

Transforming lives through educational opportunity

32ND ANNUAL KEARNS SUMMER RESEARCH SYMPOSIUM

August 2, 2024 Feldman Ballroom

The David T. Kearns Center for Leadership and Diversity at the University of Rochester strives to expand the educational pipeline through the doctoral degree for low-income, first-generation college, and underrepresented minority students.



Schedule Overview & Sessions

| 9:00 am: | Welcome & Opening |
|-----------|--|
| | Dr. Beth Olivares, Associate Vice Provost for Academic Equity & Executive Director of the Kearns Center, University of Rochester Dr. Stephen Santa-Ramirez, Assistant Professor in Educational Leadership and Policy, University at Buffalo |
| 9:30 am: | Panel Discussion AModerator: Dr. Stephen Santa-RamirezPresenters: Della Evans (Chemistry)Alex Gandy & Alexandro Balarezo (ECE)Icesis L. Hinkson-Serrano (McNair)Odin Schor (Physics & Astronomy)Katie E. Mann (Photonics) |
| 10:10 am: | Break |
| 10:25 am: | Oral Presentation Block A |
| 11:25 am: | Break |
| 11:40 am: | Poster Presentation Block A |
| 12:40 pm: | Lunch |
| 1:20 pm: | Panel Discussion BModerator: Dr. Stephen Santa-RamirezPresenters: Krishangee Bez (Chemistry)Devin Johnson (ECE)Marvin Calderon (McNair)D'Ross Prince & Taylor Madison Mae Williams (Physics & Astronomy)Veronica Masztalerz (Photonics) |
| 2:05 pm: | Break |
| 2:20 pm: | Oral Presentation Block B |
| 3:15 pm: | Break |
| 3:25 pm: | Poster Presentation Block B |
| 4:25 pm: | Closing Dr. Miguel Baique, Director of the Kearns Center, University of Rochester |

Oral Presentation Breakout Room Sessions

Oral Presentation Block A 10:25 AM – 11:25 AM

Douglass 401

Kelvin Nguyen (McNair) Emma Gemberling (McNair) Tima Yabar-Herrera (McNair) Rosebell Onuma (McNair) Jaydee Ortez (McNair) Yuliahnna Mendiola (McNair) London Paige (ECE) Ismerai Gonzalez (ECE) Omar Khalil (ECE)

Gamble Room

Amber Krape (Physics & Astronomy) Samantha Conrow (Physics & Astronomy) Lars Pedersen (Physics & Astronomy) Samantha Andes (Chemistry) Tess Anthony (Chemistry) Kinsey Clark (Chemistry) Josephine Hastings (Chemistry) Wesley Gibson (Chemistry)

Humanities Conference Room D

Molly Cohan (Photonics) James Kong (Photonics) Zahidul Zahin (Photonics) Alex Mavian (Photonics) Cailey Varnell (Photonics) Samuel Azzarello (Physics & Astronomy) Krist Ha (Physics & Astronomy) Aiden Karpf (Physics & Astronomy) Oral Presentation Block B 2:20 PM – 3:15 PM

Douglass 401

Kai Hua Liu (McNair) Emily DeVeyra (McNair) Najla Silmi (McNair) Xiomara Ortiz Lopez (McNair) Nichole Taylor (McNair) Paola Almendarez (McNair) Ann-Rita Nanyunja (ECE) Christiana Murph (ECE) Maria Camila Gonzalez Garcia (ECE)

Gamble Room

JJ Pimentel (Physics & Astronomy) Stephen Heritage (Physics & Astronomy) Carrel Moralez (Physics & Astronomy) Talia Senall (Physics & Astronomy) Andrew Saulsbury (Chemistry) Leah Coffey (Chemistry) Jimmy Heath (Chemistry) Nathan Venegas (Chemistry)

Humanities Conference Room D

Katie Lee (Photonics) Nathan Campos (Photonics) Alyssa Almekinder (Photonics) Christopher J. Ryan (Photonics) Jayvyn Dennis (Photonics) Ben Furst (Physics & Astronomy) Reid Pfaltzgraff-Carlson (Physics & Astronomy) Sanya Arora (Physics & Astronomy)



Poster Presentation Block A

11:40 AM – 12:40 AM

Quantum Computing on Long Time Scales: Nuclear Spin States as a Quantum Memory

Aiden Karpf, Mentor: Dr. John Nichol (Physics & Astronomy)

