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 Berkeley, Jul 2020–present
- 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

Research Interests

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

Selected Fellowships/Awards/Grants/Honors

- Simons Fellowship, 2023–2024
- ICM invited speaker, 2022
- Miller Professorship, 2021
- NSF grants DMS-2101688/1802039/1501882/1449558/1162250, 2012–2024
- France–Berkeley grant, 2017–2019 (PIs: S. Morra and S. W. Shin)
- RTG grant DMS-1646385 (PI: M. Olsson, co-PIs: S. W. Shin, X. Yuan), 2017–2024
- Sloan Fellowship, 2013–2017
- Clay Math Institute Liftoff Fellowship, 2007
- Harvard Merit Fellowship, 2006–2007

PhD advising

6 PhDs completed, 9 current students:

- Rahul Dalal, Ian Gleason, and Sander Mack-Crane, UC Berkeley, PhD 2021
- Alexander Bertoloni Meli, UC Berkeley, PhD 2020
- Alex Youcis, UC Berkeley, PhD 2019
- John Binder, MIT, PhD 2016
- Thomas Browning, CJ Dowd, Sean Gonzales, Connor Halleck-Dube, Zixin Jiang, See Woo Lee, Dong Gyu Lim, Rose Lopez, Alan Peng (current students)

Undergraduate theses and research/reading courses

- Javier Lopez-Contreras, Fall 2022–Spring 2023 (visiting student from Spain)
- Austin Lei, Fall 2022 (Math 196)
- Nir Elber, Haydn Gwyn, Ausin Lei, Spring 2022 (Math 199)
- Nathan Kenshur, Fall 2020–Spring 2021 (Math 199)
- Sequoia Snow, Spring 2020 (Math 196)
- Xiaoyu Niu, Fall 2019 (Haas Scholarship mentor)
- Vin Yi, Fall 2018 (Math 196)
- Nikolay Grantcharov, Sung Hyup Lee, Sameera Vemulapalli, Spring 2017 (Math 199)
- Rachel Lee, Fall 2016

Postdoctoral mentoring

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

Editorial Work

- Astérisque, 2021–present
- Manuscripta Mathematica, 2019–present
- Journal of the Korean Mathematical Society, 2016–present

Publication

(1) Counting points on Igusa varieties of Hodge type, with Sander Mack-Crane, preprint

(2) Recent progress on Langlands reciprocity for GL(n): Shimura varieties and beyond, with Ana Caraiani, preprint (2023 IHES summer school proceedings)

(3) Weak transfer from classical groups to general linear groups, submitted

(4) The stable trace formula for Igusa varieties II, with A. Bertoloni Meli, preprint

(5) The stable trace formula for Shimura varieties of abelian type, with M. Kisin and Y. Zhu, to appear in *Annals of Math. Studies*

(6) Points on Shimura varieties modulo primes. Proc. Int. Cong. Math. 2022, Vol. 3 (2023), pp. 1966–1988. EMS Press, Berlin

(7) Cohomology of Igusa curves - a survey, RIMS Kokyuroku 2204 (2021), pp.166–176

(8) H^0 of Igusa varieties via automorphic forms, with A. Kret, J. Ecole Polytech. Math. 10 (2023), 1299–1390

(9) Galois representations for even general special orthogonal groups, with A. Kret, to appear in *J. Inst. Math. Jussieu*

(10) Congruences of algebraic automorphic forms and supercuspidal representations, with Jessica Fintzen, *Camb. J. Math.* 9 (2021), no.2, 351–429

(11) Base change (appendix to "On the existence of admissible supersingular representations of p-adic reductive groups" by F. Herzig, K. Koziol, and M.-F. Vigneras), *Forum of Math. Sigma* 8 (2020), e2

(12) Honda–Tate theory for Shimura varieties, with M. Kisin and K. Madapusi Pera, *Duke. Math. J.* 171 (2022), no.7, 1559-1614

(13) Endoscopy and cohomology of $U(n,1)$, with S. Marshall, *Forum Math. Sigma* 7 (2019), e19

(14) Asymptotic behavior of supercuspidal representations and Sato-Tate equidistribution for families", with J. Kim and N. Templier, *Adv. Math.* 362 (2020), 106955

(15) Patching and the p-adic Langlands program for $GL(2, \mathbb{Q}_p)$, with A. Caraiani, M. Emerton, T. Gee, D. Geraghty, and V. Paškūnas, *Compos. Math.* 154 (2018), no.3, 503–548

(16) Galois representations for general symplectic groups, with A. Kret, *J. Eur. Math. Soc.* 25 (2023), no. 1, 75–152

(17) Asymptotics and local constancy of characters of p-adic groups, with J. Kim and N. Templier, *Families of automorphic forms and the trace formula, Simons Symposia Proceedings* (2016), 259–295

(18) Endoscopic classification of representations: inner forms of unitary groups, with T. Kaletha, A. Minguez, and P.-J. White, 220 pages, preprint (2014)

(19) Families of L-functions and their symmetry, with P. Sarnak and N. Templier, *Families of automorphic forms and the trace formula, Simons Symposia Proceedings* (2016), 531–578

(20) Patching and the p-adic Langlands correspondence, with A. Caraiani, M. Emerton, T. Gee, D. Geraghty, and V. Paškūnas, *Camb. J. Math.* 4 (2016), no.2, 197-287

(21) Compatible systems of symplectic Galois representations and the inverse Galois problem III. Automorphic construction of compatible systems with suitable local properties, with S. Arias-de-Reyna, L. Dieulefait, and G. Wiese, *Math. Ann.* 361 (2015), no.3, 909–925

