

# Sasha Rubin

*Curriculum Vitae, 10/2017*

University of Naples "Federico II"  
Naples, Italy

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📄 [sasharubin.github.io](https://sasharubin.github.io)



## Personal Information

Citizenship New Zealand  
Languages English (first language), Italian (beginner)

## Current Appointment

2017-present **PostDoc. (Computer Science)**, *University of Naples "Federico II"*, Department of Electrical Engineering and Information Technology, Fellow of the ASTREA lab headed by Aniello Murano, for the study of formal methods, artificial intelligence, and multi-agent systems.

## Academic Qualifications

Begun 1999, **PhD**, *Department of Mathematics and Department of Computer Science*, University of Auckland, Best Doctoral Thesis in the Faculty of Science (at most five awarded per year).  
Defence 2004, Awarded 2007.

1997-1998 **MSc**, *Department of Mathematics and Department of Computer Science*, University of Auckland, First Class.

1994-1996 **BSc**, *Department of Mathematics and Department of Computer Science*, University of Cape Town, Dean's Merit List.

## Previous Appointments

2015-2017 **Marie Curie Fellow of INdAM "F. Severi"**, *University of Naples "Federico II"*.  
Research in collaboration with Aniello Murano and his group

2014-2015 **PostDoc. (Computer Science)**, *TU Wien and TU Graz*.  
Research in collaboration with Helmut Veith and Roderick Bloem, and their groups

2012-2014 **PostDoc. (Computer Science)**, *TU Wien and IST Austria*.  
Research in collaboration with Helmut Veith and Krishnendu Chatterjee and their groups

2010-2012 **Honorary Research Fellow (Computer Science)**, *University of Auckland*.

**Visiting Researcher (Computer Science)**, *University of Tel Aviv*.  
Research in collaboration with Alexander Rabinovich, one semester in 2011  
**Visiting Lecturer (Mathematics)**, *University of Cape Town*.  
1 semester in 2010

2008-2009 **Visiting Assistant Professor (Mathematics)**, *Cornell University*.  
Lecturer, and Research in collaboration with Anil Nerode and his group, 3 semesters

2004-2007 **Foundation for Research, Science and Technology (FRST) New Zealand Science and Technology (NZST) Postdoctoral Fellowship**, *University of Auckland*.  
NZ Government funded 3 year fellowship

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## Research Portfolio

My main research interest is in artificial intelligence, including logic, knowledge representation, multi-agent systems and automated planning. I have contributed to the following areas:

- Formal methods (modeling, verification, synthesis) of Multi-agent Systems (including parameterised systems, distributed systems, probabilistic systems, timed systems).
- Logics (for games and strategic reasoning)
- Foundations of planning and generalised planning.
- Automated reasoning (including verification and synthesis).
- Automata theory.
- Finite and algorithmic model theory.

### Research Accomplishments

Citation source: google scholar 11/10/17

2017 I published 5 CORE A\* conference papers in 2017 [C1]–[C5].

2016 I published 5 CORE A\* conference papers in 2016 [C6]–[C10].

2016-2017 I teamed up with world-experts in automated planning and multi-agent systems and made theoretical and practical contributions to verification and synthesis under imperfect information. In particular, I extended logics for strategic reasoning in two ways: allowing imperfect information (with Moshe Vardi et.al. [C3] and Alessio Lomuscio et.al. [C1]), and by graded modalities (with Aniello Murano et.al. [J2]). I extended the belief-space construction to infinite games (with Giuseppe De Giacomo et. al. [C10]), and I studied an application of these ideas to Generalised Planning (with Giuseppe de Giacomo, Blai Bonet, and Hector Geffner) [C4].

2014-2015 I opened the direction of formal methods for parameterised light-weight mobile agents with [C16]. Subsequently (with my co-authors) I continued this direction with [C12] (which won a best-paper award) and [C7].

2015 Co-authored a book surveying decidability results in parameterised verification [B1], published by Morgan & Claypool, (29 citations).

2012-2014 I (with my co-authors) generalised a cornerstone paper on verification of parameterised systems ("Reasoning about Rings", E.A. Emerson, K.S. Namjoshi, POPL, 1995) from ring topologies to arbitrary topologies (36 citations) [C17].

2008-2011 I published a survey and extension of the main results in my thesis in the Bulletin of Symbolic Logic [J8]. With a PhD student of Erich Grädel's (Tobias Ganzow) I solved a 12 year-old conjecture of Courcelle's [C22].

1999-2007 During and after my PhD I (and my co-authors) pioneered the development of the theory of automatic structures. My most cited publications in this area are: [C26] (98 citations) and [J8] (92 citations). My PhD thesis has 72 citations.

