

How about a PhD?

PhD as a step towards an industrial job

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Industrial PhD

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What is a PhD
Why should I consider doing one?
What happens afterwards?



How about a PhD?

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<https://science.ku.dk/phd/>

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My PhD cv:

PhD from Univ Newcastle Upon Tyne, UK 1982

Supervised ~35 PhD students

Examined ~70 theses 16 uni's in 10 countries

Led PhD programme in Biotechnology "FOBI"

PhD coordinator (mentor) for 20-40 PhD students

Chair dept. PhD committee (~150 PhD students)

Chair faculty board 1 year, member 20 years

Typical PhD study 3(-4) years

Primarily a research project leading to novel results which are published as peer-reviewed papers.

The thesis can be a

- monograph
- a collection of papers + synopsis

Other training activities:

- Coursework typically 15-30 ECTS
- Teaching responsibility
- Stays in other labs at home or abroad, often industry – usually to support the research project



BestPass ESR (Phd students) at career seminar

Typical PhD study 3(-4) years



CerealPath ESR at course on biological control

PhD is awarded by a university but the candidate can be employed and work in industry or a research institute

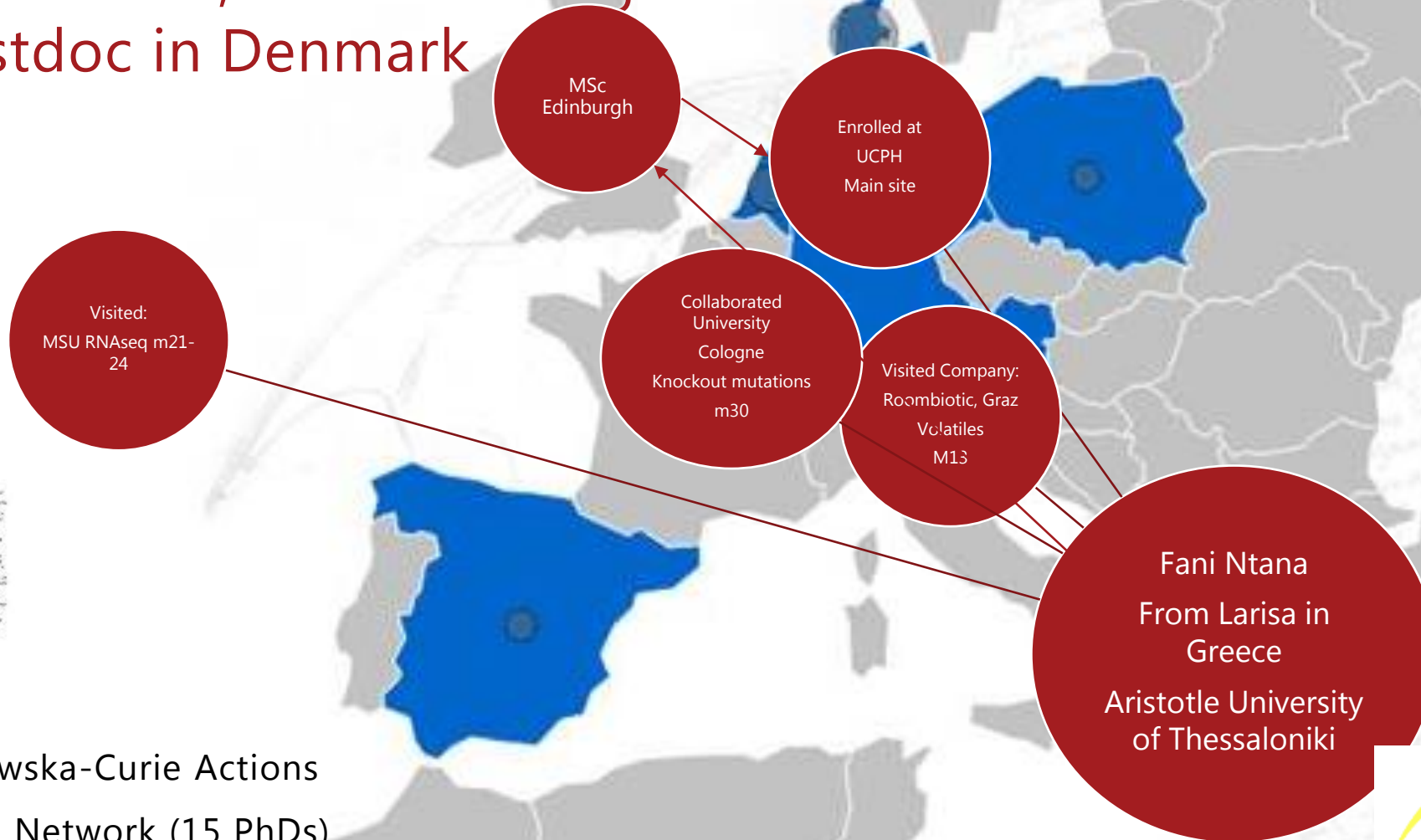
Many Universities require an accepted publication (*e.g.*, SLU) in the thesis.

