



# The Physics of the Cosmos Program Office

**Francesca Civano and Brian Humensky**

PhysCOS Chief Scientists

*NASA – GSFC*

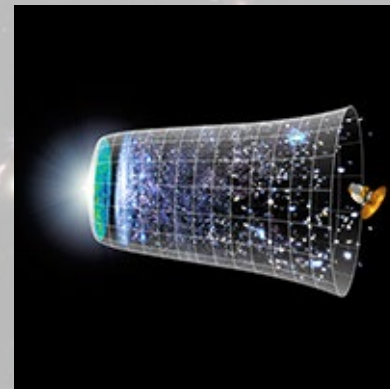
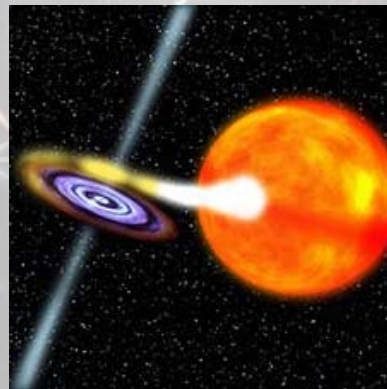
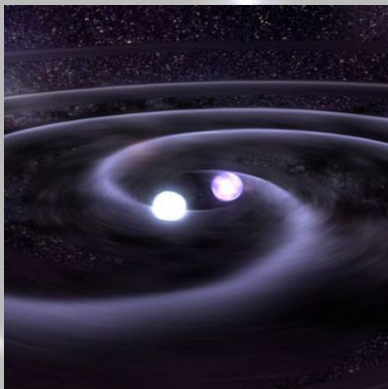
AAS 243 - NOLA 2024



# PhysCOS COR Program Office Purpose

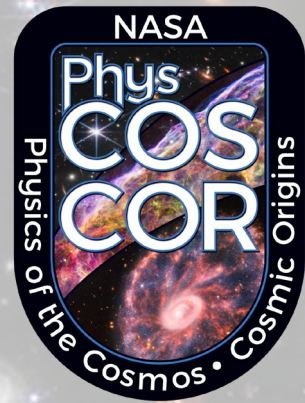


Physics of the Cosmos spans the fields of high-energy astrophysics, cosmology, and fundamental physics, to explore some of the most fundamental questions regarding the physical forces and laws of the universe:





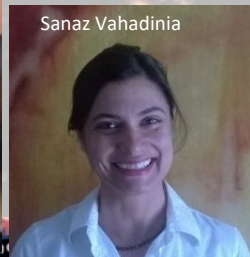
# PhysCOS Program Office Purpose



- Managed by the PhysCOS/COR Program Office at NASA's Goddard Space Flight Center and reported to NASA Headquarters.
- The program office supports the community by
  - Facilitating the PhysCOS Program Analysis Group (PhysPAG);
  - Facilitating the formation of new Science Interest and Analysis Groups
  - Informing members of upcoming funding and engagement opportunities;
  - Soliciting and prioritizing community-identified science and technology gaps;
  - Managing funded technology projects with benefits to PhysCOS science;
  - Maintaining science cognizance to enable more successful NASA strategic planning;
  - Community engagement: AAS, HEAD, SACNAS, NSBP



# NASA Physics of the Cosmos and Cosmic Origins Program



HQ Program Executive: Shahid Habib  
 HQ Program Scientist: Valerie Connaughton  
 HQ Dep. Program Scientist: Sanaz Vahadnia

**Program Management**  
*Program Manager:* Barbara Grofic  
*Deputy Program Manager:* Cathy Barclay  
*Program Business Manager:* Tracy Felton-Robinson  
*Administrative Assistant:* Susan Wright



**Resources Management Group**  
*Deputy Program Business Manager:* Patricia Smith  
*Programmatic Officer:* Patricia Butler\*  
*Resource Analyst:* Jessie Hughes\*  
*Resource Analyst:* Ryan Bradley\*

