William M. Goldman
March 9, 2024

CURRICULUM VITÆ

Professional Preparation:

Princeton Univ.	A. B.	1977
Univ. Cal. Berkeley	Ph.D.	1980
Univ. Colorado	NSF Postdoc.	1980–1981
M.I.T.	C.L.E. Moore Inst.	1981–1983

Appointments:

Institute for Advanced Study	Member	2021-2022
I.C.E.R.M.	Member	Sep. 2019
M.S.R.I.	Member	Oct.–Dec. 2019
Brown Univ.	Distinguished Visiting Prof.	Sep.–Dec. 2017
M.S.R.I.	Member	Jan.–May 2015
Princeton Univ.	Visitor	Spring 2008
Institute for Advanced Study	Member	Spring 2008
M.S.R.I.	Member	Nov.–Dec. 2007
Univ. Maryland	Assoc. Chair Grad. Studies	1995–1998
Univ. Maryland	Prof.	1990–present
Oxford Univ.	Visiting Prof.	Spring 1989
Univ. Maryland	Assoc. Prof.	1986–1990
M.I.T.	Assoc. Prof.	1986
M.S.R.I.	Member	1983–1984
Univ. Maryland	Visiting Asst. Prof.	Fall 1983
M.I.T.	Asst. Prof.	1983 – 1986

Publications

(1) (with D. Fried and M. Hirsch) *Affine manifolds and solvable groups,* Bull. Amer. Math. Soc. **3** (1980), 1045–1047.

(2) (with M. Hirsch) *Flat bundles with solvable holonomy,* Proc. Amer. Math. Soc. **82** (1981), 491–494.

(3) (with M. Hirsch) *Flat bundles with solvable holonomy II: Obstruction theory,* Proc. Amer. Math. Soc. **83** (1981), 175–178.

(4) *Two examples of affine manifolds,* Pac. J. Math.**94** (1981), 327–330.

(5) (with M. Hirsch) *A generalization of Bieberbach's theorem,* Inv. Math. , **65** (1981), 1–11.

(6) (with D. Fried and M. Hirsch) *Affine manifolds with nilpotent holonomy,* Comm. Math. Helv. **56** (1981), 487–523.

(7) *Characteristic classes and representations of discrete subgroups of Lie groups,* Bull. Amer. Math. Soc. **6** (1982), 91–94.

(8) *On the polynomial cohomology of affine manifolds,* Inv. Math. **65** (1982), 453–457.

(9) (with M. Hirsch) *Polynomial forms on affine manifolds,* Pac. J. Math.**101** (1982), 115–121.

(10) (with M. Hirsch and G. Levitt) *Invariant measures for affine foliations,* Proc. Amer. Math. Soc. **86** (1982), 511–518.

(11) (with D. Fried) *Three-dimensional affine crystallographic groups,* Adv. Math. **47** (1983), 1–49.

(12) *Conformally flat manifolds with nilpotent holonomy and the uniformization problem for 3-manifolds,* Trans. Amer. Math. Soc. **278** (1983), 573–583.

(13) (with Y. Kamishima) *The fundamental group of a compact flat Lorentz space form is virtually polycyclic,* J. Diff. Geo. **19** (1984), 233–240.

(14) *The symplectic nature of fundamental groups of surfaces,* Adv. Math. **54** (1984), 200–225.

(15) (with R. Brooks) *The Godbillon-Vey invariant of transversely homogeneous codimension-one foliations,* Trans. Amer. Math. Soc. **286** (1984), 651–664.

(16) (with M. Hirsch) *The radiance obstruction and parallel forms on affine manifolds,* Trans. Amer. Math. Soc. **286** (1984), 639–649.

(17) (with R. Brooks) *Volume in Seifert space,* Duke Math. J. **51** (1984), 529–545.

(18) *Representations of fundamental groups of surfaces,* in "Geometry and Topology, Proceedings, University of Maryland 1983-1984," J. Alexander and J. Harer (eds.), Lecture Notes in Mathematics Vol.1167 (1985), 95–117, Springer-Verlag New York.

(19) *Nonstandard Lorentz space forms,* J. Diff. Geo. **21** (1985), 301–308.

(20) (with M. Hirsch) *Affine manifolds and orbits of algebraic groups,* Trans. Amer. Math. Soc. **295** (1986), 175–198.

(21) *Invariant functions on Lie groups and Hamiltonian flows of surface group representations,* Inv. Math. **85** (1986), 1–40.

(22) (with J. Millson) *Eichler-Shimura homology and the finite generation of cusp forms by hyperbolic Poincare series,* Duke Math. J. **53** (1986), 1081–1091.

(23) (with J. Millson) *Deformations of flat bundles over Kähler manifolds,* in "Geometry and Topology, Manifolds, Varieties, and Knots," C. McCrory and T. Shifrin (eds.), Lecture Notes in Pure and Applied Mathematics **105** (1987), 129-145 Marcel Dekker Inc., New York.

(24) *Projective structures with Fuchsian holonomy,* J. Diff. Geo. **25** (1987), 297–326.

(25) (with J. Millson) *Local rigidity of discrete groups acting on complex hyperbolic space,* Inv. Math. **88** (1987), 495–520.

(26) *Geometric structures and varieties of representations,* in "The Geometry of Group Representations," Contemp. Math., Amer. Math. Soc. **74**, (1988), 169–198.

(27) (with A. Magid, eds.) "The Geometry of Group Representations," Contemp. Math., Amer. Math. Soc. **74**, (1988).

(28) (with Y. Kamishima) *Topological rigidity of developing maps with applications to conformally flat manifolds,* in "The Geometry of Group Representations," Contemp. Math., Amer. Math. Soc. **74** (1988), 199–203.

(29) (with J. Millson) *The deformation theory of representations of fundamental groups of compact Kähler manifolds,* Bull. Amer. Math. Soc. **18** (1988), 153–158.

(30) *Topological components of spaces of representations,* Inv. Math. **93** (3) (1988), 557–607.

(31) (with J. Millson) *The deformation theory of representations of fundamental groups of Kähler manifolds,* Publications Mathématiques d'Institut des Hautes Études Scientifiques, **67** (1988), 43–96.

(32) *Convex real projective structures on compact surfaces,* J. Diff. Geo. **31** (1990), 791–845.

(33) (with J. Millson) *The homotopy invariance of the Kuranishi space,* Illinois J. Math. (memorial issue dedicated to K. T. Chen), **34** (1990), 337–367.

(34) *The symplectic geometry of affine connections on surfaces,* Journal für die reine und angewandte Mathematik **407** (1990), 126–159.

(35) (with J. Millson) *Differential graded Lie algebras and singularities of level sets of momentum mappings,* Comm. Math. Phys. **131** (1990), 495–515.

(36) (with T. Drumm) *Complete flat Lorentz 3-manifolds with free fundamental group,* Int. J. Math. **1** (1990), 149–161.

(37) Review of "Conformal Geometry," by R. Kulkarni and U. Pinkall, Bull. Amer. Math. Soc. **23** (1990), 566–575.

(38) (with Y. Kamishima) *Conformal automorphisms and closed conformally flat manifolds,* Trans. Amer. Math. Soc. **323** (1991), 797–810.

(39) *Complex hyperbolic Kleinian Groups,* in "Complex Geometry," Proceedings of the Osaka International Conference, Marcel Dekker, New York, G. Komatsu and Y. Sakane (eds.), 31–52 (1992).

(40) (with J. Parker) *Complex hyperbolic ideal triangle groups,* Journal für die reine und angewandte Mathematik **425** (1992), 71–86.

(41) (with J. Parker) *Dirichlet Polyhedra for Dihedral Groups Acting on Complex Hyperbolic Space,* J. Geom. Anal. **2** (6) (1992), 517–554.

(42) (with S. Choi) *Convex real projective structures on closed surfaces are closed,* Proc. Amer. Math. Soc. **118** (2) (1993), 657–661.

(43) *Complex Hyperbolic Geometry,* Proceedings of the Topology Geometry Research Center Workshop, Kyungpook National University, Taegu, Korea, July 1994.

(44) *Moduli spaces,* Proceedings of the Korean Science and Engineering Foundation Workshop, Korea National University of Education, Ch'onju, Korea, July 1994.

(45) Review of "An extension of Casson's invariant," by K. Walker, Bull. Amer. Math. Soc. **30** (1) (1994), 100–104.

(46) (with T. Drumm) *Crooked planes,* Electronic Research Announcements of the Amer. Math. Soc. **1** (1), (1995), 10–17.

(47) (with M. Darvishzadeh) *Deformations of real projective structures and hyperbolic affine structures,* J. Korean Math. Soc. **33** (1996), 625–638.

(48) (with S. Choi) *The Classification of Real Projective Structures on compact surfaces,* Bull. Amer. Math. Soc. **34** (2) (1997), 161–170.

(49) *Ergodic Theory on Moduli Spaces,* Ann. Math. **146** (1997), 1–33.

(50) Review of "Geometry and Topology," by G. Bredon, American Mathematical Monthly **05** (2) (1998), 192–194.

(51) (with T. Drumm) *The Geometry of Crooked Planes,* Topology **38** (2) (1999), 323–351.

(52) (with R. Benedetto) *The topology of the relative character variety of the quadruply-punctured sphere,* Experimental Mathematics (1999) **8:1**, 85–104.

(53) "Complex Hyperbolic Geometry," Oxford Mathematical Monographs, Oxford University Press xvii + 316 pp. + 58 illus. (1999).

