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Citizenship

Brazilian (permanent resident of the U.S.A.)

Research Interests

Mathematical Logic, Computability Theory and Applications, Computable Versions of Randomness, Kolmogorov Complexity, Reverse Mathematics

Education

Ph.D. in Mathematics, Cornell University, Aug. 1999 (advisor: Richard A. Shore).
M.S. in Computer Science, Cornell University, Aug. 1998.
B.A. in Mathematics, University of Pennsylvania, May 1993.

Employment

Professor, University of Chicago, from Oct. 2008.
Associate Professor, University of Chicago, Oct. 2005 – Sep. 2008.
Assistant Professor, University of Chicago, Sep. 2002 – Sep. 2005.
Dickson Instructor of Mathematics, University of Chicago, Dec. 2000 – Sep. 2002.
Postdoctoral Fellow, Victoria University of Wellington, Aug. 1999 – Dec. 2000.

Grants

National Science Foundation Research Grant 2002 – 2011.
National Science Foundation Focused Research Group Grant (with several other researchers), 2007 – 2011.
Air Force Office of Scientific Research Grant, 2009.
Templeton Foundation “Exploring the Infinite” Program Grant (with other researchers), 2008 – 2009.
National Science Foundation U.S.-Russia Binational Grant (with several other researchers), 2006 – 2009.
Research Incentive Grant from the University of Chicago Department of Computer Science, 2002.
Research Incentive Grant from the University of Chicago Department of Mathematics, 2002 – 2005.
Associate investigator on a research grant from the Marsden Fund for Basic Science of New Zealand, 2004 – 2006, awarded to the Department of Computer Science, University of Auckland, New Zealand.

Honors and Awards

2010 Shoenfield Prize of the Association for Symbolic Logic.
 Visiting Scholar at the University of Notre Dame, Apr. 2005.
 Visiting Assistant Professorship at the University of Wisconsin–Madison, Sep. 2003.
 1999 Sacks Prize of the Association for Symbolic Logic (best doctoral dissertation in mathematical logic worldwide).
 Honorary Fellowship at the University of Wisconsin–Madison, Aug. – Sep. 1999.
 Alfred P. Sloan Doctoral Dissertation Fellowship, Spring 1998 – Fall 1999.
 Research Fellowship at Victoria University of Wellington, supported by the Marsden Fund for Basic Science of New Zealand, Oct. – Nov. 1998.
 Robert John Battig Prize of the Cornell Department of Mathematics, 1998.

Invited Talks and Refereed Conference Talks

Short Course on Reverse Mathematics of Combinatorial Principles, Asian Initiative for Infinity Summer School, Jul. 2010, Singapore.
 Plenary Lecture, Computability in Europe, Jun. – Jul. 2010, Ponta Delgada, Portugal.
 5th Conference on Logic, Computability, and Randomness, May 2010, South Bend, IN.
 Special Session on Computability Theory, Logic Colloquium, Aug. 2009, Sofia, Bulgaria.
 Foundational Adventures: A Conference in Honor of Harvey M. Friedman, May 2009, Columbus, OH.
 Special Session on Computability Theory, Aug. 2009, Logic Colloquium 2009, Sofia, Bulgaria.
 Marden Lecture, University of Wisconsin–Milwaukee, Apr. 2009, Milwaukee, WI.
 Tutorial on Algorithmic Randomness, NZIMA / NZMRI summer workshop, Jan. 2009, Napier, New Zealand.
 Computability, Reverse Mathematics, and Combinatorics, Dec. 2008, Banff International Research Station, Canada.
 Special Session on Computability Theory and Effective Algebra, AMS Sectional Meeting, Oct. 2008, Middletown, CT.
 Workshop on the Effective Mathematics of the Uncountable, Aug. 2008, New York, NY.
 Memorial Meeting in Honor of Andrei Muchnik, Mar. 2008, Moscow, Russia.
 Special Session on Computability Theory, Dec. 2007, Joint AMS–NZMS Meeting, Wellington, New Zealand.
 Keynote Talk, Algorithmic-Logical Theory of Infinite Structures, Oct. – Nov. 2007, Schloss Dagstuhl Research Center for Computer Science, Germany.
 Keynote Address, 8th Graduate Student Conference in Logic, Apr. 2007, Chicago, IL.
 Plenary Lecture, Association for Symbolic Logic Annual Meeting, Mar. 2007, Gainesville, FL.
 Workshop on Model Theory and Computable Model Theory, Feb. 2007, Gainesville, FL.
 Tutorial on Algorithmic Randomness, Third International Conference on Computability and Complexity in Analysis, Nov. 2006, Gainesville, FL.
 Special Session on Computability Theory in Honor of Manuel Lerman’s Retirement, AMS Sectional Meeting, Oct. 2006, Storrs, CT.
 Special Session on Randomness and Real Computation, Theory and Applications of Models of Computation (TAMC 06), May 2006, Beijing, China.
 Special Session on Model Theory and Computability, AMS Sectional Meeting, Apr. 2006, South Bend, IN.
 Kolmogorov Complexity and Applications, Jan. – Feb. 2006, Schloss Dagstuhl Research Center for Computer Science, Germany.
 Computational Prospects of Infinity, Jun. – Aug. 2005, Singapore.
 11th Southeastern Logic Symposium, Apr. 2005, Gainesville, FL.

