CURRICULUM VITAE

JOHN BRITTAIN LITTLE

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PERSONAL DATA

- Born January 15, 1956, Elmira, NY; U.S. citizen
- Single

EDUCATION

Haverford College	1972-1976	B.A., major in mathematics, 1976
Yale University	1976-1980	Ph.D. in mathematics, 1980
Harvard University	1979-1980	Visiting scholar

ACADEMIC HISTORY

1978-1979	Graduate Teaching Assistant	Yale University
1980-1986	Assistant Professor of Mathematics	College of the Holy Cross
1986-2003	Associate Professor of Mathematics	College of the Holy Cross
1993-94	Visiting Fellow	Cornell University, Mathematical Sciences Institute
Spring 2003	Member	Mathematical Sciences Research Institute, Berkeley CA
2003-present	Professor of Mathematics	College of the Holy Cross

ACADEMIC AWARDS

- Graduated from Haverford College *magna cum laude*, with departmental honors in mathematics.
- Phi Beta Kappa, Haverford College, 1975
- O'Leary Faculty Recognition Award, Holy Cross, 2002
- Holy Cross Distinguished Teaching Award, 2003
- Swords Medal (25 years of service), 2005
- Anthony and Renee Marlon Professorship in the Sciences, 2012-2015
- Leonard P. Steele Prize for Mathematical Exposition, given by the American Mathematical Society to David Cox, John Little, and Don O'Shea for *Ideals, Varieties, and Algorithms*, 2016

PRINCIPAL MATHEMATICAL INTERESTS

Algebraic Geometry, Commutative Algebra, Computational Methods, Applications in Algebraic Coding Theory

COURSES TAUGHT

Abstract Algebra, Algebraic Structures, Applied Mathematics, Calculus (all of the different courses offered at Holy Cross), Calculus on Manifolds, Complex Analysis, Data Structures, Discrete Mathematics, FYP: The Mathematics of Order and The Mathematics of Chaos, History and Development of Mathematical Ideas, Introduction to Computing (using FORTRAN and Pascal), Linear Algebra, Montserrat: Identifying Patterns and Understanding Randomness, Montserrat: Mathematics Through Time and Mathematics Across Cultures, Montserrat: Modeling the Environment and Analyzing Environmental Data, Montserrat: Mathematical Journeys: From Known to Unknown; From Unknown to Known, Numerical Analysis, Ordinary Differential Equations, Principles of Analysis, Probability and Statistics, Real and Abstract Analysis, Seminar in Algebra, Seminar in Coding Theory, Seminar in Computational Commutative Algebra and Algebraic Geometry, Seminar in Lie Groups, Seminar on Representation Theory of Finite Groups and Compact Lie Groups, Seminar in Riemann Surfaces and Algebraic Curves, Seminar: Geometry Through History, Topics in Mathematics–Symmetry, Topics in Topology.

ARTICLES IN REFEREED JOURNALS

1. *Translation Manifolds and the Converse of Abel's Theorem*, *Compositio Mathematica*, **49** (1983), 147-171.
2. *On the Converse of Abel's Theorem in Characteristic p*, *Manuscripta Mathematica*, **46** (1984), 27-63.
3. *Characterizing Curves on Surfaces of Special Types*, *Mathematische Annalen*, **271** (1985), 459-465.
4. *On Some Analogs of the Reiss Relation for Curves on Rational Ruled Surfaces*, *Duke Mathematical Journal*, **52** (1985), 909-922.
5. *On Lie's Approach to the Study of Translation Manifolds*, *Journal of Differential Geometry*, **26** (1987), 253-272.
6. *On Webs of Maximum Rank*, *Geometriae Dedicata*, **31** (1989), 19-35.
7. (with Kathryn Furio) *On the Distribution of Weierstrass Points on Rational Nodal Curves*, *Pacific Journal of Mathematics*, 144 (1990), 131-136.
8. *Distribution of Weierstrass Points on Rational Cuspidal Curves*, *Canadian Mathematical Bulletin*, **33** (1991), 184-189.
9. (with Chris Heegard and Keith Saints) *Systematic Encoding via Groebner Bases for a Class of Algebraic Geometric Goppa Codes*, *IEEE Transactions on Information Theory*, **41**, no. 6 (1995), 1752-1761.

