

Guidelines for Conducting Doctoral Research at the Stuttgart Center for Simulation Science (SC SimTech)

By resolution of the Doctoral Committee, the following academic degrees can be obtained at the Center for Simulation Science:

- Dr.-Ingenieur/Dr.-Ingenieurin (Dr.-Ing.)
- Doktor/Doktorin der Naturwissenschaften (Dr. rer. nat.)
- Doktor/Doktorin der Philosophie (Dr. phil.)
- Doktor/Doktorin der Wirtschafts- und Sozialwissenschaften (Dr. rer. pol.)

All of the following regulations refer to the Doctoral Degree Regulations of the University of Stuttgart as last amended on April 01, 2019.

1. General Provisions

1.1. Status and Training Program

- a. In general, the applicants for doctoral studies at SC SimTech are members of the SimTech Graduate School (GS SimTech) and are subject to the respective rules (see Part 2 - Regulations for GS SimTech).
- b. Association with GS SimTech: In individual cases, applicants that are already members of another graduate school (e.g. SFB, RTG) in a field closely related to SC SimTech may become associates of GS SimTech. To this end, a cooperation agreement must be concluded between GS SimTech and the respective other graduate school (see also Part 2, 2.3).
- c. Doctoral studies at International Max Planck Research Schools (IMPRS): IMPRS doctorates may be conducted at SC SimTech with or without the participation of another faculty. In the event that doctoral studies are conducted at SC SimTech without the participation of another faculty, the respective rules apply (see Paragraph 3). The equivalence of the training programs at the IMPRS (or their individual components) is defined in a cooperation agreement between GS SimTech and the IMPRS. An associate membership in GS SimTech is not required for doctoral candidates at the IMPRS.
- d. If the applicants are not members of GS SimTech, training components that are equivalent in content and scope must be specified in the doctoral supervision agreement and completed before the doctoral exam.

1.2. Course of the Doctoral Procedure

1.2.1. Regulations Regarding the Doctoral Supervision Agreement

- a. For doctoral procedures conducted at SC SimTech with participation of another faculty of the University of Stuttgart, the doctoral supervision agreement as well as the proof of completion of

the training program must comply with the regulations, catalogs and forms of the respective faculty.

- b. For doctoral procedures conducted at SC SimTech without participation of another faculty, the doctoral supervision agreement must comply with the regulations of GS SimTech with regard to the training program. Usually, the completion of the individual training components is confirmed by the advisor to GS SimTech in the application for the Milestone Presentation or, at the latest, in the application for admission to the examination (see Part 2 and 4.)

1.2.2. Introduction to the Doctoral Committee upon Admission as a Doctoral Student

- a. For doctoral procedures conducted at SC SimTech with the participation of another faculty, the introduction of the candidate and the topic of the dissertation to the Doctoral Committee of SC SimTech by the main supervisor upon submission of the application as a doctoral student is optional.
- b. For doctoral procedures conducted at SC SimTech without participation of another faculty, the introduction of the candidate and the topic of the dissertation to the Doctoral Committee of SC SimTech by the main supervisor (or, in exceptional cases, by a representative) is obligatory. If the main supervisor is not a member of SC SimTech, he/she has to choose a co-supervisor from SC SimTech who will take over the introduction to the Doctoral Committee. Should the main supervisor or the representative be unable to introduce the candidate in the respective Doctoral Committee meeting, the decision regarding the admission as a doctoral candidate is postponed. To decide upon the application for admission, the Doctoral Committee determines whether the specified topic matches the research agenda. In particular, the application for admission is only considered further if members of SC SimTech who are authorized to conduct examinations declare themselves willing to assume the necessary duties to report and co-supervise, at least for the time being. If these conditions are met, the Doctoral Committee determines whether the professional prerequisites for pursuing doctoral studies at SC SimTech are fulfilled and subsequently establishes the corresponding requirements (equivalency).

1.2.3. Regulations regarding the Admission to the Examination

- a. For doctoral procedures conducted at SC SimTech with the participation of another faculty, the appointment of the Examination Committee by the Doctoral Committee of the respective faculty is generally supported by the Doctoral Committee of SC SimTech. If the Doctoral Committee of SC SimTech does not consent, it will propose examiners from SC SimTech and return the procedure to the respective faculty for a new vote.
- b. For doctoral procedures conducted at SC SimTech without participation of another faculty:
 - i. The application for admission to the examination is submitted in writing by the candidate's main supervisor to the office of SC SimTech. The application must confirm that the thesis is ready for submission and suggest possible examiners. The application should be received by the office of SC SimTech at least one week before the respective meeting of the Doctoral Committee. Special consideration must be given to the semester breaks of the

Doctoral Committee to prevent any delays in the procedure.

