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## SCIENTIFIC SECTION OF THE PROPOSAL

MAIN LANGUAGE CHOSEN = ENGLISH

This part includes the following elements:

1. Report on past research (optional)
2. Description of the research project
3. Comments on changes made in the research project in case of resubmission (optional)
4. Potential interdisciplinary approach of the research project (optional)
5. Description of the work environment
6. Summary of the master's thesis or equivalent
7. Additionnal comments (optional)

**The applicant must fill in the sections below and convert the file into an unprotected PDF before appending it to the online application form.**

The F.R.S.-FNRS insists on **strict compliance with the instructions given for each part of the proposal** (scientific section relevant to the instrument selected, number of pages allowed for documents to be enclosed with the application form...) and stresses again the sovereign consideration of the Scientific Commissions assessing the application file.

### **1. REPORT ON PAST RESEARCH (OPTIONAL)**

My interest in the philosophical and historical study of the scientific process arose from several research experiences within the field of Neuroscience. After graduating with Honors from a BSc in Liberal Arts and Sciences, with a specialization in Biology (Maastricht University, 2014), I then studied and worked on the molecular and cognitive dimensions of psychiatric disorders. I graduated with an MSc in Neuroscience (Université de Strasbourg, 2016), approaching the brain from a translational approach. My experience in different fields within Neuroscience included a student research assistantship on the molecular and behavioral underpinnings of depression (Uniklinikum Freiburg, 2016), a one-year master thesis studying the anatomical and cognitive dimensions of borderline personality disorder (Freiburg University, 2016), and after graduation, a one-year research assistantship on the genetic and functional basis of a rare epileptic disease (Universidad Autónoma de Madrid, 2017). These diverse research experiences came with their particular epistemic challenges. Together with an awareness of the diversity in disciplinary approaches to studying mental health, my direct experience with the inevitable social character of the research practice fueled my interest in the History and Philosophy of Science.

This interest quickly turned into a systemic and professional dedication. In December 2020 I graduated with Cum Laude from my second Master's degree in History and Philosophy of Science (Utrecht University). My expertise is, broadly speaking, on describing the social structures needed for the production of knowledge and identifying the way epistemic and ethical concerns are entangled in scientific practice and policy. Specifically, I am drawn to studying how knowledge is (or isn't) politically put into effect, with special attention to the heterogeneity in how the different modes of knowledge are instrumentalized, visibilized, and financially sponsored. I have a particular interest in contemporary history, from the mid-twentieth century to the present. I am very keen on this period, especially for the Western history of science, as the period after the

Second World War is an important turning point for science – in terms of policy, the identity of the scientific community, and the novel ways of funding and communicating scientific developments. During my last years of specialization within the field of History and Philosophy of Science (HPS), I have worked on: (1) the study of the history of the modern molecular life sciences, with an emphasis on the history of science policy and of the negotiation of the scientific identity in ethical debates; and (2) an interdisciplinary publishing initiative proposing solutions to current worries in academic publishing.

Regarding (1), I dedicated my Master's program to elucidate one question: *what does it mean to be a good scientist?* Having taken courses in ethics, on the history of the different natural science disciplines, and the relationship of science with society, I set this moral question in the context of 1970s molecular sciences. My thesis, 'To be a molecular scientist. The negotiation of epistemic and social virtues in 1970s *Nature*'s marketplace,' tells the history of the identity of the molecular scientist – the ethical, social, political, and epistemic commitments as told and negotiated in the magazine *Nature* as a sort of forum for self-reflection and self-construction (section 6). The three topics that became the backbone of my master thesis study were: a) the topic of science as a consumption, especially regarding the commercialization of laboratory materials; b) the topic of science policy and the social responsibility of scientists; and c) the topic of workplace safety and research ethics in the context of the debates over the safety of recombinant DNA technology.