Special Session on Computability and Randomness, Association for Symbolic Logic Annual Meeting, Mar. 2005, Stanford, CA.
 UCLA Logic Meeting, Feb. 2005, Los Angeles, CA.
 Special Session on Reverse Mathematics, American Mathematical Society Annual Meeting, Jan. 2005, Atlanta, GA.
 North Texas Logic Conference, Oct. 2004, Denton, TX.
 10th Southeastern Logic Symposium, Mar. 2004, Gainesville, FL.
 Series of twelve lectures at the University of Wisconsin–Madison, Sep. 2003.
 Logic Section, 12th International Congress of Logic, Methodology, and Philosophy of Science, Aug. 2003, Oviedo, Spain.
 Plenary Lecture, Greater Boston Logic Meeting, May 2003, Boston, MA.
 Kolmogorov Complexity and Applications, Apr. 2003, Schloss Dagstuhl Research Center for Computer Science, Germany.
 Special Session on Computability and Models, AMS Annual Meeting, Jan. 2003, Baltimore, MD.
 Special Session on Effectiveness Questions in Model Theory, AMS Sectional Meeting, Oct. 2002, Madison, WI.
 Midwest Model Theory Meeting, Apr. 2002, Chicago, IL.
 Special Session on Computability Theory with Applications, AMS Annual Meeting, Jan. 2002, San Diego, CA.
 Computability and Complexity in Analysis, Nov. 2001, Schloss Dagstuhl Research Center for Computer Science, Germany.
 26th International Symposium on Mathematical Foundations of Computer Science (MFCS 2001), Aug. 2001, Mariánské Lázně, Czech Republic.
 Special Session on Computability Theory, Association for Symbolic Logic European Summer Meeting, Aug. 2001, Vienna, Austria.
 Plenary Lecture, Association for Symbolic Logic Annual Meeting, Mar. 2001, Philadelphia, PA.
 18th Annual Symposium on Theoretical Aspects of Computer Science (STACS 2001), Feb. 2001, Dresden, Germany.
 Computability Theory Meeting, Jan. 2001, Oberwolfach, Germany.
 Plenary Lecture, Association for Symbolic Logic Winter Meeting, Jan. 2001, New Orleans, LA.
 Plenary Lecture, Logic and Applications Meeting, May 2000, Novosibirsk, Russia.
 Special Session on Computability Theory, AMS Sectional Meeting, Mar. 1999, Gainesville, FL.
 Special Session on Computability Theory, Association for Symbolic Logic European Summer Meeting, Aug. 1998, Prague, Czech Republic.
 Special Session on Computability Theory, AMS Sectional Meeting, Oct. 1997, Milwaukee, WI.
 Colloquia and seminars at various universities.