10. (with Chris Heegard and Keith Saints) *On the Structure of Hermitian Codes*, Journal of Pure and Applied Algebra, **121** (1997), 293-314.
11. (with David Ortiz, Ricardo Ortiz-Rosado, Rebecca Pablo, and Karen Rios-Soto) *Some Remarks on Fitzpatrick and Flynn's Gröbner Basis Method for Padé Approximation*, Journal of Symbolic Computation, **35** (2003), 451-461.
12. *Solving the Selesnick-Burrus Filter Design Equations Using Compututational Commutative Algebra and Algebraic Geometry*, Advances in Applied Mathematics, **31** (2003), 463-500.
13. *On the Zeroes of Two Families of Polynomials Arising From Certain Rational Integrals*, Rocky Mountain Journal of Mathematics, **35** (2005), 1205 - 1216.
14. (with George Boros, Victor Moll, Edward Mosteig, and Richard Stanley) *A Map on the Space of Rational Functions* , Rocky Mountain Journal of Mathematics **35** (2005), 1861-1880.
15. (with Leah Gold and Hal Schenck) *Cayley-Bacharach and Evaluation Codes on Complete Intersections*, Journal of Pure and Applied Algebra **196** (2005), 91-99.
16. (with Cristina Ballantine and Sharon Frechette) *Determinants Associated to Zeta Matrices of Posets*, Linear Algebra and Its Applications **411** (2005), 364-370.
17. (with Hal Schenck) *Toric surface codes and Minkowski sums*, SIAM Journal on Discrete Mathematics **20** (2006), 999-1014.
18. (with Ryan Schwarz) *On toric codes and multivariate Vandermonde matrices*, Applicable Algebra in Engineering, Communications, and Computing **18** (2007), 349-367.
19. *The Ubiquity of Order Domains for the Construction of Error Control Codes*, Advances in Mathematics of Communications **1** (2007), 151-171.
20. *Erratum for: The Ubiquity of Order Domains for the Construction of Error Control Codes*, Advances in Mathematics of Communications **2** (2008), 344-345.
21. (with Julian Hachmeister, Jasmine McGhee, Roberto Pelayo, and Spencer Sasarita) *Continua of central configurations with a negative mass in the n-body problem*, Celestial Mechanics and Dynamical Astronomy **115** (2013), 427-438.
22. *Remarks on generalized toric codes*, Finite Fields and Their Applications **24** (2013), 1-14.
23. (with Jonathan Gomez, Alex Gutierrez, Roberto Pelayo, and Jesse Robert) *Cocircular relative equilibria of four vortices*, Involve, **9:3** (2016), 395-410.
24. *Toric codes and finite geometries*, Finite Fields and Their Applications **45** (2017), 203-216.
25. *A mathematician reads Plutarch: Plato's criticism of the geometers of his time*, Journal of Humanistic Mathematics, **7:2** (July 2017), 269-293.
26. Erratum to "Toric Codes and Finite Geometries," *Finite Fields and Their Applications*, **48** (2017), 447–8.
27. *Codes from surfaces with small Picard number*, SIAM J. Algebra Geometry **2** (2018), 242-258.

New in 2018-2019:

28. *The many lives of the twisted cubic*, Am. Math. Monthly, **126: 7** (2019), 589–592.

ARTICLES IN CONFERENCE PROCEEDINGS

1. *Translation Manifolds and the Schottky Problem*, *Proceedings of Symposia in Pure Mathematics*, **49** part 1 (1989) 517-529.
2. *The Algebraic Structure of Some AG Goppa Codes*, Proceedings of 33rd Annual Allerton Conference on Communication, Control, and Computing, (1995) University of Illinois, 492-500.
3. *Canonical Curves and the Petri Scheme*, in *Gröbner Bases and Applications (Proceedings of "33 Years of Gröbner Bases", RISC-Linz, 1998)*, B. Buchberger, and F. Winkler, eds., London Mathematical Society Lecture Note Series 251, Cambridge University Press, 1998, 381-392.
4. *A key equation for codes from order domains*, in Advances in Coding Theory and Cryptography, T. Shaska, W. C. Huffman, D. Joyner, V. Ustimenko, eds. World Scientific, 2007.

