

# Awareness of cross-disciplinary skills associated with Ph.D.

Dijon – November, 13<sup>th</sup> 2018

*Lien vers les présentations  
(en français et en anglais)*



I love hats



- Alexandre Matic – 3<sup>rd</sup> year Ph.D. Candidate in Engineering Sciences & Microtechnology
  - My subject: “Transducer based on ferroelectric domains and realization of passive components for radiofrequency signal processing at 5 GHz”
- My other (and numerous) activities
  - President (2016-2018) of the Association A'Doc
  - President (2017-2018) of the Confédération des Jeunes Chercheurs
    - Leading work group on junior researchers representativity and Ph.D. recognition among private and public institutions
  - Ph.D. representative (2017-2019) at SPIM doctoral school council
  - SPIM Ph.D. representative (2017-2019) at UBFC doctoral college council

- *A'Doc is the « Association des Jeunes Chercheurs de Franche-Comté », based in Besançon. We help and support junior researchers (Ph.D. candidates, new doctors) belonging to UBFC, by organizing social meetings, conferences about Ph.D. **and highlighting works and skills from junior researchers.** At national level, A'Doc is member of the CJC.*



*The « Confédération des Jeunes Chercheurs » is a national network of junior researchers from a wide range of fields, exchanging and gathering informations, skills and experiences among a large audience. About 30 local associations, covering the whole country and representing all disciplines are today members of the Confederation. The CJC has been recognized by the public institutions as a privileged partner for every questions regarding the doctorate, **including promotion of doctoral skills and doctoral training as an effective professional experience***

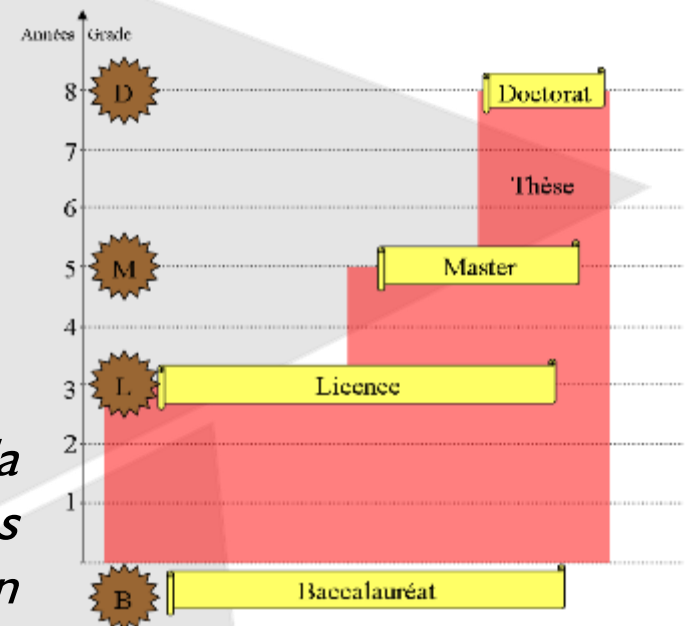
- I. Definition and commonplaces on Ph.D.
- II. An extended view of Ph.D.: the role of cross-disciplinary skills
- III. The Ph.D. candidate plays an active role in his research and his career

- I. **Definition and commonplaces on Ph.D.**
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*“The third cycle is a practical, heavily on-the-job, training in research, which includes, within the framework of doctoral programs, individually or collectively carrying out original scientific work. “...” Doctoral training is a professional research experience”*

### Art. L612-7 du code de l'Education

*« Le troisième cycle est une formation à la recherche et par la recherche qui comporte, dans le cadre de formations doctorales, la réalisation individuelle ou collective de travaux scientifiques originaux. «...» Les formations doctorales constituent une expérience professionnelle de recherche »*