### Bibliometrics

conf. papers 16 × CORE A\* (including 5 LICS, 4 IJCAI, 4 AAMAS, 1 KR, 1 IJCAR, 1 CAV), and 7 × CORE A

journal articles 3 × SJR Q1, and 4 × SJR Q2

H-index According to Google Scholar, my H-index is 15 (since 2002), and 12 (since 2012)

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## Awards

PhD Prize **Best doctoral thesis in the Faculty of Science, University of Auckland, 2004, At most five awarded per year.**

PhD Prize **Montgomery memorial prize in logic from the Department of Philosophy, 2004, At most one awarded per year.**

Paper Prize **Best-paper award at PRIMA 2015, [C12],** *One awarded per year.*  
Competition **As part of a team of three, won the national heats and represented New Zealand in the world finals of the 1998 ACM Programming Contest, Atlanta, Georgia USA.**

## Funding and Grant writing

### Individual Funding

- 2004-2007 **Foundation for Research, Science and Technology (FRST) New Zealand Science and Technology (NZST) Post Doctoral Fellowship (n. UOAX0413, "Automatic Structures"), 3 years, NZ\$224532.**
- 2015-2016 **Marie Curie Fellowship of INdAM "F. Severi", 2 years, €107000, one of four awarded in 2015.**
- 2011 **Exchange Grant within the framework of the European Science Foundation (ESF) activity on "Games for Design and Verification", 12 weeks, €5300.**
- 2015-2016 **GNSAGA grants for research travel, €4909.**
- 2011 **Short Visit Grant (n. 4391) of the European Science Foundation (ESF) activity on "Games for Design and Verification", 15 days, €1475.**
- 2011 **Short Visit Grant (n. 4500) of the European Science Foundation (ESF) activity on "Games for Design and Verification", 10 days, €1350.**

### Grant writing

- 2017 Assisted Aniello Murano with writing a Programma Operativo Nazionale (PON) "Ricerca e Innovazione" 2014-2020 grant application.
- 2017 Assisted Giuseppe De Giacomo with writing an ERC grant application.
- 2017 Assisted Aniello Murano's postdoc with writing an INdAM postdoctoral application.
- 2016-2017 Assisted Florian Zuleger with writing an Austrian Science Fund grant application.
- 2014 Assisted Helmut Veith with writing and editing Austrian Science Fund grant applications and reports for the National Research Network (NFN).  
<http://arise.or.at/>

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## Supervision and Mentoring

I've supervised/mentored a number of students, resulting in publications.

### PhD Mentoring

- 2015-2017 Closely worked with PhD students of Aniello Murano (Vadim Malvone, Antonio di Stasio, Loredanna Sorrentino) and produced [W2], [C6], [C10]
- 2007 Closely worked with a PhD student of Erich Gradel's (Tobias Ganzow) and solved a 12-year open problem [C22]

### Masters Supervision

- 2017 **Masters Internship: Aurele Barriere**, *University of Naples*, Topic: Epistemic Logic. co-supervision, ongoing

### Undergraduate Supervision

- 2017 **Undergraduate thesis: Paolo Lambiase**, *University of Naples*, Topic: Graphical Games. co-supervision, ongoing
- 2012 **Summer undergraduate project: Siddhesh Chaubal**, *IST Austria*, Topic: Edit-distance and Formal Languages. co-supervision, produced [C19]
- 2009 **Summer research experience for undergraduates: Andrey Grinshpun, Pakawat Phal-itnonkiat, Andrei Tarfulea**, *Cornell University*, Topic: Parity Games. supervision, produced [J7]
- 2009 **Summer research experience for undergraduates: Alex Kruckman, John Sheridan, Ben Zax**, *Cornell University*, Topic: Automatic Structures with Advice. supervision, produced [C20]

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## Teaching

### Graduate courses

- 2017 **PhD course**, *Milestones in Solving Games on Graphs*, Technical University of Vienna, Duties: design, present and examine. Scheduled 11/2017
- 2017 **PhD course**, *Games on Graphs*, University of Naples, Duties: designed and presented.
- 2009 **PhD course**, *Logical Definability and Random Graphs*, Cornell University, Duties: designed and presented.

### School course

- 2006 **Advanced course**, *Logic and Computation in Finitely Presentable Infinite Structures*, European Summer School in Logic, Language and Information (ESSLLI 2006), Duties: designed and presented. co-taught

### Undergraduate courses

- 2015/2016 **System specification**, *University of Naples "Federico II"*, Duties: Teaching assistant.
- 2010 **Logic and Computation**, *Department of Mathematics, University of Cape Town*, Duties: Lecturer, course design.
- 2008-2009 **Calculus for Engineers**, *Department of Mathematics, Cornell University*, Duties: Lecturer, weekly online quizzes, marking. taught the course 5 times

- 2007 **Discrete Structures in Mathematics and Computer Science**, *Department of Computer Science, University of Auckland*, Duties: Lecturer (including tutorials), course design. co-taught
- 2007 **Mathematical Foundations of Software Engineering**, *Department of Computer Science, University of Auckland*, Duties: Lectures (including tutorials), course design. co-taught
- 2003 **Introduction to Formal Verification**, *Department of Computer Science, University of Auckland*, Duties: Lecturer (including tutorials), course design. co-taught
- 2002 **Automata theory**, *Department of Computer Science, University of Auckland*, Duties: Lecturer (including tutorials), course design. co-taught
- 2000-2001 **Pre-calculus**, *Department of Mathematics, University of Wisconsin, Madison*, Duties: Lecturer, tutorials, marking. taught the course 2 times

