National Aeronautics and Space Administration

Cosmic Origins Program Analysis Group (COPAG) Report to Astrophysics Advisory Committee (APAC) November 8, 2024

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

On behalf of COPAG EC

COSMIC ORIGINS EXECUTIVE COMMITTEE: Highlights Since March 20, 2024 APAC Presentation

COPAG Strategic Plan Implementation–high-level examples in this presentation

Updates on COPAG EC and SIGs/STIGs Activities

UV WG Report

White paper published (Tuttle, S. et al. 2024, arXiv:2408.07242), will be submitted to JATIS-UV and shared with HQ

Presentations have been made at:

Cosmic Origins Virtual Town Hall, October 2024

SPIE Astronomical Telescopes and Instrumentation, Yokohama, Japan, June 2024

UV Science and Instrumentation Workshop at JPL, Pasadena, May 2024

UV Workshop, JATIS Special Issue On UV Science and Instrumentation – Manuscript Submission Deadline: 1 Dec 2024

AAS Plans: COPAG Splinter, Joint SIG/STIG Splinter Stars/Galaxies/Diffuse Gas/UV STIG, IRSTIG splinter, Cosmic Pathfinders

Town Hall(s): Two virtual Town Halls held July and October 2024

Cosmic Pathfinders: In full swing, detail in slides later in presentation

COPAG EXECUTIVE COMMITTEE

Member	Term	Institution
Shouleh Nikzad (Chair)	April 2022–October 2024	Jet Propulsion Laboratory
Stephan McCandliss	November 2018–October 2024	Johns Hopkins University
Hsiao-Wen Chen	April 2022–October 2024	University of Chicago
Enrique Lopez Rodriguez	April 2022–October 2024	Stanford University
Sabrina Stierwalt, Vice Chair	November 2020–October 2025	Occidental College
Rachael Beaton	January 2023–October 2025	Space Telescope Science Institute
Sanchayeeta Borthakur	January 2023–October 2025	Arizona State University
Rana Ezzeddine	February 2024–January 2027	University of Florida
Varsha Kulkarni	February 2024–January 2027	University of South Carolina

Rana

Varsha

Feb' 24 - Jan '27

Shouleh, Chair

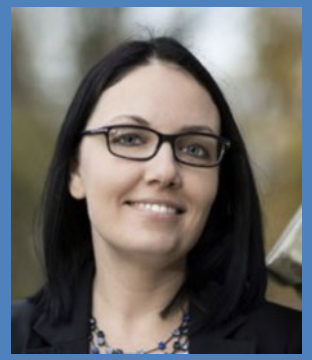
Steve

Hsiao-Wen

Enrique

Apr' 22 - Oct '24

Sabrina, Vice Chair



Rachael

Sanch

Nov '20 - Oct '25

Jan' 23 - Oct '25

COPAG Strategic Plan

Introduction

The Cosmic Origins Program Analysis Group (COPAG) undertook a thorough strategic planning process during Spring 2023. The process was kicked off with a 2-day meeting on May 11 and 12 at the Keck Center Think Tank.

This report is the culmination of this extensive process. This strategic plan will guide COPAG over the next five years and beyond as we transform into a more focused, responsive, and collaborative organization.

Our commitment to community and our desire to serve that community with the highest level of engagement and inclusion will be strengthened by the implementation of this far-reaching plan.

Our executive committee will use this strategic plan as a road map into the future, guiding our analysis, processes, and interactions with the community and NASA. The COPAG-EC will measure progress towards the established goals of this plan periodically in order to ensure our vision is kept on target.

The COPAG-EC and leaders of the COPAG-affiliated Science Interest Groups have a great deal of enthusiasm for this strategic plan. Its implementation will only ensure the successful future and effectiveness of COPAG to serve the astrophysics community and help NASA uncover mysteries of the Universe and discover our cosmic origins.

