



## 2019 Accomplishment Report NIP Photonics Research Laboratory

Prepared by:

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## 1. Executive Summary

### 1.1. Activities of the research group

#### 1.1.1. Organization

Regular members	4
Student members	33
PhD students	12
MS students	3
BS students	18
Apprentices	0
Total	37

### 1.1.2. Mentoring

	Number of graduates
BS Physics	4
BS Applied Physics	5
MS Physics	5
MS MSE	0
PhD Physics	0
Total	14

### 1.2. Research highlights

International peer-reviewed journals	8
Local peer-reviewed journals	0
International conference papers	5
International conference presentations	17
Local conference papers /presentations	28
Chapter in books	0
Patents	0
NIP funded projects	3
Non-NIP funded projects	3
Major equipment acquired/ upgraded	5
Research travels abroad	5
Visiting researchers	1
MOA's entered with local and foreign institutions	1

### 1.3. Extension work highlights

Members' extension work activities	23
Research interns/ OJT's for training held at NIP	13

### 1.4. Main challenges encountered and proposed solutions

### 1.5. Awards received, accreditations, positions of responsibility held and other accomplishments

National awards received, accreditation, positions of responsibility held	4
Int'l awards received, accreditations, positions of responsibility held	0
Other accomplishments	0

## 2. Technical Report

### 2.1. Highlights of research activities for 2019

- The Photonics Research Laboratory has 37 researchers (4 regular members and 33 student members).
- The Group helped graduate 9 BS students, and 5 MS students. It also welcomed 4 new student members.
- The Group had published 8 ISI/ Scopus-indexed papers in 2019.
- N. Hermosa, P. Almoró, and W. Garcia each received One U.P. Professional Chair Award for Outstanding Teaching and Research, 2019 - 2020. P. Almoró was appointed UP Scientist III (2018-2020).
- The Group members engaged in extension work as reviewers in local and international peer-reviewed publications. P. Almoró was appointed as Topical Editor of Applied Optics by The Optical Society (second term, 2019-2021). The Photonics Group continued to host high school interns and college OJT's in the Lab.
- W. Garcia was appointed as Director of NIP (Period of appointment: 17 July 2019 to 16 July 2022)
- The Group had 5 research-related travels abroad. N. Hermosa II attended the VAST & JINR conference on Challenges and Opportunity of International Cooperation in Natural Science, in Vietnam. N. Hermosa II also presented their work at the OSA Frontiers in Optics in Washington, D.C. USA. Dina Banguilan and Niña Angelica Zambale attended the Summer School on Optics, Lasers and Laser Applications 2019 in Gwangju, South Korea. Jayson Cabanilla presented his work at the SPIE/COS Photonics Asia 2019, in Hangzhou, China.

## 2.1.1. Organizations

### 2.1.1.1. Group members

#### Regular members (4)

1. Almoró, Percival
2. Dasallas, Lean
3. Garcia, Wilson
4. Hermosa, Nathaniel II

#### Student members (33)

##### PhD students (10)

1. Abregana, Timothy Joseph (P5)
2. Banguilan, Dina Grace (P1)
3. Binamira, Jonel (P1)
4. Cabanilla, Jayson (P1)
5. De Mesa, Joseph (P4)
6. Emperado, Rommil (P3)
7. Miranda, Jessa Jayne (P2)
8. Olaya, Cherrie May (P3)
9. Onglao, Mario III (P3)
10. Zambale, Niña Angelica (P1)

##### MS students (3)

1. Pablico, Dennis Angelo (M2)
2. Revilla, Miguel (M1)
3. Tabuzo, Rigil (M1)

##### MSE students (2)

1. Sagisi, Jenny Lou (P2)
2. De Mata, Joy Kristelle (P1)

##### BS Applied Physics students (11)

1. Argonza, Maria Liana (B5)
2. Dela Cruz, Mary Nathalie (B5)
3. Estrada, Viron Gil (B6)
4. Gaffud, Ymmanuel (B5)
5. Gloria, Gelli Mae (B4)
6. Manuel, Janelle (B4)
7. Manzo, Agatha Jill (B5)
8. Ofina, Edrien Dominick (B4)
9. Operaña, Jared Joshua (B6)
10. Parales, Ares Amable (B5)
11. Tinte, Bienica Yzabelle (B4)

