**FUTURE FELLOWSHIP 2018**

**D6 - Research Opportunity and Performance Evidence (ROPE) - Details of your academic career and opportunities for research, evidence of research impact and contributions to the field, including those most relevant to this Proposal**

**AMOUNT OF TIME AS AN ACTIVE RESEARCHER**

I defended my PhD on 3/2004, and it was conferred 10 years ago on 5/2007.

Over the last 5 years I have been employed full-time as a postdoctoral scholar or research fellow with minimal interruption between positions. All positions have been research positions (which includes service to the community, detailed below) with optional teaching and minimal University administrative load.

* 5/17 - 4/18. Postdoc at the University of Naples, Italy.
* 3/15 - 2/17. Marie Curie Fellow of INDAM "F Severi", University of Naples, Italy.
* 3/12 - 1/15. Joint Postdoc at TU Wien, TU Graz and IST Austria, Austria.

For 1.5 years prior to that I was an honorary research fellow at the University of Auckland and held various long and short term visits to collaborate abroad. Prior to that I was visiting lecturer in the department of mathematics at the University of Cape Town for 1 semester.

For 1.5 years prior to that I was a full time Visiting Assistant Professor at Cornell University, USA. My responsibilities were a full time lecturer.

For 3 years prior to that I was a Foundation for Research, Science and Technology (FRST) New Zealand Science and Technology (NZST) Postdoctoral Fellow, at the University of Auckland, New Zealand. This was a full time research-only position with no administrative duties.

**RESEARCH OPPORTUNITIES**

My current role is a full time research position with minimal teaching, and no University administrative duties. The research position includes, as is typical, administrative duties involved in research related activities. In particular, I co-organised two conferences and one workshop this year (2017) which resulted in a lot of administrative duties. Thus, I estimate that this year I spent 65% of my time on research, 10% on teaching, and 25% on service. Even with this load, I have published 10 CORE A\* articles (and others) in the last two years.

During my time in Austria (3/2012-1/2015) I was hired as a postdoc on a national research network RiSE (http://arise.or.at/nfn/) on the topic of "rigorous systems engineering". In that capacity I was jointly hired by three of the contributing organisations, i.e., TU Wien and IST Austria (this explains why in D4 I was hired part-time from 3/12 - 3/14 by both TU Wien and IST Austria, summing up to a full time research position). The joint position had its advantages, but it also meant that my obligations were split to more than one host. From 2013 - 2016 I was **project co-ordinator** for the Handbook of Model Checking, to be published by Spriner, Dec 2017.

While at Cornell University (8/2008-12/2009) I was **teaching full time** and **working on a survey of my field** at the time (finite and algorithmic model theory), which was published in 2011 (ISBN 978-0-521-71820-2). For this reason I did not publish in the period 2009-2010.

In the past I have received mentoring from my PhD supervisor (Bakhadyr Khoussainov) with whom I am still in contact. More recently, I have received career mentoring from Aniello Murano (University of Naples Federico II), Giuseppe De Giacomo (Sapienza University of Rome) and Alessio Lomuscio (Imperial College London). These researchers have helped guide me into the academic field of Artificial Intelligence. I am regularly invited to visit and collaborate with Alessio Lomuscio (Imperial College London), Michael Wooldridge (Oxford University), Giuseppe De Giacomo (Sapienza University of Rome). I am also developing strong and regular collaborations with Hector Geffner(Pompeu Fabra University) and Blai Bonet (Simón Bolívar University).

I have had no significant career interruptions.

**RESEARCH ACHIEVEMENTS AND CONTRIBUTIONS**

My **research trajectory** has been from formal methods in computer science to formal methods in artificial intelligence. This puts me in a unique position to advance the analysis of formal aspects in artificial intelligence, the topic of this proposal.

Alessio Lomuscio (Imperial College London) has described my recent research in artificial intelligence as "**effectively changing the discipline by providing very significant results in the community of formal aspects of AI**".

Michael Wooldridge (Oxford University) has recently written: "**I give this application my wholehearted support. Sasha is an highly motivated, extremely active researcher, with a superb technical grasp of issues in logic, AI, and game theory."**

**Research in Formal Methods**

I am an internationally regarded researcher in Formal Methods and have, in the last few years, developed a profound interest in Artificial Intelligence. My work has been published in top conferences in formal methods such as 5 papers at LICS (CORE A\*), the flagship conference in Logic in Computer Science, as well as top journals in computer science such as Information and Computation, Bulletin of Symbolic Logic, Logical Methods in Computer Science, the ACM Transaction on Computational Logic and Theoretical Computer Science.

In 2015 I, with my co-authors, **published a book** surveying decidability results in parameterised verification, published by Morgan & Claypool, that is fast becoming the standard reference in its field (30 citations on google scholar).

Between 2012-2014 I (with my co-authors) **generalised a cornerstone paper** on verification of parameterised systems (https://doi.org/10.1142/S0129054103001881) from ring topologies to arbitrary topologies (36 citations).

Between 2008-2011 I **published a survey and extension** of the main results in my thesis in the Bulletin of Symbolic Logic (http://www.math.ucla.edu/~asl/bsl/1402/1402-001.ps) with 92 citations. My PhD thesis (completed in 2004) has 72 citations on google scholar.

In 2007, with a PhD student of Erich Grädel’s (Tobias Ganzow), we **solved a 12 year-old**

**conjecture** of Courcelle’s and published this in STACS 2008 (doi 10.4230/LIPIcs.STACS.2008.1353).

In 1998 I, in a team of three, won the national heats and **represented New Zealand**

in the world finals of the 1998 ACM Programming Contest, Atlanta (USA).

**Research in Artificial Intelligence**

Between 2014 - present I have published 9 papers in CORE A\* Artificial Intelligence conferences, i.e., 4 IJCAI (the flagship conference in Artificial Intelligence) and 4 AAMAS (the flagship conference on autonomous and multi-agent systems), 1 KR (the flagship conference on Knowledge Representation). Besides the quality and quantity, I was also awarded a **Marie-Curie Fellowship** (COFUND with INdAM) on the topic of verification of mobile multi-agent systems, and a **best-paper award** at PRIMA 2015 (CORE B) on a paper on the topic of verification of multi-agent systems.

**Significant Funding**

I wrote and was awarded the following **major individual fellowships**:

* 2004-2007 Foundation for Research, Science and Technology (FRST) New Zealand Scienceand Technology (NZST) Post Doctoral Fellowship (n. UOAX0413, “Automatic Structures”), NZ$224532.
* 2015-2016 Marie Curie Fellowship of INdAM “F. Severi”, Eu 107000 (one of four awarded in 2015).
* 2011 Exchange and Travel grants within the framework of the European Science Foundation (ESF) activity on “Games for Design and Verification“ (approx 9000Eu in 2011).

**Invited speaker**

I have given invited talks at the following international events:

* 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.

I have given invited seminar talks at UNSW (Australia), University of Auckland (New Zealand), GSSI (Italy), IMT Lucca (Italy), University of Naples "Federico II" (Italy), Free University of Bolzano (Italy), UC San Diego (USA), Tel Aviv University (Israel), EPFL (Switzerland), LSV (Cachan), LIAFA (Paris), Cornell University (USA), Heidelburg University (Germany).