Marco Immanuel Bayle **Rivera**

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Last Updated on 12th February 2022

EDUCATION

UNIVERSITY OF THE PHILIPPINES
Master of Science in Physics (Student)
September 2020 - Present | Quezon City, Philippines
Current GPA: 1.079/1.000

UNIVERSITY OF THE PHILIPPINES
Bachelor of Science in Physics (Magna Cum Laude)
August 2015 - July 2020 | Quezon City, PH
GPA: 1.436/1.000

RESEARCH EXPERIENCE

MS RESEARCH PROJECT
Observational Signatures of Environmental Effects on Gravitational-Wave Signals from Black Hole Binaries
Jan 2021 – Dec 2021 | Data and Computation Group, NIP

- Principal Investigator: Reinabelle C. Reyes, PhD
- Codebase development and manuscript preparation for conference proceeding and MS thesis
- Performed Fisher matrix and overlap analysis via Mathematica and Python
- Funded by the National Institute of Physics, University of the Philippines Diliman, Quezon City 1101, Philippines

BS RESEARCH PROJECT
Orbits influenced by pseudo-Newtonian potentials and their approximate analytical solutions
Jul 2019 – June 2020 | Theoretical Physics Group, NIP

- Principal Investigator: Jose Perico H. Esguerra, PhD
- Codebase development and manuscript preparation for conference proceeding and BS thesis
- Used Mathematica's built-in functions to solve nonlinear differential equations and plot orbits
- BS Thesis funded by the Department of Science and Technology - Science Education Institute, Republic of the Philippines

TEACHING EXPERIENCE

INSTRUCTOR
Elementary Mechanics, Elementary Electromagnetism and Optics, Elementary Thermal Physics, Special Relativity, and Quantum Physics, Computational Physics lab, EM and Optics lab
Sep 2020 - Present | National Institute of Physics, UP Diliman

- Lecturer for EM and Optics, thermal physics, special relativity, and introductory quantum physics course for engineering and science majors.
- Facilitated discussion and laboratory classes for elementary physics subjects including computational physics and EM and Optics.
- Grader for undergraduate mathematical physics.

RESEARCH INTERESTS

Gravitational Wave Astronomy
Data Analysis – Big Data in GW Astronomy
Source Parameters Estimation
Waveform parameter manifold analysis
Astrophysical environments of compact objects
Tests of GR and alternative theories
Markov Chain Monte Carlo methods

SKILLS

PROGRAMMING
Python • Mathematica • R

OTHER
LaTeX• Git • Microsoft Office Suite

COURSEWORK

Graduate Electrodynamics (Jackson)
Graduate Quantum Mechanics (Sakurai)
Graduate Classical Mechanics (Goldstein)
Graduate Statistical Mechanics* (Reichl)
General Relativity (Schutz)
Applications of General Relativity (Ferrari, Gualtieri, Pani)
Advanced Signal and Image Processing* (Trucco, Cyganek, etc.)
Computational Physics (Newman)
Bayesian Statistics (Coursera)
Python, Matplotlib, and Pandas (DataCamp)
* In progress

AFFILIATIONS

University of the Philippines Physics Association (Alumnus)

International Honor Society of Phi Kappa Phi Chapter 045 (Inducted Member)

PUBLICATIONS

CONFERENCE PROCEEDINGS

- MI Rivera and JP Esguerra, Linear emulator approach for bound orbits under the influence of the Paczynski-Wiita potential, Proceedings of the Samahang Pisika ng Pilipinas 38, SPP-2020-5A-04 (2020). URL.
- MIB Rivera and RC Reyes, Probing the parameter constraints on astrophysical environments of intermediate and extreme mass ratio inspiral binaries with LISA, Proceedings of the Samahang Pisika ng Pilipinas 39 SPP-2021-1C-02 (2021). URL.