Reginald Christian Bernardo, Ph.D.

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https://reggiebernardo.github.io

Research Interests

Gravitational Waves, Cosmology, Dark Energy, Gravity, Machine Learning, Data Analysis

Service to the Community

Referee
- PRL, PRD, JCAP, CQG, Phys. Dark Universe, EPJC, Astron. Comput., Chinese J. Phys., Sci. Rep., Proceedings of the Physics Society of the Philippines

Editor
- Topical Editor in Theoretical Physics, Proceedings of the Physics Society of the Philippines

Highlights

Codes (/2)
- **PTAfast**: PTA correlations from stochastic gravitational wave background, ascl:2211.001.
- **gp6**: Gaussian Processes for Physics – Designed for late time cosmology with noisy & correlated data, zenodo.7767321.

Papers (/37)
- R. C. Bernardo and K.-W. Ng, Stochastic gravitational wave background phenomenology in a pulsar timing array, Phys. Rev. D 107, 044007 (2023), arXiv:2208.12538 [gr-qc].
- R. C. Bernardo and K.-W. Ng, Pulsar and cosmic variances of pulsar timing-array correlation measurements of the stochastic gravitational wave background, JCAP 11 (2022) 046, arXiv:2209.14834 [gr-qc].

Employment History

2023 – pres
- **Postdoctoral Fellow,** Asia Pacific Center for Theoretical Physics, Korea

2021 – 2023
- **Postdoctoral Fellow,** Institute of Physics, Academia Sinica, Taiwan

2021 – 2021
- **Assistant Professor,** National Institute of Physics, University of the Philippines

2015 – 2020
- **Instructor,** National Institute of Physics, University of the Philippines

Education

2017 – 2020
- **Ph.D. Physics, University of the Philippines Diliman**
  Thesis: *Compact objects, cosmologies, and gravitational perturbations in scalar-tensor theories of gravity*

2015 – 2017
- **M.Sc. Physics, University of the Philippines Diliman**
  Thesis: *Some consequences of the generalized uncertainty principle: energy levels, thin-layer quantization, and quantum dynamics*

2010 – 2015
- **B.Sc. Physics, University of the Philippines Diliman**
  Thesis: *Bound states, quantum scattering, and dynamics in one-dimensional systems with minimal length*