- ii. The Doctoral Committee appoints the examiners (bearing in mind the necessity of an external examiner) and the Managing Director of SC SimTech (in his/her capacity as Dean) appoints the chair as his/her representative. At least one examiner must be a member of SC SimTech.
- iii. In case of a thesis by publication, the respective guidelines of SC SimTech must be observed. The main examiner has to confirm the equivalence and adequacy of the thesis to the Doctoral Committee of SC SimTech in a separate statement. Furthermore, the particular regulations regarding the selection of examiners must be taken into consideration. The Doctoral Committee of SC SimTech has to determine the equivalence and adequacy of the thesis.
- iv. The thesis may be submitted as soon as the main supervisor has confirmed to the Doctoral Committee of SC SimTech that the thesis is ready for submission, the Examination Committee has been appointed and, in case of a thesis by publication, the Doctoral Committee has approved of the thesis by publication.
- v. After the examiners have been appointed, GS SimTech will send appointment letters to the respective examiners.

1.2.4. Submitting the Thesis

- a. For doctoral procedures conducted at SC SimTech with the participation of another faculty, the thesis must be submitted in accordance with the regulations of the respective faculty. In addition, one copy of the thesis must be submitted to GS SimTech along with a list of publications and a confirmation that the regulations of GS SimTech were complied with (see Part 2 of the guidelines).
- b. For doctoral procedures conducted at SC SimTech without participation of another faculty:
 - i. The thesis and the list of publications also have to be submitted to the office of GS SimTech. One copy for each of the examiners and one copy for GS SimTech have to be submitted. Whether the submitted version of the thesis is acceptable is determined by the Head of the Examination Committee and, if necessary, confirmed (electronically). In case of a thesis by publication, the respective regulations for a thesis by publication are taken into account. Only then is the thesis deemed to have been actually submitted.
 - ii. The copies of the thesis are forwarded to the examiners by GS SimTech (including the respective guidelines for the evaluation of the thesis).
- c. For all doctoral procedures conducted at SC SimTech (with or without participation of other faculties), the submission of the thesis to SC SimTech has to be mentioned on the title page.

1.2.5. Oral Examination

For doctoral procedures conducted at SC SimTech with the participation of another faculty, the oral examination must comply with the regulations of the respective faculty.

- a. GS SimTech must be informed of the dates for the oral examinations (even if another faculty is involved).
- b. Part of the oral examination is a public presentation of up to 45 minutes.

- c. Without participation of another faculty, a viva voce examination (examination of general expertise) is a compulsory part of the oral examination. During the viva voce examination, the candidate's knowledge in core areas of SimTech is examined (modeled on the Department of Mathematics and the Faculty of Chemistry). For the viva voce examination, the Doctoral Committee of SC SimTech appoints an additional member of the Examination Committee from among its members. However, this member should not be one of the persons who completed a report on the thesis. The topic of the viva voce examination must differ from the central topic of the thesis and is specified by an examiner who is appointed separately.

1.3. General Regulations

- a. If necessary, all decisions of the Doctoral Committee of SC SimTech may be made by written consent.
- b. GS SimTech must be informed if the doctoral thesis is discontinued.
- c. GS SimTech must be informed if the main supervisor changes, including a statement of reasons (see Part 2 of these guidelines). The Doctoral Committee of SC SimTech will be informed of the change at its next meeting.

2. Regulations for GS SimTech

2.1. Mission, Goals and Executive Bodies of GS SimTech

- a. One of the tasks of the Stuttgart Center of Simulation Science (SC SimTech) is the promotion of young researchers through coordinated doctoral programs. For this purpose, the SC SimTech has set up its graduate school "Simulation Technology" (GS SimTech). GS SimTech is an institution dedicated to the structured training of doctoral students and the promotion of young researchers. The defining concepts of GS SimTech in the promotion of doctoral candidates include:
 - i. GS SimTech is a doctoral program with an international perspective.
 - ii. GS SimTech sees itself as an interface to promote the exchange of scientific information and the cooperation within SC SimTech.
 - iii. GS SimTech offers its doctoral students individual supervision by professors of the University of Stuttgart as well as by international guests of SC SimTech.
 - iv. GS SimTech encourages its members to take an interdisciplinary scientific approach. To this end, it hosts annual doctoral seminars where individual projects are presented as well as graduate school seminars (GS seminars).
- b. Unless specified otherwise in the Doctoral Degree Regulations, the Committee responsible for making decisions on behalf of GS SimTech consists of the Board of Directors of SC SimTech.
- c. GS SimTech has a coordination office that supervises all procedures at GS SimTech, as well as an Executive Committee that is appointed by the Board of Directors of SC SimTech.

