

GORDAN SAVIN'S PORTFOLIO

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I Personal data

Education

Ph.D. Harvard University, 1988; Advisor: D. Kazhdan

B.S. University of Zagreb, 1984; Advisor: M. Tadić

Professional Experience

1988-90 Moore Instructor, MIT, Cambridge, MA
 1990-93 Assistant Professor, Yale University, New Haven, CT
 1993-98 Associate Professor, University of Utah
 1998-present Professor of Mathematics, University of Utah
 1995 Member, MSRI, Berkeley, CA
 1996 (Spring) Visiting Senior Lecturer, HKUST, Hong Kong
 2001 (Spring) Visiting Scholar, Harvard University, Cambridge, MA
 2007 (Fall) Visiting Professor, National University of Singapore
 2013 (May) Visiting Professor, HKUST, Hong Kong
 2014 (Sep.) Member, MSRI, Berkeley, CA
 2015 (Spring) Visiting Professor, National University of Singapore

Specialization Representation Theory and Number Theory

Fellowships and Awards

Sloan Doctoral Fellowship, 1986-87.

NSF Postdoctoral Research Fellowship, 1993-96.

Sloan Research Fellowship, 1993-95.

Student Choice Teaching Award, University of Utah, 2006.

Conference Organization

April 1997 Special Session on Lie Groups and Automorphic Forms
 at the AMS Meeting, College Park, MD (with Jian-Shu Li).
 October 1999 Lie Groups, Lie Algebras, and their Representations,
 University of Utah (with Joe Wolf).
 November 2001 Automorphic Forms and Representations of p -adic groups, at
 PIMS, Banff, Canada (with Wee Teck Gan and Jiu Kang Yu).
 July 2008 American Institute of Mathematics, Palo Alto, CA (with Wee Teck Gan).
 June 2013 American Institute of Mathematics, Palo Alto, CA (with Wee Teck Gan
 and Jeff Adams).

Research Grants (as PI)

1996-99 NSF Grant DMS-9623533
 1998-01 NSF Grant DMS-9803806 (post-doc Goran Muic)
 1999-02 NSF Grant DMS-9970689
 2001-04 NSF VIGRE DMS-0091675 (co PI)
 2001 NSA Grant MSPR-01C-176 (a conference grant)

2002-05	NSF Grant DMS-0138604
2004-06	NSF Grant DMS-0401636 (a supplement to the previous grant)
2006-09	NSF Grant DMS-0551846
2009-14	NSF Grant DMS-0852429 (5 year grant)
2014-18	NSF Grant DMS-1359774
2018-19	Simons Collaboration Grant 579347
2019-22	NSF Grant DMS-1901745

II Teaching and Research

Undergraduate Teaching highlights

- (1) I ran undergraduate colloquium for five years (Fall 2002 - Spring 2007).
- (2) Putnam Exam preparation with Bestivina, Fall 2005 - Fall 2013.
- (3) Student Choice Teaching Award, University of Utah, 2006.
- (4) A paper written with an undergraduate student (Rob Denomme) published in the Journal of Number Theory.
- (5) I ran 2009 Summer REU at University of Utah program.
- (6) Steven Sullivan's Honors Thesis: *Trace formula for G_2* , (2013) is an original work publishable in a research journal.
- (7) Michael Zhao's Honors Thesis *Binary hermitian forms and optimal embeddings* (2017) is also an original work publishable in a research journal. Michael is a recipient of the Barry Goldwater Scholarship and Churchill Fellowship. He was accepted to graduate school at Columbia University.

Classes Taught at University of Utah (since 2002)