##### BS Physics students (7)

1. Depasucat, Cyrill Hope (B5)
2. Jamiliarin, Roger (B4)
3. Lorenzo, Joshua Cesar (B6)
4. Suelto, Nathan (B5)
5. Tolentino, Meara Noelle (B5)
6. Valdeavilla, Charlyn (B5)
7. Villareal, Mark Roan Elrae (B5)

### 2.1.1.2. Summary

Regular members	4
Student members	33
PhD students	12
MS students	3
BS students	18
Apprentices	0
Total	37

## 2.1.2. Mentoring

### 2.1.2.1. List of graduates

#### 1<sup>st</sup> semester 2018-2019 (1 MS)

1. Narag, Jadze Princeton C.  
Structured Light Using a Digital Micromirror Device as Slit: Generating Self-healing beams and Probing the Orbital Angular Momentum of Laguerre-Gaussian Beams (Adviser: N. P. Hermosa II)

#### 2<sup>nd</sup> semester 2018-2019 (4 MS, 7 BS)

2. Banguilan, Dina Grace C.  
Determining the Magnitude, Charge, Parity and Location of Optical Vortices Through OAM Beam Diffraction by a Programmable Aperture (Adviser: N. P. Hermosa II)
3. Cabanilla, Jayson P.  
Colored Ronchi Pattern for Surface Profilometry (Adviser: N. P. Hermosa II)
4. Oca, Gilbert M.  
Enhanced Schlieren Imaging Applied in Heat Visualizations: A Wave-Propagation-Based Model (Adviser: P. F. Almoró)
5. Zambale, Nina Angelica F.  
Goos Hanchen shifts due to Monolayer Graphene with Different Optical Conductivities (Adviser: N. P. Hermosa II)
6. Binamira, Jonel F.  
Accelerated Multiple-Plane Phase Retrieval Using Unordered Wave Propagations (Adviser: P. F. Almoró)
7. Bucó, Christian L.  
Enhanced Multiple-Plane Phase Retrieval Using Adaptive Support (Adviser: P. F. Almoró)
8. De Mata, Joy Kristelle C.  
Hollow Cathode Argon DC Glow Discharge (Adviser: W. O. Garcia)
9. Pineda, Zeus Jr. T.  
Enhanced Multiple-Plane Phase Retrieval With Modulated Randomization Using Stabilizing Parameters (Adviser: P. F. Almoró)
10. Remulla, Katherine Isabel T.  
Rotational Orientation Sensing via Spatial Mode Projection of Hermite Gauss Modes (Adviser: N. P. Hermosa II)
11. Revilla, Miguel L.  
Generalizing the four-lens Paraxial Invisibility Cloak to Lenses with Different Focal Lengths (Adviser: N. P. Hermosa II)
12. Tabuzo, Rigil G.  
Enhance Phase Retrieval by Intensity Measurement Scaling Via Modified Bi-Histogram Equalization (Adviser: P. F. Almoró)

1<sup>st</sup> semester 2019-2020 (2 BS)

13. Abesa, Alvaro (Applied)

Design, construction and operation of a vacuum thermal evaporator for metal thin film deposition (Adviser: W. O. Garcia)

14. Alemania, Marielle (Applied)

Deposition of aluminum thin films on glass substrate via thermal evaporation (Adviser: W. O. Garcia)

2.1.2.2. Summary of Mentoring

	Number of graduates
BS Physics	4
BS Applied Physics	5
MS Physics	5
MS MSE	0
PhD Physics	0
Total	14

