

# Thesis Projects

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# Thesis Projects

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# Industry Thesis Projects

- **Pro:**

- Get in contact with the real world early
- Meet your future employer, build your network
- Test your knowledge and abilities
- English is often company language or otherwise accepted

- **Cons:**

- Requires more effort and time than academic projects since jobs are usually not tailored for thesis projects
- Two processes and two “bosses”: processes and supervisors in industry and at the university with different requirements and (possibly) contradicting interests/goals
- Usually no payment for industry thesis projects in Sweden

# Requirements of Linnaeus University

- Formal and take time from the actual project
- **Thesis course:**
  - Take classes in scientific methods
  - Report and discuss progress with teachers and students
- **Thesis proposal:**
  - Agreement between supervisor and student
  - Must then not be changed by either of the parties alone
- **Thesis defense:**
  - Report achievements (oral)
  - Argue for your approach and solutions in a discussion
- **Thesis report:**
  - Document achievements (written)
  - Includes results of discussion from the defense
  - This is what you get your grade for (you don't get any grade for customer satisfaction).

# Thesis proposal

- Needs to be defined in agreement with **both** supervisors.
- **Problem**: what's to address in the project?
- **Goal** and **success criteria**: what should be reached and how would I measure the success?
  - On Master's level: scientific questions
  - Could differ from the goals and objectives in the company
- **Scientific questions**: what is scientifically interesting
  - Could be the goal or the method
- **Motivation**: why are the problem/scientific questions worth thinking about?
  - Cant we take an off-the-shelf solution?
- **Plan**: What are tasks, milestones, deliverables?

# Thesis defense

- Invite your supervisor from industry but, in fact, it's an academic exercise
- **Presentation** of
  - Problem, goal, criteria, scientific questions, motivation, ...
  - Solution, answers with validation and proofs
- **Answer critical questions** from
  - an opponent who has read the preliminary thesis report (usually, you will be asked to be the opponent for another thesis on this occasion)
  - a general audience

# Academic Thesis report for the IT subjects

- **Introduction** (the revised thesis proposal)
  - Your thesis proposal goes here
  - Structure of the thesis
- **Basics**
  - Explain the theory if necessary
  - Introduce the definitions and notions needed
- **State of the Art**
  - Refine success criteria such that they become directly measurable
  - Measure how others have tried to achieve the same goal using to your refined criteria
- **Main:**
  - Document your method
  - Document your analysis/design/solution/answers to the scientific questions
  - Describe a prototype implementation if applicable
- **Validation and proofs:**
  - Defend analysis/design/solution/answers against the refined measurable objectives
- **Conclusion & Future work**
  - Conclusions relate back to the goal and point to the solutions in the Main part
  - Future work discusses ideas you cannot follow because of the restricted time
- **Appendix** e.g., further documentations of the software, theory if needed

# What's interesting for industry in an academic Thesis report

- Introduction (the revised thesis proposal)
  - Your thesis proposal goes here
  - Structure of the thesis
- Basics
  - Explain the theory if necessary
  - Introduce the definitions and notions needed
- State of the Art
  - Refine success criteria such that they become directly measurable
  - ~~■ Measure how others have tried to achieve the same goal using to your refined criteria~~
  - **Explain what others have done to achieve the same goal**
- Main:
  - Document your method
  - **Document your analysis/design/solution**/answers to the scientific questions
  - **Describe a prototype implementation if applicable**
- Validation and proofs:
  - Defend analysis/design/solution/answers against the refined measurable objectives
- Conclusion & Future work
  - Conclusions relate back to the goal and point to the solutions in the Main part
  - Future work discusses ideas you cannot follow because of the restricted time
- Appendix e.g., **further documentations of the software**, theory if needed



# Requirements of Industry

- In general, no formal requirements
- Instead, requirements are informal usually not outspoken and company / task specific, i.e., depend on the company and its interests
- Interests could be very diverse:
  - Project results (program, prototype device)
  - Documentation of an explorative study – usually only a minor part of a thesis
  - Getting in contact with students as (future) customers
  - Getting in contact with supervisors as part of the marketing strategy
  - Assessment of students for hiring
  - ...
- Ask your host company what's important for them!
- For sure: requirements of industry differ from the formal requirements of university

# My interests as a Professor ...

- ... to supervise thesis projects with industry:
1. Get in contact with a potential applied research project partner to eventually file funding proposals
  2. Support a research project partner in a common project
  3. Understand the state of the art in solving real world problems in industry to improve my teaching and/or research
  4. Validate my research in industry
- ...

# My interests as a Director ...

... to supervise thesis projects with university:

1. Recruit the right people
2. Explore new technologies and train my staff
3. Get cheap work force for tasks which are not mission critical
4. Get in contact with a researchers in the field
5. Win the university as a customer

...

# Finding such a project ...

- ... takes time and requires duration
  - Don't wait until the thesis project courses start
  - Obey holidays in your time plan
  - Can take a bunch of e-mails, calls and time
- You find a project that is announced jointly by university and industry:
  - Fine, no conflicts of interest to start with
- You find a project idea outside university which you seek to get approved and supported by a university supervisor
  - Ask yourself: what's in the interests of a potential supervisor / researcher / professor?
  - E.g., connections to the research / teaching activities of this supervisor. Check the homepages for publication topics.
- You find a project idea within university and seek an industry partners
  - Ask the potential supervisor at university for industry connections
  - Ask yourself: what's in the interests of a potential company?
- Mind "It would be interesting (for me/us)" is not a valid answer

# Along the way ...

- Its your venture – so you have to drive it!
- Don't waste your time
  - A day you lose at the beginning of the project hurts just as much as a day you lose towards the end
- Your first priority: to get the MSc/BSc degree
  - Therefore, you need to keep up the communication with your university supervisor
  - Especially, report deviations from the thesis proposal and problems in the project early
- You want the industry project to become a success otherwise the additional effort is just wasted
  - Therefore, you need to keep up the communication with your industry supervisor
  - You cannot drop out and go back to such a project just like to any other university course
  - You will be seen like a employee rather than a student: misbehavior leads to dismissal

# Between us immigrants

- **People are different**  
in their general views, religion, temperament, ...
- Understand that there are things
  - acceptable in your home country and inappropriate here
  - and vice versa
- Respect the people here and you will be respected likewise
- Expecting and accepting differences is half the way to avoid disturbances and conflicts
- Swedish are very nice people, reluctant to criticize, which does not mean that they are always happy with your performance and achievements
- Develop “sensors” to read your colleagues’ /supervisors’ feedback even if not given boldly and explicitly

# Do's and Don'ts

- You represent Linnaeus university
  - Be proud of your education:
    - You are generally well-prepared for industry jobs
    - Disrespectful remarks about the university, your fellow students and your teachers fall back on the university but most of all on yourself
  - Don't think that you know everything:
    - Never underestimate practical and theoretical knowledge in industry
    - You cannot gain experience by studying and certain issues are hardly addressed in your education (issues with scalability, special customers, legal issues)
    - Be ready to learn!
- You represent the company, as well
  - Your project may contribute to Linnaeus university's (your university supervisor's) impression of the company you work for
  - This holds even more so if your thesis project is the first contact between Linnaeus university and that company, which maybe is your future employer

# Some useful pointers

- IEC, a cluster of IT companies and IT@Lnu  
<http://iec2020.se>
- IT companies in Småland region of Sweden  
<http://iec2020.se/medlemsforetag>
- You want to join Kodkollektivet  
<https://kodkollektivet.se>
- You want to be friends with Diana Unander Nordle: [diana.unandernordle@lnu.se](mailto:diana.unandernordle@lnu.se)