



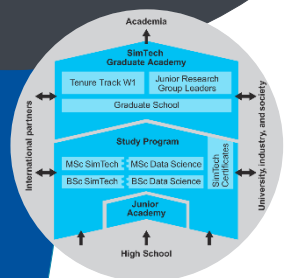
Universität Stuttgart

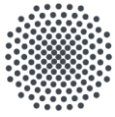
Cluster of Excellence EXC 2075 „Data-Integrated Simulation Science“

Graduate Academy SimTech

Training Program Winter term 2024/25

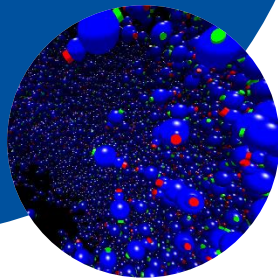
The Graduate Academy of the SC SimTech promotes excellence in postdoctoral and doctoral education across all disciplines in the field of simulation science. It offers an interdisciplinary structured and international training program in order to prepare the candidates with optimal conditions for their successful PhD and beyond.





Graduate Academy SimTech

Overview



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):

Subject-specific courses (at least 6 CP)

(May be selected from the regular courses offered by the University of Stuttgart or from suitable courses outside the University of Stuttgart.)

Key qualification (at least 1 course)

(May be selected from the program offered by GRADUS.)

Units offered by GS SimTech (at least 3 units)

(To be selected from the “Academy Program” of GS SimTech.)

- **GS Seminar (at least 1 seminar)**
- **Additional GS units**
(This program includes, for example, career counseling, mentoring schemes as well as industry connections.)

Annual poster presentation

(For example during the annual status seminar of SC SimTech.)



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GS Seminars during the winter term 2024/25

(to promote interdisciplinary networking among the doctoral students and to expand their scientific horizon)

“Research Software Engineering 102”

Lecturers: Jun.-Prof. Dr. rer. nat. Benjamin Uekermann, Dipl.-Inf. Matthias Braun, Dr. rer. nat. Stefan Meggendorfer, Prof. Dr. rer. nat. Bernd Flemisch, Gerasimos Chourdakis, and Ishaan Desai.

Date/ Time: From October 7th, 2024, to October 11th, 2024, from 9:00 AM to 5:30 PM each day and December, 10th from 2:00 PM to 6:00 PM.

Language: English

Proof of attendance: Regular presence and active participation in exercises and presentations

Please register via [**C@MPUS**](https://campus.uni-stuttgart.de/).

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"Advanced Topics in Simulation Science"

Lecturers: Dr. Kristyna Pluhackova and Dr. Benjamin Unger

Language: English

Date/ Time: 17.10.2024 - 06.02.2025 |

Thursdays, 11.30 - 13.00

Proof of attendance: Regular presence and holding a presentation

Registration: Please register via ILIAS. Limited seats, first come first serve.

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"Data Processing for Engineers and Scientists"

Lecturer: Prof. Dr.-Ing. Felix Fritzen

Description: The course teaches basics in statistics and probability theory, which serve as foundations for data processing. Then the Fourier transform, signal filtering, image processing, kernel methods and a small introduction to artificial neural networks are presented. The lecture is accompanied by an extensive python computer lab. (3 ECTS)

Date/ Time: 14.10.2024 - 03.02.2025 | Mondays, 8.00 – 9.30

There is also an additional exercise on Thu, 8-9:30 a.m. in the same room.

Room: Pfaffenwaldring 5A, Room 0.009

Language: English

Proof of attendance: Regular presence

Registration: Please register via C@MPUS.
Limited seats, first come first serve.

