Michael James Yantovski Barth

Curriculum Vitae

Departement de Physique
Université de Montréal
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https://github.com/mjyb16

*Version en français disponible sur demande

Education

2027 **Ph.D in Physics**, Université de Montréal (University of Montreal).
Summer 2025: Visiting researcher at University of Oxford

2022 **B.S. in Physics and Astronomy**, *Summa Cum Laude, with honors, Graduate School Preparation Track*, University of Pittsburgh.

2022 **B.A. in Russian**, *Summa Cum Laude*, University of Pittsburgh.

Peer-reviewed publications

Publications in each are listed in reverse chronological order. Papers led by a student under close supervision by M.J.Y.B. indicated with an asterisk (*). Note that I publish under the name M. J. Yantovski-Barth to avoid confusion with similar names.

4. *IRIS: A Bayesian approach for image reconstruction in radio interferometry with expressive score-based priors (submitted to Astrophysical Journal).
Author list: Author list: Noé Dia, **M. J. Yantovski-Barth**, et al. `https://ui.adsabs.harvard.edu/abs/2025arXiv250102473D/abstract`

3. Caustics: A Python Package for Accelerated Strong Gravitational Lensing Simulations, Journal of Open Source Software, 9(103), 7081, 22 November 2024.
Author list: Connor Stone, Alexandre Adam, Adam Coogan, **M. J. Yantovski-Barth**, et al.
`https://ui.adsabs.harvard.edu/abs/2024JOSS....9.7081S/abstract`

2. The CluMPR Galaxy Cluster-Finding Algorithm and DESI Legacy Survey Galaxy Cluster Catalogue, MNRAS, 531, 2, Jun 2024.
Author list: **M. J. Yantovski-Barth**, Jeffrey A. Newman, Biprateep Dey, et al.
`https://ui.adsabs.harvard.edu/abs/2024MNRAS.531.2285Y/abstract`

1. *Bayesian Imaging for Radio Interferometry with Score-Based Priors, MLPS Workshop at 2023 NeurIPS conference, Dec 2023.
Author list: Noé Dia, **M. J. Yantovski-Barth**, et al.
`https://ui.adsabs.harvard.edu/abs/2023arXiv231118012D/abstract`

Accepted Telescope Observing Proposals

2024 **Co-I, Atacama Large Millimeter/submillimeter Array (8.6 hours)**, First dynamical supermassive black hole mass measurement at z 4: resolving the sphere of influence of a z=4.24 galaxy.

Research Experience

2023-Present **SuperMAGE: Supermassive black hole masses from ALMA observations of gas kinematics**, University of Montreal and University of Oxford.
Advisors: Yashar Hezaveh, Laurence Perreault-Levasseur, and Martin Bureau

2023-Present **Caustics: GPU-accelerated ray tracing simulations for gravitational lensing**, University of Montreal.
Advisors: Yashar Hezaveh and Laurence Perreault-Levasseur

2021-2022 **SiRIUS (Simulation of Radio Interferometry from Unique Sources)**, National Radio Astronomy Observatory.
Advisors: Jan-Willem Steeb and Andrew McNichols

2019-2024 **CluMPR: A new galaxy cluster-finding algorithm**, University of Pittsburgh, University of Montreal.
Advisor: Jeffrey Newman

Research Supervision (Mentoring)

2023-Present **Bayesian Imaging for Radio Interferometry with Score-Based Priors**, University of Montreal.
Co-supervised undergraduate student Noé Dia. Co-supervisors: Alexandre Adam, Yashar Hezaveh, Laurence Perreault-Levasseur

Scholarships and Fellowships

2025 **Mitacs Research Award**, Competitive grant to support my visiting researcher role at the University of Oxford for the summer.

2024 **Bourse Gilles Beaudet**, Competitive scholarship award for PhD students in the physics department of the University of Montreal.

2024 **Bourse du passage accéléré UdeM**, Competitive scholarship award for successfully transitioning from a masters to PhD on the accelerated track.

2022-Present **Bourse d'exemption UdeM**, Competitive international student scholarship, covers tuition fees.

2022-23 **Bourse d'excellence du centenaire**, Scholarship warded to a top incoming graduate student in the physics department at University of Montreal.