(54) Review of "Algorithmic and Computer Methods for Three-Manifolds" by A.T. Fomenko and S.V. Matveev. Society for Industrial and Applied Mathematics Review, **41-2** (1999), 15–17.

(55) (with V. Charette) *Affine Schottky groups and crooked tilings,* Contemp. Math., Amer. Math. Soc. **262**, (2000), 69–98.

(56) (with G. Margulis) *Flat Lorentz 3-manifolds and cocompact Fuchsian groups,* Contemp. Math., Amer. Math. Soc. **262**, (2000), 135–146. math.DG/0005292.

(57) (with M. Kapovich and B. Leeb) *Complex hyperbolic manifolds homotopy-equivalent to a Riemann surface,* Comm. Geom. Anal. **9:1**, (2001), 61–96.

(58) (with T. Drumm) *Isospectrality of flat Lorentz 3-manifolds,* J. Diff. Geo. **58:3** (2001), 457–466.

(59) *The Margulis Invariant of Isometric Actions on Minkowski (2+1)-Space,* in "Ergodic Theory, Geometric Rigidity and Number Theory," Springer-Verlag (2002), 149–164.

(60) (with V. Charette, T. Drumm and M. Morrill) *Complete flat affine and Lorentzian manifolds,* Geom. Ded. **97** (2003), 187–198.

(61) *Action of the modular group on real SL(2)-characters of a one-holed torus,* Geometry and Topology **7** (2003), 443–486. mathDG/0305096.

(62) *The complex symplectic geometry of $SL(2,C)$-characters over surfaces,* in "Proceedings of the International Conference on

Algebraic Groups and Arithmetic: Mumbai 2001," (S. Dani and G. Prasad, eds.) Tata Institute of Fundamental Research, Narosa Publishing House (distributed by American Mathematical Society) (2004), 375–407. math.DG/0304307.

(63) (with V. Charette and C. Jones) *Recurrence of geodesics in flat Lorentz 3-manifolds,* Canadian Math. Bull. **47** (2004) no.3, 332-342

(64) (with W. Neumann) *Homological action of the modular group on some cubic moduli spaces,.* Math. Res. Letters, **12**, Issue 4, (2005), 575-591. math.GT/0401257

(65) (with S. Choi) Real projective structures on 2-dimensional orbifolds, American J. Math. **127** no. 5 (October 2005), 1019–1102. `math.GT/0107193`

(66) (with O. Baues) *Is the deformation space of complete affine structures on the 2-torus smooth?,* "Geometry and Dynamics", J. Eels, E. Ghys, M. Lyubich, J. Palis and J. Seade (eds.), Proceedings of the Conference "Geometria complejo et sistemos dynamicos," commemorating the sixtieth birthday of Alberto Verjovsky, Cuernavaca, Mexico. Contemp. Math., Amer. Math. Soc. **389** (2006) 69–89 `math.DG/0401257.`

(67) *Mapping Class Group Dynamics on Surface Group Representations,* "Problems on Mapping Class Groups and Related Topics", B. Farb, ed., Proc. Symp. in Pure Math. **74**, American Mathematical Society (2006), 189 – 214 `math.GT/0509114.`

(68) *The Mapping Class Group acts reducibly on* $\mathsf{SU}(n)$*-character varieties,* "Knots and Primes: Proceedings of the 2004 Japan-American Mathematics Institute, Johns Hopkins University,"o Contemp. Math., Amer. Math. Soc. **416** (2006), 115–119 `math.GT/0509115`

(69) *What is a ... projective structure?* Notices of the Amer. Math. Soc. **54** (no. 1) (January 2007), 30–33.

(70) (with R. Wentworth) *Energy of Twisted Harmonic Maps of Riemann Surfaces,* "In the Tradition of Ahlfors-Bers IV," (May 19-22, 2005 , University of Michigan, Ann Arbor, Michigan) (Dick Canary, Jane Gilman, Juha Heinonen, Howard Masur, eds.) Contemp. Math., Amer. Math. Soc. 432, (2007) American Mathematical Society, 45-63 `math.DG/0506212`

(71) *An ergodic action of the outer automorphism group of a free group,* Geom. Func. Anal. Vol. 17-3 (2007), 793-805 `math.DG/0506401`

(72) (with K. Scannell, L. Andersson, T. Barbot, R. Benedetti, F. Bonsante, F. Labourie, J.-M. Schlenker) *Remarks on a paper of*

Mess, Geom. Ded. Vol. 126, No. 1 (2007), 47–70. `math.DG.0706.0640`

(73) (with E. Xia) *Rank one Higgs bundles and fundamental groups of Riemann surfaces,* Memoirs of the American Mathematical Society. **193** (2008), no. 904. `math.DG/0402429`

(74) (with T. Barbot, V. Charette, T. Drumm, and K. Melnick) *A Primer on the (2+1)-Einstein Universe,* in *Recent Developments in Pseudo-Riemannian Geometry,* (D. Alekseevsky, H. Baum, eds.) Erwin Schrödinger Lectures in Mathematics and Physics, European Mathematical Society (2008), 179–230 `math.DG.0706.3055`.

(75) *Higgs bundles and geometric structures on surfaces,* in *The Many Facets of Geometry: a Tribute to Nigel Hitchin,* O. García-Prada, J.P. Bourgignon, and S. Salamon (eds.), Oxford University Press (2010) 129 – 163, `math.DG.0805.1793`

(76) *Trace coordinates on Fricke spaces of some simple hyperbolic surfaces,* Chapter 15, pp. 611–684, of *Handbook of Teichmüller theory, vol. II* (A. Papadopoulos, ed.), IRMA Lectures in Mathematics and Theoretical Physics volume 13, European Mathematical Society (2008), `math.GM.0402103`).

(77) (with F. Labourie and G. Margulis) *Proper affine actions and geodesic flows on hyperbolic surfaces,* Annals of Mathematics **1**70 (2009), 1051–1083. `math.DG/0406247`.

(78) (with V. Charette and T. Drumm) *Stretching three-holed spheres and the Margulis invariant,* (in "In the Tradition of Ahlfors-Bers, V. The Triennial Ahlfors-Bers Colloquium, May 8-11, 2008, Rutgers University, Newark New Jersey, M. Bonk, J. Gilman, H. Masur, Y. Minsky, and M. Wolf (eds.)) Contemp. Math., Amer. Math. Soc. **510** (2009), 61–70. `DG:0907.0680`

(79) *Locally homogeneous geometric manifolds,* Proceedings of the 2010 International Congress of Mathematicians, Hyderabad, India (2010), 717–744, Hindustan Book Agency, New Delhi, India `DG:1003.2759`

(80) (with V. Charette and T. Drumm) *Affine deformations of the three-holed sphere,* Geometry & Topology **14** (2010), 1355-1382. `DG:0907.0690`

(81) (with E. Xia) *Ergodicity of mapping class group action on* $\mathsf{SU}(2)$*-character varieties,* in "Geometry, rigidity, and group actions," 591 – 608, Chicago Lectures in Math., University of Chicago Press (2011) `GT:0901.1402`

(82) (with E. Xia) *Action of the Johnson-Torelli group on representation varieties,* Proc. A. M. S. 140 (2012), no. 4, 1449 – 1457 `DS:1003.2825`

(83) (with F. Labourie) *Geodesics on Margulis spacetimes,* Ergodic Theory and Dynamical Systems / Volume 32 / Issue 02 / April 2012, pp 643 - 651 `DS:1102.0431`

(84) (with C. Series and S. P. Tan, eds.) "Geometry, Topology and Dynamics of Character Varieties," Bookmark and Share Lecture Notes Series, Institute for Mathematical Sciences, National University of Singapore, Publisher World Scientific Publishing Company Incorporated, (2012)
(ISBN 9814401358, 9789814401357), 364 pp.

(85) *Two papers which changed my life: Milnor's seminal work on flat manifolds and flat bundles,* in "Frontiers in Complex Dynamics: In Celebration of John Milnor's 80th Birthday" (Araceli Bonifant, Misha Lyubich, Scott Sutherland, eds.), Princeton University Press (2014), 679–704,
(ISBN: 9780691159294), `DG:1108.0216`

(86) *Manifolds: a global setting for geometry and analysis, with or without coordinates,* WIREs Comp Stat, 4: 447– 454. doi: 10.1002/wics.1220 Wiley Interscience (2012)

(87) (with V. Charette and T. Drumm) *Finite-sided deformation spaces of complete affine 3-manifolds,* J. Topol. 7 (2014), no. 1, 225–246. `GT:1107.2862`

(88) (with J.-P. Burelle, V. Charette, T. Drumm) *Crooked half-spaces,* L'Enseignement Mathématique (2) **60** (2014), 43–78. `DG.1211.4177`

(89) *Crooked surfaces and anti-de Sitter geometry,* Geometriae Dedicata **175** (2014), 1–29. `DG.1302.4911`

(90) (with D. Cooper) *A 3-manifold with no real projective structure,* Annales de la Faculté des sciences de Toulouse (6) **24** (2015), no. 5, 1219–1238. MR 3485333, `GT:1207.2007`

(91) (with V. Charette, T. Drumm) *Proper affine deformations of the one-holed torus,* Transform. Groups 21 (2016), no. 4, 953–1002. `DG:1501.04535`

(92) (with V. Charette) *McShane-type identities for affine deformations,* Ann. Inst. Fourier 67 (2017), no. 5, 2029–2041. `GT:507.01854`

(93) (with S. Choi) *Topological tameness of Margulis spacetimes,* American Journal of Mathematics 139 (2017), no. 2, 297–345 `GT:1204.5308`

(94) (with G. McShane, G. Stantchev and S. Tan) *Automorphisms of two-generator free groups and spaces of isometric actions on the hyperbolic plane,* Mem. Amer. Math. Soc. 259 (2019), no. 1249, vii+78 pp.

