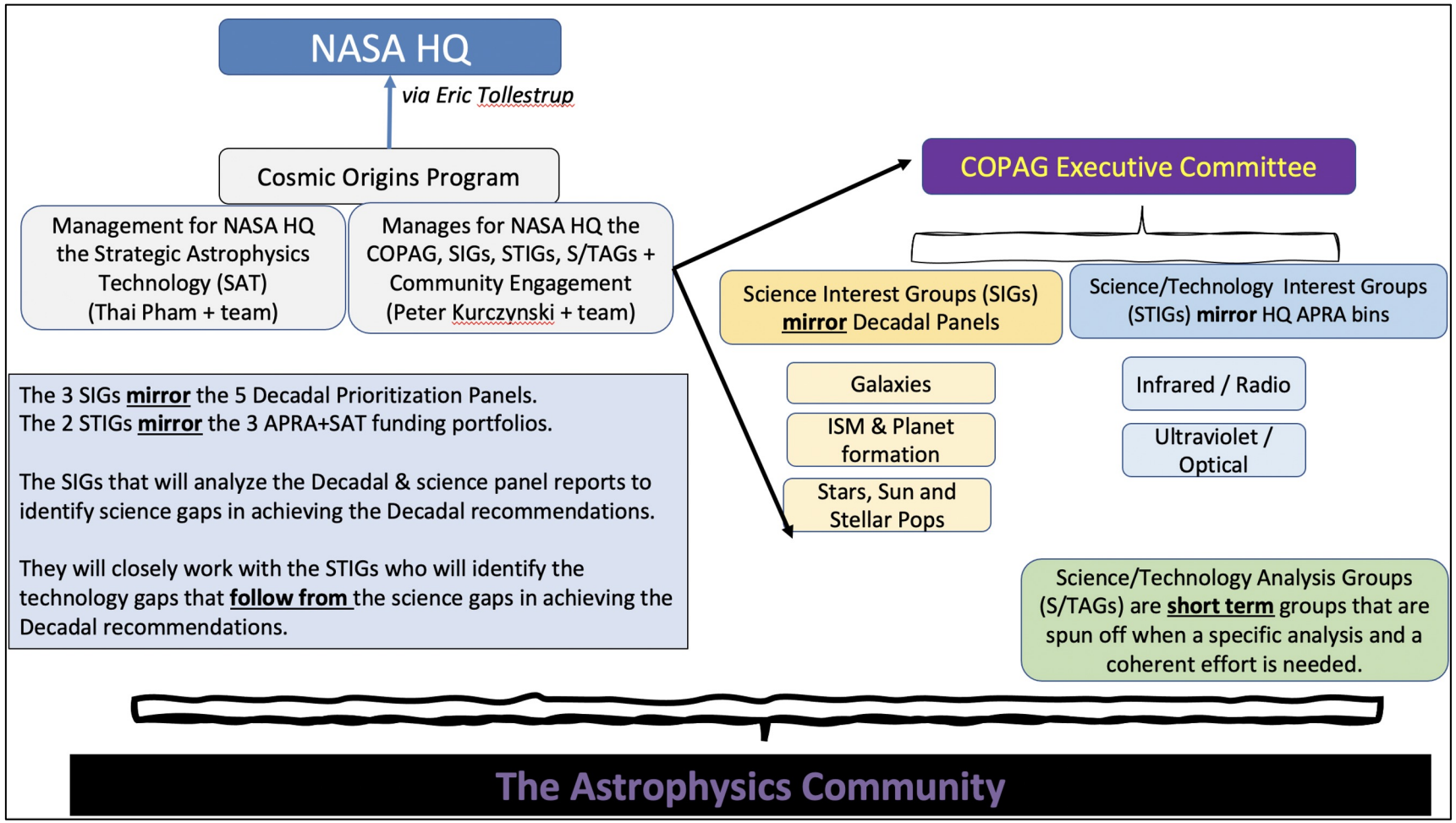

Jan' 23 - Oct '25

IR and UV STIGS: active since 2000s; established networks and participation

New SIGS proposed by former EC Chair Meixner to prepare for analysis of Astro2020

- Galaxies, Stars active
- New AGN SIGs activated by Cosmic Origins Program Office

From Oct 2021 APAC Report:



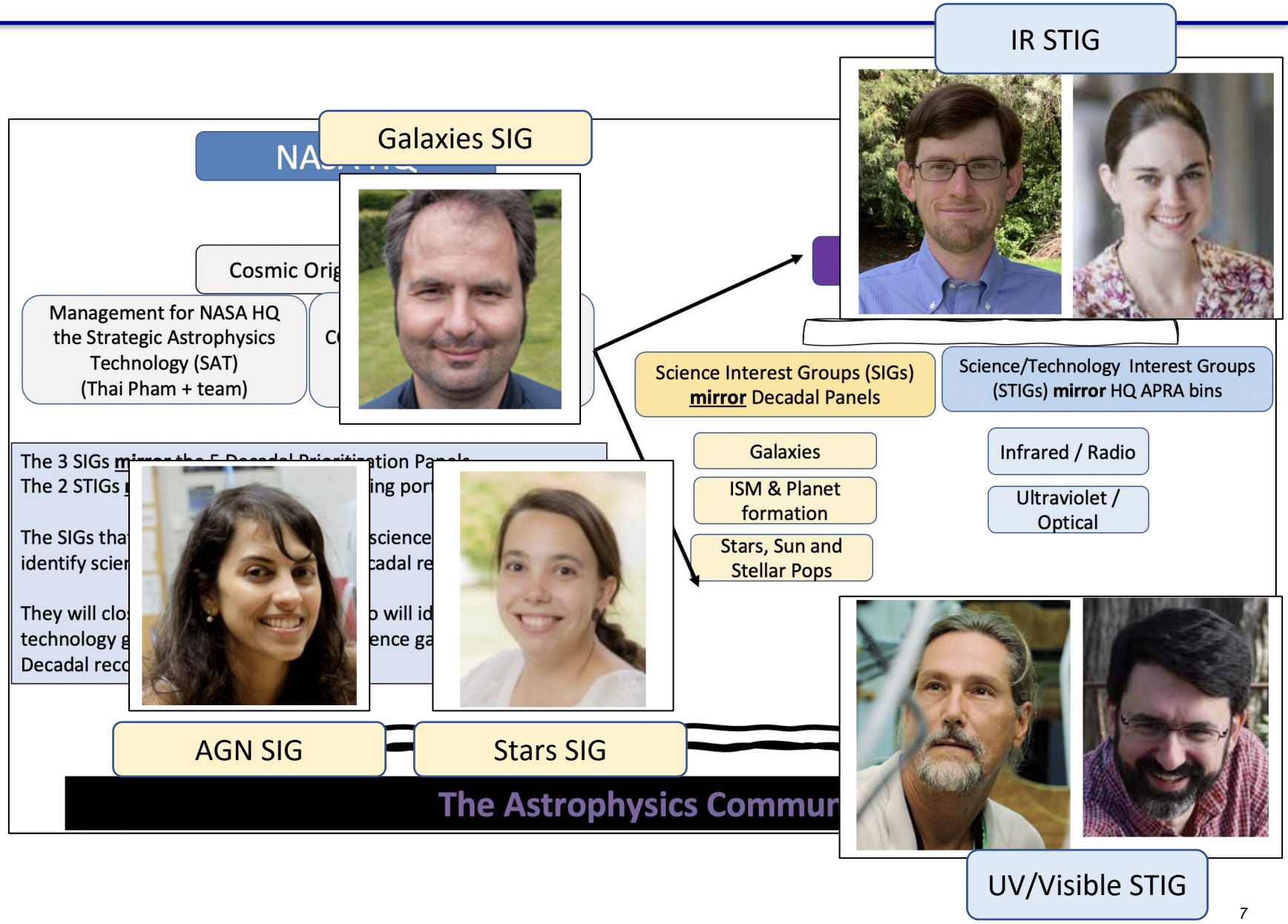
IR and UV STIGS: active since 2000s; established networks and participation

New SIGS formed by Meixner EC to prepare for analysis of Astro2020

➔ Galaxies and Stars SIGs now active

STIG/SIG Leadership

- **IRSTIG**: M. MacGregor (Colorado), J. Connors (NIST)
- **UVSTIG**: S. McCandliss (JHU), J. Tumlinson (STScI)
- **Galaxies SIG**: B. Holwerda (Louisville)
- **Stars** SIG: R. Beaton (STScI)
- **AGN** SIG: S. Satyapal (GMU)