Regarding (2), I have experience in practically addressing the question: *what does 'success' mean in science?* This question certainly has a conceptual link to (1), yet is independent project-wise. I am one of the co-founders of the Journal of Trial and Error, which was initially born as a student initiative aimed at creating a platform for reporting and reflecting on failure in research and problematizing success. What began as a thought experiment based on readings within the traditions of HPS and STS, as well as from personal experiences in research became an international peer-reviewed, indexed journal, and just recently the journal has become embedded within the Center for Trial and Error, a research institute backed by Utrecht and Tilburg Universities. In short, the Journal serves as a platform where researchers from any field share negative, unexpected, unfinished results – that despite these seemingly valueless characteristics for the individual researcher, are still useful for the scientific community at large. Complementarily to this, the journal also gives special attention to not only reports but to systemic and critical reflections about science and research failure. As one of the journal's co-founders, I worked on designing the editorial approach, taking philosophically-complex and abstract concepts, like 'replication' or 'negative results' within the HPS and STS literature, and translating them into a clear application: the development of a working journal and the production of an annual issue. I have been invited to several international conferences of different disciplines (molecular and structural biology at Cambridge, 2019; neuroscience at Bern, 2020; academic publishing in Latin-American countries at Manabí, 2020) where I have talked about the intimate relationship between modes of academic publishing, epistemic challenges, and employment in research.

I started my Ph.D. project in September 2021 thanks to an arrangement by which the start of my work could be funded by Dr. Pence's FNRS PDR (section 4). This funding, however, will last at most two years, and thus cannot finance the entirety of my project. In the past 5 months, I have achieved significant progress in delineating the appropriate case studies that respond to the philosophical question of interest, begun the historical dimension of the research by visiting two archives abroad, formulated a theoretical framework for the interpretation of the documentation, sharpened my analytical question, was awarded the 'Vicent Peset Llorca Fellowship' (section 5), and have submitted two abstracts for two conferences: the Congress of the Spanish Network for Environmental History (RUEDHA, Granada, May 2022) and the 10<sup>th</sup> Congress of the European Society for the History of Science (ESHS) on 'Science policy and the politics of science' (Brussels, September 2022).

## **2. DESCRIPTION OF THE RESEARCH PROJECT**

## 2.1 Goals of the research

'Biodiversity' is a scientific concept with a thick history and a lively political life. The concept permeates environmental policy around the world. Governmental ministries, university departments, investing programs, and intergovernmental lobbies carry its name and mobilize grand political, social, and economic resources. Beyond a ubiquitous presence, 'biodiversity' is not a settled scientific concept. Conservation biologists, ecologists, tropical biologists, systematists, theoretical biologists, and philosophers of biology are entrenched in debates about the epistemic, ontological, and ethical dimensions of the concept. The consensus, however, seems to be that, at the very least, there is no single "empirically correct" measure of 'biodiversity,' and, thus, value judgments play a large role in how priorities are assigned in conservation projects. The evident mission-laden dimension of this science poses an epistemic challenge: how is scientific knowledge about biodiversity created, and how does that knowledge move between these communities? And in turn, how do we reconcile the pluralist commitment to a variety of conceptualizations and measures of biodiversity with a need for centralized governance of conservation and ethically legitimate expert interventions?

My **long-term goal** is to improve our ability to understand and intervene in this complicated scientific, social, and political context surrounding biodiversity. The **objective of this project** is to develop this understanding in a particular, practical context: here, changes in forestry science, conservation projects, and, later, biodiversity conservation in Spain from 1970 to the present. My **central hypothesis** is that *the legitimization of knowledge about biodiversity and the value-laden nature of conservation biology are two sides of the same coin*. This hypothesis was formulated based on an initial archival study, already completed (section 1), which suggests that the period of the 1980s-00s saw profound changes in the way that nature's variety was conceived by Spanish conservationists, and that those changes were the product of shifts in values and knowledge practices, with *biodiversity* having a central, coordinating role between them. An evaluation of this period will enable us to explore the links between scientific knowledge creation, value judgments, and the process of political and public legitimization in a rich context with important consequences for our general approaches to the biodiversity crisis as a whole. The interactions between this project and extant FNRS PDR and FWO projects (section 4), as well as my familiarity with both the history of science and the Spanish context, make me particularly well positioned to accomplish this goal.

**Specific Aim 1: Explore the development of the concept of biodiversity in Spain.** Over the period from the 1970s to today, paradigms for the management of what we would now call "biodiversity" have shifted, from perspectives based around natural resources and forestry management to ecosystem-based conservation biology, and finally to the contemporary notion of "biodiversity." I explore how biological diversity was differently conceived, the role the concept 'biodiversity' had in the cultural, scientific, and political shifts I describe, and the values that the different expert groups embraced, based on two case studies on seed varieties.

