Dan M. Ciubotaru

CONTACT INFORMATION

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ACADEMIC POSITIONS

September 2014– . Associate Professor, University of Oxford and Fellow of Somerville College.

July 2011–August 2014. Associate Professor, University of Utah.

July 2007–June 2011. Assistant Professor, University of Utah.

July 2004–June 2007. C.L.E. Moore Instructor, Massachusetts Institute of Technology.

Visiting Scholar: November 2013. Hong Kong University of Science and Technology; September 2013. Massachusetts Institute of Technology; May 2012. Hong Kong University of Science and Technology; August 2011 and June 2008. Max Planck Institute, Bonn.

EDUCATION

Cornell University, Ithaca, NY

- Ph.D., Department of Mathematics, August 2004
- Thesis: Unitary representations of split p-adic exceptional groups
- Advisor: Prof. Dan Barbasch

Babeş-Bolyai University, Cluj, Romania

- B.S. and M.A., Department of Mathematics and Computer Science, July 1998
- Advisor: Prof. Andrei Mărcuş

GRANTS AND AWARDS

NSF-DMS 1302122, 07/2013-08/2016, Standard Grant "Unitary representations of affine Hecke algebras and reductive p-adic groups", Principal Investigator.
NSA-AMS 111016, 07/2013–06/2015, Young Investigator Award "Dirac cohomology of unitary Hecke algebra modules", Principal Investigator.
NSF-DMS 0968065, 07/2010–06/2013, FRG collaborative grant "Atlas of Lie groups: Unitary representations", Senior Personnel.
NSA-AMS 081022, 01/2010–01/2012, Young Investigator Award "Unitary modules of affine Hecke algebras", Principal Investigator.
NSF-DMS 0554278 and 0532088, 07/2005-06/2009, FRG collaborative grant "Atlas of Lie groups and representations", Personnel (summer salary).

M.A. Oxford (2014), degree by resolution.
Faculty Undergraduate Teaching Award (2011), Department of Mathematics, University of Utah.
Graduate Student Teaching Award (2003), Department of Mathematics, Cornell University.

PAPERS

Preprints

1. Cocenters and representations of affine Hecke algebras, with X. He, arXiv:1409.0902, 31 pages, submitted.
2. Ladder representations of $GL(n, Q_p)$, with D. Barbasch, arXiv:1409.1367, 14 pages, submitted.
3. Hermitian forms for affine Hecke algebras, with D. Barbasch, arXiv:1312.3316, 40 pages.
4. Star operations for graded affine Hecke algebras, with D. Barbasch, 19 pages, submitted.
5. Green polynomials, elliptic pairings, and the extended Dirac operator, with X. He, arXiv:1303.6806, 40 pages, submitted.

6. The cocenter of graded affine Hecke algebra and the density theorem, with X. He, `arXiv:1208.0914`, 26 pages, submitted.

To appear

7. Formal degrees of unipotent discrete series representations and the exotic Fourier transform, with E. Opdam, `arXiv:1310.3546`, *Proc. London Math. Soc.*, 32 pages.

8. Dirac cohomology of one-W-type representations, with A. Moy, `arXiv:1208.4664`, *Proc. Amer. Math. Soc.*, 13 pages.

9. Special unipotent representations, with P. Trapa, in appendix to "Small representations, string instantons, and Fourier modes of Eisenstein series" by M. B. Green, S. D. Miller, and P. Vanhove, `arXiv:1111.2983`, *J. Number Theory*, 6 pages.

Published

10. Unitary Hecke modules with nonzero Dirac cohomology, with D. Barbasch, *Symmetry in Representation Theory and Its Applications: In honor of Nolan Wallach*, Progr. Math. Birkhäuser (2014), 1–21.

11. Algebraic and analytic Dirac induction for graded affine Hecke algebras, with E. Opdam and P. Trapa, *J. Inst. Math. Jussieu* **13** (2014), no. 3, 447–486.

