The professional profile of PhD-holders

Deshan Sandanayake

Ph.D. Researcher (Neutrino Physics)

Who do I want to be? A neutrino physicist - full time. With core skills such as organisation, networking and teamwork - as well as values of faith, hope and love - I believe we can achieve together!

deshan.sandanayake@iphc.cnrs.fr
My personal portfolio at ORCID: : https://orcid.org/0000-0003-3292-5262

Core business

PHASE 2 **Skill development**

I gained this skill by taking part in various training sessions offered to me as part of my doctoral training, which concerns training such as "Identification of skills - Introduction to Portfolio approach", "Developing Leadership Qualities & Positive Thinking", "Effective reading" etc. These helped me to gain a better overview of what the industry/recruiter expects from me as a candidate, specific to what I am applying.

Takes a critical look at his skills and experience and regularly fine-tunes his career goals.
Knows how to develop new skills to keep step with changing knowledge and needs.
Relies on advice from competent professionals (coaching) or experienced staff and takes their opinions into account; uses his networks to manage his career.
Is able to evolve gradually from technical expertise to managerial expertise.
Helps his staff develop their skills and networks and assists them in achieving career development goals.

PHASE 1 **Evaluation**

As the expert (representing my local research group) for certain tasks in regular international collaboration meetings, it is my duty to stay up-to-date, alert and vigilant about the latest trends, techniques and decisions being made. I am responsible for evaluating the scientific validity of them in terms of both quality and value, proceed to question the motives and give valuable feedback, as well as to report and account to my local group about them. On the other hand, I need to update the global collaboration concerning the activities and results of the group, prepared to answer questions as well as to adjust myself accordingly by weighing different suggestions and advice based on plausibility and validity.

Evaluates the value of various documents concerning his field of expertise.
Is able to judge his own results in terms of both quality and added value.
Is willing to expose ideas to a critical audience; takes others' opinions of his work into account.
Is willing to evaluate the work of other contributors and provides reasoned, realistic judgments of others' work.

PHASE 1 **Information management**

For my research activities I constantly use (and have to be aware of) the latest results by following up articles on specific websites such as arxiv, and internal databases such as JUNO DocDB.

Knows how to review the state of the art (SOTA) in a scientific topic.
Makes efficient use of information-gathering methods, identifies pertinent resources, particularly bibliographic resources.
Masters web-based research (e.g., bibliographic databases, patent databases)
Knows how to judge the pertinence of information, critique sources and check source reliability.
Designs and implements information-gathering and management systems using suitable technology.
Addresses issues relating to the security and life cycle of data.
Seeks out support from experts in information and data management.

PHASE 2

Expertise and methods

I developed a passion for Neutrino Physics when I started learning Physics at the university level. Ever since, I have chosen subjects, and participated in training programs, summer schools, and internships in order to orient myself in the field of neutrino physics. Especially from internships (and my Ph.D.), I have developed a specific skill set in order to solve problems and achieve goals for me by my work, as well as to develop a sense of awareness of the most recent results and research activities relevant to my field. Thereon, I was also able to present my work among international colleagues, to get recognition to my work in an international context.

Is familiar with recent progress in fields related to his own.
Is able to engage in dialogue and collaboration with experts in other disciplines or fields of activity.
Takes ownership of new research methods and techniques.
Is able to document and evaluate his activities using statistical methods where applicable.
Can formulate complex problems that correspond to new challenges.
Is able to develop arguments in support of new projects.
Knows how to adapt his arguments to his audience.
Advises and assists his staff in making appropriate use of investigative methods, improving their performance and enhancing their skills.

Personal and relational qualities

PHASE 2

Communication

As I am a collaborator of an international collaboration spans multiple nations, I have familiarized myself with the set of keywords and the scientific terms necessary for efficient communication among each other, both in-person and virtual contexts. It spans mostly English language, but also French, occasionally. Also being a member of the international doctoral program (PDI) of the University of Strasbourg, I work in a team of students who span all disciplines, and interdisciplinarity is a core theme there. Together we organise and assist the organisation of different training projects which promote interdisciplinarity.

