SEAN LAWTON

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PROFESSIONAL EXPERIENCE

George Mason University (GMU): Full Professor (with Tenure), August 2020-Present

George Mason University (GMU): Associate Professor (with Tenure), August 2014-August 2020

University of Lisboa, Lisboa, Portugal: Research Visitor, Summer 2021, 2022, & 2024

Institute Des Hautes Études Scientifiques (IHES), Bures-sur-Yvette, France: Research Visitor, Spring 2019 & 2021, Summer 2023

Mathematical Sciences Research Institute (MSRI), Berkeley: Research Member, Spring 2015

Tata Institute Fundamental Research, Mumbai, India: Research Visitor, January 2014

University of Texas-Rio Grande Valley (UTRGV): Assistant Professor/Associate Professor (with Tenure), August 2009- August 2014

University of Maryland at College Park: Visiting Lecturer, August 2008-August 2009

Instituto Superior Técnico, Portugal: Research Fellow, August 2007-August 2009

Kansas State University: Visiting Assistant Professor, August 2006- August 2007

EDUCATION

Ph.D. Mathematics University of Maryland, May 2006. Adviser: William Goldman,
Thesis: $\mathrm{SL}(3,\mathbb{C})$-*Character Varieties and* $\mathbb{RP}^2$-*Structures on a Trinion*,
Committee: William Goldman, John Millson, Sergei Novikov, James Schafer, Dieter Brill.

M.A. Mathematics University of Maryland, May 2003. Adviser: John Millson,
Thesis: *Deformation Spaces of Polygons in the Euclidean Plane.*

B.S. with Honors in Mathematics University of Maryland, May 2000. Adviser: Lawrence Washington,
Thesis: *Puzzles, Graphs, and Permutation Groups.*

RESEARCH INTERESTS

The geometric study of representations of groups and their moduli. Dynamical systems on moduli spaces of representations. Experimental and visual pure mathematics.

PUBLICATIONS[1][# citations in brackets]

Refereed Articles[2]:

1. *Non-ergodicity on* SU(2) *and* SU(3) *character varieties of the once-punctured torus* (with G. Forni, W. Goldman, C. Matheus), Annales of Henri Lebesgue (accepted in 2024, to appear) [3]

2. *Mixed Hodge structures on character varieties of nilpotent groups* (with C. Florentino, J. Silva), Revista Matemática Complutense (accepted in 2024, to appear) [2]

3. *Flawed groups and the topology of character varieties* (with C. Florentino), Topology and its Applications, 341 (2024), Paper No. 108756, 30 pp. [6]

4. *Dynamics on nilpotent character varieties* (with J-P, Burelle), Conformal Geometry and Dynamics, 26 (2022), pp. 194-207. [2]

5. *Poisson maps between character varieties: gluing and capping* (with I. Biswas, J. Hurtubise, L. C. Jeffrey), J. Symplectic Geom. 20 (2022), no.6, 1255-1312. [2]

6. *Bad Representations and Homotopy of Character Varieties* (with D. Ramras and C. Guérin), Annales Henri Lebesgue, Volume 5 (2022), pp. 93-140. [5]

7. *Mapping class action on* SU(3)*-character varieties* (with W. Goldman and E. Xia), Ergodic Theory and Dynamical Systems, 41 (2021), no. 8, 2382-2396. [9]

8. *Wonderful Compactification of Character Varieties* (with Indranil Biswas and Dan Ramras), Pacific Journal of Mathematics, 302 (2019), no. 2, 413-435. [4]

9. *Geometry Labs United: an invitation.* (with Jayadev Athreya, David Dumas, William Goldman, Sergey Grigorian, Rosemary Guzman, Philipp Hieronymi, Anton Lukyanenko, Jeremy Tyson, and Aaron Wilson), Notices Am. Math. Soc. 65, No. 9, 1088-1094 (2018).[3]

10. *Rank 1 character varieties of finitely presented groups.* (with Caleb Ashely and Jean-Philippe Burelle), Geom. Dedicata 192 (2018), 1–19. Mathematica, Sage, & Python companion programs available. Program has been implemented into SnapPy. [24]

11. *Varieties of Characters* (with Adam Sikora), Algebr. Represent. Theory, 20 (2017), no. 5, 1133–1141. [16]

12. *Decision problems, complexity, traces, and representations* (with Lars Louder, Ben McReynolds), Groups Geom. Dyn. 11 (2017), no. 1, 165–188 [14]

13. *Invariants of pairs in* $\mathrm{SL}(4,\mathbb{C})$ *and* $\mathrm{SU}(3,1)$ (with Krishnendu Gongopadhyay), Proc. Amer. Math. Soc. 145 (2017), no. 11, 4703–4715. [5]

14. *Homotopy groups of character varieties of free groups* (with Carlos Florentino, Daniel Ramras), Ann. Sc. Norm. Super. Pisa Cl. Sci. (5) 17 (2017), no. 1, 143–185. [16]

15. *On the homotopy type of free group character varieties*[4] (with Ana Casimiro, Carlos Florentino, André Oliveira), Boletim da Sociedade Portuguesa de Matemática, Special Issue (2016), 53-57 [2]

[1]Research articles available on `https://arxiv.org/a/lawton_s_1.html`.
[2]Coauthors listed in alphabetical order here and as published ("first authors" do not exist in pure mathematics).
[3]Not counted in citation analysis since it is not a research article.
[4]A summary of our paper: *Topology of Moduli Spaces of Free Group Representations in Real Reductive Groups*

16. *Character varieties of free groups are Gorenstein, but not always factorial* (with Chris Manon), Journal of Algebra, 456 (2016), 278–293.[3]

17. *E-polynomial of the* $\mathrm{SL}(3,\mathbb{C})$*-character variety of free groups* (with Vicente Muñoz), Pacific Journal of Mathematics, 2016 [25]

18. *Topology of Moduli Spaces of Free Group Representations in Real Reductive Groups* (with Ana Casimiro, Carlos Florentino, André Oliveira), Forum Mathematicum, 2016 [18]

19. *Fundamental groups of character varieties: surfaces and tori* (with Indranil Biswas and Daniel Ramras), Mathematische Zeitschrift, 2015 [14]

20. *Covering spaces of character varieties* (with Daniel Ramras), New York Journal of Mathematics, 2015 [18]

21. *Fundamental Group of Moduli Spaces of Representations* (with Indranil Biswas), Geometriae Dedicata, 2015 [6]

22. *E-polynomial for* $\mathrm{SL}(2,\mathbb{C})$*-character spaces of free groups* (with Samual Cavazos), International Journal of Mathematics, 2014 [12]

23. *Topology of character varieties of Abelian groups* (with Carlos Florentino), Topology and its Applications, 2014 [41]

24. *The topology of parabolic character varieties of free groups* (with Indranil Biswas, Carlos Florentino, Marina Logares), Geometriae Dedicata, 2014 [2]

25. *Character varieties and the moduli quiver representations* (with Carlos Florentino), In the tradition of Ahlfors-Bers, Papers from the 5th Ahlfors-Bers Colloquium held at Rice University, Contemporary Mathematics, American Mathematical Society, 2013 [13]