Research Papers

Articles

1. Bernardo, R. C., Liu, G.-C., & Ng, K.-W. (2023). Correlations for an anisotropic polarized stochastic gravitational wave background in pulsar timing arrays. arXiv: 2312.03383 [gr-qc]
2. Bernardo, R. C., & Ng, K.-W. (2023a). Beyond the Hellings-Downs curve: Non-Einsteinian gravitational waves in pulsar timing array correlations. arXiv: 2310.07537 [gr-qc]
3. Bernardo, R. C., & Lee, Y.-R. (2023). Hubble constant by natural selection: Evolution chips in the Hubble tension. *Astron. Comput.*, 100740. doi:10.1016/j.ascom.2023.100740. arXiv: 2212.02203 [astro-ph.CO]
4. Bernardo, R. C., & Ng, K.-W. (2023b). Testing gravity with cosmic variance-limited pulsar timing array correlations. *In review*. arXiv: 2306.13593 [gr-qc]
5. Appleby, S., & Bernardo, R. C. (2023). Tadpole cosmology: Milne solution as a cosmological constant hideout. *JCAP*, *12*, 003. doi:10.1088/1475-7516/2023/12/003. arXiv: 2308.01712 [gr-qc]
6. Bernardo, R. C., & Chen, C.-Y. (2023). Dressed black holes in the new tensor–vector–scalar theory. *Gen. Rel. Grav.*, *55*(1), 23. doi:10.1007/s10714-023-03075-x. arXiv: 2202.08460 [gr-qc]
7. Bernardo, R. C., Grandón, D., Levi Said, J., & Cárdenas, V. H. (2023). Dark energy by natural evolution: Constraining dark energy using Approximate Bayesian Computation. *Phys. Dark Univ.*, *40*, 101213. doi:10.1016/j.dark.2023.101213. arXiv: 2211.05482 [astro-ph.CO]
8. Bernardo, R. C., & Ng, K.-W. (2023c). Constraining gravitational wave propagation using pulsar timing array correlations. *Phys. Rev. D*, *107*(10), L101502. doi:10.1103/PhysRevD.107.L101502. arXiv: 2302.11796 [gr-qc]
9. Bernardo, R. C., & Ng, K.-W. (2023d). Hunting the stochastic gravitational wave background in pulsar timing array cross correlations through theoretical uncertainty. *JCAP*, *08*, 028. doi:10.1088/1475-7516/2023/08/028. arXiv: 2304.07040 [gr-qc]
10. Bernardo, R. C., & Ng, K.-W. (2023e). Looking out for the Galileon in the nanohertz gravitational wave sky. *Phys. Lett. B*, *841*, 137939. doi:10.1016/j.physletb.2023.137939. arXiv: 2206.01056 [astro-ph.CO]
11. Bernardo, R. C., & Ng, K.-W. (2023f). Stochastic gravitational wave background phenomenology in a pulsar timing array. *Phys. Rev. D*, *107*(4), 044007. doi:10.1103/PhysRevD.107.044007. arXiv: 2208.12538 [gr-qc]
12. Villegas, K. H. A., & Bernardo, R. C. (2022). Quantum and higher curvature corrections to the anti-de Sitter black hole. *In review*. arXiv: 2208.07663 [gr-qc]
13. Appleby, S., & Bernardo, R. C. (2022). Tadpole cosmology: self tuning without degeneracy. *JCAP*, *07*(07), 035. doi:10.1088/1475-7516/2022/07/035. arXiv: 2202.08672 [astro-ph.CO]
14. Bernardo, R. C., Chen, C.-Y., Said Levi, J., & Kung, Y.-H. (2022). Confronting quantum-corrected teleparallel cosmology with observations. *JCAP*, *04*(04), 052. doi:10.1088/1475-7516/2022/04/052. arXiv: 2111.11761 [gr-qc]
15. Bernardo, R. C., Grandón, D., Said Levi, J., & Cárdenas, V. H. (2022). Parametric and nonparametric methods hint dark energy evolution. *Phys. Dark Univ.*, *36*, 101017. doi:10.1016/j.dark.2022.101017. arXiv: 2111.08289 [astro-ph.CO]
16. Bernardo, R. C., & Ng, K.-W. (2022). Pulsar and cosmic variances of pulsar timing-array correlation measurements of the stochastic gravitational wave background. *JCAP*, *11*, 046. doi:10.1088/1475-7516/2022/11/046. arXiv: 2209.14834 [gr-qc]
17. Palpal-latoc, C. J., Bernardo, R. C., & Vega, I. (2022). Testing time-delayed cosmology. *Eur. Phys. J. C*, *82*(1148). doi:10.1140/epjc/s10052-022-11126-x. arXiv: 2111.10742 [astro-ph.CO]

18 Bernardo, R. C., Said, J. L., Caruana, M., & Appleby, S. (2021a). Well-Tempered Minkowski Solutions in Teleparallel Horndeski Theory. doi:10.1088/1361-6382/ac36e4. arXiv: 2108.02500 [gr-qc]

19 Bernardo, R. C. (2021a). Gravitational wave signatures from dark sector interactions. *Phys. Rev. D*, *104*(2), 024070. doi:10.1103/PhysRevD.104.024070. arXiv: 2103.02311 [gr-qc]

20 Bernardo, R. C. (2021b). Inflationary quantum dynamics and backreaction using a classical-quantum correspondence. *Eur. Phys. J. C*, *81*(11), 994. doi:10.1140/epjc/s10052-021-09781-7. arXiv: 2109.08508 [gr-qc]

21 Bernardo, R. C. (2021c). Self-tuning kinetic gravity braiding: Cosmological dynamics, shift symmetry, and the tadpole. *JCAP*, *03*, 079. doi:10.1088/1475-7516/2021/03/079. arXiv: 2101.00965 [gr-qc]

22 Bernardo, R. C., & Levi Said, J. (2021a). A data-driven Reconstruction of Horndeski gravity via the Gaussian processes. *JCAP*, *09*, 014. doi:10.1088/1475-7516/2021/09/014. arXiv: 2105.12970 [astro-ph.CO]

23 Bernardo, R. C., & Levi Said, J. (2021b). Towards a model-independent reconstruction approach for late-time Hubble data. *JCAP*, *08*, 027. doi:10.1088/1475-7516/2021/08/027. arXiv: 2106.08688 [astro-ph.CO]