## Dissemination and Outreach

### Recent Talks of Accepted Papers

- 2017 **IJCAI, Melbourne**, *Generalised Planning: Non-Deterministic Abstractions and Trajectory Constraints.*
- 2017 **FMAI, Naples**, *Verification of Multi-agent Systems with Imperfect Information and Public Actions.*
- 2016 **SR, New York**, *LTL Reactive Synthesis under Assumptions.*
- 2016 **KR, Cape Town**, *Model Checking Prompt Alternating-Time Epistemic Logics.*
- 2016 **IJCAI, New York**, *Imperfect-Information Games and Generalized Planning.*
- 2016 **AAMAS, Singapore**, *Automatic Verification of Multi-Agent Systems in Parameterized Grid-Environments.*
- 2015 **PRIMA, Bertinoro**, *Verification of Asynchronous Mobile-Robots in Partially-Known Environments.*
- 2015 **HIGHLIGHTS, Prague**, *The Composition Method and Parameterised Verification.*
- 2015 **AAMAS, Istanbul**, *Parameterised Verification of Autonomous Mobile-Agents.*
- 2014 **VMCAI, San Diego**, *Cutoffs for Parameterised Token-Passing Systems.*
- 2014 **SR, Grenoble**, *First Cycle Games.*
- 2014 **HIGHLIGHTS, Paris**, *First Cycle Games.*
- 2014 **FRIDA, Vienna**, *Using automata and logic to reason about parameterised robot protocols.*
- 2013 **LATA, Bilbao**, *How to Travel between Languages.*

### Outreach

- 2010 I briefly volunteered at a secondary school in Accra, Ghana, teaching, observing and commenting on grade 5 mathematics classes.
- 2010 I briefly volunteered in Khayelitsha, South Africa, helping high-school students prepare for their mathematics exams.
- 2009 I taught two interactive lectures to non-mathematics majors at Cornell University on i) Hilbert's Hotel and Infinite Cardinals and ii) Algorithms and Termination.

## Esteem

### Chairs, Organisation, Committees

- 2018 PC member of the International Workshop on Strategic reasoning (SR)  
<http://projects.lsv.fr/sr18/>
- 2018 PC member of the International Conference on Autonomous Agents and Multi-agent Systems (AAMAS)
- 2018 PC member of the AAAI Conference on Artificial Intelligence (AAAI)  
<https://aaai.org/Conferences/AAAI-18/>
- 2017 External reviewer for Icelandic Research Fund
- 2017 Co-chair and co-organiser of the Italian Conference on Theoretical Computer Science (ICTCS)  
<http://ictcs2017.unina.it/>
- 2017 Co-chair of the International Workshop on Strategic reasoning (SR)  
<http://sr2017.csc.liv.ac.uk/>
- 2017 Co-organiser of the Italian Conference on Computational Logic (CILC)  
<http://cilc2017.unina.it/>
- 2017 Co-organiser and -chair of the First Workshop on Formal Methods in AI (FMAI)  
<https://sites.google.com/site/fmai2017homepage/>
- 2017 PC member of the International Joint Conference on Artificial Intelligence (IJCAI)
- 2017 PC member of the AAAI Conference on Artificial Intelligence (AAAI)
- 2017 PC member for IRISA Master Research Internship
- 2016 PC member of the International Workshop of Strategic Reasoning (SR)
- 2016 PC member of the International Symposium on Games, Automata, Logics and Formal Verification (GandALF)
- 2016 PC member of the European Conference on Artificial Intelligence (ECAI)
- 2013 Co-organiser of the IST Austria Young Scientist Symposium on the topic 'Understanding Shape: in silico and in vivo'  
[ist.ac.at/young-scientist-symposium-2013/](http://ist.ac.at/young-scientist-symposium-2013/)
- 2012 Founded the computer science seminar at IST Austria whose goal was to foster collaborations within the institute between computer scientists and, at the time, biologists.  
[ist.ac.at/computer-science-seminar/](http://ist.ac.at/computer-science-seminar/)

### Editorship

- 2017 Guest-editor, Special issue of SR 2017, Information and Computation, In process.
- 2017 Guest-editor, Special issue of ICTCS 2017 and CILC 2017, Theoretical Computer Science, In process.
- 2017 Editor, Joint proceedings of ICTCS 2017 and CILC 2017, CEUR Workshop proceedings, ISSN 1613-0073, [ceur-ws.org/Vol-1949/](http://ceur-ws.org/Vol-1949/)

### Project co-ordinator

- 2013-2016 Handbook of Model Checking, to be published by Springer, and edited by Edmund Clarke, Thomas Henzinger, Helmut Veith and Roderick Bloem. Duties included: assisted editors in managerial, organisational, and technical matters, including: organising reviews, reviewers, and copy-editors; liaising between editors and Springer editor. ISBN 978-3-319-10575-8, <http://www.springer.com/us/book/9783319105741>

### Reviewing

- Funding Icelandic Research Fund
- Book Handbook of Model Checking

- Journals Artificial Intelligence (AIJ), Journal of Symbolic Logic (JSL), Logical Methods in Computer Science (LMCS), Transactions on Computational Logic (ToCL), Theory of Computing Systems (ToCS), Central European Journal of Mathematics, Information and Computation (IC), Journal of Logic and Computation (JLC), Annals of Mathematics and Artificial Intelligence (AMAI), Theory and Practice of Logic Programming (TLP), Science of Computer Programming (SCP)
- Conferences IJCAI, KR, AAMAS, AAAI, EUMAS, ECAI, LICS, STACS, ICALP, MFCS, CONCUR, CSL, FoSSaCS, FSTTCS, SR, KRR@SAC, CiE, GandALF, RV, LPAR, LATA

