BARBARA F. CSIMA

University of Waterloo
Department of Pure Mathematics
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Canada
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CITIZENSHIP:

Canadian

EDUCATION:

Ph.D., Mathematics, University of Chicago, 2003.
M.S., Mathematics, University of Chicago, 1999.
Hon.B.Sc., Mathematics Specialist and Actuarial Science Major, University of Toronto, 1998.

DISSERTATION:

Title: Applications of Computability Theory to Prime Models and Differential Geometry
Advisor: Robert I. Soare

EMPLOYMENT:

Professor of Pure Mathematics, University of Waterloo, Jul. 2015 – present.
Associate Professor of Pure Mathematics, University of Waterloo, Jul. 2010 – Jun. 2015.
Assistant Professor of Pure Mathematics, University of Waterloo, Jul. 2005 – Jun. 2010.
H. C. Wang Assistant Professor of Mathematics, Cornell University, Jul. 2003 – Jun. 2005.

ADMINISTRATIVE APPOINTMENTS:

Associate Chair of Graduate Studies, Department of Pure Mathematics, University of Waterloo, Jul. 2019 – present.

PUBLICATIONS AND PREPRINTS:

[33] B. F. Csima, K. M. Ng, Every Δ^0_2 degree is a strong degree of categoricity, submitted.

[32] B. F. Csima, D. Rossegger, D. Yu, Positive Enumerable Functors. In *Connecting with Computability - 17th Conference on Computability in Europe, CiE 2021, Virtual Event, Ghent, July 5-9, 2021, Proceedings* (Vol. 12813, pp. 385–394).

[31] L. Bienvenu, B. F. Csima, M. Harrison-Trainor, Some Questions of Uniformity in Algorithmic Randomness, *J. Symbolic Logic*, accepted.

[30] W. Boney, B. F. Csima, N. A. Day, and M. Harrison-Trainor, Which classes of structures are both pseudo-elementary and definable by an infinitary sentence?, *Bulletin of Symbolic Logic*, accepted.

[29] L. Bienvenu, B. F. Csima, M. Harrison-Trainor, Optimal bounds for single-source Kolmogorov extractors, *Trans. Amer. Math. Soc.* 373 (2020), no. 3, 1983–2006.

[28] B. F. Csima, M. Deveau, M. Harrison-Trainor, M. A. Mahmoud, Degrees of categoricity above limit ordinals, Computability 9 (2020), no. 2, 127–137.

[27] B. F. Csima, D. D. Dzhafarov, D. R. Hirshfeldt, C. G. Jockusch, R. Solomon, and L. B. Westrick, The reverse mathematics of Hindman's theorem for sums of exactly two elements, *Computability*, 8 (2019), no. 3-4, 253–263.

[26] B. F. Csima, M. Deveau and J. Stephenson, When does a relation code an isomorphism?, submitted.

[25] B. F. Csima and J. Stephenson, Finite computable dimension and degrees of categoricity, *Annals of Pure and Applied Logic* 170 (2019), no. 1, 58-94.

[24] B. A. Anderson, B. F. Csima, and K. M. Lange, Bounded low and high sets, *Archive for Mathematical Logic* 56 (2017), no. 5-6, 507-521.

[23] B. F. Csima and M. Harrison-Trainor, Degrees of categoricity on a cone via η-systems, *J. Symbolic Logic*, 82 (2017), no. 1, 325-346.

[22] B. A. Anderson and B. F. Csima, Degrees that are not degrees of categoricity, *Notre Dame J. of Formal Logic*, 57 (2016), no. 3, 389–398.

[21] B. F. Csima and C. Knoll, Measuring Complexities of Classes of Structures, *Annals of Pure and Applied Logic* 166 (2015), pp. 1365–1381.

[20] B. A. Anderson and B.F. Csima, A bounded jump for the bounded Turing degrees, *Notre Dame J. of Formal Logic*, 55 (2014), no. 2, 245–264.

[19] B. F. Csima, J. N. Y. Franklin and R. A. Shore, Degrees of Categoricity and the Hyperarithmetic Hierarchy, *Notre Dame J. of Formal Logic* 54 (2013), no. 2, 215–231.