BOOK CHAPTERS

1. *Applications To Coding Theory*, in *Applications of Computational Algebraic Geometry*, D. Cox and B. Sturmfels, eds. Proceedings of Symposia in Applied Mathematics, v. 53, American Mathematical Society, 1997, 143-167.
2. *Algebraic geometry codes from higher-dimensional varieties*, in *Advances in Algebraic Geometry Codes*, E. Martinez-Moro, Carlos Munera, and D. Ruano, eds. World Scientific. (March 2009)
3. *Automorphisms and Encoding of AG and Order Domain Codes*, in *Gröbner Bases, Coding, and Cryptography* (Proceedings of D1 Workshop, Special Semester on Gröbner bases, Linz, 2006). M. Sala, T. Mora, L. Perret, S. Sakata, C. Traverso, eds. Springer (May 2009)

BOOKS

1. (with David Damiano) *A Course in Linear Algebra*, Orlando: Harcourt Brace Jovanovich, 1988.
2. (with David Cox, Donal O'Shea) *Ideals, Varieties, and Algorithms*, New York: Springer Verlag, 1992, second edition, 1996, third edition 2007, fourth edition 2015. (Japanese translation, 2000, Russian translation 2000.)
3. (with David Cox, Donal O'Shea) *Using Algebraic Geometry*, New York: Springer Verlag, 1998, second edition, 2005. (Japanese translation, 2000.)
4. (with David Cox, Henry Schenck) *Toric Varieties*, Providence: American Mathematical Society, Graduate Studies in Mathematics 124, 2011.
5. (with David Damiano) *A Course in Linear Algebra*, corrected reprinting. Mineola: Dover, 2011.
6. (with David Cox, Donal O'Shea) *Ideals, Varieties, and Algorithms*, fourth edition, New York: Springer Verlag, 2015.

New in 2018-2019:

7. *Modeling and Data Analysis: An Introduction with Environmental Applications*, Providence: Americal Mathematical Society, MBK 120, 2019.

PREPRINTS AND UNPUBLISHED MANUSCRIPTS

1. *Another Connection Between Approaches to the Schottky Problem*, arXiv alg-geom/9202010.
2. *A key equation and the computation of error values for codes from order domains*, arXiv math.AC/0303299.

RECENT TALKS

1. *Symbolic Algebra Techniques in Algebraic Coding Theory*, NSA Computational Algebra Seminar, Fort Meade, MD, 8/8/1995
2. *The Algebraic Structure of Some AG Goppa Codes*, 33rd Annual Allerton Conference on Communication, Control, and Computing, University of Illinois, Urbana-Champaign, IL, 10/1/1995
3. *Error-Correcting Codes from Algebra and Geometry*, Boston University Undergraduate Mathematics Club, 2/26/1996
4. *Applications to Coding Theory*, AMS Short Course on Applications of Computational Commutative Algbra, at Joint Mathematics Meetings in San Diego, CA, 1/10/1997
5. *Gröbner Bases and Integer Programming*, in MAA Short Course on Computational Commutative Algebra and Applications, at Joint Mathematics Meetings in Baltimore, MD, 1/10/1998
6. *Canonical Curves and the Petri Scheme*, 33 Years of Gröbner Bases Conference at RISC-Linz, Austria, 2/20/1998
7. *Signal Processing and Commutative Algebra*, in SIMU Colloquium, University of Puerto Rico at Humacao, 7/20/2000
8. *Solving the Selesnick-Burrus Filter Design Equations*, in AMS Special Session on Commutative Algebra and Applications, Sectional Meeting in Hoboken, NJ, 4/29/2001
9. *Applications of Computational Commutative Algebra in Signal Processing*, Grostat V Conference, Tulane University, New Orleans, LA, 9/4/2001
10. *Applications of Computational Algebraic Geometry in Signal Processing*, Memorial Conference for Ruth Michler, Annapolis, MD, 10/28/2001
11. *Counting the Number of Solutions of A System of Polynomial Equations*, SIMU Colloquium, University of Puerto Rico at Humacao, 6/21/2002
12. *An Application of Symbolic Computational Algebra in Signal Processing*, Fields Institute SCA2002 Conference, University of Western Ontario, London, Ontario, Canada, 7/15/2002
13. *Order Domains*, UC Berkeley/MSRI Computational Algebra Seminar, 2/10/2003.
14. *Error-Correcting Codes from Algebra and Geometry*, Loyola Marymount University Mathematics Colloquium, 3/20/2003.
15. *An Application of Symbolic Computational Algebra in Signal Processing*, MSRI Resultants Seminar, 3/26/2003.
16. *Order Domains*, Tulane University Mathematics Colloquium, 4/24/2003.
17. *Order Domains*, MSRI Commutative Algebra Seminar, 4/28/2003.

