Dr.-Ing. Aurore Fass

Tenure-Track Faculty at CISPA

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Research Overview

My research work revolves around designing practical approaches to protect the security and privacy of Web users. I build systems to proactively detect malicious JavaScript code and suspicious browser extensions. I analyze data to understand how people spend time on the Web, and I want to use the resulting perspective to prioritize defense strategies.

Scientific Career

2023– **Tenure-Track Faculty**, *CISPA Helmholtz Center for Information Security*, Germany

2021–2023 **Visiting Assistant Professor**, *Stanford University*, U.S
- Host: Zakir Durumeric

2021 **Postdoctoral Researcher**, *CISPA Helmholtz Center for Information Security*, Germany

2017–2021 **Ph.D. Student**, *Saarland University & CISPA Helmholtz Center for Information Security*, Germany
- Ph.D. thesis: *Studying JavaScript Security Through Static Analysis*
- Advisors: Michael Backes and Ben Stock

Education

2014–2017 **Grande École** (similar to a Master Degree), *TELECOM Nancy*, France, valedictorian
Major: Telecommunication, Network, and Security
- Master thesis: German Federal Office for Information Security (BSI), Germany
  Automated clustering of JS samples for the detection of malware contained in obfuscated code
- Industrial project: French Ministry of Defense, France
  Implemented an Xposed module to monitor Android devices; group of 4 persons (6 months)
- Internship: Fraunhofer IOSB, Germany
  Implemented a passive asset detection system (8 weeks)

2012–2014 **Preparation for the highly competitive nationwide entrance examination to the French Grandes Écoles**, France
Major: Mathematics, Physics, and Computer Science

2012 **High school graduation**, France, graduated with distinction ("mention très bien"), European section
Major: Mathematics, Physics & Chemistry, Biology, and German

Awards and Honors

2023 **Top Reviewer Award**, *ACSAC*

2023 **Top Reviewer Award**, *ACM CCS*

2022 **Top Reviewer Award**, *ACM CCS*

2022 **PC Member Honorable Mention**, *TheWebConf*

2021 **Inspiring Career Recognition**, *1 of 3 invited alumni (out of 2,300 alumni) for the 30th anniversary of the French Grande École TELECOM Nancy*, Remote

2019–2022 **Program of Excellence**, *Saarland University*, Germany

2017 **Valedictorian**, *French Grande École TELECOM Nancy*, France

2016 **Best Student Recognition Event**, *IBM*, UK

Publications

Shubham Agarwal, **Aurore Fass**, and Ben Stock. Peeking through the window: Fingerprinting Browser Extensions through Page-Visible Execution Traces and Interactions. In *ACM CCS*, 2024.

* Sheryl Hsu, Manda Tran, and **Aurore Fass**. What is in the Chrome Web Store? In *ACM AsiaCCS*, 2024.

Liz Izhikevich, Manda Tran, Michalis Kallitsis, **Aurore Fass**, and Zakir Durumeric. Cloud Watching: Understanding Attacks Against Cloud-Hosted Services. In *ACM Internet Measurement Conference (IMC)*, 2023.

* Kimberly Ruth, **Aurore Fass**, Jonathan J. Azose, Mark Pearson, Emma Thomas, Caitlin Sadowski, and Zakir Durumeric. A World Wide View of Browsing the World Wide Web. In *ACM Internet Measurement Conference (IMC)*, 2022.

* **Aurore Fass**, Dolière Francis Somé, Michael Backes, and Ben Stock. DoubleX: Statically Detecting Vulnerable Data Flows in Browser Extensions at Scale. In *ACM CCS*, 2021. Code repository: `https://github.com/Aurore54F/DoubleX`.

Marvin Moog, Markus Demmel, Michael Backes, and **Aurore Fass**. Statically Detecting JavaScript Obfuscation and Minification Techniques in the Wild. In *Dependable Systems and Networks (DSN)*, 2021. Code repository: `https://github.com/MarM15/js-transformations`.