Shouleh Nikzad, Ph.D.
EC Chair

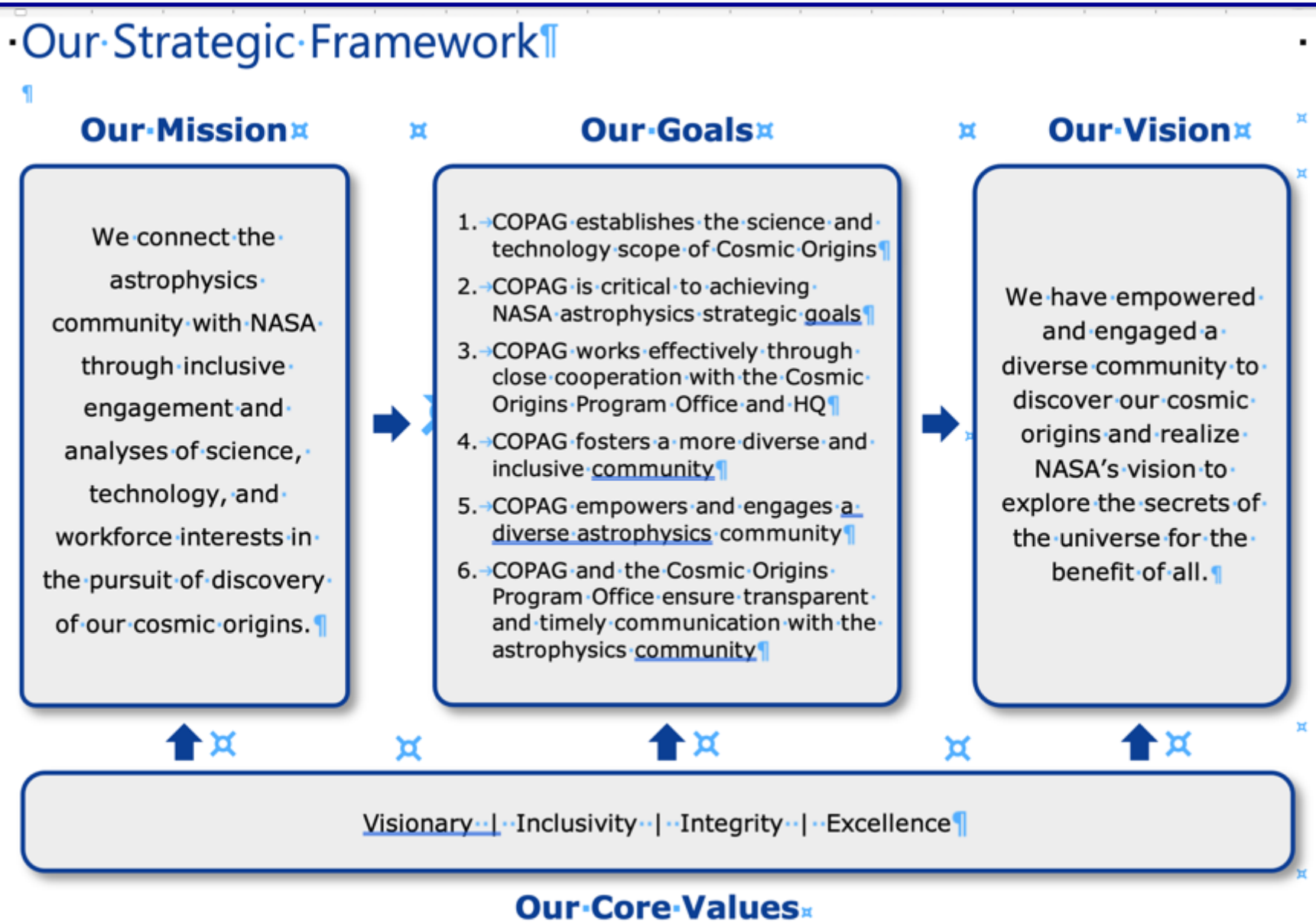
Manuel Bautista, Ph.D.
NASA HQ Program Scientist

