

Curriculum Vitae (Sug Woo Shin)

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Education

- Ph.D., Mathematics, Harvard University, Sep 2002–Jun 2007
Thesis: Counting points on Igusa varieties, supervised by Richard Taylor
- B. Sc., Mathematics, Seoul National University, Mar 1997–Feb 2000
(Military service, May 2000–Jul 2002)

Position

- Professor, UC Berkely, Jul 2020–present
(Miller Professor, UC Berkeley/Miller Institute, Jan–Dec 2021)
- Associate Professor, UC Berkeley, Jul 2014–Jun 2020
- Assistant Professor, MIT, Jul 2011–Jun 2014
- Member, Institute for Advanced Study, Sep 2010–Jun 2011
- Dickson Instructor, University of Chicago, Jan 2009–Aug 2010
- Member, Institute for Advanced Study, Sep 2007–Dec 2008

Visiting Position

- KIAS scholar, Korea Institute for Advanced Study, 2011–present
- Associate member, Pohang Mathematics Institute, 2011–present

Research Interests

number theory, Langlands program, Shimura varieties, automorphic forms, trace formula

Fellowships/Awards/Grants

- NSF grant DMS-1802039, 2018–2021
- France–Berkeley grant, 2017–2019 (PIs: Stefano Morra and S. W. Shin)
- RTG grant DMS-1646385 (PI: Martin Olsson, co-PIs: S. W. Shin and Xinyi Yuan), 2017–2022
- NSF grant DMS-1501882, 2015–2018
- Sloan Fellowship, 2013–2017
- NSF grant DMS-1162250/1449558, 2012–2015
- MIT NEC Research funds (competitive internal fellowship), 2011–2013
- Clay Math Institute Liftoff Fellowship, 2007
- Harvard Merit Fellowship, 2006–2007
- Samsung Scholarship for graduate studies, 2003–2006
- International Mathematical Olympiad (2 golds, 1 bronze), 1994–1996

Publication

- (1) (with Arno Kret) H^0 of Igusa varieties via automorphic forms, preprint
- (2) (with Arno Kret) Galois representations for even general special orthogonal groups, preprint
- (3) (with Jessica Fintzen) Congruences of algebraic automorphic forms and supercuspidal representations, preprint
- (4) Appendix: “Base change” (*appendix* to “On the existence of admissible supersingular representations of p-adic reductive groups” by Florian Herzig, Karol Koziol, and Marie-France Vigneras), to appear in Forum Math. Sigma.
- (5) (with Mark Kisin and Keerthi Madapusi Pera) Honda–Tate theory for Shimura varieties, preprint
- (6) (with Simon Marshall) Endoscopy and cohomology of $U(n, 1)$, to appear in Forum Math. Sigma.
- (7) (with Julee Kim and Nicolas Templier) “Asymptotic behavior of supercuspidal representations and Sato-Tate equidistribution for families”, to appear in Adv. Math.
- (8) (with Ana Caraiani, Matthew Emerton, Toby Gee, David Geraghty, and Vytautas Paškūnas) “Patching and the p-adic Langlands program for $GL(2, \mathbb{Q}_p)$ ”, Compos. Math. 154 (2018), no. 3, 503–548
- (9) (with Arno Kret) “Galois representations for general symplectic groups”, to appear in J. Eur. Math. Soc.