Courses Taught

Undergraduate Courses: Mathematical Logic I and II, Effective Randomness and Dimension, Point-Set Topology, Algebra III, Galois Theory, First Semester Calculus.
 Graduate Courses: Set Theory I and II, Computable Model Theory I and II, Intuitionistic Logic and Constructive Mathematics, Model Theory III, Effective Randomness I and II, Effective Dimension, Descriptive Set Theory I and II, Advanced Topics in Logic.

Graduate Students Examined or Advised

- Associate advisor for Barbara Csima's Ph.D. Dissertation in Mathematics, University of Chicago, 2003.
- Associate advisor for Kenneth Harris's Ph.D. Dissertation in Mathematics and Computer Science, University of Chicago, 2007.
- Associate advisor for Karen Lange's Ph.D. Dissertation in Mathematics, University of Chicago, 2008.
- Associate advisor for Chris Conidis' Ph.D. Dissertation in Mathematics, University of Chicago, 2009.
- Associate advisor for Rachel Epstein's Ph.D. Dissertation in Mathematics, University of Chicago, 2010.
- Associate advisor for the following Ph.D. dissertations in mathematics currently in progress at the University of Chicago: Damir Dzhafarov, David Diamondstone, Matthew Wright, Jonathan Stephenson, Eric Astor.
- Outside examiner for Adam Day's Ph.D. Dissertation in Mathematics, Victoria University of Wellington, New Zealand, 2011.
- Outside examiner for Sasha Rubin's Ph.D. Dissertation in Computer Science, University of Auckland, New Zealand, 2004.
- Outside examiner for Joseph Mileti's Ph.D. Dissertation in Mathematics, University of Illinois at Urbana-Champaign, 2004.

Professional Activities and Memberships

- Editor for the *Journal of Symbolic Logic*, 2010–present.
- Member of program committee for Computability in Europe 2011, Sofia, Bulgaria, 2011.
- Co-organizer of the Workshop on Reverse Mathematics: Foundations and Applications, Chicago, IL, 2009.
- Member of program committee for the 2nd Workshop on the Effective Mathematics of the Uncountable, New York, 2009.
- Member of program committee for the 4th International Conference on Logic, Computability and Randomness, Luminy, France, 2009.
- Member of program committee for the Symposium on Logical Foundations of Computer Science (LFCS '09), Deerfield Beach, FL, 2009.
- Member of program committee for the Workshop on the Effective Mathematics of the Uncountable, New York, 2008.
- Member of program committee for the Conference on Computability, Complexity, and Randomness, Nanjing, China, 2008.
- Co-organizer of the Workshop on Effective Randomness, Chicago, 2007.
- Co-organizer of Topics in Computability: A Meeting in Honor of Richard A. Shore, Boston, 2007.
- Member of program committee for the Conference on Logic, Computability, and Randomness, Buenos Aires, Argentina, 2007.
- Member of program committee for the Symposium on Logical Foundations of Computer Science (LFCS '07), New York, 2007.
- Member of program committee for the Third International Conference on Computability and Complexity in Analysis, Gainesville, Florida, 2006.
- Co-organizer of the Workshop on Effective Randomness at the American Institute of Mathematics, 2006.
- Member of the Association for Symbolic Logic Committee on Meetings in North America, 2006 – present.

Member of an Association for Symbolic Logic Nominating Committee, 2005.
 Reviews editor for the *Bulletin of Symbolic Logic*, 2004–2008.
 Member of program committee for the Conference on Logic, Computability, and Randomness, Córdoba, Argentina, 2004.
 Member of program committee for the Association for Symbolic Logic 2004 Annual Meeting.
 Member of program committee for the Association for Symbolic Logic 2003 Annual Meeting.
 Member of organizing committee for the New Zealand Mathematics Research Institute Summer Meeting, Kaikoura 2000.
 Wrote the internal *Journal of Symbolic Logic* database and its web-based interface.
 Referee for various journals and reviewer for *Mathematical Reviews*.
 Member, American Mathematical Society, Association for Symbolic Logic, and Mathematical Association of America.

