

OSASE OMORUYI

Center for Astrophysics | Harvard & Smithsonian
60 Garden St, Cambridge, MA 02138, USA
osase.omoruyi@gmail.com - osaseo.github.io

Education

Ph.D., Harvard University in Astronomy and Astrophysics	2020-25
<i>Thesis: The Multiphase and Multiscale Impact of Stellar and AGN Feedback on Galaxy Evolution</i>	
<i>Committee: Grant Tremblay (Advisor), Karin Öberg, Peter Galison, Lars Hernquist, Douglas Finkbeiner</i>	
M.A., Harvard University in History of Science	2020-23
<i>Thesis: The Extractive Gaze – The Development of American Astronomical Stations in South Africa</i>	
<i>Advisors: Prof. Peter Galison and Prof. Chakanetsa Mavhunga</i>	
B.S., Yale University in Astronomy and Astrophysics	2015-19
<i>Thesis: A Multiwavelength View of Bubbles in the Milky Way</i>	
<i>Advisor: Prof. Héctor Arce</i>	

Research Interests and Experience

3 first-author papers published and/or under review. See list of publications below and click [here](#) for an exhaustive ADS library.

- Aims to assemble the high-resolution, multi-wavelength observations needed to **calibrate the *ad-hoc* treatment of AGN feedback in cosmological simulations** using **direct observations of feedback** in addition to aggregate galaxy properties
- Specializes in high-resolution, multi-wavelength **X-ray, optical, mm, and radio observations of stellar and AGN feedback in galaxies and galaxy clusters**, utilizing telescopes such as JWST, ALMA, Chandra, LOFAR, and HST
- Proficient in **computational astrophysics**, particularly in bridging the detailed physical outputs from **hydrodynamical simulations** with computationally inexpensive, flexible **semi-analytic models** of galaxy formation and evolution.
- Experience conducting ethnographic and archival research on the **history of astronomy**, examining the roles of race, colonialism, and labor in the development of astronomical observatories in the Global South
- Extensive experience **mentoring** and **teaching** undergraduate and high school students, including leading workshops on data analysis methods and graduate school preparation, with a focus on **supporting underrepresented students in STEM**

Honors & Awards

Harvard Philippe Wamba Summer Research Travel Grant (\$5,000)	2024
ALMA Student Observing Support Grant (\$40,000)	2023
Derek Bok Distinction in Teaching Certificate (Harvard University)	2023
John C. Hansen & Katherine Vogelheim Research and Travel Fund for Africa (\$2,000)	2022
240th AAS Chambliss Honorable Mention	2022
Harvard Graduate Prize Fellowship	2020
National Science Foundation Graduate Research Fellowship	2019
Yale Astronomy George Beckwith Prize (\$1,000)	2019
Yale College Edward Bouchet Undergraduate Research Fellowship	2017 - 2019
NSF REU Fellowships at Yale University, Caltech and SAO	2016, 2017, 2018

Accepted Telescope Proposals/Observing

Atacama Large Millimeter/submillimeter Array	PI, 29.5 hours
Cycle 9 PID-2023.1.00471.S: A Comprehensive Observational Test of Positive and Negative Black Hole Feedback	
Upgraded Giant Metrewave Radio Telescope	PI, 6 hours
Cycle 46 PID-084: A Multi-Frequency uGMRT Survey of an Extreme AGN Outburst Tied to Young Star Formation	
MMT Observatory	PI, 4 hours
2023A: Resolving the Cooling Flow Problem in SDSS 1531 with a Spectroscopic Survey	
JWST	co-I, 8.6 hours
Cycle 2 PID-4094: A Galaxy-Scale Fountain of Multiphase Gas Pumped by a Black Hole: The power of JWST combined with ALMA, MUSE, Chandra, and HST	
Chandra X-ray Observatory	
Cycle 26 PID-26700422: Chandra confirmation of a runaway supermassive black hole	Co-I, 300 ks
Cycle 26 PID-26700420: A hot shell bounding a multiphase, jet-driven outflow in a nearby galaxy	Co-I, 200 ks

