

An aerial night photograph of the TU/e campus in Eindhoven. The image shows several modern buildings with illuminated windows, surrounded by trees and city lights. A semi-transparent red banner is overlaid on the bottom half of the image, containing white text.

Q&A – Internship and graduation project

Master's program Electrical Engineering

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Contents

- General information on internship and graduation (duration, when to start, registration)
- Finding a project
- Going abroad
- Contracts (Company, NUFFIC, NDA, IP)
- Assessment
- Questions

Disclaimer

This presentation is based on the study guides of internship and graduation. In the end, the texts in both study guides are leading

General information

Internship

- Small research project (15 EC) on an Electrical Engineering topic
- Learn how to do a research project in a scientific way
- Opportunity for industrial or international experience
- Always under the responsibility of an EE staff member (TU/e supervisor)
- Can be done inside (research group) or outside (company or abroad) the department of EE.
Note: former hbo graduates do the internship within the research group (inside)!

General information

Graduation project

- Large research project (45 EC) on an Electrical Engineering topic
- Apply your acquired knowledge, competences and skills in the final project
- Graduation project within the research group based on your specialisation
- Always under the responsibility of an EE staff member (TU/e supervisor)
- Can be done inside (research group) or outside (company or abroad) the department of EE.

General information

Internship versus graduation

- Internship and graduation projects should be treated as separate projects (but can be within overall bigger research project).
- You can also take the internship in another research group than your graduation project: broaden your horizon 😊.
- Internship comes before graduation: finish internship before you start your graduation project

General information

Are you doing a double diploma?

- Only one internship is required, either within EE (EE topic) or within the other Master's program, or a combination. Always check the other Master's program's regulations if it is mandatory to do the internship within the other program
- Graduation project: typically combined, although separate graduation projects are possible.
Check the education guide for more information on the (combined) graduation project:

<https://educationguide.tue.nl/programs/internal-double-diploma/>

Duration

Duration internship

- Internship: $15 \text{ [EC]} * 28 \text{ [hrs/EC]} = 420 \text{ [hrs]} / 40 \text{ [hrs/wk]} = \mathbf{10,5 \text{ weeks}}$
Extension internship: $5 \text{ [EC]} (=140 \text{ hrs}) = \mathbf{3,5 \text{ weeks}}$

Former hbo graduates (no extension possible):

Internship: $10 \text{ [EC]} * 28 \text{ [hrs/EC]} = 280 \text{ [hrs]} / 40 \text{ [hrs/wk]} = \mathbf{7 \text{ weeks}}$

Duration graduation

- Graduation: $45 \text{ [EC]} * 28 \text{ [hrs/EC]} = 1260 \text{ [hrs]} / 40 \text{ [hrs/wk]} = \mathbf{31,5 \text{ weeks}}$
Students starting the master in 2016 and 2017: graduation: $40 \text{ [EC]} = \mathbf{28 \text{ weeks}}$

Double diploma: $60 \text{ [EC]} * 28 \text{ [hrs/EC]} = 1680 \text{ [hrs]} / 40 \text{ [hrs/wk]} = \mathbf{42 \text{ weeks}}$

Duration

Internship

- Calculations based on fulltime work week (40 hrs)
- Part-time is possible but with good reason, discuss with your supervisor(s). Indicate part-time when filling in the registration form
- Examination Committee checks duration of the internship project, therefore always mention if you have breaks or work part-time, because the total duration of the internship will be longer
- Double diploma: the “longest” internship counts:
internship at EE is 15 EC, internship at BME is 20 EC, then the internship should be 20 EC

Duration

Graduation

- Calculations based on fulltime work week (40 hrs)
- Part-time is possible but with good reason, discuss with your supervisor(s). Indicate part-time when filling in the registration form
- In case you take breaks or holidays, add the number of weeks to the total duration when registering and also mention the breaks with dates
- Examination Committee checks duration of the graduation project, therefore always mention extra time or working part-time, because the total duration will be longer

Postponing the end date

In case of circumstances (personal or project-related)

