Curriculum Vitae for Simon Marshall

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Research Interests

Number theory and harmonic analysis on Lie groups.

Education

- Princeton University, PhD in mathematics under Peter Sarnak, June 2010.
- The University of Auckland, BSc (Hons) in mathematics, May 2006.

Appointments

- Associate Professor, University of Wisconsin–Madison, 2020–present.
- Member, Institute for Advanced Study, 2017–2018.
- Member, MSRI, Spring 2017.
- Assistant Professor, University of Wisconsin–Madison, 2014–2020.
- Boas Assistant Professor, Northwestern University, 2011–2014.
- Member, Institute for Advanced Study, 2010–2011.

Awards

- NSF Grant DMS-1902173, June 2019–May 2023.
- UW Madison Fall Competition award, July 2019–June 2020.
- UW Madison Fall Competition award, July 2018–June 2019.
- NSF Grant DMS-1501230, July 2015–June 2018.
- NSF Grant DMS-1509331, August 2014–June 2017.
- NSF Grant DMS-1201321, July 2012–December 2014.
- AMS-Simons Travel Grant, July 2011–June 2012.
- Princeton University Centennial Fellowship.
- International Mathematics Olympiad silver and gold medals, 2001 and 2002.

Publications

1. Appendix to *Asymptotic trace formula for the Hecke operators*, by Junehyuk Jung and Naser Sardari, Math. Annalen (2020), https://doi.org/10.1007/s00208-020-02054-w. 4 pages.
2. *Lower bounds for Maass forms on semisimple groups* (with F. Brumley), Compos. Math. 156 no. 5 (2020), 959-1003. https://doi.org/10.1112/S0010437X20007125.
3. *Bounds for the number of cohomological automorphic representations of $GL_3/\mathbb{Q}$ in the weight aspect*, IMRN (2020), https://doi.org/10.1093/imrn/rnaa048. 13 pages.

4. *Endoscopy and cohomology in a tower of congruence manifolds for $U(n,1)$* (with Sug Woo Shin), Forum Math. Sigma (2019), vol. 7, e19, 49 pages, doi:10.1017/fms.2019.13.
5. *On the number of harmonic frames* (with S. Waldron), Appl. and Comp. Harm. Ann. (2018), 22 pages, https://doi.org/10.1016/j.acha.2018.02.004
6. *Endoscopy and cohomology of a quasi-split $U(4)$*. In Families of Automorphic Forms and the Trace Formula, Simons Symposia, 297-325. Springer (2016). DOI 10.1007/978-3-319-41424-9.
7. *Local bounds for L^p norms of Maass forms in the level aspect*, Algebra and Number Theory 10 no. 3 (2016), 803-812, DOI: 10.2140/ant.2016.10.803.
8. *L^p norms of higher rank eigenfunctions and bounds for spherical functions*, J. Eur. Math. Soc. 18 issue 7 (2016), 1437-1493, DOI: 10.4171/JEMS/619.
9. *Geodesic restrictions of arithmetic eigenfunctions*, Duke Math. J. 165 no. 3 (2016), 463-508.
10. *Restrictions of SL_3 Maass forms to maximal flat subspaces*, IMRN 2015 no. 16 (2015), 6988-7015, doi:10.1093/imrn/rnu155.
11. *Upper bounds for Maass forms on semisimple groups*, 51 pages, preprint available at arXiv:1405.7033.
12. *Endoscopy and cohomology growth on $U(3)$*, Compositio Math. 150 (2014), 903-910. Available on CJO2014 doi: 10.1112/S0010437X13007720.
13. *Triple product L-functions and quantum chaos on $SL(2,\mathbb{C})$*, Israel J. Math. 200 (2014), 423-448, doi: 10.1007/s11856-014-1044-9.
14. *On the torsion in the cohomology of arithmetic hyperbolic 3-manifolds* (with W. Müller), Duke Math. J. 162 no. 5 (2013), 863-888.
15. *Theta lifting and cohomology growth in p-adic towers* (with M. Cossutta), IMRN 2013 no. 11 (2013), 2601-2623, doi: 10.1093/imrn/rns139.
16. *Zero repulsion in families of elliptic curve L-functions and an observation of S. J. Miller*, BLMS 45 no. 1 (2013), 80-88, doi: 10.1112/blms/bds063.
17. *Bounds for multiplicities of automorphic forms of cohomological type on GL_2*, Ann. of Math. 175 no. 3 (2012), 1629-1651.
18. *Erratum to "Mass equidistribution for automorphic forms of cohomological type on GL_2"*, J. Amer. Math. Soc. 25 (2012), 615-616.
19. *Mass equidistribution for automorphic forms of cohomological type on GL_2*, J. Amer. Math. Soc. 24 (2011), 1051-1103.
20. *Eigenvalues of schroedinger operators with potential asymptotically homogeneous of degree -2* (with A. Hassell), Trans. AMS 360 (2008), 4145-4167.
21. *Another simple proof of the high girth, high chromatic number theorem*, Amer. Math. Monthly 115 no. 1 (2008), 68-70.
22. *On the existence of extremal cones and comparative probability orderings*, J. Math. Psych. 51 no. 5 (2007), 319-324.
23. *Orders on multisets and discrete cones* (with M.D.E. Conder and A. Slinko), Order 24 no. 4 (2007), 277-296.

