

# Academic CV

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## Personal Data

Name	<b>DI Sophie Rain</b>
Birthday	05 August 1996
Email	<a href="mailto:sophie.rain@tuwien.ac.at">sophie.rain@tuwien.ac.at</a>
Homepage	<a href="https://forsyte.at/people/rain">forsyte.at/people/rain</a>

Languages	German (native) English (excellent) French (intermediate) Spanish (elementary)
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Interests	various types of sports, languages, travelling
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## Research Interests

Logic, Security of Blockchain Applications, Game Theory, Automated Reasoning, Formal Methods

## Academic Qualification

### PhD

Since October 2020 student of SecInt Doctoral College at the Institute of Logic and Computation (TU Wien).

- supervised by Laura Kovacs and co-supervised by Matteo Maffei
- working in Laura Kovacs' Automated Reasoning group (Formal Methods)
- focus on verifying game-theoretical security properties of distributed protocols

### Bachelor and Master

From October 2014 until June 2020 student of Mathematics at TU Wien.

#### Bachelor (2014-2018)

- discovered interest in Logic and formal theorem proving in the first semesters
- very good background knowledge on proofs
- graduated with highest distinction

#### Bachelor Thesis

- in the area of NLP, based on the i2b2 medication extraction challenge

#### Master (2018-2020)

- focus on computer science: Automated Deduction, Machine Learning, Logic
- also during term abroad at University of Waterloo, Canada
- Summer School on SAT, SMT and AR in Lisbon 2019
- BEST course on IoT, Aalborg, Denmark, August 2019
- ATHENS course on Data Transfer in Paris, November 2019
- graduated with highest distinction

## Master Thesis

- on „First-Order Reasoning with Aggregates“, motivated by verification of Smart Contracts
- encoding sums in First-Order logic and reasoning about it
- Institute of Logic and Computation, supervised by Laura Kovacs, in collaboration with Mooly Sagiv from Tel Aviv University

## Professional Experience

From February 2024 on	Part-time employee of the <b>Ethereum Foundation</b> as <b>Formal Verification</b> scientist
Since October 2020	<b>University Assistant</b> at <b>TU Wien</b> in the course of my Phd studies
September - November 2023	<b>Internship</b> with the <b>Ethereum Foundation</b> connecting my PhD research with Ethereum's smart contracts
September - December 2021	<b>Applied Science Intern</b> at <b>Amazon Web Services (AWS)</b> using Automated Reasoning to make AWS's services secure
February 2021	IPMA Level D certified Project Manager
October 2019 - August 2020	<b>Process Engineer</b> at <b>BOSCH</b> working in an international agile team in the area of integration testing of BOSCH control unit software, while in parallel finishing my master's degree
2015 - 2019	several <b>long term internships</b> at <b>BOSCH</b> supporting the customer project teams in terms of software testing
Summers 2014, 2012	summer <b>internships</b> at <b>Polymun</b> and <b>TGB</b>
School Year 2012/13	<b>CEO</b> of the <b>Junior Company</b> Hasta la Pasta in High School

## Teaching

Winter Term 2023, Summer Term 2023	Advising <b>Projects in Computer Science</b> of Ivana Bocevska (received the Siemens Award for Excellence)
Summer Term 2022	<b>Master Thesis Co-Supervision</b> of Lea Brugger (received the Young Distinguished Alumn Award and the City of Vienna Diploma Thesis Prize).
Winter Term 2022, Summer Term 2022, Summer Term 2021,	<b>Teaching Assistant</b> for Formal Methods in Informatics (mandatory Computer Science Master course)

Winter Term 2020

Summer Term 2017      **Tutor** for Computer Mathematics  
(mandatory Mathematics Bachelor course)

Winter Term 2016      **Tutor** for Introduction to Programming  
(mandatory Mathematics Bachelor course)

## Awards and Stipends

- **Best Presentation Award** at LPAR 2024
- Listed as one of **TU Wien's 30 under 30**, July 2023
- **Netidee Stipend** for my PhD project (November 2022 – May 2024)
- **Christiana Hörbiger Prize** for the mobility of junior researchers (October 2022)
- **Dr. Maria Schaumayer prize** for excellent master theses (October 2021)
- Stipend for **Excellent Students** 2018, 2019, 2020
- **VERBUND Frauenstipendium** 2016 (stipend to support outstanding young women in technical studies)

## Selected Publications

S. Rain, L. Brugger, A. Petkovic-Komel, L. Kovács, M. Rawson. „**Scaling CheckMate for Game-Theoretic Security**“, 2024, LPAR 2024

L. Brugger, L. Kovács, A. Petkovic-Komel, S. Rain, M. Rawson, „**CheckMate: Automated Game-Theoretic Security Reasoning**“, 2023, CCS 2023

M. Landman, S. Rain, L. Kovács, G. Futschek, „**Reshaping Unplugged Computer Science Workshops for Primary School Education**“, 2023 ISSEP 2023

S. Rain, Z. Avarikioti, L. Kovács, M. Maffei, „**Towards Game-Theoretical Security Analysis of Off-Chain Protocols**“, 2022, CSF 2023

N. Elad, S. Rain, L. Kovács, M. Sagiv, N. Immerman, „**Summing up Smart Transitions**“, CAV 2021

S. Rain, „**First-Order Reasoning with Aggregates**“, Master Thesis 2020

## Community Service

- FMCAD Student Forum 2024 PC member
- Member of the ATVA 2024 Artifact Evaluation Committee
- Reviewer for the IEEE Transactions in Information Forensics and Security (T-IFS) journal 2024
- FMBC 2024 Programm Committee member

- Promoting careers in STEM at BG/BRG Hollabrunn (my former Highschool) November 2022
- Student Volunteer FloC 2022
- Abenteuer Informatik, TU Wien initiative to bring Computer Science to Volksschule (Austrian primary school)
- Student Volunteer CAV 2021
- Voluntary Fire Fighter (Freiwillige Feuerwehr Niederösterreich)

## **Invitations and Participation**

Trail of Bits, presentation of my research, 2024

Selected as participant for the Heidelberg Laureate Forum, September 2023

Presented at Austrian Blockchain Community Seminar, July 2023

Presented at Days on Computational Game Theory Amsterdam, June 2023

WORLD.MINDS Annual Summit, December 2022

EUGAIN Summer School on Gender Balance in Informatics, Switzerland, June 2022

Winter School and Workshop on Proof Theory, Portugal, December 2021

Dagstuhl Seminar on Rigorous Methods for Smart Contracts, Germany, October 2021