18. *Error-Correcting Codes from Algebra and Geometry*, Texas A&M University Algebra-Combinatorics Seminar, 7/10/2003.
19. *Error-Correcting Codes from Algebra and Geometry*, Minicourse at SACNAS Annual Meeting, 10/2/2003.
20. *Order Domains and Generalized Goppa Codes*, AMS Special Session on Coding and Design-Theoretic Applications of Polynomials, Joint Mathematics Meetings, Phoenix, AZ, 1/7/2004.
21. *Applications of Computational Commutative Algebra in Statistics*, Clemson University Algebra and Discrete Math Seminar, 2/5/2004.
22. *Error-Correcting Codes from Algebra and Geometry*, Minicourse at SACNAS Annual Meeting, 9/25/2004.
23. *An Introduction to Computational Commutative Algebra and an Application in Statistics*, WPI Mathematics Department Colloquium, 1/14/2005.
24. *An Introduction to Computational Commutative Algebra and an Application in Statistics*, Oberlin College Mathematics Colloquium, 5/5/2005.
25. *Symmetry in Music*, Mathematics Institute at SACNAS Annual Meeting, 10/1/2005.
26. *Toric Codes*, Valley Geometry Seminar, U. Mass. Amherst, 3/31/06.
27. *Gröbner Bases for Encoding of Certain Codes from Order Domains*, D1 Workshop on Gröbner bases in Coding Theory, RISC-Linz, 5/1/06.
28. *Error-Correcting Codes from Algebra and Geometry*, Minicourse at Texas Algebraic Geometry Seminar Workshop, 5/17 - 5/19/06.
29. *Toric Codes*, Texas Algebraic Geometry Seminar, Texas A & M University, 5/20/06.
30. *Toric Codes*, Northeast Discrete Math Day, Holy Cross, 11/11/06.
31. *Mathematics and Music*, Northeastern Sectional Meeting of the MAA, Sacred Heart University, 11/18/06.
32. *Gröbner bases and polynomial equations*, University of South Alabama Mathematics Department Colloquium, 4/5/07.
33. *Order domains*, University of South Alabama Algebra Seminar, 4/6/07.
34. *Toric Codes*, AMS Special Session on Linear Codes Over Rings and Modules, Kalamazoo, 10/17/2008.
35. *Error-Correcting Codes from Algebra*, SACNAS National Meeting, 10/16/09.
36. *Mathematics Courses in the Montserrat Program at the College of the Holy Cross*, Session on First-Year Seminar/First-Year Experience Mathematics Courses, MAA MathFest, Lexington, KY, 8/4/2011.
37. *Was "Pythagoras a Babylonian?"*, Amherst College Mathematics Colloquium, 9/29/2011.
38. *List Decoding for AG Codes using Gröbner Bases*, Session on Applications of Algebraic Geometry to Coding Theory and Cryptography, SIAM Conference on Applied Algebraic Geometry, Raleigh, NC, 10/8/2011.
39. *Environmental Mathematics in a First Year Program*, MAA Session on Climate Change and Sustainability, Joint Mathematics Meetings, Boston, 1/7/2012.
40. *Continua of central configurations with a negative mass in the n-body problem*, AMS Special Session on Celestial Mechanics, Joint Mathematics Meetings, San Diego, CA, 1/9/2013.

