Formalize or Improvise
Best Practices for Ph.D. projects

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My background

• PhD student (1992-1997) at Leiden University, Netherlands
  – Spent 1 year in UK (Oxford and Imperial/London)
• Visiting Researcher in Melbourne (Austr), Lille (France)
• Supervisor to 14 PhD students
  TU Eindhoven & Leiden, Netherlands, Sweden
• External examiner (15 Ph.D. students)
  Finland, France, Sweden, U.K, ..
• Currently:
  – Managing 9 lecturers from Uganda as Ph.D. students in Sweden
Different Constellations

• **Topic wise:**
  – Formal methods – Empirical SE – Start-up’s

• **Sandwich students**
  – Industry – University
  – Uganda – Sweden

• **Part-Time student**
  – Teaching at Polytechnic (3 days) and doing research (2 days)

• **Co-supervision**
  – Uni-Spain – Uni-Netherlands
  – Uni-Australia – Uni-Sweden
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<tr>
<th><strong>Netherlands</strong></th>
<th><strong>Sweden</strong></th>
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<tr>
<td>• 4 year</td>
<td>• 5 (4+1) year</td>
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<td>• 1 mandatory seminar/year</td>
<td>• Mandatory 40-60 EC over 4 years</td>
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<td>• Only starts if 4 years of funding are available at start of project</td>
<td>• Mandatory: ‘examiner’: person that performs QA on project – from day 1.</td>
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<td>• IT-system for monitoring progress</td>
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<td>• Yearly progress meeting</td>
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NL-BP: Common Training Schools

• Universities in Netherlands share graduate schools around broad thematic areas
  – Programming & Algorithms, HPC & Imaging, AI & Knowledge systems

• These schools organize one 3-day and one 5-day thematic training week each year
  + Pooling of resources
  + Exposure to other research groups / views on research area
Best Practices: Recruitment

• Never ever do alone – also not if you are a very experienced professor
• Invest time in top candidates
  – Ask them to perform representative tasks during interview visit (summarizing/writing, analyzing, presenting)
• Pay attention to personality-match between candidate and supervisor
  – Esp. communication-match
• Teach PhD students how to recruit!
Best Practices: Research Design

• “Shoot for the stars” & Low hanging-fruit

• Think: Portfolio, Risk and Return
SW-Best Practice: Examiner

- At the start of a project, the supervisor needs to appoint an ‘examiner’ – an independent third party looking at the PhD-project.

  Ideally in same working-environment
  (informal chat at coffee-machine)

The duties of this examiner are:
- quality assurance
  - monitor progress
  - identify bottlenecks
  - benchmark against other supervisors
- solve disputes
- increases ‘transparency’
Social embedding of PhD students

• Social Networking
  – In academic community
    - student volunteering at conferences
    - summer schools
    - in ‘office’ community research group

• Senior PhD students mentor novice PhD students
  – In ‘local’ culture (housing, recreation, …)
  – ‘hanging-in there’ / mobilizing social-support
  – Dealing with supervisors
Training / Personal Development

• Ph.D. student
  – Look at needs of individual
    • Technical or soft-skills
    • Networking

• Supervisor
  – “Get feedback early and often”
    – but from whom?
    – organize ‘intervision’?
    – select your own training/mentor
Best Practice

• Ph.D. examination:
  – Have both public and closed examination

  – Public examination is always more ‘polite’ / can be short

  – Feedback for supervisor from external examiner
Summary & Final Remarks

- Wide range of constellations* require tailoring to needs
  
  *: background, duration, funding

- Hardly ever ‘economies of scale’: numbers are too small

- Best Practices:
  - Joint schools
  - Examiners
  - Organize feedback for supervisors

- Post-PhD career-stage of Postdoc is **harsh**

  Can we do anything as a community/industry to improve this?
Ph.D. students supervised/in progress:

- Arif Nurwidiantoro (Joint with Prof. Jon Whittle, Monash Univ, Australia), started summer 2017, working topics: automated program understanding & algorithmic bias.
- Truong Ho Quong, started March 2014, working topic: A study of UML practices in open source projects, Gothenborg Univ.
- Dave Stikkolorum (part-time: started 2010-planned 2018), Didactics of teaching software design, Leiden University
- Ana Fernandes Saez (joint with Marcela Genero, Ciudad Real; expected Q2 of 2018), Studying the effect of modelling in software Maintenance, Leiden University
- Bilal Karasneh, An online corpus of UML Design Models: construction and empirical studies, 7 June 2016, Leiden, Netherlands
- Hafeez Osman (Governement of Malaysia), Interactive scalable condensation of reverse engineered UML class diagrams for software comprehension, defence: March 2015, Leiden, Netherlands
- Werner Heijstek (CapGemini funded), Architecture Design in Global and Model-centric Software Development, defence: 5 Dec 2012, Leiden, Netherlands
- Ariadi Nugroho (Finesse, LIACS), The Effects of UML modelling on the Quality of Software, defence 21 October 2010, Leiden, Netherlands
- Egor Bondarev (TUE, Space4U, joint with Peter de With, Johan Lukkien); defence 22 december 2009 Design-Time Performance Analysis of Component-Based Real-Time Systems
- Christian Lange (TUE, Empanada); Assessing and Improving the Quality of Modeling, defence 24 October 2007, Eindhoven, Netherlands.
- Giovanni Russello (TUE, SACC, joint with Maarten van Steen); Separation and adaptation of concerns in a shared data space, defence: 2001 - 27 June 2006, Eindhoven, Netherlands

Co-supervisor to:

- Mohamad Mousavi (TUE, SACC, joint with Michel Reniers), Ph.D. defence: 26 September 2005
- Evgeni Eskenazi (AIMES, with Dieter Hammer), defence: Fall 2004
- Alexandre Fioukov (AIMES, with Dieter Hammer), defence: Fall 2004