## 2.2. Research highlights

### 2.2.1. Publication in ISI/SCI and Scopus indexed journals (8)

1. De Vero, J. C., Jasmin, A.C., Dasallas, L.L., Garcia, W.O., and Sarmago, R.V., "Synthesis of irod oxide nanostructures via carbothermal reaction of Fe microspheres generated by infrared pulsed laser ablation", *Coatings* 9 (3), 179 (2019). DOI: [10.3390/coatings9030179](https://doi.org/10.3390/coatings9030179).
2. Bucu, C. L., and Almoró, P. F., "Enhanced Multiple-Plane Phase Retrieval Using Adaptive Support," *Optics Letters* 44, 6045-6048 (2019). DOI: [10.1364/ol.44.006045](https://doi.org/10.1364/ol.44.006045).
3. Binamira, J. F., and Almoró, P. F., "Accelerated single beam multiple-intensity reconstruction using unordered propagations," *Optics Letters* 44, 3130-3133 (2019). DOI: [10.1364/OL.44.003130](https://doi.org/10.1364/OL.44.003130).
4. Aguilar, R. A., Hermosa, N., & Soriano, M. N. (2019). Low-cost Fourier ghost imaging using a light-dependent resistor. *American Journal of Physics*, 87(12), 976-981. DOI: [10.1119/10.0000163](https://doi.org/10.1119/10.0000163).
5. Narag, J. P. C., & Hermosa, N. (2019). Probing Higher Orbital Angular Momentum of Laguerre-Gaussian Beams via Diffraction through a Translated Single Slit. *Physical Review Applied*, 11(5), 054025. DOI: [10.1103/PhysRevApplied.11.054025](https://doi.org/10.1103/PhysRevApplied.11.054025).
6. Revilla, M., Lorenzo, J. C., & Hermosa, N. (2019). A paraxial cloak with four lenses of different focal lengths. *European Journal of Physics*, 40(3), 035303. DOI: [10.1088/1361-6404/ab0e52](https://doi.org/10.1088/1361-6404/ab0e52).
7. Zambale, N. A. F., Sagisi, J. L. B., & Hermosa, N. P. (2019). Goos-Hänchen shifts due to graphene when intraband conductivity dominates. *Optics Communications*, 433, 25-29. DOI: [10.1016/j.optcom.2018.09.058](https://doi.org/10.1016/j.optcom.2018.09.058).
8. Remulla, K. I. T., & Hermosa, N. (2019). Spatial light modulator phase calibration based on spatial mode projection. *Applied optics*, 58(21), 5624-5630. DOI: [10.1364/AO.58.005624](https://doi.org/10.1364/AO.58.005624).

### 2.2.2. Publication in local peer reviewed journals (0)

### 2.2.3. International conference presentations with full papers (5)

1. Cabanilla, J. P., & Hermosa, N. (2019, November). Colored Ronchi pattern for fringe projection profilometry. In *Optical Metrology and Inspection for Industrial Applications VI* (Vol. 11189, p. 111891M). International Society for Optics and Photonics. DOI: [10.1117/12.2537690](https://doi.org/10.1117/12.2537690).
2. Narag, J. P., & Hermosa, N. (2019, September). Laguerre-Gaussian beams diffraction through mobile slit for orbital angular momentum detection. In *Frontiers in Optics* (pp. JW3A-4). Optical Society of America. DOI: [10.1364/FIO.2019.JW3A.4](https://doi.org/10.1364/FIO.2019.JW3A.4)
3. Oca, G. M., and Almoró, P. F., "Enhanced schlieren imaging applied in heat and air jet visualizations: A wave propagation-based model" Proc. SPIE 11052, Third Int'l Conference on Photonics and Optical Engineering, 110521W (24 January 2019)