Many have strict time limits (*e.g.*, DK)
Others require publications before acceptance (*e.g.*, Finland).

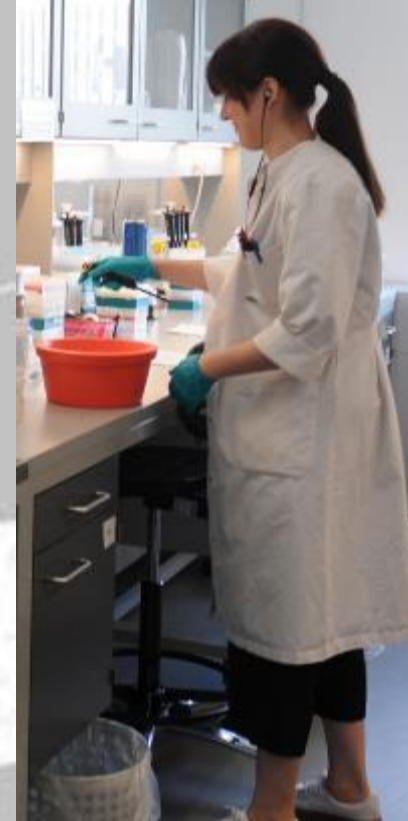
Usually an international committee
(therefore thesis & defence in English)

Not **necessarily** the case in large countries – but examiner(s) external.

Fani Ntana , from Greece,
BSc Thessaloniki, MSc Edinburgh
Now postdoc in Denmark

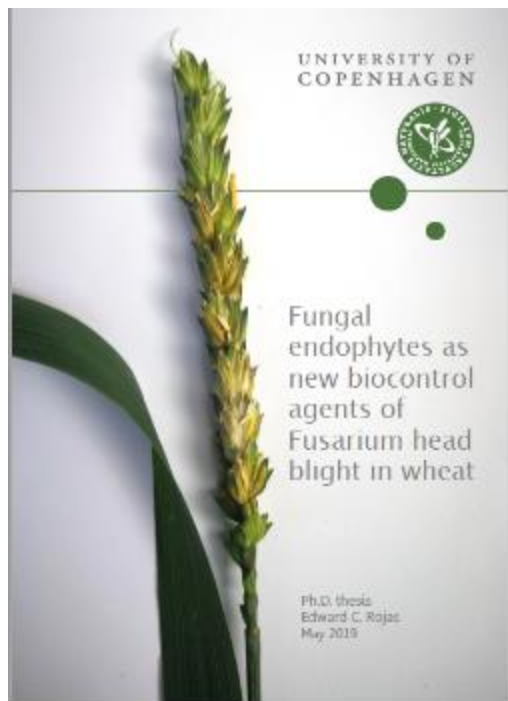


- Marie Skłodowska-Curie Actions
- Early Training Network (15 PhDs)
- Early Stage Researchers



Example

A PhD at UCPH (Edward Rojas) 2016 to 2019 Now a Scientist in industry (Chr. Hansen A/S, Denmark)



"CerealPath and BestPass received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreements No. 674964 and 676480, respectively" (cerealpath.eu & Bestpass.ku.dk)



Manuscript I:

Fusarium head blight modifies fungal endophytic communities during infection of wheat spikes.

Edward C. Rojas, Rumakanta Sapkota, Birgit Jensen, Hans J. L. Jørgensen, Tina Henriksson, Lise Nistrup Jørgensen, Mogens Nicolaisen & David B. Collinge. Submitted to *Microbial Ecology* 2019

<https://doi.org/10.1007/s00248-019-01426-3> (7 citations)

Manuscript II:

Selection of fungal endophytes with biocontrol potential against *Fusarium* head blight in wheat.

Edward C. Rojas, Birgit Jensen, Hans J. L. Jørgensen, Meike Latz, Pilar Esteban, Yuwei Ding & David B. Collinge. To be submitted to *Biological Control* 2019

<https://doi.org/10.1016/j.biocontrol.2020.104222> (14 citations)

Manuscript III:

Fungal endophyte *Penicillium olsonii* ML37 reduces *Fusarium* head blight via early plant defence activation of wheat spikes.

Edward C. Rojas, Birgit Jensen, Hans J. L. Jørgensen, Meike Latz, Pilar Esteban & David B. Collinge.

