We explore the foundations and find solutions.
Quick Facts

- Profile Area of TU Darmstadt since 2015
- Permanent unit strengthening the research profile of the university
- Growth since 2008 based on funding by the Federal State of Hesse through LOEWE Center CASED (2008-2016), leading to seven new professorships in IT security since 2008 at TU Darmstadt
- 250+ Researchers with emphasis on IT security aspects
Research Profile of TU Darmstadt

Six profile areas represent the core competencies of TU Darmstadt:

1. Cybersecurity
2. Future Energy Systems
3. Internet and Digitisation
4. Matter and Radiation Science
5. Thermo-fluids & Interfaces
6. From Material to Product Innovation
Governance

Spokesperson

Prof. Johannes Buchmann

Deputy Spokesperson

Prof. Stefan Katzenbeisser

General Manager

Dr. Karin-Irene Eiermann
## Task Forces

<table>
<thead>
<tr>
<th>Scientific Excellence</th>
<th>Cooperation, Spin-Offs, and Transfer</th>
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<tr>
<td>Ahmad Sadeghi</td>
<td>Peter Buxmann</td>
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<td><img src="image" alt="Peter Buxmann" /></td>
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<tr>
<th>Promotion of Young Researchers</th>
<th>International Affairs</th>
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<tr>
<td>Marc Fischlin</td>
<td>Neeraj Suri</td>
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<tr>
<th>Teaching</th>
<th>Prizes and Academic Honors</th>
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<tr>
<td>Stefan Katzenbeisser</td>
<td>Mira Mezini</td>
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<td><img src="image" alt="Stefan Katzenbeisser" /></td>
<td><img src="image" alt="Mira Mezini" /></td>
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IT Security Research Groups

Johannes Buchmann
Cryptography & Computer Algebra (Spokesperson)

Stefan Katzenbeisser
Security Engineering (Deputy Spokesperson)

Patrick Eugster
Distributed Systems Programming

Marc Fischlin
Cryptography & Complexity Theory

Matthias Hollick
Secure Mobile Networking

Heiko Mantel
Modeling and Analysis of Information Systems

Mira Mezini
Software Technology

Max Mühlhäuser
Telecooperation Lab

Ahmad-Reza Sadeghi
System Security

Neeraj Suri
Embedded Systems & Software

Melanie Volkamer
Security, Usability & Society

Michael Waidner
Security in Information Technology
CYSEC is interdisciplinary

30+ Research Groups from 8 Departments
Main Pillars of CYSEC
Research – Diversity of Topics
Research Areas Overview

- **Human and Societal Aspects**
  - Value Dimensions, Law & Economics
  - Cognitive & User-centric Technology

- **S&P Applications**
  - Genomic Data & Computing
  - IoT / Smart City
  - Reputation Systems
  - Collaborative Autonomous Systems

- **S&P Infrastructures**
  - Computation & Storage
  - Networks
  - Cloud
  - Architectures & Platforms

- **S&P Building Blocks**
  - Cryptography
  - Languages
  - Hardware
  - Software
  - PETS
  - ML & Data Analytics

- **S&P Foundations**
  - Privacy
  - Security
  - Trust and Consensus

- **Assessment**
  - Verification
  - Risk & Vulnerability Analysis
  - Quantification
CYSEC Research Profile

- Shows all research areas, people, topics and projects within CYSEC and their interdependence

- [www.cysec.tu-darmstadt.de/research](http://www.cysec.tu-darmstadt.de/research)
Collaborative Projects

funded by DFG
Deutsche Forschungsgemeinschaft
2014 - 2018
7.5 mil. €
2015 - 2020
5.2 mil. €

funded by CROSSING
2010 - 2017
2.45 mil. €

funded by CRISP
Center for Research in Security and Privacy
2015 – 2019
22.6 mil. €

funded by LOEWE
Excellent Research for Hesse’s Future
2015 - 2017
4.5 mil. €

funded by NICER
2010 - 2017
4.5 mil. €

funded by Industry
since 2012
4.8 mil. € (Intel: 1.2 mil. €)
Collaborative Project – CROSSING