#### Recent Research Visits

- 2015,2016,2017 **Host: Giuseppe De Giacomo, Sapienza University of Rome, Topic 1: Synthesis under Assumptions; Topic 2: Generalised Planning with Partial Observability.**
- 2016,2017 **Host: Mike Wooldridge, Oxford University, Topic: Rational Synthesis.**
- 2016,2017 **Host: Alessio Lomuscio, Imperial College London, Topic: Strategic-Epistemic logics for Multi-Agents Systems.**
- 2016 **Host: Diego Calvanese and Marco Montali, University of Bolzano, Topic 1: Data-aware strategic logics; Topic 2: Knowledge Representation for Business Process Management.**
- 2016 **Hosts: Frank Stephan and Sanjay Jain, National University of Singapore, Topic: Learning Theory and Verification.**
- 2015 **Host: Helmut Veith, TU Wien, Topic 1: Logic and Impossibility Results in Distributed Computing; Topic 2: Abstractions for Fault-tolerant Distributed Algorithms.**

#### Invited Workshop Talks

- 2017 **Games of Imperfect-information with Public Actions, RoboLog, Rennes.**
- 2017 **Verification of Multi-Agent Systems with Imperfect Information and Public Actions, FMAI17, Napoli.**
- 2012 **Finite and Algorithmic Model Theory, Les Houches, France.**
- 2011 **Automata theory and Applications, IMS programme, Singapore.**
- 2008 **Computational Model Theory, CNRS SIG, Bordeaux, France.**
- 2007 **Algorithmic-Logical Theory of Infinite Structures, Dagstuhl, Germany.**
- 2006 **Finite and Algorithmic Model Theory, Newton Institute, England.**
- 2004 **Workshop on Automata, Structures and Logic, Auckland, New Zealand.**

#### Invited Seminar Talks

- 2017 **Complexity of strategic reasoning under partial observability, GSSI, Italy.**
- 2017 **Temporal-Strategic Reasoning for Partial-Observation Games, University of New South Wales, Australia.**
- 2016 **Imperfect-Information Games and Generalized Planning, Free university of Bolzano, Italy.**
- 2014 **Verification of Mobile Agents in Partially Known Environments, University of Naples, Italy.**
- 2014 **Memoryless Determinacy of Cycle Games, University of California, San Diego, USA.**
- 2012 **Automata theoretic approach to mixed integer and rational arithmetic, IST Austria, Austria.**
- 2011 **Representing infinite structures by automata, TU Wien, Austria.**
- 2011 **An introduction to automatic structures, Tel Aviv University, Israel.**
- 2011 **Representing infinite structures by automata, EPFL, Switzerland.**
- 2008 **Generalised Quantifiers on Automatic Structures, LSV Cachan, France.**

- 2007 **Generalised Quantifiers on Automatic Structures**, *LIAFA Paris, France*.
- 2007 **Decidable extensions of the Monadic Second-order theory of one successor by unary predicates**, *Cornell University, USA*.



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## Refereed Publications

The cited bibliometrics are as follows: conferences are given their CORE (<http://portal.core.edu.au/conf-ranks/>) letter ranking, followed by the acceptance rate, followed by the number of submissions; journal are given their SJR letter ranking (<http://www.scimagojr.com/journalrank.php>) at time of publication (if a ranking is not available for the current year, then an average of the last 5 years is taken).

### Book

- [B1] Roderick Bloem, Swen Jacobs, Ayrat Khalimov, Igor Konnov, Sasha Rubin, Helmut Veith, and Josef Widder. *Decidability of Parameterized Verification*. Synthesis Lectures on Distributed Computing Theory. Morgan & Claypool Publishers, 2015. DOI: 10.2200/S00658ED1V01Y201508DCT013.

### Book Chapter

- [BC1] Vince Bárány, Erich Grädel, and Sasha Rubin. “Automata-based presentations of infinite structures”. In: *Finite and Algorithmic Model Theory*. Ed. by Javier Esparza, Christian Michaux, and Charles Steinhorn. London Mathematical Society Lecture Note Series 379. Cambridge Books Online. Cambridge University Press, 2011, pp. 1–76. ISBN: 978-0-521-71820-2.
- [BC2] Sasha Rubin. “Automatic Structures”. In: *Automata: From mathematics to applications*. Ed. by Jean-Eric Pin. Invited chapter, in process. European Mathematics Society (EMS).

