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Courses in winter term 2021/22

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Prof. Dr. Markus Bläser

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Complexity of bilinear problems

- Monday 10:15–12:00
- Thursday 12:15–14:00
- starts Oct 21
- specialized lecture, 6 CP
- tutorial every second Thursday
- online lecture

- Flagship question: How fast can we multiply matrices?
- Solid knowledge of linear algebra is highly recommended

- Web: `cms.sic.saarland/bil2122/`
- Contact: Markus Bläser `mblaeser@cs.uni-saarland.de`

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Dr. Aleksandar Bojchevski

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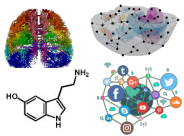
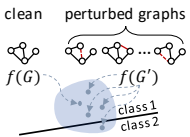
Trustworthy Graph Neural Networks Seminar

CISPA HELMHOLTZ CENTER FOR INFORMATION SECURITY

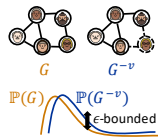
TL;DR: GNNs + [Robustness | Privacy | Fairness | Explainability | Uncertainty]

trustworthiness aspects

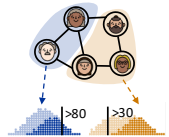

graphs across domains



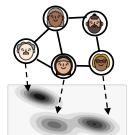
robustness certificates



privacy guarantees



fairness constraints


uncertainty estimates

Organization: Block format, Kick-off meeting via Zoom, Final presentations at the end
Grade: Seminar paper (40%, 4 pages), Presentation (30%), Reviews (3 × 10%)
Lecturer: Dr. Aleksandar Bojchevski, bojchevski@cispa.de, abojchevski.github.io

Website: `https://cms.cispa.saarland/tgnn_ws21/`

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Prof. Dr. Karl Bringmann

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Algorithms and Data Structures

Core Course 9CP

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mpi

You will learn:

- Fundamental problems
- Efficient algorithms
- Algorithmic problem solving

Topics:

- Algorithms on graphs, strings, polynomials, points & lines, …
- Randomized algorithms
- Advanced data structures using amortized analysis

Details:

Intensive block course: February 28 – March 25 with 2 lectures per day

Lecturers: Prof. Karl Bringmann, Prof. Raimund Seidel

Requirements: introductory course on algorithm design

Website: https://cms.sic.saarland/algodat_21/

Online participation will be possible

Fine-Grained Complexity Theory

Advanced Lecture 5CP

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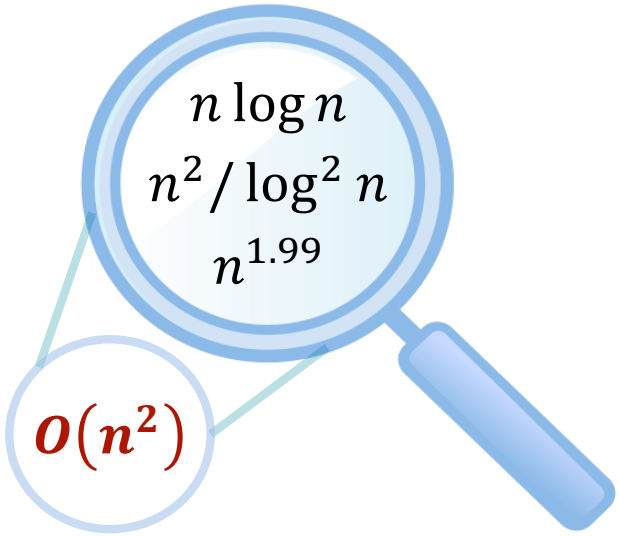
P vs NP is too coarse!

Even $O(n^2)$ can be too slow!



What you will see:

A fine-grained view on complexity theory

Conditional lower bounds and algorithm design

Where+When: Monday 14:15-16:00 hybrid (in room 024 E1.4 or on Zoom)

Lecturer: Prof. Karl Bringmann

Requirements: basics in algorithm design and theoretical computer science

Website: https://cms.sic.saarland/finegrained/

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Derek Dreyer, Ph.D.

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We will use Coq!

Semantics

Wed, Fri: 10:15-11:45
Room 002, E1.3
+ Zoom option
More details on CMS

- Formalize what programs do
- Show that they do the right thing!

Type systems

$$\frac{\Delta \vdash \mathrm{A} : \mathbf{T} \quad \Delta;\, \Gamma, x : \mathrm{A} \vdash e : \mathrm{B}}{\Delta;\, \Gamma \vdash \lambda x : \mathrm{A}.\, e : \mathrm{A} \to \mathrm{B}}$$

Semantic models

$$[\![A \to B]\!]_\delta \triangleq \lambda\, v.\ \square \left(\forall w.\ [\![A]\!]_\delta(w) \twoheadrightarrow [\![B]\!]^{\mathrm{e}}_\delta(v\, w)\right)$$

Program logics

$$\frac{\{\mathrm{P}_1\}\ \mathbf{C_1}\ \{\mathrm{Q}_1\} \quad \{\mathrm{P}_2\}\ \mathbf{C_2}\ \{\mathrm{Q}_2\}}{\{\mathrm{P}_1 * \mathrm{P}_2\}\ \mathbf{C_1} \,||\, \mathbf{C_2}\ \{\mathrm{Q}_1 * \mathrm{Q}_2\}}$$

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Prof. Bernd Finkbeiner, Ph.D.

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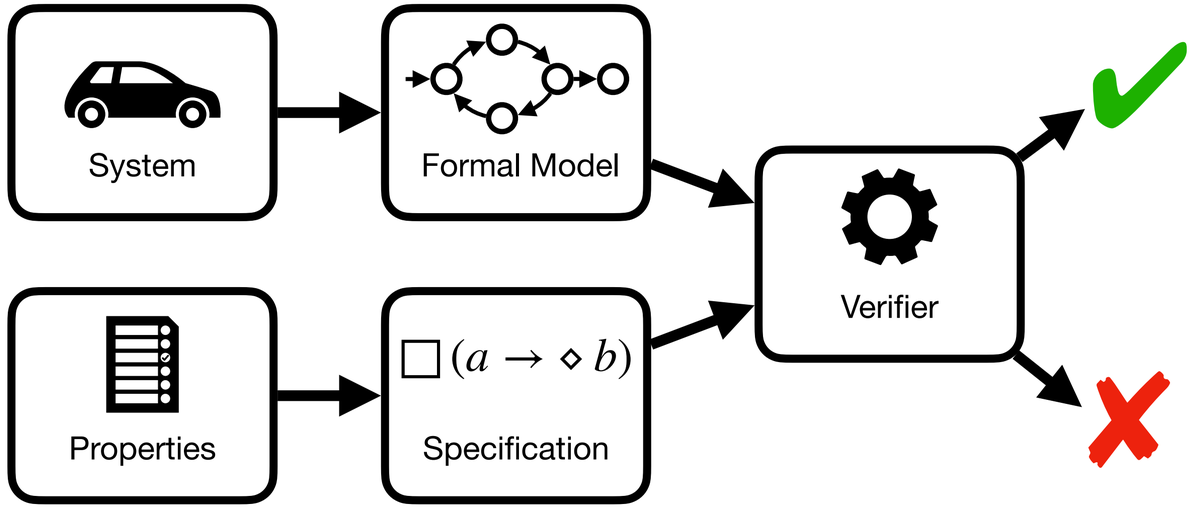
Verification

Prof. Bernd Finkbeiner, Ph.D.