Talks and Presentations

Wellesley Astronomy Colloquium, <i>Invited Speaker</i>	Nov. 2024
--	-----------

SAO Harvard Summer Astronomy Colloquium, <i>Invited Speaker</i>	Jun. 2024
XXXII International Astronomical Union General Assembly, <i>Contributed Poster and Flash Talk</i>	Aug. 2024
Space Telescope Spring Symposium on Star Formation, <i>Contributed Poster and Flash Talk</i>	Apr. 2024
Tufts Astronomy Seminar, <i>Invited Speaker</i>	Mar. 2024
Stockholm University Workshop on Space Science and Care, <i>Invited Speaker</i>	Sep. 2023
University of Colorado Boulder Astronomy Seminar, <i>Invited Speaker</i>	Apr. 2023
National Society of Black Physicists Conference, <i>Contributed Talk</i>	Nov. 2022
Historic Observatory Networks Conference, <i>Invited Speaker</i>	Jun. 2022
240 th American Astronomical Society Conference, <i>Contributed Poster</i>	Jun. 2022
Cambridge Festival: Astronomy and Imperialism, <i>Invited Speaker</i>	Apr. 2022

Teaching Experience

ASTRON 1: The Big Questions of Astronomy , <i>Teaching Fellow</i> , Harvard College	Jan. – May. 2023
Select Review from Median 5.0/5.0 Student Evaluation Rating: “Osase was an amazing TF! One experience that really stands out to me is during one lab, we were observing the Big Dipper [...] Osase went out of her way to help me identify the Big Dipper, using a variety of methods until I was able to see it. I was so impressed by her determination [...] She was also really great at explaining concepts in the class, and helping students arrive at answers to the homework questions without just giving them answers [...] She was also [...] a warm and friendly and approachable TF in general”	
ASTRON 35S: Fundamentals of Astronomy , <i>Teaching Fellow</i> , Harvard Summer School	Jun. – Aug. 2020
Select Review from Median 5.0/5.0 Student Evaluation Rating: “Osase always made sure every student in the course understood the course’s subjects. She was always both patient and informative, pushing others to do their best.”	
EVOLUTIONS After School Program , <i>Teaching Assistant</i> , Yale Peabody Museum	2016 - 2019
Select article on work with students: ‘Ladies First’ exhibit at Peabody spotlights women in STEM	

Service

NSF SAO Astronomy REU Program, <i>REU Director</i>	2023-24
Harvard Astronomy Student-Faculty Council, <i>Student Representative</i>	2022-24
Center for Astrophysics Harvard & Smithsonian Executive Committee, <i>Student Representative</i>	2023-24
Black Hole Initiative Responsible Siting Group, <i>Member</i>	2023-24
ALMA Distributed TAC, <i>Proposal Reviewer</i>	2022-24
Space Studies Board, National Academies, <i>Lloyd v. Berkner Space Policy Intern for Astro2020</i>	2019-20

Science Communication & Outreach

Astrophoto Challenge of Interacting Galaxies, <i>Invited Subject Matter Expert</i> , NASA	Nov. 2024
Annual Women+ of Color Project Graduate Applications Workshop, <i>Lead Organizer & Panelist</i> , Harvard Univ.	2020-23
Intro to Astronomy Research Workshop, <i>Invited Speaker</i> , EVOLUTIONS After School Program	Jan. 23
Optimizing Code, Python Workshop, <i>Instructor</i> , SAO Latino Initiative Program	Aug. 22
Getting Great Letters of Recommendation, <i>Printed Interview</i> , GradSchoolShopper Magazine	Aug. 22

Research Press

Black Hole Fashions Stellar Beads on a String	NASA & Chandra X-Ray Observatory
200 Millionth Anniversary Gift: A Necklace Made of Stars	AAS NOVA
Cosmic ‘necklace’ of stars may have formed after powerful black hole outburst	The Independent
Powerful Jets From a Black Hole are Spawning Star Clusters	Universe Today

References

Grant Tremblay , Center for Astrophysics Harvard & Smithsonian grant.tremblay@cfa.harvard.edu	<i>Graduate Astronomy Thesis Advisor</i>
Rachel Somerville , Rutgers University & Flatiron Center for Computational Astrophysics rsomerville@flatironinstitute.org	<i>Graduate Research Advisor</i>
Matthew Ashby , Center for Astrophysics Harvard & Smithsonian mashby@cfa.harvard.edu	<i>Graduate Research & Outreach Collaborator</i>
Peter Galison , Harvard University galison@fas.harvard.edu	<i>Graduate History of Science Thesis Advisor</i>
Héctor Arce , Yale University hector.arce@yale.edu	<i>Undergraduate Astronomy Thesis Advisor</i>

