Elias K. Oakes

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Education

The University of Connecticut Storrs, CT — August 2021 - Present
Ph.D. Physics
Advisor: Christopher M. Faesi

The University of Chicago Chicago, IL — September 2016 - June 2020
B.S. Astrophysics with Honors; **B.A.** Physics
Honors thesis: *The Distance to the Fornax dSph via the Tip of the Red Giant Branch and Horizontal Branch Stars*
Advisor: Wendy L. Freedman

Awards and Honors

NASA Connecticut Space Grant Consortium — June - August 2022
$8,000 over three months

Chambliss Astronomy Achievement Award — January 2021
Honorable mention

National Merit Scholar — 2016 - 2020
$16,000 over four years

Dean's Fund for Undergraduate Research — December 2019
One-time grant of $1,346.42

University of Chicago Dean's List — 2016 - 2018

Professional Experience

Graduate Research Assistant — August 2021 - Present
University of Connecticut, Storrs, CT
Investigating the hierarchical structure and scales of molecular gas in nearby galaxies using wide-field, high-resolution ALMA CO data cubes as part of the PHANGS collaboration.

Charge Injection Systems Expert — June 2020 - July 2021
CERN, Meyrin, Switzerland
Upgraded, calibrated, and maintained the Hadronic Tile Calorimeter on the ATLAS experiment at the Large Hadron Collider, with a focus on the charge injection and cooling systems.

Undergraduate Research Assistant — September 2017 - August 2021
Kavli Institute for Cosmological Physics, Chicago, IL
Measured three new distances to the Fornax dwarf spheroidal galaxy, working with Prof. Wendy Freedman in the Carnegie-Chicago Hubble Program.

Research Intern — June - September 2019
REU Program at the Max Planck Institute for Astronomy, Heidelberg, Germany
Developed methods to associate giant molecular clouds and HII regions in overlapping ALMA and VLT/MUSE data, working with Prof. Christopher Faesi in the PHANGS collaboration.

Publications

"The impact of HII regions on Giant Molecular Cloud properties in nearby galaxies sampled by PHANGS ALMA and MUSE." Zakardjian, A., Pety, J., Herrera, C. N., Hughes, A., **Oakes, Elias K.**, and the PHANGS collaboration, accepted in *A&A*.

"Distances to Local Group Galaxies via Population II, Stellar Distance Indicators II: The Fornax Dwarf Spheroidal." **Oakes, Elias K.**, Hoyt, T. J., Freedman, W. L., Madore, B. F., Tran, Q. H., Cerny, W., Beaton, R. L., and Seibert, M. 2022, *ApJ*, **786**, 64.

"Distances to Local Group Galaxies via Population II, Stellar Distance Indicators I: The Sculptor Dwarf Spheroidal." Tran, Q. H., Hoyt, T. J., Freedman, W. L., Madore, B. F., **Oakes, Elias K.**, Cerny, W., Hatt, D., and Beaton, R. L. 2022, *ApJ*, **935**, 34.

"Multi-Wavelength, Optical (VI) and Near-Infrared (JHK) Calibration of the Tip of the Red Giant Branch Method based on Milky Way Globular Clusters." Cerny, W., Freedman, W. L., Madore, B. F., Ashmead, F., Hoyt, T., **Oakes, Elias K.**, Tran, Q. H., and Moss, B. 2020, arxiv:astro-ph/0507244.

Scientific Presentations

"Are Giant Molecular Clouds Real? Searching for a virialized scale in NGC 253." Invited talk presented at MPIA Galaxy Coffee, October 5, 2023, Heidelberg, Germany.

"Are GMCs Real? Measuring the virial parameter at high resolution in NGC 253." Talk presented at Northeast Star and Planet Formation meeting, June 28, 2023, Cambridge, MA.

"Environmental dependence of star formation efficiency in spiral galaxy NGC 4254." Poster presented by Neal Krishna at AAS 241, January 8-12, 2023, Seattle, WA.

"Are GMCs Real? Measuring the virial parameter at high resolution in NGC 253." Poster presented at NASA CTSG Exposition, November 4, 2022, Windsor Locks, CT.

"Are Giant Molecular Clouds (GMCs) Real? Measuring the virial parameter at high resolution in NGC 253." Poster presented at From Stars to Galaxies II, June 20-24, 2022, Gothenburg, Sweden.

"Three Population II Distances to the Fornax Dwarf Spheroidal." Talk presented at UConn Physics Colloquium, March 30, 2022, Storrs, CT.

"The distance to the Fornax dSph via the tip of the red giant branch and horizontal branch stars." Poster presented at AAS 237, January 11-15, 2021 (remote due to COVID-19).