Core lecture with course project and weekly assignments = **9** ECTS

Lecture: Tue 14-16 and Thu 10-12 in HS001, E1 3 **and** online
Tutorials: Fri 10-12 or 12-14 in Room 206, E1 1 **and** online
Office Hour: Wed 10-12 in Room 106, E1 1 **and** online

Check out our CMS!

www.verification.saarland

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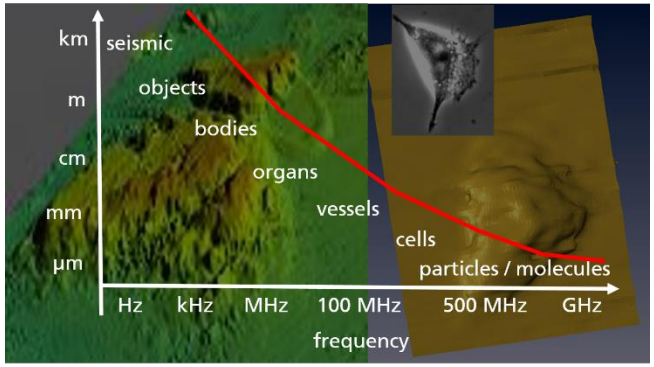
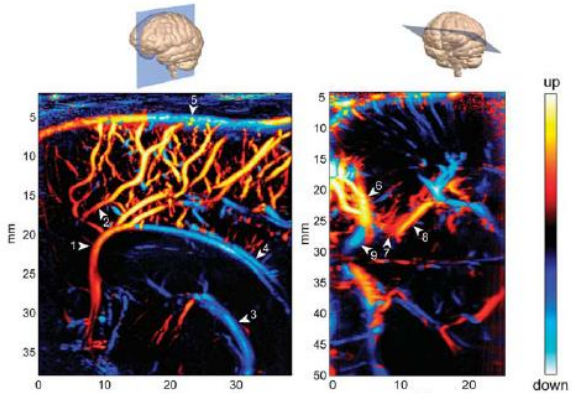
Weekly lecture Mo 16-17h30 (or block seminar in Jan/Feb 2022)

- Lecture in English
- Final written or oral exam



- Topics:
  - Physics of Ultrasound
  - Ultrasound Signal Processing
  - Ultrasound Systems and Transducers
  - Ultrasound Imaging modalities (B-mode, Doppler,…)
  - Ultrasound Image Reconstruction → from signals to images
  - Technical Ultrasound Applications (NDT, Sonar)
  - Molecular imaging & hybrid approaches



Tanter et al: Journal of Cerebral blood flow & metabolism (2014), 34, 1009-1017

- Please register:
  - Dr. Marc Fournelle (+49 6897 9071 310)
  - marc.fournelle@ibmt.fraunhofer.de

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Prof. Dr. Thorsten Herfet

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Courses WS2021/22
Telecommunications Lab

Prof. Dr.-Ing. Thorsten Herfet

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Digital Transmission & Signal Processing

- Core- / Advanced Lecture 9CP (4L2T)
  - Tuesdays 12:15–13:45, Wednesdays 08:30–10:00, **Start October 19th**
  - Lectures & Tutorials: **MS-Teams** (LIVE, recordings available to class)
  - Assignments & Quizzes: **UdS-Moodle** (100% paperless)
- All major building blocks of modern telecommunication systems
  - Discretization (Sampling & Quantization), Digital Modulation (PSK, QAM), Multicarrier-Transmission (OFDM), Forward Error Coding
- …and the underlying mathematical foundations
  - Fourier-, Laplace-, Z- and Hilbert-Transforms, Algebra on Finite Fields (Prime Fields and extended Prime Fields), Stochastic Signal Analysis
- **Registration mandatory via Moodle**: https://lms.sulb.uni-saarland.de/moodle/enrol/index.php?id=5802
  - Will be duplicated into MS-Teams for all registered students!

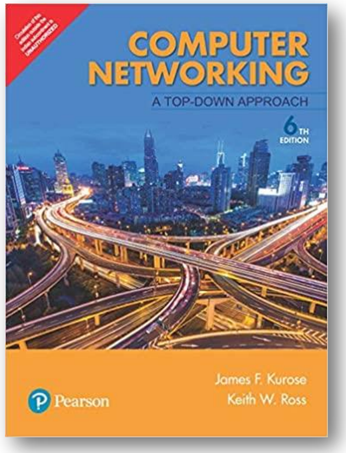
Multimedia Transport

- Core- / Advanced Lecture 9CP (4L2T)
  - Tuesdays 10:15–11:45, Wednesdays 12:15–13:45, **Start October 19th**
  - Lectures & Tutorials: **MS-Teams** (LIVE, recordings available to class)
  - Assignments & Quizzes: **UdS-Moodle** (100% paperless)
- All major components of multimedia streaming
  - Latency- and Resilience-Awareness, Congestion- & Flow Control, Adaptive Hybrid-ARQ, Video- and Audio-Coding
- …and the underlying mathematical foundations
  - Markov-Chains, Gilbert-Elliot Erasure Channel Models, LDPC-Coding, Residual Error Rate Calculation, Delay Budgets
- **Registration mandatory via Moodle**: https://lms.sulb.uni-saarland.de/moodle/enrol/index.php?id=5803
  - Will be duplicated into MS-Teams for all registered students!

Hands on Spring 2022*

Hands on Networking

- Practical / Advanced Course 6CP (2L2T)
  - Block Course CW11/12 2022 (**14.–25. March 2022**), daily 8:30–15:00
  - Individual project work (**–10. April 2022**)
  - Admission test in January (date to be communicated)
  - Course Announcements and Material: **UdS-Moodle** (100% paperless)
- Networking Practice
  - Wired & Wireless Networks (Physical & Link Layer)
  - Network Addressing (IPv4 & IPv6)
  - Transport Protocols (UDP, TCP, QUIC)
  - Network Management & Debugging (GNS3)



- **Registration mandatory via Moodle**:
  - Link will be provided on our websites:
    https://www.nt.uni-saarland.de/education/
    https://lms.sulb.uni-saarland.de/moodle/

*: Hands on Networking + Hands on Dependability

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AG Prof. Dr. Holger Hermanns

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Hands-On
Spring 2022
HOD + HON

Hands-On Dependability with Rust

Advanced Lecture*

25. Feb. - 11. Mar. & 28. Mar. - 01. Apr. 2022

Andreas Schmidt

register at
dcms.cs.uni-saarland.de/hod_21/

Dependable Systems and Software Chair

* no requirements except Programming 1/2 or comparable

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Prof. Dr. Jörg Hoffmann

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Planning? What's that?

