

# DJORDJE ZIKELIC (ĐORĐE ŽIKELIĆ)

## PERSONAL INFORMATION

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**Address:** Am Campus 1, 3400 Klosterneuburg, Austria  
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## EDUCATION

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**Institute of Science and Technology Austria (ISTA)**

*2018 - Present*

Ph.D. in Computer Science

Advisors: Krishnendu Chatterjee, Petr Novotný

Research Interests: Formal methods, Probabilistic verification, Static program analysis, Probabilistic programming, Safe AI, Learning-based control, Neural network verification, Safe RL, Games on graphs

**University of Cambridge, UK**

*2014 - 2018*

Mathematical Tripos, Gonville & Caius College

Bachelor of Arts (BA) and Master of Mathematics (MMath)

Part III essay: *Lagrangians of Hypergraphs*

**Mathematical Grammar School, Belgrade, Serbia**

*2010 - 2014*

## INTERNSHIPS

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**Amazon, UK**

*August 2022 - October 2022*

Position: Applied Scientist Intern

Team: Prime Video Automated Reasoning & Anomaly Detection and Insights

Project: On-line Automated Threshold Analysis for Time-series Anomaly Detection

Programming: Python

**Amazon, UK (virtual)**

*October 2020 - January 2021*

Position: Applied Scientist Intern

Team: Prime Video Automated Reasoning

Project: Differential cost analysis in programs (PLDI 2022)

Programming: Python, OCaml

**University of Cambridge, UK**

*July 2017 - September 2017*

Position: Research Intern

Supervisor: Alexei Kovalev

Project: Aspects of Morse Theory (study of topics in differential geometry and algebraic topology)

**Institute of Science and Technology Austria (ISTA)**

*June 2016 - September 2016*

Position: Research Intern

Supervisor: Krishnendu Chatterjee, Petr Novotný

Project: Safety analysis in probabilistic programs (POPL 2017), planning under uncertainty (AAAI 2017)

Programming: Matlab

## PUBLICATIONS

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13 out of 17 conference publications accepted at premier venues according to CSRankings

\* equal contribution, † authors ordered alphabetically

### Conference publications

1. *MDPs as Distribution Transformers: Affine Invariant Synthesis for Safety Objectives.*  
S. Akshay, Krishnendu Chatterjee, Tobias Meggendorfer, Đorđe Žikelić<sup>†</sup>.  
To appear in the 35th International Conference on Computer Aided Verification (CAV 2023)
2. *A Learner-Verifier Framework for Neural Network Controllers and Certificates of Stochastic Systems.*  
Krishnendu Chatterjee, Thomas A. Henzinger, Mathias Lechner, Đorđe Žikelić<sup>†</sup>.  
29th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2023)