[18] B. F. Csima, R. Downey, and K. M. Ng. Limits on Jump Inversion for Strong Reducibilities. *J. Symbolic Logic*, 76 (2011), no. 4, 1287–1296.

[17] B. F. Csima and R. Solomon, The Complexity of Central Series in Nilpotent Computable Groups. *Ann. Pure Appl. Logic* 162 (2011), no. 8, 667–678.

[16] B. F. Csima, V. S. Harizanov, R. G. Miller, and A. Montalbán, Computability of Fraïsé Limits, *J. Symbolic Logic*, 76 (2011), no. 1, 66–93.

[15] B. F. Csima and I. S. Kalimullin, Degree Spectra and Immunity Properties, *MLQ. Mathematical Logic Quarterly*, Vol. 1/2010, page 67–77.

[14] B. F. Csima and J. R. Mileti, The Strength of the Rainbow Ramsey Theorem, *J. Symbolic Logic*, 74 no. 4 (2009), 1310–1324.

[13] D. Cenzer, B. F. Csima, and B. Khoussainov, Linear Orders with Distinguished Function Symbol, *Archive for Mathematical Logic* 48 (2009), no. 1, 63–76.

[12] B. F. Csima and B. Khoussainov, When Is Reachability Intrinsically Decidable?, In Masami Ito and Masafumi Toyama, editors, *Developments in Language Theory*, volume 5257 of *Lecture Notes in Computer Science*, pages 216–227. Springer, 2008.

[11] B. F. Csima, B. Khoussainov, and J. Liu, Computable Categoricity of Graphs with Finite Components, *Logic and Theory of Algorithms, CiE 2008 (A. Beckmann, C. Dimitracopoulos, and B. Lowe Eds.), LNCS 5028*, pp. 139–148, 2008.

[10] B. F. Csima, The settling time reducibility ordering and Delta-2 sets, *Journal of Logic and Computation, Special Issue: Computation and Logic in the Real World: CiE 2007*, 19 (2009), no. 1, 145–150.

[9] B. F. Csima, Comparing C.E. Sets Based on Their Settling Times. *Computation and Logic in the Real World - Third Conference of Computability in Europe, CiE 2007 (S.B. Cooper, B. Lowe, and A. Sorbi Eds.), LNCS 4497* pp. 196–204, 2007.

[8] B. F. Csima and R. A. Shore, The Settling-Time Reducibility Ordering, *J. Symbolic Logic* 72 (2007), no. 3, 1055–1071.

[7] B. F. Csima, V. S. Harizanov, D. R. Hirschfeldt, and R. I. Soare, Bounding Homogeneous Models, *J. Symbolic Logic*, 72 (2007), no. 1, 305–323.

[6] B. F. Csima and R. I. Soare, Computability Results Used in Differential Geometry, *J. Symbolic Logic*, 71 no. 4 (2006), 1394–1410.

[5] B. F. Csima, R. Downey, N. Greenberg, D. R. Hirschfeldt, and J. S. Miller, Every 1-Generic Computes a Properly 1-Generic, *J. Symbolic Logic*, 71 no. 4 (2006), 1385-1393.

[4] B. F. Csima, A. Montalbán, and R. A. Shore, Boolean Algebras, Tarski Invariants, and Index Sets, *Notre Dame J. of Formal Logic*, 47 (1), 2006, 1–23.

[3] B. F. Csima and A. Montalbán, A Minimal Pair of K-degrees, *Proceedings of the AMS*, 134, 2006, 1499–1502.

[2] B. F. Csima, D. R. Hirschfeldt, J. F. Knight, and R. I. Soare, Bounding Prime Models, *J. Symbolic Logic* 69 no. 4 (2004), 1117–1142.

[1] B. F. Csima, Degree Spectra of Prime Models, *J. Symbolic Logic* 69 no. 2 (2004), 430–442.

AWARDS:

NSERC Discovery Grant, July 2018 – June 2023.
NSERC Discovery Grant, July 2013 – June 2018.
NSERC Discovery Grant, July 2008 – June 2013.
NSERC University Faculty Award, July 2005 – June 2010.
NSERC Discovery Grant, July 2005 – June 2008.
NSERC Postdoctoral Fellowship, 2003, declined.
NSERC Postgraduate Scholarship for 2001/2002 and 2002/2003.