(22) More examples (appendix to On sparsity of positive-definite automorphic forms in a family by J. Jung), with J. Jung, *J. Analyse Math.* 129 (2016), no.1, 105–138

(23) On fields of rationality for automorphic representations, with N. Templier, *Compos. Math.* 150 (2014), no.12, 2003–2053

(24) Sato-Tate theorem for families and low-lying zeros of automorphic L-functions, with N. Templier, Appendix A by R. Kottwitz and Appendix B by R. Cluckers, J. Gordon and I. Halupczok, *Invent. Math.* 203 (2016), no. 1, 1–177

(25) Supercuspidal part of the mod l cohomology of $GU(1, n-1)$-Shimura varieties, *J. Reine Angew. Math.* 705 (2015), 1–21

(26) On the cohomology of compact unitary group Shimura varieties at ramified split places, with P. Scholze, *J. Amer. Math. Soc.* 26 (2013), no.1, 261–294

(27) On the cohomological base change for unitary similitude groups (appendix to "Galois representations associated to holomorphic limits of discrete series I: Unitary Groups" by W. Goldring), *Compos. Math.* 150 (2014), no.2, 191–228

(28) Geometric reductive dual pairs and a mod p theta correspondence, 16 pages, preprint (2011)

(29) Abelian varieties and the Weil representations, *Algebra Number Theory* 6 (2012), no.8, 1719–1772

(30) Automorphic Plancherel density theorem, *Israel J. Math.* 192 (2012), no.1, 83–120

(31) Construction of automorphic Galois representations: the self-dual case, *Shimura Varieties, London Mathematical Society Lecture Note Series*, vol. 457, Cambridge University Press (2020), 209–250

(32) On the cohomology of Rapoport-Zink spaces of EL-type, *Amer. J. Math.* 134 (2012), no.2, 407–452

(33) Galois representations arising from some compact Shimura varieties, *Ann. of Math.* 173 (2011), no.3, 1645–1741

(34) Stable trace formula for Igusa varieties, *J. Inst. Math. Jussieu* 9 (2010), no.4, 847–895

(35) Counting points on Igusa varieties, *Duke Math. J.* 146 (2009), no.3, 509–568

Selected conferences, workshops, and schools I have co-organized

- BIRS workshop on New tools in the local and global Langlands programs, Hangzhou, Aug 10–15, 2025
- PRIMA 2022 special session in algebraic number theory and arithmetic geometry, Dec 2022
- KAST International Symposium on periods of automorphic forms, 2021
- Intensive lecture series on Logarithmic Riemann-Hilbert correspondences for rigid varieties and applications to Shimura varieties, KIAS, 2018
- Simons Symposium: Relative trace formula, 2018
- Oberwolfach workshop: Harmonic analysis and the trace formula, 2017
- The Langlands correspondence in arithmetic and geometry, KIAS, August 2016
- Simons Symposium: Geometric aspects of the trace formula, 2016
- AMS Summer Institute in Algebraic Geometry, session co-organizer, July 2015
- Banff 5-day half workshop: Families of Automorphic Forms and the Trace Formula, 2014
- Simons Symposium: Families of Automorphic Forms and the Trace Formula, Puerto Rico, 2014
- KIAS intensive lecture series on Shimura varieties and Rapoport-Zink spaces, 2014
- Workshop on Modular Forms and Galois Representations, KIAS, January 2013
- 2012 Conference on L-functions, Shineville Resort, Jeju island, August 2012
- Cohomology of Shimura varieties: Arithmetic Aspects and the Construction of Galois representations, Fields Institute, 2012
- Rigid Geometry and the Local Langlands Correspondence, KIAS, 2012
- Theta Festival, Postech, South Korea, 2011
- Congruences of modular forms and Galois representations (summer school), Postech, South Korea, July 2010

Workshops and Conferences attended as a speaker

- Arithmetic and Cohomology of Algebraic Varieties, Hanoi, Sep 18–22, 2023
- Arithmétique des formes automorphes (Clozel's birthday conference), Paris-Saclay, Sep 4–8, 2023
- Satellite Conference in Number Theory of International Congress of Basic Science, Beijing, July 10–14, 2023
- Arithmetic of Shimura Varieties, Oberwolfach, Jan 29–Feb 4, 2023
- Introductory Workshop: Algebraic cycles, L-values, and Euler systems, MSRI/SLMath, Jan 23–27, 2023
- Korean Mathematical Soceity conference (plenary talk), October 2022
- CLAP Conference (problem session), Bonn, August 2022
- Summer School on the Langlands program, IHES, July 4–29, 2022
- International Congress of Mathematicians, July 6–14, 2022
- Representations and Characters: Revisiting the Works of Harish-Chandra and André Weil – A satellite conference of the virtual ICM 2022, July 1–15, IMS Singapore, 2022
- Topology and Arithmetic around the Langlands Program, Jun 7–11, 2022
- AMS Western Sectional Meeting, May 14–15, 2022
- Texas-Oklahoma Representations and Automorphic forms XI, Apr 1–13, 2022
- Relative Langlands program, L-functions and Beyond Endoscopy, CIRM, May 24–28, 2021
- Arbeitsgemeinschaft: Derived Galois Deformation Rings and Cohomology of Arithmetic Groups, Oberwolfach, Apr 4–10, 2021
- 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 11–14, 2021
- The 2020 Paul J. Sally, Jr. Midwest Representation Theory Conference, 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