

Jaeden E. Bardati

GRADUATE STUDENT · PHYSICS

California Institute of Technology
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Education

California Institute of Technology

Pasadena CA, United States

PHD PHYSICS

2023 - Present

- Advisor: Philip F. Hopkins

Bishop's University

Sherbrooke QC, Canada

BSc PHYSICS HONOURS (WITH DISTINCTION)

2020 - 2023

- Minor in Mathematics
- GPA: 4.0/4.0
- Advisor: John J. Ruan

Professional Experience

2024-Present **Head Graduate Teaching Assistant**, California Institute of Technology

2023-Present **Graduate Research Assistant**, California Institute of Technology

2022-2023 **Undergraduate Teaching Assistant**, Bishop's University

2021-2023 **Undergraduate Research Assistant**, Bishop's University

2020-2023 **Private Tutor**, Bishop's University

2020-2021 **Mathematics Tutor**, Bishop's College School

2019-2020 **Mathematics and Physics Tutor**, Champlain College

Awards & Scholarships

2023	Hummel-Gray Award , Caltech Y	\$1K USD
2023	The University Prize in Physics and Astronomy , Bishop's University	\$100 CAD
2023	The David Savage Prize in Physics and Mathematics , Bishop's University	\$1K CAD
2022-2023	American Biltrite (Canada) Ltd Scholarship (merit scholarship), Bishop's University	\$1.5K CAD
2022-2023	Florence May Foreman Scholarship (merit scholarship), Bishop's University	\$1.5K CAD
2022	The Undergraduate Prize in Physics and Astronomy (highest achievement), Bishop's University	\$100 CAD
2021-2023	3x awarded Undergraduate Student Research Award (USRA) , Natural Sciences and Engineering Research Council of Canada (NSERC)	\$18K CAD
2021-2023	3x awarded Supplément au bourse de 1er cycle du CRSNG , Fonds de Recherche du Québec Nature et technologies (FRQNT)	\$4.5K CAD
2021-2022	Bourse d'Écellence Hydro-Québec (scholarship for "academic excellence and leadership qualities"), Bishop's University	\$4K CAD
2021	The Faculty Prize in Physics (highest achievement), Bishop's University	\$100 CAD
2020-2023	Academic Honour Roll (every year), Bishop's University	
2020-2021	H. Greville Smith Memorial Scholarship (entrance merit scholarship), Bishop's University	\$5K CAD
2020	Academic Excellence Award , Champlain College	
2020	Highest Achievement in Physics , Champlain College	

Teaching Experience

TEACHING ASSISTANT

Spring 2024	Ph 1c: Classical Mechanics & Electromagnetism , Head Teaching Assistant	Caltech
Winter 2024	Ph 1b: Classical Mechanics & Electromagnetism , Teaching Assistant	Caltech
Winter 2023	MAT 82: Enriched Calculus Laboratory II , Teaching Assistant	Bishop's University
Fall 2022	PHY 113: Introduction to Astronomy , Marker	
Fall 2022	PHY 101: Statistical Methods in Experimental Science , Marker	
Fall 2022	MAT 81: Enriched Calculus Laboratory I (2 groups), Teaching Assistant	

TUTORING

2023-Present	Caltech Y-Tutor , University Tutor	Online
2023-Present	Rise Tutor , High School Tutor	Caltech
2022-2023	Math Help Center , Tutor	Bishop's University
2020-2023	Nimbus Learning Platform , Private Tutor	
2020-2021	R.D.W. Howson Enrichment Centre , Mathematics Tutor	Bishop's College School
2019-2020	Math and Physics Workshop , Tutor	Champlain College

Presentations

April 2024. *Signatures of Massive Black Hole Merger Host Galaxies in Morphology and Stellar Kinematics*. Contributed talk: Massive Black Holes in First Billion Years, Kinsale, Co. Cork, Ireland.

June 2023. *Host Galaxy Morphological Indicators of MBH Mergers*. Invited talk: LISA MMA-WP telecon.

Apr 2023. *Signatures of MBHs in their Host Galaxy Morphologies*. Honours thesis talk: Bishop's University.

Mar 2023. *MBH Mergers and Their Host Galaxies: Multi-Messenger Prospects*. Seminar talk: Bishop's University.

Mar 2023. *How Do We Find Supermassive Black Hole Mergers?* 3-min thesis: Bishop's University.

Jan 2023. *Host Galaxy Morphological Signatures of Massive Black Hole Mergers*. Poster: AAS Meeting 241, Seattle, WA.

Aug 2022. *Host Galaxy Morphological Signatures of MBH Mergers*. Contributed talk: LISA Canada 2022 Workshop.

Jul 2022. *Department Paper Presentation*. Physics & Astronomy Lunch Talk: Bishop's University.