3. *Learning Control Policies for Stochastic Systems with Reach-avoid Guarantees.*  
Đorđe Žikelić\*, Mathias Lechner\*, Krishnendu Chatterjee, Thomas A. Henzinger.  
37th AAAI Conference on Artificial Intelligence (**AAAI 2023**), **oral presentation**
4. *Quantization-aware Interval Bound Propagation for Training Certifiably Robust Quantized Neural Networks.*  
Mathias Lechner, Đorđe Žikelić, Krishnendu Chatterjee, Thomas A. Henzinger, Daniela Rus.  
37th AAAI Conference on Artificial Intelligence (**AAAI 2023**), **oral presentation**
5. *Bidding Graph Games with Partially-Observable Budgets.*  
Guy Avni, Ismaël Jecker, Đorđe Žikelić†.  
37th AAAI Conference on Artificial Intelligence (**AAAI 2023**), **oral presentation**
6. *Algorithms and Hardness Results for Computing Cores of Markov Chains.*  
Ali Ahmadi, Krishnendu Chatterjee, Amir Kafshdar Goharshady, Tobias Meggendorfer, Roodabeh Safavi, Đorđe Žikelić†.  
42nd IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (**FSTTCS 2022**)
7. *Sound and Complete Certificates for Quantitative Termination Analysis of Probabilistic Programs.*  
Krishnendu Chatterjee, Amir Kafshdar Goharshady, Tobias Meggendorfer, Đorđe Žikelić†.  
34th International Conference on Computer Aided Verification (**CAV 2022**)
8. *Differential Cost Analysis with Simultaneous Potentials and Anti-potentials.*  
Đorđe Žikelić, Bor-Yuh Evan Chang, Pauline Bolignano, Franco Raimondi.  
44th ACM SIGPLAN Conference on Programming Language Design and Implementation (**PLDI 2022**)  
Featured in an **Amazon Science blog post**
9. *Stability Verification in Stochastic Control Systems via Neural Network Supermartingales.*  
Mathias Lechner\*, Đorđe Žikelić\*, Krishnendu Chatterjee, Thomas A. Henzinger.  
36th AAAI Conference on Artificial Intelligence (**AAAI 2022**), **oral presentation**
10. *Infinite Time Horizon Safety of Bayesian Neural Networks.*  
Mathias Lechner\*, Đorđe Žikelić\*, Krishnendu Chatterjee, Thomas A. Henzinger.  
35th Conference on Neural Information Processing Systems (**NeurIPS 2021**)
11. *On Lexicographic Proof Rules for Probabilistic Termination.*  
Krishnendu Chatterjee, Ehsan Kafshdar Goharshady, Petr Novotný, Jiří Závěručky, Đorđe Žikelić†.  
24th International Symposium on Formal Methods (**FM 2021**)  
Invited for the Special Issue on “**Best Papers from Formal Methods Symposium 2021**” in **FAC**
12. *Proving Non-termination by Program Reversal.*  
Krishnendu Chatterjee, Ehsan Kafshdar Goharshady, Petr Novotný, Đorđe Žikelić†.  
43rd ACM SIGPLAN Conference on Programming Language Design and Implementation (**PLDI 2021**)
13. *Scalable Verification of Quantized Neural Networks.*  
Thomas A. Henzinger, Mathias Lechner, Đorđe Žikelić†.  
35th AAAI Conference on Artificial Intelligence (**AAAI 2021**)
14. *Infinite-Duration All-Pay Bidding Games.*  
Guy Avni, Ismaël Jecker, Đorđe Žikelić†.  
ACM-SIAM Symposium on Discrete Algorithms (**SODA 2021**)
15. *Bidding Mechanisms in Graph Games.*  
Guy Avni, Thomas A. Henzinger, Đorđe Žikelić†.  
44th International Symposium on Mathematical Foundations of Computer Science (**MFCS, 2019**)
16. *Optimizing Expectation with Guarantees in POMDPs.*  
Krishnendu Chatterjee, Petr Novotný, Guillermo A. Perez, Jean-Francois Raskin, Đorđe Žikelić†.  
31st AAAI Conference on Artificial Intelligence (**AAAI, 2017**)
17. *Stochastic invariants for probabilistic termination.*  
Krishnendu Chatterjee, Petr Novotný, Đorđe Žikelić†.  
44th ACM SIGPLAN Symposium on Principles of Programming Languages (**POPL, 2017**)

## Journal publications

1. *On Lexicographic Proof Rules for Probabilistic Termination.*  
Krishnendu Chatterjee, Ehsan Kafshdar Goharshady, Petr Novotný, Jiří Závěručky, Đorđe Žikelić†.  
Formal Aspects of Computing (**FAC 2023**)