12. Unitary equivalences for reductive p-adic groups, with D. Barbasch, *Amer. J. Math.* **135** (2013), no. 6, 1633–1674.

13. Characters of Springer representations on elliptic conjugacy classes, with P. Trapa, *Duke Math. J.* **162** (2013), no. 2, 201–223.

14. Dirac cohomology for graded affine Hecke algebras, with D. Barbasch and P. Trapa, *Acta Math.* **202** (2012), no. 2, 197–227.

15. Spin representations of Weyl groups and Springer's correspondence, *J. Reine Angew. Math.* **671** (2012), 199–222.

16. On characters and formal degrees for classical affine Hecke algebras, with M. Kato and S. Kato, *Invent. Math.* **187** no. 3 (2012), 589–635.

17. Duality for $GL(n, R)$, $GL(n, Q_p)$, and the degenerate affine Hecke algebra for $gl(n)$, with P. Trapa, *Amer. J. Math.* **134** (2012), 1–30.

18. Regular orbits of symmetric subgroups on partial flag varieties, with K. Nishiyama and P. Trapa, *Representation Theory, Complex Analysis, and Integral Geometry*, Birkhäuser (2012), 61–86.

19. Tempered modules in exotic Deligne-Langlands correspondence, with S. Kato, *Adv. Math.* **226**, issue 2 (2011), 1538–1590.

20. Functors for unitary representations of real classical groups and affine Hecke algebras, with P. Trapa, *Adv. Math.* **227** (2011), no. 4, 1585–1611.

21. Reducibility of generic unipotent standard modules, with D. Barbasch, *J. Lie Theory* **21** (2011), no. 4, 837–846.

22. Ramanujan bigraphs arising from p-adic $SU(3)$, with C. Ballantine, *Proc. Amer. Math. Soc.* **139** (2011), no. 6, 1939–1953.

23. Whittaker unitary dual for affine graded Hecke algebras of type E, with D. Barbasch, *Compositio Math.* **145**, issue 6 (2009), 1563–1616.

24. On unitary unipotent representations of p-adic groups and affine Hecke algebras with unequal parameters, *Represent. Theory* **12** (2008), 453–498.

25. Multiplicity matrices for the affine graded Hecke algebra, *J. Algebra* **320** (2008), 3950–3983.

26. Unitarizable minimal principal series of reductive groups, with D. Barbasch and A. Pantano, *Contemp. Math.*, **472**, Amer. Math. Soc., 2008, 63–136.

27. Unitary I-spherical representations for split p-adic E_6, *Represent. Theory* **10** (2006), 435–480.

28. Spherical unitary principal series, with D. Barbasch, *Pure Appl. Math. Q.* **1** (2005), no. 4, 755–789.

29. The unitary I-spherical dual of split p-adic F_4, *Represent. Theory* **9** (2005), 94–137.

Teaching Experience

University of Oxford
Lie algebras.

University of Utah
Modern Algebra I, Modern Algebra II, Topics in Representation Theory, Graduate Complex Analysis, Foundations of Analysis I, Foundations of Analysis II, Multivariable Calculus, Discrete Mathematics, Trigonometry, Business Algebra.

Massachusetts Institute of Technology
Analysis I (published by MIT OpenCourseWare), Mathematical Methods for Engineering I, Linear Algebra (published by MIT OpenCourseWare), Seminar in Analysis (Applications to number theory), Calculus I.

Cornell University
Calculus for Engineers, Calculus I, Calculus II.