EXTENDED VISITS:

Max Planck Institute for Mathematics, February, April, June and August of 2010.
University of Leeds, Department of Mathematics, London Math Society Collaborative Grant visitor, February 23 – March 6, 2009.
Institut des Hautes Études Scientifiques, February 5 – May 5, 2009.
University of Auckland, January 7 – February 5, 2008.
University of Florida, Special Year in Logic, January 23 – February 10, 2007.
Computational Prospects of Infinity, Institute for the Mathematical Sciences, National University of Singapore, July 17 – August 16, 2005.

INVITED TALKS:

2021 Joint Mathematics Meeting, ASL Invited Address, January 8, 2021

AMS 2019 Fall Central Sectional Meeting, Special Session on Computability Theory in Honor of Steffen Lempp's 60th Birthday, Madison, Wisconsin, Sept 14, 2019

AMS 2019 Spring Eastern Sectional Meeting, Special Session on Computability Theory, Hartford, Connecticut, April 13 2019

2019 Joint Mathematics Meetings, Special Session on Recent Advances and Trends in Computable Structure Theory (in honor of J. Remmel), Baltimore, Maryland, Jan 17, 2019

2019 Joint Mathematics Meetings, Special Session on Algorithmic Dimensions and Fractal Geometry, Baltimore, Maryland, Jan 16, 2019

Colloquium, Special Semester in Logic Colloquium Series, Department of Mathematics, University of Connecticut, Storrs, October 5, 2017

2016 CMS Winter Meeting, Mathematical Logic Session, Niagara Falls, ON, December 4, 2016

AMS 2015 Central Fall Sectional Meeting, Special Session on Computability Theory and Applications, Chicago, Illinois, October 4, 2015

AMS 2015 Spring Eastern Sectional Meeting, Special Session on Computable Structure Theory, Georgetown University, Washington DC, March 7, 2015

South-Eastern Logic Symposium, University of Florida, February 28, 2015

Workshop on Computability Theory, Prague, July 3, 2014

Women in Computability Workshop, Computability in Europe 2014, Budapest, Hungary, June 24, 2014

Plenary Speaker, 2014 ASL North American Annual Meeting, Boulder CO, May 22 2014

McMaster University, Logic Seminar, February 25th, 2014

BIRS Workshop on Computable Model Theory, November 5, 2013

AMS 2013 Fall Central Sectional Meeting, Special Session on Computability Across Mathematics, St. Louis, MO, October 19, 2013

American Institute of Mathematics (AIM), Workshop on Computable Stability Theory, August 15, 2013

University of Chicago, Logic Seminar, April 18, 2012

AMS 2012 Fall Section Meeting, Computable Mathematics (in honor of Alan Turing), Washington DC, March 18, 2012

University of Windsor, Colloquium, March 11, 2011

AMS 2010 Fall Central Section Meeting, Computability and Its Applications, Notre Dame, IN, November 6, 2010

Notre Dame University, Logic Seminar, September 2, 2010

University of Heidelberg, Logic Seminar, August 9, 2010

Workshop on Computability Theory, Paris, France, July 24, 2010

University of Bonn, Logic Seminar, June 28, 2010

Mal'tsev Meeting 2010, Novosibirsk, Russia, plenary talk, May 3, 2010

University of Waterloo, Pure Math club "Prof Talk", March 17, 2010

MIT Logic Seminar, March 10, 2010

MIT Women in Mathematics Seminar Lecture Series, Mar 9, 2010

The George Washington University, Summer Program for Women in Mathematics, Guest Lecture, July 7, 2009

University of Chicago Logic Seminar, June 1, 2009

University of Leeds, Logic Seminar, March 4, 2009

University of Leeds, Computability Seminar, March 3, 2009

University of Leeds, Computability Seminar, February 24, 2009

2009 Joint Mathematics Meeting, ASL Invited Address, January 8, 2009

Institute of Mathematics, Prague, Logic Seminar, November 15, 2008

Cornell University Logic Seminar, October 15, 2008

AMS 2008 Fall Eastern Section Meeting, Special Session on Computability Theory and Effective Algebra, Middletown, CT, October 11, 2008