24 Bernardo, R. C., Said, J. L., Caruana, M., & Appleby, S. (2021b). Well-tempered teleparallel Horndeski cosmology: a teleparallel variation to the cosmological constant problem. *JCAP*, *10*, 078. doi:10.1088/1475-7516/2021/10/078. arXiv: 2107.08762 [gr-qc]

25 Bernardo, R. C., & Vega, I. (2021). Stealth black hole perturbations in kinetic gravity braiding. *J. Math. Phys.*, *62*(7), 072501. doi:10.1063/5.0048929. arXiv: 2007.06006 [gr-qc]

26 Bernardo, R. C., Celestial, J., & Vega, I. (2020). Stealth black holes in shift symmetric kinetic gravity braiding. *Phys. Rev. D*, *101*(2), 024036. doi:10.1103/PhysRevD.101.024036. arXiv: 1911.01847 [gr-qc]

27 Bernardo, R. C., & Vega, I. (2019a). Hair-dressing Horndeski: An approach for obtaining hairy solutions in cubic Horndeski gravity. *Phys. Rev. D*, *99*(12), 124049. doi:10.1103/PhysRevD.99.124049. arXiv: 1902.04988 [gr-qc]

28 Bernardo, R. C., & Vega, I. (2019b). Tailoring cosmologies in cubic shift-symmetric Horndeski gravity. *JCAP*, *10*, 058. doi:10.1088/1475-7516/2019/10/058. arXiv: 1903.12578 [gr-qc]

29 Bernardo, R. C. S., & Esguerra, J. P. H. (2018). Maximally-localized position, Euclidean path-integral, and thermodynamics in GUP quantum mechanics. *Annals Phys.*, *391*, 293–311. doi:10.1016/j.aop.2018.02.015

30 Bernardo, R. C. S., & Esguerra, J. P. H. (2017). Euclidean path integral formalism in deformed space with minimum measurable length. *J. Math. Phys.*, *58*(4), 042103. doi:10.1063/1.4979797

31 Cruz, P. C. S., Bernardo, R. C. S., & Esguerra, J. P. H. (2017). Energy levels of a quantum particle on a cylindrical surface with non-circular cross-section in electric and magnetic fields. *Annals of Physics*, *379*, 159–174. doi:https://doi.org/10.1016/j.aop.2017.02.004

32 Bernardo, R. C. S., & Esguerra, J. P. H. (2016a). Energy levels of one-dimensional systems satisfying the minimal length uncertainty relation. *Annals Phys.*, *373*, 521–531. doi:10.1016/j.aop.2016.07.035

33 Bernardo, R. C. S., & Esguerra, J. P. H. (2016b). Quantum scattering in one-dimensional systems satisfying the minimal length uncertainty relation. *Annals Phys.*, *375*, 444–459. doi:10.1016/j.aop.2016.10.022

34 Esguerra, J. P., Bernardo, R. C., Vallejos, J. D., & Canda, J. J. (2015). Reply to comment on 'wind-influenced projectile motion'. *European Journal of Physics*, *36*(6), 068004. doi:10.1088/0143-0807/36/6/068004

35 Bernardo, R. C., Esguerra, J. P., Vallejos, J. D., & Canda, J. J. (2015). Wind-influenced projectile motion. *European Journal of Physics*, *36*(2), 025016. doi:10.1088/0143-0807/36/2/025016

36 Bernardo, R. C. S., & Esguerra, J. P. H. (2015b). Exactly Solvable Dynamical Models with a Minimal Length Uncertainty. *Few Body Syst.*, *56*(4-5), 219–229. doi:10.1007/s00601-015-0978-8. arXiv: 1602.02240 [hep-th]

37 Bernardo, R. C. S., & Palisoc, C. P. (2014). Wronskian method for bound state central force problem. *European Journal of Physics*, *35*(3), 035024. doi:10.1088/0143-0807/35/3/035024