**Specific Aim 2: Apply the framework of 'endangerment sensibility' to describe how values enter into the conservation of seed varieties.** From the historical case studies of SA1 as interpreted within the historiographical framework of 'endangerment sensibility' (see 2.2), I aim to develop an account of how values enter the practice of classification in biodiversity conservation science, and how the value-ladenness is contextual to goals (here, agricultural) and practices of legitimization of knowledge.

**Specific Aim 3: Extend the integrated HPS account to corporate and agricultural contexts.** Understanding the values at play in conservation science within a historical framework will be useful to place the discipline within a grander social context. Issues of land ownership, protection, and use are at the center of conflicts between scientists who value biodiversity and other economic activities, like agriculture. Set in the Delta del Ebro, a rice-producing region on the Mediterranean coast with high biodiversity of bird species, my final aim will be to analyze how the

classification of the delta as a protected area in 1983 and the conflict that ensued until the present can be understood as a struggle between the values that biodiversity conservation promotes.

**Expected Outcomes.** The research performed shall interact with ongoing discussions in the fields of conservation science, history of science, and philosophy of science. As such, I will produce two articles in peer-reviewed journals (SA1 history, SA2 philosophy), two commentaries in the wider press, and a dissertation that will be ready to be converted into a monograph after my defense. By the end of the research project I will organize an integrated history and philosophy of science conference on biodiversity and conservation biology. I will perform at least 4 research stays: 2 archival visits (1 carried out already), a fellowship stay (upcoming at the University of Valencia), and one as visiting scholar (Universities of Exeter/Cambridge, see section 5 for details)

## 2.2 State of the art

This project seeks to integrate studies in the philosophy of science and theoretical biology on the epistemic role of values in biodiversity measures and conservation projects with historical work on the cultural and political contexts of environmental science and conservation biology.<sup>1</sup>

There has been growing attention in the philosophy of science since the early 2000s to the practices of conservation, centered initially on the question of how exactly biodiversity might be defined and measured [1], [2]. Biodiversity interests philosophers for its epistemic appropriateness and ethical operability – is 'biodiversity' a useful scientific concept to compare value between ecosystems? Is 'biodiversity' a good way of capturing the entities that conservation biology aims to conserve? Can a pluralist conception of 'biodiversity' have any significant normative power? [3]. Ethical and epistemic dimensions of biodiversity's pluralism have encouraged philosophers to participate in debates about the standardization of species lists [4]. Should we rest content with a sort of pluralism concerning taxonomic concepts and the understanding(s) of biodiversity that result from them, or instead resist this "taxonomic anarchy" [4] by reaching some consensual agreement on species lists, concepts, and taxonomic practice? With these debates, questions arise about governance and jurisdiction over scientific practice, which immediately raises issues about the legitimacy of knowledge: who are the valid actors, institutions, communities to be drawn into the conversation, and what kind of knowledges (scientific or not) should form the appropriate bases for decision-making? [5]

In short, the engaged philosophical work of the previous years has been focused on describing the epistemic limits of one globally articulable conception of biodiversity as well as proposing normative solutions. Debates are centered around the extent of the value-ladenness of the discipline of conservation and the concept of biodiversity [6] with some defending that biodiversity is still a valid and interoperable scientific tool with some going as far as to argue that the mission-driven dimension of this science is, in fact, a desirable epistemic feature [7]. Others, on the other hand, argue that unreflective adoption of other values can threaten the discipline's mission giving rise to problematic research patterns such as the predisposition towards studying charismatic species. Other more quotidian roles of values are in the choice of 'species concept' scientists may adopt (e.g., biological, phylogenetic), or in the characteristic(s) one may select as species-defining (e.g., morphological, genetic, behavioral), among others [8]. Empirical efforts are being made to elucidate cartographies and taxonomies of how values enter biodiversity (see FNRS PDR and FWO projects, section 5). Such empirical interest within philosophy appropriately complements a historical study of the evolution of the value-knowledge relation.