- (10) (with Julee Kim and Nicolas Templier) “Asymptotics and local constancy of characters of p -adic groups”, Families of automorphic forms and the trace formula, Simons Symposia Proceedings (2016), 259–295
- (11) (with Tasho Kaletha, Alberto Minguez, and Paul-James White) “Endoscopic classification of representations: inner forms of unitary groups”, 220 pages, preprint (2014)
- (12) (with Peter Sarnak and Nicolas Templier) “Families of L -functions and their symmetry”, Families of automorphic forms and the trace formula, Simons Symposia Proceedings (2016), 531–578
- (13) (with Ana Caraiani, Matthew Emerton, Toby Gee, David Geraghty, and Vytautas Paškūnas) “Patching and the p -adic Langlands correspondence”, Camb. J. Math. 4 (2016), no.2, 197–287
- (14) (with Sara Arias-de-Reyna, Luis Dieulefait, and Gabor Wiese) “Compatible systems of symplectic Galois representations and the inverse Galois problem III. Automorphic construction of compatible systems with suitable local properties”, Math. Ann. 361 (2015), no.3, 909–925
- (15) (with Junehyuk Jung) “More examples” (*appendix* to On sparsity of positive-definite automorphic forms in a family by Junehyuk Jung), J. Analyse Math. 129 (2016), no.1, 105–138
- (16) (with Nicolas Templier) “On fields of rationality for automorphic representations”, Compositio Math. 150 (2014), no.12, 2003–2053
- (17) (with Nicolas Templier) “Sato-Tate theorem for families and low-lying zeros of automorphic L -functions” (with Appendix A by R. Kottwitz and Appendix B by R. Cluckers, J. Gordon and I. Halupczok), Invent. Math. 203 (2016), no. 1, 1–177
- (18) “Supercuspidal part of the mod l cohomology of $GU(1, n - 1)$ -Shimura varieties”, J. Reine Angew. Math. 705 (2015), 1–21
- (19) (with Peter Scholze) “On the cohomology of compact unitary group Shimura varieties at ramified split places”, J. Amer. Math. Soc. 26 (2013), no.1, 261–294
- (20) Appendix: “On the cohomological base change for unitary similitude groups” (*appendix* to the paper “Galois representations associated to holomorphic limits of discrete series I: Unitary Groups” by Wushi Goldring), Compositio Math. 150 (2014), no.2, 191–228
- (21) “Geometric reductive dual pairs and a mod p theta correspondence”, 16 pages, preprint (2011)
- (22) “Abelian varieties and the Weil representations”, Algebra and Number Theory 6 (2012), no.8, 1719–1772
- (23) “Automorphic Plancherel density theorem”, Israel J. Math. 192 (2012), no.1, 83–120
- (24) “Construction of Galois representations” (survey paper), to appear in Book Shimura Varieties (edited by Haines and M. Harris)
- (25) “On the cohomology of Rapoport-Zink spaces of EL-type”, Amer. J. Math 134 (2012), no.2, 407–452
- (26) “Galois representations arising from some compact Shimura varieties”, Ann. of Math. 173 (2011), no.3, 1645–1741
- (27) “Stable trace formula for Igusa varieties”, J. Inst. Math. Jussieu 9 (2010), no.4, 847–895.
- (28) “Counting points on Igusa varieties”, Duke Math. J. 146 (2009), no.3, 509–568.

Conferences, Workshops, Schools, and Research Groups I have co-organized

- AIM Square: On mod p and p -adic Langlands functorialities, Aug 5–9, 2019
- Intensive lecture series on Logarithmic Riemann-Hilbert correspondences for rigid varieties and applications to Shimura varieties, KIAS, Aug 5–9, 2018
- Simons Symposium: Relative trace formula, Apr 23–27, 2018
- Oberwolfach workshop: Harmonic analysis and the trace formula, May 21–27, 2017
- The Langlands correspondence in arithmetic and geometry, KIAS, Aug 1–5, 2016
- Simons Symposium: Geometric aspects of the trace formula, Apr 10–16, 2016
- AIM Square: The p -adic Langlands Program for non-split groups 3, Sep 13–17, 2015
- AMS Summer Institute in Algebraic Geometry, session co-organizer, Jul 22–27, 2015
- HIM Research in Groups: Families of automorphic forms and the trace formula 2, Jul 5–Jul 17, 2015
- Banff 5-day half workshop: Families of Automorphic Forms and the Trace Formula, Nov 30–Dec 5, 2014
- AIM Square: The p -adic Langlands Program for non-split groups 2, Sep 22–26, 2014
- HIM Research in Groups: Families of automorphic forms and the trace formula, Jun 22–Jul 5, 2014
- Simons Symposium: Families of Automorphic Forms and the Trace Formula, Puerto Rico, Jan 26–Feb 1, 2014
- KIAS intensive lecture series on Shimura varieties and Rapoport-Zink spaces, Jan 13–16, 2014
- AIM Square: The p -adic Langlands Program for non-split groups 1, Jul 15–19, 2013
- Workshop on Modular Forms and Galois Representations, KIAS, Jan 2013
- Banff FRG: The p -adic Langlands Program for non-split groups, Aug 2012
- 2012 Conference on L -functions, Shineville Resort, Jeju island, Aug 2012
- Cohomology of Shimura varieties: Arithmetic Aspects and the Construction of Galois representations, Fields Institute, Mar 2012
- Rigid Geometry and the Local Langlands Correspondence, KIAS, Jan 2–5, 2012