4. Olaya, C. M., Garcia, W. O., and Hermosa, N., "Goos-Hänchen effect on Si thin films with spherical and cylindrical pores", Proc. SPIE 10533, Oxide-based materials and Devices IX, 105332O (23 February 2018). DOI: 10.1117/12.2291484.
  5. Revilla, M. L., & Hermosa, N. P. (2019, September). A four-lens paraxial invisibility cloak with lenses of different focal lengths. In Laser Science (pp. JTU3A-14). Optical Society of America. DOI: [10.1364/FIO.2019.JTU3A.14](https://doi.org/10.1364/FIO.2019.JTU3A.14).
- 2.2.4. International conference presentations without full papers (17)
1. Almoró, P., "Speckle Phase Retrieval: Techniques and Applications," 3rd International Conference on Photonics and Optical Engineering, (Xi'an, China) Dec. 5-8, 2018.
  2. Hermosa, N., "Some Simple experiments in optics to probe the nature of graphene", Philippine – Japan Conference on Photonics and Optical Materials NIP-MSEP-RIKEN-FUKUI-NICT Network (University of the Philippines Diliman, Quezon City), December 12 – 14, 2019.
  3. Simon, R., & Hermosa, N., "Polarization and angle-insensitive surfaces using polynomial graded index of refraction ", International OSA Network of Students (IONS) KOALA (University of Otago, Dunedin, New Zealand), December 02 – 06, 2019.
  4. Abregana, T. J., and Almoró, P. F., "Object-image plane distance considerations for DMD-based phase retrieval," Asian Network School and Workshop on Complex Condensed Matter Systems 2019 (University of the Philippines Diliman, Quezon City), November 04 – 08, 2019.
  5. Banguilan, D.G., & Hermosa, N., "Tracing the position of optical vortices through diffraction by a triangular aperture", Asian Network School and Workshop on Complex Condensed Matter Systems 2019 (University of the Philippines Diliman, Quezon City), November 04 – 08, 2019.
  6. Binamira, J. F., and Almoró, P. F., "Robust phase retrieval using unordered propagation on partial intensity patterns," Asian Network School and Workshop on Complex Condensed Matter Systems 2019 (UP Diliman), November 04 – 08, 2019.
  7. Cabanilla, J., & Hermosa, N., "Color Ronchi pattern for fringe projection profilometry", Asian Network School and Workshop on Complex Condensed Matter Systems 2019 (University of the Philippines Diliman, Quezon City), November 04 – 08, 2019.
  8. De Mata, J. K., and Garcia, W. O., "Hollow cathode argon DC glow discharge," Asian Network School and Workshop on Complex Condensed Matter Systems 2019 (University of the Philippines Diliman, Quezon City), November 04 – 08, 2019.
  9. De Mesa, J. A., Sagisi, J. B., Garcia, W. O., and Dasallas, L. L., "Numerical investigation of heat transfer in ultrafast laser processing of silicon material," Asian Network School and Workshop on Complex Condensed Matter Systems 2019 (University of the Philippines Diliman, Quezon City), November 04 – 08, 2019.
  10. Emperado, R. B., Dasallas, L. L., and Garcia, W. O., "Simulation of the plasma plume expansion in pulsed laser ablation of copper using hydrodynamic model," Asian

Network School and Workshop on Complex Condensed Matter Systems 2019 (University of the Philippines Diliman, Quezon City), November 04 – 08, 2019.