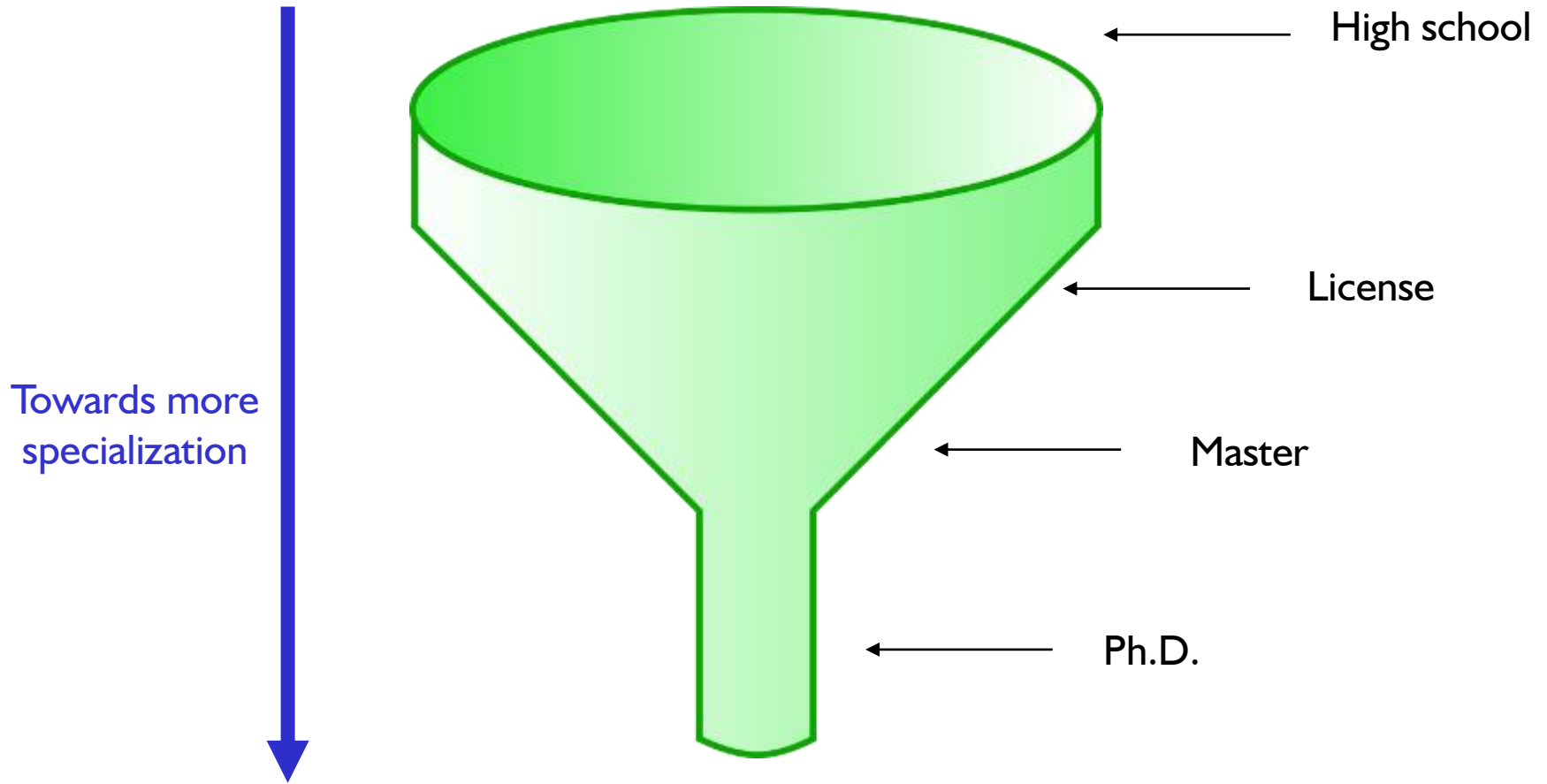
LMD system in France

Wikimedia Commons - Tiraden

The goal of your research during the Ph.D. is to be able to:

- take initiatives among a research program
- demonstrate novel results from your researches
- set their position compared to the actual state of art

As a first entry into research, Ph.D. is a **requirement** for academic career in most countries in the world as well as some positions in private institutions



**The more you study, the more you specialize in**



The  
 Economist

Doctoral degrees

## The disposable academic

Dec. 16th 2010

*Why doing a PhD is often a waste of time*

*“Although a doctorate is designed as training for a job in academia, the number of Ph.D. positions is unrelated to the number of job openings. Meanwhile, business leaders complain about shortages of high-level skills, suggesting Ph.D.s are not teaching the right things. The fiercest critics compare research doctorates to Ponzi or pyramid schemes.”*

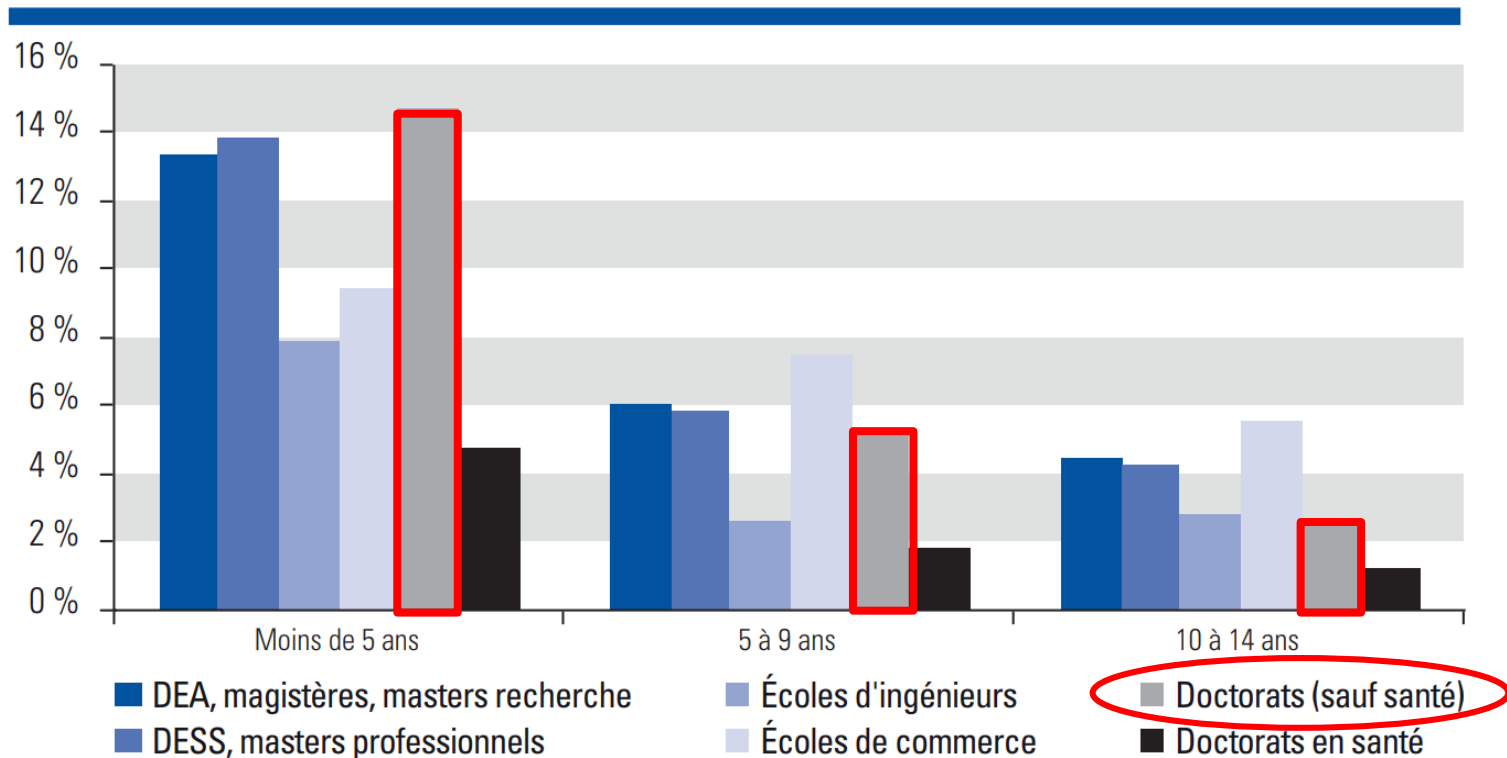
*« Bien que ce diplôme soit conçu comme une formation au travail académique, le nombre de places en troisième cycle ne correspond pas au nombre de postes à pourvoir. Parallèlement, les chefs d'entreprise se plaignent du manque de compétences de haut niveau, insinuant que le troisième cycle ne correspond pas aux attentes. Les critiques les plus féroces comparent les thèses de recherche aux systèmes de vente pyramidale. »*