Peter Kurczynski, Ph.D.
Chief Scientist, COR

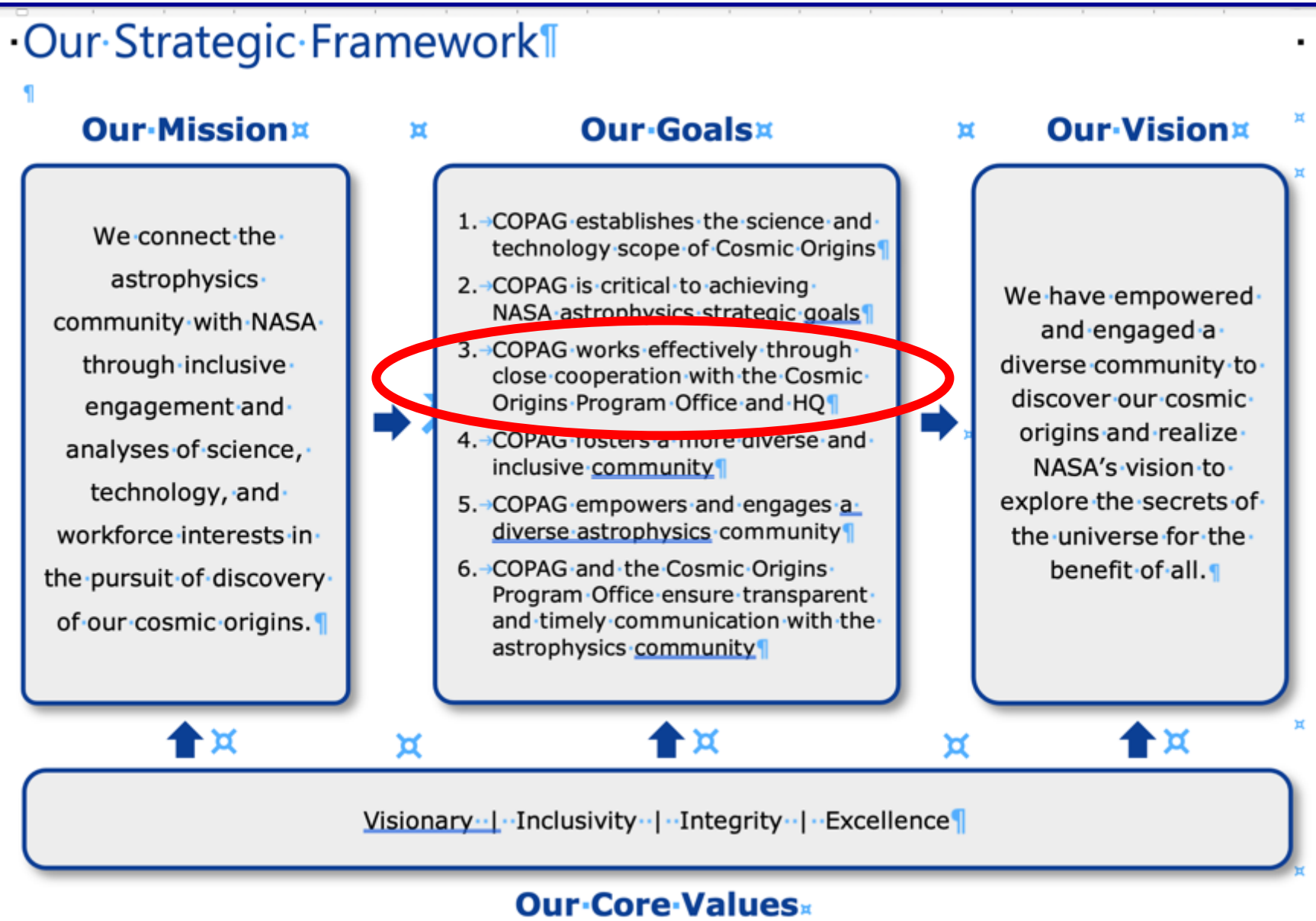
Sabrina Stierwalt, Ph.D.
Vice-chair, COPAG EC