Internship

- ≤ 1 month: discuss and arrange with EE supervisor (and external supervisor)
- >1 month: Extensions or delays need approval from the Examination Committee

Graduation project

- Send a request to the Examination Committee with motivation from EE supervisor
- At least 1 month before the original (planned) end date
- Maximum of 2 months extension can be allowed

Registration

1. Register for internship, extension and graduation via Osiris Student using the course code

- Internship: course code [5I015](#) **Internship 15 ects**
Internship extension: course code [5I005](#) **Extension internship**
- Former hbo graduates: course code [5I010](#) **Internship 10 ects** (no extension possible)
- Graduation: course code [5G045](#) **Graduation Project 45 ects**
- Double diploma: course code [5EEIDD30](#) **Combined graduation project 60 EC**

Registration

2. Register for internship and graduation via the registration form

- Register the internship via the [internship registration form](#)
- Register the graduation via the [graduation project registration form](#)

Note:

Registration can be done throughout the academic year. It is not necessary to register before a (quarterly) registration deadline (this is only for courses and exams)

When to start

Master's program of Electrical Engineering		credits
Year 1: 60 credits	Core courses	15
	Specialization electives	10
	Free electives	30
	Professional development	5
Year 2: 60 credits	Internship	15
	Graduation project	45



When to start

Internship

- Independent of quarter: every week, every day, even in summer period
- Discuss start date with your supervisor(s)
- No requirement to have all the courses finished, but supervisors can expect specific courses to be finished/followed before starting the internship (prior knowledge)

Graduation project

- Independent of quarter: every week, every day, even in summer period
- Discuss start date with your supervisor(s)
- A maximum of two electives may be open, but all other study components of your study program have to be completed!
- Your study program must have been approved by the Examination Committee

Finding a project

How to find a project (internship and graduation)

- Master Marketplace
- Websites of research groups
- Company
- Supervisor
- Abroad

Master Marketplace

- Contains mostly projects carried out inside the research groups
- Contains both internship projects and graduation projects
- <https://master.ele.tue.nl>

Published graduation projects

ALL PROJECTS

FAVORITE ONLY

Copy

CSV

Print

Clear filters

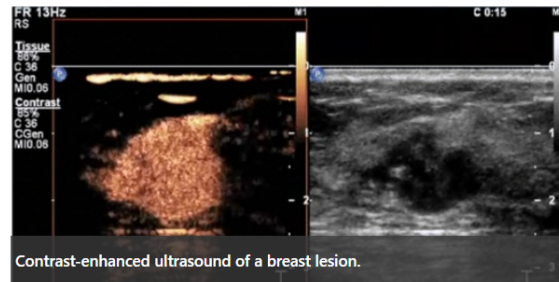
Show 100 entries

Search:

★	↑ Name	Research group	Responsible staff	Assistants	Specialization Path	End date visible	Progress
	Type to filter	Select value	Select value	Select value			Select value
★	Secure Firmware Design for IoT	ES	Nelson, Andrew	• Koedam, Martijn	Any	None	Project is reserved
★	Semiconductor laser simulation and design	PHI	Bente, Erwin		Any	None	Not yet started
★	Design optimization of a sweat sensing device for patient monitoring	SPS	Peri, Elisabetta	• Turco, Simona	Any	None	Not yet started
★	Learning and Control Design for Compensation of Machine Frame Dynamics	CS	Schoukens, Maarten	• Toth, Roland	Any	None	Project is being executed
★	Reconfigurable efficiency-aware EMI filters for smarter power conversion	EES	Serra, Ramiro		Any	None	Not yet started
★	Interface-Photonics Design for Real-time Computing Applications	ECO	Stabile, Patty		Any	None	Not yet started
★	Optimizing the Ink Drying Process of High-end Digital Printer Systems	ES	Geilen, Marc		• ES in 2019-2020	None	Project is being executed

Advanced contrast-enhanced ultrasound techniques for improved diagnosis of breast cancer