26. *Singularities of free group character varieties* (with C. Florentino), Pacfic Journal of Mathematics, Vol. 260 (2012), No. 1, 149-179. [35]

27. *Computing* $\mathrm{SL}(2,\mathbb{C})$ *Central Functions with Spin Networks* (with Elisha Peterson), Geometriae Dedicata, Volume 153, 73-105, Number 1 (August 2011) Companion Mathematica program available at `wolframlibrary.com`. [1]

28. *Algebraic independence in* $\mathrm{SL}(3,\mathbb{C})$ *character varieties of free groups*, Journal of Algebra, Volume 324, Issue 6, 1383-1391, (September 2010) [9]

29. *The topology of moduli spaces of free group representations* (with Carlos Florentino), Mathematische Annalen, 345, No. 2, 453-489 (October 2009) [44]

30. *Obtaining the One-Holed Torus from the Pair-of-Pants: Duality in an* $\mathrm{SL}(3,\mathbb{C})$*-Character Variety*, Pacific Journal of Mathematics, 242, No. 1, 131-142 (September 2009) [6]

31. *Poisson Geometry of* $\mathrm{SL}(3,\mathbb{C})$*-Character Varieties Relative to a Surface with Boundary*, Transactions of the American Mathematical Society, 361, No. 5, 2397-2429 (May 2009) [28]

32. *Spin Networks and* $\mathrm{SL}(2,\mathbb{C})$*-Character Varieties* (with Elisha Peterson), Papadopoulos, Athanase (ed.), Handbook of Teichmüller Theory Volume II, European Mathematical Society, IRMA Lectures in Mathematics and Theoretical Physics 13, 685-730 (March 2009). ISBN 978-3-03719-055-5. [7]

33. *Minimal Affine Coordinates for* $\mathrm{SL}(3,\mathbb{C})$ *Character Varieties of Free Groups*, Journal of Algebra, Volume 320, Issue 10, 3773-3810 (November 2008) [24]

34. *Generators, relations and symmetries in pairs of* 3×3 *unimodular matrices* , Journal of Algebra Volume 313, Issue 2, Pages 782-801 (July 2007) [51]

35. $\mathrm{SL}(3,\mathbb{C})$-*Character Varieties and* $\mathbb{RP}^2$-*Structures on a Trinion* (PhD Dissertation)[5], ProQuest, 2006, ISBN 9780542910173 [13]

Submitted Research Articles:

1. *Character Varieties of Generalized Torus Knot Groups* (with C. Florentino), `https://arxiv.org/abs/2401.15228` [1]

2. *Dynamics on the* $\mathrm{SU}(2,1)$-*character variety of the one-holed torus* (with S. Maloni, F. Palesi), `https://arxiv.org/abs/2402.10838`

Citation index is 13.41 (36 research articles receiving 483 citations from 219 sources & 192 authors)[6]; averaging 1 citation per week 2016-2024 (according to Google scholar)

GRANTS (Total Awards: ∼$580,000)

1. PI (co-PI's W. Goldman, A. Lukyanenko), July 2020, Institute for Computational and Experimental Research in Mathematics (ICERM) Workshop Grant to host Geometry Labs United Conferences, approximate budget $20,000 (GMU is matching funds for a total of $40,000).

2. **PI, Simons Collaboration Grant, 2018-2023, $42,000**

3. PI (co-PI A. Lukyanenko), MEGL Expansion grant from COS-GMU, $150,000, Awarded Fall 2017

4. PI, Outreach and Development grant from Elsevier, $2,500, Awarded Spring 2016

5. PI (co-PI C. Manon), Research Equipment grant from GMU, $17,500, Awarded Fall 2105

6. PI, *Character Varieties: Experiments And New Frontiers*, Mathematics Research Communities, Co-PIs: Adam Sikora, Chris Manon, Event held Summer 2016 [7]

7. PI, Geometry Labs United (GLU) conference, NSF (via GEAR), $8,000, Event held Summer 2015

8. PI (with co-PI Manon), Research Experiences for Graduate Students (NSF subaward via GEAR) , $23,560 supporting 3 visiting students to work in MEGL, Event held Summer 2015

9. **PI, NSF-DMS,** *Applications of Non-Commutative Algebra to Character Varieties***, 2013-2016, $118,167**

10. PI (co-PI Todd Drumm), Research Workshop Grant (NSF subaward via GEAR), $35,000, Event held December 2013

11. **PI, Simon's Collaboration Grant, 2012-2017, $35,000**

12. Invited "founding member" in the multi-institutional (University of Maryland, University of Illinois, Princeton, Stanford) NSF Research Networks in Mathematical Science (RNMS) program GEometric structures And Representation varieties (GEAR–NSF-RMS 1107367), Fall 2010-Spring 2019, providing approximately $10,000 in research travel support.

13. Member of Portugese research projects (2009-2012) providing approximately $6000 in research travel support.

[5]Some results in this thesis do not appear elsewhere.
[6]Citation data available upon request.
[7]Budget handled by MRC.

14. LSAMP awards to support undergraduate research in EAGL, approximately $4,000, UTRGV 2010-2012

15. PI, Undergraduate Research Initiative, UTRGV, $2,000, Fall 2010 and $2,000, Fall 2011 and $4,000, Spring 2013

16. PI, Faculty Development Council Grant, UTRGV, $2400, Spring 2010 and $1,337, Spring 2012

17. PI, American Mathematical Society researcher travel grants to attend the International Congress of Mathematicians, $3050, Fall 2009 (and $3700 awarded Summer 2014 but could not accept)

18. PI on Faculty Research Council Grant, UTRGV, $5000, Fall 2009

19. PI, Research Fellowship from Fundação para a Ciência e a Tecnologia (FCT) to work at Insituto Superior Técnico (IST), 2007-2009 (approximately 25,000€)

PRESENTATIONS

1. *The* $\mathrm{SU}(2,1)$*-Character Variety of a 1-holed Torus*, Geometry & Physics Seminar, University of Lisbon, Portugal, June 19, 2024

2. *The* $\mathrm{SU}(2,1)$*-Character Variety of a 1-holed Torus*, Knots in Washington Conference, George Washington University (GWU), April 28, 2024

3. *Deformations of Generalized Torus Knot Groups*, Knots in Washington Conference, George Washington University (GWU), December 10, 2023

4. *The Mason Experimental Geometry Lab*, GMU Honors College Colloquium, September 15, 2023

5. *What is a Character Variety?*, Special Colloquium, University of Saskatchewan, Canada, July 12, 2023

6. *Dynamics on nilpotent character varieties*, Dynamics Seminar, Indian University-Purdue University, Indianapolis (IUPUI), February 27, 2023

7. *Flawed Groups*, Colloquium, Indian University-Purdue University, Indianapolis (IUPUI), February 24, 2023

8. *Dynamics on nilpotent character varieties*, Geometry Seminar, University of Virginia (UVA), December 13, 2022