### Conference Articles

- [C1] Francesco Belardinelli, Alessio Lomuscio, Aniello Murano, and Sasha Rubin. “Verification of Broadcasting Multi-Agent Systems against an Epistemic Strategy Logic”. In: *International Joint Conference on Artificial Intelligence (IJCAI 2017)*. 2017. DOI: DOI10.24963/ijcai.2017/14. **CORE A\*, 25%, 2540**
- [C2] Francesco Belardinelli, Alessio Lomuscio, Aniello Murano, and Sasha Rubin. “Verification of Multi-agent Systems with Imperfect Information and Public Actions”. In: *Proceedings of the 2017 International Conference on Autonomous Agents & Multiagent Systems (AAMAS 2017)*. 2017. **CORE A\*, 26%, 595**
- [C3] Raphaël Berthon, Bastien Maubert, Aniello Murano, Sasha Rubin, and Moshe Y. Vardi. “Strategy logic with imperfect information”. In: *32nd Annual ACM/IEEE Symposium on Logic in Computer Science, LICS 2017, Reykjavik, Iceland, June 20-23, 2017*. IEEE Computer Society, 2017, pp. 1–12. ISBN: 978-1-5090-3018-7. DOI: 10.1109/LICS.2017.8005136. **CORE A\***
- [C4] Blai Bonet, Giuseppe De Giacomo, Hector Geffner, and Sasha Rubin. “Generalized Planning: Non-Deterministic Abstractions and Trajectory Constraints”. In: *International Joint Conference on Artificial Intelligence (IJCAI 2017)*. 2017. **CORE A\*, 25%, 2540**
- [C5] Julian Gutierrez, Aniello Murano, Giuseppe Perelli, Sasha Rubin, and Michael Wooldridge. “Nash Equilibria in Concurrent Games with Lexicographic Preferences”. In: *International Joint Conference on Artificial Intelligence (IJCAI 2017)*. 2017. DOI: DOI10.24963/ijcai.2017/148. **CORE A\*, 25%, 2540**
- [C6] Benjamin Aminof, Vadim Malvone, Aniello Murano, and Sasha Rubin. “Graded Strategy Logic: Reasoning about Uniqueness of Nash Equilibria”. In: *Proceedings of the 2016 International Conference on Autonomous Agents & Multiagent Systems (AAMAS 2016)*. 2016, pp. 698–706. **CORE A\*, 25%, 550**
- [C7] Benjamin Aminof, Aniello Murano, Sasha Rubin, and Florian Zuleger. “Automatic Verification of Multi-Agent Systems in Parameterised Grid-Environments”. In: *Proceedings of the 2016 International Conference on Autonomous Agents & Multiagent Systems (AAMAS 2016)*. 2016, pp. 1190–1199. **CORE A\*, 25%, 550**
- [C8] Benjamin Aminof, Aniello Murano, Sasha Rubin, and Florian Zuleger. “Prompt Alternating-Time Epistemic Logics”. In: *Principles of Knowledge Representation and Reasoning: Proc. of the 15th International Conference, (KR 2016)*. 2016, pp. 258–267. **CORE A\*, 27%, 182**

- [C9] Benjamin Aminof and Sasha Rubin. "Model Checking Parameterised Multi-token Systems via the Composition Method". In: *Proc. 8th International Joint Conference on Automated Reasoning, (IJCAR 2016)*. 2016, pp. 499–515. DOI: 10.1007/978-3-319-40229-1\_34. **CORE A\***
- [C10] Giuseppe De Giacomo, Antonio Di Stasio, Aniello Murano, and Sasha Rubin. "Imperfect-Information Games and Generalized Planning". In: *Proceedings of the Twenty-Fifth International Joint Conference on Artificial Intelligence (IJCAI 2016)*. 2016, pp. 1037–1043. **CORE A\*, 25%, 2294**
- [C11] Benjamin Aminof, Aniello Murano, and Sasha Rubin. "On CTL\* with Graded Path Modalities". In: *Logic for Programming, Artificial Intelligence, and Reasoning - 20th International Conference, LPAR-20 2015, Suva, Fiji, November 24-28, 2015, Proceedings*. 2015, pp. 281–296. DOI: 10.1007/978-3-662-48899-7\_20. **CORE A**
- [C12] Benjamin Aminof, Aniello Murano, Sasha Rubin, and Florian Zuleger. "Verification of Asynchronous Mobile-Robots in Partially-Known Environments". In: *PRIMA 2015: Principles and Practice of Multi-Agent Systems - 18th International Conference, Bertinoro, Italy, October 26-30, 2015, Proceedings*. 2015, pp. 185–200. DOI: 10.1007/978-3-319-25524-8\_12. **CORE B**
- [C13] Benjamin Aminof, Sasha Rubin, Francesco Spegni, and Florian Zuleger. "Liveness of Parameterized Timed Networks". In: *Automata, Languages, and Programming - 42nd International Colloquium, ICALP 2015, Kyoto, Japan, July 6-10, 2015, Proceedings, Part II*. 2015, pp. 375–387. DOI: 10.1007/978-3-662-47666-6\_30. **CORE A**
- [C14] Benjamin Aminof, Sasha Rubin, and Florian Zuleger. "On the Expressive Power of Communication Primitives in Parameterised Systems". In: *Logic for Programming, Artificial Intelligence, and Reasoning - 20th International Conference, LPAR-20 2015, Suva, Fiji, November 24-28, 2015, Proceedings*. 2015, pp. 313–328. DOI: 10.1007/978-3-662-48899-7\_22. **CORE A**
- [C15] Aniello Murano, Giuseppe Perelli, and Sasha Rubin. "Multi-agent Path Planning in Known Dynamic Environments". In: *PRIMA 2015: Principles and Practice of Multi-Agent Systems - 18th International Conference, Bertinoro, Italy, October 26-30, 2015, Proceedings*. 2015, pp. 218–231. DOI: 10.1007/978-3-319-25524-8\_14. **CORE B**
- [C16] Sasha Rubin. "Parameterised Verification of Autonomous Mobile-Agents in Static but Unknown Environments". In: *Proc. of the International Conference on Autonomous Agents and Multiagent Systems, (AAMAS 2015)*. 2015, pp. 199–208. **CORE A\*, 25%, 670**
- [C17] Benjamin Aminof, Swen Jacobs, Ayrat Khalimov, and Sasha Rubin. "Parameterized Model Checking of Token-Passing Systems". In: *Verification, Model Checking, and Abstract Interpretation - 15th International Conference, VMCAI 2014, San Diego, CA, USA, January 19-21, 2014, Proceedings*. 2014, pp. 262–281. DOI: 10.1007/978-3-642-54013-4\_15. **CORE B**
- [C18] Benjamin Aminof, Tomer Kotek, Sasha Rubin, Francesco Spegni, and Helmut Veith. "Parameterized Model Checking of Rendezvous Systems". In: *CONCUR 2014 - Concurrency Theory - 25th International Conference, CONCUR 2014, Rome, Italy, September 2-5, 2014, Proceedings*. 2014, pp. 109–124. DOI: 10.1007/978-3-662-44584-6\_9. **CORE A**
- [C19] Krishnendu Chatterjee, Siddhesh Chaubal, and Sasha Rubin. "How to Travel between Languages". In: *Language and Automata Theory and Applications - 7th International Conference, LATA 2013, Bilbao, Spain, April 2-5, 2013, Proceedings*. 2013, pp. 214–225. DOI: 10.1007/978-3-642-37064-9\_20.
- [C20] Alex Kruckman, Sasha Rubin, John Sheridan, and Ben Zax. "A Myhill-Nerode theorem for automata with advice". In: *Proceedings Third International Symposium on Games, Automata, Logics and Formal Verification, GandALF 2012, Napoli, Italy, September 6-8, 2012*. 2012, pp. 238–246. DOI: 10.4204/EPTCS.96.18.
- [C21] Alexander Rabinovich and Sasha Rubin. "Interpretations in Trees with Countably Many Branches". In: *LICS 2012, Proceedings of the 27th Annual IEEE Symposium on Logic in Computer Science, Dubrovnik, Croatia, June 25-28, 2012*. 2012, pp. 551–560. DOI: 10.1109/LICS.2012.65. **CORE A\***