11. Hermosa, N. "Some Simple experiments in optics to probe the nature of graphene", Asian Network School and Workshop on Complex Condensed Matter Systems 2019 (University of the Philippines Diliman, Quezon City), November 04 – 08, 2019.
12. Simon, R., & Hermosa, N., "Single layer graphene: A slab with finite thickness or an infinitesimally thin 2D material?", Asian Network School and Workshop on Complex Condensed Matter Systems 2019 (University of the Philippines Diliman, Quezon City), November 04 – 08, 2019.
13. Miranda, J. J., De Mesa, J. A., Gaffud, Y., Rillera, A., Sarmago, R. V., and Garcia, W. O., "Transmission spectroscopy of CeO<sub>2</sub> thin film deposited on glass via femtosecond pulsed laser deposition," Asian Network School and Workshop on Complex Condensed Matter Systems 2019 (University of the Philippines Diliman, Quezon City), November 04 – 08, 2019.
14. Onglao, M. J. III, and Almoró, P. F., "Effects of the number of beamsplitters used in single-shot multiple plane phase retrieval," Asian Network School and Workshop on Complex Condensed Matter Systems 2019 (University of the Philippines Diliman, Quezon City), November 04 – 08, 2019.
15. Sagisi, J. B., De Mesa, J. A., and Dasallas, L. L., "Two-temperature model simulations of femtosecond pulsed laser ablation of copper," Asian Network School and Workshop on Complex Condensed Matter Systems 2019 (University of the Philippines Diliman, Quezon City), November 04 – 08, 2019.
16. Tabuzo, R. G., and Almoró, P. F., "Enhanced phase retrieval using modified quad-histogram equalization," Asian Network School and Workshop on Complex Condensed Matter Systems 2019 (University of the Philippines Diliman, Quezon City), November 04 – 08, 2019.
17. Zambale, N., & Hermosa, N., "Goos-Hanchen shifts of visible light due to monolayer graphene", Asian Network School and Workshop on Complex Condensed Matter Systems 2019 (University of the Philippines Diliman, Quezon City), November 04 – 08, 2019.

#### 2.2.5. Local conference papers

##### 2.2.5.1. With full paper (28)

1. Abregana, T. J., and Almoró, P. F., "Amplitude- versus phase-type diffusers: A wave propagation-based model," Proceedings of the 37th Physics Congress of the Samahang Pisika ng Pilipinas, (Tagbilaran City, Bohol, Philippines) 29 May – 01 June 2019.
2. Aguilar, R. A. P., Hermosa, N., & Soriano, M. N. (2019). Low-cost Fourier ghost imaging using a photoresistor. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.

3. Argonza, M. L. O., Banguilan, D. G. C., & Hermosa, N. (2019). Light crystal patterns from symmetric and anti-symmetric beams. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
4. Banguilan, D. G. C., & Hermosa, N. (2019). OAM beam diffraction by a triangular aperture and a triangular slit: a comparative study. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
5. Binamira, J. F., and Almoró, P. F., "Accelerated iterative wavefront reconstruction using multiple planes with unordered propagation," Proceedings of the 37th Physics Congress of the Samahang Pisika ng Pilipinas, (Tagbilaran City, Bohol, Philippines) 29 May – 01 June 2019.
6. Binamira, J. F., and Almoró, P. F., "Hurdling local minima in multiple-plane phase retrieval using a reference passage plane," Proceedings of the 37th Physics Congress of the Samahang Pisika ng Pilipinas, (Tagbilaran City, Bohol, Philippines) 29 May – 01 June 2019.
7. Bucó, C. L., and Almoró, P. F., "Accelerated multiple-plane phase retrieval using adaptive support constraint," Proceedings of the 37th Physics Congress of the Samahang Pisika ng Pilipinas, (Tagbilaran City, Bohol, Philippines) 29 May – 01 June 2019.
8. Cabanilla, J. P., & Hermosa, N. (2019). Three-color Ronchi pattern for surface profilometry. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
9. Capuli, C. J. D., Hermosa, N., & Simon, R. (2019). Minimum layers for graded refractive index film approximation. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
10. Celebrado, M. B., Sagisi, J. B., and Garcia, W. O., "Spectroscopic studies of low pressure hydrogen DC glow discharge," Proceedings of the 37th Physics Congress of the Samahang Pisika ng Pilipinas, (Tagbilaran City, Bohol, Philippines) 29 May – 01 June 2019.
11. Cruz, M. N. G. D., Cabanilla, J. P., & Hermosa, N. (2019). A multiple three-step phase shifting profilometry for nonlinearity error reduction. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
12. Cruz, M. N. G. D., Narag, J. P., & Hermosa, N. (2019). Optical vortices detected in the near-field heart diffraction. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
13. De Mesa, J. A., Miranda, J. J., Rillera, A., Sarmago, R. V., and Garcia, W. O., "Surface morphology and elemental composition of CeO<sub>2</sub> thin films grown by femtosecond pulsed laser deposition," Proceedings of the 37th Physics Congress of the Samahang Pisika ng Pilipinas, (Tagbilaran City, Bohol, Philippines) 29 May – 01 June 2019.
14. Emperado, R. B., Garcia, W. O., and Dasallas, L. L., "Simulation of the hydrodynamic expansion of plasma plume in pulsed laser ablation of copper," Proceedings of the 37th Physics Congress of the Samahang Pisika ng Pilipinas, (Tagbilaran City, Bohol, Philippines) 29 May – 01 June 2019.