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My mother: *"My son works on this but I have no idea what it is."*

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Me: *"... the reachability problem in large transition systems."*

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- Given an initial state I, a goal G, and a set A of actions, find a path from I to a state s s.t. $s \models G$.
- Symbolic AI (main content): heuristic search, pruning, decomposition.
- Data-driven AI (we will have a brief look): Learn a policy π mapping states to actions. But how to gain trust in π?
  $\Rightarrow$ policy explanation, verification, testing, visualization.

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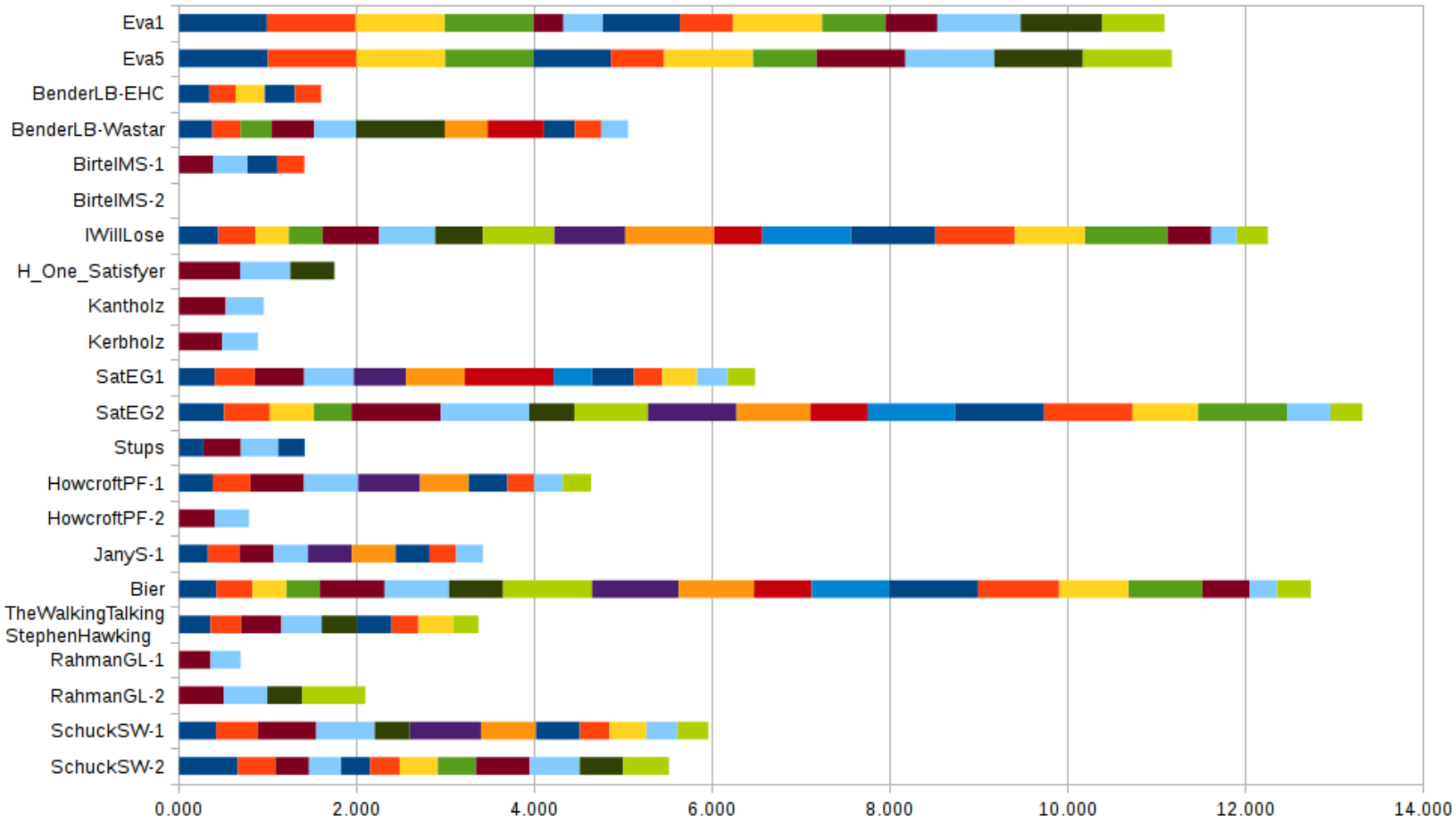
Programming projects: You'll make your own planning system and participate in a competition!

FAI Group Spezialized Course: AI Planning

Tue 14:00–16:00 + Wed 10:00–12:00; 9 ECTS



Prof. Hoffmann, Foundations of AI Group
Seminar: Neural Networks in Planning (7 ECTS)

Me: *"Data-driven AI: Learn a policy π mapping states to actions $\Rightarrow$ policy explanation, verification, testing, visualization."*

But how to learn π in the first place?

- We will cover graph neural networks as an essential paradigm, then cover the current state of the art in learning policies (among others).
- Prerequisites: Basic knowledge assumed (AI core course, neural networks general background).
  More specialized knowledge helpful (AI Planning course, neural network courses).

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Dr. Swen Jacobs

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Parameterized Verification

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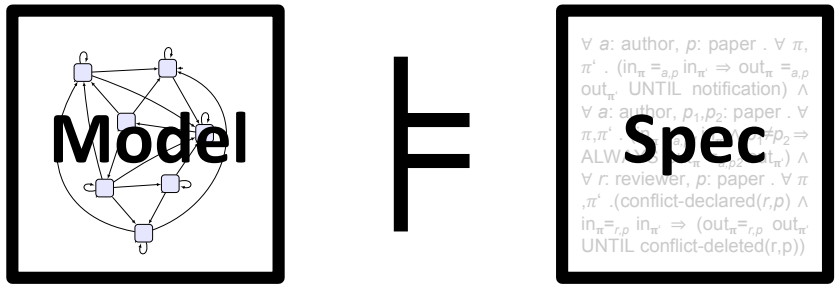
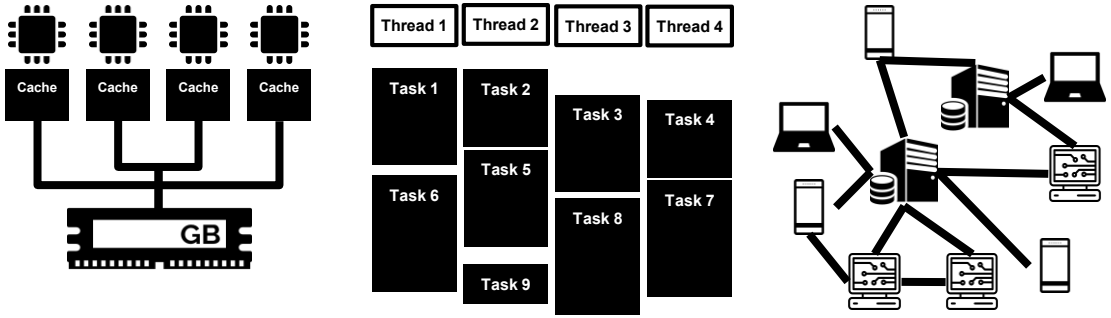
Formal Verification ⊨ of Systems with arbitrary # of components