**Procurement Support:**  
 Malika Graham

**Program Support**  
*IPTL:* Patricia Butler\*  
*PSM:* Mary Dobay\*



**Program Science**  
*PhysCOS Chief Scientists:* Dr. Francesca Civano, Dr. Brian Humensky  
*COR Chief Scientist:* Dr. Peter Kurczynski  
*Deputy COR Chief Scientist:* Dr. Swara Ravindranath\*  
*PhysCOS/COR Science PSM:* Stephanie Clark\*

**Strategic Studies & Implementation**

**Program Technology & Systems Engineering**  
*Program Systems Engineer:* Dr. Mark Matsumura^  
*Technology Development Manager:* Rachel Rivera  
*Chief Technologist:* Jason Derleth  
*Program Technologist:* Dr. Opher Ganel\*

**ULTRASAT MOU Implementation**  
*Initiative Manager:* Barbara Grofic  
*Deputy Initiative Manager:* Cathy Barclay  
*Scientist:* Dr. James Rhoads  
*System Engineer:* Dr. Mark Matsumura

**LISA Study**  
*Study Manager:* Terry Doiron  
*Study Scientist:* Dr. Ira Thorpe  
*System Engineer:* Norman Rioux^

**Fornax Initiative**  
*Initiative Manager:* Patrick Coronado\*

**Decadal Studies**

<b>TDAMM Study</b> <i>Study Manager:</i> Dr. Chris Roberts <i>Study Scientist:</i> Dr. Brian Humensky <i>Study Systems Engineer:</i> Dr. Mark Matsumura <i>Study Technologist:</i> Jason Derleth	<b>USORT</b> <i>Study Manager:</i> Lee Feinberg <i>Study Technologist:</i> Jason Derleth
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# PhysCOS Program Analysis Group Executive Committee - 2024



Fifteen Members

R. O'Brient – JPL  
*IP SIG*

V. Miranda – Stony Brook  
*CoS SIG*

M. Errando - WU SL  
*GR SIG*

C. Mingarelli - Yale  
*GW SIG*

B. Grefenstette - Caltech  
*XR SIG*

R. Hounsell - UMBC  
*CoS SIG*

A. Corsi – TTU  
*GW SIG*

Stephanie Wissel - PSU  
*CR SIG*

D. Pooley – Trinity U.  
*XR SIG – Vice Chair*

K. Madsen - GSFC  
*XR SIG*

E. Burns – LSU  
*TDAMM SIG*

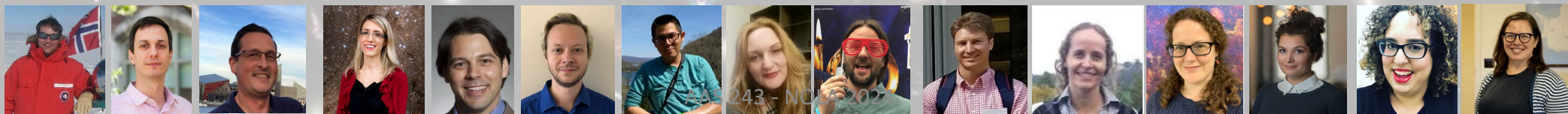
C-T. Chen - USRA  
*XR SIG*

A. Meli – NC A&T  
*CR SIG & Chair*

J. Finke - NRL  
*GR SIG & Chair Emeritus*

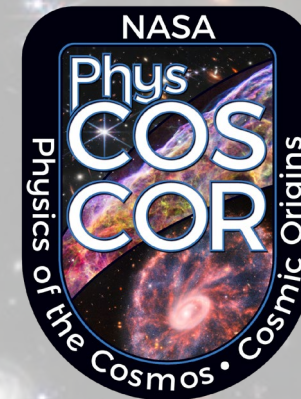
J. Perkins - GSFC  
*GR SIG*

Thanks to out-going members:  
G. Tremblay (SAO)  
V. Glusevic (USC)  
A. Romero-Wolf (JPL)