Historians have shown how the values embodied within the concept of 'biodiversity' didn't suddenly arise in 1986 during the Washington 'National Forum for BioDiversity' [9]. In the 1970s, biological diversity was revalorized, due to both new scientific (paleontology) views on 'extinction' and a larger cultural Cold War concern about the destructive reach of humans [10]. This receptivity towards the loss of biological diversity, which historians have termed 'endangerment

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<sup>1</sup> Due to space limitations, the citations that follow are only a selection of the relevant literature and/or positions.

sensibility', was an influential context for the construction of the neologism and framed nature as interconnected, fragile, and in need of protection [11]. As a framework that puts the stress on the perceptual dimension ('sensibility') of these new approaches towards nature, 'endangerment sensibility' plays a central historiographical role in my thesis as a way to describe the main value of 'biodiversity': an appreciation of variety and a fear of loss. As a "supreme late-modern value", Vidal and Dias argue, 'biodiversity' becomes good by virtue of being at risk [11].

While the 'endangerment sensibility' extends as a global perception of nature, not all knowledge kinds are legitimate tools to measure loss and propose solutions. Recent scholarship on the conservation movement in Spain and its environmental history more generally gives some useful starting points to address my question about the legitimization of knowledge. Bertomeu Sánchez (who is part of my Ph.D. committee, section 5) has attended to the politics of knowledge in Spain during the Francoist era, showing how the autarkic policies, aimed at promoting the national industry, visibilized specific solutions (e.g., pesticides) and veiled others (e.g., breeding) in the management of crop pests [12]. Mining, agricultural, and forest engineers were key in furthering the extractivist and economically minded approach to nature [13]. One of my thesis aims' is to analyze the legacy of forest engineers, who ruled the management of forests and nature in Spain since the nineteenth century, and more importantly, with centralizing power in the Ministry of Agriculture through the ICONA (National Institute for the Conservation of Nature, 1973-1995).

While Spain underwent significant changes in the last third of the twentieth century in how nature was conceived and managed, histories of science and of the environment on the co-evolution of values and knowledges are still sparse. Gil Farrero situates expertise building and use of land as key historiographical categories to analyze these environmental conflicts in the shores of environmental history and the history of science [14]. Camprubí situates the making of the Doñana National Park as a product of international political maneuvering and new ecological visions of wetlands [15]. Ecology, protected species, and later 'biodiversity' science became central to how Spain's conservationists looked at nature, and my project contributes to these understudied phenomena of the role of knowledge in the dismantling of the ICONA and the making of biodiversity-focused interventions, and in general, to the twentieth-century transition from productivist visions of forests to the red-list model of conservation biology.

### 2.3 Research Project

**SA 1: Explore the development of the concept of biodiversity in Spain. Rationale.** This project will describe how the concept of biodiversity developed in Spain, based on a cross-comparative and diachronic study of two case studies: the network of pine seed orchards of ICONA (1973-95), and the making of the Centro de Recursos Filogenéticos (CRF, 1993-present). Using archival sources, I have already studied the role that ecological knowledge and population genetics played in ICONA's seed orchards network and the institute's dismantling in the mid-1990s. I am currently studying the foresters' views on nature's variety, and how those views and knowledge affected their field practices and political position within the Ministry. The seed orchards are an appropriate case study to understand how different knowledges (genetic, forestry, and ecological) were incorporated to fulfill several goals (conservation, economical) in this conservation institute close to political power. Comparing my findings of ICONA, I will study the making of the CRF, a hybrid agricultural-environmental experimental station whose mission tightly falls under what historians call 'endangerment sensibility'. Created by Royal Decree in 1993 under the auspices of a "global worry" for the "conservation of biodiversity", their goal today is to "avoid the loss of genetic diversity of indigenous plant species, varieties, ecotypes and discontinued crops whose genetic potential can be used in food and agriculture." [16], my translation. I'll be looking at the scientists' motivations and how diversity was seen through the eyes of agricultural goals, and the role genetic data played in defining native taxonomic lineages. Archival Sources: Archivo Central del Ministerio de Agricultura (Madrid), Fondo Documental del Monte (Madrid), CRF's archive (Alcalá de Henares). Oral histories: interviews with Antonio López Lillo, Juan Rodríguez Velasco Vega, interviews with CRF's founders. Object(s) of analysis: to understand

ICONA's incorporation of ecological knowledge I'll look at internal memos, correspondence and reports with INIA (National Institute for Agronomical Research), and minutes of the Consejo Superior Agronómico (CSA). The latter will be key to analyze debates between the representative of different Ministry departments (agronomy, forestry, conservation) and what role their knowledge played in the highest council of the Ministry. To understand how biodiversity science and the endangerment sensibility was enacted by CRF, in addition to oral history interviews, I will look at their archival documentation such as scientific publications, public reports, and technical and educational material distributed to farmers, companies, and other governmental institutes.