Adapts his register to communicate with experts in other fields at both the national and international levels.
Masters communication techniques for various contexts and media.
Communicates effectively when addressing a diverse and lay audience.
Knows how to address a community of professionals.
Educates and trains his staff in the use of digital communication technologies.
Is able to work and lead a group in at least English and one other world language.

PHASE 2

Collaboration

As part of my Ph.D. research activities, I am a collaborator in the JUNO collaboration, which spans multiple nations, such as France, China, Italy, Germany, etc. It is structured into various branches based on different requirements and responsibilities, and I naturally involve myself in different branches or working groups, which allow me to create a network of experts in different fields with vivid experience. This allows me to create partneships with those with knowledge external to my expertise, such as electronics, structural engineering, chemistry, etc. As a collaboration, we publish results together, with all of us co-authoring papers.

Collaborates with people/teams who play a pivotal role on the global scale.

Leads networks and helps to institute dialogue between different entities.
Knows how to establish partnership relations with people working outside his field.
Has the ability to co-produce results and/or innovations.

PHASE 2 Analysis, synthesis and critical thinking

I consider my Ph.D. training as the first step towards becoming an independent researcher, and I am willing to make full use. Even in small tasks presented to me, I try to come up with solutions or methods of my own, before taking any suggestions from my supervisors. At execution, I seek their advice to evaluate the validity & importance of my ideas. I believe this stimulates critical thinking and ignites new ideas in my co-workers and other students working in our group.

Knows how to apply his analyzing and synthesizing abilities to new fields.
Takes ownership of new analytical methods.
Has a novel and independent way of thinking and makes significant contributions.
Questions "business-as-usual" scenarios in his activity.
Advises his staff to help them develop their own capacities of analysis and synthesis.
Stimulates critical thinking among his peers and his staff.

PHASE 2 Open-mindedness and creativity

Originating from Sri Lanka and currently based in France, I have well adapted to work in an international, multicultural setting. My Ph.D. training constantly challenges me to make every effort to equip myself to be an independent thinker as well as an active team player. I am active in data acquisition & testing of a prototype setup in my lab, and when certain unexplained observations present themselves, I try my best to propose a solution/test independently, and seek the good judgement and validity of it with my supervisors before I act. This has been a constant practice in my research. It makes me creative & innovative as well as challenges me to be critical and realistic of every observation. I believe I encourage and set a vison ahead of the fellow students in the group.

Explores related fields.
Conceives new projects to find answers to essential questions.
Encourages his staff to seek challenge, be curious and engage in scientific questioning.
Defines and carries out innovative interdisciplinary projects with the help of contributors from various backgrounds.
Serves as a vector of innovation, a realistic visionary, a constructive agitator.
Encourages creativity and innovation among his staff.
Has acquired professional experience abroad in a culture other than his own.

PHASE 2 Commitment

Being in a vivid research group that spans many who contribute towards a common experiment, our tasks involve a high level of interdependency. As a result, each member has to specifically familiarise themselves with the activities of other members from vivid fields, evaluate the tasks and give feedback. At the same time, one cannot afford to be the reason for setbacks of others' activities; everyone must persevere and make every effort to facilitate other coworkers. I am constantly learning to cooperate, collaborate and coexist in this group. When I progress at a healthy pace, it stimulates gratitude, enthusias,m and commitment in the group that reinforces and encourages myself and others positively.

Can picture himself in other contexts; applies his commitment and motivation to other activities and fields of expertise.
Perseveres in his undertakings and projects; paves the way for other staff and supports them.
Inspires the enthusiasm and commitment of his staff.

PHASE 2 Integrity

One of the most important trainings I received as part of my Ph.D. training was about Integrity in Science & Research. It created in me a sense of awareness of breach of scientific conduct, either intentional or unintentional, concerning my work as well as others. I am also motivated in contributing to different projects about research integrity as well as open science (organised by

the University). While my research collaboration has a strict policy in managing the scientific research, techniques & publications via different responsible committees, I am ready to take every measure to prevent any form scientific misconduct and step out against any.

Builds staff awareness of the need for responsible conduct of research.
Advises his peers and staff concerning matters of respect, confidentiality, anonymity and intellectual property.

