

# MARK IVAN UGALINO

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## EDUCATION

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<b>University of the Philippines, Diliman</b> Doctor of Philosophy in Physics National Institute of Physics	2020 ( <i>ongoing</i> )
<b>University of the Philippines, Diliman</b> Master of Science in Physics National Institute of Physics	2018 – 2020 GWA:1.6786/1.0000 (GPA: 3.37/4.00)
<b>University of the Philippines, Diliman</b> Bachelor of Science in Physics, <i>Nominated for the Best BS Physics thesis award</i> National Institute of Physics	2013 – 2018 GWA: 1.7895/1.0000 (GPA: 3.26/4.00)
<b>Quezon City Science High School</b> High school diploma	2009 – 2013

## SKILLS

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<b>Research specialization</b>	Theoretical astrophysics
<b>Computer Languages</b>	Python, <i>knowledgeable</i> in C, Julia and R
<b>Software &amp; Tools</b>	L <sup>A</sup> T <sub>E</sub> X, Excel, Mathematica, MATLAB, Scilab
<b>Languages</b>	English, Filipino, <i>knowledgeable</i> in Spanish
<b>Other skills</b>	Astronomy education and outreach

## RESEARCH EXPERIENCE AND PUBLICATIONS

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

- Proposed a solution to the dynamical friction problem in a finite cylindrical domain 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

*Steady-state density perturbations induced by a point mass in a finite cylinder* (Co-author: Ian Vega, Ph.D.)

Submitted to: *Proceedings of the 38<sup>th</sup> 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: Ian Vega, 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 previous 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: Ian Vega, Ph.D.)

Submitted to: *Proceedings of the 36<sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress*

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

## GRANTS

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### UP Diliman OVCRD Thesis and Dissertation Grant

Jan. 2020-August 2020

- A grant amounting to Php 30,000.00 (~ 600 USD) was awarded as research support for student faculty and staff.

## PROFESSIONAL AFFILIATIONS

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### Samahang Pisika ng Pilipinas

*Associate Member*

Oct. 2020-present

## AWARDS AND RECOGNITIONS

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### Gawad Direktor para sa Natatanging Bagong Guro

Dec. 7, 2018

*National Institute of Physics, UP Diliman*

- 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

Dec. 7, 2018

*National Institute of Physics, UP Diliman*

- 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.

## SCHOOLS AND CONFERENCES

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### 38<sup>th</sup> Samahang Pisika ng Pilipinas Physics Conference

October 19–23, 2020

*Zoom teleconference*

- *Contributed talk:* Steady-state density perturbations induced by a point mass in a finite cylinder
- Link: <https://spp-online.org/activities/spp2020/>

### Deciphering Dark Matter: From Galaxies to the Universe

September 14–25, 2020

*Institut Teknologi Bandung, Bandung, West Java, Indonesia*

- Link: <https://www.as.itb.ac.id/ssgc2020/>

### Philippine Meteorological Society Annual Convention

July 20–23, 2020

*Zoom Teleconference*

### ICTP Asian Network School and Workshop on Complex Condensed Matter Systems

November 4–8, 2019

*National Institute of Physics, University of the Philippines Diliman, Philippines*

- Link: <https://spp-online.org/activities/ictp-asian-network-2019/>

### UP SITF C Programming Short Course

Summer 2014

*University of the Philippines Diliman*

- Link: <https://tinyurl.com/y2rmjm48>

### 5<sup>th</sup> International Research School

June 24–July 4, 2012

*Zvenigorod, Moscow, Russia*

- Link: <http://irschool.org/>

## WORK EXPERIENCE AND EXTRA-CURRICULAR ACTIVITIES

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### 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*)
  - Applied Physics 155 (*Computer Methods in Physics I*) Laboratory
- Handles online courses on classical mechanics, electromagnetism, and computational methods in Physics during the Academic Year 2020-2021.
  - 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 (See *Awards and Recognitions*)

#### **Reviewer**

2019 – present

*Proceedings of the Samahang Pisika ng Pilipinas Physics Conference*

- Reviews scientific articles submitted to the Samahang Pisika ng Pilipinas for its annual international conference on different fields of Physics, e.g. theoretical physics.

#### **Student researcher**

Aug. 2018 – present

*Gravity, Group, Theoretical Physics Group, National Institute of Physics*

- Worked on research that led to the publication of two (2) papers 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**

2015 – present

*Education and Research Cluster Coordinator*

*Jun. – Dec. of 2017*

- 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
- Engaged high school students through lectures and activities about astronomy (history, misconceptions, and basic facts)

#### **Head Writer**

2017 – 2018

*Parish of the Holy Sacrifice Media Ministry*

- Generated media content (*news articles, reflections*) for the Parish website, and for *Handuhay*, the official newsletter of the Parish.

## **PROFESSIONAL REFERENCES**

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#### **Ian Vega, Ph.D.**

Adviser and Professor of Physics

ivega@nip.upd.edu.ph

National Institute of Physics, UP Diliman

#### **Reina Reyes, Ph.D.**

Associate Professor of Physics

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National Institute of Physics, UP Diliman

#### **Johnrob Y. Bantang, Ph.D.**

Associate Professor of Physics

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National Institute of Physics, UP Diliman