



Career options

November 2020

The European Commission has awarded the UAM the HRS4R seal of *Excellence in Research for Human Resources*, which endorses the UAM's adherence to the contents of the "European Charter for Researchers" and the "Code of Conduct for the Recruitment of Researchers", a reference document drawn up by the European Commission and aimed at both researchers and the entities that recruit or fund them.

This document was produced in the framework of the Human Resources Strategy for Researchers initiative of the UAM.

Updates and other content can be found [here](#).

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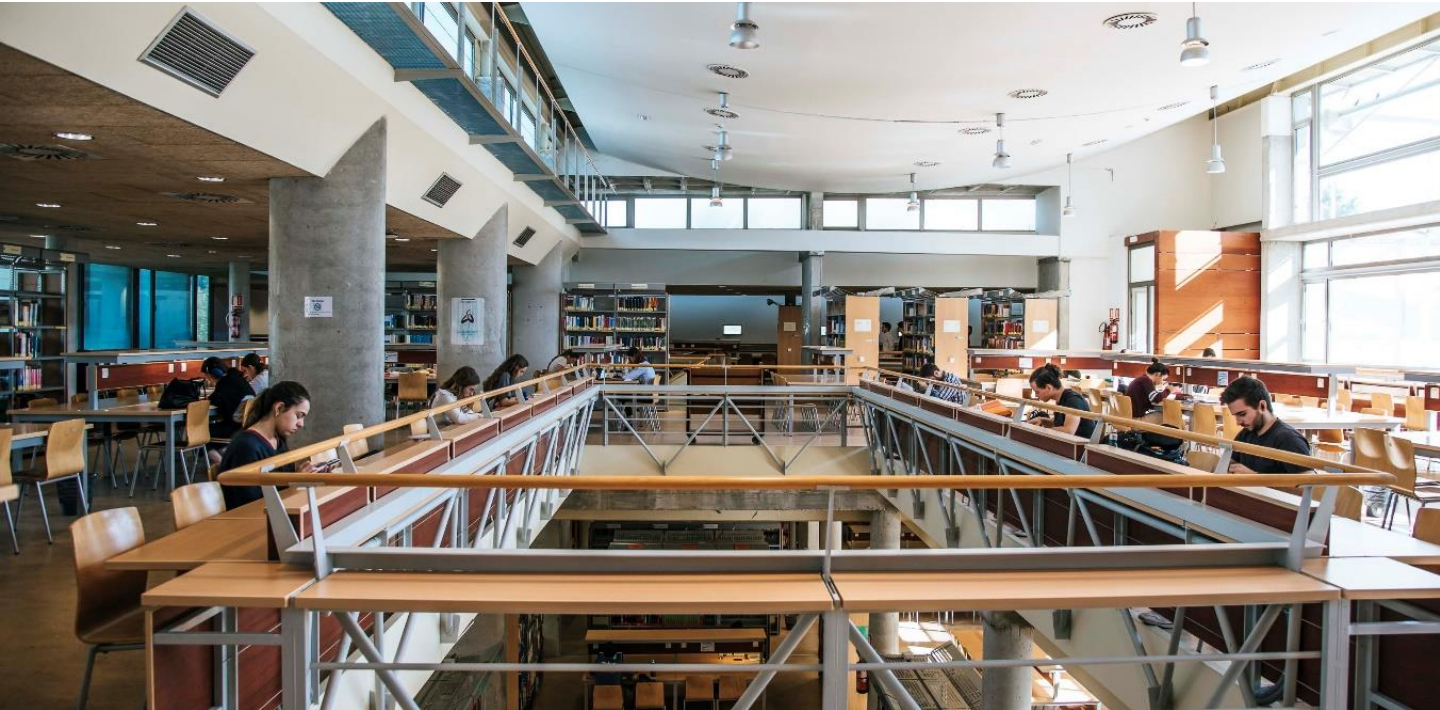
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Presentation

This document is part of the actions foreseen in the [human resources strategy for research at Autonomous University of Madrid](#) (UAM).

The aim of this guide is to provide information on employment options for UAM scientific and research staff who wish to continue a research career or in the research environment after the training received at university. In addition, this document, together with other actions, aims to provide information and share personal experiences that allow the exploration of alternatives to a research career outside the UAM, through post-academic professional transition, professional reinvention, and entrepreneurship.



A career in research

Beginning of a research career

Starting a research career is a personal challenge, but it is also an exciting adventure, as a person becomes an active agent in the generation of knowledge. The Ministry of Science and Innovation is currently working on the Statute for teaching and research staff. The aim of the draft bill is to resolve the shortcomings detected in the Spanish Science, Technology, and Innovation System, placing the emphasis on scientific careers and the transfer of knowledge. The stages currently identified in the research career are the following:

Pre-doctoral stage

During the last year of the degree, students can obtain a grant to collaborate in the different university departments or in other research groups in Public Research Organisations. This allows them to get to know the type of research being carried out in the different research groups, which can be very useful when making decisions once they have completed their degree.

With a bachelor's degree, the following is possible:

- The insertion in the labour market (this option will be open permanently).
- To do a Master's degree in order to enter the labour market with greater specialisation.
- Starting a research career.

For the last option it is necessary to find a doctoral thesis supervisor among the quality research groups existing in the universities or research centres

(University Register), and to get involved in the postgraduate studies of any of the universities. Information on the quality mention of these studies is also relevant, as well as any other national or international recognition that these studies may have (ERASMUS MUNDUS, European Label, etc.).

The doctorate (normally 4 years) consists of a first part (a Master's degree of between 60-120 ECTS credits), which gives access to the research stage of the doctorate. The entire process prior to the defence of the doctoral thesis is called the pre-doctoral period.

The doctorate

Once the Master's degree has been completed, the original work that will constitute the doctoral thesis is carried out. This doctoral thesis will give rise to publications in journals in the same field of knowledge, as well as the presentation of papers at conferences related to the area of study.

Finally, the doctoral thesis report must be submitted to the University. The thesis can also be awarded with a European mention, for which it is required that at least 3 months of the research has been carried out in a laboratory in another European country, that part of the committee that judges the thesis is also from a different European country and that the defence of the thesis is carried out in two European languages.

Post-doctoral stage

At the post-doctoral stage, there are several options available under the National Programme for the Recruitment and Incorporation of Human Resources.

Torres Quevedo Sub-programme

The sub-programme finances the recruitment of doctors and technologists in companies, business associations, technology centres and science and technology parks. Doctors and technologists recruited under this sub-programme must be involved in carrying out specific industrial research projects, technological development projects or prior technical feasibility studies.

Companies, technology centres, business associations and science and technology parks may apply for and be beneficiaries of the aid granted under this sub-programme.

Ramón y Cajal Sub-programme

The main objective of this sub-programme is the incorporation of PhDs into Spanish R&D centres. The aid granted is to co-finance the employment of PhDs in all areas of knowledge by Spanish R&D centres for a period of five years.

Juan de la Cierva Sub-programme

The aim is the recruitment of young doctors. Researchers must meet the requirement that they hold a doctoral degree and that no more than three years have passed since the date on which they obtained their doctoral degree by the closing date for the submission of applications.

Applications for participation are submitted by the R&D Centre and will include the candidate researchers for incorporation into the research teams.

The aid granted is to co-finance the employment of PhDs in all areas of knowledge by Spanish R&D centres for a period of three years.