Traduction du Courrier International –  
 « Faut-il vraiment faire un doctorat ? »

- Ph.D. is depicted as a diploma strongly connected to an academic career, with few (or even no) benefit for pursuing a non-academic career
- Moreover, Ph.D. holders are often depicted only as specialists on a narrow field (especially in France)
  - They can be seen as overspecialized and having a very theoretical approach
  - This vision deeply impacts attractiveness of Ph.D. among private institutions

*Graduated unemployment rate, according to diploma and elapsed time from diploma obtention*  
*Source: French ministry of Research, Superior Education & Innovation – SIES department*

**GRAPHIQUE 2 - Taux de chômage des diplômés de formation initiale selon la durée écoulée depuis l'obtention du diplôme**



Champ : France métropolitaine, population de 25 à 64 ans, actifs diplômés bac + 5 ou +8, vivant en ménage ordinaire.  
 Source : Insee, enquête Emploi 2010-2015, calculs SIES



**Imagine you have an interview with a recruiter and he/she asks you some question about your Ph.D.**

**Please raise your hand if you feel confident you could argue against these sentences**

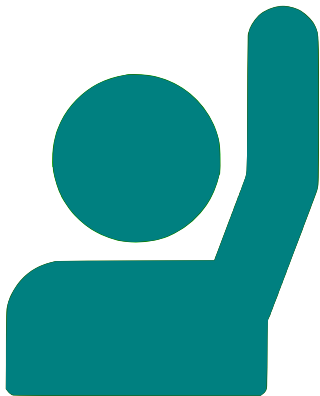
“Can doctors meet deadlines ?”

“You have done a Ph.D.... so you want a job in academia ?”

...but Ph.D. is non a real job... Is it ?

“A Ph.D. is not suitable for private institutions, they are over-specialized”

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**Please raise your hand if you agree with the following sentences**

- 1 ) A Ph.D. can meet deadlines
- 2 ) A Ph.D. is a good project manager
- 3 ) A Ph.D. is able to implement scientific tools and methods on a innovative R&D project
- 4 ) A Ph.D. can have both a general and specific scientific expertise
- 5 ) A Ph.D. can analyze and get a critical look on scientific information
- 6 ) A Ph.D. can communicate to a wide audience, with different levels of complexity
- 7 ) A Ph.D. is aware of deontology, integrity & ethics problematics

# All these cross-disciplinary skills are recognized as part of Ph.D. training

- Meeting deadlines
- Project management
- Ability to implement scientific tools and methods on a innovative R&D project
- Having both a general and specific scientific expertise
- Analyzing and getting a critical look on scientific information
- Communication to a wide audience, with different levels of complexity
- Awareness of deontology, integrity & ethics problematics

