

Education

Rice University

Physics PhD Candidate

- GPA: 4.03

Houston, Texas
Jun 2017-Present

Universidad Nacional Autónoma de México (UNAM), Ciudad Universitaria

B. Sc. in Physics

- Class Valedictorian in Physics
- GPA: 10 (scale from 0 to 10)

Mexico City, Mexico
2011-2016

Research experience

Rice University

PhD candidate advised by Dr Kaden R A Hazzard

- Pioneered a numerical algorithm using Quantum Monte Carlo to simulate the $SU(N)$ Fermi Hubbard Model.
- Collaborated in the development of Exact Diagonalization and Numerical Linked Cluster Expansions to study the $SU(N)$ Fermi Hubbard Model.
- Contributed to the construction of a Constrained Path Quantum Monte Carlo and Hartree-Fock codes to investigate the $SU(N)$ Fermi Hubbard Model.
- Developed and maintained data analysis modules written in Python.
- Mentored graduate and undergraduate students in the group. Expected publications in 2022.

Houston, Texas
Jun 2019-Present

Rice University

Master student advised by Dr Randall G Hulet

- Improved performance of data analysis software by reducing running time by a factor of 10.
- Assembled optical setup for cooling and trapping bosonic and fermionic lithium.
- Automated and refined experimental equipment using Python, Raspberry Pi and Arduino.
- Designed and engineered electronic circuits for hardware control and PID stabilization.

Houston, Texas
Jun 2017-Jun 2019

Ultracold Matter National Laboratory, Physics Institute UNAM

Research assistant of Dr Jorge A Seman Harutinian

- Designed and simulated an ultra-high vacuum system which currently achieves a pressure of 10^{-12} Torr for experiments with ultracold quantum gases.
- Built optical setup for cooling and trapping ${}^6\text{Li}$.

Mexico City, Mexico
2014-2017

European Laboratory for Non-Linear Spectroscopy (LENs)

Internship with Dr Giacomo Roati

- Built optical setup for studying spin-imbalanced Fermi Gases.

Firenze, Italy
Sep 2016

Instituto de Ciencias Aplicadas y Tecnología (ICAT), UNAM

Research assistant of Dra María Córdova Aguilar

- Developed a UV sterilizing system for nutritional injectable solutions.

Mexico City, Mexico
2013-2015

Fermi national Accelerator Laboratory

IPM Internship with Dr Rahmat Rahmat

- Improved HF GFlash simulation written in Python. Simulation runs 76 % faster than the previous GFlash simulation, reducing error by 55 % when tested against Test Beam Data.

Batavia, Illinois
Jun-Aug 2014

Honors, Awards and Fellowships

IOP Trusted Reviewer

Acknowledges a high level of peer review competence, upholding the scientific literature to an excellent standard 2021

- Journal of Physics: Condensed Matter
- Journal of Physics D: Applied Physics

Institute of Physics (IOP)

Robert Lowry Patten Award <i>Honor graduate students for their service and achievements on behalf of graduate students</i>	Rice University 2021
Robert A. Welch Foundation Predoctoral Fellowship <i>Competitive basis fellowship for PhD Studies</i>	The Welch Foundation 2017 & 2020
Eric Umland Memorial Award <i>Recognizes the student who has contributed most to the quality of graduate student life in the physics department</i>	Rice University 2020
Bonner Book Award <i>Given each year to the most outstanding first year graduate students in physics</i>	Rice University 2018
G. King Walters Fellowship <i>Competitive basis fellowship for PhD Studies</i>	Rice University 2017
Leon M. Lederman Award <i>The recipient of this merit based award participates at the IPM internship at Fermilab</i>	Fundación Hertel 2014

Publications

Number of citations: 30 External citations: 27 Self citations: 3

- **E Ibarra-García-Padilla**, S Dasgupta, H-T Wei, S Taie, Y Takahashi, R T Scalettar, K R A Hazzard, *Universal thermodynamics of an $SU(N)$ Fermi-Hubbard Model*, Phys. Rev. A **104** 043316 (2021) [Editors's Suggestion]
- S Taie & **E Ibarra-García-Padilla**, N Nishizawa, Y Takasu, Y Kuno, H-T Wei, R T Scalettar, K R A Hazzard, and Y Takahashi, *Observation of antiferromagnetic correlations in an ultracold $SU(N)$ Hubbard model* arXiv:2010.07730 [currently under review at Nat. Phys.]
- **E Ibarra-García-Padilla**, R Mukherjee, R G Hulet, K R A Hazzard, T Paiva, and R T Scalettar *Thermodynamics and magnetism in the two-dimensional to three-dimensional crossover of the Hubbard model* Phys. Rev. A **102** 033340 (2020)
- **E Ibarra-García-Padilla**, C G Malanche-Flores, and F J Poveda-Cuevas, *The hobbyhorse of magnetic systems: the Ising model*, Eur. J. Phys **37** 065103 (2016) [Eur. J. Phys 2016 Highlights]

Teaching experience, invited talks, competitions and conference participation

Consulting competitions: Semifinalist of the 2021 Texas Medical Center Consulting Club Competition (TMCCC).