15. Miranda, J. J., De Mesa, J. A., Gaffud, Y., Rillera, A., Sarmago, R. V., and Garcia, W. O. "Transmission spectroscopy of CeO<sub>2</sub> thin film deposited on glass via femtosecond pulsed laser deposition," Proceedings of the 37th Physics Congress of the Samahang Pisika ng Pilipinas, (Tagbilaran City, Bohol, Philippines) 29 May – 01 June 2019.
16. Narag, J. P. C., Hermosa, N., Sagisi, J. L., & Zambale, N. A. (2019). Goos-Hänchen shift: An optical phenomenon to measure thin film thickness of SiO<sub>2</sub>. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
17. Onglao, M. S. III, and Almoró, P. F., "Investigation of beam splitter reflection/transmission ratio on single beam multiple intensity reconstruction towards a single shot setup," Proceedings of the 37th Physics Congress of the Samahang Pisika ng Pilipinas, (Tagbilaran City, Bohol, Philippines) 29 May – 01 June 2019.
18. Oca, G. M., and Almoró, P. F., "Investigation of schlieren cutoff filters: A wave propagation-based model," Proceedings of the 37th Physics Congress of the Samahang Pisika ng Pilipinas, (Tagbilaran City, Bohol, Philippines) 29 May – 01 June 2019.
19. Ofina, E. D., Cabanilla, J. P., & Hermosa, N. (2019). Automated detection of the first order frequency in Fourier transform profilometry. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
20. Operaña, J. C., Zambale, N., & Hermosa, N. (2019). Influence of the ratio between extinction coefficient and real component refractive index of materials to the Spatial Goos-Hänchen shifts of incident light beams. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
21. Remulla, K. I. T., & Hermosa, N. (2019). Mode imaging with Hermite-Gauss beams. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
22. Revilla, M., Remulla, K. I., & Hermosa, N. (2019). Tunable binary Fresnel zone plates using a digital micromirror device. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
23. Sagisi, J. L. B., & Hermosa, N. (2019). Simultaneous determination of thickness and refractive index of thin films by mean squared error analysis of reflectivity measurements. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
24. Simon, R., Zambale, N. A. F., Carillo, M. I., Somintac, A., Salvador, A., Estacio, E., & Hermosa, N. (2019). Reflectivity of textured GaAs modeled as graded index film. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
25. Tabuzo, R. G., and Almoró, P. F., "Improved wavefront reconstruction using modified bi-histogram equalization," Proceedings of the 37th Physics Congress of the Samahang Pisika ng Pilipinas, (Tagbilaran City, Bohol, Philippines) 29 May – 01 June 2019.

26. Tolentino, M. N., & Hermosa, N. (2019). Refractive indices of birefringent photopolymer resin using the Brewster angle method. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
27. Tolentino, M. N., Remulla, K. I. T., & Hermosa, N. (2019). Superposition of two Airy beams with different accelerations. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.
28. Zambale, N. A. F., & Hermosa, N. (2019). Spin Hall effect of visible light due to monolayer graphene on SiO<sub>2</sub>/Si. Proceedings of the Samahang Pisika ng Pilipinas. (Tagbilaran City, Bohol) June 2019.

