CURRICULUM VITAE

EZRA A. BROWN

Education

- Ph. D. Mathematics, LSU, August 1969
- M. S. Mathematics, LSU, August 1967
- B. A. Mathematics, Rice University, June 1965

Professional Experience

- Alumni Distinguished Professor, Mathematics Department, Virginia Tech, 2005-2017; Professor, 1981-2005; Associate Professor, 1973-81; Assistant Professor, 1969-73; Retired since June 1, 2017
- Project NExT (New Experiences in Teaching) Consultant, 1998, 2001, 2003 to present
- Consulting Mathematician, Washington DC, 1993-2018 (summers)
- Sabbatical Year, Washington DC, 1991-92
- Consulting Mathematician, Princeton NJ, 1989-90, 2009 (summers)
- Reader, Advanced Placement Examinations in Mathematics, 1981-86
- Sabbatical Year, Munich, Germany, 1978-79

National/Regional Honors and Awards

- Mathematical Association of America (MAA) 2020 Certificate of Meritorious Service.
- MAA MD-DC-VA Section 2014 Sister Helen Christensen Service Award
- MAA 2013 Carl B. Allendoerfer Award for Excellence in Expository Writing for "Why Ellipses Are Not Elliptic Curves" (with Adrian Rice), Math Magazine 85 (June 2012), 163-174
- MAA 2010 Allendoerfer Award for "Kirkman's Schoolgirls Wearing Hats and Walking through Fields of Numbers" (with Keith Mellinger), Math Magazine 82 (2009), 3-15
- MAA 2006 Polya Award for Excellence in Expository Writing for "Phoebe Floats!," College Math Journal 36 (2005), 114-122
- MAA 2003 Allendoerfer Award for "The Many Names of (7,3,1)", Math Magazine 75 (2002), 83-94
- MAA 2001 Polya Award for "Three Fermat Trails to Elliptic Curves," College Math Journal 31(2000), 162-172
- MAA 2000 Polya Award for "Square Roots from 1; 24, 51, 10 to Dan Shanks," College Math Journal 30 (1999), 82-95
- MAA MD-DC-VA Section 1999 John M. Smith Award for Outstanding College or University Teaching

Virginia Tech Honors and Awards

- Alumni Distinguished Professorship, 2005; reappointed, 2015; emeritus since 2017
- Commencement Address, University Commencement Exercises, Fall 2003
- ODK G. Burke Johnston Award for Teaching Excellence, 2000
- Upsilon Pi Epsilon National Computer Science Honor Society, 1999
- Academy of Teaching Excellence, 1998
- William E. Wine Award for Excellence in Teaching, 1998
- MAA Student Chapter Outstanding Professor Award, 1998, 2000, 2002, 2016
- Edward S. Diggs Teaching Scholar Award, 1997
- College of Arts and Sciences Certificate of Teaching Excellence, 1991

Ph. D Students

- Robert Johnson, Graphical sequences. Ph. D. in Mathematics, 1974.
- Bruce Landman, Generalized van der Waerden numbers. Ph. D. in Mathematics, 1983.

Master of Science Students (all in Mathematics)

- Lawrence Gosnell, Quadratic forms over fields of characteristic 2. M. S., 1973.
- Kenneth Hawkes, Perfect numbers and other numbers defined by the sum of their divisors. M. S., 1975.
- Robert Ellis, Cubical complexes. M. S., 1996.
- Matthew Briggs, The General Number Field Sieve. M. S., 1998.
- Karen Potanka, Symmetry and automorphism groups of graphs. M. S., 1998.
- John McGee, Schoof's Algorithm for counting points on elliptic curves. M. S., 2006.
- Courtney Baber, List colorings of graphs. M. S., 2009.
- Maria Beane, The S(5,8,24) Steiner System. M. S., 2011.

- James Dickson, An introduction to Ramsey theory on graphs. M. S., 2011.
- Andrew Wills, The Inverse Galois Problem. M. S., 2011.
- Ryan Shifler, Computational Algebraic Geometry Applied to Invariant Theory. M. S., 2013.
- Sohail Farhangi, The 2-Large Is Large Conjecture. M. S., 2015.