List of Publications

Books

Editor (with R. G. Downey): *Aspects of Complexity: Minicourses in Algorithmics, Complexity, and Computational Algebra, NZMRI Summer Meeting, Kaikoura, New Zealand, January 7–15, 2000, de Gruyter Series in Logic and its Applications 4* (de Gruyter, 2001).
Algorithmic Randomness and Complexity (with R. G. Downey), Springer-Verlag, New York, 2010.

Articles in Refereed Journals and Conference Proceedings

Degree Spectra of Relations on Computable Structures, *Bulletin of Symbolic Logic* 6 (2000), 197–212.
 Undecidability and 1-types in Intervals of the Computably Enumerable Degrees (with K. Ambos-Spies and R. A. Shore), *Annals of Pure and Applied Logic* 106 (2000), 1–47.
 Degree Spectra of Intrinsically C.E. Relations, *Journal of Symbolic Logic* 66 (2001), 441–469.
 Prime Models of Theories of Computable Linear Orderings, *Proceedings of the American Mathematical Society* 129 (2001), 3079–3083.
 A Δ_2^0 Set with no Infinite Low Subset in Either It or Its Complement (with R. G. Downey, S. Lempp, and R. Solomon), *Journal of Symbolic Logic* 66 (2001), 1371–1381.
 Degree Spectra and Computable Dimensions in Algebraic Structures (with B. Khossainov, R. A. Shore, and A. M. Slinko), *Annals of Pure and Applied Logic* 115 (2002) 71–113.
 Degree Spectra of Relations on Structures of Finite Computable Dimension, *Annals of Pure and Applied Logic* 115 (2002) 233–277.
 Randomness, Computability, and Density (with R. G. Downey and A. Nies), *SIAM Journal on Computing* 31 (2002) 1169–1183 (extended abstract in A. Ferreira and H. Reichel (eds.), *STACS 2001*, Lecture Notes in Computer Science 2010 (Springer, 2001)).
 Degree Spectra of Relations on Computable Structures in the Presence of Δ_2^0 Isomorphisms, *Journal of Symbolic Logic* 67 (2002) 697–720.
 Reverse Mathematics of the Nielsen-Schreier Theorem (with R. G. Downey, S. Lempp, and R. Solomon), in *Proceedings of International Conferences on Mathematical Logic*, (Novosibirsk State University Press, 2002), 59–71.

