Welcome to EPFL

Prof.
Mathias
Payer

Feb. 19, 2024

École
polytechnique
fédérale
de Lausanne

Welcome to the School of Computer & Communication Sciences

School of Computer and Communication Sciences - IC

- Internationally highly ranked
- 54 professors/labs
- Internationally highly recognized
- Strong industry liaison
- Core + interdisciplinary science: Collaboration with Life Sciences, Mathematics, Microengineering, Electrical Engineering, etc.
- Doctoral school

Exchange semester at EPFL

- Have to take courses for 20 – 35 credits.
- Must fill in the form (ETHZ study plan) prior to the beginning of the semester at EPFL.
- ETHZ study plan may be changed within the first two weeks of the semester. Changes must be communicated to ETHZ studies administration: brigitteregula.marti@inf.ethz.ch
- The EPFL course list for Cyber Security is available at: go.epfl.ch/MS-cybersecurity-courselist

Important dates

go.epfl.ch/academic-calendar

Deadlines – Spring 2024 semester	
March 1	Registration for spring semester courses
April 30	Exam-session timetable is released
May 3	Withdrawal from exams for spring semester
June 17- July 6	Summer examination session
July 26	Exam results are published

Research project

- You can do the research project here.
- Interested students should contact the laboratories at EPFL directly.
- The project must be done in the field of Cyber Security.
- Once a project from the list has been identified, register it in IS-Academia.
- If the project is off list, send the abstract and the lab's name to EPFL Master Cyber admin for approval.
- Registration deadline in IS-Academia = **1st March 2024**

URL Projects	Laboratory	Authorised supervisors
IC School of Computer and Communication Sciences IC		
COMPSEC	Laboratory for Computation Security	Prof. Alessandro Chiesa
DCL	Distributed Computing Laboratory	Prof. Rachid Guerraoui
DCSL	Data Center Systems Laboratory	Prof. Edouard Bugnion
DEDIS	Decentralized and Distributed Systems Lab	Prof. Bryan Ford
DSLAB	Dependable Systems Laboratory	Prof. George Candea
HEXHIVE	HexHive Laboratory	Prof. Mathias Payer
LASEC	Security and Cryptography Laboratory	Prof. Serge Vaudenay
LIA-CYBER	Artificial Intelligence Laboratory	Prof. Boi Faltings
LSIR	Distributed Information Systems Laboratory	Prof. Karl Aberer
MIL	Mathematics of Information Laboratory	Prof. Yanina Shkel
NAL	Network Architecture Laboratory	Prof. Katerina Argyraki
PARSA	Parrallel Systems Architecture Laboratory	Prof. Babak Falsafi, Dr. Mirjana Stojilovic
RS3LAB	Robust Scalable Systems Software Lab	Prof. Sanidhya Kashyap
SaCS	Scalable Computing Systems Laboratory	Prof. Anne-Marie Kermarrec
SPRING	Security and Privacy Engineering Laboratory	Prof. Carmela Gonzalez Troncoso
SYSTEMF	Systems and Formalisms lab	Prof. Clément Pit-Claudel
VCA	Verification and Computer Architecture Lab	Prof. Thomas Bourgeat
STI School of Engineering		
LIS	Laboratory of Intelligent Systems	Prof. Dario Floreano

