

The professional profile of PhD-holders

Francesca Crivelli

Nuclear Engineer focusing on waste management, process development and decommissioning operations

Nuclear engineer specialized in waste treatment and process innovation, with international experience. Open to roles across the nuclear lifecycle and advanced energy technologies.

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Core business

PHASE 2 Skill development

During my PhD and my work as a nuclear/process engineer, I strengthened this skill by leading complex projects such as the development of a novel waste-treatment and conditioning process and by contributing to preliminary dismantling projects, including reactor internals segmentation studies. These tasks required me to reassess my competencies, set ambitious yet realistic goals, and acquire new methods to meet evolving technical needs. Working in international teams at JRC Ispra broadened my ability to transfer expertise and expand my professional reach. I also relied on mentoring, professional advice and networking to support my development and take on broader project responsibilities.

*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 2 Evaluation

Throughout my PhD and my work as a nuclear/process engineer, I developed this skill by critically assessing technical documents, results and procedures related to waste-treatment technologies and dismantling projects. I regularly evaluated the progress and impact of internal activities, coordinated laboratory tests and guided interns and junior colleagues in their tasks. These experiences strengthened my ability to judge the quality and relevance of technical work, integrate feedback from multidisciplinary teams and assess hypotheses beyond my core expertise. This approach helped me refine my methods and contribute to sound, realistic evaluations within my projects.

*Knows how to regularly evaluate the progress, impact and outcomes of his staff's activities.
Takes part in evaluating both internal and external projects.
Is able to evaluate hypotheses and concepts lying beyond his field of expertise.
Encourages his staff to take ownership of the evaluation process.*

PHASE 2 Information management

During my PhD and my work as a nuclear/process engineer, I developed strong information-management skills by conducting extensive state-of-the-art reviews, analyzing scientific literature and performing advanced searches across databases, patents and technical

guidelines. I regularly organized and validated experimental data from laboratory tests, ensuring proper storage, traceability and reliability of results. I also supervised interns and coordinated team activities, supporting them in the use of information-gathering methods and in assessing the relevance and quality of technical sources. Managing data related to radioactive waste and dismantling projects strengthened my understanding of security and compliance requirements.

Conducts advanced searches using a range of software solutions, resources and techniques, recognizing the advantages and limitations of each.

Masters the creation, organization, validation, sharing, storing and archiving of information and/or raw data and addresses the associated risks.

Understands the legal, ethical and security requirements of information management.

Is familiar with the value of, and uses, metadata.

Advises and assists his staff using information-gathering and management methods, critiquing sources and evaluating information and data.

Makes his staff aware of information security and legal and ethical requirements.

PHASE 2 Expertise and methods

Throughout my PhD and my work as a nuclear/process engineer, I strengthened this skill by constantly comparing methods, refining my investigative approach and grounding each choice in scientific evidence. I regularly reviewed literature, assessed alternative techniques and adapted my methodology to evolving project needs. Working with multidisciplinary and international teams helped me develop clearer arguments, validate my hypotheses and present my results effectively to different audiences. I also supported interns and colleagues in structuring their analyses and improving the quality of their investigative work.

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

I developed strong communication skills by presenting my research in international conferences, preparing and delivering technical presentations for industrial clients and collaborating with multidisciplinary teams. Throughout my PhD and engineering work, I regularly communicated complex concepts to experts, suppliers and patent attorneys, adapting my register to each audience and supporting the drafting of a patent application. I also supervised interns, guiding them in structuring technical documents and using digital communication tools. Working in English on a daily basis further strengthened my clarity, precision and confidence in professional communication.

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

I developed strong collaboration skills by working with multidisciplinary and international teams during my PhD and engineering activities. I coordinated laboratory work and information exchange between university groups, industrial partners, suppliers and technical staff, and

contributed to joint developments such as a novel radwaste treatment process and related dismantling studies. My experience at JRC Ispra strengthened my ability to collaborate with teams from different countries and fields while maintaining clear objectives. I also worked closely with patent attorneys and supported interns and colleagues, helping to establish productive relationships and co-produce high-quality results.

*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 strengthened my analytical and critical-thinking skills by working on complex experimental and engineering problems throughout my PhD and industrial activities. I routinely analysed and compared data from laboratory tests, assessed the reliability of different methods and integrated evidence to formulate or refine hypotheses. Developing a novel radioactive-waste conditioning process required questioning standard practices, evaluating alternative approaches and adopting new analytical tools. Collaborating with multidisciplinary and international teams helped me confront different perspectives and sharpen my reasoning. I also supported interns and colleagues in structuring their analyses and encouraged a rigorous, evidence-based approach in our shared work.

*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

I strengthened open-mindedness and creativity by working in highly interdisciplinary environments throughout my PhD and engineering activities. I explored related fields such as materials science, chemistry, process engineering and decommissioning, and developed new ideas to address technical challenges, including innovative approaches for radioactive-waste conditioning. My experience at JRC Ispra exposed me to international teams and different working cultures, helping me remain flexible and receptive to new perspectives. I also encouraged curiosity and critical questioning among interns and colleagues, promoting a constructive and exploratory mindset during laboratory and project activities.

