# Sasha Rubin – Curriculum Vitae 4.2017

## 1 Personal Details

Affiliation: University of Naples "Federico II", Italy.
Nationality: New Zealand
Email: rubin@unina.it

## 2 Education

**PhD** Department of Mathematics and Department of Computer Science 2004
University of Auckland, New Zealand.
Supervisor: Bakhadyr Khoussainov
Title: Automatic Structures
Awards: Prize for the best doctoral thesis in the Faculty of Science, and Montgomery memorial prize in logic from the Department of Philosophy.

**MSc** Department of Mathematics and Department of Computer Science 1998
University of Auckland, New Zealand.
Award: First Class.

**BSc** Department of Mathematics and Department of Computer Science 1996
University of Cape Town, South Africa
Award: Dean's Merit List.

## 3 University Positions

**Fellow** 03.2017 – present
Fellow of the ASTREA lab, University of Naples "Federico II", Italy.

**Postdoctoral Researcher** 03.2015 – 03.2017
University of Naples "Federico II", Italy.
Marie Curie fellow of the National Institute of Higher Mathematics (INdAM "F. Severi").
INdAM-COFUND-2012, FP7-PEOPLE-2012-COFUND, Proj. ID 600198.

**Postdoctoral Researcher** 03.2014 – 02.2015
Institute for Information Systems, Technical University of Vienna, Austria and Institute of Applied Information Processing and Communications, Technical University of Graz, Austria.

**Postdoctoral Researcher** 03.2012 – 03.2014
Institute for Information Systems, Technical University of Vienna, Austria, and IST Austria

**Visiting Researcher** 05.2010 – 03.2012
Department of Computer Science, University of Auckland, New Zealand.
Including research visits to: Tel Aviv University, Israel; University of Naples, Italy; University of Paris Diderot, France.

**Visiting Lecturer** 02.2010 – 05.2010
Department of Mathematics, University of Cape Town, South Africa.

**Visiting Researcher** 12.2009 – 02.2010
Department of Computer Science, University of Auckland, New Zealand.

**Visiting Assistant Professor** 08.2008 – 12.2009
Department of Mathematics, Cornell University, USA.

**Honorary Research Fellow** 12.2004 – 08.2008
Department of Computer Science, University of Auckland, New Zealand.
New Zealand Science and Technology Postdoctoral Fellowship UOAX0413.

## 4 Research

I work in formal methods, a branch of theoretical computer science, and study the power of automata theory (broadly construed) and mathematical logic for describing, reasoning and controlling systems.

**Classification** ACM Computing Classification System: Theory of Computation [Models of Computation, Logic, Formal Languages and Automata Theory]; Computing Methodologies [Artificial Intelligence: Planning and Scheduling, Knowledge Representation and Reasoning, Distributed Artificial Intelligence]

Mathematics Subject Classification: 03Bxx (General Logic), 03Cxx (Model Theory); 68Qxx (Theory of Computing), 68Txx (Artificial Intelligence)

**Main 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; Automata Theory; Finite and Algorithmic Model Theory.

**Accomplishments**

During my PhD I (and my co-authors) pioneered the development of the theory of automatic structures. My most cited publications in this area are: [1] (94 citations; all citation counts are as reported by Google Scholar) and [3] (85 citations). My PhD thesis (67 citations) was awarded the Vice-chancellor's prize for the best doctoral thesis in the Faculty of Science, and Montgomery memorial prize in logic from the Department of Philosophy.

I was then awarded a prestigious New Zealand Science and Technology Postdoctoral Fellowship. During this fellowship, I published a survey and extension of the main results in my thesis in the Bulletin of Symbolic Logic [3], and I (with a PhD student of Erich Grädel's) solved a 12 year-old conjecture of Courcelle's [2].

In the last few years, 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 (34 citations) [6]. We also completed a book, published by Morgan & Claypool, surveying decidability results in parameterised verification [9].

Recently, I was awarded a two year Marie-Curie fellowship from the Istituto Nazionale di Alta Matematica to work on formal methods for parameterised light-weight mobile agents. I opened this direction with [11]. Subsequently (with my co-authors) I continued this direction and published in top rated conferences [8], [14] and won a best-paper award [10] (invited to JAAMAS.)