Invited Talks

"Holomorphic QUE for Hilbert modular varieties"

- Ohio State University, November 2009.
- Texas A&M, November 2009.
- Princeton University, April 2010.
- Stellenbosch University, July 2010.

"On the multiplicities of cohomological automorphic forms on GL_2"

- The University of Georgia, September 2010.
- The University of Texas at Austin, October 2010.
- Stanford University, October 2010.
- Northwestern University, January 2012.
- The University of Chicago, March 2012.
- The University of Michigan, April 2012.
- BIRS, June 2012.
- Joint Regensburg-Munich number theory seminar, July 2012.
- The University of Wisconsin, September 2012.
- The University of Illinois at Chicago, January 2013.
- MIT, April 2013.
- Boston College, April 2013.
- Caltech, May 2013.

"L^p norms of higher rank eigenfunctions and asymptotics of spherical functions"

- Stanford University, February 2012.
- Princeton University, March 2012.
- The University of Göttingen, July 2012.
- The University of Auckland, August 2013.
- The University of Melbourne, August 2013.
- The University of Sydney, August 2013.
- The University of Wisconsin, September 2013.
- UCLA, November 2013.
- Purdue, November 2013.
- Waterloo, November 2013.
- The University of Illinois at Chicago, December 2013.
- Rutgers, December 2013.
- The University of Maryland, December 2013.
- The University of Toronto, January 2014.
- UC Santa Cruz, January 2014.
- Cambridge University, February 2014.

"Endoscopy and cohomology growth on $U(3)$"

- The University of Minnesota, September 2012.
- Northwestern University, January 2013.
- UCLA, May 2013.
- The University of Wisconsin, September 2013.
- The University of Chicago, October 2013.
- The Erwin Schrödinger Institute, Vienna, October 2013.

"Geodesic restrictions of arithmetic eigenfunctions"

- Northwestern University, November 2012.

"Amplification of semiclassical periods and subconvexity"

- UCLA, November 2013.

"Bounds for arithmetic eigenfunctions"

- Duke, March 2014.
- Berkeley, April 2015.
- Göttingen, July 2015.
- The University of Chicago, March 2016.
- Columbia, March 2016.
- Princeton / IAS joint number theory seminar, March 2016.
- The University of Auckland, August 2016.
- Purdue, September 2016.
- MSRI, March 2017.
- Stony Brook (colloquium), November 2017.
- UIUC, November 2018.

"Endoscopy and cohomology growth on $U(n,1)$"

- Caltech, April 2017
- UCLA, April 2017
- Stanford, May 2017
- The Hebrew University of Jerusalem, June 2017

"The subconvexity problem"

- IAS, March 2018
- The University of Auckland, May 2018
- Northwestern, October 2019
- UIC, November 2019

"Counting cusp forms on GL_3"

- University of Chicago, October 2019
- Ohio State University / online, September 2020

"Large values of eigenfunctions on hyperbolic manifolds"

- University of Auckland, August 2021 (canceled 24 hours before talk due to covid lockdown).
- Purdue / online, November 2021.
- Johns Hopkins / online, February 2022.