Fall 2002	MATH 1250 (AP calculus), MATH 5310 (undergraduate algebra I)
Spring 2003	MATH 5320 (undergraduate algebra II)
Fall 2003	MATH 1210 (calculus I)
Spring 2004	MATH 2210 (calculus III), MATH 6350 (topics course in algebra)
Fall 2004	MATH 4400 (number theory)
Spring 2005	MATH 2210 (calculus III), MATH 6350 (topics course in algebra)
Fall 2005	MATH 3150 (differential equations), MATH 4400 (number theory)
Spring 2006	MATH 5405 (cryptography)
Fall 2006	MATH 6310 (graduate algebra I)
Spring 2007	MATH 5405 (cryptography), MATH 6320 (graduate algebra II)
Fall 2008	MATH 4030 (algebra for teachers), MATH 4400 (number theory)
Spring 2009	MATH 5405 (cryptography)
Fall 2009	MATH 4030 (algebra for teachers)
Spring 2010	MATH 1260 (AP calculus), MATH 3150 (differential equations)
Fall 2010	MATH 1030, MATH 2210 (calculus III)
Spring 2011	MATH 6370 (algebraic number theory)
Fall 2011	MATH 2210 (calculus III), MATH 5310 (undergraduate algebra I)
Spring 2012	MATH 5320 (undergraduate algebra II)
Fall 2012	MATH 2210 (calculus III), MATH 5310 (undergraduate algebra I)
Spring 2013	MATH 5320 (undergraduate algebra II)
Fall 2013	MATH 4030 (algebra for teachers), MATH 6370 (algebraic number theory)
Fall 2015	MATH 2210 (calculus III), MATH 4400 (number theory)
Spring 2016	MATH 6370 (algebraic number theory)
Fall 2016	MATH 2270 (linear algebra), MATH 5310 (undergraduate algebra I)
Spring 2017	MATH 5320 (undergraduate algebra II)
Fall 2017	MATH 6210 (real analysis)
Spring 2018	MATH 6370 (algebraic number theory)
Fall 2018	MATH 3210 (honors analysis), MATH 6210 (real analysis)

Spring 2019 MATH 5320 (undergraduate algebra II)
Fall 2019 MATH 3210 (honors analysis)
Spring 2020 MATH 5321 (undergraduate real analysis) MATH 6370 (algebraic number theory)

Graduate Students Advised at Utah

- (1) Domagoj Kovacevic, PhD Utah 2006.
- (2) Michael Woodbury, Masters Degree Utah, PhD Madison 2011. (We have two joint papers.)
- (3) Jason Preszler, PhD Utah 2009.
- (4) Chris Kocs, Utah, PhD Utah 2012.
- (5) Aaron Wood, Utah, PhD Utah 2013.
- (6) Shiang Tang, Utah, PhD Utah 2018.
- (7) Sabine Lang, Utah, PhD 2020.

Collaborators

Adams, Bestvina, Chan, Denomme, Flicker, Gan, Gross, Hanzer, Huang, Jiang, Kazhdan, Khare, Kobayashi, Larsen, Liu, Loke, Ma, Magaard, Moy, Muic, Pandzic, Prasad, Weissman and Woodbury (total 24).

III Conference and lecture invitations (since 1993)

1993

January Colloquium, University of Utah, Salt Lake City, UT
 February Colloquium, University of Minnesota, Minneapolis, MN
 February Colloquium, University of Iowa, Iowa City, IO
 March Seminar, Cornell University, Ithaca, NY
 April Conference “ p -adic Field of Dreams”, Iowa City, IO

1994

April Colloquium, HKUST, Hong Kong
 June Seminar, University of Zagreb, Zagreb, Croatia
 October Colloquium, University of Arizona, Tucson, AZ
 October Seminar, University of Arizona, Tucson, AZ
 November Seminar, California Institute of Technology, Pasadena, CA

1995

March Conference “Workshop on Automorphic Forms”, Berkeley, CA
 April Colloquium, Wayne State University, Detroit, MI
 May Number Theory Seminar, Harvard University, Cambridge, MA (three lectures)
 November Lie Groups Seminar, MIT, Cambridge, MA
 November Brandeis-Harvard-MIT Colloquium at Harvard University, Cambridge, MA

1996

March AMS Sectional Meeting, Iowa City, IO
 April Conference “Workshop on Representation Theory”, Hong Kong
 May Colloquium, HKUST, Hong Kong
 November Number Theory Seminar, Harvard University, Cambridge, MA

1997

May Conference “Harmonische Analyse und Darstellungstheorie topologischer Gruppen”, Oberwolfach, Germany
 July Summer Research Conference on Representation Theory of Reductive Groups, Seattle, WA (two lectures)