2022-2023 **Bourse d'excellence des ESP**, Scholarship awarded to a top incoming graduate student in the physics department at University of Montreal.

2020, 2022 **NASA Pennsylvania Space Grant Consortium Research Award**, Undergraduate summer research scholarship.

2021 **NSF (National Science Foundation) Research Experiences for Undergraduates (REU) at NRAO**, Undergraduate summer research scholarship to fund a research internship at the National Radio Astronomy Observatory (NRAO).

2018-22 **University of Pittsburgh Full Tuition Scholarship**.

Presentations (selected)

2024 **Talk, "Score-based Bayesian Imaging for Interferometry"**, *Spatio-spectral Modeling of Interferometric Data Workshop, National Radio Astronomy Observatory*, 29 May 2024.

2023 **Poster Presentation, "CluMPR: A new galaxy cluster-finding algorithm"**, *Statistical Challenges in Modern Astronomy VIII*, 13 June 2023.

2022 **Poster Presentation, "CluMPR: A new galaxy cluster-finding algorithm"**, *240th Meeting of the AAS*, 13 June 2022.

2021 **Talk, "SiRIUS: Simulation of Radio Interferometry from Unique Sources"**, *NRAO Summer Student Symposium at Green Bank Observatory*, 2 August 2021.

Community Service and Extracurriculars

2025 **Invited lecturer**, *Club des Astronomes Amateurs de Rosemère*, French-language outreach talk on cosmology (1 hour).

2023-Present **Organizing committee member**, *Student Symphony Orchestra (OSEUM)*, University of Montreal.

2023 **Organizing committee member and instructor**, *Astromatic Hackathon*, University of Montreal.

2021 **Startup accelerator participant**, *Pitt Blast Furnace*, Summer 2021.

2019-2020 **Public Outreach Volunteer/Guide**, *Buhl Planetarium at the Carnegie Science Center*.

2017-2018 **Public Outreach Volunteer/Guide**, *Observatory at Turner Farm, Great Falls, VA*.

Professional Development

2025 **NRAO ALMA Cycle 12 Proposal Preparation workshop and invited talk**.

2023 **Statistical Challenges in Modern Astronomy VIII conference and Summer School in Statistics for Astronomers XVIII**.

2023 **CRAQ (Center for Research in Astrophysics of Quebec) conference and flash talk**.

2022 **NRAO 18th Synthesis Imaging Workshop**.

Computer Skills

Programming languages: Python, Mathematica, bash/SLURM, git, LaTeX, XML/HTML/CSS, Java, Swift, SQL

Python Libraries: `PyTorch`, `Dask`, `KeOps`, `Numba`, `Scikit-learn`, `Pandas`, `numpy/scipy`, `astropy/photutils`, `Matplotlib`, `astroalign`

Software: CASA (Common Astronomy Software Applications) radio astronomy data reduction and analysis suite

Languages (estimated ACTFL level)

English Native Language

Russian Distinguished Listening/Reading, Superior Speaking/Writing

French Advanced High Reading, Writing, Listening, and Speaking

Other Honors and Awards

2021-Present **Sigma Pi Sigma Member**, Physics Honor Society.

2020, 2021 **Pitt Big Idea Blitz (1st Place x2)**, 24-hour startup pitching competition.

2020, 2021 **ACTR National Post-Secondary Russian Essay Contest (2nd Place)**, US national Russian-language essay writing contest.

2018 **National Merit Scholar**.

Research Interests

Strong gravitational lensing, supermassive black holes, radio astronomy/interferometry, neural networks/machine learning, Bayesian statistics, galaxy clusters/large scale structure, multiwavelength galaxy surveys, measurement of cosmological parameters, statistical and machine learning methods in cosmology, high-performance computing

Citizenship

U.S. Citizen

Current Canadian status: student visa with work authorization for on- and off-campus work

References

Yashar Hezaveh, Professor, *Department of Physics, University of Montreal*, yashar.hezaveh@umontreal.ca.

Laurence Perreault-Levasseur, Professor, *Department of Physics, University of Montreal*, laurence.perreault.levasseur@umontreal.ca.

Jeffrey Newman, Professor, *Department of Physics and Astronomy, University of Pittsburgh*, janewman@pitt.edu.