

# How to write a thesis in the Earth Observation Lab

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Is the Earth Observation Lab the right place for me and my thesis?

Humankind is rapidly transforming the planet, triggering drastic changes in land use and climate. Identifying strategies for monitoring these changes is among the major challenges remote sensing faces in the 21<sup>st</sup> century. At the Earth Observation Lab, we strive to find smarter ways to map when, where and in which ways land surfaces change and thereby allow a better understanding on why land use changes occur, how these changes impact ecosystem services, and what characterizes sustainable land systems. Focal areas of research relate to urban, agricultural, and forest environments. Concerning forests, we also have strong ties to forest ecology, where e.g. understanding disturbance regimes (management or natural disturbances) is of core interest, and where linkages to carbon monitoring are of great importance (e.g. in the frame of REDD+ studies). In agricultural systems, we are interested in both long-term changes in grassland and cropping systems, as well as dense time series analyses that allow analyses of vegetation phenology. A third research domain rather embraces the methodological developments around big data and specifically forthcoming hyperspectral opportunities.

For carrying out a thesis in the Earth Observation Lab, you should generally be interested in remote sensing, either from an application point-of-view, or with an interest in remote sensing methods – or ideally both. You should at the same time be keen on learning more about issues of global change and how it manifests in different regions of the world, about interactions between people and nature, and about threats to ecosystems and the services they provide. In the Earth Observation Lab, we typically work with quantitative and spatially-explicit tools from remote sensing, GIS analyses, spatial and temporal statistics, and modeling approaches driven with or profiting from remote sensing data. We work highly interdisciplinarily, often in larger and international teams, and the working language of our group is therefore mainly English (while a thesis at the Bachelor level may be written in German or English – the choice is yours).

For a successful thesis in our group, you should feel broadly comfortable with the thematic and methodological research mode outlined above. A thorough knowledge in basic statistics, GIS and remote sensing is mandatory for the topics we offer and a thesis with us will be most beneficial if you visited our classes (for details click [here](#)). Participating in our colloquium is mandatory, and – depending on your respective study regulations – you either present and/or defend your thesis during the colloquium. We expect you to participate regularly in the colloquium, not just when presenting your topic (further details on the colloquium below).

## How to find a topic for a thesis?

A thesis can be carried out with different motivations, for example with the goal to deepen your knowledge of a particular field of research or a certain methodological approach, or to get insights into ongoing research in our working group. While we do not expect you to approach us with a ready-to-go thesis topic, we appreciate that you have reflected on what, thematically or methodologically, you would like to put the focus in your thesis. Both our classes and our ongoing research projects (and publications) are a starting point for thinking about this. Theses we offer are typically part of a research project, and thus you would be working closely with a postdoc or Ph.D. student in the Earth Observation Lab. We also encourage you to explore the interlinkages between the Earth Observation Lab, other labs at HU Geography, or the IRI THESys, where you may also find great motivation to use remote sensing for a better understanding of changes in different ecosystems or human-environment systems.

If you already have a specific and well-defined thesis topic in mind, for example a topic that arose from an internship at an NGO or a research institute, the main question will be whether a senior researcher from the lab can meaningfully supervise and evaluate this thesis.

## The initial step: writing a thesis proposal

Once we have agreed on a topic, you write a thesis proposal that includes (i) the background and rationale (i.e., motivation), (ii) research questions and clear objectives, (iii) a research plan that provides for each objective a summary of the planned analyses, what data is needed, and what the expected outcome will be. Against the background of your literature research, including a short section on the significance of the anticipated outcomes is highly welcome. This proposal should typically be ca. 2 pages and can consist of bullet points – the idea is to arrive at a ‘cooking recipe’ that will guide you through the rest of the thesis.

## Thesis admission

You will usually hand in the thesis registration form including all signatures at the examination office (“Prüfungsbüro”) 3 months before handing in your bachelor thesis or 6 months before handing in your master thesis. You may or may not have presented already in the colloquium (see next section), as the admission process is entirely steered by the “Prüfungsausschuss” and the faculty/“Prüfungsbüro”.

Therefore, **carefully read** the relevant information at [MNF](#), at [Prüfungsbüro](#) regarding external examiners (if relevant for you) and at [Prüfungsausschuss](#). In case of uncertainties, approach Dirk Pflugmacher or Patrick Hostert.

## Presenting your thesis in the colloquium

Both, Bachelor and Master students present their thesis work twice at different stages in the Earth Observation Lab colloquium. Please visit the [colloquium moodle course](#) to see the schedule and read the guidelines for presenting. Please get in contact with the colloquium organizers ([dirk.pflugmacher@geo.hu-berlin.de](mailto:dirk.pflugmacher@geo.hu-berlin.de) or [patrick.hostert@geo.hu-berlin.de](mailto:patrick.hostert@geo.hu-berlin.de)) to schedule presentations. Please note that the colloquium will only take place during the term (i.e. until ca. mid-Feb in winter and ca. mid-July in summer). It is hence a good strategy to think about the timing of the entire process early on and reserve two slots in the colloquium at the beginning of the semester you wish to hand in your thesis.