*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

I strengthened my sense of commitment by working on long-term and technically demanding projects throughout my PhD and industrial experience. I learned to remain focused and motivated even when experiments failed or unexpected challenges arose, and I consistently sought solutions rather than stopping at obstacles. Managing parallel responsibilities—research, laboratory work, collaborations and presentations—helped me develop discipline and resilience. I also supported interns and colleagues, sharing methods and helping them progress in their tasks. This experience taught me to maintain determination, adapt to new contexts and sustain motivation over time.

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 1 Integrity

I strengthened this skill by working in environments where rigorous standards, confidentiality and data integrity are essential. Throughout my PhD and industrial activities, I consistently followed safety rules, laboratory procedures and internal guidelines for handling, processing and sharing technical data. Collaborating with industrial partners, research institutions and patent professionals required strict respect for intellectual property and restricted information. I always ensured accuracy and transparency in my work, honored my commitments and maintained coherence between results, documentation and communication.

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 2 Balance

I developed a strong sense of balance by managing demanding responsibilities during my PhD and industrial work. I learned to cope with pressure, adjust priorities and maintain focus even during intense or stressful periods. Feedback from supervisors, colleagues and partners helped me recognize my strengths and address areas for improvement, allowing me to face challenges constructively rather than reactively. Working in different environments taught me to separate professional and personal spheres and to manage setbacks with resilience. Over time, I developed strategies to stay grounded, remain motivated and handle difficult situations with composure.

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

I strengthened my listening and empathy skills by working with people from different disciplines, roles and cultures during my PhD and industrial experience. I learned to adapt my communication to technicians, interns, professors, suppliers and international teams, taking their needs and perspectives into account. Active listening helped me understand expectations, solve misunderstandings and support colleagues during challenging moments in laboratory or project work. I regularly expressed gratitude and fostered a collaborative atmosphere, which made discussions more open and productive. This experience taught me to remain attentive, patient and responsive in diverse professional contexts.

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 2 Negotiation

I strengthened my negotiation skills by working with partners, suppliers and stakeholders who often had different priorities or concerns. At the beginning of my research and development activities, I had to address scepticism about the feasibility and value of the project. To build consensus, I helped prepare detailed budgets, technical justifications and planning documents inspired by lean tools such as A3T. This process allowed me to clarify constraints, propose win-

win solutions and obtain the resources needed to carry out the work. I also negotiated with suppliers and external laboratories to align timelines, specifications and costs, ensuring smooth cooperation and shared objectives.

*Is familiar with negotiating techniques.
Knows how to come up with win-win solutions.
Is able to negotiate in order to obtain the resources needed for projects.*

Business management and value creation

PHASE 2 Project management

I strengthened advanced project-management skills by coordinating multiple parallel activities: laboratory campaigns, process-development milestones, supplier interactions, and the drafting of patent documentation. I routinely identified gaps, adjusted objectives, and reorganized schedules and resources when unexpected issues arose. Working across multidisciplinary teams taught me to clarify priorities, formalize expectations, and maintain quality standards. When needed, I supported colleagues by taking leadership of tasks that required clearer structure or direction.

*Is attentive to discontinuities, trends and weak signals; is prepared for the unexpected; identifies unforeseen opportunities in the project.
Recognizes good ideas and best practices, identifies weaknesses and gaps.
Considers and implements any necessary changes in objectives, organization, schedule, resources and quality requirements.
Knows how to drive his staff in compliance with scheduling and time constraints.
Utilizes a wide range of project management strategies; clarifies priorities and formalizes expectations.
Introduces quality systems.
Guides difficult, complex projects to successful completion; manages several projects simultaneously and efficiently; can intervene to conduct project audits and propose action plans to get projects back on track.
Provides support or assistance to his staff; takes over on projects that lack leadership.*

PHASE 2 Managing change

Working in a dual academic–industrial framework taught me how to build support for rapid changes and maintain momentum under pressure. To convince stakeholders and sponsors, I clarified objectives, explained constraints and proposed realistic action plans. I managed fast-paced experimentation, corrected mistakes quickly when needed, and created alignment between partners. This experience strengthened my ability to drive change, secure buy-in and achieve early tangible results.

*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 2 Managing risks

I progressively took responsibility for analysing the risks linked to experimental activities and for ensuring that interns and junior colleagues were properly trained and aware of laboratory hazards. I developed clear protocols, reinforced the correct use of PPE, and monitored compliance during high-risk operations. Managing an innovation project with limited funding also strengthened my ability to evaluate economic and organisational risks, make informed decisions.