- Theta Festival, Postech, South Korea, Aug 13–19, 2011
- Congruences of modular forms and Galois representations (summer school), Postech, South Korea, Jul 18–30, 2010

International Workshops and Conferences attended as a speaker

- Automorphic forms, automorphic representations, Galois representations, and its related topics, RIMS, Jan 25–29, 2021
- Berkeley-Tokyo lectures on Number Theory, U of Tokyo, Jan 11-1-14, 2021
- The 2020 Paul J. Sally, Jr. Midwest Representation Theory Conference, online, Oct 16–18, 2020
- KIAS Workshop on Combinatorial Problems of Algebraic Origin, KIAS, Jul 14–15, 2020
- BIRS-CMO workshop on Modularity and Moduli Spaces, Oaxaca, Oct 21–25, 2019
- International Workshop on Arithmetic Geometry and Quantum Field Theory, KIAS, Aug 12–16, 2019
- Padova school on Serre conjectures and the p-adic Langlands program, Padova, May 27–Jun 14, 2019
- Conference on Arithmetic Geometry in honor of Rapoport's 71st birthday, Beijing, Mar 18–22, 2019
- On the Langlands Program: Endoscopy and Beyond, NUS, Jan 7-11, 2019
- p-adic Langlands correspondence, Shimura varieties and perfectoids, Luminy, Jul 2–6, 2018
- Intensive lectures on the Langlands–Rapoport conjecture (10 hour lectures), U Tokyo, May 7–11, 2018
- Arithmetic Geometry and Related Topics, Matsuyama, Japan, Nov 20–22, 2017
- Workshop on Shimura varieties, representation theory and related topics, Kyoto, Japan, Nov 21–25, 2016
- The Asian Mathematical Conference (plenary speaker), Bali, Indonesia, Jul 25–29, 2016
- 2016 Seoul-Tokyo Conference on Number Theory, KIAS, Jun 16–17, 2016
- 2016 AS-NCTS Workshop on Shimura Varieties and Related Topics, Taipei, May 30–Jun 3, 2016
- Workshop on New Developments in Representation Theory, NUS Singapore, Mar 14-25, 2016
- Motives and Automorphic Forms, Oxford, Sep 28-Oct 2, 2015
- AMS Summer Institute in Algebraic Geometry, Utah, Jul 22-27 (3rd week), 2015
- Arithmetic geometry, representation theory and applications, Luminy, Jun 22-26, 2015
- Arithmetic geometry and automorphic representations (workshop II), Vienna, May 6-22, 2015
- p-adic methods in the theory of classical automorphic forms, Montreal, Mar 9-14, 2015
- 2014 Pan Asian Number Theory Conference (ICM satellite), Postech (S. Korea), Aug 5-9, 2014
- The Bellairs workshop in Number Theory: The cohomology of arithmetic groups and the Langlands program, Barbados, May 2-9, 2014
- Simons Symposium: Families of Automorphic Forms and the Trace Formula, Puerto Rico, Jan 26-Feb 1, 2014
- The 4th conference of Tsinghua Sanya international mathematics forum, Sanya, Dec 17-22, 2013
- Conference on arithmetic algebraic geometry, Paderborn, Oct 7-11, 2013
- Modular Representation Theory of Finite and p-adic Groups, IMS (Singapore), Apr 1-26, 2013
- Arithmetic geometry of Shimura varieties, representation theory, and related topics, Hokkaido Univ, Jul 18-22, 2012
- Arithmetic geometry of orthogonal and unitary Shimura varieties, BIRS, Jun 3-8, 2012
- Cohomology of Shimura varieties: Arithmetic Aspects and the Construction of Galois representations, Fields Institute, Mar 19-23, 2012 (speaker/co-organizer)
- Automorphic Forms: Arithmetic and Geometry, ESI, Jan-Feb, 2012
- Rigid Geometry and the Local Langlands Correspondence, KIAS, Jan 2-5, 2012 (speaker/co-organizer)
- Palmetto Number Theory Series XVII, Clemson, Dec 3-4, 2011
- Theta Festival, Postech, South Korea, Aug 13-19, 2011 (speaker/co-organizer)
- Durham Symposium - Automorphic forms and Galois representations, Durham Univ, Jul 18-28, 2011
- Workshop on the arithmetic geometry of Shimura varieties and Rapoport-Zink spaces, Kyoto Univ, Japan, Jul 4-8, 2011
- FRG/RTG Workshop on L-functions, Galois Representations and Iwasawa theory, U of Michigan, May 17-22, 2011
- Automorphic forms: New directions, Oberwolfach, Mar 6-12, 2011
- The 2nd Pan Asian Number Theory Conference, RIMS, Kyoto, Sep 13-17, 2010
- Congruences of modular forms and Galois representations (summer school), Postech, South Korea, Jul 18-30, 2010 (speaker/co-organizer)
- Workshop on Arithmetic Geometry and Related Topics, National Taiwan Univ, Taipei, Jul 12-16, 2010
- Southern California Number Theory Day, UCSD, Mar 6, 2010
- Workshop on Arithmetic Geometry in Kanazawa, Japan, Nov 24-28, 2009
- Midwest Number Theory Day, Univ of Wisconsin, Madison, Nov 6, 2009
- Workshop on Automorphic Representations, Geometry, and Arithmetic, Taipei, Jul 21-24, 2009

