

Antonina Kolokolova

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Research Interests

Complexity theory and logic in computer science, in particular bounded arithmetic, finite model theory, descriptive complexity, computational logic.

Education

- Ph.D. Computer Science: University of Toronto, 2005
Supervisor: Stephen A. Cook
Thesis: *Theories of arithmetic from descriptive complexity*
- M.Sc. Computer Science: University of Toronto, 2000
Supervisor: Stephen A. Cook
Thesis: *V-Horn: a Horn-based second-order theory of arithmetic*
- B. Sc. Computer Science and Mathematics: University of Arizona, 1998.
Honours thesis in Computer Science on proof complexity, supervised by Toniann Pitassi.
Honours thesis in Mathematics on dynamical systems, supervised by William Schaffer.

Publications

- Michal Koucky, Valentine Kabanets, Antonina Kolokolova, "Expanders made elementary", in preparation.
- Russell Impagliazzo, Valentine Kabanets, Antonina Kolokolova, "An axiomatic approach to algebrization", submitted to STOC'09.
- Antonina Kolokolova, "Expressing vs. proving: relating forms of complexity in logic", submitted to the special Cie08 issue of Theory of Computing Systems.
- Antonina Kolokolova, "Many facets of complexity in logic", **invited paper** for Computability in Europe (CiE'08), LNCS 5028, pp. 316-325.
- Antonina Kolokolova, Yongmei Liu, David G. Mitchell and Eugenia Ternovska, "Model expansion and the expressiveness of FO(ID) and other logics". SFU tech. report TR2007-29
- Antonina Kolokolova, Yongmei Liu, Eugenia Ternovska and David Mitchell, "Complexity of Expanding a Finite Structure and Related Tasks". workshop on Logic and Computational Complexity (LCC 2006).
- Antonina Kolokolova, "Closure properties of weak systems of bounded arithmetic, in proceedings of the 14th Annual Conference on Computer Science Logic (CSL 2005), pages 369-383, 2005.

- Stephen Cook and Antonina Kolokolova, “Bounded arithmetic of NL”, in Proceedings of the Nineteens annual IEEE symposium on Logic in Computer Science (LICS 2004), pages 398-407, 2004
- Stephen Cook and Antonina Kolokolova, “A second-order system for polytime reasoning based on Grädel’s theorem”, Annals of Pure and Applied logic 124 (2003), 193-231.
- Stephen Cook and Antonina Kolokolova, “A second-order system for polynomial-time reasoning based on Grädel’s theorem”, Electronic Colloquium on Computational Complexity technical report TR01-024.
- Stephen Cook and Antonina Kolokolova, “A second-order system for polynomial-time reasoning based on Grädel’s theorem”, in proceedings of the Sixteens annual IEEE symposium on Logic in Computer Science (LICS 2001), pages 177-186, 2001.

Invited conference talks

A plenary talk at *Computability in Europe: Logic and Theory of Algorithms (CiE)* 2008

Invited workshops

- Oberwolfach Meeting on Proof Complexity, 2008
- Newton’s Institute in Cambridge *New Directions in Proof Complexity*, 2006
- BIRS workshops on *Advances in Computational Complexity*, 2004, 2006, 2008
- Institute for Advanced Study workshop on *Complexity of Proofs and Computations* in Princeton, 2001.

Research funding

- **2008-now** NSERC discovery grant, \$16,000/year for 5 years.
- **2007-2008** Start-up grant, MUN Computer Science, \$20,000.

Awards and scholarships

- **2005,2006**: PIMS postdoctoral fellowship
- **2002-2003**: Ontario graduate scholarship
- **1998-1999,2000-2001**: University of Toronto fellowship

Service

- *Refereeing*: Discrete Applied Math. Journal, Archive for Math. Logic, Journal of Logic and Computation, Math Reviews
- *Lecture notes*: Preparation of a manuscript for lectures by Steven Rudich and Avi Wigderson at the IAS/Park City Summer School 2000, published as IAS/Park City Mathematics Series volume 10 “Computational Complexity Theory”, Steven Rudich and Avi Wigderson (editors).

Academic employment

- *Faculty position*
 - **July 2007 - now:** Assistant professor, Memorial University of Newfoundland
- *Postdoctoral employment*
 - **Jan 2005– May 2007:** Postdoctoral fellow, School of Computing Science, Simon Fraser University (supported in part by PIMS).
 - **Sep 2004–Dec 2004, May 2005–Aug 2005:** Visiting scientist, Mathematical Institute of Czech Academy of Sciences in Prague, Czech Republic.
- *Instructorships*
 - **Fall 2005, Spring 2007:** Simon Fraser University
 - **Winter 2004:** York University
 - **Summer, Fall 2003, Winter 2004:** University of Toronto.

Non-academic work experience

- **Jan 2000-Dec 2001:** System administrator, University of Toronto, Dept. of Computer Science (CSLab).
- **Oct 1996-May 1998:** System administrator, Planetary Science Institute, Arizona.
- **May 1995-Mar 1997:** System administrator assistant, University of Arizona, Chemistry department.