Consolidation

In some cases and after postdoctoral stays abroad, the Juan de la Cierva contract serves as a first consolidation stage, followed by the award of a Ramón y Cajal contract within ten years of obtaining the doctorate. It is made for five years with two evaluations.

Doctoral School

The UAM Doctoral School is a key element in the UAM's strategy to promote the training of researchers. It brings together 35 doctoral programmes in the areas of Arts and Humanities, Sciences, Health Sciences, Social Sciences and Law and Engineering. Its main objective is to raise the quality of doctoral studies, enhance their social and international projection and promote cross-cutting activities to encourage interdisciplinarity, always oriented towards respect for human rights and a culture of peace, equality, social progress and respect for sustainable development.

During the doctorate, students can apply for a research grant from programmes aimed at training in scientific and technical activities organised by the Ministry of Science, Innovation and Universities or equivalent, autonomous communities, public or private universities, public bodies and private sector entities such as companies or foundations.

Career options

Among the employment alternatives available to a researcher or professional after completing their doctoral studies are the following:

- **Doing a postdoc.** This consists of working in an academic institution doing research for a limited period of time. Generally, postdoctoral researchers carry out international stays of two or three years in a group with lines of research related or unrelated to the object of their thesis.
- **Research and teaching at university.** This is the option most often chosen.
- **Working in the private sector in R&D&I departments.** Not many companies in Spain carry out research, some 10,100, but even so, investment in private R&D is increasing annually. In 2018, it was companies that drove the advance in research spending by increasing their investment by 8.2% (spin-offs, start-ups, medium-sized and large companies, both national and international). The biomedicine, ICT, environment and engineering sectors are the most active.
- **Create technology-based companies (Spin offs).** By researchers or by participating in self-employment projects. Generally, the university or research centres themselves support the creation of companies when an innovative idea arises.
- **Working in the private sector in technical management.** Access to these jobs may require additional management training such as a Master's degree in business administration or other more specific training in innovation management.
- **Managing research.** There are numerous bodies and positions with responsibilities for research management, for roles in:
 - the design of science policy, planning and management of science funding programmes, in organisations such as the European Commission, Ministries and Departments with competences in science, innovation, etc.
 - management of research and its results in research centres and universities, occupying positions in research project management, technology transfer, science dissemination, etc.

A description of career opportunities beyond academia is developed below.

Research career outline

The European Commission, in the [HRS4R](#) - Human Resources Strategy for Researchers programme, classifies researchers into 4 levels R1, R2, R3 and R4 in order to refer generically to the different stages of a scientific career.

STUDENTS		RESEARCHERS			
GRADE	MASTER	R1	R2	R3	R4
		Doctoral training	Postdoctoral stay	Independent Researcher	Established researcher
		Junior researcher	Recognised researcher	Independent Researcher	Lead Researcher
		Theses	Postdoctoral	Tenure Track	Research officer, tenure
		Art. 21 LCTI*. Pre-doctoral contract	Art. 22 LCTI*: Access Contract to the Spanish Science, Technology and Innovation System	Art. 23 LCTI*: Distinguished researcher contract	Art. 25 LCTI*: Professional career of civil servant research personnel
4 years	1-2 years	4 years	5 years	8 years	CONSOLIDATION

Law 14/2011, of 1 June, on Science, Technology and Innovation (BOE 02/07/2011).

Profiles

The [European Framework for Research Careers](#) (2011) distinguishes and describes four general profiles on the career development of researchers, which are independent of any particular sector.

Researcher R1. Stage I. Doctoral Training Stage	
First stage for a researcher. Research is carried out under supervision in universities, research institutes or industry. Includes doctoral students.	
NECESSARY SKILLS	DESIRABLE SKILLS
<ul style="list-style-type: none"> • Conduct research under supervision. • Having the ambition to develop knowledge through the use of research methodologies and discipline • Demonstrate a good understanding of a field of study. • Demonstrate the ability to produce data under supervision. • Be capable of critical analysis, evaluation and synthesis of new and complex ideas. • Be able to explain the research result (and its value) to other researchers. 	<ul style="list-style-type: none"> • Develop integrated language, communication and analytical skills, especially in an international context.
	REQUIREMENTS
	<ul style="list-style-type: none"> • 300 ECTS credits of which at least 60 must be at Master's level. Enrolment in a Doctoral Programme.

Researcher R2. Stage II. Postdoctoral Stage.

Recognised researcher. Doctors who have not yet established that they have a significant level of independence or researchers with an equivalent level of experience and competence.

NECESSARY SKILLS

- Those of R1 plus the following.
- Has demonstrated a systematic understanding of a field of study and mastery of the research associated with that field.
- He has demonstrated the ability to conceive, design, implement and adapt a substantial research programme with integrity.
- Has contributed to the widening of knowledge barriers through original research that has developed a substantial body of work, innovation or application reflected in national or international publications or patents.
- Demonstrates critical analysis, evaluation of results and synthesis generating new and complex ideas.
- Demonstrates communication skills with colleagues by being able to explain the outcome of their research and its value to the international community).
- Takes responsibility for and manages own career progression, setting realistic and achievable career goals.
- Identifies and develops ways to improve their employability
- He is co-author of articles, participates in workshops and conferences.

DESIRABLE SKILLS

- It understands the needs of industry and other related employment sectors.
- It understands the relevance of its research work for the generation of industrial products and services and for other related employment sectors.
- It communicates its contributions and areas of expertise to the community and society at large.
- Promotes, in professional contexts, technological, social or cultural progress in a knowledge-based society.
- You can mentor Early Stage Researchers, helping them to become more effective and successful in their research career.

REQUIREMENTS

- Doctorate degree.

Researcher R3. Stage III. Independent researcher stage.

Established researcher. Researchers who have developed a level of independence.

NECESSARY SKILLS	DESIRABLE SKILLS
<ul style="list-style-type: none"> • Those of R2 plus the following. • He has an established reputation based on the excellence of his research in his field. • It contributes positively to the development of knowledge, research and progress through partnerships and collaborations. • Identifies research problems and opportunities within their area of specialisation. • Identifies appropriate research methodologies and approaches. • Conducts research independently. • Can lead the implementation of collaborative research projects in cooperation with colleagues and project partners. • He publishes papers as lead author, organises workshops or conference sessions. 	<ul style="list-style-type: none"> • Establishes collaborative relationships with relevant research or development groups in industry. • Communicates its research effectively to the research community and society at large. • Its research approach is innovative • Can form research consortia and obtain funding/budgets/resources from research organisations or industry. • He/she is committed to his/her own professional career development and acts as a mentor to others.

Researcher R4. Stage IV. Stabilised researchers, professors, professors, directors, senior researchers.

Lead Researcher. Researchers leading their area of research or field. This would include the team leader of a research group or the head of an industry R&D laboratory.

NECESSARY SKILLS	DESIRABLE SKILLS
<ul style="list-style-type: none"> • Those of R3 plus the following. • It has an international reputation based on research excellence in its field. • Demonstrates critical judgement in the identification and execution of research activities. • Makes a substantial contribution (breakthrough) to its field of research or covers multiple areas. • Develops a strategic vision for the future of the research field. • It recognises the wider implications and applications of its research. • Publishes and presents influential papers and books. • He participates in committees organising workshops and conferences and gives guest lectures. 	<ul style="list-style-type: none"> • He is an expert in management and leading research projects. • It has a proven track record in securing significant research funds / budgets / resources. • Beyond team building and collaboration, the focus is on long-term team planning (e.g. career paths for researchers and securing funding for team positions). • He is an excellent communicator and networker within and outside the research community [networker]. • It is able to create an innovative and creative environment for research. • Act as a role model for professional development for others.