- Realizing Levels of the Hyperarithmetical Hierarchy as Degree Spectra of Relations on Computable Structures (with W. M. White), *Notre Dame Journal of Formal Logic* 43 (2002) 51–64.
- Degree Spectra of Relations on Boolean Algebras (with R. G. Downey and S. S. Goncharov), *Algebra and Logic* 42 (2003) 105–111.
- Trivial Reals (with R. G. Downey, A. Nies, and F. Stephan), in R. Downey, D. Decheng, T. S. Ping, Q. Y. Hui, and M. Yasugi (eds.), *Proceedings of the 7th and 8th Asian Logic Conferences*, (Singapore University Press and World Scientific, 2003), 103–131 World Scientific, Singapore (extended abstract in *Electronic Notes in Theoretical Computer Science* 66).
- Computability-Theoretic and Proof-Theoretic Aspects of Partial and Linear Orderings (with R. G. Downey, S. Lempp, and R. Solomon), *Israel Journal of Mathematics* 138 (2003) 271–290.
- Uniformity in Computable Structure Theory (with R. G. Downey and B. Khoussainov), *Algebra and Logic* 42 (2003) 318–332.
- A Computably Categorical Structure Whose Expansion by a Constant Has Infinite Computable Dimension (with B. Khoussainov and R. A. Shore), *Journal of Symbolic Logic* 68 (2003) 1199–1241.
- Randomness and Reducibility (with R. G. Downey and G. LaForte), *Journal of Computer and Systems Sciences* 68 (2004) 96–114 (extended abstract in J. Sgall, A. Pultr, and P. Kolman (eds.), *Mathematical Foundations of Computer Science 2001*, Lecture Notes in Computer Science 2136 (Springer, 2001), 316–327).
- Bounding Prime Models (with B. F. Csima, J. F. Knight, and R. I. Soare), *Journal of Symbolic Logic* 69 (2004) 1117–1142.
- Relativizing Chaitin’s Halting Probability (with R. Downey, J. S. Miller, and A. Nies), *Journal of Mathematical Logic* 5 (2005) 167–192.
- Computable Trees, Prime Models, and Relative Decidability, *Proceedings of the American Mathematical Society* 134 (2006) 1495–1498.
- An Uncountably Categorical Theory whose Only Computably Presentable Model Is Saturated (with B. Khoussainov and P. Semukhin), *Notre Dame Journal of Formal Logic* 47 (2006) 63–71.
- Calibrating Randomness (with R. Downey, A. Nies, and S. A. Terwijn), *Bulletin of Symbolic Logic* 12 (2006) 411–491.
- Every 1-Generic Computes a Properly 1-Generic (with B. F. Csima, R. Downey, N. Greenberg, and J. S. Miller), *Journal of Symbolic Logic* 71 (2006) 1385–1393.
- Combinatorial Principles Weaker than Ramsey’s Theorem for Pairs (with R. A. Shore), *Journal of Symbolic Logic* 72 (2007) 171–206.
- Bounding Homogeneous Models (with B. F. Csima, V. S. Harizanov, and R. I. Soare), *Journal of Symbolic Logic* 72 (2007) 305–323.
- Π_1^0 Classes and Strong Degree Spectra of Relations (with J. Chisholm, J. Chubb, V. S. Harizanov, C. G. Jockusch, Jr., T. McNicholl, and S. Pingrey), *Journal of Symbolic Logic* 72 (2007) 1003–1018.
- Subspaces of Computable Vector Spaces (with R. Downey, A. M. Kach, S. Lempp, J. R. Mileti, and A. Montálban), *Journal of Algebra* 314 (2007) 888–894.

- Using Random Sets as Oracles (with A. Nies and F. Stephan), *Journal of the London Mathematical Society* 75 (2007) 610–622.
- Order Computable Sets (with R. Miller and S. Podzorov), *Notre Dame Journal of Formal Logic* 48 (2007) 317–347.
- Undecidability of the Structure of the Solovay Degrees of C.E. Reals (with R. Downey and G. LaForte), *Journal of Computer and System Sciences* 73 (2007) 769–787.
- Limit Computability and Constructive Measure (with S. A. Terwijn), in Chong, Feng, Slaman, Woodin, and Yang (eds.), *Computational Prospects of Infinity, Part II: Presented Talks*, Lecture Notes Series, Institute for Mathematical Sciences, National University of Singapore, Vol. 15, World Scientific 2008, 131–141.
- The Strength of Some Combinatorial Principles Related to Ramsey’s Theorem for Pairs (with C. G. Jockusch, Jr., B. Kjos-Hanssen, S. Lempp, and T. A. Slaman), in Chong, Feng, Slaman, Woodin, and Yang (eds.), *Computational Prospects of Infinity, Part II: Presented Talks*, Lecture Notes Series, Institute for Mathematical Sciences, National University of Singapore, Vol. 15, World Scientific 2008, 143–161.
- The Atomic Model Theorem and Type Omitting (with R. A. Shore and T. A. Slaman), *Transactions of the American Mathematical Society* 361 (2009) 5805–5837.
- Characterizing the strongly jump-traceable sets via randomness (with N. Greenberg and A. Nies), to appear.
- Counting the changes of random Δ_2^0 sets (with S. Figueira, J. S. Miller, K. M. Ng, and A. Nies), to appear.