Ruiyuan Chen

Department of Mathematics and Statistics
McGill University
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RESEARCH INTERESTS	Mathematical logic, centered around descriptive set theory and connections with dynamical systems and category theory, including countable group actions, Polish groups, connections with model theory, lattices and locales, and topos theory.

EMPLOYMENT

CRM–Simons Postdoctoral Fellow
McGill University, September 2021–present.

J.L. Doob Research Assistant Professor (postdoc)
University of Illinois at Urbana–Champaign, August 2018–August 2021.

EDUCATION

Ph.D. in Mathematics
California Institute of Technology, June 2018.
Advisor: Alexander Kechris.
Thesis: *Definability and classification of equivalence relations and logical theories.*

B.Sc. in Computer Science and Mathematics (with distinction)
University of British Columbia, May 2013.

GRANTS & AWARDS

NSF Grant DMS-2054508, "Descriptive Set Theory and Categorical Logic"
2021–2024.

NSERC Postdoctoral Fellowship (declined)
2018–2020.

Scott Russell Johnson Prize for Excellence in a Graduate Dissertation
California Institute of Technology, 2018.

NSERC Postgraduate Scholarship (doctoral)
California Institute of Technology, 2014–2017.

NSERC Postgraduate Scholarship (masters)
California Institute of Technology, 2013–2014.

Governor-General's Silver Medal in Science
University of British Columbia, 2013.

NSERC Undergraduate Student Research Award
University of British Columbia, summers of 2011, 2012, 2013.

PUBLICATIONS & PREPRINTS

R. Chen, *Cardinal algebras, Borel fields of structures, and ℓ^2-Betti numbers*
in preparation, 2021+.

R. Chen, *Cardinal algebras, $[0, \infty]$-enriched frames, and valuation locales*
in preparation, 2021+.

R. Chen, *On sifted colimits in the presence of pullbacks*
Theory Appl. Categ. 37 (2021), 1176–1193.

R. Chen, *On the Pettis–Johnstone theorem for localic groups*
submitted, https://arxiv.org/abs/2109.12721, 2021, 12pp.

R. Chen, *Borel and analytic sets in locales*
preprint, https://arxiv.org/abs/2011.00437, 2020, 121pp.

R. Chen, *Decompositions and measures on countable Borel equivalence relations*
Ergodic Theory Dynam. Systems 41 (2021), 3671–3703.

W. Chan and R. Chen, *Bounds on continuous Scott rank*
Proc. Amer. Math. Soc. 148 (2020), 3591–3605.

R. Chen, *A universal characterization of standard Borel spaces*
submitted, https://arxiv.org/abs/1908.10510, 2019, 28pp.

R. Chen, *Representing Polish groupoids via metric structures*
submitted, https://arxiv.org/abs/1908.03268, 2019, 70pp.

R. Chen, *Borel functors, interpretations, and strong conceptual completeness for $\mathcal{L}_{\omega_1\omega}$*
Trans. Amer. Math. Soc. 372 (2019), 8955–8983.

R. Chen, *Amalgamable diagram shapes*
J. Symb. Logic 84 (2019), 88–101.

R. Chen, *Notes on quasi-Polish spaces*
preprint, https://arxiv.org/abs/1809.07440, 2018, 21pp.

R. Chen, *Borel structurability by locally finite simplicial complexes*
Proc. Amer. Math. Soc. 146 (2018), 3085–3096.

R. Chen and A. S. Kechris, *Structurable equivalence relations*
Fund. Math. 242 (2018), 109–185.

R. P. Anstee and R. Chen, *Forbidden submatrices: some new bounds and constructions*
Electron. J. Combin. 20 (2013), Paper 5, 13pp.

INVITED TALKS	ASL North American Annual Meeting, April 2022 (upcoming).
	University of Maryland logic seminar, December 2021.
	Categorical aspects of descriptive set theory (tutorial) Dagstuhl Seminar on DST and Computable Topology, November 2021.
	Some results in descriptive locale theory ASL North American Annual Meeting, June 2021.
	Some results in descriptive locale theory Cornell logic seminar, April 2021.
	Categorical and descriptive perspectives on classification (keynote) Graduate Student Conference in Logic XXII, March 2021.

Gabriel–Ulmer duality for continuous categories
UWO topology seminar, March 2021.