1998

July Conference on Representation Theory, Park City, UT

1999

February Conference “Lie Groups, Lie Algebras and their Representations”, Oklahoma State University, Stillwater, OK
 May Conference “Workshop on representations of reductive p -adic groups”, CRM, Montreal, Canada

May	CMS Summer Meeting, Newfoundland, Canada
September	4 lectures in Dubrovnik, Croatia
2000	
March	Algebraic Geometry Seminar, Princeton University, Princeton, NJ
June	Second Croatian Mathematical Congress, Zagreb, Croatia
August	Conference "Automorphic forms on $GL(n)$ ", Trieste, Italy
2001	
April	Lie Groups Seminar, MIT, Cambridge, MA (two lectures)
April	Number Theory Seminar, Brandeis University, Waltham, MA
April	Number Theory Seminar, Harvard University, Cambridge, MA
July	Conference "Representation Theory and Automorphic Forms", China
2002	
April	Conference "Midwest workshop in Lie theory", Notre Dame, IN
June	8 lectures at Zhejiang University, Hangzhou, China
July	12 lectures at National University of Singapore, Singapore
2003	
March	Lie Groups Seminar, MIT, Cambridge, MA
June	Representation Theory Conference, Dubrovnik, Croatia
December	Lie Groups Seminar, UCSD, San Diego, CA
2004	
April	City wide Colloquium in Montreal, Canada
April	Quebec-Vermont Number Theory Seminar, Montreal, Canada
October	AMS Sectional meeting, Evanston, IL
2005	
January	Lie Groups Seminar, UCSD, San Diego, CA
January	Lie Groups Seminar, Cal-Tech, Pasadena, CA
April	Groups Seminar, University of Michigan, Ann Arbor, MI
April	Algebra Seminar, Wayne State University, Detroit, MI
June	Representation Theory Conference, Dubrovnik, Croatia
2006	
October	Number Theory Conference, Schiermonnikoog, Holland
2007	
January	AMS Annual meeting, New Orleans, LA
January	Conference "Southern California Number Theory Day", San Diego, CA
January	Lie Groups Seminar, UCSD, San Diego, CA
September	Colloquium, NUS, Singapore

2008

January Number Theory Seminar, UCLA, Los Angeles, CA
 February Automorphic Forms Conference, Oberwolfach, Germany
 April Lie Groups Seminar, UCSD, San Diego, CA
 April Algebra Seminar, UCSD, San Diego, CA
 July Fourth Croatian Mathematical Congress, Osijek, Croatia
 May Number Theory Seminar, Harvard University, Cambridge, MA
 December Number Theory Seminar, IAS/Princeton, NJ

2009

January Erwin Schroedinger Institut, Vienna, Austria
 March Lie Groups Seminar, MIT, Cambridge, MA
 April Colloquium, University of Vienna, Vienna, Austria
 April Arithmetic Geometry Seminar, Ohio State, Columbus, OH
 May Number Theory Seminar, UCLA, Los Angeles, CA
 May Number Theory Conference, University of Florida, Gainesville, FL
 July Representation Theory Conference, University of Utah, UT
 September Colloquium, Idaho State University, Pocatello, ID
 December Colloquium, TATA Institute, Bombay, India

2010

January Number Theory Seminar, IIT, Bombay, India
 June Conference for Dick Gross, Harvard University, Cambridge, MA
 June Number Theory Conference, Banff, Canada
 July Representation Theory Conference, Banff, Canada
 August Number Theory Conference, Goa, India

2011

March Automorphic Forms Conference, Oberwolfach, Germany
 March Group Theory Seminar, University of Birmingham, Birmingham, UK
 April 68 th Algebra Day, University of Ottawa, Canada
 May Number Theory Seminar, UCLA, Los Angeles, CA
 May Two lectures at the Chinese Academy of Sciences, Beijing, China
 June International Workshop on Representation Theory and Harmonic Analysis,
 Nankai University, Tianjin, China
 June L -packets Conference, Banff, Canada
 August Harmonic Analysis on Lie Groups, month long stay, Max Planck Institute, Germany
 November Colloquium and Seminar, Purdue University, West Lafayette, IN

2012

January Number Theory Conference, Tata Institute, Bombay, India
 February Erwin Schroedinger Institut, Vienna, Austria
 March Conference, National University of Singapore, Singapore