Funding for research careers

The [FECYT](#) (Spanish Foundation for Science and Technology) periodically prepares a map of career options. This is a complete diagram that identifies the different sources of funding for each stage of the research career, you can consult it at this [link](#).



Career options

Research and teaching at university level

The functions of the TRS - Teaching and Research Staff

The TRS develops all the activities necessary for university to be of quality, modern and competitive in relation to the generation of knowledge and its transmission, dissemination or application.

Within the TRS category one can find:

- Civil Servant TRSs:
 - Full Professors
 - Associate Professors
 - Interim (in accordance with article 8 of Law 7/2007 of 12 April 2007, Basic Statute of the Public Employee).
- Hired TRSs: specific modalities in the university field:
 - Assistants
 - Assistant Professors (with Phds)
 - Associate Professors (Profesores Contratados Doctores)
 - Professors of practice (Profesores asociados)
 - Visiting Professors
 - Lecturers (exceptional recruitment)
 - Emeritus Professors
- Other TRSs:

- Contracts for a specific project service of teaching, research, technical or other personnel, for a fixed term, through specific national or regional programmes or for the development of scientific, technical or artistic research projects, pedagogical innovation, knowledge transfer, specialised teaching assignments of limited duration and other academic activities.

Types of activities of university teaching and research staff:

- Teaching
- Research
- Innovation and Knowledge Transfer
- Direction and Management

University teaching and research staff have full teaching and full research capacity, as long as they hold a doctoral degree, and therefore assume a general orientation from the moment they take up their position: teaching and research/innovation orientation.

The university teaching and research staff may carry out their duties with an increase in teaching activities or in research and innovation and transfer activities.

In addition, temporarily, the lecturer may have a university management and leadership orientation which may significantly limit his or her dedication to teaching and research activities.

Teaching activities involve all actions, tasks and work that involve the dissemination of knowledge and support for the acquisition of competences by students through the training processes.

- Classroom and laboratory teaching: theory classes and seminars, and practical classes.
- Individual and group tutoring, guidance and attention to students.
- Management, monitoring and evaluation of external placements (in institutions and companies).
- Participation in the development of subjects and material.
- Direction, monitoring and evaluation of work.
- Direction of Bachelor's or Master's degree final projects.
- Direction of doctoral theses.

- Preparation of teaching material and guides.
- Preparation and development of exams and assessments (continuous and final).
- Participation in educational innovation.
- Participation in continuous training activities.
- Participation in the management, administration and academic coordination of teaching.
- Management and participation in international and inter-university exchange and mobility programmes (Erasmus, Seneca...).

Research activities involve all actions, tasks and work that contribute to the construction and dissemination of scientific, technological or artistic knowledge that teaching and research staff carry out individually or as part of a research group.

- Design, direction and material execution of research work and projects.
- Coordination, management and supervision of research groups and participation in them.
- Direction of doctoral theses and research-oriented Master's theses.
- Supervision and training of researchers.
- Design, management, maintenance and use of infrastructures and facilities.
- Fine-tuning of instruments, techniques, protocols, procedures
- Dissemination of knowledge to the scientific community.
- Direction, organisation and participation in congresses, conferences and scientific meetings.
- Carrying out activities that contribute to the internationalisation of research.
- Establishment of collaborations with other national and foreign groups or researchers.
- Participation in peer review processes.
- Planning, implementation and participation in scientific training activities.
- Design and implementation of quality plans and best practice protocols.

Innovation activities include all the actions, tasks and artistic work that teaching and research staff carry out individually or as part of a research group that promote the application of knowledge to society and its economic agents, in the field of R&D&I, through processes of development and productive innovation.

- Design, direction and material execution of technical projects and works.
- Development of patents, licences, trademarks, prototypes.
- Creation of or participation in technology-based companies.
- Creation of or participation in knowledge-based enterprises.
- Collaborations with companies, science parks or public or private organisations.
- Exchanges and information activities with companies.
- Participation in business incubators.
- Participation in OTRIS activities.
- Design, management and material execution of production models.
- Economic-financial, technical or environmental feasibility studies
- Activities for the valuation of results. Participation in proofs of concept.
- Conducting technology research and intelligence.
- Preparation of opinions and reports. Scientific and technical advice and consultancy.
- Scientific, cultural and artistic dissemination.

Leadership and management activities entail all the actions, tasks and work involved in the correct planning and successful execution of all the aforementioned activities. These leadership and management activities may form part of the activities that university teaching and research staff carry out in the field of teaching, research or innovation and knowledge transfer, or they may be specific leadership, representation and management activities with a global projection on the University or any of its areas.

- Hold academic positions of leadership, representation and management.
- Participate in the preparation, execution and evaluation of the University's strategic plans at different levels, as well as in all decisions and actions aimed at their effective and efficient implementation.
- Participate in the design, implementation and evaluation of curricula and training programmes.
- Partake in academic committees and commissions, in all areas of the university, and to participate in their work and reports.
- Partake in tribunals and committees for the evaluation of the teaching and research staff.

The teaching and research staff may be **full-time** or **part-time**, distributed as follows:

- 80% for teaching and research, innovation and transfer activities, depending on the corresponding orientation. This percentage may be reduced for management and administration activities, under the terms established by each university.
- 10% for continuous training activities in the form of attendance at courses and seminars, scientific meetings and congresses, and short stays in other universities, institutions, companies or research centres.
- The remaining 10% for activities that facilitate or support your roles as a university lecturer, to be determined freely by the individual concerned.

The **remuneration** and incentives for the teaching and research staff are as follows:

- Basic salary
- Triennia
- Additional payments

And supplementary remuneration:

- Posting allowance
- Specific allowances (General, Post and Teaching merits)
- Productivity bonus (for academic careers, research and additional regional payments)

Geographical and interdisciplinary mobility, as well as mobility between the public and private sectors, is a powerful instrument for the development of the teaching and research staff at any stage of their careers. Mobility also contributes to optimising universities' human and material resources, to establishing synergies between institutions and increasing their academic quality, as well as to the development of the higher education system, research, innovation and knowledge transfer.

Mobility of the regulated TRS:

- Permanent attachment of teachers from other countries to a university.
- Temporary mobility of lecturers between Spanish universities and public research organisations (OPIs).
- Special temporary mobility of lecturers between Spanish and foreign universities and PROs (visiting lecturers).

- Temporary mobility for the exploitation of research results (leave of absence for joining technology-based companies (Art. 83 and additional provision 24 of LOMLOU)).

The **National Agency for Quality Assessment and Accreditation (NAQAA)** is an Autonomous Body, attached to the Ministry of Science, Innovation and Universities, whose objective is to contribute to the improvement of the quality of the higher education system through the evaluation, certification and accreditation of teaching, teaching staff and institutions.