go.epfl.ch/IC-semester-project-procedure **go.epfl.ch/projects-cyber-labs**

Internship in industry

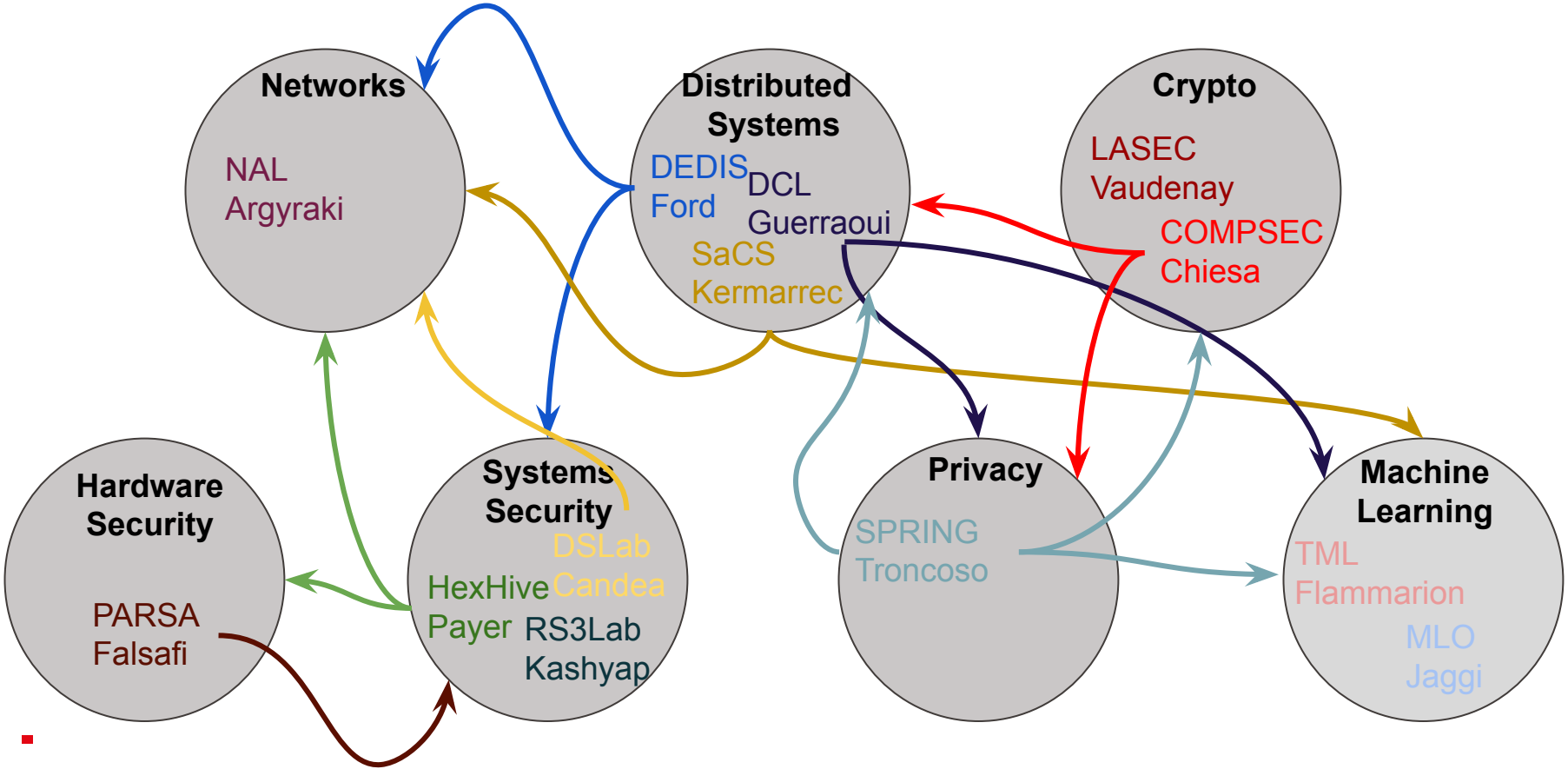
go.epfl.ch/IC-internships

- Possibility to do an internship in industry through the IC network.
- Interested students must contact the internship office at the start of their semester.
- Patricia Genet can answer any questions in relation to an internship in industry.

Internship Office

Patricia Genet
Internship Program Coordinator
patricia.genet@epfl.ch
Building INN - Office 131
021 693 56 41

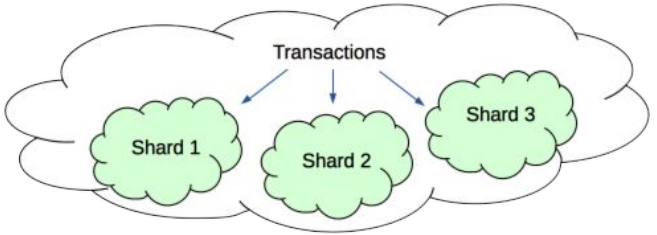
What are you interested on? Talk to us!