### ***Bachelor students:***

You present your topic for the **first time** after your proposal is accepted (**5 minutes** flash talk in English plus discussion; ca. 5 slides). Discuss the timing for this presentation early on with your supervisors to ensure that there is a free slot in the colloquium and to secure a slot during the teaching term. Also, we kindly ask you to write a **1-paragraph summary** of the thesis idea to be used for the colloquium announcement. Please, take care to send the summary to the colloquium organizer at least **14 days before** the presentation date.

The **second presentation** will take place **once first results** are obtained – ideally at a point in time when you can still incorporate the feedback you receive. This time, you will present for **15 minutes** plus discussion (ca. 12 slides), also in English. Again, discuss the timing for this presentation early on with your supervisors to ensure that there is a free slot in the colloquium and send one summarizing paragraph to the colloquium organizer **14 days before** the presentation date.

### ***Master students:***

A colloquium **presentation on the concept and first results** will be scheduled once **first results** are obtained. This presentation takes place as early as possible to ensure that you still can incorporate the feedback in your analyses. The presentation should take **15 minutes** plus discussion (ca. 12 slides). Schedule this presentation early on with your supervisors to ensure that there is a free slot in the colloquium and to secure a slot during the teaching term. Send one summarizing paragraph to the colloquium organizer **14 days before** the presentation date.

The **second presentation** is your official thesis **defense**. It takes place in the colloquium after your thesis has been reviewed and marked (i.e. ca. 1 month after handing in). Study regulations according to your “Studien- und Prüfungsordnung” apply. Make sure to have the defense date arranged early on with your supervisors and to bring the necessary form provided by the “Prüfungsamt”. Again, be aware that your defense has to take place during teaching term (i.e. until ca. mid-Feb in winter and ca. mid-July in summer).

## Working on your thesis

While working on your thesis, report your progress regularly to discuss main results and their interpretation. Also, particularly approach your supervisors in case you run into major problems. For theses carried out within a research project, such feedback should be primarily obtained from the respective Postdoc or PhD student in charge.

Writing your thesis should be an ongoing process, not a ‘writing-it-all-up-in-a-rush’ at the very end. The most important characteristic of a high-quality thesis is that it is consistently so – from motivating the research question(s) after exploring the existing state-of-the-art on your topic, to discussing the results against the background of other research. Plan for the necessary time to do so – and do not trade-off another analysis for a well-written discussion section. Check for [good-practice examples](#).

The format of the thesis itself is regulated in your study regulations (“Studien- und Prüfungsordnung”, SPO). Theses are written in English and we encourage writing in the form of a research paper. Guidelines for the latter, especially regarding the length of the thesis, have been specified by the [examination board](#).

## Submitting your thesis

Be aware of the fixed deadline and plan ahead for submitting in time. In case you need a quick review that is shorter than the time allocated in the respective study program (SPO), for example because of a pending job or fellowship application, please contact your supervisor team early-on to discuss this, ideally already at the beginning of the thesis project or as soon as possible – definitely not at the time of submission. Once you have submitted your thesis, please prepare a short summary (this can be the abstract) of your thesis with one or two key figures and/or photos for our webpage (incl. credits for figures/photos, e.g. “own work myname”).

Summary of steps to a successful thesis in the Earth Observation Lab (**formal steps are yellow** and relate to the “Prüfungsausschuss” (examination board) or “Prüfungsbüro” (examination office) – for details on formal issues, please, check the regulations on the Geography website and ask back to the examination office in case of uncertainties.

Bachelor students	Master students
Develop a thematic or methodological focus of your thesis and discuss the <b>idea</b> it with Patrick Hostert or your respective supervisor in the Earth Observation Lab.	
Submit thesis proposal to advisor, receive feedback, get accepted as a BSc/MSc student. Note: this is not the formal enrolment (see next point), but our agreement on the scope and research approach.	
<b>Hand in the registration form in the examination office – this is the formal step to take.</b>	
Details to take care of:	
- The first supervisor needs to be a professor from the Geography Department.	
- The second supervisor should also be a researcher from the Geography Department, but may also be an external. In case of an external researcher, you need to apply with the “Prüfungsausschuss” to make the case	

why the expertise of this second reviewer is not available at the Geography Department (which is the prerequisite for being admitted as 2<sup>nd</sup> supervisor from elsewhere). In such cases, always consult Dirk Pflugmacher or Patrick Hostert first, to get the arguments right.

- Get the signatures of your supervisors on the respective form(s).	
- The second supervisor needs to hold at least a Masters degree (i.e. is a PhD candidate)	- The second supervisor needs to hold a PhD ("Dr.")
- Typical time to hand in the registration: 3 months before handing in the thesis	- Typical time to hand in the registration: 6 months before handing in the thesis
Present thesis concept in the Earth Observation Lab colloquium (5 minutes flash talk + discussion)	Present concept and first results in the Earth Observation Lab colloquium (15 minutes + discussion)
Work on the thesis. Report progress to your supervisor(s) and get in touch if there are problems.	
Present first results and interpretations in the Earth Observation Lab colloquium (10 minutes + discussion)	
<b>Finalize and submit your thesis.</b>	
Once submitted, write a half-page summary with one or two key figures/photos for the webpage	
	<b>Provide the review form for the defense to the supervisors.</b>
	<b>Defend your thesis in the colloquium (30 minutes + discussion)</b>

Celebrate your success!