

Bernat Ballester**PhD student in nuclear physics** bernat.ballester@sckcen.be**Core business****PHASE 1 Skill development**

Fulfilling the PhD project's objectives will require extensive learning and training of several new skills, which brings valuable input from supervisors and co-workers that helps develop my competences.

- *Sets his professional goals to be ambitious yet realistic.*
- *Identifies and develops means to enhance his employability throughout his career; manages his professional development.*
- *Broadens and upgrades his skillset, personal qualities and achievements.*
- *Uses his networks to expand his scope of competence.*
- *Knows how to transfer his expertise to other fields of activity.*
- *Realizes the necessarily international dimension of his career path.*
- *Accepts input from a mentor or coach to benefit his professional development.*

PHASE 1 Evaluation

As a PhD student I am required to search for information in scientific literature from several sources. Therefore, selecting the most valuable information is a required skill. Additionally, the results of my work must be analyzed by myself and presented to the supervisors, who share their ideas regarding the quality of the work.

- *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

The development of the PhD project required an extensive study of the state of the art of the scientific topic. The information was obtained from several resources, and from this research a large amount of data had to be managed and evaluated to select the most useful.

- *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.*



Personal and relational qualities

PHASE 1 Expertise and methods

The state of the art research of my PhD topic has helped me obtain the knowledge of the key concepts of the topic, as well as the most recent developments and the main challenges to overcome.

- *Masters the basic knowledge and key concepts of his field and knows their history and their significance.*
- *Is familiar with recent progress in his field.*
- *Can view his research activities within an international context.*
- *Is familiar with the investigative methods and techniques of his field (including mathematics and statistics) and can explain why they are appropriate for a given purpose.*
- *Is able to consider alternative methods and techniques.*
- *Is able to formulate problems and hypotheses according to needs.*
- *Defends his research findings in a constructive manner; provides evidence to support his ideas and proposals.*
- *Organizes his presentations in a clear, informative and concise manner.*

PHASE 1 Communication

The work of a PhD student involves presenting the progress of the research to the supervisors periodically. Sharing my results, hypotheses and expectations has helped me develop better communication skills.

- *Knows how to put together a persuasive presentation and communicate about his project or his activity.*
- *Understands, interprets and communicates appropriately in a register suited to his aims and his audience.*
- *Masters a range of communication tools.*
- *Masters his online identity.*
- *Contributes to the dissemination of knowledge within the company, and demonstrates effective teaching skills.*
- *Is proficient in at least English and one other world language.*

PHASE 1 Analysis, synthesis and critical thinking

The large amounts of information found during bibliographical research has forced me to make an effort to analyze, synthesize and select the most critical information.

- *Analyzes his own findings and those of his peers.*
- *Is able to synthesize; expresses key ideas clearly.*
- *Can sort and rank information according to the goal.*
- *Pursues his reasoning and hypotheses free of dogmatism or ideological bias.*
- *Has the objectivity to consider various schools of thought; is able to modify his point of view.*
- *Demonstrates intellectual rigor.*

PHASE 1 Open-mindedness and creativity

My PhD project has brought me to a relatively new field with which I had little experience. This has brought me to learn new facts and techniques and to adapt and apply my previous experience to the project.

- *Demonstrates an ability to acquire knowledge; shows flexibility and open-mindedness. Engages in interdisciplinary activities.*
- *Possesses a constructive style of questioning and scientific doubt.*
- *Develops, takes ownership of and tests new ideas; is clever; seizes opportunities.*

- *Interacts with and seeks the collaboration of professionals of different cultures; knows how to accommodate cultural differences.*

PHASE 1 Commitment

A PhD project, which has a duration of several years, teaches the student to be committed and motivated, even when the circumstances are not the expected.

- *Recognizes and can clearly identify his sources of motivation.*
- *Is able to sustain his commitment and motivation in the face of setbacks and adversity.*
- *Deals efficiently with the routine aspects of his job.*
- *Strives for excellence; shows determination.*
- *Learns from his mistakes and bounces back from failures.*
- *Relies on the support and assistance of his peers.*

PHASE 1 Integrity

The University of Strasbourg gives great importance to research integrity and offers its students extensive training in that regard, of which I have greatly benefited.

- *Respects the standards and practices of his entity.*
- *Demonstrates integrity in the processing and dissemination of data.*
- *Demonstrates integrity with respect to his partners' or competitors' contributions in accordance with intellectual property rules.*
- *Upholds the confidentiality and anonymity of subjects taking part in studies and research.*
- *Honors his commitments and ensures the congruence between actions and words.*
- *Declares any conflict of interest.*

PHASE 1 Balance

In several occasions I have found myself in the need of using a technique for which I did not have the training or experience. In those situations, I have had to seek the help of my colleagues, which has helped me to knowledge my own limitations and learn from my co-workers. On the other hand, I have been able to share my experience in other aspects with my colleagues when they have found themselves in the same situation.

- *Is aware of his aptitudes, knows how to take advantage of them and demonstrate them.*
- *Expresses himself relevantly, confidently and didactically.*
- *Recognizes the limits of his knowledge, skills and expertise, and knows where to find support when needed.*
- *Is able to consider his practices and experience as part of the bigger picture.*
- *Develops his strengths and knows how to correct his weaknesses by seeking the opinion of others.*
- *Is aware of the need to reconcile career and personal life.*
- *Develops mechanisms to cope with pressure and seeks support when needed.*

PHASE 2 Listening and empathy

- *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 Project management

A big project such a PhD thesis requires the student to plan long-term goals and set a realistic

Business management and value creation

planning of the work to be done years in advance, developing the skills of project management.

- *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 1 Managing risks

Working in the laboratory with radioactive materials requires a thorough assessment of the risks involved.

- *Can determine the risks related to his project and the means for controlling them.*
- *Is aware that technological and financial risks increase during the innovation process.*
- *Understands the concept of corporate social responsibility.*

PHASE 2 Decision-making

In many situations, reality does not allow to achieve all the expectations one has. In those situations, I have had to rethink the objectives to adapt to the technical means available, or develop an alternative approach that allowed me to achieve my objectives making use of the available tools.

- *Realizes that no one solution is perfect; can reconcile the imperatives of the market with the quest for technical optimization.*
- *Is able to make choices and assume the consequences of his decisions; has the ability to reconsider decisions when needed.*

PHASE 1 Producing results

- *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).*



Strategy and Leadership

PHASE 1 Strategy

As part of a larger group of scientists who work with the same overall objective, my research project serves to research the answers for one of the many challenges that the group is facing. Being a part of this group has helped me understand how my project fits into the organization and how it relates to the work of other members of the group.

- *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 influential people that support his projects and understand what they stand to gain from it.*



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