COMPSEC

Theoretical Computer Science and Computer Security. Specific interests include theoretical and applied cryptography, complexity theory, privacy-enhancing technologies, and quantum information.

DEDIS



The DEDIS team is working on projects related to large-scale collective authorities (cothorities), which distribute trust among a number of independent parties to allow scalable self-organizing communities.

With no single trusted party, cothorities can secure software updates, provide public randomness, enable privacy-conscious medical-data sharing and more.

Alp, Enis Ceyhun	Doctoral Assistant
Basescu, Cristina	Doctoral Assistant
Borsò, Pierluca	Computer Scientist
Colombo, Simone	Doctoral Assistant
Estrada-Galiñanes, Vero	Scientist
Ford, Bryan Alexander	Associate Professor
Hünsch, Sandra Renata	Administrative Assistant
Kocher, Noémien	Computer Scientist
Lopes, Yves	Systems Engineer
Lüthi, Marc-André	ETS/HES Engineer
Merino, Louis-Henri Manuel Jakob	Doctoral Assistant
Nikitin, Kirill	
Subira Nieto, Jordi	Student/Auxiliary
Tennage, Pasindu Nivanthaka	Doctoral Assistant
Viaene, Jean	Computer Scientist
Zhang, Haoqian	Doctoral Assistant

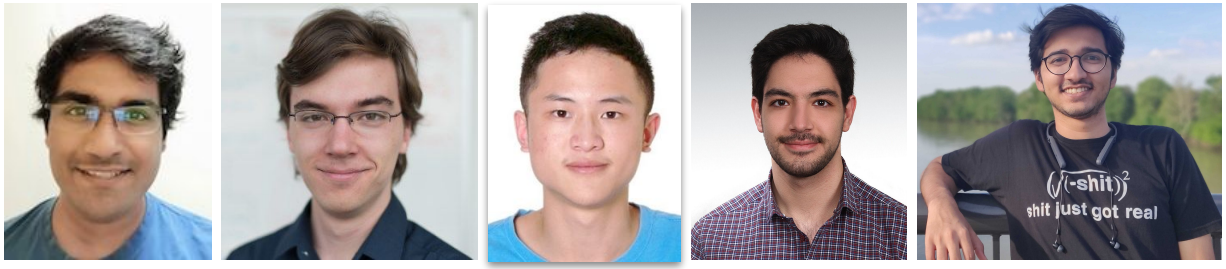
EPFL Dependable Systems Lab

Techniques and abstractions for building trustworthy computer systems (i.e., systems that are safe and secure)

George Candea

https://dslab.epfl.ch

- Explore the fundamental challenges posed to security and safety by large-scale systems consisting of many threads, many nodes, and millions of lines of code written by many programmers
- Solve real-world problems, overcome theoretical worst-case limitations, open-source prototypes
- Operating systems + formal methods + computer architecture
- Examples: Trustworthy network devices, Performance clarity, Secure smart-home infrastructure, …

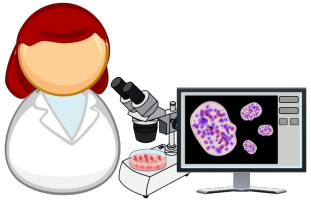


EPFL

hexhive

Compartments

- Goal: fail safe
- Small, safe components
- ISA abstractions
- Kernel extensions



Software Testing

- Goal: prune bugs
- Helps developers
- Fuzzing discovers them
- Sanitization detects them

Mitigations

- Goal: stop exploitation
- Last line of defense
- Guard control flow (CFI)
- Type-aware data guards

LASEC

The Security and Cryptography Laboratory (LASEC) was created at EPFL in 2000. It is part of the School of Computer and Communication Sciences (I&C). The main activities of LASEC are research and education on the security of communication and information systems, cryptography, and applications.