9. *Flawed Groups*, Knots in Washington Conference, George Washington University (GWU), December 10, 2022

10. *Mixed Hodge Structures on Character Varieties of Nilpotent Groups*, Topology, Algebraic Geometry & Dynamics Seminar, GMU, October 28, 2022

11. *The Mason Experimental Geometry Lab*, GMU Honors College Colloquium, September 23, 2022

12. *Dynamics on nilpotent character varieties*, Virtual Geometric Structures Seminar, Indian Institute of Science Education and Research (IISER) Mohali, India, May 17, 2022

13. *Dynamics, Finite Fields, and Character Varieties: A Geometry Lab Project Working!*, Heidelberg Experimental Geometry Lab Seminar, Heidelberg University, Germany, May 2, 2022

14. *Dynamics, Finite Fields, and Character Varieties: A Geometry Lab Project Working!*, Metrics, Measures, and Analysis Seminar, George Mason University, April 18, 2022

15. *Dynamics on nilpotent character varieties*, Dynamics Seminar, University of Maryland, College Park, March 17, 2022

16. *Dynamics on nilpotent character varieties*, Topology, Algebraic Geometry & Dynamics Seminar, George Mason University, March 12, 2022

17. *Examples of Moduli Spaces*, GMU Graduate Student Seminar, February 4, 2022

18. *The Mason Experimental Geometry Lab*, GMU Honors College Colloquium, November 19, 2021

19. *Mixed Hodge Structures on Character Varieties of Nilpotent Groups*, Geometry-Topology Seminar, University of Maryland, College Park, November 8, 2021

20. *Flawed Groups*, The 3rd JNU-KAIST Geometric Topology Fair, Korean Advanced Institute Science Technology (KAIST), South Korea (virtual), October 21, 2021 (Korean time zone)

21. *Poisson maps between character varieties*, Geometry & Physics in Lisbon Seminar, University of Lisbon, Portugal, June 21, 2021

22. *Flawed Groups*, Geometry & Physics in Lisbon Seminar, University of Lisbon, Portugal, June 14, 2021

23. *Mapping class group action on SU(3)-character varieties*, Séminaire, Institut des Hautes Études Scientifiques (IHES), France, April 14 & 21, 2021

24. *Flawed Groups*, Leiden Algebra, Geometry, and Number Theory Seminar, Leiden University, Netherlands, April 12, 2021

25. *State of MEGL*, Geometry Labs United 2020 Conference (Virtual, Hosted by ICERM), July 16, 2020

26. *What is a Character Variety?*, TX-State University, Second Annual Jorge Acosta Memorial Lecture, April 3, 2020

27. *Bad representations and homotopy of character varieties*, University of Lisboa, Geometry Seminar, January 10, 2020

28. *Minimal generating sets for coordinate rings of representations*, GMU, Combinatorics, Algebra and Geometry Seminar (CAGS), April 12, 2019

29. *Minimal Generating Sets for Coordinate Rings of Representations*, Institut des Hautes Études Scientifiques (IHES), Séminaire Géométrie et groupes discrets, France, March 11, 2019

30. *The hidden non-commutative structure of representations*, Howard University, Colloquium, February 15, 2019

31. *Geometry Labs United: Welcome and Overview*, Joint Mathematics Meetings, January 2019

32. *Compactification of Character Varieties*, Current Trends in Hitchin Systems , Universidad Nacional de Buenos Aires, Argentina, December 18, 2018

33. *Rank 1 character varieties of finitely presented groups*, University of VA, Topology Conference, October 2017

34. *Compactification of Character Varieties*, University of Lisbon (Portugal), Geometry Seminar, May 2017

35. *Compactification of character varieties*, AMS NY Sectional, May 2017

36. (1) *Examples of Outreach Activities*, (2) *Invariants of pairs in SL(4,C) and SU(3,1)*, & (3) *Character Varieties of Free Groups are Gorenstein but not always Factorial*, Atlanta, GA, AMS-JMM, January 2017

37. *About the Mason Experimental Geometry Lab*, SIAM Faculty Symposium at GMU, November 4, 2016

38. *Varieties of Characters*, AMS Maine Sectional, September 24-25, 2016

39. *The Betti Moduli Space: Experiments and visualizations*, Geometries, surfaces and representations of fundamental groups (University of Maryland), June 20-25, 2016

40. *The Betti Moduli Space in Arbitrary Characteristic*, Simons Center Talk, June 16, 2016

41. *Introduction to Character Varieties I and II* and *Computations/Experiments with Character Varieties*, Snowbird Lectures, June 5-11, 2016

42. *Rank 1 Character Varieties* , TADS at GMU, May 13, 2016

43. *Homotopy of Betti Moduli Spaces*, Higgs Bundles, International Centre for Theoretical Sciences (Bangalore, India), March 2016

44. *Character Varieties of Free Groups are Gorenstein, but not always Factorial*, UMCP, Geometry and Topology Seminar, December 14, 2015

45. *Introduction to character varieties* (2 expository talks) and *Topology of the moduli space of local systems over an open surface* (1 research talk), Workshop on Geometric Structures, Hitchin Components and Representation Varieties, Korean Institute of Advanced Study (Seoul, Korea), Oct. 20-Oct. 24, 2015

46. *What is a Lie group?*, Student Research Talk, GMU, Fall 2015

47. *Conjugation classes of pairs in* $\mathrm{SL}(4,\mathbb{C})$ *and* $\mathrm{SU}(3,1)$, Geometry and Topology Seminar, Universidad Complutense de Madrid (Spain), June 3, 2015

48. *Conjugation classes of pairs in* $\mathrm{SL}(4,\mathbb{C})$ *and* $\mathrm{SU}(3,1)$, Universitat Autònoma de Barcelona (Spain), June 4, 2015

49. *Homotopy groups of character varieties*, Higgs Bundles and Character Varieties Special Session, Joint SPM-AMS Meetings, Porto, Portual, June 10, 2015

50. *Topology of Free Group Character Varieties* , Geometry-Topology Seminar, UMCP, November 10, 2014

51. *Counting Points on a Moduli Space* & *Homotopy of Character Varieties*, Topology, Arithmetic, & Dynamics Seminar, GMU, October 15 & November 12, 2014

52. *What is the Mason Experimental Geometry Lab*, SIAM Faculty Symposium at GMU, Fall 2014

53. *What is a character variety?*, Colloquium, Howard, October 24, 2014

54. *What is a character variety?*, Colloquium, IUPUI, October 10, 2014

55. *Topology of moduli spaces of representations*, ICM Satellite Workshop, *The Geometry, Topology, & Physics of Moduli Spaces of Higgs Bundles*, NUS (Singapore), Summer 2014

56. *Character Varieties and their Topology*, Workshop on the topic of Geometric Structures and Discrete Groups, University of Texas, Austin, Spring 2014

57. *Irreducibility of Abelian Character Varieties*, Algebra Seminar, Northwestern University, Spring 2014

58. *Covering Spaces of Moduli Spaces of Representations*, Topology Seminar, Purdue University, Spring 2014