(95) (with Jayadev Athreya, David Dumas, Sergey Grigorian, Rosemary Guzman, Philipp Hieronymi, Sean Lawton, Anton Lukyanenko, Jeremy Tyson, and Aaron Wilson) *Geometry Labs United: An Invitation,* Notices Amer. Math. Soc. October 2018, 65, no.9

(96) *Flat Affine, Projective and Conformal Structures on Manifolds: A Historical Perspective,* in "Geometry in History," S. Dani and A. Papadopoulos, eds., 515–552, Springer, Cham (2019).

(97) (with G. Forni) *Mixing flows on moduli spaces of flat bundles over surfaces,* in "Geometry and Physics: A Festschrift in honour of Nigel Hitchin, vol. II, Jørgen Andersen, Andrew Dancer, Oscar García-Prada, eds., Oxford University Press, 519–533 (2018).

(98) (with S. Lawton and E. Z. Xia) *The mapping class group action on* $\mathsf{SU}(3)$*-character varieties,* Ergodic Th. and Dyn. Systems 41 (2021), no. 8, 2382–2396.

(99) (with J.-P. Burelle, V. Charette, D. Francoeur) *Einstein tori and crooked surfaces,* Advances in Geometry, 21 no. 2, (2021), 237–250, `DG.1702.08414`

(100) *Parallelism on Lie groups and Fox's free differential calculus,* (in *Characters in low-dimensional topology,* Edited by Olivier Collin, Stefan Friedl, Cameron Gordon, Stephan Tillmann and Liam Watson in honor of Steven Boyer's sixtienth birthday, Contemporary Mathematics, 760, 157–166 (2020), American Mathematical Society, Providence, RI).

(101) (with J. Danciger, T. Drumm and I. Smilga) *Proper actions of discrete groups of affine transformations,* in *Dynamics, Geometry, Number Theory: the Impact of Margulis on Modern Mathematics,* (Festschrift for Grigori Margulis's seventieth birthday) (D. Fisher, D. Kleinbock, G. Soifer, eds.) pp. 95–168, University of Chicago Press, Chicago, IL. (2022)

(102) *Geometric Structures on Manifolds,* Graduate Studies in Mathematics 227, American Mathematical Society, Providence, RI, (2022), li+409 pp. (According to my royalties report, 109 copies had already been sold in 2022.)

(103) (with Suhyoung Choi and Todd Drumm) *Tameness of Margulis spacetimes with parabolics,* Forum Math. 35 (2023), no. 1, 1–59. 57M60 (57K35)

(104) *Compact components of planar surface group representations,* in *Computational Aspects of Discrete Subgroups of Lie Groups,* eds. Michael Kapovich, Alla Detinko, Alex Kontorovich, Peter Sarnak, and Richard Schwartz), Contemporary Mathematics 783 (2023)

(105) (with G. Forni, S. Lawton and C. Matheus) *Non-ergodicity on* $\mathsf{SU}(2)$ *and* $\mathsf{SU}(3)$*-character varieties of the once-punctured torus,* Annales Henri Lebesgue (submitted), `arXiv:2206.14183`

(106) *Affine structures on surfaces and the twisted cubic,* Contemporary Mathematics (to appear)

Doctoral Theses Advised

- Ser-Peow Tan, "Geometric structures and representations of surface groups into $\mathsf{PSL}(2,\mathbb{R})$" (UCLA, 1988, co-advised with J. Millson).
- Todd Drumm, "Fundamental polyhedra for Margulis spacetimes" (1990).
- Mark Phillips, "Dirichlet polyhedra in complex hyperbolic space" (1990).
- Robert Miner, "Affine manifolds with dilations" (1991).
- Bernhard Leeb, "3-manifolds with(out) metrics of nonpositive curvature" (1992).
- Shigeru Takamura, "Deformations of complex surfaces"(1994).
- Richard Brown, "Mapping class actions on the $\mathsf{SU}(2)$-representation varieties of compact surfaces"(1996).
- Po-Hsun Hsieh, "Submanifolds of Kähler manifolds and their normal bundles" (1997).
- Eugene Z. Xia, "Moduli of flat $\mathsf{PGL}(2,\mathbb{R})$-bundles on Riemann surfaces" (1997).
- Igor Belegradek, "Counting negatively curved manifolds" (1998).
- Hong Chan Kim, "The symplectic structure on the moduli space of real projective structures" (1999).
- Virginie Charette, "Proper actions of discrete groups on (2+1)-spacetime" (2000).
- Justin Wyss-Gallifent, "Complex hyperbolic triangle groups" (2000) (co-advised with R. Schwartz).
- Adam Sikora, "3-Manifolds, group actions, and character varieties" (2000).
- Ilya Kofman, "Vassilliev invariants of knots and links in S^3 and other 3-manifolds" (2000).

- Lawrence Triplett, "Cyclic groups and complex hyperbolic space" (2001).
- George Stantchev, "Action of the modular group on $\mathsf{PGL}(2,\mathbb{R})$-characters on a once-punctured torus" (2003).
- Cathy Jones, "Pyramids of properness: towards the properness conjecture" (2003).
- Sean Lawton, "$\mathsf{SL}(3,\mathbb{C})$-Character Varieties and $\mathbb{RP}^2$-Structures on a Trinion" (2006).
- Elisha Peterson, "Trace Diagrams, Representations, and Low-Dimensional Topology" (2006).
- Taejung Kim, "An Investigation on Holomorphic Vector Bundles and Krichever-Lax Matrices Over An Algebraic Curve" (2007)
- Anton Lukyanenko, "Projective triangle groups," (M.A. 2008)
- Robert Delgado "Density properties of Euler characteristic -2 surface group $\mathsf{PSL}(2,\mathbb{R})$-character varieties" (Ph.D. 2009)
- Ryan Hoban, "Local rigidity of triangle groups in $\mathsf{Sp}(4,\mathbb{R})$" (Ph.D. 2009)
- Jeffrey Frazier, "Length Spectral Rigidity of Nonpositively Curved Surfaces" (Ph.D. 2012)
- Weiqiang Wu, "Embedded spheres in affine manifolds," (Ph.D. 2012)
- Andrew Sanders, "Minimal surfaces, hyperbolic 3-manifolds, and deformation spaces," (Ph.D. 2013)
- Son Lam Ho, "On conformally flat circle bundles over surfaces," (Ph.D. 2014)
- Gregory Laun, "Fundamental Domains for Proper Affine Actions of Coxeter Groups in Three Dimensions," (Ph.D. 2016)
- Jean-Philippe Burelle, "Generalizations of Schottky groups" (Ph.D. 2017)
- Charles Y. Daly, "Affine manifolds with an invariant line," (Ph.D. 2021)
- Nakyung (Rachel) Lee, "Classification of closed conformally flat Lorentzian 3-manifolds with unipotent holonomy," (Ph.D. 2023) (coadvised with Karin Melnick)
- Jacob W. Erickson, "Closed surface pairs with maximal rolling symmetries," (advanced to candidacy October 26, 2021), Ph.D. expected Spring 2025
- Shuo (Amber) Liu, expected to advance to candidacy 2024.

Other thesis committees:

- Lisa Goldberg, Brandeis
- Bruno Klingler, Paris
- Ron Karidi, Tel-Aviv University
- Aristide Tsemo, Montpellier
- Oliver Baues (Habilitation), ETH Zürich
- François Salein, ENS Lyon
- Charles Frances, ENS Lyon
- Bruno Klingler (Habilitation), Paris.
- Olivier Guichard, Paris 2004
- Ying Zhang, National University, Singapore 2004
- Greg McShane (Habilitation), Toulouse 2005
- Daniel Virgil Mathews (M.Sc.), Melbourne 2005
- Julien Paupert, Paris 2005
- Panagiotis Konstantinou, Arizona 2006
- Peter Gothen, (Agregado), Porto 2007
- David Klein, Toronto 2008
- Krishnendu Gongopadhyay, Indian Institute of Technology, Mumbai 2008
- Reza Seyyadali, Johns Hopkins, 2009
- Ludovic Marquis, University of Paris Sud, 2009
- Frederic Palesi, Insitut Joseph Fourier, Grenoble, 2009
- Martin Deraux (Habilitation), Institut Joseph Fourier, Grenoble, 2010.
- Tobias Hartnick, ETH Zürich 2010.
- François Beguin (Habilitation), Paris, 2011
- Roberto Rubio, Universitad Autonoma de Madrid, 2012
- Tanner Crowder, Howard University, March 2013
- Caleb Ashley, Howard University, April 2013
- Dominik Francoeur (Mémoire), Univ de Sherbrooke, February 2014
- François Fillastre (Habilitation), Toulouse, January 2015
- Fanny Kassel, (Habilitation), Paris, November 2016
- Tianyu Ma, Univ of Maryland (Math) May 21, 2018
- Maxime Wolff (Habilitation), Sorbonne, December 2019
- Robin Timsit, Sorbonne, December 2019
- Bo Tian, University of Maryland (Math), July 14, 2020
- Philip Dasler, Univ of Maryland (Comp Sci), April 2020
- Ahmed Abdelrazek, Univ of Maryland (Comp Sci), April 2020
- Alhanouf Alburaikan, Howard University, July 2020
- Sheng Yuan, University of Rennes, July 2020

- Pierre Will (Habilitation), Grenoble, December 2020
- Nicolas Tholozan (Habilitation), Paris, February 12, 2021
- Stephen Gilles, Univ of Maryland (Math), March 24, 2021
- Dani Kaufman, Univ of Maryland (Math), April 16, 2021
- Zachary Greenberg, Univ Maryland (Math), November 9, 2021
- Juan Duran, Univ Autonoma de Barcelona, October 25, 2021
- Yohann Bouilly, University of Strasboug, December 14, 2021
- Zhao Liu, University of Maryland, July 20, 2022
- Charles Hanner, Comprehensive Exam, Aerospace and Mechanical Engineering, University of Maryland, March 17, 2023
- Jianlong Liu, University of Maryland, March 29, 2023
- Rodrigo A. Silva, University of Maryland (Physics), April 26, 2024.