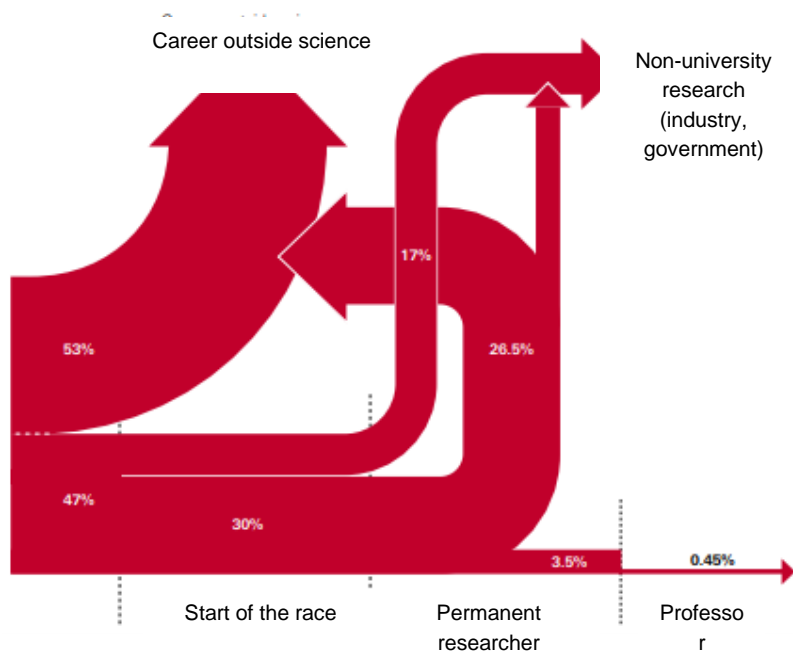
ANECA is the body responsible for the evaluation, certification and accreditation of the Spanish university system with the aim of its continuous improvement and adaptation to the European Higher Education Area (EHEA).

Within its sphere of competence, NAQAA is responsible for assessing:

- The teaching leading to obtain university degrees of an official status and valid throughout the national territory.
- The merits of candidates for university teaching and hired teaching staff.
- The teaching, research, knowledge transfer and management activities of the teaching and research staff of the Universities and of the career civil servant research staff of the Public Research Bodies.
- University institutions and centres.
- Foreign university degrees through homologation or equivalence procedures.

Some data

A PhD can be a gateway to a scientific career, but most people who undertake it will end up in careers outside scientific research. The journey from PhD student to professor has key turning points, as shown in the figure below produced by the Royal Society. At each of these points, some researchers abandon their scientific careers and only a small proportion of PhD students can be expected to end up as university professors. Policy can help ensure job security and flexibility, so that the best scientists can look forward to long and rewarding careers.



Recommendations from human resources experts

We wanted to hear the thoughts of human resources managers and headhunters to find out first-hand what the career options are in the private sector.

Research careers in the Life Sciences sector

By Luis Truchado, Managing Partner of EuroGalenus Executive Search in Life Sciences



Are you considering a career in the world of scientific and medical research? Excellent decision! You will be working on what you love and the current situation is better than ever... which does not mean it is good.

As you know, in Spain little more than 1.20% of GDP is dedicated to R&D, while the European average is over 2% and successful countries such as Japan, Korea and Israel lead the effort with more than 3.5%. However, the Spanish situation is improving every year, as the value of innovation is established in private companies and institutions, which generate the most job opportunities. For this reason, in this article we are going to leave out the public sector, which works in a very different way, through public examinations and competitions organised by very different organisations.

The first thing we can recommend is to specialise in a field or segment that appeals to us and get the right training for it. Let's not try to be generalists, because in this century, specialisation is installed in our minds: we are not all good at everything; it is no different in research.

When it comes to Life Sciences or Biosciences, human life is presented to us in all its forms, from molecules and cells to organisms, living beings or the environment. In addition to Medicine and Pharmacy, some branches have become highly relevant in their own right, such as Nutrition, Botany, Genetics,

Toxicology, Bioinformatics or the emerging segment of Digital Health, to name but a few.

Graduates in the Life Sciences sector can find themselves working in segments more or less related to the more "traditional" Research and Science (Research is never traditional because it is at the cutting edge of knowledge). Work offers appear every day in sub-segments, such as the food industry, Dermo-cosmetics, the environment or the pharmaceutical industry, biomaterials, Artificial Intelligence, Big Data or Bioethics.

What jobs can you carry out?

Biosciences graduates can pursue careers in many different areas of specialisation. Career options could include scientific research and chemical or clinical analysis, environmental management, ecology and environment, toxicology, microbiology, forensic science or scientific/medical/chemical laboratories.

The various pharmaceutical, agrochemical or veterinary industries also offer opportunities for Biosciences graduates in a variety of roles, including research and development, clinical research (clinical trials: CRO's), Regulatory Affairs, Consultancy at various levels, Patenting, Medical Writing as well as Commercial and Marketing.

The Commercial/Marketing career is a surprising and fascinating outlet for many Life Sciences graduates who never thought at the end of their degrees that they would be working in this field as satisfied, fulfilled and well-paid. Undoubtedly, the Commercial/Marketing field is one of the best second vocations (those that are discovered after the studies and already in the working field) that offers the most satisfaction to its participants.

Communicating, disseminating or teaching is another attractive and growing outlet. New technologies and platforms have revolutionised the need to translate and transmit pure and complicated scientific language to different levels of knowledge.

All areas of business and finance are also open to Biosciences graduates, as their good analytical and calculation skills make them attractive candidates in Consulting, Business Intelligence, or Venture Capital firms.

Another recommendation we can make is to plan your continuing education, that which you will have to develop over the next 30 years or more, and which depends exclusively on your vision of the future.

For example, fluency in English still gives a decisive advantage to many candidates today and if yours is not fluent enough, do not think twice about it and get on with it. You need to reach the level of being able to conduct a full interview in English (which you will do sooner or later).

Make sure you polish your presentation skills, your ability to summarise, to refute arguments, because this is also something that candidates will be judged in from very early on. You must be able to present with conviction even topics that you have not prepared yourself or that you do not particularly like.

The importance of soft skills.

University training in science produces classical cognitive skills such as study, concentration, analysis, synthesis, etc. These traditional skills are assumed of graduates or PhDs in the sector. They are known as "hard" skills.

There are also other professional competences enhanced by doctoral students' research, such as presentation skills, the ability to collect and critically analyse data, or the practical experience gained from laboratory and field work. These skills, which can be learned by anyone, including the ability to work as part of a team, manage time efficiently, develop one's initiative or put oneself in the other party's shoes, are known as soft skills.

Soft skills are important in the academic or research world, but they are crucial and absolutely essential in the private world. We can say that academic credentials alone are enough to thrive in that particular field, but they are by no means enough to work in the private sector. Moreover, after 20 years of experience with managers, experts and scientists, we can affirm that the vast majority of organisations will always prefer the empathetic candidate who is able to communicate, motivate and align his/her team to the one with similar or even better qualifications, but who does not have those skills so necessary in today's man/machine work environment. For companies, if humans are not able to provide "something more of value", it is better to let machines do the job.

To learn more about the fascinating world of soft skills, we conclude by recommending a classic: Emotional Intelligence by Daniel Goleman. A book that engages and contains many key concepts to improve ourselves without having to go to the classroom.

Know yourself

Answering the question "What can I do after my PhD?" is a difficult task for any PhD student, posed by the decision to pursue a career in academia or to consider alternate careers. We propose a few hints on how to answer this question.

Which career should I pursue: academic or industrial?