"The Cradles of Giants: Star formation at high resolution in nearby galaxies." Poster presented at AAS 235, January 4-8, 2020, Honolulu, HI.

"Observations and association of GMCs and HII regions in the PHANGS sample." Invited talk presented at MPIA Galaxy Coffee, August 29, 2019, Heidelberg, Germany.

"Aggregation as an efficiency driver in bulk heterojunction devices measured through mixed squaraines in ternary blends." Poster at SPIE Optics + Photonics, August 19-23, 2018, San Diego, CA.

"The role of H-aggregation on device efficiency as determined through squaraine sidegroup elongation and molecular separation in crystals." Poster presented at SPIE Optics + Photonics, August 19-23, 2018, San Diego, CA.

Service, Teaching, and Outreach

Graduate Student Lead July 2022 - Present
UConn Science, Technology, and Astronomy Recruits (STARs)
Mentor a cohort of 18 undergraduates from historically excluded backgrounds in physics to organize professional development workshops, social and community-building events, and public outreach to local schools.

Union Guide July 2023 - Present
District Steward September 2022 - July 2023
Graduate Employee & Postdoc Union - United Auto Workers Local 6950
Elected member of the executive board, responsible for coordinating stewards to lead outreach to local members, organize events and political actions, and address grievances.

Lead Member May 2022 - Present
PHANGS Colloquium and YouTube teams
Facilitate colloquium events and produce an external video series about PHANGS research.

Lead Member August 2022 - Present
UConn Astrophysics Seminar Committee
Invite speakers and organize weekly seminars for the UConn Astrophysics community.

Volunteer Scientist July 2022 - Present
Skype a Scientist
Regularly discuss astrophysics via accessible, educational presentations to schools and groups.

Organizing Member August 2021 - Present
UConn Physics Graduate Student Association
Helped organize the first Astronomy on Tap events in Connecticut. Gave a talk on "Historical Astronomy Through the Ages" to a public audience of 30+.

Undergraduate Thesis Mentor August 2022 - July 2023
Group of Prof. Christopher Faesi
Mentored Neal Krishna in his honors thesis project on the star formation scaling relation at high resolution in NGC 4254.

Teaching Assistant August 2021 - June 2022
UConn Physics Department
Led two sections each of lab-based introductory physics classes: PHYS 1401Q and PHYS 1502Q.

Organizing Member September 2017 - June 2020
UChicago Society for Physics Students
Helped run events including the 2020 Conference for Undergraduate Women in Physics (CUWiP).

Successful Proposals and Observing Experience

James Webb Space Telescope
Co-I on 155.38-hour awarded proposal for Cycle 2, "A JWST Census of the Local Galaxy Population: Anchoring the Physics of the Matter Cycle."

James Webb Space Telescope
Co-I on 22-hour awarded proposal for Cycle 2, "Resolving HII Regions and ISM Structure Across the Milky Way Analog NGC 253."

Submillimeter Array
CO-I on 50-hour awarded proposal for the 2022A semester, "Measuring the dust and B-field structure in M33's massive GMCs."

IRAM 30-meter telescope
Co-I on 16.4-hour proposal, "Resolved CO Observations in M31: Connecting GMCs to Diffuse Molecular Gas, continued." Executed observations at the telescope on February 3 - 6, 2023.

Schools and Technical Skills

IMPRS Heidelberg September 4 - 8, 2023
Participant in the 18th IMPRS Heidelberg Summer School on "Unraveling Galaxy Evolution with JWST."

GISM2 Summer School July 25 - August 2, 2023
Participant in the 2nd International Summer School on Galaxies and the ISM.

National Radio Astronomy Observatory (NRAO) June 13 - 21, 2023
Participant in the 19th NRAO Synthesis Imaging Workshop.

Submillimeter Array (SMA) January 18 - 22, 2022
Participant in the 2022 SMA Interferometry School, awarded and executed one hour of observations for the proposal "First detection of molecular cloud-scale dust continuum emission in M33".

Institut de Radioastronomie Millimétrique (IRAM) November 15 - 23, 2021
Participant in the 10th IRAM 30-meter School on Millimetre Astronomy.

Programming: Proficient in Python, C, ROOT, Linux systems, Java, HTML.

Software: Proficient with CASA, IRAF, SAOImage DS9, DAOPHOT/ALLSTAR. Familiar with high-performance computing (Bridges-2, UConn TACC).

Languages & Citizenship

Languages: Native English, Proficient German (Goethe-Zertifikat B2), Conversational French (B1)

Citizen of the United States & Switzerland