Postdoctoral Sponsorship

- Kevin Corlette (Fall 1988) (co-sponsor with John Millson)
- John Parker (1989–1992)
- Michael Kapovich (Fall 1991)
- Bruno Klingler (Winter 1995)
- Richard Schwartz (1995 - Summer 1996)
- Doug Bullock (1997-1998) (co-sponsor with John Millson)
- Hanna Sandler (NSF POWRE grant 1999)
- Kyeonghee Jo, 2004–2006.
- Karin Melnick, Summer 2006
- Kelly Delp (AWM fellowship, Summer 2009)
- Aaron Magid, (NSF 2009-2012)
- Rasmus Villemoes (Spring 2011)
- Rania Amer (2011)
- Michelle Lee (2012–2014)
- Caleb Ashley (2013–)

Selected undergraduate mentoring

- Sergey Brin, summer project to visualize Pappus's theorem in Objective C (1993)
- Robert Benedetto, summer research project (1992), leading to publication [52]
- Rachel Kirsch, Experimental Geometry Lab project (2009)
- Ajeet Gary, Experimental Geometry Lab (2015-2018)
- Faculty (with Tarik Aougab, Moira Chas and Jonah Gaster), REU program "Low-dimensional topology" at ICERM, Summer 2018

- Research reading course, Emerson Hemley, Fall 2022
- LEMMA project, Joshua Lee, Fall 2023

Selected invited lectures (since 1989)

1989

- January, Geometry seminar, Oxford University
- February, Topology seminar, University of Warwick
- Colloquium, University of London
- March, Colloquium, University of Manchester
- Geometry seminar, Oxford University
- Colloquium, University of Southampton
- May, Geometry seminar, Institut Fourier, University of Grenoble
- Seminar, Institut des Hautes Études Scientifiques
- June, Seminaire A.Besse, École Politechnique, Paris
- August, Special Session, "Dynamics and Moduli Space," AMS Summer Meeting, Boulder, Colorado
- International Conference on Algebra, Novosibirsk, USSR
- Algebraic Geometry Seminar, Institute of Mathematics, Siberian branch of USSR Academy of Sciences, Novosibirsk, USSR
- September, Seminar Talk, Reinhart Memorial conference, Geometry Special Year, University of Maryland
- Colloquium, University of Toronto, Toronto, Canada
- October, Special Session, "Low-dimensional topology," AMS Regional Meeting, Hoboken, NJ
- December, Miniconference, Ohio State Univ., Columbus, OH
- Colloquium and Geometry Seminar, Rice University

1990

- January, Workshop, University of Utah
- February, Geometry Seminar and Complex Analysis Seminars, SUNY at Stony Brook
- May, Seminaire d'invariant de Casson, Universität Bern, Switzerland
- June, Colloquium, Tokyo Institute of Technology, Tokyo, Japan
- Principal Speaker, Workshop in "Geometric structures and representation spaces," Kyoto, Japan (two lectures)
- Colloquium, Osaka University, Japan
- Colloquium, Kumamoto University, Japan
- Colloquium and Topology seminar (3 lectures), Seoul National University, Korea

- October, Invited One-hour address, AMS meeting, Amherst, Massachusetts
- December, Conference on Complex Geometry, Commemoration of Fiftieth anniversary of Osaka University, Japan
- Conference on CR Structures, Kumamoto University, Japan

1991

- January, Conference on "Representations of fundamental groups," University of Chicago
- Colloquium, Northern Illinois University, De Kalb, Illinois
- March, Conference on "Bundles in complex differential geometry," Idaho State University, Pocatello, Idaho
- UMIACS Seminar on Computational Geometry and Computer Graphics
- Summer, Lectured (with computer demonstration) to Undergraduates and High-School Teachers, Regional Geometry Institute, Park City, UT
- September, Colloquium, University of Connecticut
- Valley Geometry Seminar, Amherst, MA
- October, Colloquium, American University, Washington, DC

1992

- Special Session on "Complex analysis and symplectic topology," AMS Annual Meeting, Baltimore, MD
- Conference on "Flat connections and their applications," Tulane University
- Seminaire A.Besse, École Politechnique, Paris
- Colloque de Geométrie et Topologie, Université de Paris, Orsay, France
- Colloque de Geométrie et Topologie, Université Paul Sabatier, Toulouse, France (two lectures)
- Relativity Seminar, Physics Department, University of Maryland
- Invited Speaker, Cornell Topology Festival
- Workshop on "Visualization of Geometric Structures," MSRI, Berkeley
- Colloquium, University of Washington, Seattle

1993

- Special Session, "Low-dimensional topology," AMS regional meeting, Howard University, Washington DC
- Topology conference, University of Pennsylvania
- Differentialgeometrie im Großen, Oberwolfach, Germany

- Conference in hyperbolic geometry, University of Warwick, UK
- Geometry Seminar, Oxford University, UK
- Special session of joint AMS-DMV meeting, Heidelberg, "Visualization in geometry and topology" (invited but declined)
- Geometry Seminar, University of Toronto
- Colloquium, University of Kentucky
- December, "Geometries in Interaction," Tel-Aviv University

1994

- Colloquium, Rutgers University, Newark
- Topology Seminar, Princeton University
- Topology Seminar, Institute for Advanced Study
- TGRC Workshop, Kyungpook National University, Taegu, Korea
- KOSEF Workshop, Korea National University of Education, Ch'onju, Korea
- Seminar, Okayama University, Okayama, Japan
- Special session, "Complex hyperbolic geometry and discrete groups, AMS regional meeting, Stillwater Oklahoma
- Workshop, "Applications of symplectic geometry," Newton Institute, Cambridge University, England

1995

- Geometric analysis seminar, University of Minnesota
- Ontario Topology Seminar, Montréal, Quebec
- 4-week course, "Geometria differeneziale," University of Perugia, Perugia, Italy
- Special Sessions, "Locally symmetric spaces," and "Cohomology of groups," AMS regional meeting, Boston, Massachusetts (invited)

1996

- Geometry Seminar, University of Pennsylvania
- "Visualizing geometry," Rutgers University, Camden, New Jersey
- Valley Geometry Seminar, University of Massachusetts, University of Massachusetts, Amherst, Amherst
- GANG Seminar, University of Massachusetts, University of Massachusetts, Amherst, Massachusetts
- Special Session, "Hyperbolic Geometry," AMS regional meeting, Courant Institute, New York City
- Midwest Geometry Conference, Norman, Oklahoma

- Conference on "Geometry, Physics and Harmonic maps," Campinas, Brazil
- Special session, "Holomorphic vector bundles with or without additional structure," AMS regional meeting, Lawrenceville, New Jersey
- Conference on "Crystallographic groups and their generalizations," Kortrijk, Belgium
- 'Knots in Washington" conference, George Washington University.

1997

- "Moduli Spaces in Geometry and Physics", Institute of Fundamental Theory, Gainesville, Florida.
- Colloquium, Rutgers University (New Brunswick, NJ).
- AMS regional meeting, College Park.
- Special session, "Noneuclidean and spacetime geometries", AMS regional meeting, Montréal.

1998

- Colloquium, University of Arizona (2 lectures).
- Colloquium, University of Mainz.
- Round Table on "Pseudo-Riemannian Geometry", Nancy, France.
- Conference on "Rigidity, Ergodic Theory, and Geometry," Paris.
- Topology Conference, Athens, Georgia.
- Special Session on "Complexity of Geometric Structures," AMS meeting, Chicago (invited but declined).

1999

- Analysis Seminar, Columbia University.
- Special session on "Diophantine Problems," Regional A.M.S. Meeting, Las Vegas, Nevada.
- Special session on "Integrable Systems," Regional A.M.S. Meeting, Buffalo, New York.
- Special session on "Complex Geometry," Regional A.M.S. Meeting, Buffalo, New York.
- Lecture, "The Art of Mathematics," Yellow Barn Art Gallery, Glen Echo, Maryland.
- "Crystallographic Groups and their Generalizations II," Kortrijk, Belgium.
- A.M.S. Summer Institute "From manifolds to singular varieties," Boulder, Colorado.
- Topology seminar, Microsoft Research.
- Colloquium, McMaster University.

- Plenary Address, Annual Meeting of Canadian Mathematical Society, Kingston, Ontario.
- Special Session, "Differential Geometry," Annual Meeting of Canadian Mathematical Society.