2013

June	Conference, AIM, Palo Alto
June	PRIMA Conference, Shanghai, China
July	Representation Theory Conference, Salt Lake City, UT
October	Conference for Jim Cogdell, ESI, Vienna, Austria
2014	
January	Representation Theory Conference, Oberwolfach, Germany
February	Inverse Galois Problem Conference, Oberwolfach, Germany
May	Colloquium, University of Minnesota, Minneapolis, MN
May	Number Theory Conference, Harvard University, Cambridge, MA
June	Conference for Marko Tadic, Zagreb, Croatia
July	Conference for Toshiyuki Kobayashi, University of Tokyo, Japan
September	MSRI, month long stay, Berkeley, CA
October	Conference on Braids and Galois Groups, Luminy, France
2015	
June	Conference for Roger Howe, Yale University, New Haven, CT
June	Representation Theory Conference, Dubrovnik, Croatia
July	Lectures at Zhejiang University, Hangzhou, China
September	Conference on Linear Algebraic Groups, Banff, Canada
November	Midwest Representation Theory Conference, University of Missouri, MO
2016	
February	Sphericity, Reute, Germany
March	Conference, National University of Singapore, Singapore
May	Conference, Relative trace formula etc, Luminy, France
June	University of Amsterdam, Netherlands
June	Croatian Math. Congress, University of Zagreb, Croatia
October	Seminar, Boston College, Newton, MA
December	Conference, Varanasi, India
2017	
May	Seminar, Weizman Institute, Israel
June	Lecture Series, Weizman Institute, Israel
July	Conference in Priština, Kosovo
October	Conference on Automorphic forms and String Theory, Banff, CA
2018	
May	Conference "Southern California Number Theory Day", San Diego, CA
December	Conference in Sanya, China
December	Conference, National University of Singapore, Singapore
2019	
February	Colloquium and Seminar, Purdue University, West Lafayette, IN
October	Representations of p -adic groups, Conference, Oberwolfach, Germany

2020

November Algebra Number Theory Day, via Zoom, John Hopkins, Baltimore, MD

IV Bibliography

Journal Published:

- (1) Local Shimura correspondence, *Math. Ann.* **280** (1988), 185-190.
- (2) Limit multiplicities of cusp forms, *Invent. Math.* **95** (1989), 149-159.
- (3) Explicit realization of a metaplectic representation (with Y. Flicker and D. Kazhdan), *J. Analyse Math.* vol LV (1990), 17-39.
- (4) The smallest representation of simply laced groups (with D. Kazhdan), *Israel Math. Conf. Proceedings, Piatetski-Shapiro Festschrift* **2** (1990), 209-233.
- (5) On the tensor product of Theta representations of $GL(3)$, *Pacific J. Math.* **154** (1992), 369-379.
- (6) Cusp forms, *Israel J. Math.* **80** (1992), 195-205.
- (7) An analogue of the Weil representation for G_2 , *J. reine angew. Math.* **434** (1993), 115-126.
- (8) A deformation of the regular representation of $sl(2)$, *International Mathematics Research Notices* No. **6** (1993), 147-149.
- (9) Dual pair $\mathbf{G}_2 \times PGL_3$ and $(\mathfrak{g}_2, SL(3))$ -modules, *International Mathematics Research Notices* No. **4** (1994), 177-184.
- (10) Dual pair $G_{\mathcal{J}} \times PGL_2$; $G_{\mathcal{J}}$ is the automorphism group of a Jordan algebra \mathcal{J} , *Invent. Math.* **118** (1994), 141-160.
- (11) New dual pair correspondences (with J. S. Huang and P. Pandžić), *Duke J. Math.* **82** (1996), 447-471.
- (12) K -types of minimal representations (p -adic case), *Glasnik Matematički*, **31(51)** (1996), 93-99.
- (13) Exceptional Θ -correspondences I (with K. Magaard), *Compositio Math.* **107** (1997), 89-123.
- (14) The dual pair $PGL_3 \times G_2$ (with B. Gross), *Canadian Math. Bull.* **40** (1997), 376-384.
- (15) Motives with Galois group G_2 (with B. Gross), *Compositio Math.* **114** (1998), 153-217.
- (16) Unipotent representations of G_2 arising from the minimal representation of D_4^E (with J. S. Huang and K. Magaard), *Crelles J.* **500** (1998), 65-81.
- (17) A class of supercuspidal representations of G_2 , to *Canadian Math. Bull.* **42** (1999), 393-400.
- (18) The dual pair $G_2 \times PU_3(D)$ (p -adic case) (with Wee-Teck Gan), *Canadian J. Math.* **51** (1999), 130-146.
- (19) Complementary series for hermitian quaternionic groups (with G. Muić), *Canadian Math. Bulletin* **43** (2000), 90-99.
- (20) Symplectic-orthogonal Theta lifts of generic discrete series (with G. Muić), *Duke Math. J.* **101** (2000), 317-334.
- (21) Fourier coefficients for G_2 (with Gan and Gross), *Duke J. Math.* **115** (2002), 105-169.
- (22) Real and global lifts from PGL_3 to G_2 . (with W. T. Gan) *IMRN*, **50** (2003) 2699-2724.
- (23) Lectures on Representations of p -adic groups. Representations of real and p -adic groups, 19-46, Singapore Univ. Press, Singapore, 2004.