Advanced Lecture

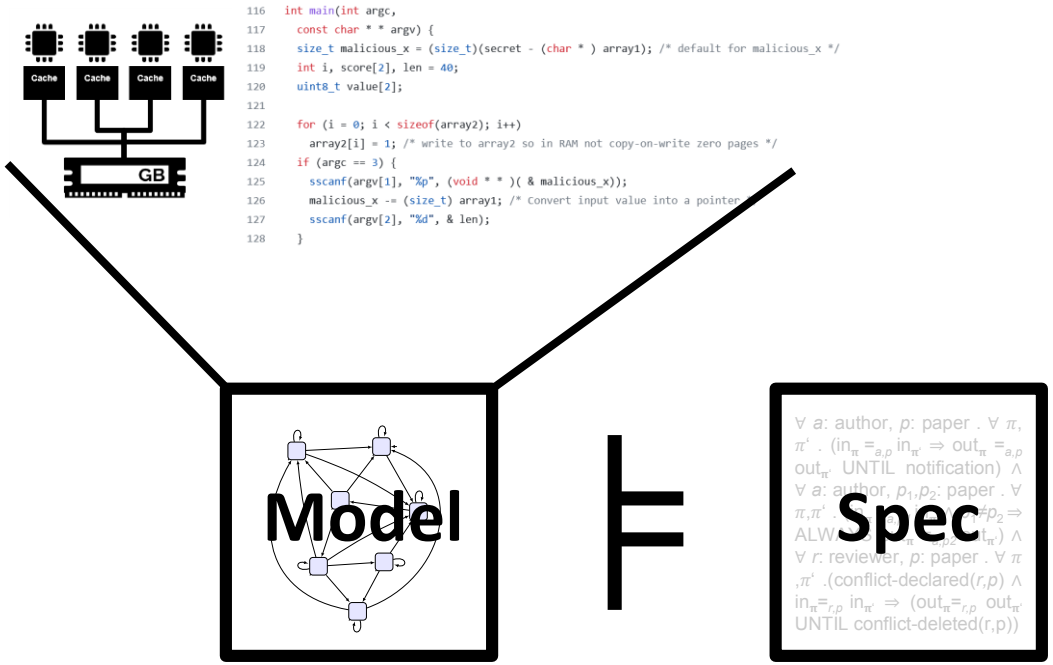
Block Course in Feb/Mar 2022

Swen Jacobs

Registration and further information: cms.cispa.saarland

Formal Methods for Finding and Fixing Information Leaks

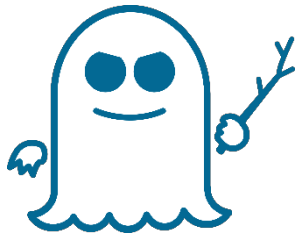
CISPA HELMHOLTZ CENTER FOR INFORMATION SECURITY




```
116 int main(int argc,
117   const char * * argv) {
118   size_t malicious_x = (size_t)(secret - (char * ) array1); /* default for malicious_x */
119   int i, score[2], len = 40;
120   uint8_t value[2];
121
122   for (i = 0; i < sizeof(array2); i++)
123     array2[i] = 1; /* write to array2 so in RAM not copy-on-write zero pages */
124   if (argc == 3) {
125     sscanf(argv[1], "%p", (void * * )( & malicious_x));
126     malicious_x -= (size_t) array1; /* Convert input value into a pointer
127     sscanf(argv[2], "%d", & len);
128   }
```

Fundamental Results

Recent Research Papers



Seminar

Swen Jacobs

Register at Seminar Assignment Platform:

seminars.cs.uni-saarland.de

(until tonight 23:59)

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AG Prof. Dr. Dietrich Klakow

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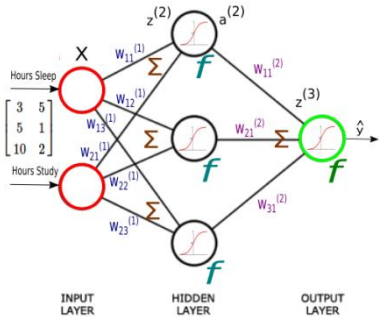
Neural Networks: Theory and Application

Topics:

- Intro to Machine Learning
- Deep Feedforward Networks
- Regularization for Deep Learning
- Optimization for Training Deep Models
- Convolutional Networks
- Sequence Modeling: Recurrent and Recursive Nets

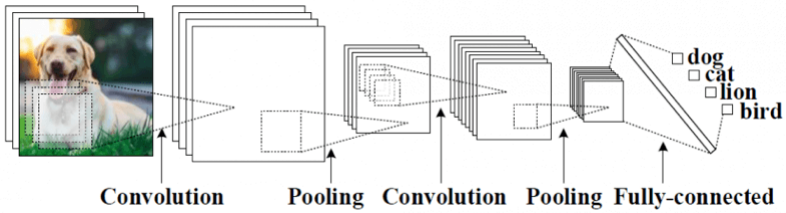


Location: MS Teams (for the start)

Lecture: Tuesday 14:15-15:45

Starts: October 26th

Registration for participation: https://www.lsv.uni-saarland.de/neural-networks-theory-and-implementation-winter-2021-2022/

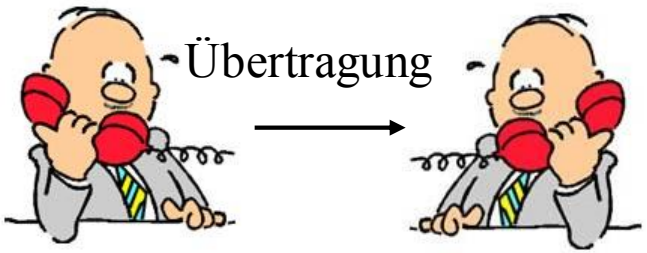


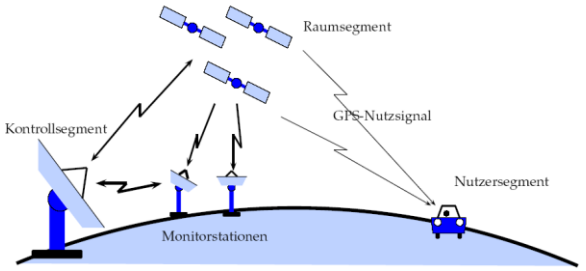
Contact: dietrich.klakow@lsv.uni-saarland.de