2000

- Colloquium, University of Maryland.
- Colloquium, University of Durham.
- Seminar, University of Edinburgh.
- EURO-Workshop, "Rigidity in Dynamics and Geometry," Programme in Ergodic Theory, Rigidity and Number Theory, Newton Institute, Cambridge.
- April, Seminar, Warwick University.
- Seminar, Johns Hopkins University.
- June, Plenary Address, Lehigh Geometry Conference

2001

- February, Lecture Series (Dynamics and group actions Special Colloquium, Lie groups Seminar), Yale University.
- April, Seminar, University of California San Diego.
- Seminar, University of Southern California.
- Seminar, Caltech.
- Colloquium, Rutgers University.
- May, Case Lecturer, Saint Louis University.
- Plenary Speaker, "Knots in Washington" conference, George Washington University.
- July, Special Session "Differential Geometric Methods in Mathematical Physics," joint meeting of AMS/SMF Lyon, France.
- September, Departmental Colloquium and Differential Geometry Seminar, University of Utah.
- October, Algebraic Geometry Seminar, Duke University.
- November, String Theory seminar, Department of Physics
- Differential Geometry Seminar, Oxford University.
- 3-lecture minicourse in Seminaire Sud-Rhodanien, "Geométrie des Éspaces Homogènes", CIRM, Luminy, France.
- December, International Conference "Discrete groups, Geometry and Arithmetic" in honor of the sixtieth birthday of M.S. Raghunathan, Tata Institute of Fundamental Research, Bombay, India.

2002

- Topology Seminar, Columbia University.
- Department Colloquium, University of Virginia.

- Geometry Seminar, University of Illinois at Chicago.
- Topology/Geometry Seminar, University of Chicago.
- Department Colloquium, University of California, Santa Cruz.
- MSRI workshop "Nonabelian Hodge Theory".
- Department Colloquium, Stanford University.
- Seminar, Johns Hopkins University.
- Geometric Analysis Seminar, Princeton University.
- Scientific Committee, Discrete Groups and Geometric Structures, with Applications. (Crystallographic Groups and their Generalizations III) at Kortrijk (Belgium), May 22 - 24, 2002.
- "Geometry and Dynamics of Groups", CIRM, Luminy
- 3-lecture minicourse and lecture in conference, European Differential Geometry Endeavor in Edinburgh, Scotland (23 July – 2 August 2002).

2003

- Plenary speaker, International Conference on "Complex Geometry and Dynamical Systems," commemorating the 60th birthday conference of Alberto Verjovsky, (January 6-10) Cuernavaca.
- Japan-Amer. Math. Inst., "Knots and Primes," Johns Hopkins
- Seminar, University of Chicago (March 13)
- Seminar, University of Illinois at Chicago. (March 14)
- Colloquium, George Mason University. (March 28)
- AMS Special Session, "Rigidity in geometry and group theory," AMS regional meeting, Courant Institute, New York.(April 13)
- Organizer and Plenary Speaker, Knots in Washington XVI (May 6)
- Seminar, Instituto de Matematicas y Fisica Fundamenta, Madrid. (May 15).
- AMS Special Session, "Moduli spaces in geometry and physics," joint AMS-RSME meeting, Sevilla. (June 21)
- Geometry/Dynamics seminar, École Normale Superieure de Lyon. (June 23)
- July, Plenary speaker, "Vector bundles in Algebraic Geometry," Porto, Portugal.
- Plenary Speaker, Knots in Washington XVII (December 21)

2004

- Keynote speaker, "Physics and Mathematics of the large N (Planar) Limit in Gauge Theory," conference at Centre de Recherches Mathématiques, Montréal. (January 8, Far Hills Inn, Val Morin)
- Colloquium, Rice University, (January 22)
- Colloquium, American University, (January 28)

- Colloquium, Northwestern University, (March 10)
- Geometry Seminar, University of Chicago, (March 11)
- Geometry Seminar, University of Chicago, (May 4)
- Co-organizer with V. Charette and T. Drumm, "New techniques in Lorentz manifolds," Banff International. Research Station. (November)

2005

- AMS Special Session, "Dynamics of Mapping Class Group Actions on Moduli Spaces" (40-minute survey talk) Atlanta
- "Geometric structures on low-dimensional manifolds and their deformation spaces," Minicourse, Cuernavaca
- Plenary speaker, "Bounded Cohomology, Harmonic Maps and Higgs Bundles," Strasbourg and Basel.
- Colloquium, Morgan State University
- Colloquium, Wesleyan University
- Plenary speaker (and co-organizer), "Discrete Groups and Geometric Structures, with Applications" ("Crystallographic Groups and their Generalizations IV"), Oostende, Belgium, May 29–June 2, 2005.
- Minicourse, "Geometric structures on low-dimensional manifolds and their deformation spaces", Lisbon Geometry Lectures
- Workshop on "Lorentzian Geometry," ENS de Lyon
- "Higgs bundles and vector bundles on curves," Madrid
- Colloquium, University of Illinois, Champaign-Urbana
- Crash course, "Mapping Class Group Dynamics on Character Varieties", University of Chicago
- "Pseudo-Riemannian Geometry", Schrödinger Institute, Vienna
- "Mathematical aspects of general relativity",Newton Institute
- Colloquium, Columbia University

2006

- Topology seminar, University of Texas
- Colloquium, Brown University
- Colloquium, Pennsylvania State University
- "Lie Groups: Dynamics, Rigidity, Arithmetic", Conference to honor Gregory Margulis's 60th birthday, Yale University
- Topology Seminar, University of Wisconsin
- Co-organizer and speaker,"Complex Geometry," Conference to honor Domingo Toledo's 60th birthday, Utah
- Principal Speaker, "Current Developments in Geometric Topology," Barrett Lectures, University of Tennessee
- "Teichmüller Spaces: Classical and Quantum," Oberwolfach

- Invited speaker, Geometry Conference, to honour Nigel Hitchin's 60th birthday, Madrid
- Pacific Northwest Geometry Seminar, Portland State Univ.

2007

- Seminar, Insituto Scientifica Tecnica., Lisbon
- Seminar, University of Porto
- Panelist (representing AMS), "What are the implications of the new curriculum recommendations for post-secondary education and employment?", conference on "K-12 Mathematics Curriculum Standards: What Should Students Learn and When Should They Learn It?", Center for the Study of Mathematics Curriculum (CSMC) (`http://cltnet.org/cltnet/misc/csmcmath07/`), Arlington, Virginia
- Dynamics and Geometry Seminars, Yale University
- Geometry Seminar, Colloquium, Univ. of Georgia
- Graduate Topology Seminar, Georgia Tech
- Workshop, "Representations of surface groups", American Institute of Mathematics, co-organizer with Steven Bradlow, Oscar García-Prada and Anna Wienhard
- 28th William J. Spencer Lecture, Kansas State Univ.
- Geometry Seminar, University of Illinois, Chicago
- Conference to honor Bill Thurston's 60th birthday, Princeton University
- Plenary speaker (two lectures), 7th KAIST Geometric Topology Fair, Gyeongju, Korea
- Cluster Algebras Seminar, Université de Sherbrooke
- Colloque, Centre de Recherches Mathématiques, Montréal
- Distinguished Scholar-Teacher Public Lecture, "Playing pool on curved surfaces and the wrong way to add fractions" (October 8).
- Seminar, "Teichmüller theory and Kleinian groups" program, Mathematical Sciences Research Institute, Berkeley (December 6).

2008

- Co-organizer (with V. Charette, K. Melnick and K. Scannell), Special Session, "Conformally flat Lorentzian Manifolds," Joint Mathematics Meetings, San Diego, January 7
- Department Colloquium and Lunch Seminar, Princeton University, February 6

- Seminar organizer and primary speaker, "Mapping class group dynamics on moduli spaces," Princeton University Mathematics Department (met weekly all Spring semester)
- After Hours Conversations, "Equilateral Triangles", Harry's Bar, Institute for Advanced Study, March 3
- Co-organizer and speaker, "Lie Theory, Geometry and Discrete Groups," Conference to honor John Millson's 62nd birthday University of Maryland, March 20–23
- Department Colloquium, Yale University, April 6
- Plenary Speaker (and workshop co-organizer), Fourth Ahlfors-Bers Colloquium, Rutgers University, Newark, May 8-11
- Plenary Speaker, "Group-theoretic Methods in the Study of Algebraic Varieties," Conference to Celebrate Friedrich Hirzebruch's 80th Birthday, Bar-Ilan University, Israel May 18 – 25
- Scientific Committee, "Crystallographic Groups and Geometric Structures", (Crystallographic groups and their generalizations V) Kortrijk, Belgium, May 26-30
- Lecture series in "Geometry and dynamics of groups" activity, École Polytechnique, Paris, June 2–3.
- Conference on Algebraic and Geometric Topology, Gdansk, Poland, June 9-13
- Symplectic Geometry seminar, University of Toronto, August
- Co-organizer and speaker, "Representations of surface groups," workshop, CIRM Luminy, September

2009

- Special Session, "Geometry, Algebra, and Topology of Character Varieties ," AMS Annual Meeting, Washington DC
- Colloquium, National University of Singapore January 21.
- Conference on "Dynamics of $\mathsf{Aut}(\mathbb{F}_n)$-actions on representation varieties", Sde-Boker, Israel, January 6-11 (invited but declined)
- Colloquium, Howard University, February 6.
- Complex Analysis and Dyamics Seminar, Graduate Center CUNY, New York City, March 4
- Research Seminar, Northeastern University, March 10
- Department Colloquium, University of Tennessee, March 20
- Invited Address, Mathematical Association of America University of Mary Washington, Fredericksburg, Virginia April 17-18.
- "Group theory, number theory and geometry," conference in honor of Fritz Grunewald on his sixtieth birthday, Oxford, 30 March - 3 April (invited but declined)
- Geometry Seminar, University of Paris Sud (Orsay) May 28

