

## **Plans for the National Institute of Physics for the Period 2026 – 2029**

### **Cristine Villagonzalo, NIP Director Nominee**

The vision of the National Institute of Physics, as part of the College of Science, University of the Philippines Diliman, is “to become the leading national center of excellence in education, training, and advanced research and development in the field of pure and applied Physics that would exert scientific and technological influence in the Asia-Pacific region.” In line with this vision and the mission of the institution, and to add value to the collective efforts of former NIP administrators, I lay forth my plans that will contribute transformative solutions to meet present and future challenges. This proposal will focus on strengthening core competencies, enhance stakeholder engagements, and manage human and material resources, including laboratory spaces, to ensure continuity of services and to maximize efficiency and scientific output.

#### **I. Core Competencies and Scientific Excellence**

##### **A. Graduate Programs**

The NIP has already started developing the PhD/MS Applied Physics degree program and have been writing new curricula on this matter. However, UP is requiring a unit to first conduct an evaluation on its current graduate program prior to offering a new one. For this matter, the NIP needs:

1. to complete its internal assessment of the content, learning outcomes, and delivery of its PhD/MS Physics program;
  2. to write new curricula on a wide variety of Applied Physics electives in accordance with the expertise of its faculty members;
  3. to establish key laboratories for Applied Physics teaching and research; and
  4. to strengthen faculty capacity in Applied Physics research through training, collaboration and targeted recruitment.
5. Furthermore, the NIP needs to revisit its MA Physics program intended for Physics teachers. Its course offerings need to be reviewed, and their prerequisites and corequisites need to be aligned for those with a Physics education background or from other related fields.

##### **B. Undergraduate Programs**

The NIP has committed to the ASEAN University Network Quality Assurance (AUN QA) of its undergraduate degree programs with a slated schedule of international external assessment in the first quarter of 2028. In this regard, the NIP will need:

1. to review learning outcomes, curriculum design and alignment of the four-year BS Physics program and the BS Applied Physics program for both the Instrumentation Physics concentration and the Materials Physics concentration;
2. to revise curricula to correct the prerequisites and corequisites of courses;
3. to develop and institutionalize more elective courses for undergraduate students; and
4. to conduct workshops to prepare faculty, staff and students for the external assessment.

### C. Physics Service Courses

To adequately prepare undergraduate science and engineering majors for advanced and emerging technologies in material science, nanotechnology, electronics and photonics, the NIP needs to complete the proposals of its Physics 76 (Lecture) / 76.1 (Laboratory) and Physics 77 (Lecture) / Physics 77.1 (Laboratory) curricula.

## **II. Operational Excellence and Sustainability**

### A. Stakeholder Engagements

To get timely and actionable assessments of its services the NIP needs to standardize its operations to get prompt feedback from its stakeholders, and make such activities part of its semestral routine. The NIP needs to:

1. review and make concise feedback surveys or consultations for its current students, alumni, faculty and staff, and schedule its regular deployment and data collection; and
2. to process data collected and report key findings and actionable recommendations.

This includes academic matters such as course content and delivery, teacher performance, and degree program feedback from its alumni and employers. More importantly, this will encompass work satisfaction of staff to drive continuous improvement of services and enhance workplace culture.

### B. Human Resources

As stewards of NIP, its faculty and staff will be encouraged to participate in trainings and workshops for continued professional development.

1. The teaching and research capability of the NIP will be increased through targeted recruitment of faculty in key priority research areas approved by the NIP Executive Council, such as in physics education research, quantum science and technology, biophysics, magnetism, among others.
2. Office staff will be encouraged to take training in digital tools, data and inventory management, and other HRDO endorsed skill-building learning modules.
3. Laboratory staff will be encouraged to take training in operation and maintenance of equipment.
4. With the rising incidence of depression, the faculty and staff need to undergo a psychological first aid training given by Psycserve or the Office of the Counseling and Guidance to provide immediate and practical support for students in distress within the Institute's premises.
5. Faculty and staff need to attend a first-aid training class to have the information and skills needed to help students, faculty and staff in emergency situations.

### C. Physical Resources

In order to provide a safe and motivating environment conducive for learning and doing research, it is important to achieve and maintain a healthy building. The NIP will advocate and push for:

1. the replacement of the roof in the fourth floor and add toilets in every floor of the research wing;

2. the conversion of the lecture pavilion basement into additional laboratories for service and undergraduate courses;
3. the restoration and water-proofing of damaged walls at the Research Wing;
4. the provision of adequate lighting and additional CCTV in walkways around the NIP Building for safety and security;
5. the addition of PWD access in key areas of the NIP; and
6. adequate inventory of high-usage consumables, safety gear, and critical building maintenance items to prevent downtime.

To ensure sustainable research practices, the NIP must also

7. perform regular inventory and life cycle assessment of laboratory equipment and materials to determine which can be recovered, repurposed, or recycled at the end of their life cycle; and
8. properly dispose of toxic and non-renewable materials and equipment to create viable spaces for study, or for new research projects.
9. The NIP will continue to encourage its researchers to apply for research grants from internal and external sources and to enable them by sharing of best practices from veteran project leaders.

### **III. Value Creation and Regional Impact**

The NIP will continue to foster collaboration with its existing international and local partners, and will broaden ties to other research institutions through a shared vision and complementary expertise.

While the NIP will continue to support dissemination of research through publications and presentations at conferences, NIP needs to lead in science communication and discussions with other educators, policy-makers and the public. We need to change the public perceptions of physics, i.e., of being difficult to understand, or of being merely a foundational knowledge. To combat misinformation and stereotypes about physics in all levels, our faculty should be incentivized:

1. to have active engagement with local and international leaders, government agencies and policy-decisions makers in providing technical assistance, in line with the UP Charter, RA 9500; and to highlight the role of physics as a primary driver of modernization and sovereign capability;
2. to help capacitate other state universities with physics degree programs through collaborative research projects, internships, and laboratory resource development; and
3. to institute modular lessons for elementary teachers and their students that prioritizes hands-on, inquiry-based science activities over rote memorization.

The increased appreciation for physics in all levels will drive student enrollment, increase student scholarships, expand research funding, and more importantly, foster societal support for policies based on science and technology. The enumerated NIP actions are key drivers for a sustainable research infrastructure and academic excellence in the long term.