- [C22] Tobias Ganzow and Sasha Rubin. "Order-Invariant MSO is Stronger than Counting MSO in the Finite". In: *STACS 2008, 25th Annual Symposium on Theoretical Aspects of Computer Science, Bordeaux, France, February 21-23, 2008, Proceedings*. 2008, pp. 313–324. DOI: 10.4230/LIPIcs.STACS.2008.1353. **CORE A**
- [C23] Lukasz Kaiser, Sasha Rubin, and Vince Bárány. "Cardinality and counting quantifiers on omega-automatic structures". In: *STACS 2008, 25th Annual Symposium on Theoretical Aspects of Computer Science, Bordeaux, France, February 21-23, 2008, Proceedings*. 2008, pp. 385–396. DOI: 10.4230/LIPIcs.STACS.2008.1360. **CORE A**
- [C24] Bakhadyr Khoussainov and Sasha Rubin. "Decidability of Term Algebras Extending Partial Algebras". In: *Computer Science Logic, 19th International Workshop, CSL 2005, 14th Annual Conference of the EACSL, Oxford, UK, August 22-25, 2005, Proceedings*. 2005, pp. 292–308. DOI: 10.1007/11538363\_21. **CORE B**
- [C25] Doron Bustan, Sasha Rubin, and Moshe Y. Vardi. "Verifying omega-Regular Properties of Markov Chains". In: *Computer Aided Verification, 16th International Conference, CAV 2004, Boston, MA, USA, July 13-17, 2004, Proceedings*. 2004, pp. 189–201. DOI: 10.1007/978-3-540-27813-9\_15. **CORE A\***
- [C26] Bakhadyr Khoussainov, André Nies, Sasha Rubin, and Frank Stephan. "Automatic Structures: Richness and Limitations". In: *LICS 2004, 19th IEEE Symposium on Logic in Computer Science, 14-17 July 2004, Turku, Finland, Proceedings*. 2004, pp. 44–53. DOI: 10.1109/LICS.2004.1319599. **CORE A\***
- [C27] Bakhadyr Khoussainov, Sasha Rubin, and Frank Stephan. "Definability and Regularity in Automatic Structures". In: *STACS 2004, 21st Annual Symposium on Theoretical Aspects of Computer Science, Montpellier, France, March 25-27, 2004, Proceedings*. 2004, pp. 440–451. DOI: 10.1007/978-3-540-24749-4\_39. **CORE A**
- [C28] Bakhadyr Khoussainov, Sasha Rubin, and Frank Stephan. "On Automatic Partial Orders". In: *LICS 2003, 18th IEEE Symposium on Logic in Computer Science, 22-25 June 2003, Ottawa, Canada, Proceedings*. 2003, pp. 168–177. DOI: 10.1109/LICS.2003.1210056. **CORE A\***
- [C29] Hajime Ishihara, Bakhadyr Khoussainov, and Sasha Rubin. "Some Results on Automatic Structures". In: *LICS 2002, 17th IEEE Symposium on Logic in Computer Science, 22-25 July 2002, Copenhagen, Denmark, Proceedings*. 2002, p. 235. DOI: 10.1109/LICS.2002.1029832. **CORE A\***

