

# Getting a Doctoral Degree (in Germany)

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# Agenda

- A. What is the doctor title?
- B. Why a doctor title?
- C. Ways to the doctor title
- D. More information

# A. What is the Doctor Title?

The **doctor title** is a (prestigious) academic title awarded for **scientific ability** demonstrated through presentation and successful defense of a **dissertation**

The actual title varies by academic discipline and study program

- Dr.-Ing. (engineering), Dr. rer. nat. (natural sciences), ...
- Dr.-Ing. for individual studies, Ph.D. for structured program, ...

You should be research-minded (Ph.D.), not business-minded (M.B.A.)

## B. Why a Doctor Title?



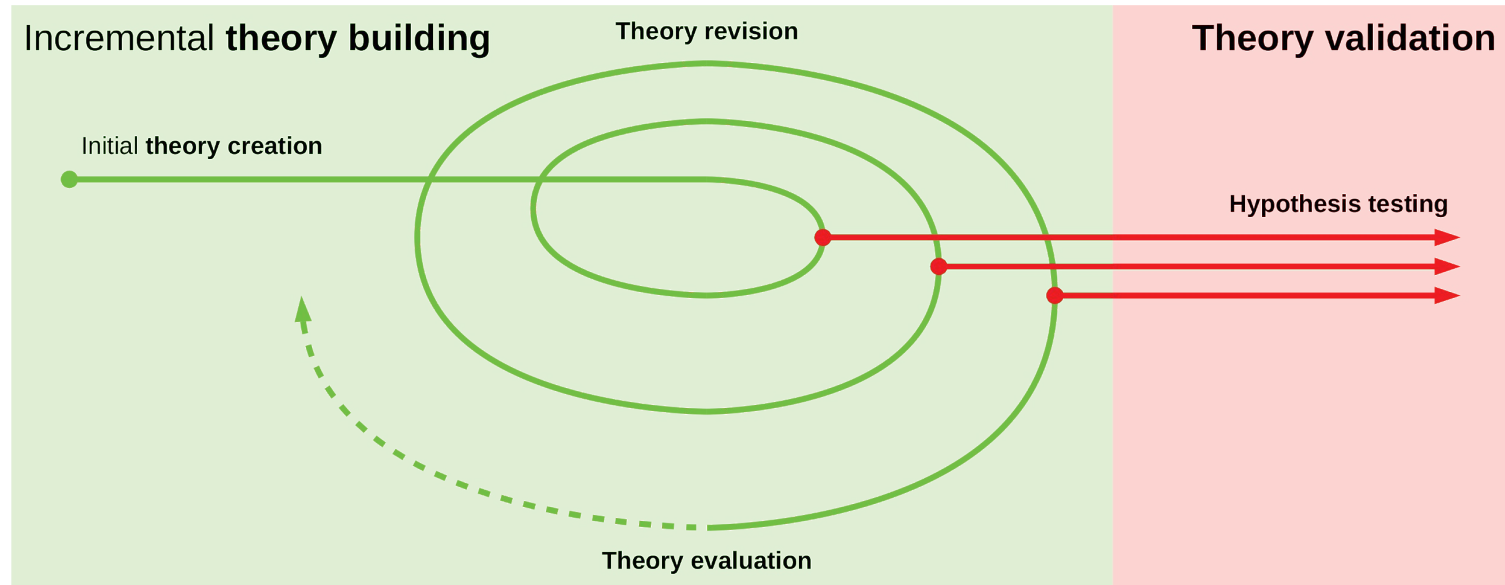
*"Sometimes I wonder if there's more to life than unlocking the mysteries of the universe."*

You ...

- are curious about a topic or field and want to research it in depth
- want to have a lasting impact, contribute to progress
- want to become a professor and enjoy academic independence
- need to qualify for a job like a chemist, medical doctor, or lawyer

# You Have to Perform Scientific Research

Science: The process of creating knowledge (theories) to reliably predict the future



Not drawn to scale or effort involved





# The Results of Hard Work

## The Patch-Flow Method for Measuring Inner Source Collaboration

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### ABSTRACT

Inner source (IS) is the use of open source software development (SD) practices and the establishment of an open source-like culture within an organization. IS enables and requires developers to collaborate more than traditional SD methods such as plan-driven or agile development. To better understand IS, researchers and practitioners need to measure IS collaboration. However, there is no method yet for doing so. In this paper, we present a method for measuring IS collaboration by measuring the patch-flow within an organization. Patch-flow is the flow of code contributions across organizational boundaries such as project, organizational unit, or profit center boundaries. We evaluate our patch-flow measurement method using case study research with a software developing multi-industry company. By applying the method in the case organization, we evaluate its relevance and viability and discuss its usefulness. We found that about half (47.9%) of all code contributions constitute patch-flow between organizational units, almost all (42.2%) being between organizational units working on different products. Such significant patch-flow indicates high relevance of the patch-flow phenomenon and hence the method presented in this paper. Our patch-flow measurement method is the first of its kind to measure and quantify IS collaboration. It can serve as a base for further quantitative analyses of IS collaboration.

### ACM Reference Format:

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### 1 INTRODUCTION

Open source software plays a key role in today's software industry. Open source (OS) development tools help to build software and open source components are used as part of proprietary software products. OS is recognized to be capable of delivering high quality software [5]. The software industry has shown a significant interest in benefiting not only from OS's outcomes (the software components and tools) but also from the adoption of software development (SD) practices exercised in the OS world [30].