Conferences Attended as a Speaker

- Princeton workshop on quantum chaos: arithmetic and dynamics, Princeton, April 2010.
- Torsion in the homology of arithmetic groups: geometry, arithmetic, and computation, BIRS, July 1–6, 2012.
- AMS spring eastern sectional meeting, special section on homology and cohomology of arithemtic groups, Boston College, April 6–7, 2013.
- p-adic modular forms, L-functions, and Galois representations, UCLA, May 10–12, 2013.
- Advances in the theory of automorphic forms and their L-functions, The Erwin Schrödinger Institute, Vienna, October 16–25, 2013.
- Simons Symposium on families of automorphic forms and the trace formula, Rio Grande, Puerto Rico, January 26–February 1, 2014.
- Summer school on eigenfunction estimates and related topics, University of Marburg, July 7–10, 2015.
- Oberwolfach workshop on Harmonic Analysis and the Trace Formula, Oberwolfach, May 22–26, 2017.
- Oberwolfach workshop on Automorphic Forms and Arithmetic, Oberwolfach, September 3–9, 2017.
- Workshop on Representation Theory and Analysis on Locally Symmetric Spaces, IAS, March 5–9, 2018.
- Pop-up conference in number theory, UIC, November 2–4, 2018.
- Crosscurrents in Number Theory, Analysis and Geometry, Paris 13, March 21–22, 2019.
- Workshop on Harmonic Analysis and Lie Group Representations, Tianyuan Mathematical Center in Southeast China, August 5–9, 2019.

Conferences Organized

- AMS special session on Automorphic Forms and L-functions, AMS central sectional meeting, University of Wisconsin-Madison, September 14–15, 2019.
- Special session on Equidistribution on Arithmetic Manifolds, CMS winter meeting, Montreal/online, December 3–8, 2020.
- Conference on Harmonic Analysis and Symmetric Spaces, online, October 27–29, 2021.

Departmental Service

Current: Undergraduate scholarships and prizes committee (co-chair), graduate advising (continuing), TA evaluation, policies and procedures committee, library renovation committee, faculty senate.

Previous: Library committee (chair), library renovation committee, awards committee, colloquium organizer, honors advising, graduate advising, conferences and special lectures committee, Putnam club.

Students Advised

Graduated: Xiaocheng Li, 2021 (Postdoc at Beijing International Center for Mathematical Research, Peking University).

Current: Phillip Harris, Jiaqi Hou, Amin Idelhaj, Yunus Tuncbilek.

Teaching Experience

University of Wisconsin–Madison:

- MATH 749, Analytic number theory, fall 2021.
- MATH 849, Automorphic forms, spring 2021.
- MATH 341: Linear algebra, spring 2021.
- MATH 340: Elementary linear algebra, fall 2020.
- MATH 222: Calculus II, fall 2019.
- MATH 845: Class field theory, spring 2019.
- MATH 725: Real analysis II, spring 2019.
- MATH 221: Calculus I, fall 2018.
- MATH 221: Calculus I, fall 2016.
- MATH 222: Calculus II, spring 2016.
- MATH 521: Analysis I, fall 2015.
- MATH 721: Real analysis I, fall 2015.
- MATH 867: Analytic number theory, spring 2015.
- MATH 521: Analysis I, fall 2014.
- MATH 721: Real analysis I, fall 2014.
- Assistant coach, UW Madison Putnam team, fall 2014.

Northwestern University:

- MAT 230: Multivariable calculus. Instructor, spring 2014.
- MAT 336-2: Introduction to number theory. Course head and instructor, spring 2014.
- MAT 351: Fourier analysis and boundary value problems. Course head and instructor, fall 2013.
- MAT 224: Integral calculus. Course head and instructor, spring and fall 2013.
- MAT 336-1: Introduction to number theory. Instructor, winter 2013.
- MAT 224: Integral calculus. Instructor, fall 2012.
- MAT 482: Introduction to modular forms. Instructor, spring 2012.
- MAT 230: Multivariable calculus. Instructor, winter 2012.
- MAT 220: Differential calculus. Instructor, fall 2011.

Princeton University:

- MAT 103: Introduction to calculus. Course head and instructor, Freshman Scholar's Institute, summer 2009.
- MAT 104: Introduction to calculus. Instructor, spring 2008.
- Assistant coach, Princeton Putnam team, fall 2007.

Mathematics Olympiad:

- Deputy leader, New Zealand International Mathematical Olympiad team, 2004 and 2005.