Chana Weil-Kennedy

Postdoctoral Researcher in Computer Science

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https://chana-wk.github.io/

Work

2023 – present **Postdoctoral Researcher**, *IMDEA Software Institute*, Madrid, Spain.
Member of Pierre Ganty's team.

I am continuing my work on parameterized verification of concurrent systems with anonymous agents, for systems communicating by broadcasts, registers and more. I also study the language inclusion problem, focusing on the wqo-approach developed by Pierre and his students in the past few years.

2018 – 2023 **PhD Student**, *Technical University of Munich*, Germany.
Doctoral candidate under the supervision of Prof. Javier Esparza at the Chair for Foundations of Software Reliability and Theoretical Computer Science (Lehrstuhl VII). Officially employed as a Wissenschaftliche Mitarbeiterin (Scientific Staff).

I worked on parameterized verification of distributed protocols and concurrent systems, often modelled by Petri nets. Given a property and a system with an infinite state space, I examined the problem of checking whether the property holds for *any* input of the system. In particular, I studied the correctness problem for population protocols (introduced by Angluin et al.) and the reachability problem for certain classes of Petri nets with an observation component.

Education

2016 – 2018 **Master's Degree in Computer Science**, *École Normale Supérieure Paris-Saclay* (ex-ENS Cachan), France.
MPRI (Master Parisien de Recherche en Informatique, or Parisian Master of Research in Computer Science)

2015 – 2016 **Master 1 in Mathematics**, *Université Paris-Sud*, France.
Master in Fundamental Mathematics (Jacques Hadamard Program) + Magistère de mathématiques

2014 – 2015 **Bachelor of Mathematics**, *Université Paris-Sud*, France.
Bachelor in Fundamental Mathematics (Jacques Hadamard Program) + Magistère de mathématiques

2012 – 2014 **Classes Préparatoires (CPGE) MPSI/MP**, *Lycée Lakanal*, Sceaux.
Undergraduate course to prepare nationwide competitive exams in sciences

2012 **Scientific Baccalauréat (French high school diploma)**, *Lycée Magendie*, Bordeaux.
Scientific Baccalauréat, with speciality in Mathematics

Internships and Projects

March 2018 to July 2018 **Internship**, *supervised by Pierre Ganty*, IMDEA Software Institute (Madrid).
This internship was centered on population protocols, a distributed protocol model in which identical mobile agents interact and compute a function by consensus. We studied the problem of verifying whether a given protocol correctly computes a function given any input. The results were published at CONCUR 2018.

May 2017 to August 2017 **Internship**, *supervised by Thomas Wies*, NYU (New York City).
This internship was centered on program verification and separation logic. We worked on a way of improving Thomas Wies's tool GRASShopper to make it more efficient. GRASShopper takes as input a program, explicits its memory specifications using separation logic and first-order logics, and then automatically checks them using SMT-solvers.

2016 **Project**, *supervised by Nicolas Ratazzi*, LRI (Université Paris-Sud).
Around Roth's theorem.

June 2015 **Internship**, *supervised by Nicolas Schabanel*, LIAFA (now IRIF, CNRS-Paris 7).
Around the proof of the PCP (Probabilistically Checkable Proof) theorem.

2015 **Project**, *supervised by Florent Jouve*, LRI (Université Paris-Sud).
Around expander graphs.

Publications

- *Parameterized Analysis of Reconfigurable Broadcast Networks*, with A. R. Balasubramanian and Lucie Guillou at the FossaCS 2022 conference.
- *Reconfigurable Broadcast Networks and Asynchronous Shared-Memory Systems are Equivalent*, with A. R. Balasubramanian at the GandALF 2021 conference.
- *The Complexity of Verifying Population Protocols*, with Javier Esparza and Michael Raskin, in the journal Distributed Computing.
- *Efficient Restrictions of Immediate Observation Petri Nets*, with Michael Raskin at the Reachability Problems 2020 conference.
- *Flatness and Complexity of Immediate Observation Petri Nets*, with Javier Esparza and Michael Raskin at the CONCUR 2020 conference.
- *Parameterized Analysis of Immediate Observation Petri Nets*, with Javier Esparza and Michael Raskin at the Petri Nets 2019 conference, **Best Paper Award**.
- *Verification of Immediate Observation Population Protocols*, with Javier Esparza, Pierre Ganty and Rupak Majumdar at the CONCUR 2018 conference.

Professional Activities

Reviewing I have reviewed papers for the conferences Petri Nets 2020, CONCUR 2020, CAV 2021 and CAV 2022, and the journals Fundamenta Informaticae and STVR.

Talks I have given talks at Highlights (2019, 2020, 2021, 2022), at Infinity 2020 (satellite workshop of ICALP/LICS 2020), at different seminars, as well as at each conference in which my papers were accepted.

Teaching I have been a tutor for the Master's courses "Automata and Formal Languages", "Petri Nets" and "Fundamental Algorithms" at the TUM.

Student Supervision I have supervised three Bachelor theses on extending the teaching tool "Automata Tutor" to Petri nets, by Arpad Botos, Felix Rinderer and Lilo Walter at the TUM. I have supervised a Master thesis on parameterized analysis of broadcast networks by Lucie Guillou of ENS Rennes.

Computer Skills

Python, OCaml, LaTeX, Z3, why3. Basic website building.

Awards

- Best Paper Award for "Parameterized Analysis of Immediate Observation Petri Nets" at the Petri Nets 2019 conference.
- "Prix de la vocation scientifique et technique des filles" (Scientific and Technological Vocational Award for Girls) given in 2012 by the Aquitaine region in France.

Languages

English, French Bilingual (French and U.S. citizen)

German Good level

Spanish Basic

Latin, Hindi Some notions

Other

Summer Schools	I attended the Autoboz 2022 workshop, the summer school on Verification Technology, Systems and Applications 2021 (Belgium), the Marktoberdorf Summer School 2019 (Germany), and the All Girls/All Math summer camp 2011 at the University of Nebraska-Lincoln (USA).
Jobs	Camp counsellor, Math and English tutor