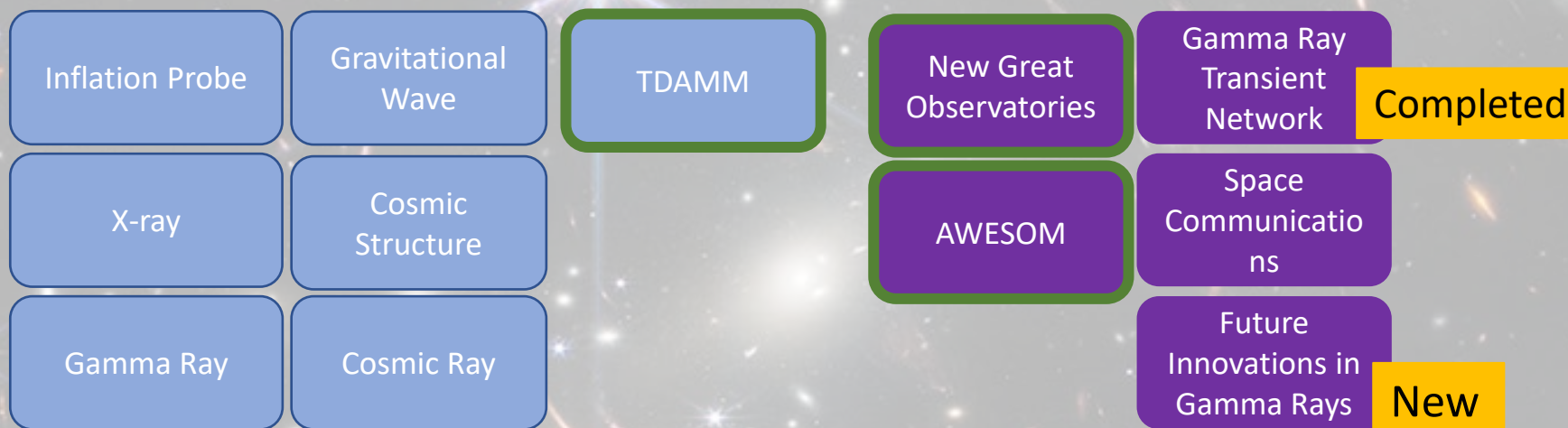


# Science Interest Groups and Science Analysis Groups



Science Interest Groups (SIGs) Science Analysis Groups (SAGs)

Cross-PAG



## Highlights:

- **Completed** the Gamma-ray Transient Network SAG Report
- **Just started** a new Gamma-Ray SAG



# What do SIGs DO?

- Organize sessions at AAS/HEAD/APS meetings
- Discussions /online seminars
- Organizing white papers in response to questions/studies – as done for Astro 2020
- Starting SAGs to address a specific question/topic and produce a report (~1 year long)
- Anything else that you think of (within reason)
  - E.g., is there a topic that needs a workshop to to address it?



- [Cosmic Ray SIG](#)
- [Cosmic Structure SIG](#)
- [Gamma Ray SIG](#)
- [Gravitational Wave SIG](#)
- [Inflation Probe SIG](#)
- [TDAMM SIG](#)
- [X-Ray SIG](#)

# Physics of the Cosmos

Exploring fundamental questions regarding the physical forces of the universe

[Session at AAS Winter Meeting](#)

[PhysCOS & COR on Tap at 243rd AAS Meeting](#)

[PhysCOS News ...](#)



## About Physics of the Cosmos

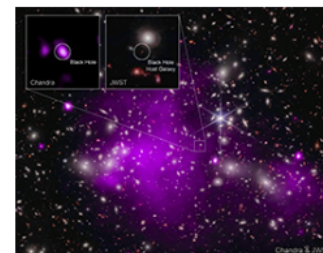
The Physics of the Cosmos (PhysCOS) Program is one of three focused programs contained within NASA's [Astrophysics Division \(APD\)](#), together with [Cosmic Origins \(COR\)](#) and the [Exoplanet Exploration Program \(ExEP\)](#). PhysCOS lies at the intersection of physics and astronomy. Its purpose is to explore some of the most fundamental questions regarding the physical forces and laws of the universe: the validity of Einstein's General Theory of Relativity and the nature of spacetime, the behavior of matter and energy in extreme environments, the cosmological parameters governing inflation and the evolution of the universe, and the nature of dark matter and dark energy.