**Specific Aim 2: Apply the framework of 'endangerment sensibility' to describe how values enter into the conservation of seed varieties.** When speaking of 'values' in conservation scientists, philosophical work has been typically centered around the values under which biodiversity is or should be defended [17]. In contrast, this philosophical part of the project embraces the most recent attempts at formulating accounts of how "non-epistemic" values enter the practice of conservation itself (see section 2.2). To achieve SA2, I will develop an account of how value enters biodiversity science when the object to be conserved is not a species or an ecosystem, but varieties of agricultural seeds. My account will describe how "non-epistemic" values play a role in what 1) scientists at the CRF deem worth to be conserved (their peculiar 'endangerment sensibility') and 2) what is a good method to measure its loss (how they legitimate their knowledge practices). I will pay particular attention to how value enters the classification of seed and their codification into databases, comparing my description to recent accounts of how classification is value-laden [6], [18]. Since the CRF's particular 'endangerment sensibility' towards agricultural seeds, rather than living species or ecosystems, this part of the project brings philosophical attention to a variety of biodiversity science that is understudied and which has explicit instrumental roles. Do the agricultural ends of CRF's endangered objects bring a different set of values as to when conserving ecosystems or species?

**Specific Aim 3: Extend the integrated HPS account to corporate and agricultural contexts.**

Rationale: Here I aim to describe the role of knowledge legitimacy and values in the direct conflict over land management at the protected land Delta del Ebro, between conservation biologists and local rice growers. Since 1988, when the delta was classified within the EU Birds Directive Special Protection Areas, ornithologists with ambition of extending the protected status, and rice growers who see their land expropriated, fight over what counts as being at risk of extinction: traditional ways of life versus endangered species. A lack of sediments that arrive from the Ebro river is causing the land to retreat yearly and which, biologists say, is due to lack of political action over the rice grower's use of water. I'll be looking at what role biodiversity science has played and plays in these conflicts and how taxonomical studies were understood under these conditions. I will also look at the case of Riet Vell, a biological rice company owned by Spanish Ornithological Society (SEO) / BirdLife, to understand how conservationists attempt to conciliate commercial, agricultural, and conservation goals. Archival Sources: collection Departament d'Agricultura, Ramaderia i Pesca. Serveis Territorials de les Terres de l'Ebre (FONS ACTE290-85), Arxiu Comarcal Baix Ebre (Tortosa). Oral history and recollections: Salvador Maluquer (SEO cofounder), José Juan Sorribes (rice grower), Sofia Rivaes (biologist).

## 2.4 Work plan

Year 1 (21-2)	Year 2 (22-3)	Year 3 (23-4)	Year 4 (24-5)
<ul style="list-style-type: none"> <li>Archival work SA1 (ICONA), <i>completed</i>.</li> <li>Refining theoretical framework, <i>completed</i>.</li> <li>Oral communications SA1's midpoint, <i>in process</i>.</li> </ul>	<ul style="list-style-type: none"> <li>Archival work SA1 (CRF).</li> <li>Oral history SA1 (ICONA, CRF)</li> <li>Writing paper of complete SA1.</li> </ul>	<ul style="list-style-type: none"> <li>Visit abroad Leonelli and Curry (section 5)</li> <li>SA2.</li> <li>Oral communications SA2.</li> <li>Archival work SA3.</li> </ul>	<ul style="list-style-type: none"> <li>Oral history SA3.</li> <li>Writing papers SA2, SA3.</li> <li>Conference integrated HPS of biodiversity.</li> <li>Writing dissertation.</li> </ul>

## 2.5 Bibliography

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### **3. COMMENTS ON CHANGES MADE IN THE RESEARCH PROJECT IN CASE OF RESUBMISSION (OPTIONAL)**

The reviewers' main point of concern was that in the previous application, details about the research project were vague. In the past months, I have worked to address their worries and I hope that my exposition until now has convincingly alleviated them. Below I defend the concrete ways I have tackled the issues and the current state of affairs. On a positive note, the reviewers recognized that the topic of biodiversity is of interest within biology and philosophy of biology and that my double training within the biological sciences and HPS made me a good candidate to tackle the political life of this slippery scientific concept. I recognized the reviewers' concern that whilst my disciplinary diversity can be helpful, I need to go more into depth into how I discuss, e.g., conceptual and ethical dimensions of the biodiversity debate. Selecting concrete case studies and adopting a framework that unites them has helped me achieve this depth.