- (24) Endoscopic lifts from PGL_3 to G_2 (with W. T. Gan) *Compos. Math.* **140** (2004) 793-808.
- (25) On uniqueness of the Joseph ideal (with W. T. Gan) *Math. Res. Lett.* **11** (2004), 589-597.
- (26) On unramified principal series for covering groups. *J. reine angew. Math.* **566** (2004), 111-134.
- (27) On Minimal Representations: definitions and properties (with W. T. Gan) *Represent. Theory* **9** (2005), 46-93.
- (28) Rank and matrix coefficients for simply laced groups (with H-Y Loke), *J. reine angew. Math.* **599** (2006), 201-216.
- (29) On local lifts from $G_2(\mathbb{R})$ to $Sp_6(\mathbb{R})$ and $F_4(\mathbb{R})$ (with H. Y. Loke), *Israel J. of Math.* **159** (2007), 349-372.
- (30) Structure of internal modules and a formula for the spherical vector of minimal representations (with M. Woodbury), *J. of Algebra* **312** (2007), 755-772.
- (31) The center of the category of (\mathfrak{g}, K) -modules (with G. Muić), *Trans. Amer. Math. Soc.* **360** (2008), 3071-3092.
- (32) Smallest representations of non-linear covers of odd orthogonal groups (with H. Y. Loke), *American J. of Math.* **130** (2008) 763-798.
- (33) Uniqueness of the minimal representations of D_n and E_n (with H. Y. Loke), *Math. Annalen* **340** (2008) 195-208.
- (34) Functoriality and the inverse Galois problem (with C. Khare and M. Larsen), *Compositio Math.* **144** (2008) 541-564.
- (35) Lifting of generic depth zero representations of classical groups, *J. of Algebra* **319** (2008) 3244-3258.
- (36) Elliptic curve primality tests for Fermat and related primes (with R. Denomme), *J. of Number Theory* **128** (2008) 2398-2412.
- (37) Dual pair correspondences for non-linear covers of orthogonal groups (with H. Y. Loke), *J. of Funct. Analysis* **255** (2008) 184-199.
- (38) Appendix to: Restrictions of Saito-Kurokawa representations, by W. T. Gan and N. Gurevich, in proceedings of Gelbart's 60th birthday conference, *Contemporary Mathematics* **488** (2009) 95-124.
- (39) Reducing the minimal representation modulo ℓ ; an exercise, *J. Ramanujan Math. Soc.* **24** No. 4 (2009) 415-425.
- (40) Functoriality and the inverse Galois problem II: groups of type B_n and G_2 (with C. Khare and M. Larsen), *Ann. Fac. Sci. Toulouse Math.* (the issue in honor of Khare's *Prix Fermat*) Vol XIX, no 1 (2010), 37-70.
- (41) Modular forms on non-linear double covers of algebraic groups (with H. Y. Loke), *Trans. Amer. Math. Soc.* **362** (2010), 4901-4920.
- (42) Representations of the two fold central extension of $SL_2(\mathbb{Q}_2)$ (with H. Y. Loke), *Pacific J. Math.* **247** (2010) 435-454.
- (43) Dichotomy for generic supercuspidal representations of G_2 (with M. Wissman), *Compositio Math.* **147** (2011), 735-783.
- (44) Geometry of hermitian binary forms (with M. Bestvina), *J. Algebra* **360** (2012), 1-20.
- (45) Representations of metaplectic groups I: epsilon dichotomy and local Langlands correspondence (with W. T. Gan), *Compositio Math.* **148** (2012), 1655-1694.

