# DJORDJE ZIKELIC (ĐORĐE ŽIKELIĆ)

#### PERSONAL INFORMATION

Address: Am Campus 1, 3400 Klosterneuburg, Austria

Website: https://djordjezikelic.github.io/

#### **EDUCATION**

# Institute of Science and Technology Austria (ISTA)

2018 - Present

Email: dzikelic@ist.ac.at

Ph.D. in Computer Science

Advisors: Krishnendu Chatterjee, Petr Novotný

Research Interests: Formal verification, Static program analysis, Neural network verification, Learning-based control, Probabilistic programming, Safe reinforcement learning, Game theory

# 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**

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**

12 out of 15 conference publications accepted at premier venues according to CSRankings

\* equal contribution, † authors ordered alphabetically

#### Conference publications

Learning Control Policies for Stochastic Systems with Reach-avoid Guarantees.
 Dorđe Žikelić\*, Mathias Lechner\*, Krishnendu Chatterjee, Thomas A. Henzinger.
 To appear in the 37th AAAI Conference on Artificial Intelligence (AAAI 2023)

- 2. Quantization-aware Interval Bound Propagation for Training Certifiably Robust Quantized Neural Networks. Mathias Lechner, Đorđe Žikelić, Krishnendu Chatterjee, Thomas A. Henzinger, Daniela Rus. To appear in the 37th AAAI Conference on Artificial Intelligence (AAAI 2023)
- 3. Bidding Graph Games with Partially-Observable Budgets.
  Guy Avni, Ismaël Jecker, Đorđe Žikelić<sup>†</sup>.
  To appear in the 37th AAAI Conference on Artificial Intelligence (**AAAI 2023**)

4. Algorithms and Hardness Results for Computing Cores of Markov Chains.

Ali Ahmadi, Krishnendu Chatterjee, Amir Kafshdar Goharshady, Tobias Meggendorfer, Roodabeh Safavi, Đorđe Žikelić<sup>†</sup>.

To appear in the 42nd IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2022)

5. Sound and Complete Certificates for Quantitative Termination Analysis of Probabilistic Programs. Krishnendu Chatterjee, Amir Kafshdar Goharshady, Tobias Meggendorfer, Đorđe Žikelić<sup>†</sup>. 34th International Conference on Computer Aided Verification (CAV 2022)

6. Differential Cost Analysis with Simultaneous Potentials and Anti-potentials. Dorđe 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** 

7. 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

8. 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)

 $9. \ \ On \ Lexicographic \ Proof \ Rules \ for \ Probabilistic \ Termination.$ 

Krishnendu Chatterjee, Ehsan Kafshdar Goharshady, Petr Novotný, Jiři Zárevúcky, Đorđe Žikelić<sup>†</sup>. 24th International Symposium on Formal Methods (**FM 2021**)

10. Proving Non-termination by Program Reversal.

Krishnendu Chatterjee, Ehsan Kafshdar Goharshady, Petr Novotný, Đorđe Žikelić<sup>†</sup>.

43rd ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2021)

11. Scalable Verification of Quantized Neural Networks.

Thomas A. Henzinger, Mathias Lechner, Đorđe Žikelić<sup>†</sup>.

35th AAAI Conference on Artificial Intelligence (AAAI 2021)

12. Infinite-Duration All-Pay Bidding Games.

Guy Avni, Ismaël Jecker, Đorđe Žikelić<sup>†</sup>.

ACM-SIAM Symposium on Discrete Algorithms (SODA 2021)

13. Bidding Mechanisms in Graph Games.

Guy Avni, Thomas A. Henzinger, Đorđe Žikelić<sup>†</sup>.

44th International Symposium on Mathematical Foundations of Computer Science (MFCS, 2019)

14. Optimizing Expectation with Guarantees in POMDPs.

Krishnendu Chatterjee, Petr Novotný, Guillermo A. Perez, Jean-Francois Raskin, Đorđe Žikelić<sup>†</sup>. 31st AAAI Conference on Artificial Intelligence (**AAAI**, **2017**)

15. Stochastic invariants for probabilistic termination.

Krishnendu Chatterjee, Petr Novotný, Đorđe Žikelić<sup>†</sup>.

44th ACM SIGPLAN Symposium on Principles of Programming Languages (POPL, 2017)

## Journal publications

1. 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**)

 $2. \ Bidding \ Mechanisms \ in \ Graph \ Games.$ 

Guy Avni, Thomas A. Henzinger, Đorđe Žikelić<sup>†</sup>.

Journal of Computer and System Sciences (JCSS, 2021)

3. 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.

Dorđe Žikelić\*, Mathias Lechner\*, Krishnendu Chatterjee, Thomas A. Henzinger.

ICLR 2022 Workshop on Socially Responsible Machine Learning (SRML@ICLR 2022)

# 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 & Cauis 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**

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**

- Program Committee: AAAI 2023
- Artifact Evaluation Committee: CAV 2022
- Reviewer: FoSSaCS 2022, AAMAS 2022, ICML 2022

# PROFESSIONAL SKILLS

- $\bullet$  Python, C++
- Serbian (native), English (fluent), German (elementary)

# PERSONAL SKILLS AND INTERESTS

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

Institute of Science and Technology Austria (ISTA) krishnendu.chatterjee@ist.ac.at

# Petr Novotný

Masaryk University, Czech Republic petr.novotny@fi.muni.cz

# Bor-Yuh Evan Chang

University of Colorado Boulder & Amazon byec@amazon.com

# Thomas A. Henzinger

Institute of Science and Technology Austria (ISTA)  ${\tt tah}@{\tt ist.ac.at}$ 

# Pauline Bolignano

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