In preparation

Nearly ready to submit – September 2021

Book chapters

Fusarium diseases: biology and management perspectives

Edward C. Rojas, Hans J. L. Jørgensen, Birgit Jensen and David B. Collinge

In: *Integrated disease management of wheat and barley*. 2018. Burleigh Dodds Science Publishing.

Editor: Richard Oliver

<http://dx.doi.org/10.19103/AS.2018.0039.02> (6 citations)

Searching for novel fungal biological control agents for plant disease control among endophytes

David B. Collinge, Hans J. L. Jørgensen, Meike Latz, Andrea Manzotti, Fani Ntana, Edward C. Rojas and Birgit Jensen

In: *Endophytes: for a growing world*. 2018. Cambridge University Press.

Editors: Trevor Hodkinson, Fiona Doohan, Mathew Saunders and Brian Murphy

<https://www.cambridge.org/core/books/endophytes-for-a-growing-world/searching-for-novel-fungal-biological-control-agents-for-plant-disease-control-among-endophytes/F15546FBB300379D401FAC27BB3B4852> (22 citations)



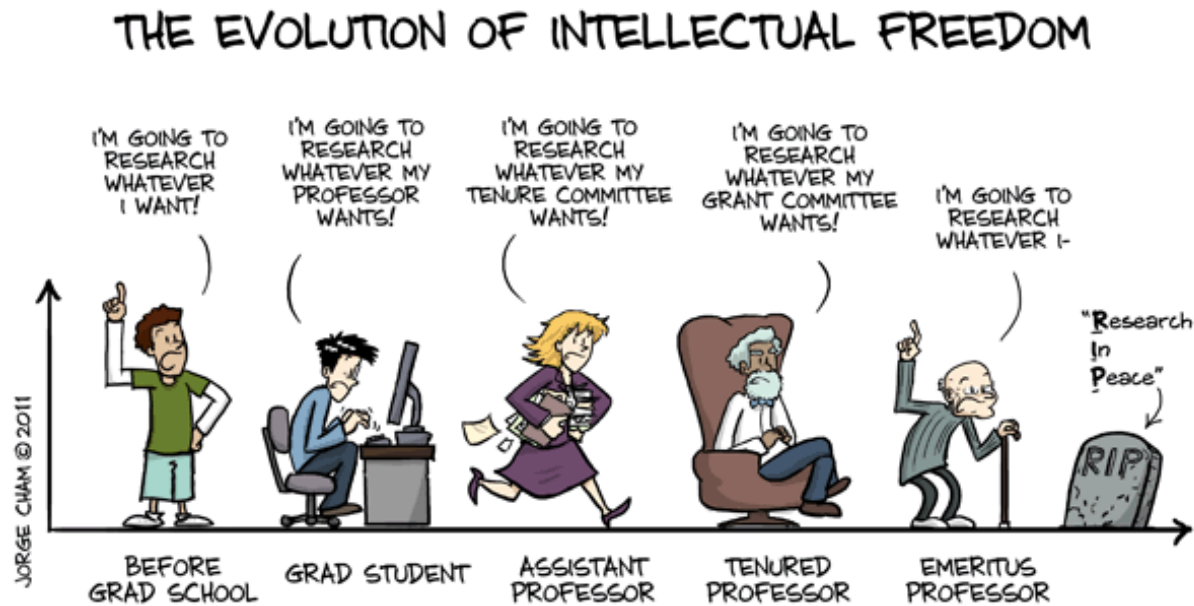
PhD defence 21-06-2019



Career planning

Research capacity is unlikely to increase – whether public or private.