## 5 Awards and Distinctions

- 2 individual fellowships (Marie Curie fellow of INdAM, New Zealand Science and Technology Postdoctoral Fellowship).
- 2 PhD prizes (best doctoral thesis in the Faculty of Science, Montgomery memorial prize in logic from the Department of Philosophy).
- 6 Invited Workshop-Talks
  - *Verification of Multi-Agent Systems with Imperfect Information and Public Actions*, Naples, Italy 02.2017
  - *Finite and Algorithmic Model Theory*, Les Houches, France 05.2012
  - *Automata theory and Applications*, IMS programme, Singapore 09.2011
  - *Computational Model Theory*, CNRS SIG, Bordeaux, France 06.2008
  - *Algorithmic-Logical Theory of Infinite Structures*, Dagstuhl, Germany 10.2007
  - *Finite and Algorithmic Model Theory*, Newton Institute, England 01.2006
  - *Workshop on Automata, Structures and Logic*, Auckland, New Zealand 12.2004
- Competed as part of a team of three, in the world finals of the 1998 ACM Programming Contest in Atlanta, Georgia USA, representing the University of Auckland and New Zealand.

## 6 Recent Research visits

- Host: Mike Wooldridge, Oxford University 03.2016, 01.2017
  Topic: Rational Synthesis
- Host: Alessio Lomuscio, Imperial College London 03.2016, 01.2017
  Topic: Strategic-Epistemic logics for Multi-Agents Systems
- Host: Diego Calvanese, University of Bolzanno 07.2016
  Topic: Data-aware strategic logics
  Topic: Knowledge Representation for Business Process Management
- Host: Frank Stephan and Sanjay Jain, National University of Singapore 05.2016
  Topic: Learning Theory and Verification

– Host: Giuseppe De Giacomo, Sapienza, Rome 12.2015
Topic: Synthesis under Assumptions
Topic: Generalised Planning with Partial Observability

– Host: Helmut Veith, TU Wien 08.2015
Topic: Logic and Impossibility Results in Distributed Computing
Topic: Abstractions for Fault-tolerant Distributed Algorithms

## 7 Teaching and Supervision

I have a passion for teaching, and a proactive approach to learning best-practices. I spent 1.5 years teaching undergraduate calculus at Cornell. I sought out a number of teaching mentors, including Maria Terrell (Department of Mathematics) and David Way (associate director of the Cornell University Centre for Teaching Excellence) to discuss successful teaching strategies, both philosophical and concrete. As a result, according to my student evaluations, I was clear, organised, proactively willing to help, and motivating.

I have a strong record of undergraduate supervision. While at Cornell I mentored six students for three months in a research programme. This resulted in two publications [4], [7] and gave students a taste of research to help them decide if they should pursue a PhD. While at IST Austria I co-mentored one intern which resulted in [5]. While in Naples, I worked closely with two PhD students, resulting in [12], [13], [15].

**Teaching**

– Logic and Computation (undergraduate) 2010
*University of Cape Town, Department of Mathematics*

– Logical Definability and Random Graphs (graduate) 2009
*Cornell University, Department of Mathematics*

– Totally Awesome Mathematics (undergraduate) 2009
Two interactive lectures:
i) Hilbert's Hotel and Infinite Cardinals
ii) Algorithms and Termination
*Cornell University, Department of Mathematics*

– Calculus for Engineers (undergraduate) 2008 – 2009
*Cornell University, Department of Mathematics*

– Discrete Structures in Mathematics and Computer Science (undergraduate) 2007
Mathematical Foundations of Software Engineering (undergraduate)
*University of Auckland, Department of Computer Science*

– Logic and Computation in Finitely Presentable Infinite Structures (co-taught five day advanced course) 2006
*European Summer School in Logic, Language and Information*

– Introduction to Formal Verification (advanced undergraduate) 2003
*University of Auckland, Department of Computer Science*

– Automata Theory (undergraduate) 2002
*University of Auckland, Department of Computer Science*

– Pre-calculus (undergraduate) 2001
*University of Wisconsin, Madison, Department of Mathematics*

**Supervision**

– Summer undergraduate project 2012
Topic: Edit-distance and Formal Languages.
*IST Austria*

– Summer research experience for undergraduates (REU) 2009
Topic 1: Parity Games.
Topic 2: Automatic Structures with Advice.
*Cornell University, Department of Mathematics*

## 8 Recent service

– I am co-chair of the Italian Conference on Theoretical Computer Science (ICTCS) 2017 (ictcs2017.unina.it), co-chair of the International Workshop on Strategic reasoning (SR) 2017 (http://sr2017.csc.liv.ac.uk/), and a co-organiser of the Italian Conference on Computational Logic (CILC) 2017 (http://cilc2017.unina.it/).