# Studies on transversal skills associated with Ph.D.

- Surveys and studies were carried out to identify transversal skills associated with Ph.D.:
  - Vitae « Researcher Development Framework » (2011)
  - Adoc Talent Management « CAREER » survey (2012) - *Durette B., Fournier M., Lafon M. (2014). "The core competencies of Ph.D.s". Studies in Higher Education. 1-16. DOI : 10.1080/03075079.2014.968540*



# CJC's involvement in Ph.D. recognition in France

- In collaboration with the National Association of Doctors (ANDès), the CJC has been working to improve Ph.D. recognition in France



Confédération des Jeunes Chercheurs &  
<http://cjc-jeunes-chercheurs.org/doctorat-a-la-loupe/>

Association Nationale Des Docteurs  
[http://www.andes.asso.fr/doctorat\\_loupe.html](http://www.andes.asso.fr/doctorat_loupe.html)

Le Doctorat à la Loupe – Compétences développées pendant le doctorat

- Based on previous studies, they have written an exhaustive guide on transversal skills developed during Ph.D.
- These cross-disciplinary skills are mastered by all doctors, **whatever their field of research**

## Compétences développées pendant le doctorat

Version générale

La formation par la recherche permet aux docteurs de développer un grand nombre de compétences, à la fois disciplinaires et transversales, dont certaines qui leur sont propres. L'exercice de ces compétences ne se limite pas à la recherche et au secteur académique, mais est tout à fait transférable à d'autres secteurs, public, associatif ou privé, en recherche ou à d'autres fonctions, comme le souligne d'ailleurs l'article 1 de l'Arrêté du 25 mai 2016 fixant le cadre national de la formation et les modalités conduisant à la délivrance du diplôme national de doctorat : « Les compétences spécifiques acquises au cours de cette formation permettent d'exercer une activité professionnelle à l'issue du doctorat dans tous les domaines d'activités, recherche ou hors recherche, dans le secteur public aussi bien que privé ». Une fiche nationale de référence, inscrite au Répertoire National des Certifications Professionnelles (RNCP) se révélerait ainsi pertinente pour présenter la liste de ces compétences. L'ANDès et la CJC sont à l'initiative de ce projet de reconnaissance officielle des compétences des docteurs.

# CJC's involvement in Ph.D. recognition in France

Along with this guide, the CJC and the ANDès have worked together with other institutions (CPU, RNCD) and the ministry to get an national and official recognition of cross-disciplinary skill



Since September 2018, Ph.D. is (almost) registered at the National Registry of Professional Certifications (RNCP) through 22 records (1 record for each economic sector) with a **common list of cross-disciplinary skills**

# CJC's involvement in Ph.D. recognition in France

The certification of Ph.D. programs through the RNCP broaden the horizon of skills associated with Ph.D., **whatever the research field**

Ph.D. is not only the highway for the researcher career, **but also a training to acquire a wide range of unique skills**

Certifications registered through RNCP are **recognized by employers, recruiters and syndicates throughout the country**

RNCP is a suitable tool for identifying relevant skills associated with a program

# Transversal skills validated through National Registry of Professional Certifications

## Design and development of a R&D approach

- *Have a scientific expertise*
- *Take stock of State of the Art*
- *Identify complex problems and possibilities of technological rupture*

## Implementation of a R&D approach

- *Implement methods and tools related to innovation*
- *Manage time and economic constraints*
- *Guarantee ethics and confidentiality of the work*

## Promotion and transfer of a R&D approach

- *Implement technology transfer*
- *Respect intellectual property*
- *Value its results through publication and Open Data*

# Transversal skills validated through National Registry of Professional Certifications

## Scientific and technological monitoring at international level

- *Acquire and analyze scientific information*
- *Have a critical look on data*
- *Develop a network of scientific cooperation*

## Training and diffusion of scientific and technical culture

- *Report and communicate in several languages scientific work*
- *Teach advanced concepts and tools while adapting to various audiences*