Swara Ravindranath, Ph.D.
Deputy Chief Scientist, COR

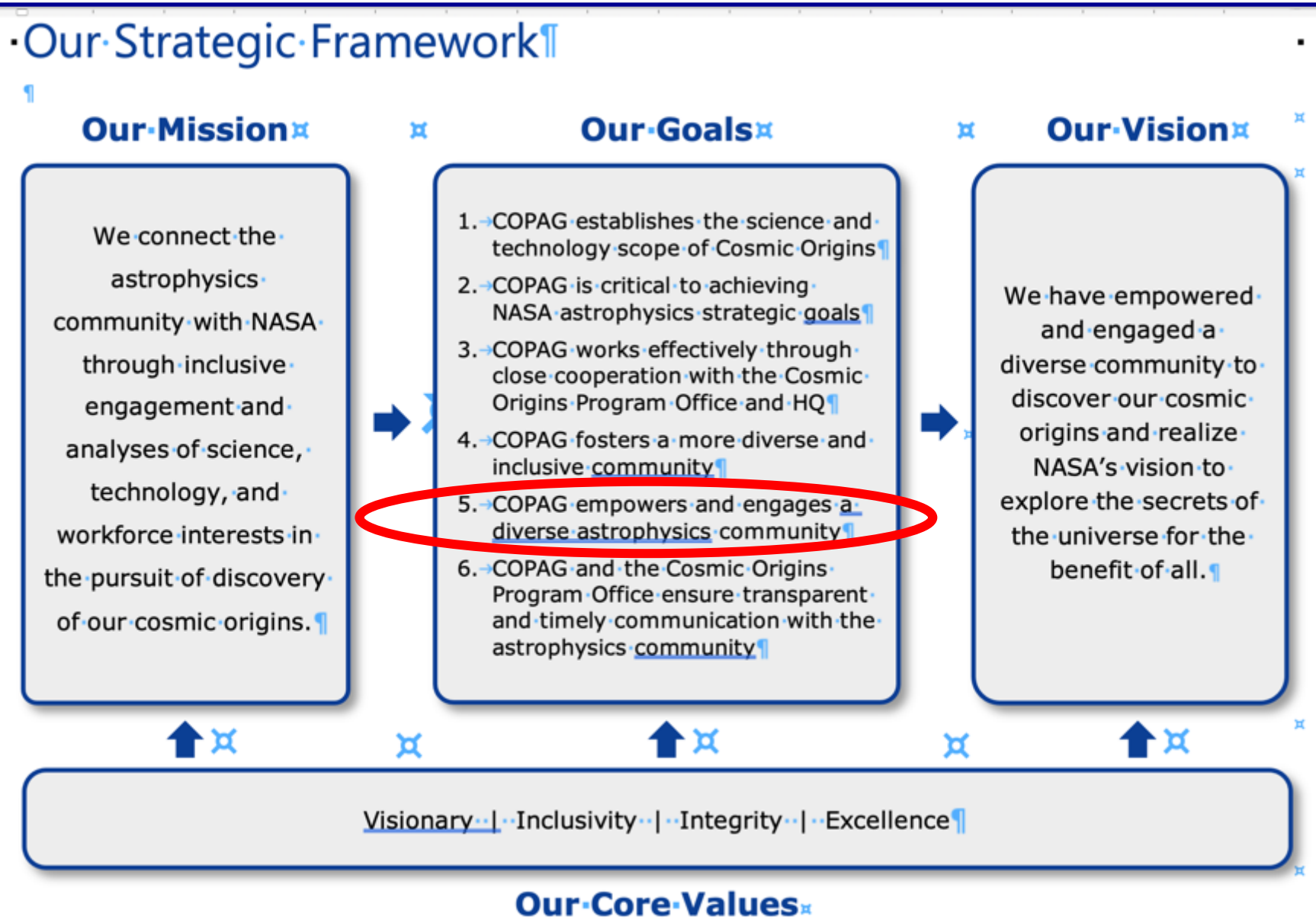
Framework


Our Strategic Framework
Our Mission
We connect the astrophysics community with NASA through inclusive engagement and analyses of science, technology, and workforce interests in the pursuit of discovery of our cosmic origins.
Our Goals
1. COPAG establishes the science and technology scope of Cosmic Origins
2. COPAG is critical to achieving NASA astrophysics strategic goals
3. COPAG works effectively through close cooperation with the Cosmic Origins Program Office and HQ
4. COPAG fosters a more diverse and inclusive community
5. COPAG empowers and engages a diverse astrophysics community
6. COPAG and the Cosmic Origins Program Office ensure transparent and timely communication with the astrophysics community
Our Vision
We have empowered and engaged a diverse community to discover our cosmic origins and realize NASA's vision to explore the secrets of the universe for the benefit of all.
Visionary | Inclusivity | Integrity | Excellence
Our Core Values