### Journal Articles

- [J1] Benjamin Aminof, Tomer Kotek, Sasha Rubin, Francesco Spegini, and Helmut Veith. "Parameterized model checking of rendezvous systems". In: *Distributed Computing* (2017), pp. 1–36. ISSN: 1432-0452. DOI: 10.1007/s00446-017-0302-6. URL: <http://dx.doi.org/10.1007/s00446-017-0302-6>. **SJR Q2**
- [J2] Benjamin Aminof, Vadim Malvone, Aniello Murano, and Sasha Rubin. "Graded Strategy Logic". In: *Information and Computation* (2017). To appear. **SJR Q2**
- [J3] Benjamin Aminof, Aniello Murano, and Sasha Rubin. "On CTL\* with Graded Path Modalities". In: *Information and Computation* (2017). Under Review.
- [J4] Benjamin Aminof, Aniello Murano, Sasha Rubin, and Florian Zuleger. "Verification of Asynchronous Mobile-Robots in Partially-Known Environments". In: *Journal of Autonomous Agents and Multi-Agent Systems* (2017). Accepted with Revisions.
- [J5] Benjamin Aminof and Sasha Rubin. "First Cycle Games". In: *Information and Computation* (2016). DOI: <http://dx.doi.org/10.1016/j.ic.2016.10.008>. **SJR Q2**
- [J6] Roderick Bloem, Swen Jacobs, Ayrat Khalimov, Igor Konnov, Sasha Rubin, Helmut Veith, and Josef Widder. "Decidability in Parameterized Verification". In: *SIGACT News* 47.2 (2016), pp. 53–64. DOI: 10.1145/2951860.2951873.

- [J7] Andrey Grinshpun, Pakawat Phalitnonkiat, Sasha Rubin, and Andrei Tarfulea. "Alternating traps in Muller and parity games". In: *Theoretical Computer Science* 521 (2014), pp. 73–91. DOI: 10.1016/j.tcs.2013.11.032. **SJR Q2**
- [J8] Sasha Rubin. "Automata Presenting Structures: A Survey of the Finite String Case". In: *Bulletin of Symbolic Logic* 14.2 (2008), pp. 169–209. **SJR Q1**
- [J9] Bakhadyr Khoussainov, André Nies, Sasha Rubin, and Frank Stephan. "Automatic Structures: Richness and Limitations". In: *Logical Methods in Computer Science* 3.2 (2007). DOI: 10.2168/LMCS-3(2:2)2007. **SJR Q1**
- [J10] Bakhadyr Khoussainov, Sasha Rubin, and Frank Stephan. "Automatic linear orders and trees". In: *ACM Transactions on Computational Logic* 6.4 (2005), pp. 675–700. DOI: 10.1145/1094622.1094625. **SJR Q1**
- [J11] Bakhadyr Khoussainov and Sasha Rubin. "Automatic Structures: Overview and Future Directions". In: *Journal of Automata, Languages and Combinatorics* 8.2 (2003), pp. 287–301.
- [J12] Bakhadyr Khoussainov and Sasha Rubin. "Graphs with Automatic Presentations over a Unary Alphabet". In: *Journal of Automata, Languages and Combinatorics* 6.4 (2001), pp. 467–480.

### Workshop Articles

- [W1] Blai Bonet, Giuseppe De Giacomo, Hector Geffner, and Sasha Rubin. "Generalized Planning: Non-Deterministic Abstractions and Trajectory Constraints". In: *ICAPS 2017 Workshop on Generalized Planning*. 2017.
- [W2] Benjamin Aminof, Vadim Malvone, Aniello Murano, and Sasha Rubin. "Graded Strategy Logic". In: *Proceedings 4th International Workshop on Strategic Reasoning, SR 2016, New York, USA*. 2016.
- [W3] Benjamin Aminof and Sasha Rubin. "First Cycle Games". In: *Proceedings 2nd International Workshop on Strategic Reasoning, SR 2014, Grenoble, France, April 5-6, 2014*. 2014, pp. 83–90. DOI: 10.4204/EPTCS.146.11.

## References

### Teaching

Mentor **Maria Terrell**, *Director of Teaching Assistant Programs*, Cornell University.  
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Mentor **David Way**, *Associate Director of Instructional Support*, Center for Teaching Excellence, Cornell University.  
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### Academic

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Current Collaborator **Giuseppe De Giacomo**, *Dipartimento di Ingegneria Informatica, Automatica e Gestionale*, Sapienza Università di Roma.  
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Current Collaborator **Michael Wooldridge**, *Department of Computer Science*, University of Oxford.  
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**Hiring Committee, Department of Computer Science**

October, 2017

*Position of Lecturer in Data Science with a focus towards Artificial Intelligence.*

**Background and Esteem.** I am a computer scientist with an interest in Artificial Intelligence, especially knowledge representation, logic, multi-agent systems, and automated planning.