Selected Talks

Conferences, Workshops

- Representations of reductive groups, a conference dedicated to David Vogan on his 60th birthday, Boston, May 2014.
- Spring school: Representation theory and geometry of reductive groups (5 lectures), Heiligkreuztal, Germany, March 2014.
- Whittaker functions: number theory, geometry, physics, workshop B.I.R.S., Banff, Canada, October 2013.
- Representations of reductive groups, Salt Lake City, July 2013.
- Representation Theory XIII, Dubrovnik, Croatia, June 2013.
- Special session on Noncommutative rings, International Joint Meeting A.M.S.-R.M.S., Alba-Iulia, Romania, June 2013.
- Algebraic groups and Representation theory, a conference in the memory of T. A. Springer, Hong Kong, January 2013.
- Representations des groupes reductifs p-adiques, Ile de Porquerolles, France, June 2012.
- Texas-Oklahoma Representations and Automorphic forms II, Stillwater, OK, April 2012.
- Special session on New Trends in Representation theory, A.M.S. National Meeting, Boston, MA, January 2012.
- Analysis on Lie groups, Max Planck Institut of Mathematics, Bonn, Germany, August 2011.
- Double Affine Hecke Algebras and the Langlands Program, CIRM Luminy, France, June 2011.
- International Workshop on Representation Theory and Harmonic Analysis, Nankai University, Tianjin, China, June 2011.
- Workshop on structure and representations of exceptional groups, Banff, Canada, July 2010.
- Representations des groupes reductifs p-adiques, Ile de Porquerolles, France, June 2010.
- Special session on Hecke algebras and deformations on geometry and topology, A.M.S. Sectional Meeting, St. Paul, MN, April 2010.
- Workshop on nilpotent orbits and representation theory, Hokkaido University, Sapporo, February 2010.
- Special session on Lie groups and automorphic forms, Canadian Mathematical Society winter meeting, Windsor, ON, December 2009.

- Representation theory of real reductive groups, Salt Lake City, July 2009.
- Functional Analysis XI, Dubrovnik, Croatia, June 2009.
- Functional Analysis X, Dubrovnik, Croatia, July 2008.
- Atlas of Lie groups and representations I–VI, American Mathematics Institute, Palo Alto, CA, 2003–2008.
- Workshop in representation theory and geometry, Tambara seminar house, University of Tokyo, August 2007.
- 6-th Congress of Romanian mathematicians, Bucharest, June 2007.
- Special session on representation theory and the theta correspondence, A.M.S. National Meeting, New Orleans, LA, January 2007.
- Representation theory of real reductive groups, Snowbird, June 2006.
- Special session on algebraic groups, A.M.S. Sectional Meeting, Durham, NH, April 2006.
- Special session on representation theory of reductive groups, A.M.S. Sectional Meeting, Evanston, IL, October 2004.

Colloquia, Seminars

- Korteweg-de Vries Institute for Mathematics, University of Amsterdam, July 2014, October 2013.
- Mathematical Institute, University of Oxford, February 2014.
- Northeastern University, January 2014.
- Boston College, Algebraic geometry and number theory seminar, September 2013.
- MIT, Lie groups seminar, September 2013 (2 talks), December 2011, May 2007, May 2006, February 2005, October 2004, September 2004.
- University of Utah, Representation theory seminar, November 2012, February 2012, September 2010, November 2008, September 2007, January 2007, April 2006.
- University of Hong Kong, Colloquium, May 2012.
- Hong Kong University of Science and Technology, Lie groups seminar, 3 talks, May 2012.
- Université Blaise Pascal, Clermont-Ferrand, France, Seminar in Pure Math, June 2011.
- University of Notre Dame, Colloquium and Lie Theory seminar, October 2010.
- Kyoto University, Number Theory seminar, February 2010.
- Babeş-Bolyai University, Romania, Algebra seminar, July 2009, June 2009.
- Idaho State University, Colloquium, February 2008.
- University of Utah, Colloquium, January 2007.
- University of British Columbia, Colloquium and Algebra seminar, January 2007.
- University of Massachusetts, Amherst, Representation theory seminar, April 2005.
- University of Maryland, College Park, Lie groups and representation theory, November 2004.
- Joint Princeton University/IAS Number Theory Seminar, March 2004.
- Rutgers University, New Brunswick, Lie Groups Seminar, October 2003.
- Cornell Lie Groups Seminar, November 2002.