Some tips for broadening your experience and exploring career options include:

- Identify personal strengths and motivations and seek a career that fits them.
- Avoid viewing this decision as an "either/or decision" and consider pathways that bridge the gap between academia and industry, e.g., technology transfer, public policy formulation in administration or consultancy careers.
- Consider your career as a path forged from a series of decisions made over time and emphasise the importance of learning through trial and error. Trying different things allows you to see for yourself what kind of work suits you.
- Getting an outside perspective is important, talking to other colleagues can be very helpful.
- Ask yourself: what have my colleagues done?
- Take part in job fairs, identify companies that might interest you and take every opportunity to ask questions of their executives.

How do I find out about employment options?

- Reaching out to alumni in your discipline can also provide you with contacts who may be willing to help or advise.
- Simply register on job portals and view offers for profiles like yours, studying your market possibilities.
- Estimate how your skills/experience fit within the profiles required in job offers, rather than focusing too much on your degree and/or area of discipline.
- Ask contacts outside academia.

- Use social media by following the relevant *hash tags* around the desired careers

If we are trained to be academics, how do we make the transition to a non-academic sector?

- When applying for a position, emphasise the responsibilities you have had during your PhD. It is important to translate your experiences into a language that employers are familiar with.
- Adapt your experience to the profile required in job offers. Analyse each job advertisement and adapt your application.
- Do not be discouraged if you don't meet all elements of the job specification – more often than not, the perfect candidate doesn't exist.

Can the lack of varied work experience be considered a handicap?

- The doctorate must be defended as a professional experience in its own right. It should be included in the work experience and education sections to emphasise that you have enjoyed autonomy.
- Never refer to yourself as a "PhD student" - you should think of yourself as a professional and present yourself accordingly.
- Do not shy away from positions of lesser responsibility. It is often possible to make the transition to a higher responsibility job in a short time.
- Think of the most appropriate answers to questions that are predictable. For example, prepare a positive answer as to why you want to make the transition from academia by focusing on what you can offer to the company and why you have a passion for it.
- During your PhD, try to find opportunities to broaden your experience and knowledge, such as placements in other laboratories or professional training courses to improve employability. If your PhD programme does not include this additional training, be proactive, look for internships, etc., but do not wait until the end of the programme.

How can I adapt my academic CV?

- Separate the skills on your CV into two sections: technical and personal.

- Each CV must be adapted to each company and job position.
- Try to make your CV "easy on the eye".
- Include examples of the skills required within the job profile you are applying for.
- Think of your CV as being rooted in the past, in what you have done, whereas your cover letter should look to the future and indicate what you can do for the organisation.
- Ask someone to review your CV.

Why would an employer hire a PhD or postdoc instead of a graduate?

- Be more positive - think of your experience as unique. You may have specific achievements to support your CV being more suitable than that of a graduate, and you should use these in your applications and interviews.
- For example, if you consider the case of an employer from outside academia coming from a start-up company and trying to secure investment, it might be very good to emphasise experience in writing applications for grants and funding, as only a postgraduate has such experience.

Should I maintain my social media and blogging activity?

- A blog can be a link to maintain a social networking presence with known contacts at conferences and other academic events. A blog is also a good way to promote yourself and your work.
- A blog can be a good way to continue to have the work you have developed throughout your career associated with your profile. By keeping a blog, you ensure that you maintain an active presence on the web.
- Proactively maintain your public profile, as employers use this profile to search for candidates. LinkedIn and Research Gate are the most used tools to check candidates' public presence. Recommendations from your LinkedIn contacts can also improve your employability.

Did you know what you wanted to do before your PhD, and did you change your mind during your PhD?

- Keep other interests alive as you can never predict your future career. You may eventually be able to articulate a coherent and meaningful career story, even if there was no prior plan.
- Always be proactive and take advantage of any random encounters at networking events you attend.

How difficult is it to return to academia after leaving industry?

- Experiences gained in industry can sometimes be attractive to some academic environments.
- Some experiences in industry can complement facets not developed in academic environments, such as negotiation, project management, teamwork, etc.

Research in industry

In the Anglo-Saxon world, approximately 80 to 90 percent of doctoral students leave university immediately after their doctorate to take up a position in a company or social organisation. They possess not only professional qualifications, but also management experience. In addition to teaching skills, the supervision of young researchers in research and innovation skills, research data management and scientific and academic integrity is particularly valued.

Many researchers enter research after a career in a related or unrelated field. Reasons for entering research as a more mature person may include professional development, upgrading skills or career proposals in an existing career, career change and interest in the subject.

Transition from academia to industry

Changing your career path can be stressful, from deciding what changes you want to make, to deciphering how to demonstrate to potential employers that you have the skills needed to excel in a position in their organisation. Often, people who have developed competences applicable to other fields as part of an academic career consider their qualifications and experiences to be very specific and therefore find it difficult to transfer their skill set to a career outside academia.

There comes a time in the life of a PhD candidate - and even, from time to time, a tenured academic - when it may be worth considering a transition from academia to the private sector. This can be a difficult step, particularly if you have spent years in academia, but the rewards can be great. The hardest part is often the question of changing your mindset. Here are some steps to help you on your way.

Gonzalo Sáenz de Miera is my name and I studied Economics and Business Studies at the UAM; in the fourth year of my degree I did the “Coopera” Programme and I was lucky enough to do a fifth year in Ireland thanks to an Erasmus Scholarship.



I then did a Master's in international Economic Policy at the University of Warwick and returned to UAM to do my PhD in quantitative economics. In the meantime, I worked as a consultant, and volunteered in India, Nicaragua and Peru.

And then I started working at Iberdrola, first in renewable energies, then in economic regulation and now I am in the presidency area leading the direction of climate change, an issue of paramount importance for the company and for society.

And in these 20 years that I have been at Iberdrola, I have had permanent contact with people from other worlds, especially with the university, where I have been an associate professor at

UAM, with the social world, with NGOs, and with the political world and think tanks.

And I am not telling you this to brag about anything, in fact, I have nothing to brag about. What I want to tell you is that the fact that I have been connected to different worlds has allowed me to: 1) have a much more complete vision of reality, 2) a bigger network 3) and has helped me to be much more empathetic.

And this is of great value today, because the problems we face are of such complexity that they can no longer be tackled by politics, business or academia alone, but require alliances between everyone to address them in conjunction.

This is why we need professionals who are not only trained, but also empathetic, open and have a broad vision, which allows them to build bridges to address the issues.

As a first message, I would like to encourage you, whatever sector you work in, to get together with people who are different from you, be empathetic, engage in dialogue and look for common ground, that is what alliances are all about.

I think this will be good for society and for your employability, it will give you a lot of personal satisfaction.

The second message I wanted to convey to you has to do with climate change and energy.

Look, since you were born, since I left the cooperative, the world has improved in almost everything: economic growth, poverty eradication, health coverage, social rights, life expectancy... But there are two major issues where it has not: inequality, economic and social, and the environmental unsustainability of the current model, which is shown in climate change and air pollution.

Climate change is already a reality, but it is going to be much more important in the future: tremendous economic, social and environmental consequences. To give you an idea of its importance, it is the main risk to the world economy for the Davos forum. And it is an ethical problem, intergenerational and between rich and poor countries.

This problem is caused by the current energy model, based on fossil fuels, and a change is needed in two directions: boosting energy savings and efficiency and replacing fossil fuels in the final uses of energy (transport, buildings and industry) with a 100% renewable electricity system.