Grundlagen der Signalverarbeitung

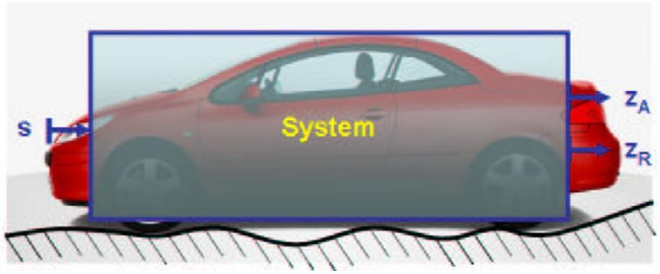
Themen:

- Darstellung von Signalen
- Systemtheorie
- Lineare Zeitinvariante Systeme
- Fourier Transformation
- Numerische Fouriertransformation (FFT Algorithmus)
- Korrelation von Signalen
- Statistische Beschreibung von Signalen
- Filter





Ort: MS Teams
Zeit Vorlesung: Montag 10:15-11:45
Beginn: 25. Oktober
Übung: Montag 12:00-13:30
CP: 6



To participate **register** on the course home page:
https://www.lsv.uni-saarland.de/grundlagen-der-signalverarbeitung-winter-2021-22/

Contact: dietrich.klakow@lsv.uni-saarland.de

Proseminar 'Computational Pragmatics'

Teacher: Dr. Volha Petukhova

You will learn:

(1) understand how to compute pragmatic meaning;

(2) study the mechanisms underlying the main pragmatic inferences and aspects of pragmatic meaning;

(3) discuss algorithms that enable the use of theoretical concepts in practical applications.

Focus will be put on **computational dialogue modelling** for dialogue system design.

Method: 10 topics with paper selection; a *presentation* for each participant based on a research paper (40% of final scores); active participation in discussions and exercises(20% of final scores); *Final assignment:* 10 pages report (40% of final scores)

First meeting: 26.10.2021 at 12:15 in TEAMS link on the course homepage: https://www.lsv.uni-saarland.de/upcoming-courses/proseminar-computational-pragmatics-winter-2021-2022/

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Prof. Dr. Jana Koehler

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Lecture: Thursdays 16:15-18:00 Tutorials: Thursdays 10:15-12:00 (HS001 in E1.3)

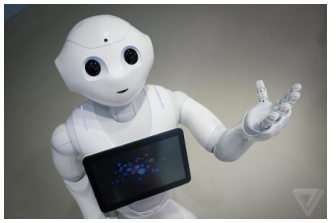
Prof. Jana Koehler: Architectural Thinking for Intelligent Systems

If you think good architecture is expensive,

try bad architecture

Brian Foote and Joseph Yoder: “Big Ball of Mud” http://www.laputan.org/mud/

- Learn about established methods to build a „good“ architecture
  - „good“ = viable and fit for a purpose
- Practice architectural thinking on an AI project step-by-step



- ➢ Focus is on systematic conceptual thinking, no coding, no proofs
- ➢ Master the language and methods used by software architects
- ➢ Lay foundation to prepare for professional certifications
- ➢ Get insights into AI architectures

Register at https://lms.sulb.uni-saarland.de/moodle/enrol/index.php?id=3991

Starts Thursday 10/21 4:15 PM in HS001 in E1.3

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AG Prof. Dr. Antonio Krüger

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Seminar
Walk While Work!

Why Because you will learn how to nudge people to a healthier work-life-style!

Who Dr. Pascal Lessel (DFKI) + Support
Thomas Immich (Centigrade) + Support

What UX-Driven Development of Player Type-Centric Motion Games

When Fridays, 10-12 am

Where https://bit.ly/3mswgfu

Seminar

Adaptive Human Machine Interfaces for Autonomous Systems

human **Dialogue** **ML** machine

Our research attempts to combine the powers of Multimodal Dialogue and Machine Learning to make human-machine interaction more ***personalized*** and ***explainable***.

Thursdays, 16:15 (Hybrid)
20 Places
Practical Group Projects + Topic Presentation + Active Discussion

Contact: Dr. Michael Feld
michael.feld@dfki.de
Amr Gomaa
Niko Kleer
Maurice Rekrut
Guillermo Reyes
Julian Wolter

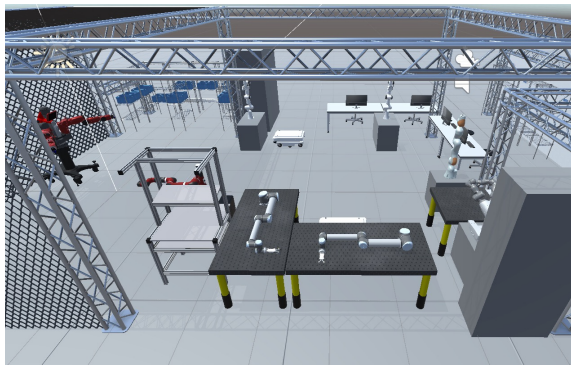
Visit our webpage for up-to-date information:
https://umtl.cs.uni-saarland.de/teaching/winter-2021/2022/adaptive-human-machine-interfaces-for-autonomous-systems.html

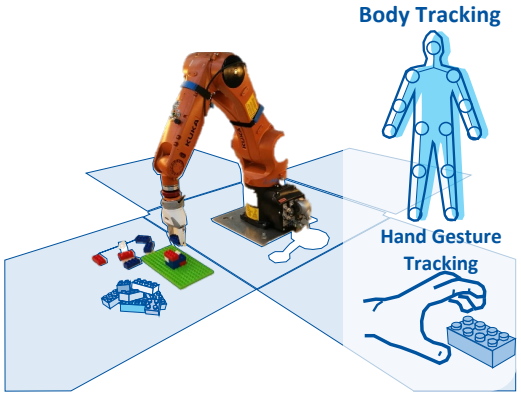
Seminar: SupRTwin

Sensing, Understanding and Provisioning of Robotic Digital Twins

Cooperation between UMTL (Prof. Krüger) and ZeMA (Prof. Müller)

Daniel Porta (DFKI), Tim Schwartz (DFKI), Ali Kanso (ZeMA)
Andreas Luxenburger (DFKI), Caspar Jacob (DFKI), Jonas Mohr (DFKI), Khansa Rekik (ZeMA), Xiaomei Xu (ZeMA)





Gain practical experience with

- Robots
- Drones
- Digital Twins
- Industrie 4.0 concepts

Requirements

- basic knowledge in AI (computer vision, planning)
- good programming skills in Java
- programming skills in Python or C++ (for CV tasks)
- beneficial: experience in Unity 3D

Location: Power4Production Hall at ZeMA (Eschberger Weg 46) and Online
Kick-off: to be announced

https://umtl.cs.uni-saarland.de/teaching/winter-2021/2022/

Contact: suprtwin@dfki.de

UMTL DFKI ZeMA

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Dr. Marco Patrignani
Dr. Hamed Nemati
Dr. Robert Künnemann

