

MARK IVAN UGALINO

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EDUCATION

University of the Philippines, Diliman
Master of Science in Physics (*in progress*)
National Institute of Physics

2018 – 2020 (*expected*)
GWA: 1.6786/1.0000

University of the Philippines, Diliman
Bachelor of Science in Physics,
Nominated for the Best BS Physics thesis award
National Institute of Physics

2013 – 2018
GWA: 1.7895/1.0000
Physics and Math GWA: 1.794/1.000

Quezon City Science High School
High school diploma

2009 – 2013

RESEARCH EXPERIENCE AND PUBLICATIONS

Masteral thesis: *Dynamical friction effects on circular orbits immersed in a finite gaseous background* (Adviser: Michael Francis Ian Vega II, Ph.D.) (*in progress*)

- Proposed a Green's function solution to the wave equation for the density perturbations induced by circular orbits immersed in a finite cylindrical domain. This procedure was done as an extension to the straight-line formulation of Vicente et al in slab geometries (2019), the motivation of which is the formation and evolution of giant planets
- Implemented an adaptive Monte Carlo integration strategy to solve the gravitational Poisson equation sourced by the density perturbations, for different Mach numbers and background geometries.

Steady-state density perturbations induced by a point mass in a finite cylinder (Co-author: Michael Francis Ian Vega II)

Submitted to: *Proceedings of the 38th Samahang Pisika ng Pilipinas Physics Congress*

- Publication in an international conference emanating from my masteral thesis.

Undergraduate thesis: *Density perturbation induced by relativistic bodies in slightly-eccentric orbits* (Adviser: Michael Francis Ian Vega II, Ph.D.)

**Nominated for outstanding BS Physics undergraduate thesis*

- Used a linear perturbation analysis to extend the relativistic formulation of dynamical friction to the slightly eccentric orbit case, that is motivated by the increasing interest on extreme-mass-ratio inspirals as gravitational wave sources.
- Developed a purely analytic approach from a self-force calculation by Diaz-Rivera et al (2004) to reproduce a result previously obtained through a semi-analytic Newtonian analysis by Kim & Kim (2007).

Density perturbations in a collisional fluid induced by a particle on a slightly-eccentric orbit (Co-author: Michael Francis Ian Vega II)

Submitted to: *Proceedings of the 36th Samahang Pisika ng Pilipinas Physics Congress*

- Publication in an international conference emanating from my undergraduate thesis.

RESEARCH GRANTS AND INSTRUCTORSHIP

UP Diliman OVCRD Thesis and Dissertation Grant

Jan. 2020-July 2020

- A grant amounting to Php 30,000.00 was awarded as research support for student faculty and staff.

Instructor

August 2018 – present

National Institute of Physics, UP Diliman

- Currently teaching/taught the following courses:
 - Physics 71 (*Elementary Physics I: Classical Mechanics*)
 - Physics 72 (*Elementary Physics II: Electromagnetism and Optics*)
 - Physics 72.1 (*Elementary Physics II Laboratory*)
 - Applied Physics 181 and 182 (*Physical Electronics I and II*) Laboratory
 - Physics 107.1 (*Fundamental Physics II Laboratory*)
- Course group leader of the elementary electromagnetism and optics (Physics 72.1) laboratory course from August 2019 to May 2020.
- Awarded as “Gawad Direktor para sa natatanging Bagong Guro” and “Gawad Direktor para sa natatanging Discussion Teacher” on December 2018.

SKILLS

Research specialization	Stellar and planetary astrophysics
Computer Languages	Python, <i>knowledgeable</i> in C
Software & Tools	L ^A T _E X, Excel, Mathematica, MATLAB, Scilab
Languages	English, Filipino, <i>knowledgeable</i> in Spanish
Other skills	Astronomy education and outreach

AWARDS AND RECOGNITIONS

Gawad Direktor para sa Natatanging Bagong Guro <i>National Institute of Physics, UP Diliman</i>	Dec. 7, 2018
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- The award was given in recognition of the exemplary performance of a newly hired junior faculty of the institute.

Gawad Direktor para sa Natatanging Discussion Teacher <i>National Institute of Physics, UP Diliman</i>	Dec. 7, 2018
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- This award is given in recognition of the exemplary performance of a junior faculty member as a discussion teacher for lecture classes offered by the institute.

WORK EXPERIENCE AND EXTRA-CURRICULAR ACTIVITIES

Theoretical Physics Group, National Institute of Physics <i>Student researcher</i>	Aug. 2018 – present
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- Worked on research that led to the publication of one (1) paper and submission of one (1) paper in an international conference (See *Research Experience* for details).
- Worked on research that led to an award-nominated undergraduate thesis.

University of the Philippines Astronomical Society <i>Education and Research Cluster Coordinator</i>	2015 – present Jun. – Dec. of 2017
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- Gave lectures on the subject of celestial spheres to applicants as part of our semestral application process.
- Developed an astronomy learning curriculum for our applicants.
- Served as head during the 2016 installment of the Big Bang! Astronomy Quiz Show held during the 2016 National Astronomy Week
- Expanded the book and periodical collection of the organization through donation campaigns.

Parish of the Holy Sacrifice Media Ministry <i>Head Writer</i>	2017 – 2018 2018
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- Generated media content (*news articles, reflections*) for the Parish website, and for *Handuhay*, the official newsletter of the Parish.

CHARACTER REFERENCES

Michael Francis Ian G Vega II, Ph.D.

Adviser and Professor of Physics

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National Institute of Physics, UP Diliman

Jose Perico H Esguerra, Ph.D.

Professor of Physics

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