We are moving in the right direction, but much more slowly than necessary, thus exacerbating the problems, which will become increasingly complex and costly to solve. But there is a clean technology revolution taking place, which has reduced costs and is becoming more competitive. Renewables and batteries have reduced their costs by 75% in the last 8 years, as have batteries. And all this means that scenarios that 10 years ago were seen as complex and costly can now be a reality.

And this is changing radically the industrial concepts in the world: last year investments in clean energy in the world exceeded 300 billion euros and according to the International Energy Agency estimates that more than 400 billion euros per year will have to be invested in clean energy until 2050).

And in the face of this revolution, which generates winners and losers, Spain and Europe are initially well positioned: 1) we have natural resources (before, the important thing was to have oil, now it is sun, wind, water...) and 2) technology companies well positioned in renewable energies and desalination.

But beware, there is global competition, and if we do not take advantage of it, others will (China, for example, has seen it) and we may end up buying their products, and losing the added value of the industry.

But the message I wanted to give you is that the fight against climate change is going to generate a revolution with enormous opportunities and jobs that we cannot afford to miss. All European countries have presented energy and climate plans and Spain's plan foresees investments of 20,000 million euros per year between now and 2030.

And it needs people like you, who are prepared. That is why, and there goes my second message, I encourage you to train and take an interest in these issues, which will affect and generate opportunities in all sectors: in the financial sector, energy, water, forestry and administration.

There are opportunities and jobs here. And working in the sector has another advantage. You are contributing to the general welfare, to a more sustainable, cleaner, fairer world, for us and for generations to come.

And now for my third and last message. The situation in the world is not easy. The reality you are about to encounter is very complicated. In addition to the problems of climate change, growing economic and social inequality, and

unbalanced globalisation are leading to a lack of dialogue, to the questioning of multilateralism, and to political and social conflicts.

And in this situation we have, you have, two options: 1) Be pessimistic, give up, fall into cynicism while looking for your own personal wellbeing, isolating yourselves in a bubble. 2) Or you can be optimistic, see the opportunities that exist, and fight for a better world.

My opinion: do not hesitate. Fight, be responsible, change the world. Because you can change it. It is in your hands. Each one of you can change it from the field in which you work. By being empathetic. By building bridges. And by adopting this attitude, you will not only contribute to building a smaller, more sustainable and fairer world, but you will also be happier.

Well then, as you embark on this new stage, allow me to wish you great professional and economic success and, above all, I wish you, from the bottom of my heart, what I consider most valuable, and that is that, as Kavafis says, you enjoy the journey.

The researcher as manager

This career path is aimed at early postdoctoral researchers with first-time management responsibilities, who are interested in management, business and economics, and who are pursuing a senior management position in industry or society. This position requires not only professional qualifications, but also management experience that can be acquired through a specific MBA with economic foundations or Master's degree in innovation management.

Moving from academic to management roles

The barriers between academia and management positions are much more permeable than they used to be, as universities continue to grow into highly complex environments that require sophisticated and adaptable management skills. Thus, if you are an academic contemplating a move into university management, now may be a good time to reflect on how your experience could be adapted to the sector.

My name is **Eva M^a Sánchez Galán** and I am currently working as a Patent Agent (Technician), specialising in Biotechnology, at BalderIP. I have a PhD in Biochemistry, Molecular Biology and Biomedicine from the Faculty of Medicine of the UAM.



My first connection with the UAM dates back to 2002, when I began to collaborate in the Experimental Nephrology and Vascular Pathology Laboratory of the IIS-Jiménez Díaz Foundation, led by Dr. Jesús Egido de los Ríos, who is currently Professor Emeritus of the UAM, and who at that time was Professor of the Faculty of Medicine of the UAM. After obtaining a degree in Biological Sciences from the Complutense University of Madrid, I obtained a pre-doctoral scholarship to carry out my thesis in the Experimental Nephrology and Vascular Pathology Laboratory of the IIS-Jiménez Díaz

Foundation, associated with the Biochemistry Department of the UAM's Faculty of Medicine.

The pre-doctoral stage was key to my later professional and personal development. Dedication to the scientific world and, mainly, to the development of a research career makes it necessary to be a flexible person, willing to work in a team and, above all, to have an open and critical mindset, since the day-to-day work and the results obtained are often not as expected, which implies a reorientation of the project, even after weeks and/or months of work. During this professional period, I realised that, although I really enjoyed the research and the group I was working in, the job security associated with a research career made me rethink my future and start looking for professional alternatives for scientists. It was clear to me that I wanted a career in which I could use my scientific knowledge and skills, as well as teamwork skills and an open and critical mind, but outside of research as we know it. So, among these alternate career opportunities, I came across, without looking for it, a field that was totally unknown to me at the time: PATENTS.

To engage in Industrial Property and become a Patent Attorney, you need to have a technical or scientific qualification, with the possession of a Doctorate degree being highly prized, which gives you an extra edge over your competitors. Such training is necessary to understand the scientific and technological principles and processes on which each invention itself is based and to be able to explain it to others in a clear and concise manner, specifically in writing, with an eye for detail and an analytical mind capable of structuring an accurate and coherent argument.

Among the various functions of patent agents, the main one is generally directed towards the initial analysis of whether a development is likely to be patentable, followed by the drafting and processing of patents before the various national and international patent offices, together with advice on bringing the patented development to market by means of freedom-to-operate analyses, as well as enforcing these patent rights against third parties if they infringe these rights. All these functions, along with many others, will always depend to a certain extent on whether private companies, public research institutes, universities, hospitals, etc. are being advised.

It is fascinating to be involved throughout the whole life of an invention, from when the idea or the first results/prototypes/processes

emerge, until it is finally developed with all its possible variations. Throughout this process, you must try to future-proof the patent to protect it against new technologies that have not yet been invented, which requires a certain amount of creativity, but always with your "feet on the ground". This job allows you to be in direct contact with inventors/owners to help them navigate the arduous patent system, often in many different countries. No two days of work are the same, every day you face new and different challenges, every invention is different from the last, you move in a world of cutting-edge technology and with the most innovative technicians and scientists in each technical sector, all of which makes every day a new challenge on an intellectual and professional level. It is also incredibly satisfying when a patent application, on which you have been working and investing time and effort, is granted thanks to the arguments put forward in its defence.

I will not deny that the training is hard, because unlike lawyers, patent agents, apart from the technical and/or scientific qualifications required, need legal training in industrial property matters, which is usually obtained while working, so you need additional dedication to study industrial property law, both at national and international level. There are also various official qualifications at national (industrial property agent) and even regional (European patent agent) level, which

are obtained after passing different exams and which legally qualify patent agents to be legal representatives of the patent holder(s) before patent offices.

The future of this profession is very promising. There is currently no unemployment, and every day there are more and more job offers to expand the staff of companies and industrial property offices. In fact, in the specific technical field of biotechnology, here in Spain, there is a shortage of professionals in the sector, so it can be a highly recommendable career opportunity.

If you have come this far because you are looking for alternatives to your research career, I encourage you to take an interest in the world of industrial property, where you will remain in contact with science, more specifically with cutting-edge science and technology, where every day you will face different challenges, in different technical fields, so you will not stop learning at any time. A challenge to keep your brain in shape!