By Mischi, Massimo



General description

Breast cancer is a major threat to women's health. Although few functional and molecular imaging modalities, such as MRI, CT, and PET, have been used in diagnosing breast cancer, they are relatively expensive, not widely available and/or use ionizing radiation. As an alternative imaging modality, ultrasound (US) has several advantages, e.g. low cost, flexibility, wide availability, high spatial and temporal resolution. Currently, US is mainly used as a complementary examination for diagnosing breast cancer, partly due to its limited capacity in distinguishing malignant and benign breast tumors. Apart from the B-mode ultrasound, which visualizes morphological information of breast tumors, several functional ultrasound modalities have been investigated, including elastography, Doppler, and contrast-enhanced ultrasound (CEUS). These functional modalities offer several quantitative parameters that can be used as biomarkers. Previous studies have shown that the incorporation of these functional modalities can extensively improve the diagnosis of breast cancer. In particular, although based on qualitative studies, CEUS has shown great promise for the detection of malignant breast lesions. In CEUS, microbubbles are injected into the bloodstream as contrast agents to visualize the blood perfusion patterns in tissue. These may reflect the presence of cancer angiogenesis, i.e., the formation of a dense and irregular network of microvessels feeding the tumor.

Type: Graduation project

Capacity group: Signal Processing Systems

Assistants:

- Turco, Simona

Students needed: 1

Required specialization path: No specific required

Created on: Jan. 27, 2022

Applications: Disabled

Distributions: None yet.

Progress: Not yet started. Students can apply to this project.

Websites of research groups

Abbreviation	Research group
<u>CS</u>	Control Systems
<u>ECO</u>	Electro-Optical Communication
<u>EES</u>	Electrical Energy Systems
<u>EM</u>	Electromagnetics
<u>EPE</u>	Electromechanics and Power Electronics
<u>ES</u>	Electronic Systems
<u>IC</u>	Integrated Circuits
<u>PhI</u>	Photonic Integration
<u>SPS</u>	Signal Processing Systems

Company

- Do you want to do a project in your favourite company? Or maybe the company already has contacts with EE staff members? Or have you found an interesting project yourself? Maybe visit the Career Days/Wervingsdagen?
- Find an EE-supervisor to guide you: Check the research area of the specific project (use the websites e.g.)
- Project should be
 - for master students,
 - of sufficient level,
 - large enough for the minimal duration
 - daily supervised by an external (company) supervisor, together with EE supervisor responsible for the project

Supervisor

- Do you know an EE staff member (a lecturer from a course, your BEP supervisor, or maybe someone from the Walhalla 😊)?
- Ask for interesting master projects
- You can also check with the mentor of the research group

Going abroad

- Do you want to go abroad to get some international experience? Contact [Exchange EE](#)
- Typically, master students of Electrical Engineering do an internship abroad, but a graduation project is also possible
- It is highly recommended/advised to do an internship or graduation project abroad (for international experience), but it is NOT mandatory
- The next slides are from International Office EE ([Exchange EE](#)) obtained from the Q2 Q&A.

Orientation

How to find an internship or graduation project abroad?

- Consult your mentor, academic staff or research groups for specific projects abroad
- Search online for foreign universities, research institutes, companies, organizations, multinationals, and chambers of commerce.
- Read the [experience reports](#) from TU/e students who already went abroad
- Consult external databases and mediators, such as [Integrand](#) or [AIESEC](#).

Mobility Online

Apply for an international experience:

- Always contact [Exchange EE](#) to receive information upon the application procedure
- [Mobility Online](#), online application system

When to apply in Mobility Online?

- Make sure details about the project (description, start and end date, etc) are agreed upon by you and your supervisor(s)
- Well in advance of your start date (you must complete the application two weeks prior to leaving)

Host institution

- Do not forget to follow the application procedure with your host institution

Scholarships, grants and other finances

Via ESA/International Office:

- Erasmus+ Study
- Erasmus+ Placement
- TU/e Fund International Experience
- Holland Scholarship
- see also the [Grants and Scholarships](#) page on the education guide