Prof. Serge Vaudenay
Martine Corval

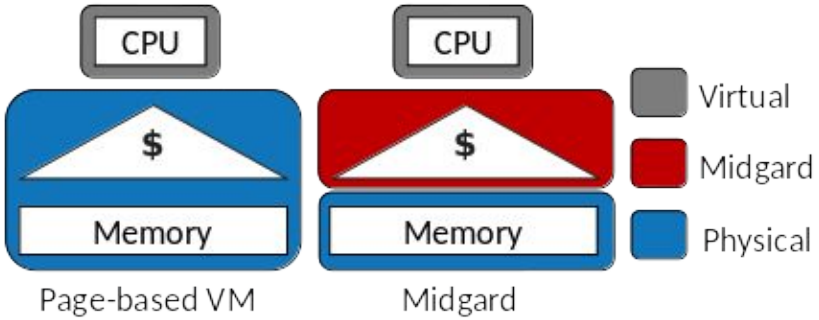
Senior Researchers

Subhadeep Banik
Thomas Lochmatter

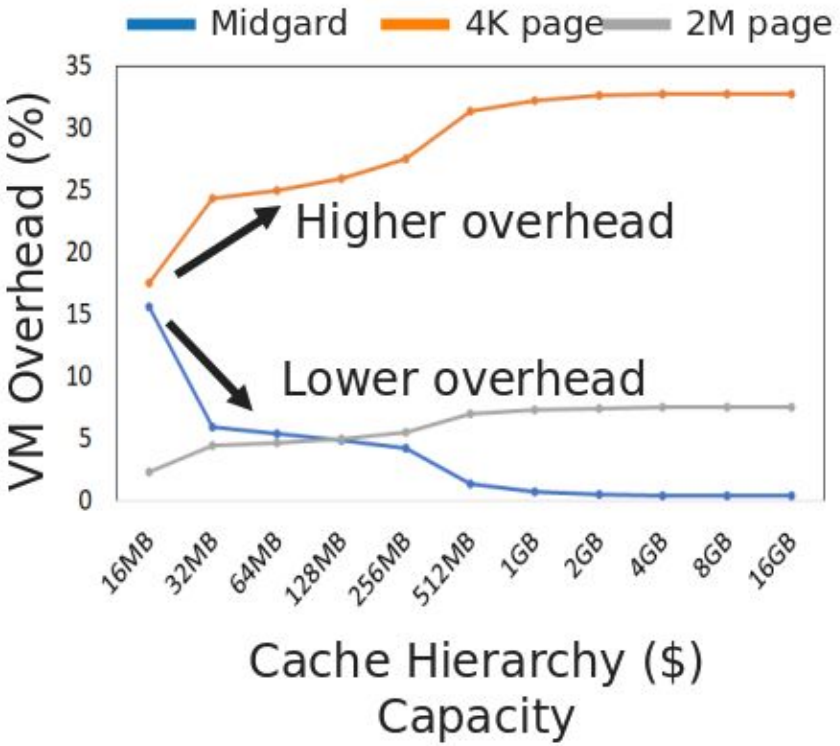
Researchers

Khashayar Barooti
Andrea Caforio
Daniel Collins
Loïs Huguenin
Aymeric Genet
Novak Kaluderovic
Laurane Marco
Dalia Papuc
Abdullah Talayhan
Bénédikt Tran