My PhD thesis, mentored by Bakhadyr Khoussainov, won the best-doctoral thesis in the faculty of computer science at the University of Auckland. I then won a prestigious New Zealand Science and Technology Postdoctoral Fellowship (NZ\$224532) on the same topic. I then held various postdoctoral positions, including a teaching position at Cornell University (2008-2009). Since 2012 I've been working in Formal Methods for Distributed Systems, and since 2014 in Formal Methods for Artificial Intelligence. In 2015-2016 I held another individual fellowship, a Marie Curie fellowship (€107000) jointly funded by the European Research Commission and the Institute for Higher Mathematics (INdAM "F. Severi") in Italy, on the topic of Formal Methods for lightweight mobile multi-agent systems, which led to a best-paper award.

Since 2013, I am chair or organiser of 5 events (workshops and conferences). In 2017 I co-founded and co-organised the First Workshop on Formal Methods in Artificial Intelligence (FMAI'17). I serve as a PC member for top AI/MAS conferences including AAAI, IJCAI, and AAMAS. I co-organised the Young Scientists Symposium at IST Austria on the topic "Understanding Shape: in silico and in vivo". I am guest editor of two special issues of International workshops and Italian conferences. In 2017 I served as an external reviewer for the Icelandic Research Fund and the IRISA Master Research Internship (France).

**Research.** My vision is to bring Formal Methods and Artificial Intelligence closer together. This is motivated by the need to ensure that the systems being built using, e.g., machine learning, can explain their decisions and actions to human users, so-called "explainable AI" (for instance, in healthcare, a diagnostic and prescription system without such features will likely go unused and untrusted). I bring personal expertise on logics and formal methods for temporal, strategic and epistemic reasoning.

The quality of my research can be quickly but roughly gauged from the venues in which I publish (that said, I strongly maintain that the only way to gauge the strength of a paper is for an expert to read it). These include 16 papers [C1-C10, C16, C21, C25, C26, C28, C29] in conferences ranked A\* by the CORE ranking ([portal.core.edu.au/conf-ranks/](http://portal.core.edu.au/conf-ranks/)), 10 of which were published since 2016, as well as a book on verification of distributed systems [B1] (references of the form [X#] are in the attached CV).

**Teaching and Supervision.** I work hard at finding angles on the material that will engage my students; this often involves finding questions that are fun for students to solve, or engaging students in big ideas. I seek out, formally and informally, talented teachers and educators from whom I can learn best practices as well as some pedagogy theory. If I have the opportunity to statistically evaluate teaching strategies and student outcomes then you can expect that I will make an effort to do so.

As evidence of this effort I make some remarks about my teaching at Cornell University 2008-2009. I sought a number of teaching mentors, including Maria Terrell (Department of Mathematics) and

David Way (Centre for Teaching Excellence) to discuss successful teaching strategies, both philosophical and concrete. As an example of innovativeness in teaching, I remark that I noticed that students who had read the relevant chapter of the textbook before coming to class would ask much deeper questions in class. As a result I instituted a “pre-class test” that was administered online and tested whether or not the student had basic knowledge of the contents of the chapter to be covered in class. Although the tests took time to set up and administer, the payoff was enormous to them and me.

Here is a sample of written student responses to my teaching, the first from my teaching at The University of Cape Town, the rest from Cornell University:

- *“I have enjoyed your maths course the most of all the maths courses I've taken so far. Even more than the content, your delivery was excellent. I made the decision during one of your lectures to do honours in mathematics and computer science.”*
- *“Sasha was a wonderful lecturer – very organized, clear, and willing to help anyone with difficulties (proactively, as well – he sought out people who were doing poorly and offered assistance, which was extremely beneficial).”*
- *“The class was interesting, fun, and easier. Professor was very well prepared and made us really understand what we were learning by having us write mathematical formulas in words. Instead of memorizing formulas, he helped us understand what we were learning, why we were learning it and why it was useful.”*

I am open to teaching theory and programming courses at all levels.

I have supervised 8 undergraduate students in research, and have mentored three PhD students of Aniello Murano in Italy. All completed projects and collaborations with students resulted in publications in, e.g., IJCAI, AAMAS.

My usual approach to undergraduate supervision is to discuss possible problems with students and let them pick one to work on. If the student lacks confidence or is unsure about how to proceed, I create a mini-proposal and timeline for them to follow. I meet with students once a week to discuss progress and troubleshoot. I consider undergraduate research successful if the student a) has fun, b) is challenged, and c) produces and publishes novel research.

**Integration in the Department of Computer Science at the University of Auckland.** My recent breakthrough work [C1,C2] on verification of a very broad class of multi-agent systems (in which agents communicate by *broadcast*), as well as previous work on verification of *probabilistic* systems [C25] and verification of *quantitative* properties [C11, C6, C5, J2], has applications to formal methods for analysis of: social networks like twitter; collusions in e-auctions and e-voting; distributed secret sharing and data-dispersal; games with public moves and bids such as poker, etc. This work aligns with the research interests of **Ian Duncan Watson** (Game AI), **Mike Barley** (intelligent systems, mental states, automated planning), **Jiamou Liu** (multi-agent systems), and **Muhammad Rizwan Asghar** (security, privacy, distributed systems). I have recently worked on generalised planning [C4,C10], including a contribution to the ICAPS 2017 Workshop on Generalized Planning [W1], for which **Patricia Riddle** was PC member. My recent work in logic in computer science, specifically games on graphs [J5], aligns with the stunning breakthrough result about parity games of **Bakhadyr Khoussainov** and **Cristian Calude**.

I look forward to hearing from you,

**Sasha Rubin**