Workshops & Invited Talks

- **YITP long-term workshop Gravity and Cosmology 2024 (GC2024)**, 29 January - 1 March 2024, hosted by the Yukawa Institute for Theoretical Physics, Kyoto University, Japan *Talk*: "Gravitational physics frontiers in the nanohertz regime with PTA and SKA"
- **Bangkok Workshop on Gravity and Cosmology**, 22 - 26 January 2024, hosted by the Physics Department, Chulalongkorn University, Thailand, *Talk*: "Gravity and cosmology in the nanohertz GW regime"
- **Pulsar timing array gravitational physics frontier**, 6 December 2023, *Invited Seminar* at the Leung Center for Cosmology and Particle Astrophysics, National Taiwan University, Taiwan
- **On future pulsar timing array gravitational physics frontier**, 27 November 2023, *Invited Online Seminar* at the Center of Quantum SpaceTime, Sogang University, Korea
- **Testing gravity using inter-pulsar correlation measurements**, 11 November 2023, *Invited Talk* at the CosPA (Cosmology and Particle Astrophysics) 2023 Symposium, Department of Physics and Institute of Theoretical Physics, The Chinese University of Hong Kong, Hong Kong
- **Testing gravity in the nanohertz GW regime using PTA correlations**, 28 September 2023, *Invited Seminar* at the Department of Physics, National Taiwan Normal University, Taiwan
- **The 27th International Summer Institute on Phenomenology of Elementary Particle Physics and Cosmology (SI2023)**, 21 - 25 August 2023, hosted by the National Center for Theoretical Sciences Physics Division and the Physics Department, National Tsing Hua University, Taiwan, *Talk*: "Testing gravity in the nanohertz gravitational wave regime"
- **Pulsar Timing Arrays: A Star-Way to New Physics**, 14 - 18 August 2023, hosted by the Mainz Institute for Theoretical Physics, Johannes Gutenberg University Mainz, Germany, *Talk*: "Testing gravity in the nanohertz GW regime using PTA correlations"
- **Theoretical milestones and recent progress on the nanohertz gravitational wave background**, 8 May 2023, *Invited Seminar* at the National Center for Theoretical Sciences Physics Division, National Taiwan University, Taiwan
- **2023 Annual Meeting of the Physical Society of Taiwan (TPS2023)**, 16 - 18 January 2023, hosted by the National Cheng Kung University, Taiwan, *Talk*: "Stochastic gravitational wave background correlation signals in a pulsar timing array"
- **19th Rencontres du Vietnam 2023: Theory meeting experiments (TMEX-2023)**, 5 - 11 January 2023, hosted by the International Centre for Interdisciplinary Science Education, Quy Nhon, Vietnam, *Talk*: "Stochastic gravitational wave background correlations in a pulsar timing array"
- **PTAfast: Finding the Galileon and other degrees of freedom in the nanohertz GW sky**, 2 December 2022, *Invited Online Talk* at the CosPA (Cosmology and Particle Astrophysics) 2022 Symposium, Asia Pacific Center for Theoretical Physics, Korea
- **Stochastic gravitational wave background phenomenology in a pulsar timing array**, 27 October 2022, *Invited Seminar* at the Department of Physics, National Tsing Hua University, Taiwan
- **The 31st Workshop on General Relativity and Gravitation in Japan (JGRG31)**, 24 - 28 October 2022, virtual, hosted by the University of Tokyo, Japan, *Talk*: "Stochastic gravitational wave background phenomenology beyond Einstein"
- **The stochastic gravitational wave background in a pulsar timing array**, 6 October 2022, *Invited Seminar* at the Department of Physics, National Taiwan Normal University, Taiwan

Workshops & Invited Talks (continued)