- Clay Summer School on Galois Representations, Hawaii, Jun 15-Jul 10, 2009
- Workshop on Shimura Varieties, Automorphic Representations and Related Topics, Kyoto, Japan, Nov 25-28, 2008
- The stable trace formula, automorphic forms, and Galois representations (summer school/workshop), Banff, Canada, Aug 10-22, 2008
- Current developments and directions in the Langlands program, Northwestern Univ., May 10-14, 2008
- Asian conference in Arithmetic Geometry, KIAS, South Korea, Sep 15-19, 2007
- France-Japan conference on Automorphic Endoscopy, Luminy, France, Jun 11-15, 2007
- Mini-workshop on Automorphic Representations and Shimura Varieties, Kyoto, Japan, May 30-31, 2007

PhD advising

- John Binder, MIT, PhD 2016
- Alex Youcis, UC Berkeley, PhD 2019
- Alexander Bertoloni Meli, UC Berkeley, PhD 2020
- Rahul Dalal, current, UC Berkeley
- Ian Gleason, current, UC Berkeley
- Sander Mack-Crane, current, UC Berkeley
- Zixin Jiang, current, UC Berkeley
- Dong Gyu Lim, current, UC Berkeley
- See Woo Lee, UC Berkeley (away for military service)
- Thomas Browning, current, UC Berkeley

Postdoctoral mentoring

- Nahid Walji (visited from U. of Zurich), UC Berkeley, 2014–2015
- Koji Shimizu (Morrey postdoc), UC Berkeley, 2018–2022 (away 2019–2020)

Editorial Work

- Journal of the Korean Mathematical Society, 2016–present
- Manuscripta Mathematica, 2019–present

As of January 2021