## Supervision of teams dedicated to R&D, studies and prospective activities

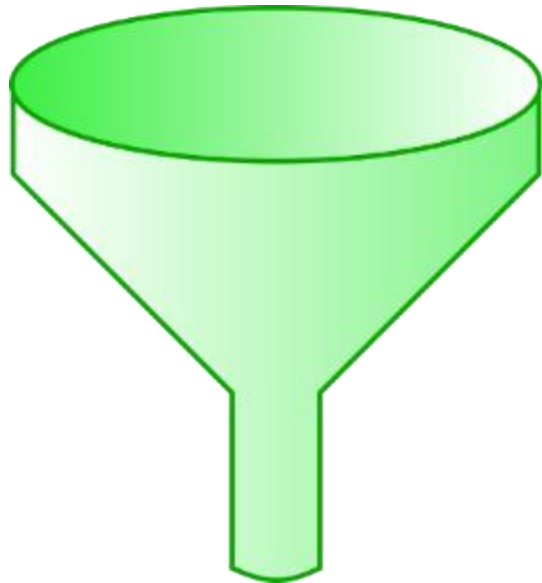
- *Animate a team in the context of complex tasks*
- *Build the steps necessary to stimulate the spirit of entrepreneurship within a team*
- *Identify key resources for a team*

The background of the slide is a photograph of an iceberg in a dark blue sea under a cloudy sky. The tip of the iceberg is above the water line, while the much larger, submerged part is below. The text is overlaid on the iceberg, with the visible part being 'RESEARCH FIELD' and the submerged part listing various skills.

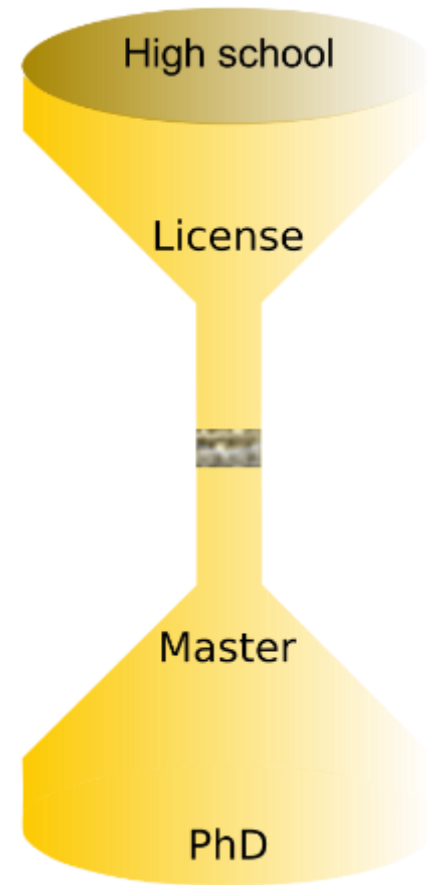
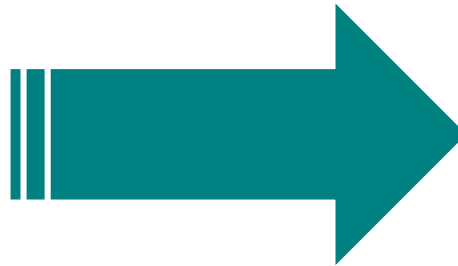
**RESEARCH  
FIELD**

**Autonomy  
Creativity  
Discipline  
Project management  
Adaptability  
Intellectual abilities  
Open-mindedness  
Pedagogy  
Curiosity  
Communication  
Listening**

**The practice of research brings to doctors a set of common skills that exceeds the apparent differences due to research field**



From a narrow view ...