41. Codes from cubic surfaces, University of Illinois Commutative Algebra/Algebraic Geometry seminar, 3/5/2015.
42. Codes from surfaces with small Picard number, Fq12 (12th International Conference on Finite Fields and their Applications), Saratoga Springs, 7/7/2015.
43. Conceptual Anachronism in the History of Mathematics: A Case Study from the Interpretation of the *Conics* of Apollonius (2 talks), Clavius Group Seminar, Holy Cross, 6/21/2016 and 6/23/2016
44. Codes from surfaces with small Picard number, AMS Special Session on Advances in Algebraic Coding Theory, 1123rd Meeting of the AMS, University of St. Thomas, Minneapolis, MN, 10/29/2016.
45. Continua of central configurations in the Newtonian n-body problem with a negative mass, WPI Mathematics Department Colloquium, 11/18/2016.
46. Returning to the roots of mathematics: a personal journey, Holy Cross Faculty Scholarship Lunch talk, 2/14/2017.
47. Introduction to Gröbner Bases and Computational Algebraic Geometry, Brown University Algebraic Statistics Reading Group, 4/7/2017.
48. Evaluation Codes from Algebraic Surfaces, Minisymposium on Codes for Distributed Storage, SIAM Applied Algebraic Geometry Conference, Atlanta, 8/2/2017.
49. Plato's Criticism of the Geometers in his Circle–Evidence About the History of Greek Mathematics from Plutarch, Worcester Winter Math Circle (unofficial title), 1/25/2018.

New in 2018-2019:

50. Greek mathematics recovered in Books 6 and 7 of Christopher Clavius' *Geometria Practica* (1604), Clavius Group meeting at Holy Cross, 6/29/2018, and repeated in Department Seminar, 9/26/2018.

GRANTS

1. Co-PI with D. Cox (Amherst College) and D.O'Shea (Mount Holyoke College) on NECUSE (Pew Charitable Trusts) grant in 1988 for $35,000 entitled *Computational Algebraic Geometry*.
2. Co-PI with E. Cattani (University of MA), M. Conway (Longmeadow HS), D. Cox (Amherst College), R. Currier (Smith College), T. Garrity (Williams College), K. Hoffman (Hampshire College), and D. O'Shea (Mount Holyoke College) on a three year (1990-1993) NSF grant DMS-9013220 for $1,425,835, entitled *Geometry in the Machine Age: A Regional Geometry Institute*.
3. Co-PI with D.Cox (Amherst College) and D.O'Shea (Mount Holyoke College) on NSF Undergraduate Course and Curriculum Development (CCD) grant (1996-7) DUE-9666132, for $45,004, entitled *Computational Algebra and Geometry*.

OTHER PROFESSIONAL ACTIVITIES

- Reviewer for *Mathematical Reviews*

- Referee for *Journal of Pure and Applied Algebra*, *Journal of Symbolic Computation*, *IEEE Transactions on Information Theory*, *Computers and Mathematics*, *Advances in Applied Mathematics*, *Mathematics of Computation*, *Computers and Mathematics*, *Applied Mathematics Letters*, *Experimental Mathematics*, *AAECC* (Applicable Algebra in Engineering, Communication), *SIAM Journal on Discrete Mathematics*, *Finite Fields and Their Applications*, *American Mathematical Monthly*, *College Mathematics Journal*, *Journal of Commutative Algebra*, *Journal of Algebra*, *European Journal of Combinatorics*
- Grant proposal reviewer for the National Science Foundation, AMS-NSA program
- Book reviewer for Academic Press, W.H.Freeman, D.C.Heath, Springer Verlag, Wiley
- Member of Editorial Advisory Board for Dover *Aurora* series of original mathematics books.

MEMBERSHIPS

American Mathematical Society
Mathematical Association of America
SACNAS (Society for the Advancement of Chicanos and Native Americans in Science)