- (46) Shimura correspondence for finite groups, *Math. Res. Lett.* **19** (2012), 461-468.
- (47) Representations of metaplectic groups II: Hecke algebra correspondences (with W. T. Gan), *Represent. Theory* **16** (2012), 513-539.
- (48) On the maximal primitive ideal corresponding to the model nilpotent orbit (with H. Y. Loke), *Int. Math. Res. Not.* (2012), 5731-5743.
- (49) Twisted Barghava Cubes (with W. T. Gan), *Journal of Algebra and Number Theory*, **8** No. 8 (2014), 1913-1957.
- (50) Matching of Hecke algebras for exceptional theta correspondences (with M. Woodbury), *J. of Number Theory*, **146** (2015), 534-556.
- (51) Rational forms of exceptional dual pairs (with H. Y. Loke), *J. of Algebra*, **422** (2015), 683-696.
- (52) Global uniqueness of small representations (with T. Kobayashi), *Math. Z.* **281** (2015), 215-239.
- (53) Classical invariant theory and theta correspondence of epipelagic representations (with H. Y. Loke and Jia Jun Ma), *Math. Z.* **283** (2016), 169-196.
- (54) Raising nilpotent orbits in wave-front sets (with Dihua Jiang and Baiying Liu), *Representation Theory*. **20** (2016), 419-450.
- (55) Euler Poincare Characteristic for the Oscillator Representation (with J. Adams and Dipendra Prasad), *Representation theory, number theory, and invariant theory*, 1-22, *Progress in Mathematics* 323, Birkhauser, 2017.
- (56) Iwahori component of the Gelfand-Graev representation (with Kei Yuen Chan), *Math. Z.* **288** (2018), 125-133.
- (57) Bernstein-Zelevinsky derivatives: a Hecke Algebra approach (with Kei Yuen Chan), *Int. Math. Res. Not. Int. Math. Res. Not. IMRN* (2019), no. 3, 731-760
- (58) Duality for spherical representations in exceptional theta correspondences (with Hung Yean Loke), *Trans. Amer. Math. Soc.* 371 (2019), no. 9, 6359-6375.
- (59) Eisenstein series arising from Jordan algebras (with M. Hanzer), *Canad. J. Math.* 72 (2020), no. 1, 183-201.
- (60) Bounded contractions for affine buildings (with Bestvina), *Proc. Amer. Math. Soc.* 148 (2020), no. 2, 875-883.
- (61) Iwahori component of Bessel model spaces (with Chan), *Proc. Amer. Math. Soc.* 148 (2020), no. 4, 1487-1497.
- (62) An exceptional Siegel-Weil formula and poles of the Spin L -function of $PGSp_6$ (with Gan), *Compositio Math.* **156** (2020), 1231-1261.
- (63) Computing finite Galois groups arising from automorphic forms (with Kay Magaard), *J. of Algebra* **561** (2020), 256-272.

On ArXiv:

- (1) On the metaplectic group in even residual characteristic (with A. Wood) arXiv:1511.04821
- (2) Binary hermitian forms and optimal embeddings (with undergraduate Michael Zhao) arXiv:1707.09001
- (3) A vanishing Ext-branching theorem for (GL_{n+1}, GL_n) (with Chan), arXiv:1803.09131 (accepted, *Duke Math. J.*)
- (4) Euler-Poincare formulae for positive depth Bernstein projectors (with Allen Moy) arXiv:2006.14648

- (5) The Gelfand–Graev representation of $SO(2n + 1)$ in terms of Hecke algebras (with P. Bakić) arXiv:2011.02456