Graz University of Technology

Hints for a Successful Habilitation at Graz University of Technology / Faculty of Electrical and Information Engineering (10/2019)

This document contains a collection of hints for successfully completing a habilitation, but this should by no means be considered a complete checklist. Ultimately, the habilitation thesis and underlying research will be evaluated by external reviewers (and not by TU Graz faculty), and candidates should properly address this target group.

1. The habilitation thesis (be it a cumulative thesis or a monograph) should be based on full, peer-reviewed papers that are published in high-quality international journals and conferences and to which the candidate made significant contributions. In applied research areas, also patents and standardization are relevant, but can never fully replace scientific publications as the candidates have to prove their ability to represent an entire *scientific subject* in research and teaching. At the time of submission of the habilitation, candidates should aim for 15+ such publications (after PhD) - not all of them should be included in the habilitation thesis, though. On the other hand, publications from the PhD thesis may be included in the habilitation thesis if they have resonated in the community and if they add to the broad coverage of the subject. In the thesis, it is of utmost importance to highlight the candidate's personal contribution to the scientific community, i.e., the addition of new scientific knowledge *and* its take-up by fellow scientists.

2. Habilitation candidates should compare their scientific standing relative to their international peers in similar career phases all over the world, and provide concrete evidence of their own excellence in research and teaching. One way to make their contributions visible is by creating a Google Scholar profile. This allows to compare their publication and citation impact with that of peers in their specific field of science. At the time of submission of the habilitation, candidates have typically reached an h-Index of 10+ in Google Scholar, but that may vary according to specialization.

3. The habilitation subject ("Habilitationsfach") should be carefully chosen to be neither too narrow nor too broad. A good starting point for selecting a subject is the list of scientific disciplines provided by Statistik Austria (https://www.fwf.ac.at/fileadmin/files/Dokumente/Antragstellung/wiss-disz-201708.pdf). Another indicator for a valid subject is the existence of professorships and/or holders of a venia with that subject at multiple international universities. For example, "Embedded Systems" is a suitable subject, "Information Technology" is probably too broad (see bullet 4 below) and "Microcontrollers" is probably too narrow (see bullet 5 below).

4. The candidate must be able to show that his or her own research and teaching activities cover the chosen habilitation subject. This can be done by choosing an established text book, a professional special interest group (e.g., ACM SIG or IEEE TC), or a leading conference or journal entitled with the habilitation subject. The candidate should then argue how his or her research and/or teaching activities cover the chapters of the

chosen text book, the topics of the chosen special interest group, or the topics in the call for papers of the chosen conference or journal. Note that not all subtopics of the habilitation subject have to be covered, it is quite normal even for well established professors that they do not cover all subtopics of their scientific subject. Therefore, one should also choose a title for the habilitation thesis which is clearly addressing a subset of the scientific subject.

5. The candidate should be able to present a teaching portfolio of up to 8 semester hours per week (this is the teaching capacity of a tenure-track position after completing the habilitation / Qualification Agreement and promotion to Associate Professor) with courses that fall into the chosen habilitation subject. These courses should not all be new but rather taken from existing curricula. Such portfolio makes also sense for external habilitation candidates even if they will eventually teach much less. Also during the preparation of the habilitation thesis, the actual teaching load will be much lower (e.g., an Assistant Professor has a teaching capacity of 4 semester hours per week).

6. Next to previous or planned teaching activities for groups in the classroom, success in the individual teaching of younger scientists has to be demonstrated. This includes being an advisor or co-advisor to Master's theses and PhD students. Even if this may sometimes not be possible in an official function (after all, one motivation to aim for habilitation is to get the right to perform this function independently), it should always be possible to foster younger scientists in an informal way through co-operations and co-authoring of scientific papers or even by funding their research work through projects. Note that the main goal is not to build a research group (as a manager) but to demonstrate your capabilities of leading younger scientists to their success.

7. The candidate should hold a habilitation colloquium in front of the faculty about one year before the planned submission of the thesis. The goal is to provide constructive feedback to the candidate in preparation of the final steps leading towards submission of the thesis. For this, the candidate should arrange with the speaker of the faculty (currently: Prof. Uwe Schichler) for a timeslot at least two months before the intended colloquium date. In order to ensure broad participation of the faculty, the colloquium is typically held before the monthly meeting of all professors of the faculty (typically 1pm on a Wednesday, no meetings are held during the semester breaks). At the latest two weeks before the agreed colloquium date, the candidate should send the title of thesis / presentation as well as the habilitation subject to the dean's assistant (currently: Alexandra Zavec) so that an invitation can be sent out in time to the faculty.

8. The colloquium consists of a 30 min presentation by the candidate (preferably in English language), followed by discussion of the candidate with the faculty which typically takes another 30 min. The presentation should have the following structure:
    - Introduction of the candidate (about 5 min): key facts about employment and education to date, key facts about engagement in the scientific community after PhD (e.g., organization of scientific events, reviewing), key facts about research after PhD (e.g., number of publications in journals, conferences, patents; citation impact; acquisition and management of funded projects, invited talks, awards),

key facts about teaching after PhD (mentoring of PhD and MSc students; courses designed and/or held).
    - Introduction of the thesis topic (about 5 min), including an outline (list of chapters) of the planned habilitation thesis along with relevant publications supporting each of the chapters.
    - Scientific presentation of selected research highlights from the thesis (about 15 min), this should be accessible to a broad scientific audience (i.e., whole faculty). This is not a teaching exercise, though; this is the core part of the colloquium that must provide a *live demonstration* of scientific excellence, unlike the quantitative facts presented at the beginning.
    - Presentation of the chosen habilitation subject (about 5 min) along with its subtopics and how the candidate's research and/or teaching activities cover the subtopics (e.g., in form of a table). The candidate should also show which reference has been used (i.e., textbook, special interest group, conference, journal) to obtain the breakdown of the habilitation subject and its subtopics.

9. After the colloquium, the professors of the faculty hold a closed meeting to discuss the suitability of the chosen habilitation subject and if there is sufficient progress to start writing up the thesis. Written feedback about the suitability of the chosen habilitation subject will be provided by the speaker of the faculty (currently: Prof. Uwe Schichler) to the candidate and to the Rectorate. In addition, a meeting with the candidate will be held to provide more detailed feedback, suggestions, and advice.

10. It is highly recommended to get in touch with colleagues who have recently gone through the habilitation process to learn from their experience and also attend their habilitation colloquia. They may also be willing to provide you a copy of their slides for inspiration. The most recent candidates at the time of writing are: Jasmin Grosinger, IHF; Olga Saukh, ITI; Carlo Boano, ITI.

11. Habilitation candidates may also have to fulfil a Qualification Agreement signed with the University to prepare for the future job as an Associate Professor. One should clearly separate the two sets of requirements, the *scientific* one for the Habilitation and the *professional* one for the Qualification Agreement. It is not advisable to focus only on the professional requirements (like attending didactics courses or management trainings, contributions to consulting /engineering/standardization, project acquisition, etc.), the scientific requirements are the harder ones and deserve much more attention, time and effort. One may compare this to the situation during doctoral studies, where the curricular component is almost negligible next to the thesis component. Nevertheless, the professional requirements should not be underestimated and completed early on, especially the international stays may require a long lead time for preparation. For candidates who perform their Habilitation in the context of a Tenure-Track Assistant Professorship with a Qualification Agreement, the (realistic) assumption is that some of the research has already been performed in a postdoc phase prior to taking on the tenure-track position.