Logic Colloquium 2008, Special Session on Computability and Arithmetic, Bern, Switzerland, July 6, 2008

University of Hawaii at Manoa, Department of Mathematics Colloquium, February 8, 2008

University of Hawaii at Manoa, Logic Seminar, February 6, 2008

University of Auckland, Department of Computer Science, Theory Group Seminar, January 21, 2008

Joint Meeting of the AMS and NZMS, Special Session on Computability Theory, Wellington, New Zealand, December 12, 2007

Computability in Europe 2007, Special Session on Computability and Mathematical Structure, Siena, Italy, June 22, 2007

University of Connecticut Logic Seminar, Storrs, Connecticut, April 2, 2007

Workshop on Model Theory and Computable Model Theory, University of Florida, February 10, 2007

University of Florida Logic Colloquium, Gainesville, Florida, January 26, 2007

New York Women in Math Network Conference, City University of New York, December 9, 2006

AMS 2006 Fall Eastern Section Meeting, Special Session on Computability Theory in Honor of Manuel Lerman's Retirement, Storrs, Connecticuit, October 28, 2006

2006 Greater Boston Logic Conference, MIT, Boston, Massachusetts, May 12, 2006

University of Chicago Logic Seminar, Chicago, Illinois, May 10, 2006

Fields Institute Set Theory Seminar, Toronto, Ontario, March 31, 2006

SouthEastern Logic Symposium, University of Florida, March 11, 2006

Cornell University Logic Seminar, February 14, 2006

McMaster University Logic Colloquium, November 15, 2005

University of California, Berkeley, Recursion Theory Seminar, October 31, 2005

Computational Prospects of Infinity, Institute for the Mathematical Sciences, National University of Singapore, July 28, 2005

University of California, Davis, Mathematics Department Colloquium, June 9, 2005

The CUNY Logic Workshop at the City University of New York, March 4, 2005

University of Notre Dame Logic Seminar, December 7, 2004

AMS 2004 Fall Central Section Meeting, Special Session on Computability Theory and Applications, Evanston, IL, October 23, 2004

University of Waterloo Pure Mathematics Department Colloquium, September 16, 2004

Connecticut Logic Seminar, Wesleyan University, April 19, 2004

Cornell University Logic Seminar, March 25, 2003

University of Notre Dame Logic Seminar, February 13, 2003

University of Illinois at Chicago Logic Seminar, February 11, 2003

Southern Wisconsin Logic Colloquium, University of Wisconsin at Madison, February 4, 2003

2003 Joint Mathematics Meetings, Special Session on Computability and Models, Baltimore, MD, January 15, 2003

AMS 2002 Fall Central Section Meeting, Special Session on Effectiveness Questions in Model Theory, Madison, WI, October 12, 2002

2002 Joint Mathematics Meetings, Special Session on Computability Theory with Applications, San Diego, CA, January 6, 2002.

ONLINE COURSE DEVELOPEMENT:

Introduction to Mathematical Logic, PMATH 330

COURSES TAUGHT AT THE UNIVERSITY OF WATERLOO:

Graduate:

Topics in Logic (Comptability Theory), PMATH 930, Fall 2014, Fall 2018

Topics in Mathematical Logic (Computability Theory), PMATH 711/911, Winter 2006, Winter 2011.

First Order Logic and Computability, PMATH 632/432, Fall 2007, Fall 2009, Winter 2012, Winter 2014.

Undergraduate:

First Order Logic and Computability, PMATH 432/632, Fall 2007, Fall 2009, Winter 2012, Winter 2014.

Polynomials, Rings & Finite Fields, PMATH 345, Spring 2012.

Introduction to Mathematical Logic, PMATH 330 - online, Spring 2016, Spring 2017, Spring 2018, Spring 2019, Winter 2020, Spring 2020, Fall 2020, Winter 2021, Spring 2021, Fall 2021.

Introduction to Mathematical Logic, PMATH 330, Fall 2006, Spring 2008, Fall 2009, Fall 2010, Spring 2012.

