

Welcome to Cysec BSc!

Dr.-Ing. Ben Stock



Welcome

To your first Semester!



Current study programs at SIC

Bachelor	Master	Staatsexamen	Doctorate
• Computer Science • Bioinformatics • Embedded Systems • Media Informatics • Cybersecurity • Cybersecurity (English), since WS 2021 • Mathematics and CS • Computational Linguistics • <i>Data Science and AI</i>	• Computer Science • Bioinformatics • Embedded Systems • Media Informatics • Visual Computing • Mathematics and CS • Language Science & Technology • <i>Data Science and AI</i> • Cybersecurity (since 2021)	• Lehramt Informatik (“Didactics of Informatics”)	• Graduate School after completion of the Bachelor



Example Course of studies (German BSc)

1	Programmierung 1 (9 CP)	Mathematik für Informatiker 1 (9 CP)	Foundations of Cyber Security 1 (9 CP)	FP: Ringvorlesung (2 CP)	29
2	Programmierung 2 (9 CP)	Mathematik für Informatiker 2 (9 CP)	Foundations of Cyber Security 2 (6 CP)	Statistics Lab (6 CP)	30
	In Semester Break: Softwarepraktikum (9 CP)				9
3	Elements of Machine Learning (6 CP)	Grundzüge der theor. Informatik (9 CP)	Algorithmen und Datenstrukturen (6 CP)	Cyber Security Proseminar (5CP)	26
4	Cryptography (9 CP)	Systemarchitektur (9 CP)	Wahlpflicht Grundlagen der Informatik (6 CP)	FP: Tutor (4 CP)	28
5	Cyber Security Project (9 CP)	Cyber Security Seminar (7 CP)	Vertiefung I – Cyber Security (6 CP)	Vertiefung II - Cyber Security (6 CP)	28
6	Vertiefung III - Cyber Security (6 CP)	Bachelor Seminar (9 CP)	Bachelor Arbeit (12 CP)	FP: Sprachkurs (3 CP)	30



Example Course of studies (English BSc)

1	Programmierung 1 (9 CP)	Mathematik für Informatiker 1 (9 CP)	Foundations of Cyber Security 1 (9 CP)	Mandatory Elective (3 CP)	30
2	Programmierung 2 (9 CP)	Mathematik für Informatiker 2 (9 CP)	Foundations of Cyber Security 2 (6 CP)	Language Course (6 CP)	30
3	Cyber Security Lab (6 CP)	Introduction to TCS (9 CP)	Fundamentals in Data Structures & Algorithms (6 CP)	Cyber Security Proseminar (5CP)	26
4	Cryptography (9 CP)	System Architecture (9 CP)	CySec Complementary Lecture (6 CP)	Statistics Lab (6 CP)	28
	Software Engineering Lab in semester break (9 CP)				9
5	Advanced Lecture CySec (6 CP)	CySec Seminar (7 CP)	CySec Complementary Lecture (6 CP)	Elements of ML (6 CP)	28
6	Advanced Lecture CySec (6 CP)	Bachelor Seminar (9 CP)	Bachelor Thesis (12 CP)	Mandatory Elective (3 CP)	30



Lecture content in the first semesters

- [Foundations of Cyber Security 1](#): Cryptography, Network Security, Web Security, Privacy
- [Foundations of Cyber Security 2](#): System Security, Mobile Security, Hardware Security
- [Mathematics for Computer Scientists 1](#): Foundations of discrete mathematics, Analysis
- [Mathematics for Computer Scientists 2](#): Algebra
- [Programming 1](#): functional programming (ML), Algorithms
- [Programming 2](#): object-oriented programming (Java)
- **All in all, there are no actual dependencies between lectures**
- **Foundations of CySec 1 and CySec 2 are in English!**



Specialization options

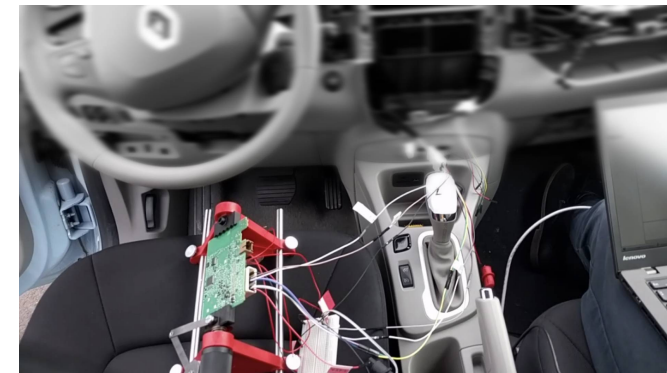
- Practical courses:
 - Web Security, Mobile Security
 - Physical-Layer Security, Side-Channel Attacks and Defenses
- Theoretical courses:
 - Privacy Enhancing Technologies
 - Verification
 - Accountability
- Complementary lectures:
 - Usable Security
 - Recht der Cybersicherheit
 - Data Analytics





Course of studies: practical focus

- Proseminar: Influential Papers in Web Security
- Adv. lecture 1: Physical-Layer Security
- Adv. lecture 2: Side Channels A&D
- Adv. lecture 3: Foundations of Web Security
- Seminar: Advanced Fuzzing Techniques
- Bachelor thesis: CAN-Bus Fuzzing to detect vulnerabilities or side-channels in cars?







