J. Hernández-Yévenes

Astronomer, PhD(c)

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Education

2025–present **PhD in Astrophysics**, *Swinburne University of Technology*, Melbourne, Australia
Advisor: Dr. Deanne Fisher & Dr. Rebecca Davies (co)

2022–2024 **MSc in Astronomy**, *Universidad de Concepción*, Concepción, Chile, 6.6/7.0
Advisor: Dr. Neil Nagar
Thesis: A scaling-based algorithm for probing supermassive black hole masses through WISE photometry

2018–2021 **BSc in Astronomy**, *Universidad de Concepción*, Concepción, Chile, 6.6/7.0

Experience

2024–2025 **Research Assistant**, *Núcleo Milenio TITANS*, Concepción, Chile
- Co-advised a master's thesis on supermassive black hole binary systems.
- Maintained WISE2MBH's internal-pipeline, public-pipeline and python library, consolidating their use for the ETHER database.
- Developed a custom pipeline for scraping and processing SDSS spectra using pPXF.
- Managed to optimize the time in observation proposals by 25% by implementing clustering algorithms.
- Author of 3 publications related to the ETHER database and its possible uses.

2022–2024 **Research Assistant**, *Universidad de Concepción*, Concepción, Chile
- Developed the WISE2MBH algorithm to address data completeness in the ETHER database.
- Author in 3 publications, presenting at conferences and securing +100 hours of observation time.
- Responsible for conducting practical classes, elaborating and evaluating assignments and exams for two final year courses.

2023 **Research Internship**, *Harvard University*, Cambridge, USA
- Late stage development of the WISE2MBH algorithm that estimate supermassive black hole masses from WISE data.
- Explore uses for EHT, ngEHT, and ALMA to present proposals based on the algorithm estimates and population predictions.
- Discussion about WISE2MBH parent and final sample, and possible interest of the community.
- Discussion over super massive black hole binary candidates and strategies to detect them.

Publications

- **Hernández-Yévenes, J.**, Jarrett, T. H., Nagar, N., Cluver, M. E., Arratia, V. Evaluating and harmonizing systematics of diverse indirect M_{BH} estimators for SMBHs. *in prep.*, 2025.
- Arratia, V., Nagar, N., **Hernández-Yévenes, J.**, Nair, D. G., Silpa, S., et al. ETHER-FP: Exploring the fundamental plane of black hole activity and radio emission mechanisms in active galactic nuclei. *in prep.*, 2025.
- **Hernández-Yévenes, J.**, Nagar, N., Arratia, V., Jarrett, T. H. Using WISE cataloged data for morphology, bulge fraction and black hole mass estimation. *XVII LARIM Proceedings*, 2025.
- Nair, D. G., Nagar, N. M., Ramakrishnan, V., Wielgus, M., **et al.** | Demographics of black holes at $<$100 R_g scales: accretion flows, jets, and shadows. *XVI EVNS Proceedings*, December 2024.
- **Hernández-Yévenes, J.**, Nagar, N., Arratia, V., Jarrett, T. H. WISE2MBH: a scaling-based algorithm for probing supermassive black hole masses through WISE catalogues. *MNRAS*, July 2024.
- Ramakrishnan, V., Nagar, N., Arratia, V., **Hernández-Yévenes, J.**, et al. | Event Horizon and Environs (ETHER): A Curated Database for EHT and ngEHT Targets and Science. *Galaxies*, January 2023.

Languages

Spanish	Native	
English	C1	*TOEFL*

Skills

Soft Skills	Leadership, Communication, Problem Solving, Goal Orientation
Programming	Python, SQL, Bash, TEX, HTML5, CSS
Software	TopCat, Excel, DS9, SSMS, PowerBI
Libraries	NumPy, Pandas, Matplotlib, Seaborn, AstroPy, SciPy, PyTorch, Tensorflow, statsmodels, scikit-learn

Academic/Outreach activities

Academic Talk	Do SMBH mass estimates agree one to each other?: A study on the systematics of indirect MBH estimators in the ETHER database, **TITANs Annual Meeting** | **Dec, 2024**
Workshop Lead	Statistical methods: Bootstrap, sliding-window and statistical tests, **TITANs Annual Meeting** | **Dec, 2024**
Conference Poster	Using WISE cataloged data for morphology, bulge fraction and black hole mass estimation, **XVII LARIM** | **Nov, 2023**
Outreach Talk	La nueva generación del Telescopio Horizonte de Eventos (ngEHT) y Chile, **Universidad de Concepción** | **Nov, 2022**

Teaching

Undergrad Assistantship	Extragalactic Astrophysics, Prof. in charge: Dr. Ricardo Demarco | *S2, 2023*
Undergrad Assistantship	Radioastronomy, Prof. in charge: Dr. Neil Nagar | *S2, 2023*

Workshops & Certificates

2024	TOEFL iBT (C1 proficiency), **ETS**	*Certificate*
2024	Machine Learning Specialization, **DeepLearning.AI & Stanford University**	*Certificate*
2023	Certification in Machine Learning with Python, **freeCodeCamp**	*Certificate*
2022	Certification in Data Analysis with Python, **freeCodeCamp**	*Certificate*
2022	Certification in Scientific Computing with Python, **freeCodeCamp**	*Certificate*
2022	Certification in Cloud Computing, **Google & Esc. de Org. Industrial**	*Certificate*
2021	School of Physics of the Master in Physical Sciences, **Universidad del Bío-Bío**	

Successful PI and Co-PI observing proposals

2024 Imaging M84 at $<$ 50 gravitational radii: jets and accretion inflow (Resubmission), Co-PI (**PI: Neil Nagar**), 8 hours (12M), Priority B, **ALMA Cycle 11**

2023 Towards resolving orbiting binary SMBH, plus shadows, jets, and accretion flows of single SMBH: ACA fluxes, **PI**, 72.6 hours (7M), Priority C, **ALMA Cycle 10**

2023 A sample of SMBH shadows, rings, accretion flows and jet bases: exploratory EHT+ALMA flux measurements, Co-PI (**PI: Neil Nagar**), 45 hours (12M), Priority B, **ALMA Cycle 10**

2022 A sample of black holes at $<$ 100 Rg scales: accretion flows, jets, and shadows, Co-PI (**PI: Dhanya Nair**), 22 hours (7mm), Priority A, **VLBA 2023A**

2022 A sample of SMBH shadows, rings, accretion flows and jet bases: exploratory EHT+ALMA flux measurements, Co-PI (**PI: Neil Nagar**), 36 hours (12M), Priority B, **ALMA Cycle 9**

2022 NGC4261: the 2nd jet at $<$ 50 gravitational radii (and the 3rd black hole shadow?), Co-PI (**PI: Neil Nagar**), 6 hours (12M), Priority B, **ALMA Cycle 9**