My name is **Victoria Ley**, and I am currently responsible for the evaluation and monitoring of projects, contracts and other grants at the State Research Agency. I did my degree and PhD, which I finished in 1983, at UAM.



I studied Biology, specialising in Biochemistry and Molecular Biology. Then I did my doctoral thesis at the Centre for Molecular Biology.

It was clear to me that I wanted to dedicate myself to research, but my CV was not enough to obtain a state grant, so I decided to talk to one of my professors, Eladio Viñuela, who allowed me to spend a few months doing an internship in his laboratory. With this stay I was able to improve my CV and get funding to do my thesis.

They were fantastic years in which I learned way more than during my degree. I learned the molecular basis of biology and many “hows” and “whys”. I also learned what the scientific method is and how to apply it. It is not just for carrying out experiments.

The first critical step that directed my entire professional career was to tell me

to talk to Eladio Viñuela, one of our best professors and teachers. I still do not know how I convinced him to let me work in his lab. There I worked with excellent scientists, intelligent, funny and generous people. I think I have gone through all the possible lives of a researcher: student, thesis, work in a private company (Abelló), postdoctoral scholarship in the USA (NYU) and re-engagement with another postdoc in France (Inst. Pasteur), grant holding mother and candidate for a research post. One of my sons was born when I was a scholarship holder in the USA (which was crazy on our part, but it has worked out great for him). When I came back to Spain, I got a research position (INIA) where I worked in virology, so I was also a PI for several years. During this period, I spent two “sabbatical” years at EMBL and USDA. One day it came to my mind to bring up at a dinner party that research evaluation was interesting because you could find out what was going on in other scientific fields, and the following week I found myself working at ANEP. That was a long time ago, in 2003, and apart from a 3-year lapse in sports medicine, I am still working on this field today.

I really liked the research, asking questions and trying to answer them, the working environment, the colleagues... but I also felt that in the lab I was very limited to my projects and my colleagues and I was missing out on a lot of information from the rest of science.

My job is mainly to manage the evaluation of applications for projects, contracts and other proposals for scientific activities so that the best quality ones are funded. Once funded, these are followed up to identify problems, to keep track of progress and to know what results have been made possible with this funding. These processes are managed within the Agency but are carried out independently by the scientific community using exclusively scientific criteria. In parallel to this management, the Agency prepares the calls for the State Research Plans in accordance with the Strategies, and the opinions of all the researchers who have participated in the evaluation and monitoring processes are also taken into account.

What I like most about my job is seeing how science advances in all fields and, above all, the personal interaction with so many researchers, who in addition to doing excellent work on their projects, are willing to dedicate their time and effort so that the Spanish scientific system maintains a high level despite its low funding.

I have no idea how my career will change in the coming years. I like what I do, and I hope to be able to continue collaborating to improve the Spanish scientific system.

How do you think the labour market for researchers might evolve, where the opportunities might lie?

There used to be a lot of prejudice and it was considered a disrepute for a researcher to work with a company or outside academia. Fortunately, this has been overcome. Now we would all be very proud that what we have developed is sold in an industry. But also, researchers, because of their training, have the capacity to work in a very broad labour market, from banks to film production companies. It would be good if there were more scientists in politics.

My recommendation is that whenever you can, try to work in what interests you, choose the most interesting place and do not shut any doors. It is also important, especially when you are young, not to be afraid to change jobs, to move, to go to another country, to start something new. You must be informed, learn as much as possible about all fields and try to work with the best (who are not always the most famous).

I see the future of young Spaniards as difficult in the short term, but I am sure they have a future. What I do see as a bad thing is a future of Spain without young researchers; this would be a real disaster. Perhaps this is a good opportunity for another generation to take the initiative, but it is essential to involve society as a whole, it is society that has to vindicate the importance of science. I hope that young people will not be discouraged and will use their energy to give a new impetus to science, technology and innovation in Spain.

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My name is **Oscar Salazar Torres**, I am currently Technical Manager at Euro-Funding SL. I have been linked to UAM for 22 years.



decided to do my PhD at the National Biotechnology Centre, CBN-CSIC.

Subsequently, and thanks to the collaboration of the pharmaceutical industry with my CNB laboratory, I received a job offer at the multinational MSD, which had an R&D centre in Madrid dedicated to drug discovery. During the following 10 years (from 1998 to 2008) I developed a fruitful professional and scientific career at MSD, collaborating in the discovery of new molecules with pharmacological interest and co-authoring numerous publications, conferences and patents.

I have a degree in Biological Sciences, specialising in Biochemistry and Molecular Biology (Faculty of Science-UAM, 1994) I did a degree in Science (thesis) specialising in Biochemistry and Molecular Biology at the Faculty of Science-UAM (1995) Later I obtained the title of Doctor of Science. In the Department of Molecular Biology, Faculty of Science-UAM (1998)

I completed my training as an Expert in Promotion and Management of International R&D&I Actions (Postgraduate course at the Polytechnic University of Madrid) And later I studied the Executive MBA. At EAE Business School.

At the beginning of my career, I focused on basic, academic research, since I

In 2008 this research centre closed and I focused my professional career on the biotechnology sector, specifically the development of molecular diagnostic tools for hospital use, first at Biotoools B&M Labs. S.A. as laboratory manager, and then at Genómica SAU (Zeltia group) as R&D manager, coordinating the development of molecular diagnostic kits and taking charge of clinical validations in hospitals.

Subsequently and after the arrival of the economic crisis, and with the corresponding cut in hospital expenses, I refocused my professional career in the public management of innovation, first receiving an offer for the position of European Project Manager and coordinator of the group of MINECO managers responsible for the European

ERAnet projects in which MINECO co-funded. After a brief stay at MINECO and at Instituto Cajal-CSIC as European project manager, I participated in the selection process of the Senior Project Manager by the Euro-Funding consultancy firm for European R&D funds counsel for the biopharmaceutical sector. I was hired in August 2014 and I have been working for this company to this day occupying different positions until reaching the current one, Technical Manager, supervising a group of 12 consultants dedicated to the preparation and management of European projects for our clients. In addition, and among other tasks, I coordinate the preparation of business plans for SMEs and startups for public funding of R+D+I and an executive MBA from EAE business school.

Changes can be brought about by external factors, such as strategic decisions, economic reasons, etc. which are imposed. Then, there are the chosen changes. For non-chosen changes, one must always be prepared in terms of training and current market trends and try to interpret it as an opportunity for improvement, and not as a catastrophe, because professional life does not end at that point.

Regarding voluntary changes, these should take place when, firstly, it is identified that in the current position there is no more room for professional development, learning curve, or even for economic reasons. I believe that it is

necessary to continue to evolve in one's professional career and not to stagnate.

My current job is to help companies and researchers obtain European funding to be able to continue with their research, and to be able to develop technologies and products so that they can be on the market and provide solutions to society and citizens, thus contributing to the success of these innovations and combining my technical and management profile to contribute to the sustainability and competitiveness of R&D in this country, with a special focus on the biotechnology and pharmaceutical sector.

My immediate future is for my team of collaborators and clients to continue growing and achieving high rates of return of European funds for Spain and contributing to the competitiveness of R&D intensive SMEs.

I believe that mixed technical and management profiles will be increasingly in demand in both public institutions and companies for R&D&I management, especially when trends indicate that we are increasingly moving towards a mixed public-private model of R&D&I funding.

My lessons teach me not to be too attached to places and people from a professional point of view, and to be in permanent learning and recycling in new technologies, trends, etc.