PHASE 2 **Balance**

I believe that the Ph.D. activities have entrusted in me certain responsibilities, which comes with attached challenges. I have faced challenges in my activities concerning deadlines, quality, problem solving, etc., and every challenge has passed with a lesson that enabled me to overcome another that lied in the future. Preserving work-life balance is a difficult task, but never impossible. The flexibility to choose my working hours in the lab and teleworking capabilities are a great assistance in preserving the balance. I am determined to not bring my workplace to home, and vice versa.

Knows how to deal with strong opposition.
Draws on his strengths and transcends his weaknesses.
Knows how to cope with pressure generated by his career or his personal life.
Is able to keep his work and home environments separate.

PHASE 2 **Listening and empathy**

In my activities, I regularly need the help of others (ex: technicians, engineers, supervisors, etc.). A simple expression of gratitude as saying "thank you" goes a long way. I acknowledge the contributions of my coworkers during my talks. I listen and respect good advise that comes from the more experienced to undertand global needs. On the other hand, I try my best to be a good "listening ear" towards fellow students when they need someone to listen and give opinion to not only their work issues, but also mental & social issues such as work stress, depression, future uncertainty, work-life balance, etc. Together we have solved problems, came up with novel ideas, created new opportunities & supported one another via fruitful & empathetic exchanges.

Knows how to engage in active listening in various situations.
Is careful to take his contacts' needs and frame of reference into account.
Expresses gratitude regularly.
Takes the needs of his staff into consideration, is sensitive to signs of stress and able to provide support and advice when needed.

PHASE 1 **Negotiation**

When clashes between decisions take place, I evaluate the weight of every choice and the possible impact on the global task. At the same time, I seek advice from my more experienced coworkers. This helps me to see the different aspects that I hadn't considered before, and to view the problem from a different perspective.

Is able to detect people's unstated needs based on the requests they formulate.
Knows how to reconcile the drivers, requirements and constraints of his contacts to reach a consensus, and is able to gather all the information needed to do so.

Business management and value creation

PHASE 1 **Project management**

As a member and a delegate of the International Doctoral program (PDI - Cohort of 2021 - Primo Levi), I have shared responsibilities in organising events such as PDI Entry days. I have given a talk to the new members, specifying what it means to be a PDI delegate & the associated responsibilities.

Plans projects to meet goals in accordance with strategy and priorities, and taking quality, deadline and budget constraints into account.
Knows how to write specifications.
Is accountable for resources used and for meeting the deadlines and quality requirements of the deliverable.
Reacts efficiently and appropriately to change and unforeseen events.
Conducts his project within a framework of auditing and evaluation, deploying the appropriate systems.

PHASE 2 **Managing change**

My Ph.D. activities have faced change continually. For example, the past pandemic severely delayed our experimental activities, requiring us to quickly modify our strategy going forward, including the future course of my Ph.D. Some coworkers left positions, leaving us at a crucial loss of workforce & expertise. After going through a transitional period, I have familiarized myself to counter balance and stabilize the group against it, in a field where I wasn't an expert initially. This entrusted on me a higher level of responsibility, and required me to produce results quickly in order to retain the balance. Through this I have practically learned to manage unexpected or sudden change.

Is able to get people to see the need for change.
Defines objectives and rallies support for them.
Creates momentum and builds alliances.
Achieves initial results rapidly.
Understands the possible causes of the failure of a change plan.

PHASE 1 **Decision-making**

My supervisors have given me a certain degree of freedom to make decisions. In my laboratory, I am tasked to conduct tests and performance analyses. I am expected to come up with proposals for different tests/checks I could make, before being validated/refused by the supervisors. While I know to make decisions depending on what the outcomes of a previous step are, I am accountable to my superiors and I am willing to comply with their judgement. Whatever the outcome may be, I am held responsible to frequently report the results, both to the group and the collaboration.

Knows how to make appropriate decisions for each phase of his project.
Assists his line management in making major decisions (e.g., reporting, scenarios)

PHASE 1 **Obtaining and managing funding**

Our group has its own budget, from which we plan expenses of different missions such as various collaboration meetings, attending conferences and summer schools, etc. I have gained the training to prepare the budget for such missions, and on return, file the final expenses with due proof.