- **The stochastic gravitational wave background in a pulsar timing array**, 4 October 2022, *Invited Seminar* at the Department of Electrophysics, National Yang Ming Chiao Tung University, Taiwan
- **NCTS The Future is Illuminating**, 28 - 30 June 2022, virtual, hosted by the National Center for Theoretical Sciences Physics Division, Hsinchu Hub, Taiwan, *Talk*: "Beyond Einstein phenomenology in the nanohertz gravitational wave sky"
- **Quantum Field Theory in Curved Spacetimes Workshop**, 23 - 27 May 2022, virtual, *Talk*: "Backreaction of modes on inflationary dynamics through a classical-quantum correspondence"
- **Self-tuning phenomenology through degeneracy and beyond**, 29 March 2022, *Invited Seminar* at the Department of Physics, National Taiwan Normal University, Taiwan
- **Asia-Pacific School and Workshop on Gravitation and Cosmology 2022**, 19 - 22 March 2022, virtual, hosted by the Department of Physics, Soochow, Taiwan and GSROC (Taiwan), *Talk*: "Self-tuning beyond degeneracy through the cosmic tadpole"
- **The cosmological constant problem, Fab Four, and well-tempered cosmology**, 18 February 2022, *Invited Seminar* at the Institute of Physics, Academia Sinica, Taiwan
- **Gravitational wave signatures from dark sector interactions**, 27 December 2021, *Invited Seminar* at the National Center for Theoretical Sciences Physics Division, National Taiwan University, Taiwan
- **The 30th Workshop on General Relativity and Gravitation in Japan (JGRG30)**, 6 - 10 December 2021, virtual, hosted by the Waseda University, Japan, *Talk*: "Towards well-tempered dark energy and teleparallel gravity"
- **LeCosPA 4th International Symposium Unity of Physics – From Plasma Wakefields to Black Holes**, 29 November - 3 December 2021, hosted by the Leung Center for Cosmology and Particle Astrophysics, National Taiwan University, *Talk*: "Progress on well-tempered cosmology: new teleparallel extensions and observational status"
- **Brookhaven Forum: Opening New Windows to the Universe (BF2021)**, 3 - 5 November 2021, virtual, hosted by the Brookhaven National Laboratory, *Talk*: "Towards a model-independent reconstruction approach for late-time Hubble data"
- **The dark Universe: Theory and data assemblies**, 20 - 22 October 2021, *Invited Online Talk* at the 39th Samahang Pisika ng Pilipinas Physics Conference, Physics Society of the Philippines
- **8th Korea-Japan workshop on Dark Energy**, 18 - 22 October 2021, virtual, hosted by the Yukawa Institute for Theoretical Physics, Kyoto University, Japan, *Talk*: "Towards well-tempered dark energy models"
- **AAPPS-DACG Workshop 2021 on Astrophysics, Cosmology and Gravitation**, 4 - 8 October 2021, virtual, hosted by the Asia Pacific Center for Theoretical Physics, Korea, *Talk*: "A data-driven reconstruction of Horndeski gravity using late-time Hubble data"
- **Black Holes Inside and Out (BHIO2021)**, 27 September - 1 October 2021, virtual, hosted by the Tokyo Institute of Technology and the Yukawa Institute of Theoretical Physics, Japan and the Florida Space Institute, US, *Poster*: "Gravitational wave signatures from dark sector interactions"
- **Alternative Gravities and Fundamental Cosmology (ALTECOSMOFUN'21)**, 6 - 10 September 2021, virtual, hosted by the Szczecin Cosmology Group, Institute of Physics, University of Szczecin, Poland, *Talk*: "A data-driven reconstruction of Horndeski gravity using late-time Hubble data"
- **Iberian Cosmology Meeting (IberiCOS 2021)**, 29 March - April 1 2021, virtual, hosted by the University of Coimbra and Instituto Superior Técnico, University of Lisbon, Portugal, *Talk*: "New scaling solutions in coupled vector dark energy"
- **International Webinar on Recent Developments in Cosmology and Modified Gravity (RDCM-2021)**, 9 - 11 March 2021, virtual, hosted by the Department of Mathematics, BITS-Pilani, Hyderabad Campus, India, *Talk*: "Gravitational waves from dark sector interactions"

Workshops & Invited Talks (continued)

- **SIGRAV International School 2021: Gravity of Compact Astrophysical Objects and Gravitational Waves**, 1 - 5 February 2021, virtual, hosted by the Italian Society of General Relativity and Gravitation, Italy
- **IV Joint ICTP-Trieste/ICTP-SAIFR School on Cosmology: Challenges for the Standard Cosmological Model**, 18 - 29 January 2021, virtual, hosted by IFT-UNESP, São Paulo, Brazil
- **The 29th Workshop on General Relativity and Gravitation in Japan (JGRG29)**, 25 - 29 November 2019, Kobe University, Japan, *Talk*: "Hairy black holes in kinetic gravity braiding"
- **2019 YITP Asian-Pacific Winter School and Workshop on Gravitation and Cosmology**, 11 - 15 February 2019, Yukawa Institute for Theoretical Physics, Kyoto University, Japan, *Poster*: "New solutions in Horndeski theory"
- **ICTP Summer School on Cosmology 2018**, 18 - 29 June 2018, Abdus Salam International Centre for Theoretical Physics, Trieste, Italy

Conference Proceedings

Samahang Pisika ng Pilipinas (Physics Society of the Philippines)

