# Michael James Yantovski Barth

Curriculum Vitae

Departement de Physique Université de Montréal Impersonal Service de Montréal.ca Impersonal Website

\*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. First author publications are in bold. 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
- 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-PI, Atacama Large Millimeter/submillimeter Array (ALMA)**, *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

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

Advisor: Jeffrey Newman

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

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

## Professional Development (selected)

- 2025 NRAO ALMA Cycle 12 Proposal Preparation workshop, gave invited talk.
- 2023 Statistical Challenges in Modern Astronomy VIII conference and Summer School in Statistics for Astronomers XVIII, gave poster presentation.

2023 CRAQ (Center for Research in Astrophysics of Quebec) conference, gave flash talk. 2022 NRAO 18th Synthesis Imaging Workshop.

#### Professional Service

- 2025 **Peer reviewer**, *ICML (International Conference on Machine Learning) ML4Astro Workshop*, Reviewed two papers submitted to the workshop.
- 2023 **Organizing committee member and instructor**, *Astromatic Hackathon*, University of Montreal.

## **Community Service**

- 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.
  - 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.

## Computer Skills

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

#### **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: study permit 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.