#### *A. The case studies and country under investigation are not concretely described.*

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I will center my research within the context of Spanish forest conservation and biodiversity sciences, with three case studies (section 2.3), the first one of which has already begun.

#### *B. The methodology remains vague.*

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I will base my historical research on archival sources and oral history interviews, and I will frame my philosophical research within the tradition of epistemic and non-epistemic values. The archives I have visited are the Spanish Ministry of Agriculture Central Archive and the Fondo Documental del Monte at the Spanish Environmental Ministry. I have also selected 2 more archives to visit: CRF's archive in Alcalá de Henares (SA1) and the Arxiu Comarcal Baix Ebre in Tortosa (SA3). To interpret the documentation, I will adopt a hermeneutic close-reading analysis of the content coupled with readings of secondary sources. For the oral history interviews, I have been already in touch with former ICONA members who would be willing to collaborate. Oral history interviews will be key in gathering the narratives, attitudes, and experiences. Regarding the philosophical work of the project, the methodology will involve the traditional approach found in the philosophy of science: engagement with philosophical texts, conceptual analysis of the components of ecology and conservation science, and careful engagement with the ways in which those concepts find expression and usage in scientific practice.

Additionally, the review also raised a minor point that given the interdisciplinary dimension of the project, it would be possible to envision more collaborations with other sciences, and pointed to the social sciences as a possibility. This point is taken up and developed below (section 4).

#### *C. The project's ambition and originality are not clearly and convincingly stated.*

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There's been significant change and sharpening of the theoretical framework. In the previous application, I talked broadly about 'the politics of biodiversity'. Now, I have made my object of analysis narrower and more concrete: I have dropped 'politics' in favor of studying the values at play in conservation science, concretely, in the classification practices; and how legitimate speech and end goals of the science modulate and make those values operable. My proposition of linking values in science with the process of knowledge legitimization is original, and the focus on non-academic science will bring a well-needed dimension of 'science in practice' within the philosophical discussions on biodiversity. As well, the focus on Spain addresses the bias within the historical literature towards North American histories.

#### *D. There's a lack of depth in the way I project presented the conceptual and ethical aspects of the notion of biodiversity.*

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The most salient ethical dimension of my thesis is around the theme of the legitimacy of knowledge. There are two salient conceptual elements: the epistemic role of value judgments in biodiversity conservation, and the practice of classification as central to the conservation enterprise in which legitimacy and value judgments coalesce.



#### **4. POTENTIAL INTERDISCIPLINARY APPROACH OF THE RESEARCH PROJECT (OPTIONAL)**

This project relies on several disciplinary frameworks to study values, biodiversity, and epistemology. At heart, this is an integrated HPS project [19] which departs from a philosophical question of crucial social relevance ('how is knowledge about biodiversity constructed, and can we rely on it to inform policy?'). Then, as a next step, it uses archival sources as case studies that will be placed in their context using historical methods and historiographical frameworks, and then, further, the project turns into a feedback loop where these historical contextualizations are used to develop a more refined account of how values enter conservation biology.

Within philosophy, my project sits under Prof. Pence's interest to understand how empirical uncertainty and values in science are applied to study conflicts in taxonomic practice and biodiversity science. His ongoing FNRS PDR project ('Conceptual Uncertainty in Biodiversity and Taxonomy', 2021-24) aims to digitally map the causes, scope, and implications of the disorder, and conceptually analyze the theoretical structures which give rise to that disorder. Complementary to the PDR project, Prof. Pence and I are actively collaborating with a group of researchers at KU Leuven and UHasselt who have been working on the issue of 'taxonomic disorder' using a multidisciplinary scientific and philosophical toolset. Two ongoing FWO (Research Foundation Flanders) projects (3H200026 and 3H210712) headed by Prof. Andreas De Block, investigate the widespread problem of taxonomic disagreement based on a traditional analysis of what species concepts are being used by scientists, and additionally, on a more novel and comprehensive study on the role of methodological choices and value judgments in causing disagreement. For my project, I also take this approach of looking at the role of values and practices to develop a comprehensive, eagle-eye account of the causes of disagreement, shifting the attention from taxonomic disagreement to the higher-level social conflict between forms of knowledge.