Sample Strategic Objectives and Assignments



Sample Strategic Objectives and Assignments



Inaugural Virtual Town Hall-July 10, 2024

- **Town halls are one of the ways we are reaching to the community for engagement, two-way communication, capturing community concerns, and sharing information.**
- **First town hall was held virtually 9-10 am Pacific on July 10, 2024, co-chaired by Shouleh & Sabrina:**
  - **Opening Remarks–**Shouleh Nikzad
  - **Overview of program office –**Swara Ravindranath
  - **HQ overview, stats on the last SAT/APRA, next calls**—Pat Knezek
  - **EC, SIG/STIGs intros and how PAGs and SIGs fit in the ecosystems**–EC members and SIG/STIG leads
  - **HWO Update**–John O'Meara
  - **Cosmic Pathfinders Presentation**–Ron Gamble
  - ***Q&A***—Moderated by Sanchayeeta Borthakur
  - **Closing Remarks**–Sabrina Stierwalt

Second Virtual Town Hall-October 30, 2024

Second town hall was held virtually 9-10 am Pacific on October 30, 2024, Webinar format, Question Submitted and Upvoted

COPAG-EC overview–Shouleh Nikzad

A Conversation with Nicky Fox—Moderated by Pat Knezek

Selected Probes Summary—Pat Knezek

UV White Paper-HWO Technology Presentation—Sara Tuttle

Q&A—Moderated by Sabrina Stierwalt

Upcoming Events, Invitation to EC, Closing—Sabrina Stierwalt

Cosmic Origins Program Analysis Group Events: Meetings

Cosmic Origins Program Analysis Group Town Hall

Virtual
Wednesday, 30 October 2024, 12:00 Noon ET

Dr. Nicola "Nicky" Fox
Associate Administrator (AA)
NASA Science Mission Directorate (SMD)

Dr. Sarah Tuttle
Associate Professor
University of Washington

- Submit a Question

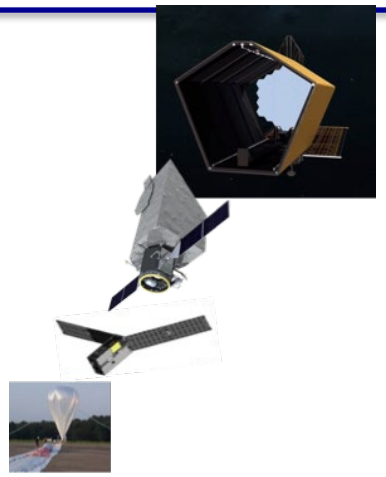
UV Science and Instrumentation Workshop

- The UV Science and Instrument: On the Way to HWO and Beyond was held at *JPL's von Karman auditorium May 7-9*. Optional tour of JPL offered, ~15 early career participants took part in the tour.
- Opening remarks were made by Dr. Mark Clampin, NASA Astrophysics Director followed by a short Q&A period. Welcoming remarks were made by JPL Director, Dr. Laurie Leshin and JPL Astrophysics Director, Todd Gaier.
- Participants with diverse backgrounds, demographics, and institutions including GSFC, JPL, CU-Boulder's LASP, SwRI, UA, ASU, STScI, JHU, IPAC, Caltech, U of Toronto, UW, UC Berkeley, …
- Total participants:183, 50 virtual *7 in-person Roman Technology Fellows!*
- Oral sessions, followed by panels. Posters and poster flash talks. Ample time for breaks provided opportunities for further discussions.
- Draft report created. JATIS Special Issue approved and call is out.
- The community was engaged: DEIA, science, balanced portfolio, mission and instrument concepts from cubesats to HWO.….
- NASA has supported UV science, instruments, and technologies over the years. A great deal of progress has been made even since the LUVOIR and HabEx studies. This enables potential for great contributions in all classes of missions especially in HWO.

