Ramanathan S. Thinniyam

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Current Address

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Biodata

Date of Birth: 19 October 1986
Gender: Male
Nationality: Indian

Education

PhD Theoretical Computer Science, The Institute of Mathematical Sciences (2012-2019)
Thesis title : Definability and Decidability in First Order Theories of Graph Order
Defended on: 12 February 2019

MSc Computer Science, Chennai Mathematical Institute (2010-2012)
Project: Proof Theory of Intuitionistic Modal Logics
CGPA: 9.31/10

BTech Mechanical Engineering, Indian Institute of Technology Madras (2004-2008)
Project: Numerical Simulation using Streamfunction Vorticity Formulation for the Lid Driven Square Cavity
CGPA: 8.66/10

Research Experience

Postdoctoral Researcher, May 2019 – Present
Max Planck Institute for Software Systems, Kaiserslautern, Germany.
Currently working on Vector Addition Systems in general and the problem of Regular Separability in particular.

Visiting Senior Research Fellow, Oct 2018 – Mar 2019
Chennai Mathematical Institute
Worked on understanding existential definability in the subword order with constants and generalizing combinatorial lemmas on Simon's congruence to more general objects such as trees and traces.

PhD Candidate, Aug 2012 – Jun 2018
The Institute of Mathematical Sciences
Adviser: Prof. R. Ramanujam, IMSc
Studied decidability and definability in the first order theories of graph orders. Graph orders are partial orders on the set $\mathcal{G}$ of isomorphism types of finite, undirected, simple graphs. In particular, I worked on graph orders arising from the subgraph, induced subgraph and minor relations.

Masters Student, Aug 2010 – May 2012
Chennai Mathematical Institute
Guided by: Prof. S. P. Suresh, CMI and Prof. R. Ramanujam, IMSc
Read the PhD thesis titled 'The Proof Theory and Semantics of Intuitionistic Modal Logic' by Alex Simpson and worked through the results.

Research Assistant, Aug 2008 – Feb 2010
Network Coding and Reliable Communications Group, Research Laboratory of Electronics, Massachusetts Institute of Technology
Used genetic algorithms to minimize the number of computational nodes required to do network coding in an optical network. The decision version of this problem is known to be NP-complete.

Research Student, Aug 2007 – Dec 2007
Prof. S. V. Raghavan, Networks Lab, Indian Institute of Technology Madras
Designed a Business Intelligence System to collect, analyze and interpret data obtained from heterogeneous sources.

Relevant Coursework

Basic Courses: Introduction to Logic, Computational Complexity I, Theory of Computation, Algorithms, Graph Theory, Discrete Mathematics.
Advanced Courses: Proof Theory (text: *Basic Proof Theory* by Troelstra and Schwichtenberg), Model Theory (text: *Model Theory: An Introduction* by David Marker, *Elements of Finite Model Theory* by Leonid Libkin), Proof Complexity (text: *Logical Foundations of Proof Complexity* by Cook and Nguyen), Algebraic Automata Theory, Computational Complexity II, Algebra and Computation.

Schools and Conferences Attended

Highlights of Logic, Games and Automata 2019, Warsaw, Poland.
Logic Colloquium (LC) 2018, University of Udine, Italy.

Indian Conference on Logic and its Applications (ICLA) 2017, Indian Institute of Technology, Kanpur, India.
Indian School on Logic and its Applications (ISLA) 2016, PSG College of Technology, Coimbatore, India.
International Symposium on Logical Foundations of Computer Science (LFCS) 2016, Deerfield Beach, Florida, USA.
Asian Logic Conference (ALC) 2015, Indian Institute of Technology Bombay, Mumbai, India.
Indian Conference on Logic and its Applications (ICLA) 2015, Indian Institute of Technology Bombay, Mumbai, India.
Indian School on Logic and its Applications (ISLA) 2014, Tezpur University, Tezpur, India.
Heidelberg Laureate Forum 2013, Heidelberg University, Germany.
Conference on Mathematical Logic and Set Theory 2010, Chennai Mathematical Institute, Chennai, India.

Programming languages

Matlab, C, Haskell

Teaching Experience

Teaching Assistant, Second semester 2017
Model Theory, IMSc
Instructor: Prof. R. Ramanujam
A course on Model Theory with an emphasis on Finite Model Theory (text: *Elements of Finite Model Theory* by Libkin).

Teaching Assistant, Second semester 2015
Introduction to Logic, IMSc
Instructor: Prof. R. Ramanujam
An introductory graduate course covering propositional, modal and first order logic; emphasizing computational aspects such as PSPACE-completeness of modal satisfiability.

Talks

Regular Separability and Intersection Emptiness are Independent Problems, 18 Sep 2019.
Thinniyam RS, Zetzsche G. Highlights 2019, Warsaw, Poland.

Decidability in the substructure ordering of finite graphs, 23 July 2018.
Anantha Padmanabha, **Thinniyam RS**. Logic Colloquium 2018.

The graph reconstruction conjecture, 8 March 2017
Thinniyam RS. Institute Seminar Day, IMSc.

Definability of recursive predicates in the induced subgraph order, 5 January 2017
Thinniyam RS. 7th biennial Indian Conference on Logic and its Applications (ICLA).

Bounded arithmetic and computational complexity (mini-course), March 2016
Ramanujam R, **Thinniyam RS**. 6th biennial Indian School on Logic and its Applications (ISLA).

Definability in first order theories of graph orderings, 28 December 2015
Ramanujam R, **Thinniyam RS**. International Symposium on Logical Foundations of Computer Science (LFCS).

Conference Publications

Regular Separability and Intersection Emptiness are Independent Problems
Thinniyam RS and Zetzsche G. Accepted at the 39th IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science, IIT Bombay, India.

Definability of recursive predicates in the induced subgraph order
Thinniyam RS. Indian Conference on Logic and Its Applications (ICLA). 2017 Jan 5 (pp. 211-223). Springer, Berlin, Heidelberg.

Definability in first order theories of graph orderings
Ramanujam R, **Thinniyam RS**. International Symposium on Logical Foundations of Computer Science (LFCS). 2016 Jan 4 (pp. 331-348). Springer, Cham.

Network coding in optical networks with O/E/O based wavelength conversion
Thinniyam RS, Kim M, Médard M, O'Reilly UM. Optical Fiber Communication (OFC), co-located National Fiber Optic Engineers Conference, 2010 Conference (OFC/NFOEC). 2010 Mar 21 (pp. 1-3). IEEE.

Journal Publication

Defining recursive predicates in graph orders
Thinniyam RS. Logical Methods in Computer Science (LMCS). Sep 2018. Volume 14 Issue 3.

References

Prof. R. Ramanujam
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