PARSA (FALSAFI)



midgard intel



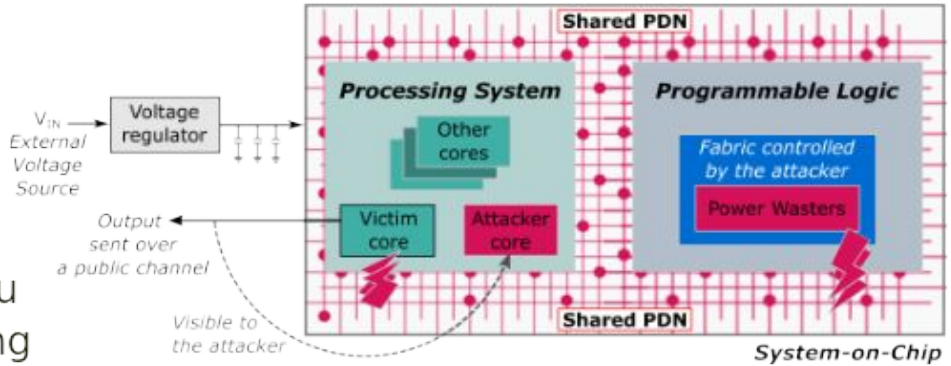
Future-proofing memory protection

- Keeps POSIX (VMA) interface to apps
  - Linux, MacOS/iOS, Android
- Eliminates page-based translation

✓ Unclogs virtual memory for security, virtualization, accelerators

FPGA Security (PARSA, Stojilovic)

- Hardware security challenges of FPGA multitenancy in datacenters and the cloud
  - FPGA power viruses for transient fault injection
  - Stealthy sensors for remote power side-channel attacks



- Ongoing research
  - CPU-to-FPGA attacks targeting Ubuntu
  - Preventing attacks, bitstream scanning
  - Active fencing: hiding side-channel leakage
- Research-oriented semester projects (challenging but often rewarding)
  - E.g., cyber MSc thesis on stealthy sensors (David Spielmann, ETHZ) accepted for TCHES'23

EPFL Robust Scalable Systems Software Lab (RS3Lab)

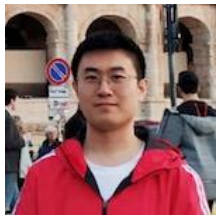
Design concurrent and safe systems software:
OSes, storage stack, and data processing systems

Scalability: Scale OS operations with increasing core count

Robustness: Remove vulnerabilities from existing OSes

Ex: Formally verified concurrent OS, Undo OS, fuzzing distributed storage stack, scalable trusted execution environments






Sanidhya Kashyap
https://rs3lab.github.io

EPFL Security and Privacy Engineering Lab (SPRING)

- Analyze, build, and deploy secure and privacy-preserving systems
- Collaborate with real-world partners
- Apply crypto to build systems in new ways
- Reason about security and privacy of Machine learning

- Research Projects
- PhD

SPRING
SECURITY AND PRIVACY ENGINEERING LABORATORY

Carmela Troncoso carmela.troncoso@epfl.ch
https://spring.epfl.ch

Center for Digital Trust

- Competence center: Privacy protection & cryptography, blockchains and smart contracts, software verification, device and system security, machine learning
- Stakeholders: EPFL laboratories, industrial partners, authorities
- Activities: Bilateral projects, events, workgroups & workshops, publications
- Collaborations: Swiss Support Center for Cybersecurity, CyberPeace Institute, Capital Market Technology Association, Trust Valley, international academic centers

Our Security and Privacy Classes

- COM-401 Cryptography and security (Fall)
- COM-402 Information security and privacy (Fall)
- **CS-412 Software security (Spring)**
- CS-438 Decentralized systems engineering (Fall)
- **COM-501 Advanced cryptography (Spring)**
- **COM-506 Student seminar: security protocols and applications (Spring)**
- **CS-523 Advanced topics on privacy enhancing technologies (Spring)**
- CS-510 Topics in Language-based Software Security (Fall)