*Analyzes and identifies the risks created by an activity.
Educates and trains staff and partners in the implementation of appropriate risk management procedures.*

*Takes social and environmental imperatives into account in the projects he manages.
Educates and trains his staff in the imperatives of social and environmental responsibility.*

PHASE 2 Decision-making

During my industrial PhD I had to make rapid and well-reasoned decisions across all stages of the project, balancing technical priorities with strict time and budget constraints set by the company. I supported management by providing clear scenarios, data-driven assessments and risk analyses. Working between academia and industry taught me that no solution is perfect: I learned to evaluate trade-offs, choose viable options under uncertainty, and take responsibility for outcomes. When new evidence emerged, I reconsidered earlier choices and redirected activities to ensure technical and strategic alignment.

*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 2 Obtaining and managing funding

During my PhD project, funded by a private start-up, I actively contributed to building and managing the project budget. With the support of senior colleagues, I defined resource needs, personnel allocation and timelines based on the experimental plan. This required balancing technical priorities with financial constraints and adapting expenditures to unexpected outcomes. Working in close contact with the company helped me understand funding dynamics, justify costs, and make informed decisions on how to allocate limited resources effectively.

*Has the knowledge to manage the budgetary, financial and accounting aspects of his projects and activities.
Is able to make choices.
Is familiar with available sources of innovation funding and knows how to mobilize them.
Views his activity in the context of investment/return on investment.
Advises and guides his staff in the financing and budget follow-up of activities.
Advises and guides his staff in creating value and generating revenue and funding.*

PHASE 1 People management

*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 2 Producing results

I developed this skill by working at the interface between research and industrial innovation. I repeatedly transformed high-level ideas into actionable experimental plans, rapidly executing prototype and test phases under tight timelines. Each campaign required learning from early results, adjusting protocols, and managing non-deterministic aspects of the process. I also coordinated stakeholders (academia, industry, suppliers) to validate outcomes and identify opportunities for real-world application, ensuring the transition from research findings to a reproducible, scalable conditioning process.

*Always seeks new ways to improve his performance and that of his staff.
Knows how to detect opportunities liable to lead to a commercial application.
Manages the transition from research to innovation: organizes processes and manages non-*

*deterministic aspects.
Meets the challenges and opportunities for value creation in his field.
Deploys experimental platforms.*

PHASE 2 Intellectual and industrial property

During my PhD and my work as a nuclear/process engineer, I became closely familiar with IP protection by contributing directly to the drafting of European patents for a novel radwaste-conditioning process and new cutting technologies for reactor vessel and internals dismantling. Working with patent attorneys and senior engineers taught me how to structure claims, document inventive steps, and protect technical know-how at different stages of development. I also learned to identify which aspects of the project were strategically sensitive and to share information responsibly within the team, ensuring confidentiality and proper knowledge management.

*Is familiar with the process of filing a patent and with all forms of protection of research outcomes (technical protection and marketing).
Makes his peers and staff aware of the legal requirements of intellectual/industrial property and/or copyright.
Is able to list the areas of technical knowledge that is strategic for the company and identify the individuals in possession of it. Knows how to manage the sharing and perpetuation of knowledge.*

PHASE 2 Customer focus

Throughout my PhD and engineering work, I often had to reconcile the expectations of multiple stakeholders: the startup funding the project, academic supervisors, suppliers and partners in the nuclear field. I made technical choices by combining their feedback with experimental constraints, regulatory requirements and realistic timelines. To keep the project aligned with market and sector needs, I constantly monitored technological trends, benchmarking similar conditioning technologies and integrating lessons learnt from suppliers and international partners. This helped maintain a shared direction and ensured the project remained relevant and feasible.

*Knows how to reconcile the needs of customers, partners and the entity.
Is able to make choices based on technical constraints and feedback from customers and partners.
Creates the conditions for his entity to keep a pulse on the needs of the market.*

Strategy and Leadership

PHASE 2 Strategy

During my PhD and my work with an innovation-driven start-up, I learned to align research activities with the company's strategic objectives. I closely monitored needs and expectations from sponsors and adapted priorities accordingly, ensuring that experimental results supported the broader development roadmap. By attending international conferences, I stayed aware of emerging trends and positioned our work within the evolving radwaste-conditioning landscape. This experience strengthened my ability to shape my own strategic understanding, identify opportunities, and steer activities toward impactful outcomes.

*Observes his environment; recognizes discontinuities and micro-trends; detects weak signals.
Develops his own approach and shapes his understanding of the topic.
Encourages brainstorming and draws conclusions relevant to his area of activity.
Regularly produces documents of a forward-looking and strategic nature.
Makes sure that his activities contribute to the company's strategy and attainment of its objectives, and to the enrichment of his organization or sector of activity.
Is familiar with various innovation strategies.
Ensures that his staff is aware of and understands their environment and the importance of strategy.*

PHASE 1 Leadership

*Exercises leadership in connection with a project of which he is in charge.
Knows how to be persuasive and enlist support for a project
.Mobilizes skills for a project of which he is not in charge; manages human resources even when people do not officially report to him.
Builds alliances.
Establishes relationships based on trust.*

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