2023 Winter AAS

- Splinter sessions
- Joint PAG participation
- COPAG
- UV STIG
- IR STIG
- AGN SIG
- Combined Galaxies and Stars SIGs

COPAG SPLINTR IN AAS 241

AAS241 COPAG Splinter Session was well attended on Monday 9 January 2023 9:00 AM PT - 11:00 AM PT

Introduction—Peter Kurczynski

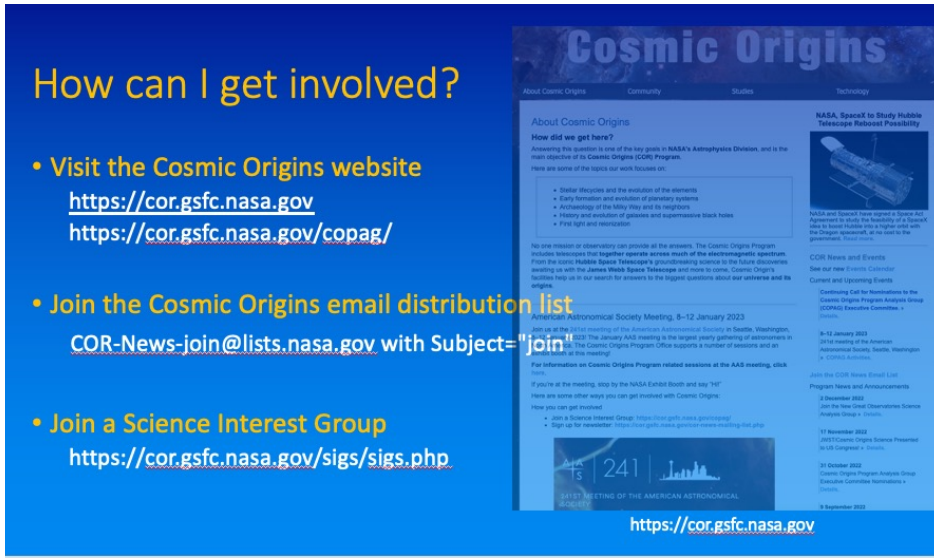
Overview of COR, COPAG—Shouleh Nikzad

Presentation by all COPAG SIG Leads to introduce their SIG, recruit members, and advertise their splinter session

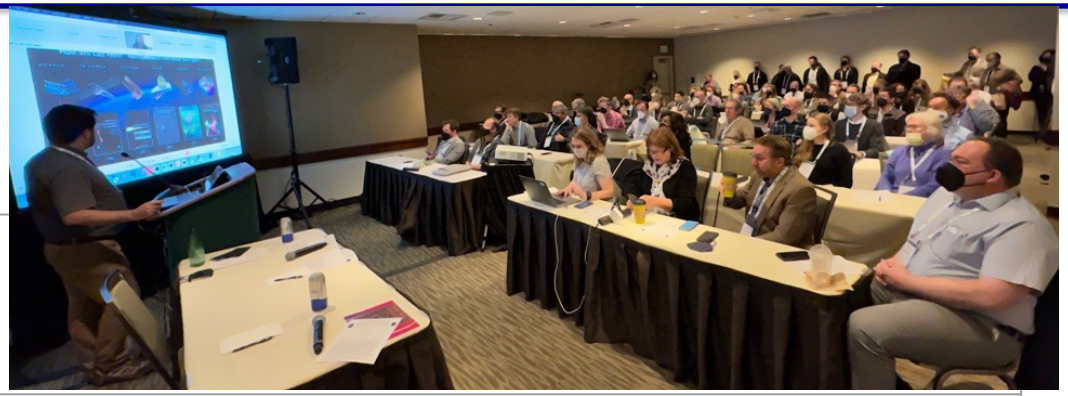
Open discussion on a potential HWO SIG facilitated by McCandliss with participation of the SIG leads. Great engagement from the community. Held off for now to coordinate with GO SIG and other activities

Consensus on

- Need for Cosmic Origins Program Office Support for Community Focused (hybrid) Workshops (Webex, Travel, Venues)
- Need to justify LUV science cases for HWO at grass roots community level
- Concern that HQ views HWO as mainly an EXO mission
- Two-way communication between PAGS and APAC to disabuse this notion
- Joint PAG meeting at Winter AAS focused on HWO to hash out science priorities
- Need Better coordination of AAS splinter asks