- "From braid groups to Teichmüller spaces", Luminy workshop, 1 - 5 June
- Department Colloquium and Seminar, Université de Rennes , 6 - 11 June
- "Encounters between mathematicians and theoretical physics" Strasbourg, 11 -13 June.
- NSF-CBMS Conference, Central Connecticut State University, July 23, 2009, Families of Riemann Surfaces and Weil-Petersson Geometry (Scott Wolpert, principal speaker)
- Seminar, Princeton University, September 20
- Colloquium, Temple University, September 21
- "What is..." seminar, University of Michigan, October 13
- Colloquium, University of Michigan, October 13
- November 16 - 21 "Computational Differential Geometry, Topology, and Dynamics" workshop in thematic program "Foundations of Computational Mathematics" Fields Institute, Toronto. (invited but declined)
- December 16- 20, Special Session "Geometric structures and Geometric group theory" of joint AMS-KMS meeting, Seoul, and possible workshop. (invited but declined)

2010

- Miniconference, "Geometric structures in 2 and 3 dimensions," Autrans, France, January 17-22
- Miniconference, "Conformally flat Lorentz manifolds," Princeton University, February 17–19 (co-organizer and speaker)
- Colloquium, University of Maryland, February 26
- Geometry Seminar, University of Münich, March 22
- Invited Speaker, Second Killing-Weierstrass Colloquium, Braniewo, Poland, March 24-26.
- Colloquium, University of Illinois, Chicago, April 23
- Co-organizer (with A. Reid, R. Canary and S. Boyer), Character Varieties in the Geometry and Topology of Low-dimensional Manifolds, BIRS, Banff April 25-30.
- Teichmüller theory and its interactions with Mathematics and Physics, Barcelona, June 28- July 3.
- Co-organizer (with J. Seade, S. Cantat and N. Gusevskii) and lecturer (5 1-hour lecture minicourse), Advanced School and Workshop on Discrete Groups in Complex Geometry, ICTP, Trieste, Italy, 28 June - 16 July
- Co-organizer (with Ser-Peow Tan and Caroline Series), Geometry, Topology and Dynamics of Character Varieties, Institute of

Mathematical Sciences, National University of Singapore July 17– August 17, speaker in Conference

- Invited Speaker, Geometry Section, International Congress of Mathematicians, Hyderabad, August 19-27
- Chair, Organizing committee, "Geometry and analysis on moduli of Riemann surfaces," symposium in honor of Scott Wolpert, University of Maryland, September 22-24
- Colloque sur Representations et les Surfaces, Université de Sherbrooke, October 2010.

2011

- Colloquium, Rice University, January 2011.
- Topology Seminar, CIRGET, Université de Quebec a Montréal, February 18.
- BIRS Workshop, "Frontiers in Complex Dynamics" (Celebrating John Milnor's 80th birthday), February 20–25.
- *Higher Teichmüller theory,* University of Michigan RTG conference and lecture series (4 lectures), 15-17 April 2011
- Scientific Committee and Plenary Talk, 30 May - 2 June, *Discrete Groups and Geometric Structures,* with Applications IV (CGG VI), Oostende (Belgian coast)
- Transformation Groups and Associated Geometric Structures, honoring Herbert Abels 70th Birthday, Bielefeld, June 2-5.
- *Faces of Geometry: 3-Manifolds, Groups and Singularities – A Conference in Honor of Walter Neumann,* Columbia University, New York, June 6–10.
- Organizer (with V. Charette, D. Cooper and A. Wienhard), Mathematical Research Community, Geometry of Real Projective Structures, 12-18 June, Snowbird, Utah.
- *Vector Bundles and Algebraic Curves,* Newton Institute, Cambridge University 27 June — 1 July
- *Geometry and Arithmetic of Lattices,* London Mathematical Society Durham Symposium (July 4-14). (3 lectures)
- *Aspects of hyperbolicity in geometry, topology, and dynamics,* A workshop and celebration of Caroline Series' 60th birthday 25-27 July 2011, University of Warwick
- *Geometry and Dynamics of Teichmüller Spaces,* Seventh William Rowan Hamilton Geometry and Topology Workshop to be held in the Hamilton Mathematics Institute, Trinity College Dublin, Ireland, September 1-3, 2011.
- *Ergodic decompositions of moduli spaces,* Workshop, Princeton University, October 2011

- Distinguished Lecturer, CIMAT, Guanajuato, Mexico, Fall 2011; Colloquium + 2 lectures, November 2–5
- Distinguished Lecturer, Texas A & M, December 5-7 (3 lectures)

2012

- Research Seminar Organizer (and first speaker), Special Trimester "Geometry and Analysis of Surface Group Representations," Institut Henri Poincaré, January-March
- Seminar, University of Paris VI (Jussieu), March 13, 2012
- Colloquium, Institut Fourier, Grenoble, March 15, 2012
- Seminar, University of Paris-Sud, Orsay, March 22, 2012
- Master Class (3 lectures), Centro de Recerca Matematica, Bellaterra, Spain, April 10–12, 2012
- Seminar, Institut Mittag Leffler, May 22, 2012
- Workshop, *Weil-Petersson Dynamics,* American Institute of Mathematics, June 2012
- Plenary Speaker, IVth Latin American congress on Lie groups in Geometry, CIMAT Guanajuato, Mexico, August 2012.
- Department Colloquium, University of Maryland, October 10, *William Thurston: a Mathematical perspective*
- Department Colloquium, Université de Sherbrooke, October 12, *William Thurston: a Mathematical perspective*
- Co-organizer (with V. Charette, F. Labourie and A. Wienhard) and Speaker, CRM Montréal workshop, *Higher Thurston-Teichmüller Theory,* October 15-19
- Invited 1-hour speaker, 22nd Fall Workshop on Computational Geometry, University of Maryland (November 10)
- Department Colloquium, McMaster University (November 23)
- Seminar, University of Toronto (November 26)

2013

- Department Colloquium, University of Oregon, January 14; Geometry Seminar, University of Oregon, January 15
- Department Colloquium, Howard University, January 25
- *Advances in Teichmüller Theory,* Schrödinger Institute Vienna, February 4-8.
- Department Colloquium, Indiana University, February 15.
- Department Colloquium, Towson University, February 28.
- 2013 Distinguished Visitor, Department of Mathematics, Oberlin College, March 19–23
- Intistute for Pure and Applied Mathematics (UCLA) workshop, *Dynamics of Groups and Rational Maps,* April 8 - 12

- Geometry Seminar, University of Toronto, June 28
- *Differentialgeometrie im Großen,* Oberwolfach workshop, June 30-July 6
- Co-organizer, Workshop on "Exotic Geometric Structures," semester on "Low-dimensional Topology, Geometry, and Dynamics," Institute for Computation and Experimental Research in Mathematics, Brown University; Research Seminar talk, September 26
- Plenary lecture, "Conformal Geometry and Riemann Surfaces: A conference in honor of Professor Ravi S. Kulkarni," Queens Collge, October 25–27
- Seminar, University of Toronto, November 15
- Plenary lecture, Workshop on "Character varieties and geometric structures," Howard University, December 16–20

2014

- Workshop, New Trends in Teichmüller theory and Mapping Class Groups, Oberwolfach, (9-14 February 2014)
- Colloquium, University of Pittsburgh, (28 February 2014)
- Organizing Committee (chair), GEAR Network Retreat, University of Maryland, (17-21 March 2014)
- Special Session "Low-dimensional Topology and Group Theory", AMS Sectional meeting March 29-30, 2014, University of Maryland Baltimore County
- Minicourse, "Geometric structures and discrete groups," University of Texas, Austin, (2-4 May 2014)
- Conference, "Teichmüller theory and mapping class groups," Kibbutz Hagoshim, Israel, (May 7-14) (invited but declined)
- Minicourse Speaker, GGTM Research School, Configuration and moduli spaces in Math. and Physics, In Memory of Bill Thurston, Rabat, Morocco, (June 3-6, 2014)
- Lectures in Casablanca and Marrakech (29 May 2014) (colloquium level)
- Conference (1 lecture) and Minicourse (4 lectures), Teichmüller theory and surfaces in 3-manifolds, Centro di Ricerca Matematica "Ennio De Giorgi", Pisa (May 26 -June 20, 2014)
- Scientific Committee and Plenary Speaker, "Groups and Geometry and Spaces," ICM Satellite Conference on Geometric Group Theory and Geometric Structures KAIST (Daejeon, Korea) (August 7–12, 2014) (invited but declined)
- Colloquium, De Paul University, (September 12)
- GEAR seminar, University of Illinois, (September 16)

- Colloquium, George Mason University, (September 19)
- September, Master Class in Geometry, Samos, Greece (5 lectures, September 22–26)
- SAG seminar, Université de Sherbrooke, (October 15)
- Université de Québec à Montréal, (CIRGET seminar), (October 17)
- Invited Address, Meeting of American Mathematical Society, Dalhousie University, Halifax, Nova Scotia. (October 18)
- Topology and Dynamics Seminar, George Mason University (November 9)
- Dynamics Seminar, University of Maryland (December 11)

2015

- Scientific Committee, Semester on "Dynamics on Moduli Spaces and Geometric Structures," MSRI, Berkeley, January – May
- Lead Organizer, Introductory Workshop, MSRI
- Seminar on "Lorentzian Geometric Structures," MSRI (2 lectures)
- MSRI-Evans Colloquium (March 2)
- Department Colloquium, University of California, Santa Cruz (April 19)
- Bay Area Differential Geometry Seminar, University of California, Santa Cruz (May 2)
- RIMS workshop, "Geometry of Moduli Space of Low Dimensional Manifolds," Kyoto, Japan (December 16)