3D Blood Volume Reconstruction: Ultrasound Studies in Phantom Models and Mice

Alex Gandy, Mentor: Dr. Marvin Doyley (Electrical & Computer Engineering)

Controlling the Degree of Coherence in Quantum Ghost Imaging Systems

Alex Mavian, Mentor: Dr. Robert Boyd (Photonics)

3D Blood Volume Reconstruction: Ultrasound Studies in Phantom Models and Mice

Alexandro Balarezo, Mentor: Dr. Marvin Doyley (*Electrical & Computer Engineering*)

Detector Uncertainties for Neutrino Oscillation Model at DUNE Near Detector

Amber Krape, Mentor: Dr. Chris Marshall (Physics & Astronomy)

Peak Power Analysis of Ultrashort Pulse Sources

Cailey Varnell, Mentor: Dr. William Renninger (Photonics)

Self-Assembly and Hydrogelation of Sulfur-Containing Amino Acids Della Evans, Mentor: Dr. Bradley Nilsson *(Chemistry)*

Characterization of Human Glial Progenitor Cell Age on Engraftment, and Spike-In Tumorigenicity

Emma Gemberling, Mentor: Dr. Lisa Zou (McNair)

Identification of Autophagy Receptor for Golgi in Fission Yeast

Icesis L. Hinkson-Serrano, Mentor: Dr. Ning Wang (McNair)

Ultrasound-Tomography-Guided Nanodroplet Activation for Image-Guided Targeted Drug Delivery

Ismerai Gonzalez, Mentor: Dr. Mohammad Mehrmohammadi (*Electrical & Computer Engineering*)

Substrate Self Alignment James Kong, Mentor: Dr. Jaime Cardenas (*Photonics*)

Poster Presentation Block A (Cont.)

11:40 AM – 12:40 AM

Understanding Skin Tone Identification in Puerto Rican Children Jaydee Ortez, Mentor: Dr. Isobel Heck (*McNair*)

Hydrosilylation reactivity of anionic Nickel (0) complexes supported by bidentate pyridonate ligands Jessica Navarro Vega, Mentor: Dr. Rose C. Kennedy *(iScholar)*

Analysis of Thermal Expansion in Crystal Structures Using Variable-Temperature Low-Frequency Vibrational Spectroscopy Josephine Hastings, Mentor: Dr. Michael Ruggiero (*Chemistry*)

Dual Capture of Enzymatic Activity and Concentration for Enterokinase and Collagenase Using Photonic Sensors. Katie E. Mann, Mentor: Dr. Benjamin L. Miller (*Photonics*)

Generalized L^p Bounds on the Solution to the Wave Equation in R^3 Kelvin Nguyen, Mentor: Dr. Alex Iosevich (*McNair*)

Facilitating Redox Reactivity with Hydrogen Peroxide at Zr(IV) Through a Lindqvist Polyoxovanadate Support Kinsey Clark, Mentor: Dr. Ellen Matson (*Chemistry*)

Laser Frequency Stabilization using Frequency Modulation (FM) Spectroscopy Krist Ha, Mentor: Dr. Nicholas P. Bigelow (*Physics & Astronomy*)

Using CAD with FLASH Lars Pedersen, Mentor: Dr. Petros Tzeferacos (*Physics & Astronomy*)

Assessing Mouse Model Behavior through Machine Learning Techniques

London Paige, Mentor: Dr. Julian Meeks (Electrical & Computer Engineering)

2nd order Correlation Measurement of Single Photons over ROQnet Mariano Alcalde, Mentor: Dr. Nick Vamivakas (*CCI*)

Laser Heating in Metal Coatings & Gold Nanoparticle Plasmonics Molly Cohan, Mentor: Dr. Andrea Pickel (*Photonics*)

Parametrization of Fusion Characteristics Odin Schor, Mentor: Dr. Sheth Nyibule (*Physics & Astronomy*)

Poster Presentation Block A (Cont.)