AAS241 **UVSTIG** hybrid Splinter Session was **standing room only**
on Tuesday 10 January 2023 13:30 - 15:30 PT



Science and Technology Tradespace for the Habitable Worlds Observatory: Working Towards a Design Reference Architecture

- Decadal Science Goals : **Jason Tumlinson**
- Telescopes : **Lee Feinberg**
- Coronagraph: **Emiel Por, Bertrand Mennesson**
- HighDefinition Imager/Workhorse Camera: **Shouleh Nikzad**
- Multi-object Spectrographs: **Kevin France**
- Star Shades: **Aki Roberge and Scott Gaudi**
- Workforce Development: **Rachael Beaton**
- GOMAP Process: **Julie Crooke**

1) **AAS241 Splinter Session archived at** https://cor.gsfc.nasa.gov/copag/AAS_Jan2023/AAS2023-agenda.php#uvstig
2) **UVSTIG Planning Activities:**
   - **QUEST** Joint Seminar with COPAG SIGs for Stars – Galaxies – AGN – ISM/CGM/IGM
     - Far-UV science gaps working group
   - **HabWorlds and the New Great Observatories**
     - 10 - 14 July 2023 at STScI/JHU
   - **Discussions for Joint COR/PHYS/ExEP-PAG Session at Winter AAS243: Focus on Habitable Worlds Observatory**

QUEST* Seminars archived at https://www.youtube.com/playlist?list=PL_dmnk6FeUeASWgZwzBIUR--Ut8axxSut

Discussions at the end called for more interactions and workshops under the auspices of PAGs on HWO

IRSTIG Activities - Winter/Spring '23

Winter AAS Splinter Session - Jan 10, 2023

"Building Synergies across the IR: JWST, Roman, ALMA and Future IR Observatories"

- Well over 100 participants in person and on-line
- Talks from 4 FIR Probe proposed missions + Roman, SphereX and science cases connecting the IR to other wavelengths

Bi-Annual Newsletter

- Currently recruiting articles for our bi-annual newsletter
- Expecting articles on recent IR/THz balloon missions GUSTO and ASTHROS, the FIR Probe SALTUS as well as multiple science-focused articles
- Expected release in mid-April

Webinar Series

- Hosted the 1st Monday of each month at 3pm ET with nominally 1x Tech-focused and 1x Science-focused talk
- Typically 30-60 online participants from US and international
- Designed these sessions to foster cooperation between the technology and science communities

LC Recruitment

- We will be looking for new leadership members this coming fall with an emphasis on helping to expose early-career scientists to leadership activities and NASA administration
- Please tell anyone you think qualified about this great opportunity!

Co-Chairs: Yuan-Sen Ting (ANU) & Rachael Beaton (STScI)

- **2022B:**
  - Continued bi-weekly seminar series. Attendance ~30-50 per session + online watches. Advertise workshops & proposal deadlines as well as other NASA announcements.
  - Continue to have good feedback from attendees on the quality of the presentations; we share "hosting" responsibilities amongst Leadership Council to distribute the work.
- **2023A:**
  - Focus on recruiting new members to the Leadership Council: aim to expand the subject expertise on the council, as well as new energy
    - Two Phase Approach: (1) brainstorm for folks to reach out to and (2) ask for volunteers
  - Facilitate white papers for the 2nd phase of the Roman Core Community Survey Process
  - Plan a Summer Series on UV-Astronomy for Stars, Science Cases for Habitable Worlds Observatory, and understanding HWO amongst our community
- **Facilitating Discussion**
  - We want to shift the talk series from 2 talks to 1 talk and a related discussion through the Summer series. Currently considering how to help participants prepare for the discussions to participate fully.
  - We want to make full use of AAS meetings and Splinters as time to talk when many are more comfortable than online-only discussions.

- **Aaron Yung & Benne Holwerda**

- AAS meeting - joint meeting with Stars SIG
- Built a Science Gap Questionnaire
- Generating a Speaker list for summer and fall.
- Science Gap Example: Discussion on synergy between Habitable Worlds Targets and extra-galactic astronomy.
  - e.g. how many targets are already known?
  - How big does the camera/IFU/MOS need to be to be useful?
  - Is this something that can be designed in? (e.g. enough onboard memory and filter wheel and shutter vibration).
  - LUVOIR and HabEx thought about this too.