– I am a PC member of the International Joint Conference on Artificial Intelligence (IJCAI) 2017, the AAAI Conference on Artificial Intelligence (AAAI) 2017, the International Workshop of Strategic Reasoning (SR) 2016, the International Symposium on Games, Automata, Logics and Formal Verification (GandALF) 2016, and the European Conference on Artificial Intelligence (ECAI) 2016.

– I co-organised the First Workshop on Formal Methods in AI (FMAI) 2017.
https://sites.google.com/site/fmai2017homepage/home

– I am a Program Committee member for IRISA Master Research Internship 2016-2017.

– Between 2013 and 2016 I was involved in reviewing and assisting with the Handbook of Model Checking, to be published by Springer, and edited by Edmund Clarke, Thomas Henzinger and Helmut Veith.

– In 2014, I assisted Helmut Veith with writing and editing consortium grant applications and reports.

– In 2014, I volunteered for the Vienna Summer of Logic, the largest event in the history of logic.
http://vsl2014.at/

– In 2012/2013 I was one of the organisers of the IST Austria Young Scientist Symposium on the topic 'Understanding Shape: *in silico* and *in vivo*'.
ist.ac.at/young-scientist-symposium-2013/

– In 2012 I formed and ran 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/

– In 2010 I briefly volunteered at a secondary school in Accra, Ghana, teaching, observing and commenting on grade 5 mathematics classes. I also briefly volunteered in Khayelitsha, South Africa, helping high-school students prepare for their mathematics exams.

– I have reviewed for the following:
*Journals*: Artificial Intelligence, Journal of Symbolic Logic, Logical Methods in Computer Science, Theory of Computing Systems, Central European Journal of Mathematics, Information and Computation, Journal of Logic and Computation, Annals of Mathematics and Artificial Intelligence, Theory and Practice of Logic Programming.
*Books*: Handbook of Model Checking.
*Conferences*:IJCAI, KR, AAMAS, AAAI, EUMAS, ECAI, LICS, STACS, ICALP, MFCS, CONCUR, CSL, FoSSaCS, FSTTCS, SR, KRR@SAC, CiE, GandALF, RV, LPAR, LATA.

# 9 References

Academic

**Roderick Bloem**
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**Giuseppe De Giacomo**
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**Erich Grädel**
Mathematische Grundlagen der Informatik, RWTH Aachen, Germany
graedel@logic.rwth-aachen.de

**Bakhadyr Khoussainov** — PhD Supervisor
Department of Computer Science, University of Auckland
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**Alessio Lomuscio**
Faculty of Engineering, Department of Computing, Imperial College London
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**Aniello Murano**
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**Frank Stephan**
School of Computing, National University of Singpore
fstephan@comp.nus.edu.sg

**Michael Wooldridge**
Department of Computer Science, University of Oxford
mjw@cs.ox.ac.uk

Teaching

**Maria Terrell**
Director of Teaching Assistant Programs, Cornell University
maria@math.cornell.edu

**David Way**
Associate Director of Instructional Support
Center for Teaching Excellence, Cornell University
dgw2@cornell.edu

Supervision

**Bob Strichartz**
Department of Mathematics, Cornell University
str@math.cornell.edu

## 10 Refereed Publications

I have 36 refereed publications, most in top conferences and journals, including 1 (co-authored) book, 1 (sole authored) book-chapter, 6 journal articles (5 of them invited), 5 LICS papers, 4 AAMAS papers, 3 STACS papers, 1 IJCAI paper, 1 KR paper, and a best-paper at PRIMA. Not listed, are 6 invited journal articles (in preparation or under evaluation) and an invited chapter in a handbook on automata theory and applications (J.E. Pin (ed.), to be published by EMS).