Technical Skills

Python: 8+ years experience

High Performance Computing: Used over 1 million CPU-hours on Compute Canada and TACC Frontera

Other languages & tools used: C/C++, Bash, Java, MIPS Assembly, Batch, HTML, CSS, Javascript, LaTeX

Publications

REFEREED PUBLICATIONS

Bardati, J., Ruan, J. J., Haggard, D., Tremmel, M., "Signatures of massive black hole merger host galaxies from cosmological simulations. i. unique galaxy morphologies in imaging", *The Astrophysical Journal* **961**, 34 (2024), <https://dx.doi.org/10.3847/1538-4357/ad055a>

IN REVIEW

Bardati, J., Ruan, J. J., Haggard, D., Tremmel, M., "Signatures of Massive Black Hole Merger Host Galaxies from Cosmological Simulations II: Unique Stellar Kinematics in Spatially-Resolved Spectroscopy", Submitted to ApJ.

CONFERENCE PROCEEDINGS

Bardati, J., Ruan, J. J., Haggard, D., Tremmel, M., “Host Galaxy Morphological Signatures of Massive Black Hole Mergers”, in American astronomical society meeting abstracts, Vol. 55, American Astronomical Society Meeting Abstracts (Jan. 2023)

Mentoring

2023-Present **Adrian Lam**, Undergraduate Student, UCLA

2023-Present **Jeremiah Reynoso**, Undergraduate Student, Morehouse College

Outreach & Professional Development

SERVICE

2024 **California Science & Engineering Fair (CSEF)**, Physics & Astronomy (Senior)
Category Award Judge

2024 **Orange County Science & Engineering Fair (OCSEF)**, International Science &
Engineering Fair (ISEF) Selection Judge

Astronomy, Mathematics and Physics Society (AMPS), Co-founder and
Physics & Astronomy Representative (Co-lead position).

2021-2023 Duties involved: Jointly coordinating bi-weekly meetings with over 60
recruited members, coding and managing a publicly-accessible club website,
organizing physics and astronomy-related AMPS projects and events such as
sky viewings at the Bishop’s Observatory or graduate school preparation
seminars, and arranging for an appropriate space to be booked, creates
detailed budgets of event expenses, and contacts speakers.

Bishop’s University

2021-2022 **Student Accessibility & Accommodation Services**, Peer Note-Taker for
students with accessibility needs.

2019-2020 **Cougar Ambassador**, Volunteer position to help new students integrate into
the college.

Champlain College

TRAINING & WORKSHOPS

**Perimeter Scholars International - Students’ Training Accelerator for
Research in Theory (PSI START)**, Waterloo, ON

2022 Attended a selective ten-week online school consisting of 4 courses in Quantum
Information, Path Integral Formulation of Quantum Mechanics, Numerical
Methods (+ an introduction to Quantum Field Theory), and Mathematics of
Symmetries, including a small research project in General Relativity. One of ten
worldwide to be offered a summer research internship (declined).

Perimeter Institute

DAWN Winter School, virtual

2022 Attended a week-long school aiming to address practical knowledge in
astrophysics for graduate students, from both observational and theoretical
perspectives.

Cosmic Dawn Center

2022 **Introduction to Machine Learning**, Compute Canada

2021 **Intro to High-performance computing (HPC)**, Compute Canada

2021 **Intro à la ligne de commande Unix**, Calcul Québec

CONFERENCES ATTENDED

- 2024 **Massive Black Holes in First Billion Years**, Kinsale, Co. Cork, Ireland
- 2023 **American Astronomical Society Meeting 241**, Seattle, WA
- 2022 **LISA Canada 2022 Workshop**, virtual
- 2022 **CRAQ Annual Meeting 2022**, Orford, QC
- 2021 **LISA Canada 2021 Workshop**, virtual
- 2021 **Atlantic General Relativity Meeting 2021**, Bishop's University, virtual
- 2021 **CAP Canadian Undergraduate Physics Conference (CUPC)**, Ryerson University, virtual

MEDIA COVERAGE

- 2023. Sherbrooke Record: *Bishop's grad accepted to PhD physics program at Caltech*
- 2023. BU Research Spotlights: *Jaeden Bardati, Bishop Graduate 2023: Accepted in the PhD Physics Program at Caltech*
- 2023. Bishop's University Blog: *Training the Physicists of Tomorrow*
- 2023. Centre de Recherche en Astrophysique du Québec Calendar: *Mergers of galaxies hosting supermassive black holes*
- 2022. BU Research Spotlights: *Undergraduate Student Accepted in Prestigious International Summer Training Program*
- 2021. Sherbrooke Record: *"This is going to be a big thing"*

PROFESSIONAL MEMBERSHIPS

- Student Member**, American Astronomical Society (AAS)
- Student Affiliate**, Canadian Association of Physicists (CAP)