... to a broad view of Ph.D. on skills

# A few resources on the topic (in French)

- The RNCP records for Ph.D. and the list of transversal skills:
  - [http://cache.media.enseignementsup-recherche.gouv.fr/file/Enseignement\\_superieur/50/7/fiches\\_RNCP\\_docteurs\\_pour\\_CNESER\\_915507.pdf](http://cache.media.enseignementsup-recherche.gouv.fr/file/Enseignement_superieur/50/7/fiches_RNCP_docteurs_pour_CNESER_915507.pdf)
  - I think you'll prefer a shorter link: <https://frama.link/RNCP>
- MyDocPro: A tool for representing skills associated with Ph.D.
  - <http://www.mydocpro.org/fr>



# A few ressources on the topic (in French)

- « Le doctorat à la loupe »: A very exhaustive guide about all facets of Ph.D. written by the CJC and the ANDès with support of the Ministry
  - <https://cjc.jeunes-chercheurs.org/doctorat-a-la-loupe/>
  - The specific guide (n°21) about cross-disciplinary skills developed during your Ph.D. : <https://cjc.jeunes-chercheurs.org/doctorat-a-la-loupe/fiches/FicheDoctoratALaLoupe-21.pdf>





## Could you now argue against these sentences ?

“Can doctors meet deadlines ?”

“You have done a Ph.D.... so you want a job in academia ?”

“Don't you think that all of the work you have done during your Ph.D. is irrelevant for this position ?”

“A Ph.D. is not suitable for private institutions, they are over-specialized”

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## Teacher

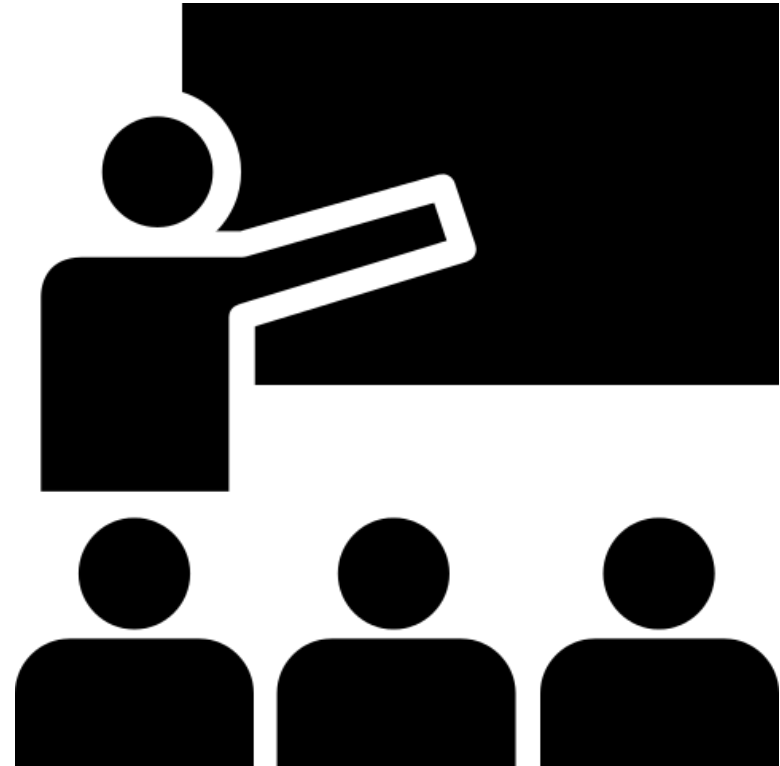
- Full professor
- Assistant professor
- Junior researcher (Post-doc)
- Ph.D. Candidate**