- CROSSING - Cryptography-Based Security Solutions: Enabling Trust in New and Next Generation Computing Environments

- Collaborative Research Center funded by Deutsche Forschungsgemeinschaft (DFG) since 2014


- 65+ researchers from 16 research groups collaborate
Post-Quantum Cryptography
Collaborative Project – Doctoral College “Privacy and Trust”

- Privacy and Trust for Mobile Users
- Doctoral College funded by Deutsche Forschungsgemeinschaft (DFG) since 2015
- Financing Volume: 5.28 million €
- 13 Professors, 8 associated Post-Docs, 3 Coordinators
- Collaboration between departments Computer Science, Law, Economics and Sociology at TU Darmstadt and Universität Kassel
Collaborative Project – RS³

- RS³ - Reliably Secure Software Systems

- Funded by Deutsche Forschungsgemeinschaft (DFG) as a Priority Programme from 2010 to 2017

- Financing Volume: 2.45 million € at TU Darmstadt, in total 12 million €

- Topics include E-Voting, Mobile Devices, Web-based Workflow Management Systems
Collaborative Project – NICER

- **NICER** - Networked Infrastructureless Cooperation for Emergency Response
- Funded by State Hesse’s LOEWE programme (Landes-Offensive zur Entwicklung Wissenschaftlich-ökonomischer Exzellenz) from 2015 to 2017
- Financing Volume: 4.5 million €
- Collaboration between TU Darmstadt, Universität Kassel, and Phillips Universität Marburg
- 18 Professors and Research Associates from TU Darmstadt
Collaborative Project – Intel CRI-SC

- **ICRI-SC** - Intel Collaborative Research Institute for Secure Computing

- Funded by Intel since 2012, first Intel CRI for IT security outside USA

- Financing Volume: 4.8 million €

- Collaboration between TU Darmstadt, University of Helsinki, and Aalto University

- Objective: Advance trustworthiness of mobile and embedded devices and ecosystems by bringing experts from academia and industry together to help explore and invent in the next generation of high-impact technologies
A Member of CRISP

CYSEC represents TU Darmstadt within CRISP (Center for Research in Security and Privacy).

Focus of research is Security at Large.
Cybersecurity in Darmstadt
Teaching – M.Sc. IT Security

Students acquire comprehensive knowledge in the following mandatory areas of study:

- **Cryptography**: modern encryption methods as well as other basic cryptographic primitives
- **System Security**: Embedded System and Network Security
- **Software Security**: software security and reliability, the design of security architectures for large IT systems

in addition to knowledge in other classical areas of Computer Science (OS, Software Engineering, etc.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Students</th>
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<tbody>
<tr>
<td>2011</td>
<td>28</td>
</tr>
<tr>
<td>11/12</td>
<td>49</td>
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<tr>
<td>12/13</td>
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<td>15/16</td>
<td>200</td>
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<tr>
<td>16/17</td>
<td>226</td>
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Growth in number of students since 2011
CYSEC: Transfer

Industry Partners

- DB (Mobility Networks Logistics)
- SAP
- Deutsche Telekom
- Intel
- Cisco
- Lufthansa
- software AG
- ROHDE & SCHWARZ (Cybersecurity)
- Micromata

Startups

- QUANTICOR SECURITY
- IT-SEAL (Social Engineering Analysis Labs)
- Kullo (Secure Messaging)
- Privalino (Kinder chatten sicher.)
Cooperation and Transfer

- **CYSIS** – Cyber Security for Critical Infrastructures
- Research group within the Alliance for Innovation between TU Darmstadt and Deutsche Bahn AG since 2016
- Answers to digitization-related challenges in the rail sector
- ICT-Security at the interface of trains and track system, i.e. process control and security technology
Achievements (Selection)

- May ‘16 | GFFT (Gesellschaft zur Förderung des Forschungstransfers e.V.) appoints CYSEC-Spokesperson Prof. Johannes Buchmann as Honorary Member