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"Selected Chapters in Data Processing: Microstructure Analysis and Synthesis"

Lecturer: Prof. Dr.-Ing. Felix Fritzen

Description: This special topic course focuses on applications of data and image processing for microstructure synthesis and analysis. In the small group we will discuss how to generate simple artificial microstructures. The lecture is seminar-like and a microstructure synthesis or analysis related project (including python coding) must be given by the participants. (Lecture, 3 ECTS)

Date/ Time: Mondays, 9.45 – 11.15 a.m. (further information on ILIAS)

Room: UN32, R219

Language: English

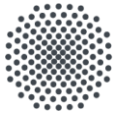
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Registration: Please register via C@MPUS.
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"Foundations and Frontiers of Data-Integrated Simulations"

Lecturer: Prof. Xiao Heng

Description: Computer simulation and data science have emerged as the third and fourth pillars of scientific inquiry, complementing the traditional pillars of theory and experimentation that have underpinned scientific progress for centuries. Data-integrated simulation, a hybrid approach that bridges these newer disciplines, has become increasingly pivotal. This course introduces the mathematical foundations, advanced methods, and research frontiers of data-integrated simulations. It focuses on the fundamental principles of combining data with physical simulations and their implementation in modern data-driven techniques.

Room: Universitätsstraße 32, Room 32.225

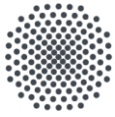
Language: English

Date/ Time: 14.10.2024 - 02.12.2024 | Mondays, 14.00 – 15.30 and 17.10.2024 – 05.12.2024 | Thursdays, 11.30 – 13.00

Proof of attendance: Regular presence in the lecture

Registration: Please register via C@MPUS.

Limited seats, first come first serve.



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"Introduction to Asymptotic Analysis and Homogenization Theory"

Lecturer: SFB 1313 associated researcher Prof. Taras Mel'nyk, University of Stuttgart/Taras Shevchenko National University of Kyiv (Ukraine)

Description: Asymptotic analysis is a powerful mathematical tool for understanding the behavior of functions and solutions to problems as inputs become large or small. Asymptotic approaches are widely used in various fields, including physics, engineering, and computer science, to simplify complex equations and gain insights into the behavior of systems.

Homogenization theory is a collection of asymptotic methods used to study the behavior of heterogeneous materials by averaging their properties to derive effective macroscopic models. The course consists of three lectures. The first lecture introduces the main concepts of asymptotic analysis, while the subsequent ones focus on the theory of homogenization. The presentation of the material will be brief but comprehensive to ensure a clear understanding of the topic, with rigorous mathematical proofs and justifications provided.

Location: University of Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart, Fakultätssaal 8.122

Language: English

Date/ Time: 10th February 2025, 11th February 2025 and 12th February 2025: 2 - 3:30 pm CET on all days

Registration: Registration via e-mail to Taras Mel'nyk: Taras.Melnyk@mathematik.uni-stuttgart.de (Please include your full name and your faculty in your email)



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"Machine Learning Meets Law"

Date and Time: Wednesday 5 February 2025 between 9:00 AM to 4:00 PM

Location: Lecture hall, Maria-von-Linden-Str. 6, 72076 Tübingen

Program: <https://ailawinstitute.de/wp-content/uploads/2024/12/Program.pdf> (jointly organized by the ML Cluster and the CZS Institute for AI and Law)

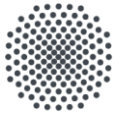
Registration: <https://forms.gle/1CiGaoE1EsmBP2KU7> , first come first serve

For further inquiries, please contact ailawinstitute@uni-tuebingen.de

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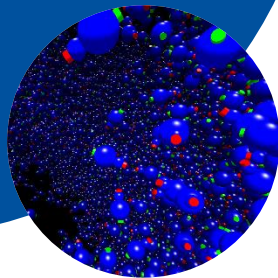


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Coursera for doctoral students

The interdisciplinary nature of our cluster requires a broad spectrum of practical knowledge in different tools and skills that may not have been part of a PhD student's education. Skills such as Git, Data Management and Machine Learning can be acquired. Lectures are prepared by official and well-known universities and companies such as Princeton University and IBM respectively in a broad spectrum of application.

Further information on “How to apply” can be found in [Confluence](#).

Please register via [Coordination GS SimTech](#).

Early Career Counseling

Please contact the [Coordination GS SimTech](#).