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Formal methods in Security

Advanced lecture, 2h lecture/week + 2h exercises/week

*Analyse computer security problems and solutions with **mathematical precision***

*Learn various **techniques** to design and implement secure software stack:*

Protocol	Protocol verification
Program	Language-based Information-flow control
System	System-level verification

Robert Künnemann

Marco Patrignani

Hamed Nemati

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Dr. Giancarlo Pellegrino

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Perspectives of Entrepreneurial Cybersecurity (5 ECTS)

- Lecture series (“Ringvorlesung”)
  - weekly presentations by successful founders and VCs in the vicinity of cybersecurity about their experience for starting a company and insights for a successful startup
  - For 5 CP: Create a pitch for a joint event at end of the semester and participate in weekly meetings

- **It is possible to join to just listen to the presentations!**
  - **Still need to sign up in CISPA CMS**

- Course website and schedule:
  https://**cms.cispa.saarland**/poser_2122/

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Prof. Dr. Sven Rahmann

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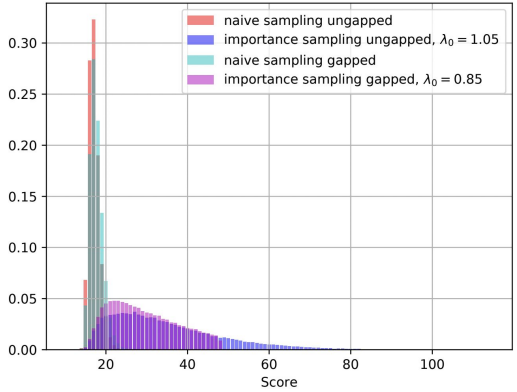
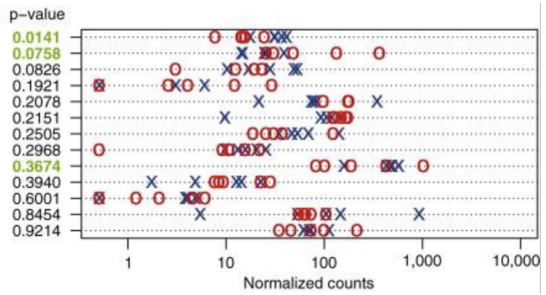
Special lecture (MSc/BSc Bioinformatics), Elective (others):
Statistics, Probability and Applications in Bioinformatics

Probabilistic modeling, specialized to bioinformatics

- elementary probability and combinatorics
- discrete and continuous distributions
- statistics: description, parameter estimation, testing
- stochastic processes: e.g., Poisson; PAAs
- **Applications:** DNA Motifs, PCR process, significance of pairwise sequence alignment, differential gene expression, methylation level estimation, variant calling





- Winter 2021/22: 4V+2Ü, 9 cr, Tue+Thu 08:30-10:00
- Tutorials: 1x on-campus, 1x online
- Information: https://www.rahmannlab.de/lehre/spab
- Registration at CMS: https://cms.sic.saarland/spab/
- **Contact:** Sven Rahmann, rahmann@cs...

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Prof. Dr. Jürgen Steimle

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HCI Human Computer Interaction Lab
Saarland University

Core lecture (9 ECTS): **Human-Computer Interaction**

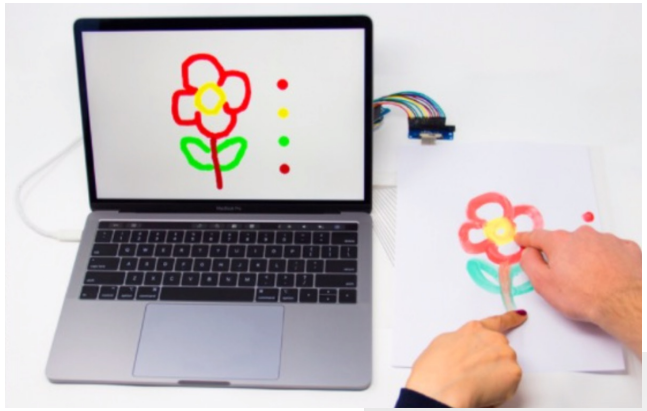
Prof. Dr. Jürgen Steimle
TA: Adwait Sharma

- What makes user interfaces good or bad?
- Learn from the past and get to see the future of UIs
- How to design great user interfaces?
- How can we shape next generations of UIs?

Registration in first lecture
Tuesday 10:15am

https://hci.cs.uni-saarland.de

HCI Human Computer Interaction Lab
Saarland University



Block Seminar (7 ECTS): **Interactive Touch Surfaces**

Prof. Dr. Jürgen Steimle
Narges Pourjafarian

- Hands-on block course during the winter semester break
- Learn about state-of-the-art technologies for touch sensing
- Implement your own project of how you envision future touch systems

More information: **https://hci.cs.uni-saarland.de**

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Dr. Sebastian Stich

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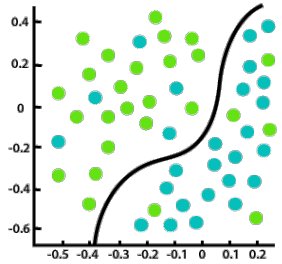
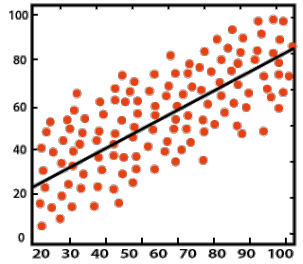
Seminar on Optimization for Machine Learning

many ML tasks can be formulated as an optimization problem:

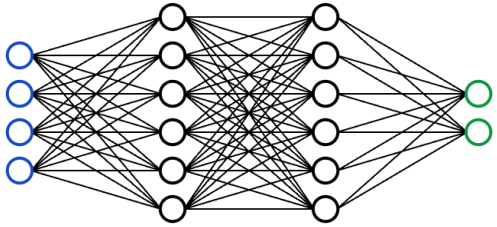
$$\min_x f(x) \quad =$$



Classification



Regression



Deep Learning

This seminar is about **algorithms** that we use to train ML models.

```
optimizer = optim.SGD(model.parameters(), lr=0.01, momentum=0.9)
optimizer = optim.Adam([var1, var2], lr=0.0001)
```

?