59. *What is a character variety?*, Colloquium, George Mason University, Spring 2014

60. *All about SL(2,C) character varieties I, II*, Mini-Course, Workshop on Character Varieties and Geometric Structures, Howard University, Fall 2013

61. *E-Polynomial of SL(2,C)-Character Varieties of Free Groups*, National Center for Theoretical Sciences, National Cheng Kung University, Tainan, Taiwan, July 5, 2013

62. *Topology and Irreducibility of Character Varieties of Abelian Groups*, National Center for Theoretical Sciences, National Cheng Kung University, Tainan, Taiwan, July 1, 2013

63. *Classification of Irreducible Moduli Spaces of Flat G-bundles on a Torus*, University of Texas-Brownsville, April 20, 2013

64. *Results on Moduli Spaces of Representations*, Geometric Groups on the Gulf, South Padre Island, Texas, March 21-24, 2013

65. *Topology of Character Varieties of Abelian Groups*, 10 minute talk, Joint Mathematics Meetings, San Diego, CA, January 2013

66. *Topology of Character Varieties of Abelian Groups*, Workshop on Higher Teichmuller-Thurston Theory, CRM Montreal, October 15-19, 2012

67. *Topology of Character Varieties of Abelian Groups*, Geometria em Lisboa, Instituto Superior Técnico, Lisbon, Portugal, July 2012

68. *Topology of Parabolic Character Varieties of Free Groups*, Workshop: Geometry of surface group representations, Centre de Recerca Matemàtica, Barcelona, Spain, May 2012

69. *What is a character variety?*, New Mexico State University, Colloquium, April 2012

70. *Topology of Character Varieties of Abelian Groups*, Purdue University, Topology Seminar, March 2012

71. *Character Varieties of Finitely Generated Abelian Groups*, University of Texas-Brownsville, Mathematics Seminar, November 2011

72. *Parabolic Character Varieties of Free Groups*, University of Texas-Pan American, Algebra & Geometry Seminar, November 2011

73. *Character Varieties of Finitely Generated Abelian Groups*, University of Texas-Pan American, Algebra & Geometry Seminar, October 2011

74. *Character Varieties and Group-Valued Quiver Representations*, Discrete Groups & Geometric Structures with Applications IV, Oostende, Belgium, May 2011

75. *Local and Global Topology of Group-Valued Quiver Representations*,The Triennial Ahlfors-Bers Colloquium, Rice University, March 2011

76. *Singularities of free group character varieties*, International Congress of Mathematicians (ICM), Hyderabad, India, August 2010

77. *Singularities of free group character varieties*, Vector Bundles and Algebraic Curves at Instituto Superior Técnico, Lisboa, Portugal, June 2010

78. *Singularities of free group character varieties*, ICM satellite Workshop at National University of Singapore on Geometry, Topology and Dynamics of Character Varieties, July 2010

79. *Mapping class group ergodicity on moduli spaces (parts I and II)* , Algebra & Geometry Seminar, UTRGV, Feb. and March 2010

80. *Singularities of free group character varieties*, South Texas Algebra Colloquium in South Padre Island (jointly organized by UT-Pan American and UT-Brownsville), November 7, 2009

81. *Singularities of free group character varieties*, Geometry/Topology Seminar at University of Chicago, November 19, 2009

82. *Singularities of free group character varieties*, American Mathematical Society Special Session on Lie Groups, Lie Algebras, and Representations at Waco, Texas, October 16-18, 2009

83. *Singularities of free group character varieties*,Topology Seminar at University of Texas at Austin, September 28, 2009

84. *A survey of free group character varieties*, Seminar Series at University of Texas at Pan American, Sept. 25, Oct. 2, Oct. 9 2009

85. *The topology of the moduli of free group representations*, Geometry-Topology Seminar, University of Maryland, 6 October 2008

86. *Algebraic Independence in* $\mathrm{SL}(3,\mathbb{C})$*-Character Varieties of Free Groups*, Algebra Seminar, Instituto Superior Técnico, 15 July 2008

87. *On the topology of the moduli of free group representations*, Geometry-Topology Special Session, Encontro Nacional da Sociedade Portuguesa de Matemática, 26 June 2008

88. *A picture book of the topology of some character varieties*, seminar, Brooklyn College, 7 April 2008

89. *Some recent results on character varieties of surface groups*, colloquium, Saint Louis University, 10 March 2008

90. *Obtaining the One-Holed Torus from Pants: Duality in an* $\mathrm{SL}(3,\mathbb{C})$*-Character Variety*, Geometria em Lisboa, Instituto Superior Técnico, 20 November 2007

91. *Poisson structures on moduli of surface group representations into* $\mathrm{SL}(3,\mathbb{C})$ Geometry Seminar, Universidade do Porto, 9 November 2007

92. *Minimal Affine Coordinates for* $\mathrm{SL}(3,\mathbb{C})$ *Character Varieties of Free Groups*, Algebra Seminar, Instituto Superior Técnico, 11 October 2007

93. *Generators of* $\mathrm{SL}(2,\mathbb{C})$*-Character Varieties of Arbitrary Rank Free Groups* (1 hour lecture), 7th Korean Advanced Institute Science Technology Geometric Topology Fair (Daejeon, Korea), 9 July 2007

94. *Central Functions and* $\mathrm{SL}(2,\mathbb{C})$*-Character Varieties* (1 hour lecture), 7th Korean Advanced Institute Science Technology Geometric Topology Fair (Daejeon, Korea), 10 July 2007

95. *Minimal Generators for* $\mathrm{SL}(3,\mathbb{C})$*-Character Varieties of Free Groups*, Algebra Seminar, Kansas State University, 23 April 2007

96. *Algebraic Independence and Symmetry in* $\mathrm{SL}(3,\mathbb{C})$*-Character Varieties of Free Groups*, Algebra Seminar, Kansas State University, 30 April 2007

97. *Obtaining the One-Holed Torus from Pants: Duality in an* $\mathrm{SL}(3,\mathbb{C})$*-Character Variety*, Geometry, Topology & Physics Seminar, Kansas State University, 9 April 2007

98. *Poisson structures on moduli of surface group representations into* $\mathrm{SL}(3,\mathbb{C})$, Geometry & Topology Seminar, McMaster University, 27 February 2007

99. *Symmetry in* $\mathrm{SL}(3,\mathbb{C})$*-Character Varieties* (25 minute talk), American Mathematical Society Special Session on Invariant Theory, New Orleans, LA, 6 January 2007

100. *Symplectic Foliation on* $\mathrm{SL}(3,\mathbb{C})$*-Character Varieties*, Geometry, Topology & Physics Seminar, Kansas State University, 6 November 2006

101. *On the Moduli of* $\mathrm{SL}(3,\mathbb{C})$*-Bundles over a Surface of Euler Characteristic -1* (40 minute talk), American Mathematical Society Special Session on Algebraic Geometry and Moduli Spaces, Storrs, CT, 29 October 2006