A universal characterization of standard Borel spaces
CMS Winter Meeting, December 2020.

Borel and analytic sets in locales
Caltech logic seminar, October 2020.

Stone duality and strong conceptual completeness for infinitary logic
SIU Online logic seminar, July 2020.

Imaginary sorts and strong conceptual completeness for $\mathcal{L}_{\omega_1\omega}$
SEALS conference at the University of Florida, March 2020.

Polish groupoids and $\mathcal{L}_{\omega_1\omega}$-theories
Joint Mathematics Meetings, Denver, January 2020.

A universal characterization of standard Borel spaces
UCLA logic seminar, January 2020.

Polish groupoids and $\mathcal{L}_{\omega_1\omega}$-theories
UIC logic seminar, October 2019.

Stone duality for infinitary logic (plenary)
BLAST conference at the University of Colorado Boulder, May 2019.

Polish groupoids and continuous logic
UIUC logic seminar, April 2018.

Structurability by simplicial complexes
SEALS conference at the University of Florida, March 2018.

Strong conceptual completeness for $\mathcal{L}_{\omega_1\omega}$
UIUC logic seminar, October 2017.

Structurability by locally finite contractible simplicial complexes
UCLA logic seminar, October 2016.

Structurable equivalence relations
Logic in Southern California conference at UCLA, May 2016.

CONFERENCE & WORKSHOP PARTICIPATION	BIRS Workshop on Descriptive Set Theory and Smooth Dynamics, March 2022 (upcoming).
	Oberwolfach Workshop on Groups and Dynamics: Topology, Measure, and Borel Structure, January 2022 (upcoming).
	Dagstuhl Seminar on Descriptive Set Theory and Computable Topology, November 2021 (upcoming).
	ASL North American Meeting, June 2021.
	CMS Winter Meeting, December 2020.
	SEALS (South Eastern Logic Symposium), University of Florida, March 2020.

Joint Mathematics Meetings, Denver, January 2020.

Measurable, Borel, and Topological Dynamics, CIRM, October 2019.

Measurability, Ergodic Theory and Combinatorics, University of Warwick, July 2019.

BLAST (Boolean algebras, Lattices, universal Algebra, Set theory, and Topology), University of Colorado Boulder, May 2019.

VIG (Very Informal Gathering of Logicians), UCLA, February 2019, 2017, 2015.

SEALS (South Eastern Logic Symposium), University of Florida, March 2018.

Logic in Southern California, Caltech–UCI–UCLA, March 2018, May 2016, February 2016, November 2015, March 2015, November 2014.

TEACHING	Teaching at UIUC:

– Math 414 (Mathematical Logic), spring 2021 (online).
– Math 416 (Abstract Linear Algebra), spring 2021 (online).
– Math 347 Honors (Fundamental Mathematics), fall 2020 (online).
– Math 414 (Mathematical Logic), spring 2020 (half-online).
– Math 595 (Advanced Topics: Categorical Logic), fall 2019.
– Math 416 (Abstract Linear Algebra), fall 2019.
– Math 347 Honors (Fundamental Mathematics), spring 2019.
– Math 403 (Euclidean Geometry), fall 2018.

Teaching assistantships at Caltech:
– Ma1b (Linear Algebra), winter 2018 (head TA).
– Ma116a (Model Theory), fall 2017.
– Ma6c (Introduction to Mathematical Logic), spring 2017.
– Ma117a (Computability Theory), fall 2016.
– Ma1b (Linear Algebra), winter 2016.
– Ma116a (Model Theory), fall 2015.
– Ma144a (Probability), winter 2015.
– Ma1a (Calculus of One Variable), fall 2014.
– Ma2b (Introduction to Probability and Statistics), winter 2014.
– Ma2a (Differential Equations), fall 2013.

Teaching assistantships at UBC:
– CPSC121 (Models of Computation), summer 2010.

SERVICE   Supervised:
– Muthana Alshaikhmubarak (M.Sc. reading course), spring–summer 2020.

Refereeing for:
– Advances in Mathematics
– Israel Journal of Mathematics
– Journal of Symbolic Logic
– Fundamenta Mathematicae
– Topology Proceedings

Organizer of UIUC logic seminars, 2019–2020.

Organizer of McGill DDC seminars, 2021.

CITIZENSHIP   Canadian