* **Aurore Fass**, Michael Backes, and Ben Stock. HideNoSeek: Camouflaging Malicious JavaScript in Benign ASTs. In *ACM CCS*, 2019. Code repository: `https://github.com/Aurore54F/HideNoSeek`.

Aurore Fass, Michael Backes, and Ben Stock. JStap: A Static Pre-Filter for Malicious JavaScript Detection. In *ACSAC*, 2019. Code repository: `https://github.com/Aurore54F/JStap`.

Aurore Fass, Robert P. Krawczyk, Michael Backes, and Ben Stock. JaSt: Fully Syntactic Detection of Malicious (Obfuscated) JavaScript. In *DIMVA*, 2018. Code repository: `https://github.com/Aurore54F/JaSt`.

Community Services

PC Co-Chair MADWeb 2024 & 2023 (co-located with NDSS)

PC Member ACM CCS 2024–2021, USENIX Security 2024, IEEE EuroS&P 2024 & 2023, ACSAC 2024 & 2023, IEEE S&P 2023, TheWebConf 2023 & 2022, ARES 2023 & 2022, SecWeb 2024–2021

Artifact Committee USENIX Security 2021, ACSAC 2018

External Reviewer IEEE S&P 2024, TWEB 2024, ESORICS 2023, ICCCN 2023, NDSS 2022–2020, USENIX Security 2022–2020, IEEE EuroS&P 2019, ACSAC 2019 & 2018, ACM CCS 2018

Hiring Committee CISPA Faculty Hiring Committee 2021

Doctoral Committee Romain Fouquet (Ph.D., Computer Science, Université de Lille, May 2023)

Project Proposal Reviewed projects for several European funding organizations

Misc ACM CCS Workshop Chair 2024, IMC Travel Grants 2023

Teaching

SS 2024 **The Web Security Seminar**

WS 2023–2024 **The Web Security Seminar**
- Malicious JavaScript Analysis
- Beyond Malicious Extensions: How can Extensions put User Security & Privacy at Risk?
- User Browsing Behavior vs. Top Lists

WS 2020–2021 **Lecturer at TELECOM Nancy** (Université de Lorraine, France)
- Browser Extensions: Architecture and Security Consideration (lectures and practicals for MSc students)

WS 2019–2020 **Seminar: Joint Advances in Web Security**
- Browser Extensions: Security and Vulnerabilities
- Overview of Malicious JavaScript Detection Techniques and Attacks

WS 2018–2019 **Seminar: Joint Advances in Web Security**
- Overview of Malicious JavaScript Detection Techniques
- Cryptojacking: Definition, Detection, and Dimensions

Advising and Mentoring

PostDoctoral Researchers

Upcoming? **Dr. Ying Yuan** – *Phishing, JavaScript, Browser Extension Security*, CISPA

Ph.D. Students

Apr 2024– **Valentino Dalla Valle** – *Fingerprinting, Browser Extension Security*, Saarland University & CISPA

Dec 2023– **Dominic Troppmann** – *Type Checks*, with Cristian-Alexandru Staicu, Saarland University & CISPA

Nov 2021– **Shubham Agarwal** (Ph.D. student of Ben Stock) – *Browser Extension Security*, Saarland University & CISPA

Oct 2021– **Kimberly Ruth** (Ph.D. student of Zakir Durumeric) – *Web Browsing Behavior*, Stanford University

Bachelor Students

Oct 2023– **Ben Rosenzweig** (BSc thesis) – *Machine Learning-Based Approach for Detecting Malicious Browser Extensions*, Saarland University

Alumni

2022–2023 **Sheryl Hsu** (BSc student) – *Browser Extension Security → AsiaCCS 2024*, Stanford University

Manda Tran (MSc student) – *Browser Extension Security → AsiaCCS 2024*, Stanford University

2022 **Mark Tran** (BSc student) – *Browser Extension Fingerprinting*, Stanford University