102. *Poisson Structure on* $\mathrm{SL}(3)$*-Character Varieties Relative to a Punctured Surface* (20 minute talk), American Mathematical Society Special Session on Low Dimensional Topology and Geometry, Salt Lake City, UT, 8 October 2006

103. *Poisson Structures on Moduli of* $\mathrm{SL}(3)$*-Bundles over a Punctured Surface* (1 hour lecture), Park City Mathematics Insitute, Park City, UT, 7 July 2006

104. *Poisson Structure of Flat* $\mathrm{SL}(3)$*-bundles over a Thrice Punctured Sphere*, Geometria em Lisboa, Instituto Superior Técnico, 7 June 2006

105. *Poisson Structure on* $\mathrm{SL}(3) \times \mathrm{SL}(3)//\mathrm{SL}(3)$ *Relative to a Trinion*, Colloquium, Kansas State University, 11 May 2006

106. *Symmetries in the* $\mathrm{SL}(3,\mathbb{C})$*-Character Variety of a Rank 2 Free Group*, Knots in Washington XXII, George Washington University, Washington DC 7 May 2006

TEACHING EXPERIENCE

1. Full/Associate Professor, George Mason University, Department of Mathematical Sciences, Fall 2014-Present

    - Created (2014) and directed (2014-2020) the Mason Experimental Geometry Lab (MEGL)
    - Created (2014) and directed (2014-2018) MEGL's outreach program (including the network, and most of the content)
    - Created and chaired the Student Research Talks (StReeTs) seminar series
    - Taught Quantitative Reasoning (Math 106)
        (a) Partially Flipped & Hybrid Classroom where students are expected to come to the board and work problems with real-time feedback (math coaching)
        (b) Used hands-on activities to create enrichment: (1) candy proof that the real numbers are uncountable, (2) balloons to teach spherical geometry, (3) dance to teach the complex numbers, (4) paper clocks to teach modular arithmetic, (5) play-doh & magic tricks to teach topology, (6) hyperbolic paper and crochet to teach hyperbolic geometry.
        (c) Used (optional) reading of *How not to be wrong* by J. Ellenberg to get students thinking about the bigger role mathematics plays in life.

- Taught (large lecture) Calculus II (Math 114)
  (a) Partially Flipped & Hybrid Classroom where students are expected to come to the board and work problems with real-time feedback (math coaching).
  (b) Supervised Teaching Assistants and Learning Assistants.
- Graduate courses taught (12 different courses, novel[8] courses marked *): Algebra I (Math 621), Algebra II (Math 721), Lie Groups (Math 689), Moduli Spaces & Invariant Theory* (Math 639), Topology (Math 631), Algebraic Geometry (Math 697, Math 725), Algebraic Geometry II* (Math 629), Dynamics (Math 673), Differential Topology (Math 740), Algebraic Topology (Math 722), Thesis Supervision (Math 998/999)
- Undergraduate courses taught (14 different courses, novel courses marked *): Algebra I (Math 321, in-person and online), Algebraic Geometry* (Math 494), Galois & Ring Theory* (Math 494, Math 421), Differential Geometry* (Math 494, Online), Topology (Math 431), Advanced Linear Algebra (Math 322), Lie Groups* (Math 494), Mostly Surfaces* (Math 494), Honors Thesis (Math 405/406), Reading & Problems (Math 491), Number Theory (Math 301).
- Added two courses (Lie groups-Math 741, Algebraic Geometry-Math 725) to the official graduate course offerings, and added three courses (Differential Geometry-Math 432, Abstract Algebra II-Math 421, Algebraic Geometry-Math 433) to the official undergraduate course offerings at GMU.
- Architect of the Pure Math Concentration for the BS at GMU.
- Teaching focus: student advocacy, student empowerment, community learning, experimental/visual experiences.

2. Associate/Assistant Professor, University of Texas, Mathematics Department, Fall 2009-Fall 2014

- Created and directed the Experimental Algebra & Geometry Lab
  (a) Collaborated with the International Museum of Art and Science, Gear Up, AVID, IDEA, and STC to create outreach activities promoting math and art in the community and local secondary schools (intersecting with 1000's of pre-collegiate students)
  (b) Advised undergraduate research projects (8+ student projects) and undergraduate outreach projects (3+ multi-year projects)
  (c) Press: Scientific American (2 online articles), Loc Arcos, Panorama, Pan American, Monitor
- Created and chair the Secret Student Seminar (supervised 14+ student presentations)
- Created the Pure Math Track to the undergraduate math degree
- Created undergraduate courses Differential Geometry and Algebraic Geometry (and co-created Linear Algebra, Real Analysis II, Modern Algebra II)
- Created graduate courses Algebraic Geometry and Differential Geometry
- Taught Modern Geometry, Modern Algebra, Number Theory, Algebraic Geometry (graduate & undergraduate), Topology (graduate & undergraduate), Differential Geometry, Real Analysis, Algebraic Topology, Differential Topology
  (a) Developed and created online proof based homework, visualizations in Mathematica & GeoGebra
- Taught Business Calculus I, Calculus I, Calculus II, Calculus III, Linear Algebra
  (a) Set up online homework
  (b) Used BLOG to interact with students and webcast solutions and assistance

[8] first time course taught at GMU

(c) Introduced group work activities and "collaborative" lectures

(d) Flipped course with video lectures as HW and student led, professor guided problems in class

3. Visiting Lecturer, University of Maryland, Mathematics Department, Fall 2008–Summer 2009

   - Taught Calculus I (large lecture) and managed 5 teaching assistants [Fall]
   - Taught Honors Calculus I (small class) [Fall]
   - Taught Calculus II (large lecture) and managed 5 teaching assistants [Spring]
   - Taught Honors Calculus II (small class) [Spring]
   - Taught senior level Euclidean and Non-Euclidean Geometry course (used Geometer's Sketchpad to explore concepts) [Fall and Spring]
   - Co-director of Experimental Geometry Lab [summer]

4. Visiting Assistant Professor, Kansas State University, Mathematics Department, Fall 2006–Spring 2007

   - Taught Experimental College Algebra (small class, innovative curriculum using Excel spreadsheets to explore concepts)
   - Taught Traditional College Algebra (large lecture with standard curriculum)
   - Received Dean's citation for good teaching (response to student praise) within 2 weeks of starting (fall 2006)
   - Fellow of the Center of Quantative Education at Kansas State University: assisting in the development of a new College Algebra course at Kansas State University under the supervision of Professor Andrew Bennett.