2.2. Conducting a Doctoral Project at GS SimTech

- a. The regulations for the admission of doctoral students to GS SimTech is set out in Section 3. An admission to GS SimTech does not establish a statutory right to an admission as a doctoral student at the University of Stuttgart.
- b. GS SimTech is subject to the Doctoral Degree Regulations as amended from time to time as well as to the Guidelines for Conducting Doctoral Research at SC SimTech (see I.).
- c. The following requirements of GS SimTech are added to the Doctoral Degree Regulations of the University of Stuttgart:
 - i. Supervision concept (see 2.4)
 - ii. Training program (see 2.5)
 - iii. Milestone Presentation (see 2.6)
 - iv. Examination Committee (see 2.7)
 - v. Stay abroad (see 2.8)

- d. The main supervisor has to confirm to the Chair of the Doctoral Committee that these requirements have been met at the time of the Milestone Presentation or when the thesis is submitted.

2.3. Admission to GS SimTech

- a. All doctoral students involved in doctoral projects of the Cluster of Excellence "Data-Integrated Simulation Science" become provisional members of GS SimTech when they are hired. Within the first three months after being hired, these students must submit an "Application for Admission to GS SimTech" to the coordination office of GS SimTech - if possible, at the same time as submitting the application for admission as a doctoral student at GRADUS.
- b. Upon request, GS SimTech will admit further doctoral students not funded by SimTech under the following provisions:
 - i. They are employed in projects that are relevant to the joint research activities of SC SimTech and
 - ii. Their main supervisor and at least one of their co-supervisors is a member of SC SimTech.
- c. Furthermore, members of other graduate schools may be admitted as associates of GS SimTech under the following provisions:
 - i. Their training program is compatible with the one at GS SimTech,
 - ii. Their main supervisor is a member of SC SimTech and
 - iii. A valid cooperation agreement has been concluded between the other graduate school and GS SimTech.

These cooperation agreements must at least regulate the mutual recognition or crediting of achievements to ensure that the training programs at both graduate schools are equivalent.

- d. The application form is provided by GS SimTech. The following documents must be enclosed with the Application for Admission to GS SimTech:
 - i. Academic certificates (Bachelor and Master),
 - ii. Curriculum vitae,
 - iii. Description of the planned topic of the doctoral thesis (approx. 1 page),
 - iv. List of publications (if any),
 - v. Doctoral supervision agreement.

By submitting the Application for Admission to GS SimTech, the doctoral student and the main supervisor agree to the regulations of GS SimTech as set out in these guidelines.

- e. Applications for admission pursuant to points (a) to (d) are to be submitted to the coordination office of GS SimTech. The decision as to whether the application is granted lies with the Executive Committee of GS SimTech. The Executive Committee will verify whether the doctoral supervision agreement is in line with the quality standards of GS SimTech. The admission to GS SimTech will be confirmed in writing.

- f. Only after the Executive Committee of GS SimTech has granted the application for admission will the doctoral student be a full or associate member of GS SimTech.

2.4. Supervision Concept

- a. GS SimTech is based upon an “Advisor Concept”. This means that the main supervisor of the doctoral thesis (hereinafter referred to as “advisor”) is not only responsible for providing individual expert advice on the project but also for establishing the individual training program at GS SimTech as well as for ensuring that the regulations of GS SimTech are complied with.
- b. The advisors confirm to GS SimTech that the regulations have been complied with at the time of the Milestone Presentation and as soon as the doctoral examination procedure is initiated. The provision of detailed evidence of the achievements completed (e.g. a list of GS seminars or courses) to GS SimTech is not obligatory, but welcome for statistical purposes.
- c. The doctoral students at GS SimTech are advised by at least two members of SC SimTech. Apart from persons entitled to conduct examinations pursuant to Section 7 (3) of the Doctoral Degree Regulations, junior research group leaders or qualified postdocs may serve as advisors in duly justified exceptional cases. As a general rule, the advisors should be from different academic disciplines as this promotes networking across different scientific disciplines within SC SimTech.
- d. In the particular case of associate members of GS SimTech, it is sufficient if the main advisor is a member of SC SimTech.
- e. The main and co-advisors are named in the doctoral supervision agreement at the start of the doctoral studies. Upon a substantiated request by the main advisor to the Executive Committee of GS SimTech, co-advisors may be released from their duties and new co-advisors may be named at the same time.

2.5. Training Program

The training program at GS SimTech consists of the following elements as specified in the doctoral supervision agreement (according to Section 4 (6) of the Doctoral Degree Regulations, at least 9 credit points must be achieved):

- a. Successful completion of subject-specific courses (at least 6 credit points):
 - i. Doctoral students are provided with a structured introduction to the topic of the thesis in subject-specific courses worth at least 6 credit points (CP).
 - ii. In principle, the courses may be selected from the regular courses offered by the University of Stuttgart or from suitable courses outside the University of Stuttgart (courses at other universities, suitable summer schools etc.).
 - iii. The advisor and the doctoral student will choose the courses (Advisor Concept) and will specify them in the doctoral supervision agreement.
 - iv. In general, these credit points must have been completed before the Milestone Presentation.