11:40 AM – 12:40 AM

Exploration of Autoencoder-based Side-channel Attacks

Omar Khalil, Mentor: Dr. Selcuk Kose (*Electrical & Computer Engineering*)

Accumulation of Microplastics and Microfibers in Xenopus laevis Tadpoles

Rosebell Onuma, Mentor: Dr. Jacques Robert (McNair)

Synthesis and Characterization of Temperature-Sensitive Redox-Active Dinuclear Complexes

Samantha Andes, Mentor: Dr. Agnes Thorarinsdottir (Chemistry)

Enhanced Shock Capturing for Nodal Radial Basis Functions

Samantha Conrow, Mentor: Dr. Pierre Gourdain (Physics & Astronomy)

Classical Stochastic Analysis of Double Quantum Dots Coupled to Reservoirs

Samuel Azzarello, Mentor: Dr. Gabriel Landi (Physics & Astronomy)

Inhibiting Crystallin Aggregation via Amphiphilic Dendrons

Tess Anthony, Mentor: Dr. Benjamin Partridge (Chemistry)

Epigenetic Control of Erythropoiesis

Tima Yabar-Herrera, Mentor: Dr. Laurie Steiner (McNair)

Synthesis of aryldithiocarbamate ligands with metal catalysts attached

Wesley Alabastro, Mentor: Dr. William D. Jones (CCI)

Pd-Catalyzed Heteroannulation of Linear Vinylogous Amine Ambiphiles

Wesley Gibson, Mentor: Dr. Shauna M. Paradine (Chemistry)

Responsibility, Entitlement, and Leadership: Investigating Children's Leadership Expectations

Yuliahnna Mendiola, Mentor: Dr. Isobel Heck (McNair)

Automated Characterization of Nano-Photonic Cavities

Zahidul Zahin, Mentor: Dr. Pablo Postigo (Photonics)

Terahertz Time Domain Spectroscopy

Zeus Chavez, Mentor: Dr. Michael Ruggiero (iScholar)

Poster Presentation Block B

3:25 PM - 4:25 PM

Automation of alignment of an eye-tracker and a large screen display.

Alyssa Almekinder, Mentor: Dr. Jannick Rolland (Photonics)

Laser Modification of Si Surface for Area-Selective Atomic Layer Deposition Applications

Andrew Saulsbury, Mentor: Dr. Alexander Shestopalov (Chemistry)

Analysis of Vessel Pulsation Using FlowSAM-based Segmentation Tracking

Ann-Rita Nanyunja, Mentor: Dr. Jiebo Luo (Electrical & Computer Engineering)

Profiling Wavelength Shifting Fibers and Cosmic Events in the T2K's Super Fine Grained Detector

Ben Furst, Mentor: Dr. Kevin McFarland (Physics & Astronomy)

Measuring Quantum States with High-Dimensional Spin Rotations

Carrel Moralez, Mentor: Dr. Machiel Blok (Physics & Astronomy)

Analysis of Vessel Pulsation Using FlowSAM-based Segmentation Tracking

Christiana Murph, Mentor: Dr. Jiebo Luo (Electrical & Computer Engineering)

Experimental Evidence of Supergrowth in Speckle

Christopher J. Ryan, Mentor: Dr. Nick Vamivakas (Photonics)

Automation of a Shearing Interferometer to improve electron density measurement accuracy: Hardware Design

D'Ross Prince, Mentor: Dr. Pierre Gourdain (Physics & Astronomy)

Developing An Experimental Platform To Test Combined Ultrasound And Optical Imager For Breast Cancer

Devin Johnson, Mentor: Dr. Regine Choe (Electrical & Computer Engineering)

Testing HOPE Datacom Chips to Measure Loss, Interference, and Quantum Efficiency

Emily DeVeyra, Mentor: Dr. Jaime Cardenas (McNair)

Polarization monitoring in silicon waveguides using optical test points

Jayvyn Dennis, Mentor: Dr. Thomas Brown (Photonics)

Poster Presentation Block B (Cont.)

3:25 PM - 4:25 PM

Impact of Composition and Surface Chemistry on the Ability of Ternary Cobalt Spinel Oxides to Photodegrade a Model Pollutant Jimmy Heath, Mentor: Dr. Kathryn E. Knowles (*Chemistry*)

Measuring Rotation Curves of Spiral Galaxies with DESI

JJ Pimentel, Mentor: Dr. Kelly Douglass (*Physics & Astronomy*)

Physics Informed Tensor Train Structures for the Efficient Simulation of Open Quantum Dynamics

Juan Camilo Rodriguez Betancourt, Mentor: Dr. Ignacio Franco (iScholar)

Validation and Evaluation of XSensor Insoles to Study Biomechanics of Walking

Kai Hua Liu, Mentor: Drs. Amy L. Lerner Cherice Hill (McNair)

Multi-Wavelength Imaging to Improve Bruise Contrast Across Skin Pigmentations

Katie Lee, Mentor: Drs. Andrew Berger & James M. Zavislan (Photonics)

Exploring the Vibrational Modes and Reorganization Energy of Organic Dyes in Solar Cells using Raman Spectroscopy