The reviewers pointed out that my project could also benefit from collaborations with social scientists. This is an interesting point, not only due to the inherent multi-disciplinary approach of the project but also because my project includes institutions and processes that are taking place and are relevant in the present, which may warrant a sociological approach. It could be very productive to place the historical process I am studying (a phenomenon of science in the Cold War era, in both a democratic and dictatorship context) and philosophical questions I inquire about within a deeper understanding of the larger social changes at hand. In that sense, I am inspired by the work of social theorists on late modernity such as Ulrich Beck. His work, such as in *Risk Society. Towards a New Modernity* (1986), helps us understand grand changes in the way late modern societies are organized and the crucial role that scientific knowledge plays in it. Within the sphere of science more concretely, Helga Nowotny, Peter Scott, and Michael Gibbons's *Rethinking science. Knowledge and the Public in an Age of Uncertainty* (2001) help extend the philosophical study of values in science into a grander picture of the place of science in society, rather than just how society, through contextualized values, shapes scientific practice. The Cold War brought about many social changes, and social theory such as the one presented here is very useful to study the co-evolution of science, politics, and culture. Works in the philosophy of science also call for this kind of perspective and, crucially, situate the study of values as a *question of science in society*. Heather Douglas writes, "The relationship between science and democratic societies also needs further exploration [...] Should scientists' judgments be free of social and ethical values to preserve democratic ideals [...], or should they be value explicit, or embedded in value-laden collaborations to preserve democratic ideals?" [20] Such questions are both philosophical, historical, and sociological, and my project will surely benefit from integrating these social theory works on late modernity into the analysis and from establishing collaborations with social theorists. For example, in UCLouvain, Prof. Eric Mangez appears as a potential candidate to contact, as he has experience in the sociology of knowledge, and is interested in the knowledge-policy interaction. Past projects like his European Commission FP6 Integrated project KNOWPOL can serve to ground my project in contemporary social theory.

## 5. DESCRIPTION OF THE WORK ENVIRONMENT

The Center for Philosophy of Science and Societies (CEFISES) at UCLouvain is an excellent place to conduct the research project that I have proposed here. The Pence Lab, which is hosted by CEFISES, is home to extensive expertise in the history and philosophy of biology, digital approaches to the history and philosophy of science, and the ethics of contemporary science and technology in society. Prof. Charles Pence, PI of the lab, has published widely on all these subjects, and the lab currently hosts two major projects: one on the ethical impacts of contemporary molecular research on organoids (EC SwafS, through 2023) and one considering our responses to the contemporary biodiversity crisis, as discussed above (FNRS PDR, through 2024). CEFISES is, moreover, a vibrant and active research community in the philosophy of science more broadly. Other center faculty, including Prof. Alexandre Guay and Prof. Peter Verdée, have interests in the general metaphysics and epistemology of science, and each hosts several doctoral students and postdoctoral fellows. The center's seminar series, which meets weekly, is also available to any center members as a tool to invite external speakers and could be used to bring relevant internal and external collaborators to visit UCLouvain.

I have already built my Ph.D. committee, formed by Prof. Pence, Prof. Alexandre Guay, Prof Raf De Bont (Maastricht University), and Prof. José Ramón Bertomeu-Sánchez (Valencia University). Their guidance has already been positively felt, from both literature suggestions (section 2.2) and my upcoming Fellowship at Valencia University (see below).

Outside the UCLouvain, I have made connections with researchers at KU Leuven (see section 4), Cambridge University, Valencia University, and Bielefeld University that have already proven to be mutually beneficial. I am convinced of the importance of threading a network of support during one's Ph.D., and I have dedicated time to develop it.