2016

- African Institute of Mathematical Sciences, Conference on "Holomorphic Differentials," Cape Town, South Africa (January 7)
- Lecture at Churchill High School, Montgomery County, Maryland (February 18)
- Geometry Seminar and Colloquium, Brown University (February 25)
- Colloquium, National University of Singapore, 21 March 2016
- Invited Speaker, "Dynamics, Geometry and Number Theory in honor of the 70th birthday of Gregory Margulis" Institut Henri Poincaré, Paris, June 13-17, 2016.
- Invited Speaker, Conference in honor of the 70th birthday of Nigel Htchin," Oxford University, 9-11 September 2016
- Virginia Topology Conf., Univ, of Virginia, 18-20 November

2017

- Colloquium, California Institute of Technology, 14 February

- Geometry/Topology Seminar, Temple University, 1 March
- Geometry/Topology Seminar, Oxford University, 12 June
- Nonpositive curvature group actions and cohomology, Isaac Newton Institute, Cambridge, June 23
- Invited Speaker, "Monopoles, Gauge theory and Integrable Systems," a conference in honor of Jacques Hurtubise, Centre de Recherches Mathematiques, Montréal, August 21-25
- Geometry Seminar, Brown University, 13 September
- Dynamics Seminar, University of Chicago, 25 September
- Geometry Seminar, Harvard University, 31 October
- Geometry/Topology Seminar, Northeastern University, 7 November
- ICTS Minicourse "Geometry, groups and dynamics," and Discussion Meeting, "Surface group representations and geometric structures," Bangalore, India, 6-24 November (invited but declined)

2018

- Colloquium, University of Missouri, March 22
- Short presentation on the research of Maryam Mirzakhani, fundraising dinner for documentary film and MSRI fellowship (sponsored by MSRI and Renaissance Technologies), April 2.
- Dynamics/Geometry Seminar, Stony Brook, April 23
- Invited Speaker, "Characters in low-dimensional topology — A conference in honour of Steven Boyer", Montréal, June 4–8
- Faculty, Summer Undergraduate Program, ICERM "Low Dimensional Topology and Geometry", (June 11– August 3)
- Invited Speaker, "Representation Varieties and geometric structures in low dimensions", University of Warwick, July 2-8
- Higgs bundle conference, BIRS conference at Oaxaca, Mexico, July 2-8 (invited but declined)
- Invited Speaker, "Geodesics on hyperbolic manifolds and related topics," honoring Ara Basmajian, Connecticut College, August 8-10
- Oberwolfach workshop, "New Trends in Teichmüller Theory and Mapping Class Groups", September 3–7
- Geometry Seminar, I.H.E.S. December 10
- Geometry/Dynamics Seminar, Université de Paris, Jussieu, December 13
- Higgs bundle conference, Las Platas, Argentina, December 17–21 (invited but declined)

2019

- Invited Speaker, "Groups, spaces and geometries, in honor of Alessandra Iozzi's 60th birthday", ETH Zürich, January 25
- Scientific Committee/Keynote Address, "Dynamics of group actions – a conference in honor of Yves Benoist," Cetraro, May 28
- I.C.E.R.M., Differential Geometry Lecture, September 26

2020

- Maryland Geometry/Topology Seminar, February 10
- Special Session, AMS sectional meeting Charlottesville, March 13–14 (canceled)

2021

- Colloquium, Indian Institute for Science, Education and Research, Mohali (state of Punjab, India), February 12
- Geometry Seminar, IISER Mohali, February 17
- Geometry Seminar, University of Heidelberg, February 23
- Greater Washington Topology Seminar, George Washington University, May 7
- Colloquium, University of California, Santa Cruz, 25 May
- *Computational Aspects of Discrete Subgroups of Lie groups,* ICERM, 14 June 2021.
- International Conference on Discrete Groups, Geometry and Arithmetic: A virtual event in honour of M.S. Raghunathan's 80th birthday, 9-11 August 2021.
- Dynamics Seminar, University of Maryland, October 7
- Seminar on *Character Varieties, Dynamics and Arithmetic,* Institute for Advanced Study, November 10, 17

2022

- Members Colloquium, *Cubic surfaces and non-Euclidean Geometry,* Institute for Advanced Study, January 24
- Joint Princeton University/IAS symplectic geometry seminar, February 28.
- Mathematical Conversations, Institute for Advanced Study, *Crooked Geometry: Crystallography in the geometry of (2+1)-special relativity,* March 2
- Colloquium, Rutgers University (Newark) April 27.
- Burton Jones Distinguished Lecture Series, University of California, Riverside, May 11 (departmental colloquium), May 14 (workshop lecture)
- Symposium for Ravi Kulkarni's 80th birthday, India, May 21-24
- Topology/Geometry seminar, 24 October

2023

- Department Colloquium, University of Toronto, April 5.
- Short-term visit, Institute for Advanced Study, 17-20 May.
- Speech to honor of Michael Kapovich, BIRS workshop *Knots, Surfaces and* 3-*Manifolds,* Oaxaca, Mexico, June 5.
- Exposure Seminar, *Lines on a cubic surface,* for Maryland *Research Experience for Undergraduates* program, July 5
- Last lecture, *Characters and Moduli of Surfaces: A symposium in honor of the Sixtieth birthday of Ser Peow Tan,* Research Institute for Mathematical Sciences (RIMS) Kyoto University. Kyoto, Japan, July 17-19.
- Geometry lunch seminar, Penn State University, November 1.

2024

- Maryland Dynamics Conference, April 4-7
- Albert Einstein Seminar (2 lectures), Graduate Center, CUNY, May 7.
- Long-term visitor, Max Planck Institute, Leipzig, Germany, June 3 – 20.
- Invited Speaker, *Hamiltonian Geometry and Quantization,* Fields Institute, 15-19 July 2024.

2025

- "New trends in Teichmüller theory," International Center for Theoretical Sciences, Bangalore, India. February 24 - March 7, (invited but declined, due to teaching duties)

Grants and Awards

- Awards
  - Fellow, Washington Academy of Sciences 2016
  - American Mathematical Society Fellow 2013
  - University of Maryland Distinguished Scholar-Teacher 2007
  - Alfred P. Sloan Foundation Fellow 1987–1989.
  - Research and Scholarship Award 2010 (Univ. Maryland)
  - Faculty Mentor (for Rachel Kirsch), Philip Merrill Presidential Scholars Program 2009-2010
- Grants
  - NSF Research Grants 1981–present
    Most recent award: DMS-2203493 (ends in 2025).
  - Research Networks in Mathematical Sciences Grant, with Steven Bradlow (UIUC), Steven Kerckhoff (Stanford), Richard Wentworth (Maryland) and Anna Wienhard (Princeton/Maryland), NSF 2011 ($5 M for 2011-2016), ended August 31, 2022. *GEometric structures And Representations* (GEAR)
  - Focused Research Group Award, "Deformation theory of geometric structures," with Daryl Cooper (UCSB), Gregory Margulis and Yair Minsky (Yale), and Anna Wienhard (Princeton), NSF 2011
  - Simons Sabbatical Grant (2014-2015)
  - Travel grants
    * NSF Travel grant for US participants at CIRM conference, "Representations of surface groups," September 1-5 2008.
    * NSF Travel grant for US participants at 2010 ICTP conference on "Complex geometry...", Trieste, Italy.
    * NSF Travel grant for US participants for 2010 IMS conference on "Geometry, topology and dynamics of character varieties," Singapore.
    * NSF Travel grant for US participants for 2012 ICTS Conference on "Geometry, groups and dynamics," Almora, India (December 3–17)
- MSRI Postdoctoral Fellowship, 1984–1985
- AMS Postdoctoral Research Fellowship 1980–81 (offered but declined)
- NSF Postdoctoral Fellowship 1980–81
- NSF Graduate Fellowship 1977–80
- SERC Visiting Fellowship, Oxford University (sponsored by Professor S. K. Donaldson)

- Supplemental NSF grant to bring Michael Kapovich to University of Maryland Mathematics Department, 1991–1992
- Supplemental NSF grant to bring Simon Donaldson to University of Maryland Mathematics Department, 1992–1993.
- University of Maryland Semester Research Awards, Fall 1998, Fall 2005.
- Equipment grants:
  - Principal Investigator, departmental NSF grant for computer equipment (SCREMS), 1986
  - Co-Principal Investigator (with H.Glaz), NSF (SCREMS) grant for computer equipment for University of Maryland Mathematics Department, 1990
  - Co-Principal Investigator (with H.Glaz), NSF (SCREMS) grant for computer equipment for University of Maryland Mathematics Department, 1992
  - Co-Principal Investigator (with H.Glaz), GRB grant for computer equipment for University of Maryland Mathematics Department, 1994

Service

- Selection Committees
  - Member, Selection Committee for the King Faisal International Prize in Science (2018), Riyadh, Saudi Arabia, January 8-12, 2018.
  - Comparative Evaluation for Institute for Mathematics, Heidelberg University 2019.
- Proposal Review
  - NSF site visit for Institute for Advanced Study, 2016
  - NSF panels for research grants
  - Reviewer for NSERC, ISF, BSF, CNRS grant proposals
- American Mathematical Society
  - Member, since 1977 (lifetime member)
  - Member-At-Large, Council (2022–2025, 2006–2009).
  - Member (AMS Representative), AWM-AMS Noether Lecture Committee (2021,2022)
  - Member (Council Position), Committee on Publications (2022–2025)
    * Subcommittee to review primary AMS journals (2022-2023)
  - Committee to review AMS-Simons grants to Predominantly Undergraduate Institutions (2023)

- Committee on the Profession (2012—2015)
- Member (Council Position), Committee on Education (2006–2009).
- Advisory Board, Mathematics Research Communities February 2010–January 2013
- Panelist, Project NeXT panel discussion on Graduate Education, Joint Mathematics Meetings, January 2007.
- AMS-IMA-SIAM Committee on Summer Research Conferences, 2003—2006 (AMS representative).