Krishangee Bez, Mentor: Dr. David McCamant (Chemistry)

Measuring Adsorption Enthalpies of PFOS and Organics on Carbon Fiber Paper

Leah Coffey, Mentor: Dr. Astrid M. Müller (Chemistry)

Reconstruction Techniques to Improve Ultrasound Tomography Image Quality

Maria Camila Gonzalez Garcia, Mentor: Dr. Trevor Mitchman (*Electrical & Computer Engineering*)

Post-Shot Analysis of Debris of Diamond Anvil Cells at the OMEGA EP Laser Facility

Marvin Calderon, Mentor: Dr. Terry-Ann Suer (McNair)

Preclinical Imbalance and Auditory Sensitivities with Two Migraine Triggers

Najla Silmi, Mentor: Dr. Anne Luebke (McNair)

Poster Presentation Block B (Cont.)

3:25 PM - 4:25 PM

Multi-Wavelength Imaging to Improve Bruise Contrast Across Skin Pigmentations

Nathan Campos, Mentor: Drs. Andrew Berger & James M. Zavislan (Photonics)

Preparation and C-C Activation of Octaphenylcubane.

Nathan Venegas, Mentor: Dr. William D. Jones (Chemistry)

Is AI Capable of Creativity? An Anchor in the Snowball Effect

Nichole Taylor, Mentor: Dr. Joel Burges (McNair)

Womanhood From War: Identity, Femininity, and the Salvadoran Civil War

Paola Almendarez, Mentor: Dr. Vialcary Crisóstomo Tejada (McNair)

FLASH Simulations of Shocked Foams

Reid Pfaltzgraff-Carlson, Mentor: Dr. Petros Tzeferacos (Physics & Astronomy)

Spatial Coherence Delocalization in a Dual Cavity System

Rittik Mandal, Mentor: Dr. Pengfei (Frank) Huo (iScholar)

Sensitivty to Neutrino Mass Hierarchy at the IceCube Neutrino Observatory

Sanya Arora, Mentor: Dr. Segev BenZvi (Physics & Astronomy)

Synthesis and Characterization of Mixed Metal-Organic Frameworks

Sheeza Fatima, Mentor: Dr. Brandon R. Barnett (iScholar)

Simulating a Glitch During the 2029 Apophis Encounter Using a Viscoelastic Model

Stephen Heritage, Mentor: Dr. Alice Quillen (Physics & Astronomy)

Testing Detectors for the Near-Earth Object Surveyor

Talia Senall, Mentor: Dr. Craig McMurtry (Physics & Astronomy)

Self-Consistent Pseudopotential Method for Band Structure Calculations

Tan Kang, Mentor: Dr. Thomas G. Brown (Photonics)

Poster Presentation Block B (Cont.)

3:25 PM - 4:25 PM

Automation of a shearing interferometer to improve e⁻ density measurement accuracy and precision: Controller Design Taylor Madison Mae Williams, Mentor: Dr. Pierre A. Gourdain (*Physics &*

Astronomy)

Manipulating Chromatic Aberrations of the Eye through Spatial Light Modulators in an Adaptive Optics Visual Simulator Veronica Masztalerz, Mentor: Dr. Susana Marcos (*Photonics*)

Using Scene-Level Priming to Facilitate Perception and Recall of

Events in Complex Naturalistic Narratives Xiomara Ortiz Lopez, Mentor: Dr. Coraline Rinn Iordan (*McNair*)

Please note: Presenters in both Panel A & Oral Presentation Session A will present in Poster Session A.

Presenters in both Panel B & Oral Presentation Session B will present in Poster Session B.

Featured Programs

Presenters are members of the following undergraduate research programs:

Centers for Chemical Innovation (CCI)

Summer Research Program for International Undergraduate Students (iScholar)

NSF REU Chemistry Research for Medicine and Energy, Department of Chemistry (Chemistry)

NSF REU Imaging in Medicine and Biology for Underrepresented Minorities, Department of Electrical & Computer Engineering (ECE)

NSF REU Physics, Astrophysics and Optics, Department of Physics & Astronomy (Physics & Astronomy)

NSF REU Nanophotonics, Quantum Photonics, and Vision/Biomedical Optics, The Institute of Optics (Photonics)

Ronald E. McNair Post-Baccalaureate Achievement Program (*McNair*)

Acknowledgements

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The David T. Kearns Center For Leadership and Diversity in Arts, Sciences & Engineering

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