- Stochastic gradient descent (SGD)
- Variance reduction (SVRG)
- Adaptive algorithms (ADAM)
- Distributed training (Local SGD)

- basic classic techniques (convex settings, standard assumptions and tools, etc.)
- standard algorithms for ML/DL
- advanced techniques (tailored to special applications)

seminar = we will discuss, present, read & review a selection of papers

Contact: Sebastian Stich
sebastian.stich@uni-saarland.de

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Prof. Dr. Isabel Valera
Prof. Dr. Jilles Vreeken

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Elements of Machine Learning

Who Prof. Jilles Vreeken & Prof. Isabel Valera

What Classification Regression Exploration

How much 1 lecture and 1 tutorial per week, 6 credits

When & Where

Lectures:	Thu	16-18	onsite+online	(starts: **21 Oct**)
Tutorials:	Mo/Tu	12-14	onsite+online	(starts: **25/26 Oct**)

https://cms.sic.saarland/eml/

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Dr. Uwe Waldmann

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Automated Reasoning (I)

Uwe Waldmann

Mondays 16:00–18:00 and Wednesdays, 16:00–18:00
(starting Wednesday, October 20)
Bldg. E1.3, Lecture hall 2
4h Lecture + 2h Tutorial (9 CP)

Contents:

Syntax and semantics of logics, proof calculi, and how to implement them:

- Propositional Logic, CDCL, OBDD
- First-Order Logic, Resolution, Tableaux
- Equality, Rewriting, Completion, Termination

More info: `https://rg1-teaching.mpi-inf.mpg.de/autrea-ws21/`
(Online students: contact me as soon as possible!)

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AG Prof. Dr. Weickert

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Differential Equations in Image Processing and Computer Vision

Four teaching awards (2003, 2006, 2009, 2015)

- **Lecturer:** Prof. Joachim Weickert
- **Type:** advanced class, 4h+2h, 9 CP
- **Scope:** denoising, restoration, segmentation, motion analysis, compression

original

shadow removal

Example: Shadow Removal with Osmosis Processes

- **Extra Benefit:** enables you to write a master thesis in our group
- **Requirements:** undergraduate mathematics, elementary C programming
- **Virtual Lectures:** Wednesday and Friday, 10:15–12:00 (starting Oct. 20)

`https://www.mia.uni-saarland.de/Teaching/dic21.shtml`

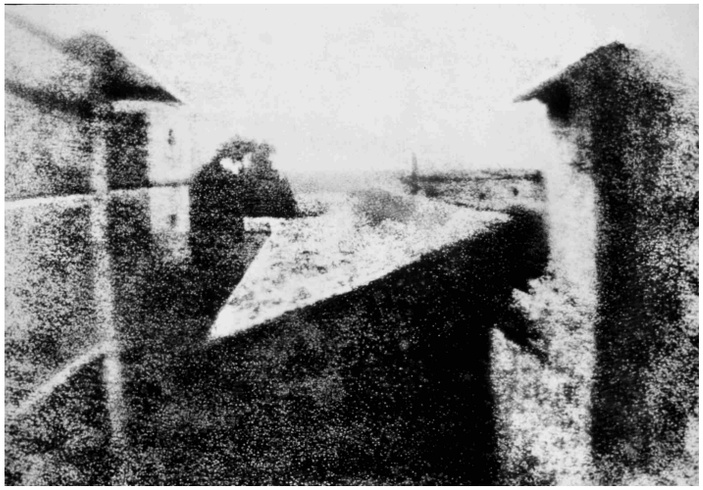
Image Acquisition Methods

Two computer science teaching awards (2014, 2018)

`https://www.mia.uni-saarland.de/Teaching/iam21.shtml`

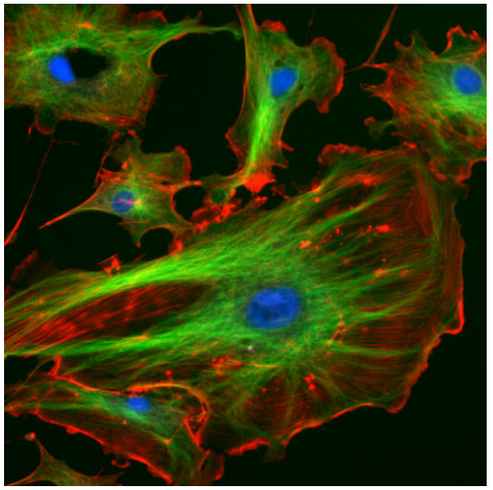
- **Lecturer:** Dr. Pascal Peter
- **Type:** advanced class, 2h+2h, 6 CP
- **Requirements:** undergraduate mathematics
- **Virtual Lectures:** pre-recorded videos + live discussions, Thursday, 10–12 c.t.
- **Interactive Tutorials**: Monday, 8:30–10 s.t. and 10–12 c.t.
- broad overview of image acquisition methods and their physical background

oldest existing photograph



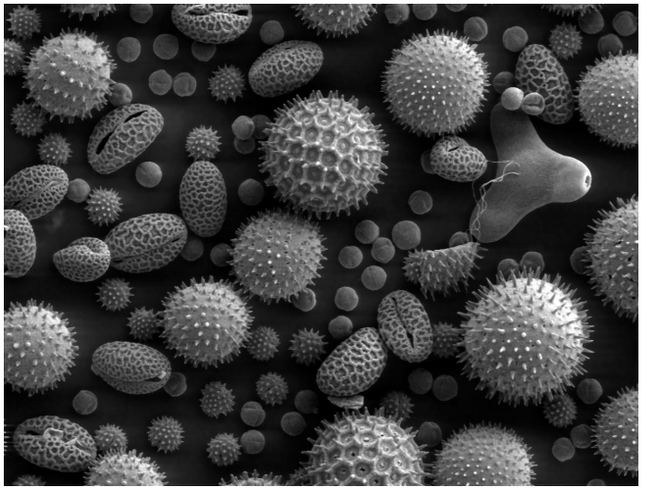
(Joseph Nicéphore Niépce, 1826)

confocal microscopy



(ImageJ Data Set)

electron microscopy



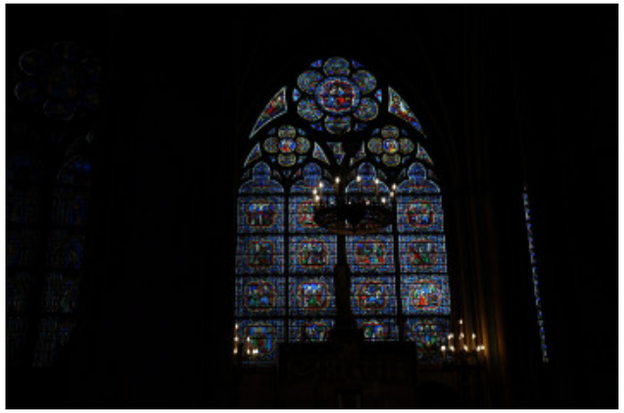
(Dartmouth EMF)

Advanced Image Analysis

https://www.mia.uni-saarland.de/Teaching/aia21.shtml

- **Lecturer:** Dr. Pascal Peter
- **Type:** advanced class, 2h+2h, 6 CP
- **Requirements:** undergraduate mathematics, C programming
  helpful: image processing/computer vision knowledge
- **Virtual Lectures:** pre-recorded videos + live discussions, Monday, 14-16 c.t.
- **Online Tutorials**: Friday, 14-16 c.t.
- advanced image processing methods that (mostly) fuse multiple input images
- HDR imaging, super resolution, focus fusion, image stitching, ...