The "use of open source [SD] practices and the establishment of an open source-like culture within organizations" is called inner source (IS) [2]. While IS SD is similar to and shares attributes with OS SD, IS opens up the development only internally within the environment of one organization [7]. In addition to the interest of the software industry, the research community has shown interest in IS as a research topic indicated by a steady stream of scientific

## Corporate Open Source Governance of Software Supply Chains

Open Source Governance der Software-Lieferketten in Firmen

DER TECHNISCHEN FAKULTÄT  
DER FRIEDRICH-ALEXANDER-UNIVERSITÄT  
ERLANGEN-NÜRNBERG  
ZUR  
ERLANGUNG DES DOKTORGRADES  
  
DOKTOR-INGENIEUR (DR.-ING.)

VORGELEGT VON

NIKOLAY HARUTYUNYAN





## C. Ways to the Doctor Title

1. The basic process
2. Funding your doctoral studies

# 1. Basic Process

- a. Preconditions
- b. Choose (type of) doctoral studies
- c. Perform and present research work
- d. Write, submit and defend a dissertation

Success! You are a Dr. (or Ph.D.) now

# 1.a Preconditions

A Master's degree with sufficient credit points in the discipline

- The Master's degree can be equated to the (anglo-saxon) “qualifying exam”
- There is (almost) no program that lets you go from Bachelor to Ph.D.

# 1.b Choose Type of Doctoral Studies [1]

- Individual doctorate (Individual-Doktorat)
  - Individual doctoral studies under the guidance of a professor (default case in Germany)
- Structured doctoral programs [2]
  - Graduate school (Graduiertenkolleg)
    - Doctoral studies in a group (“school”) including classes and multiple professors
  - (Structured) Ph.D. program (Ph.D.-Programm)
    - Full-blown program of study with time-line etc.
- Implies that a professor signs off on you getting accepted for doctoral studies
  - Does not imply you get any funding

[1] More at [Ways to the Doctor title](#)

[2] Also see FAU's [structured doctoral programs](#)



# 1.c Perform and Present Research Work

## Perform research work

- Define a research project and answer a research question
- Typically under guidance and supervision by a professor
- Using appropriate (established) research methods

## Present research work

- Publish work results (write “papers”)
- Typically (not necessarily) with professor as co-author
- Engage in scientific community

# 1.d Write, Submit, and Defend a Dissertation [1]

## Writing a dissertation

- As sole author, write a research monograph (the “dissertation”)
- You can typically draw on your research projects

## Submit and defend the dissertation

- Present the work (summarized by the dissertation)
- Defend it to (from) your promotion committee

# Example 1: Research Career

- Research question
  - How and why do people contribute to open source projects?
- Project funding
  - DFG Sachbeihilfe
- Research methods
  - Qualitative survey, descriptive survey, Delphi policy study
- Duration of studies
  - 6 years
- Career choices
  - Academic; in process of moving to U Calgary as an assistant professor
- Other
  - FAU internal education



# Example 2: Industry Career

- Research question
  - How to manage the open source software supply chain?
- Project funding
  - Industry funding
- Research methods
  - Qualitative survey, action research, case study research
- Duration of studies
  - 3 years
- Career choices
  - Industry; in the process of moving out
- Other
  - Softwarecampus, FAU education





## 2. Funding an Individual Doctorate

- Through a job at the university (research fellow / wiss. Mitarbeiter:in)
  - Employed by the professor to work on a project
  - Challenge: Aligning the job with the dissertation
  - Benefit: Serious salary! Not a stipend
- Self-sponsored (job, family, ...)
  - The alignment challenge increases
  - So-called external doctoral student

# Example 3: Entrepreneurship

- Research question
  - How to integrate microservices?
- Project funding
  - Combined public and industry funding
- Research methods
  - Qualitative survey, action research, case study research
- Duration of studies
  - Started in 2019
- Career choices
  - Interested in moving out with startup after finishing
- Other
  - Softwarecampus



# Example 4: Open Prospects

- Research question
  - How to more reliably determine software system requirements?
- Project funding
  - Combined public and industry funding
- Research methods
  - Design science: structured literature review, action research
- Duration of studies
  - Started in 2019
- Career choices
  - Too early
- Other
  - Software campus



## D. More Information

1. Career prospects
2. Questions and answers
3. Our research group



# 1. Career Prospects

- Scientist
- Salaryman
- Entrepreneur
- Will figure it out

## 2. Questions and Answers

1. How long will it take me to finish a dissertation?
2. How will I find the time to focus on my dissertation?
3. How to get a Mitarbeiter:innen job / get into a program?
4. Can I get a doctor title while working in industry?
5. Can I work with industry while getting the title?
6. How much teaching will I have to do?
7. Does the Corona crisis change anything?
8. How to learn about open Mitarbeiter:innen positions?

### 3. More Information

General information about our group

- [Our website / blog](#) (overview)
- [Recent dissertations at my group](#)
- [Our course on performing research](#)

Research projects (we are hiring!)

- Empowering software users through open source foundations
- [A world in which access to open data is easy, reliable, and safe](#)
- Open source distribution complexity (Linux, ROS, cloud stacks)



# Contact Information

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