5. Teaching Assistant, University of Maryland, College Park, Mathematics Department, Fall 2000–Spring 2006

   - Departmental Adviser for undergraduate Math Club, (Fall 2005)
   - Taught Calculus I Course as Lecturer, (Summer 2005)
   - Undergraduate Academic Adviser, (Fall 2004- Spring 2005)
   - Organized William Goldman's Research Interaction Team on Moduli Spaces, (Spring 2004)
   - Teaching Assistant for Undergraduate Topology & Differential Geometry Courses, (Fall 2004)
   - Experimental Geometry Lab Manager, (Fall 2004)
   - Graded Graduate Algebra Course, (Fall 2003)
   - Taught Recitation Courses: Linear Algebra (Spring 2003), Calculus I (Fall 2002), Calculus II (Spring 2001, Fall 2000)
   - Graded Senior Complex Analysis Course, (Spring 2002)
   - Graded Senior Linear Algebra Course & Senior Abstract Algebra Course (Fall 2001)

6. Instructor, Montgomery County Community College, Rockville Campus, Mathematics Department, Fall 2004–Spring 2006, and Summer 2009

   - Taught Linear Algebra Course, (Spring 2006)
   - Taught Multi-Variable Calculus Course, (Fall 2005)
   - Taught Calculus II Course, (Summer 2005)

- Taught Calculus I Course, (Spring 2005)
- Taught Pre-Calculus Course, (Fall 2004)
- Taught Differential Equations, (Summer 2009)
- Prepared and evaluated: homework, quizzes, MATLAB & calculator projects, tests, lectures

7. Instructor, Center for Talented Youth, South Hadley, MA, Summers 2002, 2003, 2004
   - Developed course exploring inductive & deductive reasoning in sentential logic as conjecture & proof in math
   - Taught logic, algebra, number theory, and non-Euclidean geometry to children from 10-12 years old
   - Supervised teaching assistant
8. Teaching Assistant, Center for Talented Youth, Los Angeles, CA, Summer 2001
9. Math Intern, Academic Achievement Programs, Summer 1998 - Spring 2000
   - Taught Pre-Calculus Course (Fall 1999 - Spring 2000)
   - Taught Recitation Course for Pre-Calculus (Fall 1998 - Spring 1999)
   - Worked with students "who display the potential to be successful...even though their academic profile may be less competitive."

MENTORING EXPERIENCE

Faculty Mentoring:

1. Anton Lukyanenko, Tenure-Track George Mason University (2017-2024)
2. Harrison Bray, Tenure-Track George Mason University (2024-Present)

Post-Doctoral Mentoring:

1. Rose Kaplan-Kelly, 2023-Present

PhD Students Supervised:

1. Jack Love, 2015-2019, Graduated Summer 2019, Thesis: *Stability And Classification Of Polygon Spaces*, URL: `https://mars.gmu.edu/handle/1920/12289`
   Awards: Dean's Award for Excellence (Spring 2018), Excellence in Teaching Award (Spring 2017)
   First job: (term) Assistant Professor & MEGL Outreach Director, George Mason University
2. Cigole Thomas, 2016-2022, Graduated Spring 2022, Thesis: *Stratification and Arithmetic Dynamics on Character Varieties*, URL: `https://mars.gmu.edu/handle/1920/13112`
   Awards: Provost Summer Research Fellowship (Summer 2020), TC Lim Award for Excellence in Teaching (Spring 2018), Clarke Family Award for Research (2022)
   First job: Postdoctoral Fellow, Colorado State University

Masters Students Supervised:

1. Stephanie Mui, Graduated Spring 2017, Final Presentation: *Isometric Immersion Theorems*

Undergraduate Honors Students Supervised:

1. Jermain McDermott, Graduated Spring 2016, Honors Thesis: *A Discrete Dynamical System on* $\mathrm{Hom}(F_r, \mathrm{SL}(n, \mathbb{F}_q))/\!/\mathrm{SL}(n, \mathbb{F}_q)$ *under an action of* $\mathrm{Out}(F_r)$

2. Stephanie Mui, Graduated Summer 2016, Honors Thesis: *Isometric Embedding of a Line Segment to the Unit Circle*

3. Shrunal Pothagoni, Graduated Summer 2022, Honors Thesis: *The Persistence Of Data: A Road Map*, URL: `http://hdl.handle.net/1920/12810`[9]

4. George Andrews, Graduated Spring 2022, Honors Thesis: *Vertex operator algebras: Finite-dimensional cases and conformal blocks*, URL: `http://hdl.handle.net/1920/12814`[10]

5. Violet Nguyen, Graduated Spring 2024, Honors Thesis: *Entropy on Character Varieties*

Students Supervised via Experimental Geometry Labs:[11]

1. Nicholas Lear, Fall 2024-Present

2. Dylan Evans, Fall 2024-Present

3. Violet Nguyen, Fall 2022-Spring 2024, won Amer Beslagic Award for outstanding performance in math (Spring 2022), won CMAI Research Excellence Award (Spring 2023), won Mary K. Cabell Award to the Outstanding Mathematics Student (Spring 2024), accepted to PhD program Temple University

4. Holly Miller, Fall 2022-Spring 2023, won CMAI Research Excellence Award (Spring 2023), accepted PhD program Temple University

5. Michael Merkle (graduate student), Fall 2022-Spring 2023

6. Ziqi Zhan, Fall 2022

7. Shrunal Pothagoni, Fall 2021-Spring 2022, accepted into PhD program GMU

8. George Andrews, Fall 2019-Spring 2020 & Fall 2021-Spring 2022, won Amer Beslagic Award for outstanding performance in math (Spring 2020), won Klaus Fischer Award for Academic Achievement in Mathematics (Spring 2022), accepted into PhD program North Carolina State University

9. Matthew Kearney, Fall 2019-Spring 2020, won Genevieve G. Feinstein Award in Cryptography (Spring 2020), accepted into PhD program GMU

10. Savannah Crawford, Fall 2019-Spring 2020, won the Genevieve G. Feinstein Award in Cryptography (Spring 2019), accepted to PhD program University of Utah

11. Julian Benali, Fall 2018, won Klaus Fischer Award for Academic Achievement in Mathematics (Spring 2019), won Amer Beslagic Award for outstanding performance in math (Spring 2018), accepted to PhD program University of Illinois, Chicago

12. Marvin Castellon, Summer 2017-2018, accepted into PhD program at UC, Berkeley (with Chancelor's Fellowship), won the Mary K. Cabell Award to the Outstanding Mathematics Student (Spring 2018), won best poster/presentation at the Undergraduate Research Colloquium at GMU (Spring 2018)

13. Cole Miller, Fall 2017

14. Kira Wolpert, Summer 2017

[9] I worked with the GMU Library system to set up a repository for undergraduate honors theses, this is the first one in GMU's history to use this new repository.