2.2.5.2. Without full paper (0)

2.2.6. Chapters in books (0)

2.2.7. Patents (0)

2.2.8. NIP funded projects (3)

Almoro, Percival	Technique for Enhanced Reconstruction in Phase Retrieval (P 105, 600.00)	01 Jan. - 31 Dec 2019
Hermosa, Nathaniel	Symmetric and Antisymmetric Optical Beams Impinging a Ring of n Small Circular Apertures (P 92,400.00)	01 Jan. - 31 Dec. 2019
Garcia, Wilson	Laser Ablation: Theory, Experiment and Applications (P 105, 600.00)	01 Jan. - 31 Dec. 2019

2.2.9. Non-NIP funded projects (3)

Project proponent	Project title	Period	Amount	Project grantor
Hermosa, Nathaniel	Angular Goos-Hänchen Shift: An optical phenomena for ultra thin film thickness measurement	31 January 2017 - 30 January 2020	PhP 13,724,157.70 <sup>1</sup> PS: PhP 2,866,166.40 MOOE: PhP 3,509,660.77 CO: PhP 6,875,715.20 AC: PhP 472,615.33	DOST - PCIEERD
Hermosa, Nathaniel	A Generalized Multidirectional Paraxial Optical Cloak in the Visible Range	15 July 2018- 14 July 2019	PhP 529,600.00 PS: PhP 163,200.00 MOOE: PhP 105,500.00 CO: PhP 210,000.00 AC: PhP 15,300.00	DOST-NAST

<sup>1</sup> Budget has changed due to the increase in salary of the project staffs.

Hermosa, Nathaniel	Structured beam generation via polygonal and curve slits and their self-healing properties	01 May 2018 – 31 May 2019	PhP 300,000.00 PS: 0 MOOE: PhP 131,000.00 CO: PhP 169,000.00	OVCRD, UP Diliman
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#### 2.2.10. Major equipment acquired (5)

Equipment	Cost (PhP)	Source of fund	Project proponent
Variable lens	244,750.00	DOST-PCIEERD	Hermosa, Nathaniel
Chopper Set	350,000.00	DOST-PCIEERD	Hermosa, Nathaniel
DLP Projector with controller	90,388.99	DOST-NAST	Hermosa, Nathaniel
Digital Camera	115,000	DOST-NAST	Hermosa, Nathaniel
Spatial Light Modulator	1,670,000	DOST-PCIEERD	Hermosa, Nathaniel

#### 2.2.11. Research travels abroad (6)

NIP Personnel	Purpose	Place	Dates	Mode of exchange
Hermosa, Nathaniel II	Challenges and Opportunity of International Cooperation in Natural Sciences (VAST & JINR)	Vietnam	November 26 – 29, 2019	Presenter
	OSA Frontiers in Optics	Washington, D.C.	September 15 – 19, 2019	Presenter
Cabanilla, Jayson	SPIE/COS Photonics Asia 2019	Hangzhou, China	November 2019	Presenter
Banguilan, Dina Grace	Summer School on Optics, Lasers, and Lase Applications	Gwangju, South Korea	July 08 – 12, 2019	Presenter
Zambale, Nina Angelica	Summer School on Optics, Lasers, and Lase Applications	Gwangju, South Korea	July 08 – 12, 2019	Presenter

#### 2.2.12. Visiting researchers (1)

Prof. Wei Wang  
 Department of Mechanical Engineering, School of Engineering and Physical Sciences  
 Heriot-Watt University, Edinburgh, EH14 4AS, United Kingdom  
 Title of presentation: Coherence holography and metrology  
 May 29-June 2, 2019

### 2.2.13. MOA's entered with local or foreign institutions (1)

MOA/MOU between UP Diliman through NIP and the Mindanao State University on Student Training (3 yrs, 2018-2020)