Calculus 3 for Honours Math, MATH 237, Fall 2018

Algebra for Honours Mathematics, MATH 135, Fall 2005, Fall 2006, Fall 2007.

Linear Algebra 1 for Honours Mathematics, MATH 136, Winter 2014.

Linear Algebra for Engineering, MATH 115, Fall 2014

Applied Linear Algebra 1, MATH 106, Fall 2010.

Readings in Pure Mathematics (Algorithmic Randomness), PMATH 499, Fall 2006, Winter 2012.

COURSES TAUGHT ELSEWHERE:

Graduate:

Logic; Computability Theory.

Undergraduate:

Calculus for Engineers; Mathematical Methods for the Social Sciences; Calculus.

TRAINING OF HIGHLY QUALIFIED PERSONNEL:

Postdoctoral:

August 2019 – July 2021, Dino Rossegger, Ph. D. Vienna University of Technology.

July 2017 – June 2018, Matthew Harrison-Trainor, Ph.D. University of California, Berkeley.

July 2015 – June 2017, Jonathan Stephenson, Ph.D. University of Chicago.

July 2009 – June 2012, Christopher Conidis, Ph.D. University of Chicago. Conidis is currently an Assistant Professor, at the City University of New York - College of Staten Island.

July 2009 – June 2011, Bernard Anderson, Ph.D. University of California, Berkeley. Anderson is currently an Assistant Professor of Mathematics, Gordon State College.

January 2010 – June 2010, Johanna Franklin, Ph.D. University of California, Berkeley. Franklin is currently an Assistant Professor at Hofstra University.

September 2007 – December 2007, Iskander Kalimullin, Ph.D. Sobolev Institute of Mathematics. Kalimullin is currently an Assistant Professor at Kazan State University.

PhD:

September 2019 – present, Luke MacLean.

September 2014 – August 2019, Michael Deveau, *Computability Theory and Some Applications*

September 2014 – August 2019, Mohammad Mahmoud, *Degrees of Categoricity and the Isomorphism Problem.*

September 2009 – August 2013, Carolyn Knoll, *Complexity of Classes of Structures.*

Masters:

November 2018 – August 2019, Luke MacLean, *Sure it works in theory, but is it effective?.*

September 2015 – August 2016, Emily Neufeld, *On Kolmogorov Complexity and Minimal Pairs of K-Degrees.*

March 2014 – August 2014, Michael Deveau, *Minimal Pairs of Turing Degrees.*

July 2012 – August 2012, Paul-Elliot Angles D'Auriac. Internship from ENS Lyon.

September 2010 – December 2011, Steven McPherson, *The Existence of Computable Structures of Finite Dimension.*

March 2009 – August 2010, Clinton Loo, *Settling Time Reducibility Orderings.*

May 2008 – August 2009, Carolyn Knoll, *Degree Spectra of Unary Relations on $(\omega, \leq)$ and $(\zeta, \leq)$.*

January 2008 – August 2009, David Belanger, *Structures of Some Strong Reducibilities.*

Undergraduate:

May 2020 – Aug 2020, Zhi Ying (Daniel) Yu, NSERC USRA

May 2018 – Jun 2018, Wentao Yang, USRA.

Sept 2014 – Dec 2014, Sam Eisenstat, NSERC USRA.

May 2012 – Aug 2012, Matthew Harrison-Trainor, USRA.

May 2008 – Aug 2008, Yang Lu, NSERC USRA.

May 2008 – Aug 2008, Atul Sivaswamy, NSERC USRA.

May 2007 – Aug 2007, Vladimir Soukharev, NSERC USRA.

OTHER ACTIVITIES:

Member of the Editorial Board for the *Notre Dame Journal of Formal Logic*, May 2014 – present

Member of the Scientific Committee, *New directions in computability theory*, Centre International de Rencontres Mathematiques, Luminy, France, March 7-11, 2022

Member of the Tenure & Promotion Committee, Department of Pure Mathematics, University of Waterloo, July 2020 – present

Member of the Women in Math Committee, Canadian Mathematical Society, January 2021 – present

Member of Math Faculty Graduate Studies Council, September 2017 – present

Member of Pure Mathematics Graduate Committee, September 2017 – present

Member of Pure Mathematics Chair Nominating Committee, Faculty of Mathematics, University of Waterloo, 2020 – 2021

Member of the Board of Directors, Canadian Mathematical Society, July 2017 – June 2021

Member of the University Tenure and Promotion Advisory Committee, University of Waterloo, September 2017 – June 2020

Co-organizer of the Special Session on Computability Theory ath the 2019 Canadian Mathematical Society Winter Meeting, Dec 6-9, 2019, Toronto.