Manages his own funding and is comfortable in discussions with budget, financial and economic decision-makers.
Understands the funding process and knows how to determine the profitability of an activity.
Knows how to answer a request for proposals and/or write a grant application.

PHASE 1 **People management**

I carry out my Ph.D. activities among my coworkers with expertise in different subjects. I have well enrolled myself in the group and have gained a level of familiarity of their expertise. This helps me to be a team player; identify strengths/weaknesses of everyone and to play according to them. I have identified different layers of the hierarchy, their responsibilities, and to whom they account to. I have shared responsibilities with my superiors in supporting and cooperating with peer students. Our group's international setting allows to maintain a respectful, non-discriminative work environment.

Has experience with teamwork; knows how to encourage, support and recognize the contributions of each player.
Knows how to be a team player.
Is able to win the trust of his peers and his line management.
Can report on his activities.
Supports his peers when needed and can provide assistance.
Understands human resources policies and management tools such as recruitment, evaluation, remuneration and strategic workforce planning.
Takes safety, social responsibility and labor law requirements into account.
Upholds rules on non-discrimination and equal opportunity among employees.

PHASE 1 **Producing results**

Based on the requirements, we propose different tests either collectively or independently. In the process, we carefully map out every step and function with what we already know. As soon as we set the test bench, I perform several important verification steps to make sure every configuration follows the expectation. As soon as the results are out, I analyse and graphically interpret it, often comparing with a benchmark dataset. Depending on the preference, the supervisors may ask me to project it differently. Once we all agree that we understand it well, I present it to the collaboration, and may be included in a scientific publication with everyone's approval.

Knows how to transform ideas into innovations.
Quickly deploys prototype and test phases; involves internal and external customers in these phases.
Learns the lessons of the initial tests.
Understands the policies and processes involved in publishing and exploiting research outcomes in his entity.
Is able to determine the most appropriate means of exploiting his results (e.g., patent, publication).

PHASE 1 **Intellectual and industrial property**

Within our collaboration, there's a strict policy when it comes to the use and dissemination of knowledge & intellectual property, and I am obliged to comply. In the same way, I am accountable both to my research group as well as the laboratory institute for the use of equipment and industrial property. I personally maintain a log of my activities (in the form of a notebook, a set of slides & a git repository) which I plan to officially hand over at the end of my thesis. I clearly understand the importance of preserving the confidentiality of information of internal activities, and I am aware of the outgoing information.

Has basic knowledge of the rules of intellectual/industrial property and copyright as they apply to his own activities.
Understands the advantages and drawbacks of filing a patent.
Is aware of the importance of controlling the release of information.

Strategy and Leadership

PHASE 1 **Strategy**

My research group is responsible for one of the main instruments of the JUNO detector. There's many internal documentation that states the importance of each instrument, including what I am working on. Reading them, as well as participating in numerous internal meetings, I clearly understand how integral are my efforts to the JUNO collaboration. and how do I fit in. As a Ph.D. student, my role is to gain professional exposure while providing a valuable contribution to the collaboration. Participation in frequent meetings allow me to identify collaborators with overlapping interests and with higher expertise, to whom I could reach out for further support.

Is aware of how his project fits into the organization’s strategy and the strategic directions of the sector or field of activity.
Understands relationships between entities and individuals (the role and drivers of each).
Is able to identify influent people that support his projects and understand what they stand to gain

from it.

PHASE 2 Leadership

I have developed leadership qualities via various communities that I have engaged myself in, such as in school, church, university etc. Further, I have gained training in a leadership training camps and sessions organised by the University Grants Commission of Sri Lanka, as well as a part of my doctoral training.

Recognizes the need for and merits of collective effort; knows how to motivate and drive the entity he manages.
Is familiar with various leadership styles and adapts them to the specific project and the people on the team.
Is known within the company as a leader with the potential to promote ideas and initiatives and contribute effectively to their implementation.
Is able to impose his leadership in a competitive context.
Coordinates and mobilizes networks.
Encourages his staff to build a climate of trust.
Grooms his staff for future leadership roles.