1. Baybay, J. A. B., Bernardo, R. C., & Vega, M. F. I. (2020). Scattering of nonlinear bosonic fields: A case study in superradiance. In *Proceedings of the samahang pisika ng pilipinas* (Vol. 38, SPP-2020-5A–05). Retrieved from https://proceedings.spp-online.org/article/view/SPP-2020-5A-05
2. Bernardo, R. C., Angeles, J. M., & Vega, M. F. I. (2020). Cosmological dynamics in a self-tuning cubic horndeski theory. In *Proceedings of the samahang pisika ng pilipinas* (Vol. 38, SPP-2020-1E–05). Retrieved from https://proceedings.spp-online.org/article/view/SPP-2020-1E-05
3. Celestial, J. d. L., Bernardo, R. C. S., & Vega, M. F. I. G. (2019). Electrically-charged black holes in horndeski theory. In *Proceedings of the samahang pisika ng pilipinas* (Vol. 37, SPP-2019-3C–02). Retrieved from https://proceedings.spp-online.org/article/view/SPP-2019-3C-02
4. Villanueva, J. A. N., Bernardo, R. C. S., & Vega, M. F. I. G. (2019). Gravitational radiation from extreme-mass ratio inspirals in bald kinetic gravity braiding. In *Proceedings of the samahang pisika ng pilipinas* (Vol. 37, SPP-2019-3C–04). Retrieved from https://proceedings.spp-online.org/article/view/SPP-2019-3C-04
5. Bernardo, R. C., & Vega, M. F. I. (2018). No-go theorems in cubic sector of shift-symmetric horndeski gravity. In *Proceedings of the samahang pisika ng pilipinas* (Vol. 36, SPP-2018-1D–01). Retrieved from https://proceedings.spp-online.org/article/view/SPP-2018-1D-01
6. Bernardo, R. C. S., & Esguerra, J. P. H. (2015a). Energy levels of a quantum particle on a corrugated tube in a uniform electric field. In *Proceedings of the samahang pisika ng pilipinas* (Vol. 33, SPP-2015-PB–43). Retrieved from https://proceedings.spp-online.org/article/view/1249
7. Bernardo, R. C. S., & Esguerra, J. P. H. (2014). Tunneling through rectangular double barrier potential systems in quantum mechanics with minimal length uncertainty. In *Proceedings of the samahang pisika ng pilipinas* (Vol. 32, SPP2014-3B–05). Retrieved from https://proceedings.spp-online.org/article/view/1840
8. Bernardo, R. (2013). Effect of transverse uniform electric field on spinless quantum particle confined on the surface of an elliptic cylinder. In *Proceedings of the samahang pisika ng pilipinas* (Vol. 31, SPP2013-PA–9). Retrieved from https://proceedings.spp-online.org/article/view/SPP2013-PA-9

Skills

Languages	English, Filipino
Coding	Python, Mathematica, LaTeX
Misc.	Academic research, teaching, training, consultation, LaTeX typesetting and publishing

Teaching

Lecturer	Particle Physics, Thermodynamics, Relativity, and Quantum Mechanics for Engineering and Physics Majors
Lab	Elementary Mechanics, Thermodynamics, and Modern Physics for Engineering and Science Students
Grader	Mechanics, Electromagnetism, Quantum Theory, Statistical Mechanics, Solid State Physics, and General Gelativity for Undergraduate and Graduate Students

Admin

Organizer	HEP Seminar, August 2022–January 2023, Institute of Physics, Academia Sinica
	HEP Journal Club, February–July 2022, Institute of Physics, Academia Sinica
Head	Wellness Committee, A.Y. 2019–2020, National Institute of Physics, University of the Philippines Diliman
	Modern Physics Course Group, A.Y. 2018–2019, National Institute of Physics, University of the Philippines Diliman
	Elementary Mechanics Lab Course Group, A.Y. 2017–2018, National Institute of Physics, University of the Philippines Diliman
Member	Socials Committee, A.Y. 2015–2016, National Institute of Physics, University of the Philippines Diliman

Awards and Achievements

Awards and Achievements

2020	**Most Outstanding Ph.D. Graduate**, College of Science, UPD
	Edgardo Gomez Award for Outstanding Ph.D. Graduate, College of Science, UPD
	Excellence in Graduate Studies, College of Science, UPD
2017	**Most Outstanding M.S. Graduate**, College of Science, UPD
2016	**Gawad Direktor bilang Natatanging Guro sa Laboratorio**, National Institute of Physics, UPD
2015	**Leticia Shahani Award for Best Undergraduate Thesis**, College of Science, UPD
	Magna Cum Laude, College of Science, UPD
2012 – 2015	**Jose Maria Feliciano Undergraduate Scholar**, College of Science, UPD
2010 – 2015	**College and University Scholar**, College of Science, UPD

References

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