Continuous training, specialisation in different areas, with a special focus on

digitalisation, and not being pigeonholed into one area or position.

It is always necessary to have a critical spirit and to be prepared for a changing environment, through networking, social media, public recruitment platforms and LinkedIn.

One last positive message: R&D&I will always have a place in this country.

Technology-based entrepreneurship

Entrepreneurial scientists, the entrepreneurs of the future

There is a growing consensus in the academic community that knowledge generated in academia - especially in public institutions - should be transferred to society. This includes initiatives such as science parks and business incubators.

In both cases, universities and public administrations provide the venture capital to launch *start-ups* or *spin-offs*. In this way, they support scientists during the most delicate stage in the creation of a venture. The scientific entrepreneur is the scientist who wants to put his or her knowledge - his or her techniques, products or developments - to good use by creating a company.

The scientist who decides to become an entrepreneur faces several challenges. Unlike 'ICT entrepreneurs', who have to validate their venture within six months, scientific entrepreneurs have longer cycles. They first have a phase in which they work on the scientific base, and then move on to subsequent technology-based development. Transforming purely scientific knowledge into a technological product requires research, feasibility and scaling activities, for example in a biotechnology project, or one involving hardware and software development.

Another obstacle for entrepreneurial scientists is obtaining the necessary funding for the first stage of their initiative. In general, the private investor is interested in a venture when there are already some customers or users, and with a much clearer perspective on the market opportunity. A scientist who wants to become an entrepreneur must learn management, administration and communication tools.

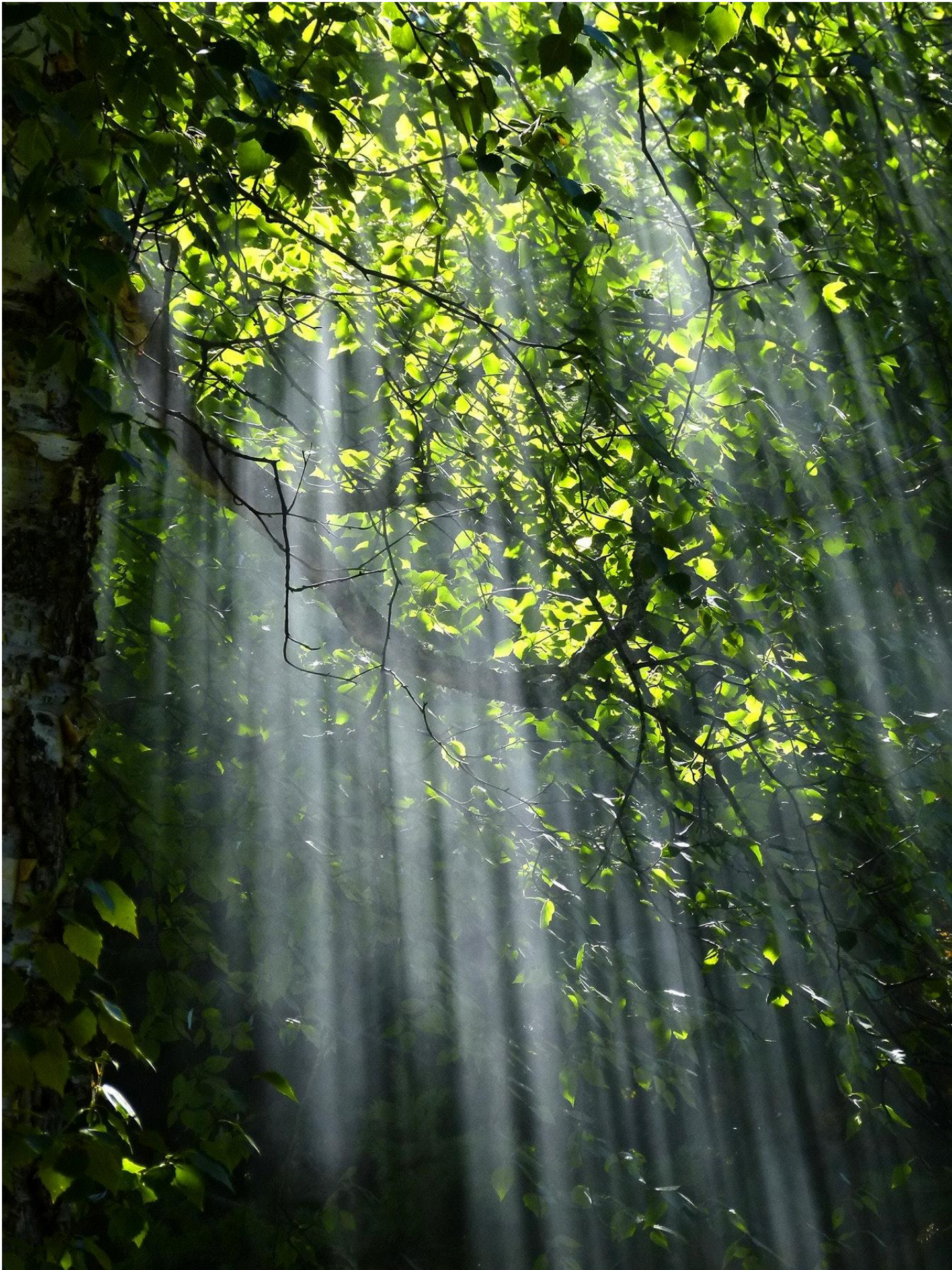
Perhaps the solution is not for the scientist to be the entrepreneur, but for the scientist to integrate with an entrepreneur; or for the scientist - through the structure of the university - to allow an entrepreneur to use that knowledge.

Entrepreneurship skills

There are four key areas that need to be developed to succeed as an entrepreneur: entrepreneurship, business and management, human relations, conceptual and relational competences.

Business Competence Framework

Entrepreneurship		
Identifying and defining a viable market niche	Development of appropriate products or services for selected companies	Market niche / product novelty
Idea generation	Market research	Recognising and anticipating situations to take advantage of opportunities
Formulate strategies to seize opportunities		
Business and Management		
Development of the management system for the long term	Functioning of the institution	Acquisition and development of resources necessary for the operation of the company
Operational business skills	Previous participation in start-ups	Management experience, skills and style
Familiarity with the industry and the market	Financial and budgetary skills	Goal setting skills
Preparation of the business plan	Marketing skills	Technical skills
Industrial skills	Ability to implement strategy (develop programmes, budgets, procedures, performance evaluation)	
Human Relations		
Development of the organisational culture that is necessary to guide the enterprise	Delegation skills	ability to motivate others individually and in groups
Recruitment skills	Human relations skills	Leadership skills
Conceptual and relational competences		
Conceptual competences	Organisational skills	Interpersonal skills
Customer management capacity	Mental capacity to coordinate activities	Written communication skills
Oral communication skills	Decision-making skills	Analytical skills
Logical thinking skills	Negotiation skills	Commitment competences



Related information

Other UAM initiatives

www.uam.es/UAM/HRS4R/1446782253482.htm?language=es&nodepath=Human%20Resources%20Strategy%20for%20Researchers

Recommended web resources

<https://www.researchgate.net/>

<https://www.nature.com/naturecareers>

<https://www.jobs.ac.uk/>

<https://www.vitae.ac.uk/>

Mentoring Programmes

<https://www.fecyt.es/es/tematica/rebeca>



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