- March ‘16 | OmniShare wins European competition „Privacy via IT Security: Innovating Mobile Apps”

- March ‘16 | CodeInspect wins the HIGHEST Startup competition’s second prize at TU Darmstadt
Achievements (Selection)

- October ‘16 | **Prof. Eric Bodden** and a team of young researchers win the German IT Security Prize 2016 (1st Prize, 100.000€ prize money)

- October ‘16 | **Dr. Lucas Davi** wins the ACM Sigsac Doctoral Dissertation Award

- November ‘16 | **M.Sc. Tommaso Frassetto** wins second prize at the CAST Promotion Prize IT-Security

- November ‘16 | **Prof. Mira Mezini** is elected a member of acatech – National Academy of Science and Engineering
Events

- February ‘16 | Kick-Off of the “Roundtable Cybersecurity Hessen“
  - CYSEC Demonstrators
  - Awareness Project (Awareness of Public Service Employees)
Events

- July ’16 | Members of the Hessian Parliament visit CYSEC to learn about our cybersecurity research
Events

SPW2016 | Conferences & Workshops
Security & Privacy Week 2016

- 3 Conferences with a total of 400 guests
  - PETS – Privacy Enhancing Technologies Symposium
  - WiSec – Security and Privacy in Wireless and Mobile Networks
  - TM – International Conference on Trust Management

- 8 Workshops, among them Medical Privacy, Usable Security and Protection of Long-Lived Systems

Website: spw2016.de | Twitter: @spw2016
Events

- October ‘16 | **ACM CCS 2016** – the largest international IT security conference with, for the first time, more than 1000 participants – organized by CYSEC Deputy Spokesperson Prof. Stefan Katzenbeissner as General Chair
International Strategic Partnerships

- Technion, Israel
- Academia Sinica, Taiwan
- TU Graz, Österreich
Taiwan:
Research Cooperation Agreement
Taiwanese Delegation Visit

Visit of Delegation of Dr. Yi-Bing Lin, Deputy Minister, MOST Taiwan, March 24, 2015
Taiwan cooperation: Long-term Development

- 2007: Humboldt Research Award for Prof. Der-Tsai Lee (Award-related research time spent at TU Darmstadt)
- 2009: Agreement between Department of Computer Science at TU Darmstadt and Academia Sinica Research Center for Information Technology Innovation (CITI) to promote scientific research cooperation
- 2011-2013: Prof. Chen-Mou Cheng (NTU) is an Alexander von Humboldt Fellow at TU Darmstadt
- 2012: Prof. Johannes Buchmann receives Tsuming-Tu Prize
- 2016: CYSEC and Academia Sinica CITI sign Cooperation Agreement
Taiwan Cooperation: Project Example 1

- November 2016: Acceptance of DAAD project "Deidentification Technology and Tools for Data Privacy Management" by Dr. Yen-Nun Huang (Director, CITI, Academia Sinica) and Prof. Neeraj Suri (CYSEC, TU Darmstadt) in the funding program "Projektbezogener Personenaustausch Taiwan 2017"

- Visit of Prof. Neeraj Suri with Dr. Yen-Nun Huang leads to joint DFG-MOST proposal being submitted
Taiwan Cooperation: Project Example 2

- 2-year research stay of postdoctoral fellow Dr. Hsuan-Yin Lin (National Chiao Tung University, NCTU) at the Secure Mobile Networking Lab of Prof. Matthias Hollick (CYSEC, TU Darmstadt)

- Prof. Yunghsiang S. Han (National Taiwan University of Science and Technology, NTUST) and Prof. Po-Ning Chen (NCTU) also visited Prof. Matthias Hollick as grantees of the Partnership Program for the Connection to the Top Labs in the World, funded by the MOST Taiwan 科技部 Ministry of Science and Technology
Infrastructure – New Building in 2019

New Building for Cybersecurity Research

1850 m² Offices and Laboratories
107 Office Workplaces
4 Storeys
10.5 mil. € Construction Costs
Thank you for your attention.

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