- b. To acquire interdisciplinary qualifications, doctoral students must complete at least one course from the area of key qualifications (e.g. from the program offered by GRADUS).
- c. To promote interdisciplinary networking among the doctoral students and to expand their scientific horizon, the doctoral students at GS SimTech actively participate in at least three units offered by GS SimTech:
 - i. At least one of these three units should be a GS SimTech seminar. In general, no credit points are awarded for participating in courses offered by the GS. However, in justified cases, the main advisors may agree to the awarding of credit points.
 - ii. Additional units may be selected from the “Academy Program” of GS SimTech. This program includes, for example, career counseling, mentoring schemes as well as industry connections. The official list of training units offered by the Graduate School can be found on the websites of SC SimTech. The doctoral students are free to choose suitable units from the Academy Program.
 - iii. At least one training unit from (c) must be completed before the Milestone Presentation.
- d. Doctoral students are required to present the results of their scientific research (annual poster presentation, possibly accompanied by a lecture) during the annual doctoral seminars (which may take place as part of the annual status seminar of SC SimTech). Participation in the doctoral seminars is obligatory.

2.6. Milestone Presentation

- a. The purpose of the Milestone Presentation is to determine whether the doctoral project progresses as required and to provide a basis for early corrective measures in case of issues. In addition, the Milestone Presentation is meant to inspire the doctoral students to reflect on their progress and the future course of the doctoral project.
- b. Prior to the Milestone Presentation the main advisor confirms to GS SimTech in writing that the doctoral student has completed the subject-specific courses as well as the interdisciplinary qualifications and that he or she presented their doctoral project during the annual doctoral seminar.
- c. The Milestone Presentation serves as proof that the doctoral student has acquired in-depth knowledge in the subject area and is an opportunity to present the intermediate results of the doctoral project as well as the work schedule.
- d. The Milestone Presentation consists of the following elements:
 - i. A written summary of about 10 pages describing the current status of the research and the future work schedule (Milestone Report). The doctoral students are required to submit the Milestone Report to the advisors and the coordination office at least two weeks before the presentation.
 - ii. A public presentation of at least 30 minutes.

- iii. A non-public oral examination of at least 60 minutes between the doctoral student and the advisors. The Chair of the Doctoral Committee of SC SimTech is entitled to participate in the examination.
- e. The Milestone Presentation may be held in English or German. The Milestone Report may likewise be written in English or German.
- f. The advisors will decide upon the result:
 - i. Passed (without conditions)
 - ii. Passed with specific conditions: The doctoral student may be subject to specific conditions that must be fulfilled and proven by the main advisor. The Milestone Presentation will not have to be repeated.
 - iii. Failed: A failed Milestone Presentation may be repeated once within three months after the examination. If the re-examination is failed, the doctoral student is expelled from GS SimTech.
- g. The main advisor is required to create a written record of the Milestone Presentation in which the topic of the presentation, the date, place and time of the oral examination, the persons present during the examination as well as the result of the examination are stated. The written record must be signed by the main advisor and submitted to GS SimTech.
- h. A publication of the Milestone Report on the website of SimTech is welcome, but not mandatory. The coordination office of GS SimTech will make the necessary arrangements.

2.7. Doctoral Examination

- a. The doctoral examination is carried out pursuant to the Doctoral Degree Regulations of the University of Stuttgart, as last amended. In addition, the following specifications apply to doctoral procedures at GS SimTech:
- b. The Examination Committee is appointed by the Doctoral Committee of SC SimTech in accordance with the Doctoral Degree Regulations. GS SimTech requires at least one of the co-examiners to be external, i.e. not a member of the University of Stuttgart.
- c. In addition to the number of statutory copies specified in the Doctoral Degree Regulations, one additional printed copy of the thesis as well as a digital copy (PDF) must be submitted to the coordination office of GS SimTech.
- d. If the doctoral procedure is conducted with the participation of another faculty of the University of Stuttgart and no public presentation on the topic of the thesis is required, the public presentation will take place additionally before the oral examination (length: 30 minutes).

2.8. Stay Abroad

- a. In general, the doctoral students at GS SimTech are required to stay abroad for up to three months.
- b. Time, duration, location, etc. of the stay abroad are determined by the advisor in agreement with the doctoral student and the co-advisors (Advisor Concept). For the duration of the Cluster of Excellence EXC 2075, funding for the stay abroad can be requested.

2.9. Timeline

The total duration of the doctoral procedure, starting with the admission to GS SimTech, should not exceed four years. The first stage of the doctoral procedure ending with the Milestone Presentation should be completed within the first 1.5 years.