- Mathematical Association of America (member)
- Association for Women in Mathematics (member)
- Departmental Review Committees (other than NSF):
  - Chair, External Review Committee, Department of Mathematics, National University of Singapore, March 2016
  - Chair, External Review Committee, Department of Mathematics and Institute of Mathematical Sciences, Stony Brook University, March 2006.
  - Review Committee for VIGRE program, University of Wisconsin, March 2006.
  - External Review Committee for Mathematics Department, Binghamton University, April 2013
- Other Administrative Committees:
  - ICERM Scientific Advisory Board (2019-2022).
  - Scientific Advisory Panel, Fields Institute (2012–2016).
  - Board of Governors, Geometry Center, University of Minnesota, 1994–1996.
  - Reviewer for Simons Collaboration Grants, 2015, 2018.
  - US Observer for European Science Foundation Research Networking Program, "Interactions of Low-Dimensional Topology and Geometry with Mathematical Physics".
- Conference organization
  - Brin Mathematics Research Center workshops:
    * Organizing Committee, "Lorentzian, Affine and Hyperbolic Differential Geometry – in memory of Todd Drumm ", Workshop, 4- 7 April 2025.
    * Organizing Committee, "Advances in Higgs bundles", Brin Mathematics Research Center, 15-19 April 2024.
  - Organizing Committee, "Geometry, Groups, and Dynamics — a conference in honor of François Labourie", 6-10 June 2022, Cargese, Corsica

- Chair, Organizing Committee, "Geometry and Analysis: A symposium in honor of Scott Wolpert's 70th birthday", Univ. Maryland, 8 March 2021
- Scientific Committee, Ahlfors-Bers Colloquium 2008 — 2014
- Scientific Committee, Summer School/Workshop/Conference, Institute of Mathematics, National University of Singapore, Summer 2010
- Co-director, School and Conference on Discrete Groups in Complex Geometry and Dynamics, ICTP, Trieste, June 28– July 14, 2010 (also presented a course of 5 75-minute lectures in the Summer School)
- Co-organizer, BIRS workshop "Geometry of Character Varieties," Banff, May 2010
- Scientific Committee, 14 - 18 March 2011 Representations of Surface Groups and Higgs Bundles (A Satellite Meeting at the University of Oxford), part of Newton Institute semester-long activity on "Moduli Spaces"
- Co-organizer, Dynamics Conference, University of Maryland 2- 5 April 2011
- Scientific Committee, Trimestre at Institut Henri Poincaré, January - March 2011 (with O. Guichard, J.-M. Schlenker and A. Wienhard), "Geometry and Analysis of Surface Group Representations"
- Scientific Committee, Trimester at Centro de Recerca Mathematica, Barcelona, March – May 2011 (with Luis Alvarez-Cónsul, S. Bradlow, Peter Gothen, I. Mundet i Riera,), "Research Programme on Geometry and Quantization of Moduli Spaces"
- Scientific Committee, Workshop at Année Thématique, Centre de Recherches Mathématiques, Montréal (with V. Charette, F. Labourie and A. Wienhard), "Higher Thurston-Teichmüller Theory" October 17, 2012
- Scientific Committee, "Groups, Geometry and Dynamics 2012", Kumaun University, Almora, Uttarakhand, India, December 12-19, 2012
- Organizing Committe, Workshop "Exotic Geometric Structures", ICERM, Brown University, September 15-20, 2013
- Scientific Committee, ICM Satellite Conference on. Geometric Group Theory & Geometric Structures, August 7– 12, 2014. KAIST, Korea, 2014
- Scientific Committee, Ahlfors-Bers Colloquium VI, Yale University, October 23–26, 2014

- Scientific Committee, Semester at MSRI (with R. Canary, F. Labourie, H. Masur and A. Wienhard), Spring 2015
- Editorial Boards
    - Editor-in-chief, Geometriae Dedicata 2003–2013, (editorial board since 1999), Honorary Editor (2013 —)
    - Advisory Board, Ramanujan Mathematical Society Lecture Notes Series
    - Managing Editor, Transformation Groups (2000-2002), Editorial Board (2002–2010).
- Departmental/University Service
    - Promotion and tenure advisory subcommittees:
        * Uri Bader (2024)
        * Christian Zickert
            · promotion (2023)
            · tenure (2016)
        * Rodrigo Treviño
            · renewal (2021)
            · tenure (2018–2022)
        * Lei Chen renewal/tenure (2021–2024)
        * Boyu Zhang (2023 –)
        * Daniel Cristofaro-Gardiner (2021)
        * Christian Rosendal (2021)
        * Karin Melnick
            · tenure (2013)
            · promotion (2021)
        * Richard Wentworth (2007)
        * Giovanni Forni (2006)
        * Richard Schwartz
            · tenure (1997)
            · promotion (2000)
        * Alessandra Iozzi
        * Jyh-Yang Wu
        * Garrett Stuck
        * Emeritus status:
            · Scott Wolpert (2020)
            · John Millson (2020)
    - Departmental Merit Pay Committee (2024, 2023, 2021)
    - Advisory Committee, Brin Mathematics Research Center (2021–)
    - Department Awards Committee (2021–2022)
    - Director/co-founder (with Richard Schwartz), Experimental Geometry Lab (2000–2021).

* Co-director (with Rodrigo Treviño), Lab for Experimental Mathematics at MAryland (2021–)
- Department Colloquium Committee, 2022–2023
- Principal Investigator, University of Maryland VIGRE program (2004–2010).
- Organizer, Reception at Joint Mathematics Meetings for "University of Maryland Mathematics Department Alumni and Friends", 2007, 2008, 2009.
- Selection Committee, 2009 Distinguished Scholar-Teachers, University of Maryland.
- Selection Committee, Kirwan Award for Undergraduate Teaching, University of Maryland 2009.
- Search Committee for Chair of the Department of Mathematics (2006-2007).

Teaching: (since 2000)

- F2000: Differential Geometry (436)
- F2000: Symplectic Topology (748C)
- F2001: Lie Groups (744)
- S2002: Lie Algebras (744)
- F2002: Differential Geometry (436)
- F2002: Riemann Surfaces (669R)
- S2003: Linear Algebra (461)
- S2003: Riemann Surfaces (669S)
- F2003: Differential Equations (246)
- F2003: Differential Geometry (436)
- S2004: Differential Forms (437)
- F2004: Differential Geometry (436)
- F2004: Euclidean and non-Euclidean Geometry (430)
- S2005: Differential Forms (437)
- S2006: Hyperbolic Manifolds (748G)
- F2006: Projective Geometry for Computer Graphics (431)
- F2006: Fundamental Concepts of Topology (730)
- F2003: Differential Geometry (436)
- S2004: Differential Forms (437)
- F2004: Differential Geometry (436)
- F2004: Euclidean and non-Euclidean Geometry (430)
- S2005: Differential Forms (437)
- S2006: Hyperbolic Manifolds (748G)
- F2006: Projective Geometry for Computer Graphics (431)
- F2006: Fundamental Concepts of Topology (730)
- F2007: Geometric Structures on Manifolds (748)

- F2008: Differential Geometry (748)
- F2008: Projective Geometry for Computer Graphics (431)
- S2009: Differential Geometry (748)
- F2009: Projective Geometry for Computer Graphics (431)
- F2009: Undergraduate Differential Geometry (436)
- S2010: Geometric Structures on Manifolds (748)
- F2010: Projective Geometry for Computer Graphics (431)
- F2010: Graduate Differential Geometry (740)
- S2011: Differential Forms (437)
- F2011: Projective Geometry on Manifolds (748)
- F2012: Dynamical Systems (642)
- S2013: Differential Forms (437)
- F2013: Projective Geometry for Computer Graphics (431)
- S2014: Differential Forms (437)
- F2015: Geometric Structures on Manifolds (848G)
- F2015: Projective Geometry for Computer Graphics (431)
- S2016: Graduate Differential Geometry (740)
- F2016: Projective Geometry for Computer Graphics (431)
- F2016: Riemann Surfaces (848D)
- S2017: Dynamics on Moduli Spaces (848R)
- F2017: (Brown University) Geometric Structures on Manifolds
- S2018: Graduate Differential Geometry (740)
- F2018: Geometry for Computer Applications (431)
- S2019: Dynamics on Moduli Spaces (848G)
- S2020: Euclidean and non-Euclidean Geometry (430)
- S2020: Algebraic Topology (734)
- F2020: Geometry for Computer Applications (431)
- F2020: Lie Groups I (431)
- S2021: Geometric Structures (848C)
- F2022: Number theory (406)
- F2022: Geometry for Computer Applications (431)
- S2023: Geometric Structures on Manifolds (848L)
- F2023: Number theory (406)
- F2023: Geometry for Computer Applications (431)
- S2024: Graduate Differential Geometry (740)