Publication List

FIRST AUTHOR PUBLICATIONS

1. **Omoruyi, O.**, Tremblay, G. R., Combes, F., Davis, T. A., Gladders, M. D., Vikhlinin, A., Nulsen, P., Kharb, P., Baum, S. A., O'Dea, C. P., Sharon, K., Terrazas, B. A., Nevin, R., Schechter, A. L., Zuhone, J. A., McDonald, M., Dahle, H., Bayliss, M. B., Connor, T., Florian, M., Rigby, J. R., and Vaddi, S. (2024a). **"Beads-on-a-string" Star Formation Tied to One of the Most Powerful Active Galactic Nucleus Outbursts Observed in a Cool-core Galaxy Cluster.** *The Astrophysical Journal*, 963, 1. doi:[10.3847/1538-4357/ad1101](https://doi.org/10.3847/1538-4357/ad1101)
2. **Omoruyi, O.**, Tremblay, G., Vikhlinin, A., Dabhade, P., Raychaudhury, S., Markevitch, M., Zuhone, J., Nulsen, P., Baum, S. A., O'Dea, C. P., Clarke, T., Randall, S., Kharb, P., Gulati, S., and Vaddi, S. **A 600 ks Chandra View of Abell 2597.** *Submitted to ApJ, expected on arXiv early-November 2024b, draft will be available [here](#)*
3. **Omoruyi, O.**, Terrazas, B., Cohen, Y., Pandya, V., Somerville, R., and Hernquist, L. **Emulating IllustrisTNG with a semi-analytic model.** *Submitted to MNRAS, expected on arXiv early-November 2024c, draft will be available [here](#)*
4. **Omoruyi, O.**, Tremblay, G., Ashby, M., Baum, S., Blanton, E., Bremer, M., Bulbul, G., Clarke, T., Combes, F., Connor, T., David, L., Davis, T., Donahue, M., Edge, A., Edwards, L., Fabian, A., Forman, W., Gaspari, M., Grace, S., Greene, J., Hamer, S., Jones, C., Kraft, R., Li, Y., McDonald, M., McNamara, B., Nevin, R., Nulsen, P., O'Dea, C., Ogle, P., Oonk, R., Powell, M., Randall, Reefe, M., S., Russell, H., Salome, P., Schechter, A., Simionescu, A., Starikova, S., Su, Y., Sun, M., Terrazas, B., Urry, C., Vantyghem, A., Vikhlinin, A., Voit, M., Wilkes, B., Worku, K., and ZuHone, J. **A JWST MIRI View of the Heart of Abell 2597.** *Expected on arXiv December 2024d, draft will be available [here](#)*

CONTRIBUTING AUTHOR PUBLICATIONS

1. Singha, M., Winkel, N., Vaddi, S., Perez Torres, M., Gaspari, M., Smirnova-Pinchukova, I., O'Dea, C. P., Combes, F., **Omoruyi, O.**, Rose, T., McElroy, R., Husemann, B., Davis, T. A., Baum, S. A., Lawlor-Forsyth, C., Neumann, J., Tremblay, G. R.. (2023, ApJ). **The Close AGN Reference Survey (CARS): An interplay between radio jets and AGN radiation in the radio-quiet AGN HE 0040-1105.** *The Astrophysical Journal*, 959(2), 107. doi:[10.3847/1538-4357/ad004d](https://doi.org/10.3847/1538-4357/ad004d)
2. Singha, M., Scharwächter, J., Kakkad, D., **Omoruyi, O.**, Rojas, A., Laha, S., Pérez-Torres, M., Combes, F., Sadaula, D. R., Baum, S. A., O'Dea, C. P., Tremblay, G. R., Sebastian, B. **A quenched galaxy at the site of supermassive black hole feedback.** *Submitted to ApJ, expected on arXiv early-November 2024, draft will be available [here](#)*
3. Cohen, Y., Pandya, V., **Omoruyi, O.**, Terrazas, B., Somerville, R., and Hernquist, L. **The Cosmic Baryon Cycle in IllustrisTNG: flows of mass, energy, and metals.** *In preparation. Expected on arXiv by late Fall 2024 - Spring 2025.*
4. Ogle, Patrick, Aravindan, A., Ashby, M., Azadi, M., Baum, S., Carilli, C., Chiaberge, M., Duggal, C., Gebhardt, K., Hyman, S., Kiantonucci, S., Lopez-Rodriguez, E., McDonald, M., Medling, A., Miley, G., Omoruyi, O., Perlman, E., Perley, D., Perley, R., Sebastian, B., Singha, M., Sparks, W., Tremblay, G., Wilkes, B., Willner, S., and Worrall, D. (2023, ApJ). **The JWST View of Cygnus A: Jet-Driven Outflow with a Twist.** *In preparation. Expected on arXiv late Fall 2024.*
5. Elford, J. S., Davis, T. A., Ruffa, I., **Omoruyi, O.**, et. al. **The Close AGN Reference Survey (CARS): A comparison between sub-mm and optical AGN diagnostic diagrams.** *In preparation. Expected on arXiv late Fall 2024.*

Last Updated: October 20, 2024