

MARK IVAN UGALINO

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EDUCATION

University of Massachusetts, Dartmouth Doctor of Philosophy in Engineering and Applied Science College of Engineering	2021 (<i>ongoing</i>) GWA:1.0000/1.0000 (GPA: 4.00/4.00)
University of the Philippines, Diliman Doctor of Philosophy in Physics National Institute of Physics	2020 GWA:1.0000/1.0000 (GPA: 4.00/4.00)
University of the Philippines, Diliman Master of Science in Physics National Institute of Physics	2018 – 2020 GWA:1.6786/1.0000 (GPA: 3.37/4.00)
University of the Philippines, Diliman 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)
Quezon City Science High School High school diploma	2009 – 2013

SKILLS

Research interests	Theoretical and computational astrophysics, <i>in particular</i> detonation mechanisms of type Ia supernovae, turbulence
Computer Languages	Python, <i>knowledgeable</i> in C, Julia and R
Software & Tools	L ^A T _E X, Excel, Mathematica, MATLAB, Scilab, FLASH
Languages	English, Filipino, <i>knowledgeable</i> in Spanish
Other skills	Astronomy education and outreach

RESEARCH EXPERIENCE AND PUBLICATIONS

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 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: 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 36th Samahang Pisika ng Pilipinas Physics Congress*

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

GRANTS

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 MEMBERSHIPS

American Physical Society (DAP, DGRAV, GPAP, FIP, FDS,FIP) Feb. 2021-present

Samahang Pisika ng Pilipinas (*Physics Society of the Philippines*) Oct. 2020-present
Associate Member

AWARDS AND RECOGNITIONS

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.

TALKS

Late-time dynamical friction in finite disks (*invited talk*) Feb. 4, 2021
University of Massachusetts Dartmouth, MA, U.S.A.

Steady-state density perturbations induced by a point mass in a finite cylinder (*contributed talk*) Oct. 19, 2020
38th Samahang Pisika ng Pilipinas Physics Conference, Philippines

SCHOOLS AND CONFERENCES ATTENDED

NSF/APS-DPP GPAP Summer school on plasma physics for astrophysicists June 7-11, 2021
Swarthmore College (on-line)

- Link: <https://www.gpapschool.com/>

237th AAS Meeting January 10–15, 2021
Zoom teleconference

38th 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 (on-line)

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

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/>

5th International Research School

June 24–July 4, 2012

Zvenigorod, Moscow, Russia

· Link: <http://irschool.org/>

WORK EXPERIENCE AND EXTRA-CURRICULAR ACTIVITIES

Research Assistant

May 2021 – present

Department of Physics, UMass Dartmouth

- Works on hydrodynamical simulations exploring detonation mechanisms in white dwarfs which eventually lead to type Ia supernovae

Teaching Assistant

January 2021 – May 2021

Department of Physics, UMass Dartmouth

- Responsible for teaching recitation and laboratory classes in the undergraduate series, *Physics for Science and Engineering*

Instructor

August 2018 – December 2020

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

2015 – 2020

Gravity Group, Theoretical Physics Group, National Institute of Physics

Jan. 2017 – 2020

- 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

- 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
- 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

Ian Vega, Ph.D.

Adviser (BSc and MSc) and Professor of Physics
ivega@nip.upd.edu.ph
National Institute of Physics, UP Diliman

Robert Fisher, Ph.D.

Adviser (PhD) and Professor of Physics
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Department of Physics, UMass Dartmouth

Johnrob Y. Bantang, Ph.D.

Associate Professor of Physics
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Reina Reyes, Ph.D.

Associate Professor of Physics
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