Located at the Goddard Space Flight Center, the PhysCOS Program Office supports, tracks, and studies a suite of science missions and enabling technologies that focus on specific aspects of these topics. PhysCOS activities include:

<https://pcos.gsfc.nasa.gov>

- Keeping its members informed of upcoming developments and funding opportunities, both within NASA and at other agencies engaged in science and technology activities.
- Soliciting, and prioritizing community-identified technology gaps that must be closed to enable or enhance future strategic Astrophysics missions with benefits to PhysCOS science. This technology gap prioritization informs APD's strategic technology development solicitation, selection, and funding.
- Managing funded technology projects with benefits to PhysCOS science.

### NASA Telescopes Discover Record-Breaking Black Hole



Astronomers have discovered the most distant black hole yet seen in X-rays, using NASA's Chandra X-ray Observatory (purple) and infrared data from NASA's James Webb Space Telescope (red, green, blue). The black hole is at an early stage of growth that had never been witnessed before, where its mass is similar to that of its host galaxy. This result may explain how some of the first supermassive black holes in the universe formed. [Read more »](#)

### News

4 January 2024

Physics of the Cosmos at the





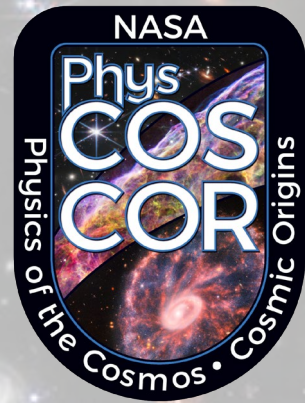
# PhysCOS & the Astro2020 Report



- What PhysCOS science should drive the design of the Future Great Observatories?
  - PhysPAG, SIGs and SAGs
  - Precursor and Preparatory science
  - Science with Habitable Worlds Observatory (HWO)
- Technology investments to enable X-ray Probes
- Time Domain and Multi-Messenger Astrophysics
  - **Astrophysics Cross-Observatory Science Support (ACROSS)** pilot initiative to incentivize and facilitate the planning and execution of TDAMM science cases.
  - **TDAMM Science Interest Group** spinning up – kick-off session 2-3pm today in 244/245!
- State of the profession: **AWESOM SAG.**

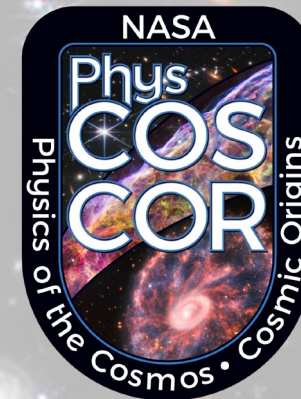


# How YOU can get involved



- Join our mailing list: [PCOS-News-join@lists.nasa.gov](mailto:PCOS-News-join@lists.nasa.gov) with Subject="join"
- Join the PhysPAG Executive committee: nominations in the fall
- Join the Science Groups:





Time	Topic	Speakers
9:00am – 9:15am	CSs	F. Civano and B. Humensky
9:15am – 10:05am	CoS SIG	R. Hounsell: Introduction (5 min), J. Mirocha: Astrophysics and Cosmology with SPHEREx (15 min), R. Gerras: Updates on Simons Observatory (15 min), D. Scolnic: Cosmological Measurements with Roman from Type Ia Supernovae (15 min)
10:05am – 10:20am	GTN SAG	E. Burns: GTN SAG Report Summary & Action Items
10:20am – 10:35am	TDComm SAG	J. Racusin: TDComm SAG Report Status & Updates
10:35am – 10:50am	Break	
10:50am – 11:10am	START Talk	J. O'Meara and C. Dressing: PhysCOS Community Involvement in START Activities
11:10am – 12:05pm	XR SIG	B. Williams: XRISM First Observations (15 min), K. Madsen: Updates from Athena (15 min), D Pooley: X-ray Precursor Science Gaps (15 min), Open Discussion (10 min)
12:05pm – 12:15pm	GR SIG	M. Errando (GR SIG Co-Chair): News from SIG and Updates on Precursor Science Gaps
12:15pm – 12:50pm	GW SIG	C. Mingarelli: Introduction (5 min), J. Key: Connections Between LIGO and LISA Science (15 min), Tingting Liu: NanoGrav Updates (15 min)
12:50pm – 2:00pm	Lunch Break	
2:00-3:00pm	TDAMM SIG (Rm 244/245)	