AGN Science Interest Group: Highlights (Shobita, et al.)

https://cor.gsfc.nasa.gov/sigs/agnsig.php

New AGN SIG began in August 2022

- Biweekly seminar series - with recorded talks on YouTube - Attendance of ~30-60 people
- Planned "AGN Vision Series" Colloquia - 30 minute talks followed by community discussion on most outstanding questions in the field and the current and future facilities needed to answer them.
- Planned Monthly informal zoom lunch meetings for Faculty/Research Staff and separately for Postdocs/Grad Students
- Discord server
- Community surveys, workshops
- Possible hybrid conference
- Held a Winter AAS splinter session

September 27, 2022
A high angular resolution view of the PAH emission in Seyfert galaxies using the James Webb Space Telescope
Ismael G. Bernete

September 13, 2022
Measuring AGN Hosts Properties at z>3 with JWST
Dale Kocevski

August 30, 2022
Dust in the Central Parsecs of AGNs
Almudena Prieto

October 11, 2022
Newborn Quasar Jets Discovered in the Very Large Array Sky Survey
Kristina Nyland

October 25, 2022
JWST ERO observations of NGC 7319
David Law

November 8, 2022
Revealing Low Luminosity AGN with JWST
Anil Seth

November 22, 2022
Low-power jet-ISM interaction in NGC 7319 revealed by JWST/MIRI MRS
Miguel Pereria Santaella

December 13, 2022
Magnetic fields as the cause or effect of the origin of radio-loud and radio-quiet AGN
Enrique Lopez Rodriguez

Student SIG under discussion

•Goals:
- Reduce information disparities between students attending R1 and less resourced institutions
- Help in recruiting younger generations into NASA activities.

•

Similar concept as the Exoplanet Explorers program:
- 10-15 min presentations given by the students and/or SME's on their research
- Mentors would work closely with students to fine tune presentations
- 15 min focus on professional career development
- Goal would be to hold sessions monthly once the group is established

•Procurement of student research presentations:
- ~5 students $1,000 for the purchase of one presentation of their research results, presented as a part of the program seminar series.
- Potential to provide internship or fellowship opportunities.

•Measure growth by how many presentations are given, number of attendees, SIG email list sign ups.

Milestone Date	Description
June 2023	Identify two SIG leads and leadership committee
September 2023	Finalize fall program with dates
September – October 2023	Establish Kickoff meeting
January 2024	SIG holds a session at the AAS conference

NEW Science Interest Group Forming: Diffuse Gas in Cosmic Ecosystems

New Science Interest Group: Highlights (Hamden et al.)

Most of the ordinary matter in the universe is found in the tenuous gas between stars and galaxies.

- organizes community input on Diffuse Gas found across Cosmic Ecosystems, emphasizing the interconnectedness of the systems at all scales.
- includes the circumgalactic and intergalactic media, and the interstellar medium environment of gas/diffuse plasma between stars and galaxies, as well as the flows within and around each of these media as they connect to each other.
- enhances the voice of this critical field within the broader astronomical community.