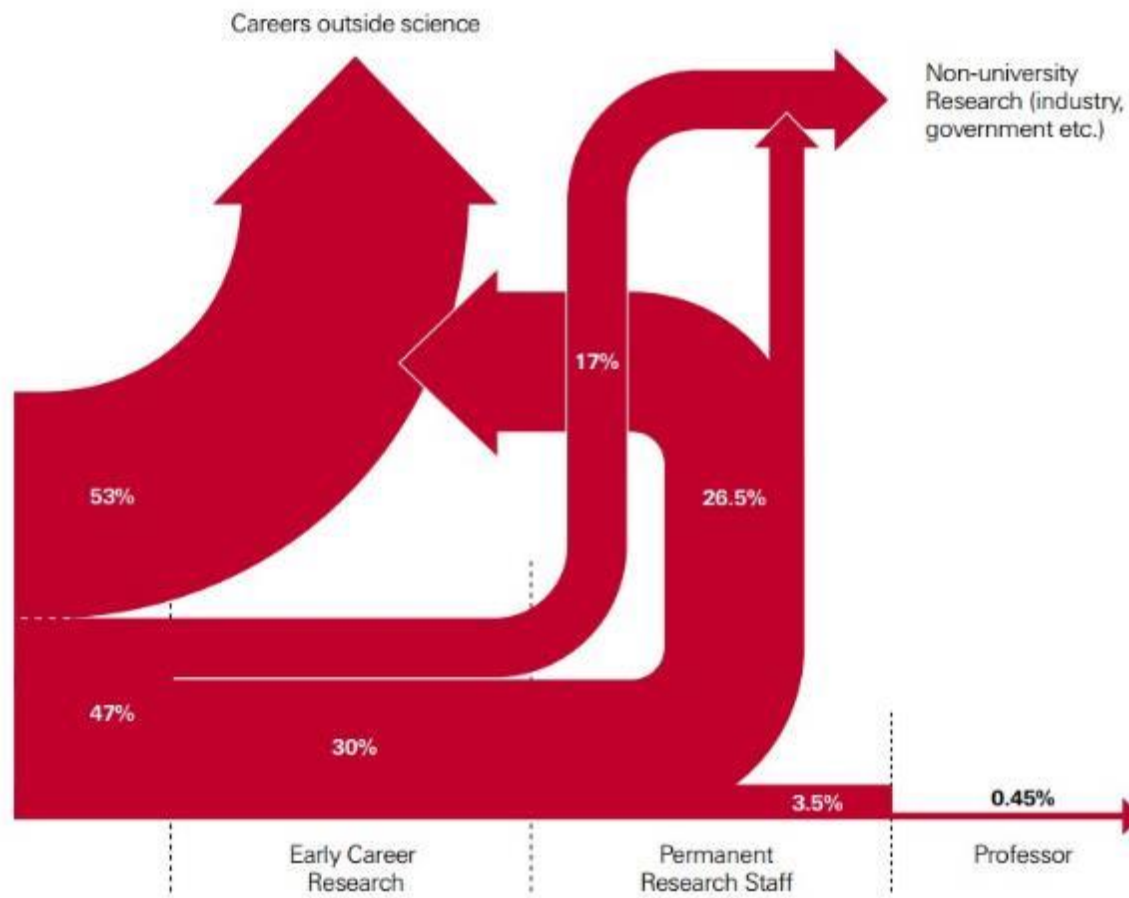
What can PhD graduates be used for otherwise?



WWW.PHDCOMICS.COM



Structure of university and research:



- Many consider their PhD training as first job rather than the essential apprenticeship in research.
- Some researchers see their PhD students as the most important dedicated cog in the research machine.
- Doing a PhD is a call: requires dedication
- Examples of jobs:
 - Research in academia and industry
 - Lab manager public and private labs
 - Problem solving and consultancy
 - Public administration
 - Tertiary education (college lecturer)
 - Entrepreneur

Industrial PhD



Linnea Stridh

- How to find a position
- Different from a regular PhD, in what ways?
 - Employment benefits
 - More flexible salary
 - Planning your time might be a challenge
 - Closer to the "real world"
- Interesting mix of tasks
- Preparing for both carriers



Important projects

- We need more company/university collaborations to create networks and share knowledge – Industrial PhD positions are important for this
- The science becomes more accessible with a larger outreach
- More efficient, solve applied problems



Some thoughts

- Research capacity is unlikely to increase – whether public or private.
- What can PhD graduates be used for otherwise?
- How can we ensure that the world outside becomes aware of the qualities that PhD graduates offer to the market.
- Recruitment manager for a Danish biotek international:

“I like to employ PhDs because they solve problems”

Do **not** do a PhD because you **think** you will earn more afterwards

Consider a PhD to learn how to do research and solve problems

- and in this area that is about making a sustainable future

Financing – there are many schemes

National fellowships, some allowing/ensuring international movement

Research Foundation Projects - +/- industrial participation.

International programmes such as Marie Skłodowska-Curie



Don't be scared of applying

The rewards are enormous – best (and worst) years of your life!

PhDs contribute to the international atmosphere in the department
(our section at PLEN, UCPH alone has (or had) MSCA PhD students from Canada, China, Colombia, Ethiopia, Germany, Greece, Italy)



BestPass: 15 ESRs (+ 3 Profs) Torun 4th June 2018

Do a SWOT to work out whether doing a PhD is for you!

E.g.

Strengths

- Strong academic profile
- Drive and commitment
- Ability to focus under adversity

Opportunities

- Interesting project
- Technology platforms
- Gain international experience

Weaknesses

- Do you match the project?
... Right scientific background.

Threats

- Chemistry with supervisors
- Supervisor relevance and conflict
- Too large cultural differences