Your first semester: Example schedule

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
8-10							
10-12			Math 1	Prog 1	Math 1		
12-14							
14-16	Ring lect.	Prog 1		CySec 1			
16-18							
18-20							
20-22							



Your first semester: Example schedule

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
8-10	Sleeping	Sleeping	Sleeping	Hangover	Sleeping		
10-12	Sleeping	Sleeping	Math 1	Prog 1	Math 1		
12-14	Sport	Reading	Food	Food	Sport		
14-16	Ring lect.	Prog 1	Sleeping	CySec 1	Job		
16-18	Gaming	Job	Beering	Netflix	Job		
18-20	Gaming	Job	Beering	Netflix	Job		
20-22	Beering	Job	More beering	Netflix	Cinema		



Your first semester: Example schedule

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
8-10							
10-12			Math 1	Prog 1	Math 1		
12-14							
14-16	Ring lect.	Prog 1		CySec 1			
16-18							
18-20							
20-22							



Your first semester: Example schedule

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
8-10							
10-12	CySec I Exercise		Math 1	Prog 1	Math 1		
12-14							
14-16	Ring lect.	Prog 1	Prog 1 Exercise	CySec 1			
16-18	CySec I Project				Math 1 Exercise		
18-20	CySec I Project						
20-22							



Your first semester: Example schedule

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
8-10							
10-12	CySec I Exercise	Exercise prep.	Math 1	Prog 1	Math 1		
12-14	Exercise prep.	Exercise prep.	Study Math 1	Study Prog 1			
14-16	Ring lect.	Prog 1	Prog 1 Exercise	CySec 1	Study Math 1		
16-18	CySec I Project	Study Prog 1	Exercise prep.	Study CySec 1	Math 1 Exercise		
18-20	CySec I Project						
20-22							



Vorlesungsverzeichnis (WiSe 2024/25)

Seitenansicht wählen: → [kurz](#) → [mittel](#) → [lang](#)

① Vorlesungsverzeichnis

→ ① MI Fakultät für Mathematik und Informatik

→ ① Informatik

→ ① Studiengänge Cybersicherheit / Entrepreneurial Cybersecurity

→ ① Bachelor Cybersicherheit, StO 2020

→ ① Vertiefungsvorlesungen

Vst.-Nr.	Veranstaltung	Vst.-Art	Aktion
153829	Side-Channel Attacks and Defense - Schwarz	Weiterführende Vorlesung	
153840	Mobile Security - Bugiel	Weiterführende Vorlesung	
153841	Automated Debugging - Zeller	Weiterführende Vorlesung	
153842	Parameterized Algorithms - Marx	Weiterführende Vorlesung	
153843	Advanced Public Key Encryption - Döttling	Weiterführende Vorlesung	
153844	Formal analysis of real-world security protocols - Cremers	Weiterführende Vorlesung	
153881	Automata, Games, and Verification - Finkbeiner	Weiterführende Vorlesung	

<https://www.lsf.uni-saarland.de/>



Course Management System (CMS)



- cms.cispa.saarland
- cms.sic.saarland

Games in Machine Learning

Advanced Lecture - Tatjana Chavdarova, Sebastian Stich

Machine Learning in Cybersecurity

Advanced Lecture - Mario Fritz

Mobile Security

Advanced Lecture - Sven Bugiel

Robustness in Machine Learning

Advanced Lecture - Xiao Zhang

Security Testing

Advanced Lecture - Andreas Zeller

Side-Channel Attacks and Defenses

Advanced Lecture - Michael Schwarz

Systems Security

Advanced Lecture - Ali Abbasi, Thorsten Holz

Elements of Machine Learning

Basic and Advanced Lecture - Krikamol Muandet and Jilles Vreeken

Foundations of Cybersecurity 1

Basic Lecture - Ben Stock

Security (WS 2023/2024)

Core Lecture - Thorsten Holz

Verification

Core Lecture - Bernd Finkbeiner

Perspectives of Entrepreneurial Cybersecurity

Lecture Series - Sven Bugiel, Giancarlo Pellegrino

Cybersecurity Lab

Practical Training - Ben Stock

CySec Project Winter Term '23/24

Project - CISPA

Decision Procedures for Verification and Synthesis

Proseminar - Rayna Dimitrova

Usable Security Research to Enhance Online Child Protection

Proseminar - Carolyn Guthoff, Katharina Krombholz

Wireless and Mobile Security

Proseminar - Mridula Singh

Advanced Theory of Secure Messaging

Seminar - Cas Cremers

An Extravaganza of Algorithmic Models

Seminar - Sebastian Brandt, Alexandre Nolin

Complexity of Games

Seminar - Dániel Marx, Tim Hartmann

Machine Learning Security Reproducibility

Seminar - Lea Schönherr

Mining Input Structures

Seminar - Rafael Dutra + Andreas Zeller

New Developments in PETS

Seminar - Wouter Lueks

Privacy of Machine Learning

Seminar - Yang Zhang

Pruning deep neural networks for lottery tickets

Seminar - Rebekka Burkholz

Static Program Analysis Lab

Seminar - Jordan Samhi + Andreas Zeller

The Web Security Seminar

Seminar - Aurore Fass, Giancarlo Pellegrino, Cristian-Alexandru Staicu, Ben Stock