UV Science UV Science & Instrumentation Workshop

On the Way to HWO and Beyond

CALL FOR PAPERS--JATIS SPECIAL ISSUE
Ultraviolet Science & Instrumentation: On the Way to Habitable Worlds Observatory and Beyond



Target Publication Date
April-June 2025

Submission Date Deadline
December 1, 2024

Scope

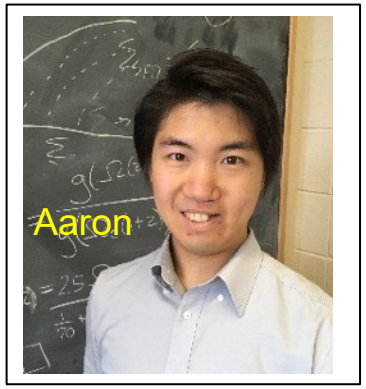
This special section of JATIS focuses on addressing the opportunities and challenges involved in doing science through ultraviolet observations, the gaps and capabilities of ultraviolet instrumentation and technologies, and the mission concepts necessary for achieving science objectives, in a variety of platforms, from CubeSats to the next astrophysics flagship: the Habitable Worlds Observatory.

Areas of interest for this special section include:

- Enabling technologies (detectors, reflective coatings, gratings, filters, μ-shutters, etc.)
- Modeling, simulations, and data analysis techniques and results
- UV Instrumentation, including reviews* (see note below)
- UV Science Cases for HWO & other classes of missions (see website, need to make connection to instrumentation)
- Mission concepts: all classes and in all stages of development and deployment

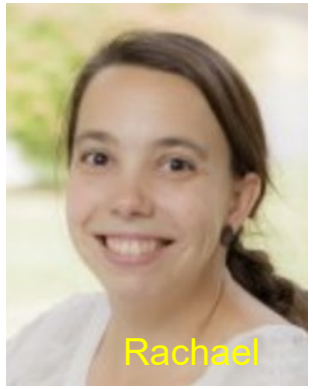
SIG and STIG leadership

Galaxies SIG



AGN SIG

Stars SIG



Cosmic Ecosystem SIG

TDAMM Cross PAG SIG

Co Chairs: Brad Cenko (COPAG), Rebekah Hounsell (PhysPAG), Eric Burns (PhysPAG), Ian Crossfield (ExoPAG)

New !

IR STIG

UV/Visible STIG

SIGs and STIGs Updates

- **IRSTIG**
  - Continuing cadence for webinar ~1 talk/month
  - Planning a workshop in DC May 5-7, 2025 to reconvene the IR community to discuss its future
  - Planning for a winter AAS splinter session focusing on IR contributions to HWO
- **UVSTIG**
  - kicked off new QUEST seminar series in April with talk by Kevin France: *STAMP: Smallest Technology Accelerated Maturation PlatforM*
  - Members are on the guest editorial board for the special edition of Jatis-UV science and Instrumentation
- **DIFFUSED GAS IN COSMIC ECOSYSTEM SIG**
  - Continuing well attended monthly online talks
- **Galaxy SIG**
  - Continuing well attended monthly talks, focusing on early career speakers
- **Stars SIG**
  - Planning to kick off seminars in the Spring 2025, recruiting, also working on COR Science Gaps
- **AGN SIG**
  - Panel Discussion: X-ray and FIR Probe Missions, 14 May 2024, 12:00pm Eastern, 62 attendees
  - Discussion in Mid Nov in coordination with the HWO AGN working group
- **TDAMM CROSS PAG SIG**
  - Workshops, AAS Splinters, White Papers. See PhysPAG presentation for details.

Cosmic Origins Program Office | November 2024

Cosmic Pathfinders Program

National Aeronautics and Space Administration

Workforce Development In The NASA STEM Community

Dr. Ronald Gamble
Cosmic Origins Scientist | Visiting Assistant Research Scientist
Cosmic Origins Program,
NASA Goddard Space Flight Center | Univ. of Maryland—College Park
Center for Research in Space Sciences & Technology

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What is the Cosmic Pathfinders Program?