*Still registered at University*



## Student

- Master
- License
- High School



*Wikimedia Commons – PanierAvide*

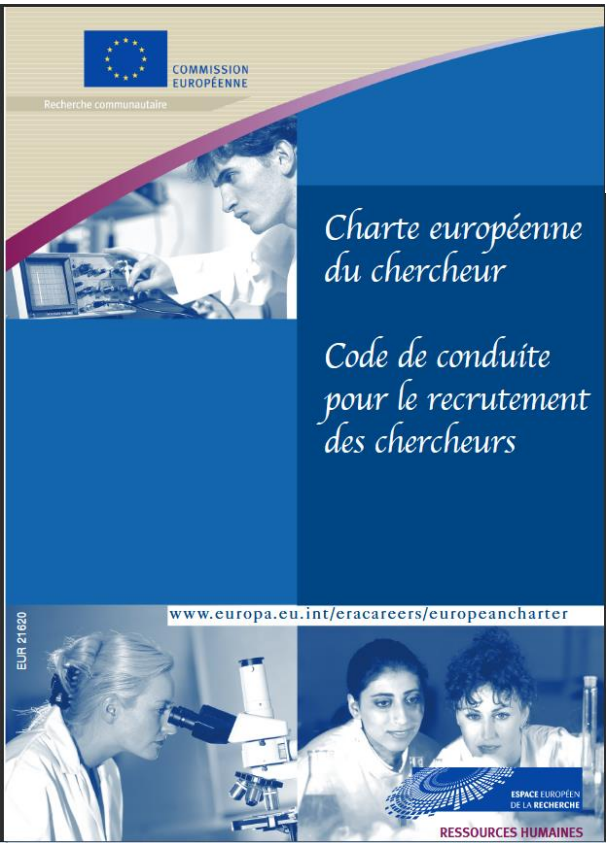


You **RECEIVE** knowledge

You **PRODUCE** knowledge

The Ph.D. candidate plays an active role in his research field, as he produces new knowledge

The Ph.D. candidate is an **Early Career Researcher**



- Le terme «chercheur en début de carrière»<sup>19</sup> fait référence aux chercheurs au cours des quatre premières années (équivalent plein temps) de leur activité de recherche, y compris la période de formation de chercheur.

- The term Early-Stage Researcher<sup>19</sup> refers to researchers in the first four years (full-time equivalent) of their research activity, including the period of research training.



# Why this specificity is important ?

As Ph.D. program is considered as the beginning of the career of researcher, **Ph.D. is a professional experience recognized by law**

This specificity is behind the wide range of cross-disciplinary skills associated with Ph.D.

- As a researcher in training, skills obtained by the Ph.D. candidate comes from both Ph.D. program and **ongoing training**

Typical example : During your researches, you face a problem which requires skills you still don't have. What should you do ?

Depending on the situation, you can try to master these skills by yourself...  
**... and this is part of ongoing training**

**You play an active role on your career and your training**



Ongoing training is part of the Ph.D. program through courses and trainings purposed by your doctoral schools, which can cover:

**Courses about your research field**, to get specific tools to deal with our project

**Courses outside of your research field**, to get informed about novelty in other fields, close or not

**General themed courses**, to deal with topics such as Open Access, patent regulation, soft skills...

Other skills can be obtained and be useful for your career (and also for your Ph.D.) :

Activities in parallel of your Ph.D. (teaching, expertise mission)

Participating in the life of your university through different councils (lab, doctoral school, university, ...)

**Participating to associative activities**  
(organizing social, cultural, athletic or professional events, related or not to your Ph.D.)

- All these cross-disciplinary skills are useful whatever the way you will choose at the end of your Ph.D.
- Being aware of your abilities and how you can improve it will always be useful (and will help you to fight against most of clichés about your work)
- Never hesitate to invest some time on other activities (concils of your doctoral school, associations,...): it will helps you during your Ph.D. and will be well considered later on



- Thanks to my friends from the A'Doc, CJC and ANDès, especially the ones who have reviewed this presentation !

# ... and thank you for your attention !

**Link to a feedback survey**



<https://goo.gl/forms/RpVAZUFtrXkOk0PkI>

**Link for retrieving the presentation  
(French & English)**



[https://nuage.asso-  
doctorat.org/index.php/s/fpDYzteZqqEYmeW](https://nuage.asso-doctorat.org/index.php/s/fpDYzteZqqEYmeW)