underexposed



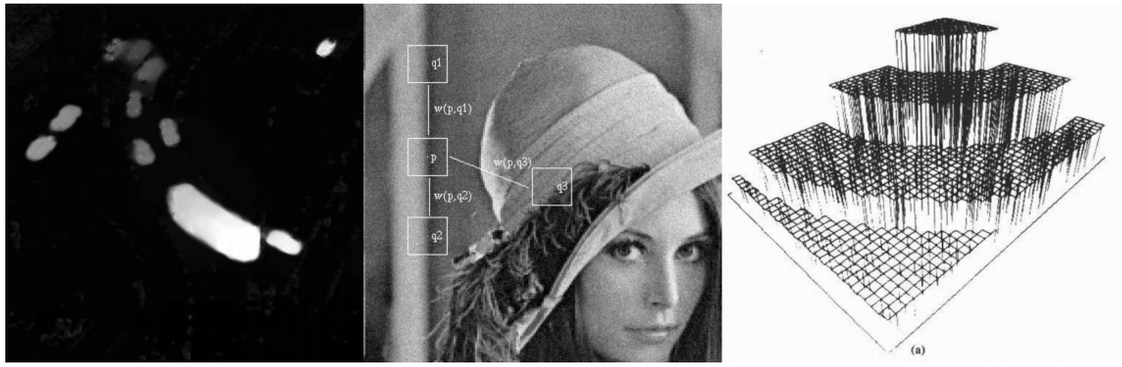
overexposed

merged HDR

images courtesy of Zimmer et al.

Seminar Milestones and Advances in Image Analysis

- **Organisers:** Karl Schrader (and Prof. Joachim Weickert)
- **Scope:** influential and novel papers on image analysis



- **Requirements:** needed: undergraduate mathematics, image analysis
  helpful: machine learning basics
- **Online Talks:** Tuesday, 16:15–18:00 (starting Nov. 16)
  `https://www.mia.uni-saarland.de/Teaching/maia21.shtml`
- **Registration:** via the SIC seminar system by tomorrow, 23:59:
  `https://seminars.cs.uni-saarland.de`
- **First Meeting:** Tue, Oct. 26, 16:15–18 (paper distribution)

Proseminar Simulation der Welt

- **Organisatoren:** Kristina Schaefer, Karl Schrader (und Prof. Joachim Weickert)
- **Themen:** Modellierung und Computersimulation von Naturvorgängen
  Hauptwerkzeug: Differentialgleichungen
  breites Spektrum: Fußpilzwachstum bis Umweltverschmutzung
- **Vorkenntnisse:** Grundkenntnisse in Mathematik (mindestens Mfl 1+2)
- **Vorträge:** Mittwochs, 16:15–18:00 , online über Teams
  `https://www.mia.uni-saarland.de/Teaching/sdw21.shtml`
- **Registrierung:** über das SIC Seminar System bis morgen 23:59 Uhr:
  `https://seminars.cs.uni-saarland.de`
- **Vorbesprechung:** Mittwoch, 27. 10., 16:15–18 Uhr

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Dr. Rhaleb Zayer

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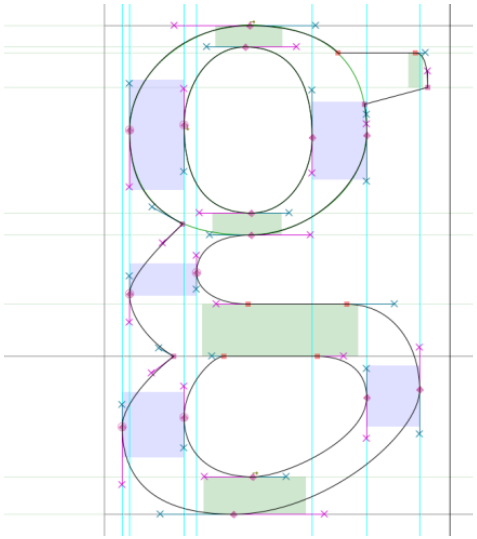
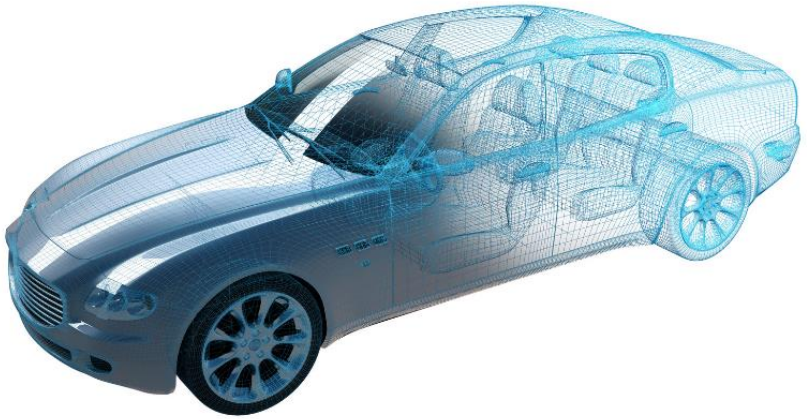
Geometric Modeling

Rhaleb Zayer

- **Part I: Geometric Modeling Techniques**
  - Differential geometry of curves
  - Bezier curves, B-Splines, NURBS, ...
- **Part II: Geometry Processing**
  - Differential geometry of surfaces
  - 3D data and mesh processing, subdivision, ...
- **What else?**
  - Mathematical background
  - Practical skills: hands on implementation
- **When & where:**
  - First Lecture: Monday Oct. 25th 12-14h
  - Mon. 12-14h, Thu. 14-16h.
  - Zoom (link by email)
- **Contact:**
  - **Site :** http://geomod.mpi-inf.mpg.de/
  - **Mail:** rzayer@mpi-inf.mpg.de





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Prof. Dr. Andreas Zeller

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Automated Testing and Debugging

Software has bugs and vulnerabilities.
This proseminar explores and evaluates automated techniques for testing and debugging software.

Weekly (virtual) Meetings

- Read, summarize, discuss a paper on a particular technique
- Give 5-minute presentations (ungraded) for training

Final Presentations (at End of Semester)

- Each participant presents one technique (graded)

Details, registration, more at seminars.cs.uni-saarland.de

Security Testing

Software has bugs and vulnerabilities.
We find them through automated test generation (fuzzing).
This advanced course (6 ECTS) teaches you how to build fuzzers.

Inverted Classroom

- Jupyter notebooks w/ Python code + videos every week at fuzzingbook.org
- Weekly coding exercises (⅓ of final grade)

Two Programming Projects

- One on black-box fuzzing, one on white-box fuzzing (⅔ of final grade)

Hybrid Meeting every Tuesday 16-18 @ CISPA

- Discuss material, exercises, projects

Details, registration, more at cms.cispa.saarland

The End.

Enjoy your studies

@ Saarland Informatics Campus

@ Saarland University

& stay safe!