Coach of the 2017 Mexican Physics Olympiads Team: The five members of the team won a bronze medal.

Teaching experience: Active since 2015, teaching assistant in different courses in physics and mathematics.

Responsibilities included lecturing, grading, and designing exams and homeworks. Breakdown of class levels:

- *Freshman:* Single Variable Calculus II (Math 102 – Spring 2015), General Physics (Phys 125 – Fall 2018, Fall 2019), Honors Mechanics (Phys 111 – Spring 2016, Fall 2020, Fall 2021), Honors Electricity and Magnetism (Phys 112 – Spring 2020, Spring 2021), Seminar in Physics and Astronomy at Rice and Beyond (Phys 116 – Spring 2022).
- *Junior:* Introduction to Quantum Physics I (Phys 311 – Fall 2015, Fall 2016).
- *Senior:* Introduction to Quantum Physics II (Phys 312 – Spring 2018).
- *Graduate:* Mathematical Methods (Phys 516 – Spring 2017), Quantum Mechanics II (Phys 522 – Spring 2019), PhD Proposal Writing Seminar (Summer 2020, Summer 2021), Quantum Information Science and Technology (Elec 660 – Fall 2021 Guest Lecturer).

Refereing experience: Peer reviewed for IOP Journal of Physics: Condensed Matter, IOP Journal of Physics D: Applied Physics, and APS Physical Review A (8 reviews in total).

Seminars, talks and conferences:

- Contributed posters and oral presentations at more than 18 local and international conferences, workshops, and summer schools.
- Session chair at APS March Meetings in 2020 and 2021.
- Invited talks:
 - UC Davis, Physics and Astronomy Department, Davis CA, USA, *Universality and magnetism of interacting fermionic systems with $SU(N)$ symmetry*, November 2021.
 - Trinity University, Physics and Astronomy Department, San Antonio TX, USA, *Quantum simulation & large spins: Toy models for understanding solids*, October 2021.
 - Rice University, Rice Quantum Group Meeting, Houston TX, USA, *Universality and quantum magnetism in the $SU(N)$ symmetric Fermi Hubbard Model*, September 2021.

- Rice University, Smalley-Curl Institute, Houston TX, USA, *Universal thermodynamics of an $SU(N)$ Fermi Hubbard Model*, August 2021.
- Rice University, Physics and Astronomy Department, Houston TX, USA (virtual), *Magnetism in the $SU(N)$ Fermi Hubbard Model*, November 2020.
- Physics Institute UNAM, Mexico City, Mexico (virtual workshop), *An Introduction to Determinant Quantum Monte Carlo*, June 2021.
- Physics Institute UNAM, Mexico City, Mexico (virtual), *Short-range magnetism in the $SU(N)$ symmetric Fermi Hubbard model*, September 2020.

Leadership and activities

Rice University Physics and Astronomy Graduate Student Association

Houston, Texas
Sep 2017-Present

Officer

- Graduate Program Committee Student Representative: Voice graduate students concerns and ideas regarding how to improve the program (Aug 2021- Present)
- President: Coordinate and supervise activities, panels, approve budgets (Aug 2020- Aug 2021)
- PhD Proposal Writing Seminar: Founder and lecturer of the seminar (Jun-Aug 2020 & 2021)
- Journal Club Coordinator: Managed a \$2000 annual budget (Sep 2017-Jun 2020)

Grad STRIVE (Students Transforming Rice Into a Violence-Free Environment)

Houston, Texas
Feb 2019- Present

Secretary & Liaison

- Host events to engage in positive, open dialogue about gender-based inequality and interpersonal violence, as well as providing tools and skills necessary to create cultural change for graduate students. Organizer of two major panels in 2020-2021.

Fundraiser for the victims of Hurricane Maria and the Earthquakes in Mexico

Houston, Texas
2017

Organizer of the fundraiser

- Raised \$3322.07 that was split among three non-profit organizations
- Coordinated and scheduled appointments to ensure success of the event

President of the OSA-UNAM Student Chapter

Mexico City, Mexico
2014-2016

Science communication organization sponsored by the Optical Society of America (OSA)

- Organized the IONS (International OSA Network of Students) Mexico City conference in 2015 during the International Year of Light, with an initial budget of \$4000.
- Submitted and won a grant from Consejo Nacional de Ciencia y Tecnología (CONACyT) for \$25,000 to organize the conference, where more than 100 students participated.
- The chapter participated in five major science communication activities each year.

Computer, Technical Skills and Languages

Programming Languages: Python (Advanced), Fortran and Julia (Intermediate), Mathematica, C++ (Basic)

Electronics: PCB design using CAD (Intermediate)

Machine shop skills: Equipment design using CAD (Intermediate) and usage of the lathe and mill (Basic)

Languages: Spanish (Native), English (Advanced), French (Intermediate), German (Basic)

Other interests

- Amateur guitar player and songwriter
- Enjoy going for bike rides and playing board games
- Percussionist in brazilian music band Batalá Houston (2018-2021)
- Played baseball (1996-2016)
- Practiced fencing (2002-2012)