Central registration for (Pro)Seminars

- All seminars and proseminars are assigned centrally.
 - Resolve problems from the past:
Waiting lists, overbooked seminars, no places for some students
- <https://seminars.cs.uni-saarland.de>

SIC Seminars



Seminar Assignment

Winter Term 2023

Proseminar Assignment Winter 2023/2024

Seminar Assignment Winter 2023/2024



Preparing for your thesis

- Choose your courses strategically
 - Check out the research that the group does – is that interesting? If so, figure out if they have a lecture/seminar/etc
- Approach (or better: impress) potential supervisors
 - Best case: focus on doing really well in the lecture/seminar of your potential supervisor
- Consult the student council FAQ for theses: <https://cs.fs.uni-saarland.de/en/faq/thesis/>



Introducing CISPA (1/2)

- CISPA – Helmholtz Center for Information Security
 - Member of the Helmholtz Association since 01/2019 ($\approx$ 50M Euro funding / year)
 - New campus in St. Ingbert by ~~2027~~ ~~2028~~ 2029
- Currently, about 650 employees
 - 40+ Faculty and Senior Researchers, 240+ PhD students and postdocs, 90+ Hiwis
 - 250+ Administration / Scientific Services
- CISPA is among the world's elite in cybersecurity research
 - According to csrankings.org, currently the leading institution in the field of IT security world-wide



#	Institution	Count	Faculty
1	▶ CISPA Helmholtz Center  	100.1	27
2	▶ Georgia Institute of Technology  	64.1	26
3	▶ Purdue University  	52.2	21
4	▶ Univ. of Illinois at Urbana-Champaign  	44.6	25
5	▶ ETH Zurich  	44.0	16



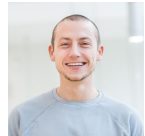
Introducing CISPA (2/2)



Brandt



Döttling



Hanzlik



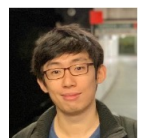
Joux



Marx



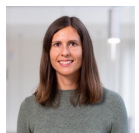
Lenzen



Quach



Sasy

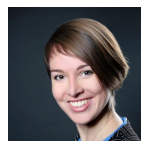


Riepel

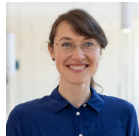
**RA1: Algorithmic
Foundations
& Cryptography**



Backes



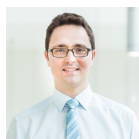
Boenisch



Burkholz



Dziedzic



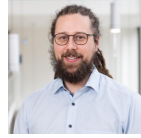
Fritz



Lueks



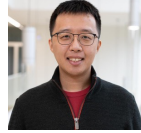
Muandet



Stich



Vreeken



X. Zhang



Y. Zhang

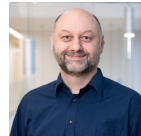
**RA2: Trustworthy
Information Processing**



Cremers



Dimitrova



Finkbeiner



Jacobs

**RA3: Reliable Security
Guarantees**



Schwarz



Schönherr



Zeller

**RA4: Threat Detections &
Defenses**



Abbasi



Bugiel



Rossow



Singh



Tippenhauer

**RA5: Secure Connected
and Mobile Systems**



Fahl



Fass



Golla



Krombholz



Pellegrino



Stock

**RA6: Empirical and
Behavioral Security**



Career path for students at CISPA

- Outstanding students from courses can work as Hiwi (student assistant)
 - First, familiarization with the topic, then assignment to research projects
- As a student assistant, it is much easier to start with the bachelor's thesis
 - The goal is already the first proper publication
- Afterwards, Grad School for the doctorate
 - Various topics in IT security are possible
 - Top infrastructure at CISPA
- Future at CISPA Helmholtz Center for Information Security
- Or: Create a startup with the help of CISPA



Points of contact

- **Always the first point of contact:** Fachschaft (Students Council)
 - E1 3, Room 109, <https://cs.fs.uni-saarland.de/>
- For examination matters: **Prüfungssekretariat** (Examination Office)
 - Responsible: Ellen Wintringer (cybersicherheit@ps-mint.uni-saarland.de)
<https://www.ps-mint.uni-saarland.de/>
- **Studienkoordinatorin** (Study Coordinator): : E1 3, Room 209, via email:
studium@cs.uni-saarland.de
- Possibly further step:
 - **Dr. Ben Stock** (general contact person for the study program)
Kaiserstraße 21, St. Ingbert - Appointment by agreement
 - **Prof. Andreas Zeller** (examination matters)
Appointment by agreement

Viel Erfolg! Good Luck!

– Do you have criticism or suggestions for improvement? –
Please feel free to contact us!

stock@cispa.de



https://www.reddit.com/r/cysec_memes/
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