2. *Social balance on networks: Local minima and best-edge dynamics.*  
Krishnendu Chatterjee, Jakub Svoboda, Đorđe Žikelić, Andreas Pavlogiannis, Josef Tkadlec.  
Physical Review E, Vol. 106, No. 3 (**PRE 2022**)
3. *Bidding Mechanisms in Graph Games.*  
Guy Avni, Thomas A. Henzinger, Đorđe Žikelić<sup>†</sup>.  
Journal of Computer and System Sciences (**JCSS 2021**)
4. *Theorems about quadrilaterals and conics.*  
Đorđe Baralić, Branko Grbić, Đorđe Žikelić<sup>†</sup>.  
International Journal of Computer Mathematics 91 (7) (**Int. J. Comput. Math., 2014**)

### Workshop publications

1. *Learning Stabilizing Policies in Stochastic Control Systems.*  
Đorđe Žikelić\*, Mathias Lechner\*, Krishnendu Chatterjee, Thomas A. Henzinger.  
ICLR 2022 Workshop on Socially Responsible Machine Learning (**SRML@ICLR 2022**)

## HONOURS AND AWARDS

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**Meta PhD Research Fellowship - finalist** 2022  
Shortlisted as one of the 4 finalists for the programming languages category.

**Gonville & Caius College Scholarship and Cambridge Trust Scholarship** 2014-2018  
Full university fees, tuition fees, and maintenance costs.

**Stephen Hawking Fund Award** October, 2017  
Awarded by Gonville & Caius College, Cambridge to mathematics students proceeding to Part III.

**Scholar of the Gonville & Caius College, Cambridge** June 2015, 2016  
High performance in the examinations of the Mathematical Tripos.

**International High School Olympiads** 2010-2014  
Participated in international high school olympiads in mathematics, physics, and astronomy. Most notable results:

- International Olympiad in Astronomy and Astrophysics (IOAA) 2014 (bronze medal)
- International Mathematical Competition Arhimede 2013 (gold medal), 2012 (silver medal)
- International Junior Science Olympiad (IJSO) 2010 (bronze medal)
- International Astronomy Olympiad (IAO) 2010 (bronze medal)
- International Mathematical Olympiad (IMO) 2014 (first reserve for the Serbian team)

**National High School Competitions** 2010-2014

- Serbian Mathematical Olympiad: second prize in 2014, third prize in 2013, 2012
- Mathematics (national): **first overall** in my year in 2014, 2012, 2010, **second overall** in 2013
- Physics (national): first prize in 2013, second prize in 2012, 2011, third prize in 2014
- Astronomy (national): second prize in 2014, 2012

## TEACHING

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Teaching at ISTA

- Computer Science Track Core Course, TA for Spring 2021.
- Formal Methods, TA for Spring 2020.
- Computer Science Track Core Course, TA for Spring 2020.
- Mathematics Track Core Course, Spring 2019, 4 lectures on Brownian motion and aspects of probability.

Prior to enrolling university, I taught in several preparation classes for mathematical olympiads at the Mathematical High School, Belgrade, as well as at the Mathematical Society "Arhimedes", Belgrade.

## SERVICE

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- Program Committee: AAAI 2023, CAV AEC 2023, CAV AEC 2022
- Reviewer: CDC 2023, LPAR 2023, CAV 2023, FoSSaCS 2022, AAMAS 2022, ICML 2022

## PROFESSIONAL SKILLS

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- Python, C++

- Serbian (native), English (fluent), German (elementary)

## PERSONAL SKILLS AND INTERESTS

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Strong analytical skills (developed through research and degree activities, maths competitions), hard working  
Good organizing skills, value teamwork:

- Co-organized **Young Scientist Symposium 2019** at ISTA May, 2019
- President of the **Cambridge University Serbian Society** 2017-2018

Hobbies and interests: History, travelling, sports (football and tennis), politics, gaming, D&D

## REFERENCES

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### **Krishnendu Chatterjee**

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krishnendu.chatterjee@ist.ac.at

### **Petr Novotný**

Masaryk University, Czech Republic  
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### **Bor-Yuh Evan Chang**

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### **Thomas A. Henzinger**

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### **Pauline Bolignano**

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