Vrushank Gunjur (BSc student) – *Over-Privileged Extensions*, Stanford University

Nahum Maru (BSc student) – *Browser Extension Crawler*, Stanford University

Fengchen (Maggie) Gong (MSc student → Princeton Ph.D.) – *Fingerprinting*, Stanford University

2021 **Liana Patel** (Ph.D. student of Zakir Durumeric) – *Crawler*, Stanford University

Luca Pistor & **Nathan Bhak** (BSc students) – *Exam Software Security*, Stanford University

Paul Szymanski (BSc thesis) – *A Study of State-of-the-Art Call Graph Creation Approaches for JavaScript*, with Cristian-Alexandru Staicu, Saarland University & CISPA

2020 **Anne Christin Deutschen** & **Luc Seyler** (BSc students) – *Browser Extension Vulnerability*, with Dolière Francis Somé, Saarland University & CISPA

2019–2020 **Marvin Moog** & **Markus Demmel** (BSc students) – *Analysis of JavaScript Obfuscation Techniques → DSN 2021*, Saarland University & CISPA

2019 **Maximilian Zöllner** & **Niklas Kempf** (BSc students) – *Intelligent Fuzzing System for JavaScript*, Saarland University & CISPA

2018 **Nils Glörfeld** (BSc student) – *Malicious JavaScript Deobfuscation*, Saarland University & CISPA

Dennis Salzmann (BSc student) – *Malicious JavaScript Detection*, Saarland University & CISPA

Invited Talks

Browser Extension (In)Security

Jun 2024 GDR Information Security. Rennes, France.

DoubleX: Statically Detecting Vulnerable Data Flows in Browser Extensions

Nov 2023 Workshop at INRIA. Paris, France.

Jul 2022 Berkeley Security Seminar. Berkeley, CA, U.S.

May 2022 RuhrSec. Bochum, Germany (extended version).

Apr 2022 Stanford Computer Forum – Security Workshop. Stanford, CA, U.S.

Nov 2021 Stanford Security Lunch. Stanford, CA, U.S.

Studying JavaScript Security Through Static Analysis

Apr 2024 PEPR Cyber – Project DefMal Webinar (France). Remote (extended version).

Mar 2022 Palo Alto Networks (CA, U.S.). Remote (extended version).
Jun 2021 Spirals Webinar at Inria Lille (France). Remote.

Statically Analyzing Malicious JavaScript in the Wild

Mar 2021 Webinar at LORIA (France). Remote.
Dec 2020 BINSEC Webinar at CEA (France). Remote.

HideNoSeek: Camouflaging Malicious JavaScript in Benign ASTs

May 2020 RuhrSec (Germany). Remote (extended version).
Mar 2019 Grande Region Security and Reliability Day (GRSRD). Nancy, France.
Feb 2019 MADWeb. San Diego, CA, U.S.

JaSt: Fully Syntactic Detection of Malicious (Obfuscated) JavaScript

Nov 2018 Blackhoodie. Berlin, Germany.
Jun 2018 Malware Meeting at LORIA. Nancy, France.
Mar 2018 Grande Region Security and Reliability Day (GRSRD). Saarbrücken, Germany.

Publicly Available Software

static-pdg-js Static analysis of JavaScript code (AST, control & data flows, pointer analysis)

DoubleX Static browser extension analyzer: detection of suspicious external data flows

HideNoSeek Static analyzer to detect syntactic clones in JavaScript inputs

JStap Static and modular malicious JavaScript detector

JaSt Static malicious JavaScript detector

reimpl-cujo Reimplementation of Cujo, static malicious JavaScript detector

reimpl-zozzle Reimplementation of Zozzle, static malicious JavaScript detector

Additional Skills – Languages

French Mother tongue

English Trilingual proficiency *TOEIC score: 910 (2014); lived in the U.S. 2021–2023*

German Trilingual proficiency *C1 Certificate (2016); lived in Germany 2017–2021 & 2023 onwards*