

A. Cosmic Pathways Program Schedule

9:00-10:00 Conference Registration and breakfast

Location: Ground floor lobby

10:00 Conference introduction

Location: Room MR3

Matthew Wright

10:00-10:20 Be A Shark

Location: Room MR3

Kyle Cash, Zahin Ritee, and Matthew Wright

Abstract: In this workshop, congress participants will channel their inner shark to explore taking control over their career pathways and how to overcome hurdles. Participants will learn how to actually network and how to use their own sharkiness to innovate, have fun, and take their physics career to the next level.

10:20-10:50 Graduate School in Physical Sciences

Location: Room MR3

Introduction by Kylie Goldade and Marlene McKinney

Brittney Hauke, Molly Mcdonough, and James St. John

Abstract: This panel discussion will inform conference goers about opportunities to attend graduate school, many of the benefits of obtaining a Ph.D. and some of the perils. The conference will also introduce Material Science as a career and will discuss attending the 2025 Sigma Pi Sigma Congress (aka SPSCong).

10:50-11:00 Break

11:00-12:00 Physical Science Career Panel

Location: Room MR3

Introduction by Annie Maloney and Katyanna Sciorra

Moderated by Brad Conrad

Panelists Fabian Chacon, Mickey Chiu, and Navjot Kaur

Abstract: This panel discussion will inform conference goers about divergent career paths for students who study physics. This panel features engineers, industry experts, and leaders at national labs.

12:00-1:30 Lunch

Location: Ground floor lobby

Ask an expert! Career, College, and Industry Floor Show

Location: Cafe and Ground floor lobby

Poster Session

Location: Ground floor lobby

Odd Posters 12-12:45

Even Poster 12:45 - 1:30

For poster assignments see E. Poster Abstracts

1:30-4:00 Workshops and Research Presentations

Location: Various locations

See: B. Research Presentation Sessions, C. Research Presentation Abstracts, and D. Workshop Schedules for further information

1:30 - 2:10 Workshop Session I

Research Talks I

2:20 - 3:00 Workshop Session II

Research Talks II

3:10 - 3:50 Workshop Session III

Research Talks III

4:00-5:00 Symphonies in Space: 'Listening' to the Universe with Gravitational Waves

Location: Room MR3

Introduction by Amii Matamoros Delgado and Matthew Gootman

Rob Coyne

Abstract: Since the first days that humans gazed up into the night sky, we've mostly used light to learn about the universe. But that changed in 2015 when, on September 14th, the Laser Interferometer Gravitational-wave Observatory (LIGO) made the first direct observation of gravitational waves from a pair of black holes that spiraled into each other and merged. Since then, we have observed gravitational waves from numerous black holes and neutron stars, opening up a new era in astronomy. In this talk, we'll learn about gravitational waves, how we detect them, and how they offer us a whole new way of observing the universe. In a way, if light allows us to 'see' the cosmos, gravitational waves allow us to 'listen' to it, enabling new discoveries that early astronomers could have only dreamed of.

B. Research Presentation Sessions (1:30pm-4:10pm)

This session is sponsored by Rochester Symposium for Physics Students

Refer to C. Research Presentation Abstracts for further information about each talk.

Session 1A (Room MR408) – Renewable Energy (AA-10)

Chair: Prof. Jerome Fung, Ithaca College

1:30-2:10pm

Exploring Wind Turbine and Solar Panel for a Better Environment

Adam Choudhry, St. John University

In-Depth Look at Solar Panels and Windmills for Energy Production

Joshua Rivera, St. John University

In-depth characterization of certain wind turbines and solar panels for the future of renewable energy

Alexander Ram-Singh, St. John University

Session 1B (Room MR410) – Astronomy & Astrophysics (AA-11)

Chair: Prof Kelly Douglass, University of Rochester

1:30-2:10pm

Investigating Radiative Levitation in White Dwarf Stars by Large-Scale Molecular-Dynamics Simulations

Annie L. Maloney, University of Rochester

Searching for Pulsation in Low Mass Stars using Unsupervised Learning Techniques

Waly M Z Karim, University of Rochester

Analysis of pion field EFT parameters for large-scale structure

David Muqattash, Manhattan University

Session 1C (Room MR417N) – Physics Education (AA-12)

Chair: Prof. Michael Pfenning, United States Military Academy

1:30-2:10pm

Bringing Experiment into the Classroom Using a Quantum Interference Effect in Rubidium

Christian Custodio, United States Military Academy

Atom-based RF Quantum Sensors: Establishment of an Undergraduate QIS Research Laboratory

Tyler Catapano & Michael Speer, United States Military Academy

Pulsed Power Inertial Fusion

Eleanor Gautsch & Faith Garrett, University of Rochester

Session 2A (Room MR408) – Condensed Matter (BB-13)

Chair: Prof. Bart Horn, Manhattan College

2:20-3:00pm

Characterizing the three-body chaotic motion of vortices in a Bose-Einstein condensate

Juan Pelaez, University of Rochester

Machine Learning Prediction and Experimental Synthesis of New High-Temperature Superconductors

Edward Jansen, Adelphi University

The Continuing Story of Perovskite Titanates: Connecting Electrical and Optical Properties to Structural Modification

Ethan Haley, Manhattan University

Session 2B (Room MR410) – Particle Physics (BB-14)

Chair: Prof Kelly Douglass, University of Rochester

2:20-3:00pm

The Study of Quantum Entanglement in the HZZ System in The Standard Model and Beyond

Jack Simoni, Manhattan University

Parametrizations of Electron Scattering Form Factors for Elastic Scattering and Electron-Excitation of Nuclear States for AL-27 and Ca-40

Amii Matamoros Delgado, University of Rochester

A Multi-Messenger Exploration of Neutrino-Emitting Blazars, the Most Energetic Persistent Particle Accelerators in the Universe

Mina Mori, Hunter College High School

Session 2C (Room MR417N) – Plasma Physics (BB-15)

Chair: Prof. Michael Pfenning, United States Military Academy

2:20-3:00pm

THOR: Towards Precise Plasma Diagnostics

Cole Jerum, University of Rochester & Timothy Seo, Pittsford High School

Distributed CASES Array for Mid-Latitude Ionospheric Characterization

Sidharth Hedge, United States Military Academy

Identifying Runaway Supermassive Black Holes Via Broad Emission Line Shapes

Kaya Miller, Rochester Institute of Technology

Session 3A (Room MR408) – Medical & Biological Physics (CC-16)

Chair: Prof. Merideth Frey, Sarah Lawrence College

3:10-3:50pm

Using an Infrared Laser to Draw Elastin Microstructures

Marlene M. McKinney, CUNY City College

Creating a Diagnostic Tool for Parkinson's Disease Using a KNN Algorithm

Kylie Goldade, Adelphi University

Rhizobium Tropici-Produced Biopolymer: Analyzing Its Impact on the Phenotype and Genotype of Arabidopsis Thaliana

Christian Chan, South Side High School

Session 3B (Room MR410) – From Mechanics to Dynamics (CC-17)

Chair: Prof. Bart Horn, Manhattan College

3:10-3:50pm

On Noether's Theorem and Its Applications in Classical Mechanics and Quantum Field Theory

Hasin A. Shaykat, The KewForest School

Investigating the stability of trojan and horseshoe co-orbitals in extrasolar multi-planet systems

Mariah C. Jones, Vassar College

Flight Dynamics: Exploring the Impact of Wing Design on Fighter Jet Speed -From Skies to the Tracks

Armina Yetimoglu, Lindenhurst High School