Scholarships, grants and other finances

- Funding offered by TU/e: [Going Abroad- Grants, funds and scholarships page](#) (do not overlook the submenus) > application procedure is integrated in Mobility Online
- Eligibility to receive student finance and/or a compensation for temporarily cancelling your student travel product from [DUO](#) (only in Dutch). The form *Aanvraag Ov-vergoeding buitenland en/of uitwonendenbeurs* can be sent to [Exchange EE](#) for signing.
- Tips on budgeting and information about expenses abroad: [WilWeg](#) (Dutch only)
- See also the Q&A presentation on International Experience in Q2:
<https://educationguide.tue.nl/programs/graduate-school/masters-programs/electrical-engineering/international-experience/>

Contracts

Company/host organisation with their own contract

- For example ASML, Vanderlande, Lely Holding
- Payment/allowance, insurance, legal information, secrecy, working hours
- Pay attention to specific clauses on intellectual property rights, non-disclosure/confidentiality, liability, insurance matters et cetera
- Upload your contract to CSA EE via the internship contract form to have it checked.

Contracts

Company/host organization without contract

- Use TU/e standard work place agreement:
<https://educationguide.tue.nl/programs/internships-and-graduation-projects/?L=2>
- Upload your contract to CSA EE via the [internship contract form](#) to have it checked and signed if necessary

Contracts

NUFFIC contract

- For non-EU/EEA-students doing an external internship in a company
- Why? Residence permit for study means you can ONLY work at a company for your study!
- See: <https://www.studyinholland.nl/dutch-education/doing-an-internship>
- Send the contract to [Exchange EE](#) to be checked and signed

Contracts

Practicalities

- Note: the process with contracts and signatures takes time, so upload your documents as soon as possible! The procedure of checking the contracts can take 2 to 4 weeks.
- Contracts will be checked by the education lawyers just to be sure

Assessment

Internship

- Report (no specific requirements, check with your supervisor)
- Presentation

Graduation project

- Paper (8-12 pages, conform IEEE publications format)
- Halfway evaluation (midterm): paper and presentation
- Final defense : paper and final presentation/defense
- Graduation committee: three voting members and two non-voting (advisory) members

Assessment

Internship and graduation

- Assessment based on 5 categories during presentation(s):
 - Specialization
 - Research and design
 - Execution
 - Report
 - Presentation and defense
- Each category completed with at least a 5.0, final grade at least a 6.0 for passing
- Each category has 4 subcategories with room for comments
- Check against plagiarism is included
- Check on academic writing and presenting skills is included. If necessary, extra training can be recommended

Assessment

Brief sub-grade motivation ¹ (Add qualitative comments per category on the next page)						Category Sub-grade
Specialization	I	S	G	VG	E	
Quality of literature review:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Level of specialized knowledge:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Disciplinary knowledge:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ability to connect problem definition to research field/sub-questions:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Research and design	I	S	G	VG	E	
Formulation of research questions:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Quality and quantity of established results:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Creativity, originality, innovative value:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Critical attitude towards results, methods, scope and perspective of research:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Execution	I	S	G	VG	E	
Level of independence:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Commitment and dedication:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Time planning:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Effectiveness:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Report	I	S	G	VG	E	
Readability of report:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Quality of content:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Problem formulation:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Structure & organization:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Presentation and defense	I	S	G	VG	E	
Coverage of research outcomes:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Presentation skills:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Quality of supporting material:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Discussion skills:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The final grade is the mean value of the five sub-grades per category. The final grade is rounded to half integers.	Final grade ² :					

Study guides/“studeerwijzers”

Two study guides (“studeerwijzers”) for internship and graduation

- Internship:

<https://educationguide.tue.nl/programs/graduate-school/masters-programs/electrical-engineering/curriculum/internship/?L=2>

- Graduation project:

<https://educationguide.tue.nl/programs/graduate-school/masters-programs/electrical-engineering/curriculum/graduation-project/?L=2>

Study guides/”studeerwijzers”

- Disclaimer: 😊
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Questions?

- This presentation will be published on the online education guide (Curriculum -> Internship and Curriculum -> Graduation project)
- If you still have questions, you can send an email to EE.Academic.Advisor.MEE@tue.nl or ask them now:

QUESTIONS?