[10] George adapted GMU's PhD thesis template in LaTeXto be used for undergraduate honors theses

[11] Listed students were undergraduate at the time of supervision unless otherwise indicated

15. Seth Lee, Spring 2017-Summer 2017, Fall 2018, won Genevieve G. Feinstein Award in Cryptography (Spring 2018)
16. Orton Babb, Spring 2016-Summer 2016
17. Jermain McDermott, Summer 2015-Spring 2016, accepted into PhD program at University of MD, College Park (graduated Spring 2024), won Genevieve G. Feinstein Award in Cryptography (Spring 2016)
18. Robert Argus, Summer 2015-Fall 2015, won Klaus Fischer Award for Academic Achievement in Mathematics (Spring 2016)
19. Patrick Brown, Summer 2015-Fall 2015
20. Tim Reid, Summer 2015-Spring 2017, accepted to PhD program North Carolina State University (graduated Spring 2022), won an OSCAR grant to do research (Fall 2016), won OSCAR Student Excellence Award (Spring 2017)
21. Stephanie Mui, Summer 2015-Spring 2017, accepted into PhD program Courant Institute, NYU, won first place award from American Mathematics Society at the Intel International Science and Engineering Fair (2016)
22. Patrick Bishop, Summer 2015-Spring 2017, accepted into PhD program at GMU
23. Quincy Frias, Spring 2016-Summer 2017, accepted into PhD program at GMU
24. Mary Leskovec, Summer 2015-Summer 2016, won Genevieve G. Feinstein Award in Cryptography (Spring 2017)
25. Mae Markowski, Fall 2015-Fall 2016, accepted into PhD program at Rice University (graduated Spring 2022), won Mary K. Cabell Award to the Outstanding Mathematics Student (Spring 2017), NSF-GRF honorable mention (2018)
26. Donnelly Phillips, Summer 2015-Spring 2016, accepted into PhD program UVA
27. Vishal Mummareddy (high school), Summer 2015
28. Clément Guérin (graduate student), Summer 2015
29. Diaaeldin Taha (graduate student), Summer 2015, now HEGL Lab manager
30. Alex Aguilar, Fall 2013-Spring 2014, accepted into PhD program Rice University (graduated Spring 2022)
31. Jose Espinoza, Fall 2013-Spring 2014
32. Carlos Salinas, Fall 2012 - Spring 2014, accepted to PhD program Purdue University
33. Julian A Caballero, Fall 2012 & Fall 2013-Spring 2014
34. Samuel Cavazos, Spring 2011-2013, NSF Graduate Research Fellowship (GRF) winner 2013, accepted in PhD program Northwestern University
35. Marisabel Rodriguez, Fall 2010-Spring 2011
36. Raul Mercado Jr., Summer 2010, accepted into PhD program UT-RGV
37. Michael Fischer, Summer 2010

38. Rodrigo Wong, Summer 2010

39. Jaime Lopez (high school), Summer 2010

Experimental Research/Visualization Projects Mentored:

1. *Topology of the Space of Chains*, with undergraduates at UMCP, Summer 2010

2. *Counting Points on Moduli Spaces*, with S. Cavazos at UTRGV, Spring 2011 - Summer 2013 (results published in Int. Journal of Mathemtics)

3. *Finding and Classifying Special Words in Free Groups*, with undergraduates at UTRGV, Fall 2012 - Summer 2014); and with undergraduates at GMU, Summer 2015-Spring 2017.

4. *Visualization in VR*, with undergraduates at GMU, Fall 2015-Summer 2017 (VR program published as companion program to the article by Pengelley, David; Ramras, Daniel *How efficiently can one untangle a double-twist? Waving is believing!*, Math. Intelligencer 39 (2017), no. 1, 27–40).

5. *Visualizing Nash-Spheres and Flat Tori Using Sine and Cosine*, with S. Mui at GMU, Fall 2015-Spring 2017.

6. *Asymptotic Ergodicity on Moduli Spaces over Finite Fields*, with undergraduates at GMU, Summer 2015-Fall 2018.

7. *Statistics in Deformations of Large Knots*, with undergraduates at GMU, Fall 2019-Spring 2020.

8. *Experiments with Moduli Spaces*, with undergraduates at GMU, Fall 2022-Spring 2023

9. *Exploring the Grothendieck Group via Character Varieities*, with undergraduates at GMU, Fall 2024-Spring 2025

CONFERENCES ORGANIZED

1. Geometry Labs United Summer 2020 Conference, ICERM, Summer 2020 (with A. Lukyanenko and J. Love)

2. Special Session on Experimental Geometry Labs, Joint Mathematics Meetings, January 2019, Baltimore, MD (co-organized with A. Lukyanenko, M. Korten)

3. Special Session on Geometry of representation spaces, Joint Mathematics Meetings, January 2019, Baltimore, MD (co-organized with C. Manon, D. Ramras)

4. Geometry Labs United Summer 2017 Conference, University of Washington, Summer 2017 (with J. Athreya, A. Lukyanenko)

5. Mathematics Research Communities program *Character Varieties: Experiments and New Frontiers*, Snowbird, Utah, June 5– 11, 2016 (with C. Manon, and A. Sikora)

6. Geometry Labs United Summer 2015 Conference, UIUC, Summer 2015 (with J. Athreya, A. Lukyanenko, G. Work, R. Guzman)

7. Workshop on Geometric Structures and Moduli Spaces of Representations, Howard University, Fall 2013 (with Todd Drumm)

8. AMS special Session on *Real Projective Geometry* at the 2012 Joint Mathematics Meetings, Boston (with Jeffrey Danciger, Kelly Delp, Kathryn Mann)

9. Invited participant, and organizational assistant at the Mathematics Research Communities program *The Geometry of Real Projective Structures*, Snowbird, Utah, June 2011

10. AMS Special Session on *Geometry, Topology, and Algebra of Character Varieties* at Joint Mathematics Meeting 2009, Washington, D.C. (with Elisha Peterson)

SUMMER UNDERGRADUATE RESEARCH PROGRAMS ORGANIZED

1. Experimental Mathematics Summer Program at GMU, June-August 2017, 7 participants

2. Experimental Mathematics Summer Program at GMU, June-August 2016, 17 participants

3. Experimental Mathematics Summer Program at GMU, June-August 2015, 20 participants

4. Experimental Mathematics Summer Program at UTRGV, June-August 2010, 5 participants

5. Experimental Mathematics Summer Program at UMCP, June-August 2009, 8 participants

HONORS & ACKNOWLEDGMENT

1. Teaching Excellence Award Winner (university level award), GMU Spring 2020[12]

2. Mentoring Excellence Award Winner (university level award), GMU, Spring 2020[13]

3. Teaching Excellence Award Finalist, Fall 2019, GMU

4. Dean's Award for Faculty Achievement, UTRGV, Fall 2013

PROFESSIONAL SERVICE

1. External PhD thesis evaluator for Christopher Mahadeo, Thesis: *Twisted Higgs Bundles, Topological Recursion, and Quantum Curves*, University of Saskatchewan, Canada, Summer 2023

2. External grant reviewer for N̂etherlands National Science Foundation (NWO), 2022

3. Research consultant (answering questions over email, in-person, etc), 2006-Present

4. (generic) Mentor to incoming PhD student at GMU, Fall 2021-Present: total students mentored 2 (1 students presently)

5. External grant reviewer for *Swiss National Science Foundation*, 2020-2021

6. Co-founder and executive board member of the international organization *Geometry Labs United* (17+ labs around the world), and consultant/advisor on starting/running geometry labs (internationally), 2013-Present

7. Advisory board for 4-year college geometry lab proposal (for NSF funding), 2019-2021.

8. Advisory board for NSF funded project to study geometry lab outreach, 2019-2024.

9. Letter writer for undergraduates going to graduate school, and/or jobs, and/or applying for NSF-GRF[14], letter writer for graduate students getting post-docs, letter writer for post-docs applying for tenure-track jobs, letter writer for tenure-track faculty applying for new jobs and/or tenure, letter writer for faculty applying for NSF grants. Overall, writing at least 10 per year.

