

# CURRICULUM VITAE

## JOHN BRITAIN 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

## PRINCIPAL MATHEMATICAL INTERESTS

Algebraic Geometry, Commutative Algebra, Computational Methods, Applications in Algebraic Coding Theory and Signal Processing

## 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 Computational 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.

- *New since May 2006:*

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.

## 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.

- *New since May 2006:*

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.

## PREPRINTS

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.

## BOOK CHAPTER

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.

## 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. (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.)

## 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 Algebra, 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.
- *New since May 2006:*
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.

## 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*
- Grant proposal reviewer for the National Science Foundation
- Book reviewer for Academic Press, W.H. Freeman, D.C. Heath, Springer Verlag, Wiley

## MEMBERSHIPS

American Mathematical Society

Mathematical Association of America

IEEE, Information Theory Society

SACNAS (Society for the Advancement of Chicanos and Native Americans in Science)