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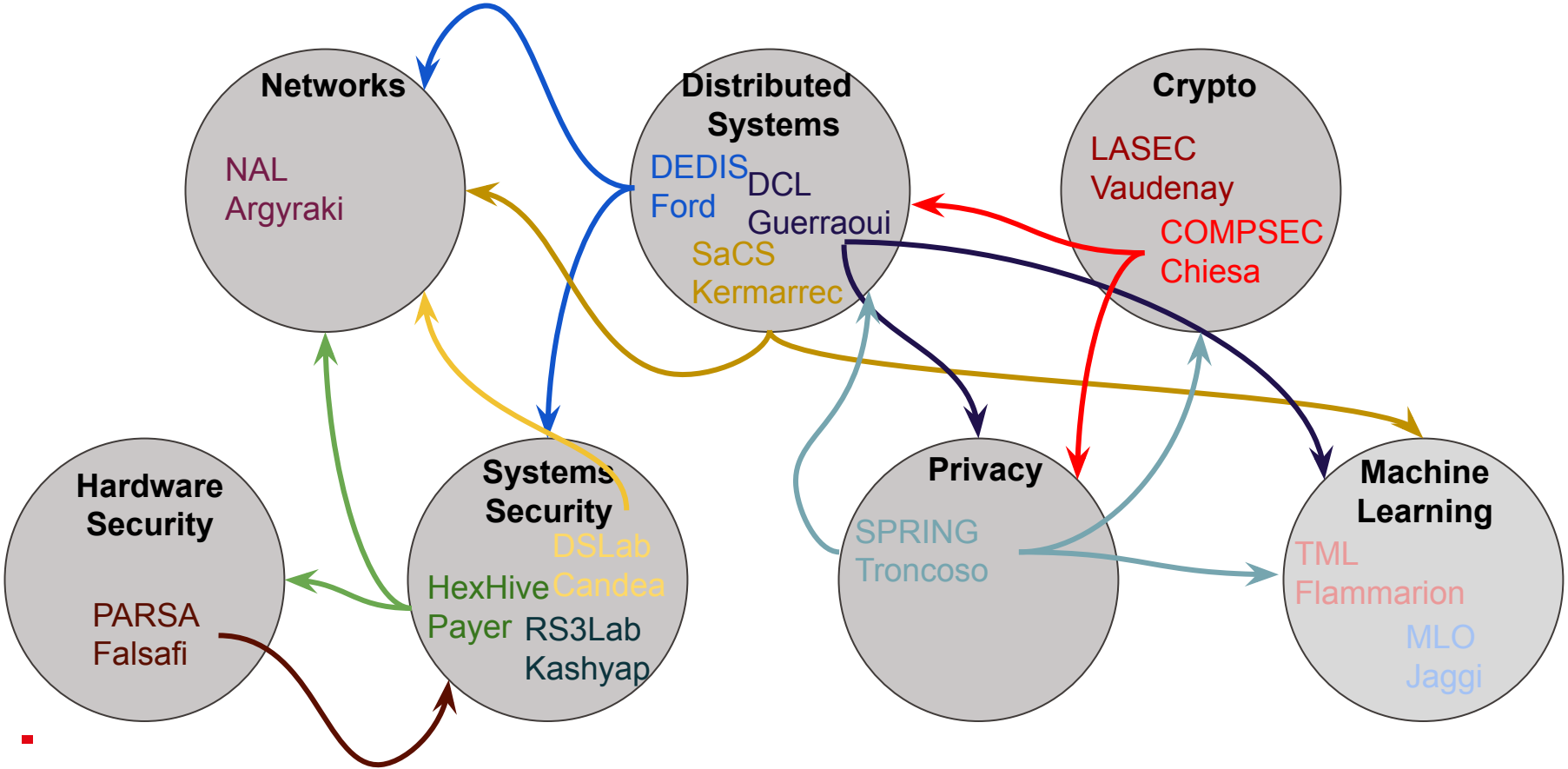

Capture The Flag (CTF)

- A cybersecurity competition
- Often involving real-world attacks
- You score points by capturing the flag of a given challenge
- The flag is a secret/hidden string
- https://polygl0ts.ch/

Your administrative contacts at EPFL

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021 693 60 48

Jasmine Locatelli
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Building INN - Office 112
021 693 28 50

We wish you an excellent semester!

Any Questions?

Hack the planet!