**Cambridge.** At the Department of History and Philosophy of Science, I actively participate in 'The Greenhouse', a seminar reading group organized in the context of Prof. Helen Curry's Wellcome Trust project 'From Collection to Cultivation'. The projects' members have been very welcoming and the readings there have helped me make connections between conservation projects and the history of agriculture. Readings on the history of seed variety preservation, for instance, have been useful to develop my understanding of seeds as technologies, fertile to be studied within their political and scientific contexts. **Valencia.** I have been awarded the 'Vicent Peset Llorca Fellowship' of the López Piñero Interuniversity Institute (IILP) at the University of Valencia. My stay has been arranged and will take place in May 2022 and will last for two weeks. This Fellowship allows me to visit the Vicent Peset Llorca library, which hosts unique documentation on the history of Spanish environmentalist movements during the Francoist era and early democracy, some of which I expect to be relevant for SA3. Crucially, I will collaborate and establish contact with the researchers at the institute, like Prof. Bertomeu Sánchez, who (as cited in section 2.2), works at the intersection of environmental history and the history of science, and has currently a project on the history of environmental toxins, chemical knowledge, and the invisibilization of risks during Francoism. **Bielefeld.** At Bielefeld University in Germany, I am collaborating with Robert Frühstückl, a second-year doctoral candidate at the philosophy department working on a project entitled "Epistemological and Normative Problems in the Operationalization of *Biodiversity*". Our collaboration, in the spirit of an integrated HPS approach, takes the form of a small literature reading group and reading each other's drafts. Robert will likely visit UCLouvain for a period of collaboration in 2022/23, in the context of the aforementioned FNRS PDR project. **Planned research stays in Cambridge/Exter.** Finally, as mentioned in section 2.4, I plan on organizing a research stay during the third year of my project (2023-24). I could deeply benefit from a stay in England for a period of 3-4 months, spending it between Cambridge, learning about seed and agricultural history at Prof. Curry's group; and Exter, working within Prof. Sabina Leonelli (a collaborator of my supervisor's Prof. Pence), whose work on the relational nature of data and her ongoing Turing project "From Field Data to Global Indicators: Towards a Framework for Intelligent Plant Data Linkage" can be of benefit for my SA2.

## **6. SUMMARY OF THE MASTER'S THESIS OR EQUIVALENT**

My master thesis, 'To be a molecular scientist. The negotiation of epistemic and social virtues in 1970s *Nature*'s marketplace,' explores the ethical, political, social, and epistemic commitments of British molecular biologists in the 1970s, told through the eyes of *Nature* as the leading outlet for the latest scientific and science policy news. In sketching what scientists adhered to and discussed in the magazine, I describe the image of 'the scientific self' of molecular scientists and the epistemic virtues—to use Daston and Galison's terminology—which they professed made 'good' science 'good'. In my research, I focused on two kinds of historical sources and two methodologies: on the one hand, the advertisements for scientific objects; and on the other, the political editorial pieces in *Nature* such as 'leaders' and the 'News and Views' section.

Regarding the advertisements, I describe a new methodology and draw some general lessons that can be learned by studying these scientific commercial images. Within the historiography of commoditization of science, and despite the interest of various authors in describing how scientific products are made, transformed, and sold; advertisements targeting scientists themselves have largely been ignored. As well, in the book-length history of *Nature* (Melinda Baldwin 2015, *Making 'Nature'*), these pieces of the journal have been omitted from the investigation. As such, my thesis serves as a defense of 'scientific advertisements' as fruitful historical sources. Concretely, I explore how much can they say about the meaning of science, and pose questions such as: are scientific advertisements proxies of what science was like in the 1970s? Can we learn something about what life was like at the bench, from an advertisement of antibodies? I presented this part of the research at the Annual Conference of the British Society for the History of Science (July 13-15, 2021) in a panel entitled 'Patrons, Publics and Profiteers: Selling Science in the Nineteenth and Twentieth Century'.

To contextualize the meaning of advertisements and illustrate the epistemic virtues within these visual objects, I turned to their immediate context—the second set of my sources. I use editorial pieces where the politics of science were explicitly debated. My two cases studies were (1) the debates over the funding of British science and the proposals of Victor Rothschild, Frederick Dainton, and the British Society for Social Responsibility in Science, in which the relationships between government, science, and society were explicitly spelled out (1971-1972); and (2) the debates over the regulation of recombinant DNA technology, the conceptualization of risk and workplace safety, and the corresponding ethical duties of scientists (1974-1978). In both these case studies, I studied concepts such as 'social responsibility', 'safety', and 'technical', and analyze their multiple plastic meanings and their diverse uses and implementations in science policy.

## **7. ADDITIONAL COMMENTS (OPTIONAL)**