[12]First and only winner from the Department of Mathematical Sciences, GMU
[13]First and only winner from the Department of Mathematical Sciences, GMU
[14]I also participate in phone interviews and security clearance interviews on behalf of former students.

10. Calculus II Course coordinator, GMU Fall 2018 & Fall 2019: (1) Met with all lectures to discuss course progress and checked all exams before given, (2) Evaluated teaching of all TAs and Lectures (formal write-ups), Made uniform online HW available for all lecturers.

11. Proposed new graduate courses at GMU and new course rotation (passed all levels of approval and implemented Spring 2020). Also, proposed/implemented new method of giving PhD "qualifying exam".

12. Proposed new undergraduate courses at GMU and new course rotation (passed all levels of approval and implemented Fall 2022).

13. Topology Prelim Exam Committee, GMU Spring 2019- Fall 2020 (chair) & Fall 2021-Fall 2022 (acting chair in Fall 2022); initiated and accomplished modernization of prelim syllabus (working with topology/geometry faculty).

14. Algebra Prelim Exam Committee, GMU 2017-2018 (chair), 2019-2022

15. Masters committee (GMU): Stephanie Mui (chair) 2016-2017, Abigail Friedman 2020-2021

16. PhD committees at GMU: Jack Love (chair), Cigole Thomas (chair), Gabe Lumpkin(chair), Anunoy Chakraborty (chair), Hannah Klawa, Yemeen Ayub, Quincy Frias, Michael Merkle, Madeline Horton, Tim Banks

17. Promotion and Tenure Committee, 2016-Present

18. Policy & Hiring Committee, GMU, 2016-2017, 2017-2018, 2022

19. Thesis Examiner, PhD Thesis Committee for Clément Guérin, Université de Strasbourg, Spring 2016

20. Founder and Director of Mason Experimental Geometry Lab (MEGL) at George Mason University, Director (Fall 2014-Spring 2020)

21. Founder of *Topology, Algebraic Geometry, & Dynamics Seminar* (TADS) at George Mason University, Chair (Fall 2014-Fall 2019), 86 research talks (53 non-GMU) during my time as chair

22. Founder and faculty mentor of *Student Research Talks* Seminar (StReeTs), GMU, 2014-Present

23. Natural Sciences and Engineering Research Council of Canada (NSERC) Research Grant Evaluator, 2015

24. National Science Foundation (NSF) Research Grant Evaluator, 2014

25. Elected Member of Faculty Senate at UTRGV, Fall 2013-Spring 2014

26. Invited to judge Undergraduate Research Posters, Joint Mathematics Meetings, San Diego, CA, January 2013 & Baltimore, MD, January 2019

27. Invited AMS Panelist *Starting a Successful Research Career*, Joint Mathematics Meetings, San Diego, CA, January 2013

28. Founder and Director of Experimental Algebra & Geometry Lab at UTRGV, Fall 2009-Summer 2014

29. Chair and Founder of *Pure Mathematics Seminar* at UTRGV, Fall 2009-Spring 2014

30. Chaired Calculus: organized common final (written and online versions), helped faculty with WebAssign, managed text book orders, helped with departmental assessment, Fall 2011- Fall 2012

31. Administrator of the online discussion forum for the Mathematics Department at UTRGV, Fall 2010-Fall 2012

32. Member of Departmental level committees at UTRGV: Library, Undergraduate Curriculum, Graduate Curriculum, Colloquium, Chair Search, Lecturer Search, Faculty Search

    Notable Contributions:

    - Created Pure Mathematics concentration for undergraduate mathematics major
    - Created 5 new senior level pure mathematics undergraduate courses
    - Create 2 new pure mathematics graduate courses
    - Precipitated the use of mathjobs.org for hiring

33. Member of University level committees at UTRGV: Email Outsourcing, and Academic Policy (elected vice-chair, Fall 2013)

34. Member of College level committees at UTRGV: College Science and Mathematics Research Council

35. Referee: *Contemporary Mathematics series of the AMS*, *Research in the Mathematical Sciences*, *Crelles Journal*, *Bull. des Sci Mathematiques*, *Experimental Mathematics*, *Canadian Journal of Mathematics*, *New York Journal of Mathematics*, *Journal de l'École polytechnique - Mathématiques*, *Journal of Math and the Arts*, *Journal of Group Theory*, *Geometriae Dedicata*; *Involve*; *Journal of Differential Geometry*; *Proceedings of the American Mathematical Society*; *The International Journal of Mathematics*; *Proceedings of the Edinburgh Mathematical Society*; *Institute of Mathematical Sciences Lecture Notes*; *Prentice Hall*; *Communications in Algebra*; *Groups, Geometry, and Dynamics*; *Revista Matemática Complutense*; *Mathematische Zeitschrift*; *Compositio Mathematica*; *Duke Mathematical Journal*; *Journal of Algebra*; *Transactions of the American Mathematical Society*; *Annales de l'Institut Fourier*; *Algebraic and Geometric Topology*; *Geometry and Topology*; *Journal of Geometry and Physics*, and others.

36. Reviewer for American Mathematical Society Mathematical Reviews (49 reviews published), 2007 - Present

37. Reviewer for Zentralblatt Mathematical Reviews (38 reviews published), 2009-Present

38. Contributor to MathOverFlow (8434 reputation, top 1% in the world), 2012-Present

39. Co-directed the Experimental Geometry Lab at the University of Maryland Summer 2009

40. Created and organized a funded weekly Student Geometry-Topology Seminar, Spring 2005–Spring 2006

MATHEMATICS OUTREACH

1. Nifty Fifty speaker, 2018-2019, & 2017-2018, & 2016-2017 (4 events, including one at the Department of Homeland Security for 100 kids)
   `https://usasciencefestival.org/explore/school-programs/nifty-fifty/speakers/`

2. Created two experimental geometry labs (one in TX and one in VA). Developed extensive network for outreach in both states (100's of venues/locations)

3. Created and developed six outreach activities/scripts that have been implemented by me or my students at 100's of events in VA and in TX. Over 10000 participants in VA and over 5000 in TX (and counting). See `https://megl.science.gmu.edu/outreach/activities/` to learn about the outreach activities I developed.

4. Trained approximately 10 undergraduates, 2 masters, and 1 PhD student to implement outreach activities. Trained Jack Love to be an outreach expert and MEGL Outreach Director.

5. Trained/advised faculty at GMU, UVA and UTRGV to conduct outreach and to use the outreach materials/scripts that I developed.

6. Personally conducted 62 outreach events in TX impacting over 5000 students (venues include: libraries, elementary schools, middle schools, high schools, museums, colleges, universities)

7. Personally conducted approximately 51 events in VA impacting over 1000 students (venues include: girl scout troops, elementary schools, middle schools, high schools, libraries, math circles, DOHS)