Member of the Program Committee, Fourteenth International Conference on Computability, Complexity and Randomness (CCR 2019), June 23-25, 2019, Astana, Kazakhstan.

Math HeForShe Faculty Advocate, July 2017 – July 2018

Chair of the Organizing Committee, Workshop on Comutability Theory and its Applications, University of Waterloo, June 4-8, 2018

Member of the Program Committee for CiE 2018 - Computability in Europe, July 30 - August 3, 2018, Kiel, Germany

Member of the Program Committee for the 2018 North American Annual Meeting of the Association for Symbolic Logic, Macomb, Illinois, May 16–19, 2018

Member of the Board of Directors for Bright Starts Co-operative Early Learning Centre (child care centre at the University of Waterloo), May 2014 – May 2017

Member of the Program Committee for the 2017 North American Annual Meeting of the Association for Symbolic Logic, Boise, ID, March 20–23, 2017

Colloquium Director, Department of Pure Mathematics, University of Waterloo, July 2006–June 2012, Jan 2014–Dec 2014, July 2015–Aug 2016

Co-organizer of the special session on *Computability Theory* at the 2016 North American Annual Meeting of the Association for Symbolic Logic, Storrs, CT, May 23–26, 2016

Member of Student Appeals Committee, Faculty of Mathematics, Spring 2016

Co-organizer of the special session on *Computability Theory* at the 2014 CMS Winter Meeting, Hamilton, ON, Dec 5–8, 2014

Member of the Dean of Mathematics Nominating Committee, 2014

Co-chair of the Program and Organizing Committees for *Two Weeks at WATERLOO - A Summer School for Women in Math*, University of Waterloo, Waterloo, ON, Aug 10–23, 2014

Co-organizer of the special session on *Computability Theory* at CiE 2014 - Computability in Europe: Language Life, Limits, Budapest, Hungary, June 23-27, 2014

Member of Undergraduate Committee, Department of Pure Mathematics, University of Waterloo, July 2013–June 2015

Co-organizer of the workshop *Computable Model Theory*, Banff International Research Station (BIRS), November 3–7, 2013

Chair of the Local Organizing Committee for the 2013 Association for Symbolic Logic North American Annual Meeting, Waterloo, ON, May 8–13, 2013

Chair of Women in Math Committee, Faculty of Mathematics, University of Waterloo July 2010–Dec 2012

Member of Women in Math Committee, Faculty of Mathematics, University of Waterloo July 2007–Dec 2012

Member of Graduate Committee, Department of Pure Mathematics, University of Waterloo July 2010–Dec 2012

Co-chair of the Program and Organizing Committees for *Two Weeks at WATERLOO - A Summer School for Women in Math*, University of Waterloo, Waterloo, ON, Aug 12–25, 2012

Chair of the Program Committee and Organizing Committee for *Computability Theory and Applications: A Meeting in Honor of Robert I. Soare*, University of Chicago, Chicago, IL, May 14–15, 2011

Member of Curriculum Committee, Department of Pure Mathematics, University of Waterloo July 2007–June 2009

Co-organizer of the workshop *Computability, Reverse Mathematics and Combinatorics*, Banff International Research Station (BIRS), December 7–12, 2008

Member of Pure Mathematics Chair Nominating Committee, Faculty of Mathematics, University of Waterloo, 2007

Co-organizer of *Topics in Computability: A Meeting in Honor of Richard A. Shore*, MIT, Boston, MA, January 21–22, 2007

Instructor at Summer Program for Women in Mathematics, The George Washington University, July 2006

Member of Representative Council, University of Waterloo, July 2005–June 2007

Member of Teaching Committee, Cornell University, 2004/5