Cosmic Pathfinders is a program of online events and in-person gatherings that provides an interface to NASA astrophysics. It is motivated by an immediate need to develop the next generation of the STEM workforce in space-related fields. The program includes an ongoing series of virtual colloquia, called Cosmic Chatter, that addresses astrophysics research and professional development topics. The program also includes virtual hack-a-thons that offer instruction for analyzing NASA mission and archival datasets. Finally, the program sponsors in-person sessions at professional society meetings and opportunities for engagement with NASA astrophysics Program Analysis Groups.

~600 STUDENTS & EARLY-CAREERS SIGNED UP!

as of November 2024

Cosmic Pathfinders Activity

As of November 2024

- ***Professional Development:***
  - *Hack Your Career Session | AAS243 Splinter Session | attendance: ~35*
  - Astro Careers Roadmap Workshop | virtual | attendance: ~40
  - How Do You "SciComm"? Science Communication in the World of Social Media | Virtual | attendance: ~40
    - Social Media engagement (personal accounts): >20,000 unique interactions!
  - Calculating Your Confidence: Building a Spacetime Calculator iPhone App | Invited Session | attendance: ~80
  - The Art of Storytelling in STEM: Intersection of Science Communication, Culture, and Art
    - Accepted SACNAS Session: Saturday, November 2, 2024 from 10:30am to 11:45am |
    - Attendance: ~150!
  - Student Leader Publish Review Paper in TDAMM special issue: Jr, Ronald Gamble, et al. "Multi-messenger emission characteristics of blazars." (2024).

- **Student Talks:**
  - *"Simulating Weak Gravitational Lensing in the Roman Space Telescope Using JWST Observed Galaxies"*
  - "No Merger No Cry: Assessing the Purity of Ground-Based Starburst Samples via High-Resolution JWST Imaging in COSMOS-Web"
  - *"Modeling Asteroids and Using Microwave Telescope Data to Constrain Thermophysical Properties"*

Cosmic Pathfinders Reach

~600 STUDENTS & EARLY-CAREERS REACHED GLOBALY

~400 active members on slack

~45% international & ~55% domestic

Garnered interest from professional societies, government entities/offices, NASA missions, universities, & commercial industry.

~12 invitations to present program overview since launch

> 100,000 interactions online (personal accounts)

Huge interest in the anticipated launching of UNIVERSITY CHAPTERS Fall '24 semester!

Questions/Ask to APAC

From Community/Town Hall—July 2024 and SAG Concept

- START/TAG WG/COPAG – Volunteer based, and some funding support would be appreciated especially for early career volunteers.

- Did community input figure in the HST and Chandra Operation Paradigm Change Review decisions, and if so, how?

- The last SAT selections seem to be focused on exoplanet science and less on COR? COR selections were not baseline higher TRL elements that needed to be advanced to 5/6 like a usual SAT selection. There was so much technology that both the TAG and the SWGs have been discussing as vital and central to HWO's capabilities over the last 9-12 months that was left on the cutting room floor. It has left many observers, both inside and outside the respective endeavors, scratching their heads about what this means for the development schedule for HWO and how much of a delay it might have introduced.

- APRA—it's meant to be about new things and not tied to specific missions. *Current call language paraphrase*: Long-term goals are guided by the Decadal Survey. This implies that only technologies that enable high priority decadal science can be proposed to APRA. There's lot of good science to be done that is not a high priority in the Decadal.

- Potential SAG —*Stellar Age Ladder*

  Stellar Age Ladder came from the panel in COPAG/Joint SIG Splinter that we held at Winter AAS 2024 as a major coordinating community effort to address forefront science. Conceptually, it was to address "ages" being measured for high redshift galaxies. How do we validate that? how do we connect Kepler seismic ages for individual stars, to star clusters, to stellar population models that are ultimately used. JWST gives us a larger horizon for star clusters, can we use that? Seismology in Roman could give us many more ages locally.