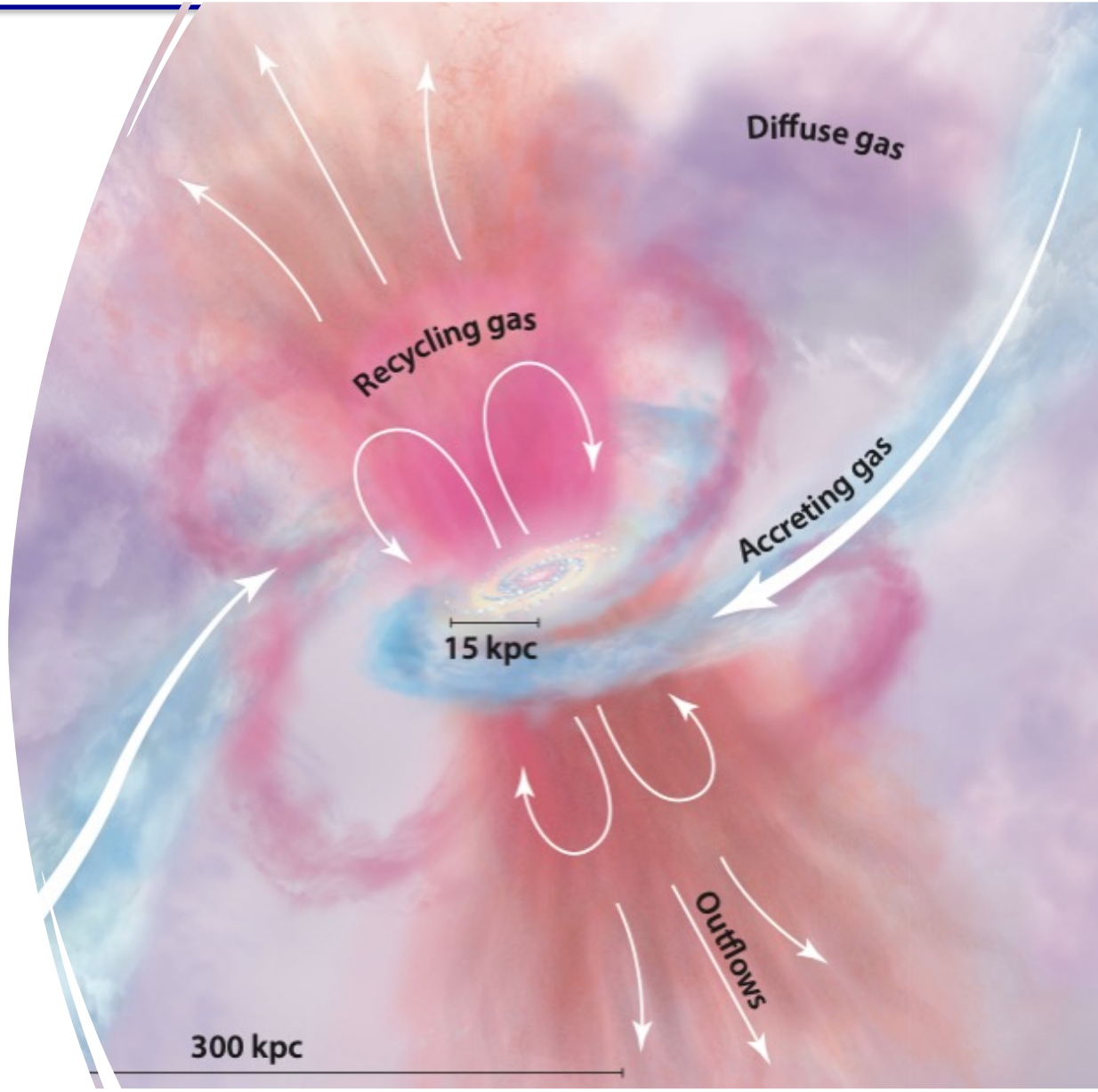


Image: Tumlinson, Peeples, Werk, 2017, ARAA 55:389

UV Science and Technology Working Group in support of Habitable Worlds Observatory

OBJECTIVES

Build upon and update (not duplicate!) extensive work on this topic by the LUVOIR, HabEx, and other studies.

Articulate UV requirements for general astrophysics.

Coordinate with ExEP working groups to identify UV coating requirements for exoplanet coronagraphy,

Develop a UV technology development plan,

Communicate results and report to the COPAG EC (through EC member Champions and UV STIG).

ACTIVITIES

6 month study beginning June 2023.

Meetings would take place weekly or biweekly.

The plan would include series of workshops ~ starting with one being planned for summer 2023.

Publish previous unpublished white papers and study material establishing the UV science case

Envision consolidated into a publication into a peer-reviewed journal—special issue of JATIS

COPAG EC STRATEGIC PLAN

- Create a strategic plan for COPAG-EC activities
  - Retreat being planned May-June time frame, venue-Keck Institute for Space Studies (KISS) Center
  - Work with a facilitator to converge quickly to create the plan, goals, actionable objectives
  - Assign EC members as Champions of actionable objectives
  - Strategic plan, goals, and objectives will be documented as a living, dynamic document that can be used by new members as updated as landscape evolves
- Work with other PAGs to implement objectives

Backup Slides