## 2.3. Extension work activities

### 2.3.1. Members' extension work activities (23)

Abregana, Timothy Joseph	Reviewer, 37 <sup>th</sup> SPP Physics Congress
Almoro, Percival	Topical Editor, Applied Optics, The Optical Society (2019-2022) Chair, PCIEERD Technical Panel for Optics and Photonics 1st Vice President, Samahang Pisika ng Pilipinas Topical Editor, 37 <sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress Member of Sci. Prog. Comm., Information Photonics'19, Yokohama, Japan, 23-27 April 2019 Member of Tech. Prog. Comm., OPTILAS 2019 Mexican Opt. and Photonics Mtg. Conf, Cancun Mexico, 23-27 Sept. 2019 Co-Chair, Pandaigdigang Araw ng Liwanag, Arete, Ateneo De Manila University, May 16, 2019
Banguilan, Dina Grace	Reviewer, 37 <sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress Reviewer, OSA Journals
Cabanilla, Jayson	Reviewer, 37 <sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress
Dasallas, Lean	Reviewer, 37 <sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress
De Mesa, Joseph	Reviewer, 37 <sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress
Emperado, Rommil	Reviewer, 37 <sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress
Garcia, Wilson	Director, National Institute of Physics Period of Appointment: 17 July 2019 to 16 July 2022

	Reviewer, optics, photonics and plasma physics, 37 <sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress
Hermosa, Nathaniel	Reviewer for optics, photonics and plasma physics, 37 <sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress  Reviewer, OSA Journals
Miranda, Joseph	Reviewer, 37 <sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress
Narag, Jadze Princeton	Reviewer, 37 <sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress
Onglao, Mario	Reviewer, 37 <sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress
Sagisi, Jenny Lou	Reviewer, 37 <sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress
Zambale, Nina Angelica	Reviewer, 37 <sup>th</sup> Samahang Pisika ng Pilipinas Physics Congress

### 2.3.2. Research interns/ OJT's for training held at NIP (13)

SSIP	Francis Niko Rey C. Velez Philippine Science High School – Central Mindanao Campus
	Cristina Ysabel SJ. Almario Philippine Science High School – Calabarzon Region Campus
	Kate Zyrill M. Plantilla Philippine Science High School – Calabarzon Region Campus
	Stanley Jeff J. Sanchez Philippine Science High School – Southern Mindanao Campus
	Celina Miren S. Santos Philippine Science High School – Southern Mindanao Campus
	Marylen T. De la Cruz Philippine Science High School – Eastern Visayas Campus
OJT	Brandon Kristoff B. Apat Mindanao State University – Iligan Institute of Technology
	Hessam T. Jamaloden Mindanao State University – Main Campus



Clarisse Jade T. Estrada  
Mindanao State University – Main Campus

Cyrill Hope T. Depasucat  
University of the Philippines – Diliman

Ma. Liana O. Argonza  
University of the Philippines – Diliman

Ymmanuel P. Gaffud  
University of the Philippines – Diliman

Agatha Jill D. Manzo  
University of the Philippines – Diliman

#### 2.4. Main challenges encountered and proposed solutions

#### 2.5. Awards received, accreditations, positions of responsibility held and other accomplishments (4)

1. N. Hermosa, P. Almoro, and W. Garcia each received One UP Professional Chair Award for Outstanding Teaching and Research, 2019-2020
2. P. Almoro was appointed UP Scientist III (2018-2020)

### 3. Photos, ISI/SCI Publications and other appendices

#### 3.1. Photos



*Figure 1. Interns/ OJTs of the Photonics Research Laboratory from June to July 2019, together with Dr. Percival F. Almoro.*



Figure 2. D. Banguilan and N. Zambale, together with other international students, attending at SSOLLA 2018 held last July 08 - 12 in Gwangju, South Korea.



Figure 3. Photronics Group during the International Day of Light held last May 16, 2019 at the Arete, Ateneo De Manila University, Quezon City.



Figure 4. Dr. Nathaniel Hermosa II presented his work at OSA Frontiers in Optics last September 15 - 19, 2019 in Washington, D.C. USA.



*Figure 5. Photonics Group 2019 year end celebration and fellowship.*