Publications in refereed journals

- 1. Brown's Law of Mathematical Eponymy, or Whose Theorem Is It, Anyway? (with Adrian Rice), submitted to *Math Horizons*.
- 2. Cayley-Dickson Construction for Beginners: An Accessible Proof of Hurwitz's Sums of Squares Theorem (with Adrian Rice), to appear in *Mathematics Magazine (Math Mag)*.
- 3. Why Hamilton couldn't multiply triples (with Adrian Rice), *College Mathematics Journal* **52**, #3 (2021), 185-192.
- 4. Richard Guy, Bud Brown, and the Writing of *The Unity of Combinatorics, The Pi Mu Epsilon Journal* **15**, #3 (Fall 2020), 129-137.
- 5. Five Families around a Well: a new look at an old problem (with Matthew Crawford), *CMJ* 49 (May 2018), 162-168
- 6. Commutativity and Collinearity: A historical case study of the interconnection of mathematical ideas. Part II (with Adrian Rice), *Bulletin, British Society for the History of Mathematics (BSHM)* 31, #2 (2016), 90-103.
- Commutativity and Collinearity: A historical case study of the interconnection of mathematical ideas. Part I
 (with Adrian Rice), BSHM 31, #1 (2016), 1-14.
- 8. Saints and scoundrels and two theorems that are really the same, CMJ 46 (Nov 2015), 326-334.
- 9. Many more names of (7,3,1), Math. Mag. 88 (April 2015), 103-120.
- 10. Squareorama 4, Math Horizons 22 (November 2014), inside front cover.
- 11. A (7,3,1) puzzle, MAA Focus 34 (Aug-Sept 2014), p. 18.
- 12. Generalizing Gauss's Gem (with Marc Chamberland), *Amer. Math. Monthly* 119 (August-September 2012), 597-601.
- 13. Why ellipses are not elliptic curves (with Adrian Rice), Math Mag. 85 (June 2012), 163-174.
- 14. Trigonometry without triangles (with Adrian Rice), Math Horizons 19 (Nov 2011), 20-23.
- 15. Chocolate Key Cryptography (with Dale Bachman and Anderson Norton), *Mathematics Teacher* 104 (Sept 2010), 100-104.
- 16. A mathematical journey to Princeton, Math Intelligencer 32 #3 (Fall 2010), 35-37.
- 17. A conversation with Archimedes, Math Horizons 17 (April 2010), 22-24.
- 18. Why Is PSL(2,7) Isomorphic to GL(3,2)? (with Nicholas Loehr), Amer. Math. Monthly 116 (Oct 2009), 727-731.
- 19. A dozen problems about hats (with James Tanton), Math Horizons 16 (April 2009), 22-25.
- Kirkman's Schoolgirls Wearing Hats and Walking through Fields of Numbers (with Keith Mellinger), Math Mag. 82 (2009), 3-15.
- 21. Fibonacci's forgotten number (with Jason C. Brunson), CMJ 39 (2008), 112-120.
- 22. Whodunit? Math Horizons 14 (April 2007), 25-26, 28-29.
- 23. A conversation with Lewis Carroll, Math Horizons 14 (November 2006), 9-11.
- 24. Hyperelliptic curves with compact parameters (with Bruce Myers and Jerome Solinas), *Designs, Codes and Cryptography* 36 (2005), 245-261.
- 25. Phoebe Floats!, CMJ 36 (2005), 114-122.
- 26. A conversation with Leonardo Pisano, Math Horizons 12 (February 2005), 16-18.
- 27. Configurations with subset restrictions (with Theresa P. Vaughan), *Journal of Combinatorial Mathematics and Combinatorial Computing* 48 (2004), 197-215.
- 28. The ancient world's magical genius thinks big, Math Horizons 12 (November 2004), 5-8.
- 29. The fabulous (11,5,2) biplane, Math. Mag. 77 (2004), 87-100.
- 30. The sliding ladder, Math Horizons 11 (September 2003), 31.
- 31. Three connections to continued fractions, Pi Mu Epsilon Journal 11 (2002), 241-250.
- 32. Elliptic curves from Mordell to Diophantus and back (with Bruce Myers), *Amer. Math. Monthly* 109 (2002), 639-649.
- 33. The many names of (7,3,1), Math. Mag. 75 (2002), 83-94.
- 34. Cycles of directed graphs defined by arithmetic (mod n) (with Theresa P. Vaughan), *Discrete Mathematics* 239 (2001), 109-120.
- 35. Diophantine triplets and the Pell sequence (with M. N. Deshpande), Fibonacci Quarterly 39 (2001), 242-249.
- 36. Magic squares, finite geometries and points of inflection on elliptic curves, CMJ 32 (2001), 260-268.
- 37. Three Fermat trails to elliptic curves, CMJ 31 (2000), 162-172.
- 38. Square roots from 1; 24, 51, 10 to Dan Shanks, CMJ 30 (1999), 82-95.
- 39. Directed graphs defined by arithmetic (mod n), Fibonacci Quarterly 35 (1997), 346-351.
- 40. Why not try a sabbatical at the Nat'l Security Agency? Notices Amer. Math. Soc. (AMS) 41 (1994), 451-452.

- 41. Periodic seeded arrays and automorphisms of the shift. Transactions of the AMS. 339 (1993), 141-162.
- 42. The euclidean (mod U) property in quadratic number fields (with Daniel Shapiro and Raj Markanda), *Acta Arithmetica* 47 (1986), 143-152.
- 43. Sets in which xy + k is always a square, *Mathematics of Computation* 45 (1985), 613-620.
- 44. The class number of Q(-2q), for $p \equiv 1 \pmod{16}$ a prime, J. Number Theory 16 (1983), 95-99.
- 45. The class number of Q(-pq), for $p \equiv -q \equiv 1 \pmod{4}$ primes, Houston J. Math. 7 (1981), 497-505.
- 46. Social relativity: the motion of groups and actors (with C. J. Dudley), *The Sociological Quarterly* 22 (1981), 313-326.
- 47. Circularity in graphs and continua: topology (with H. Bell, R. F. Dickman and E. L. Green), *Fundamenta Mathematica* 112 (1981), 103-110.
- 48. The first proof of the quadratic reciprocity law revisited, Amer. Math. Monthly 88 (1981), 257-264.
- 49. Circularity in graphs and continua: combinatorics (with H. Bell, R. F. Dickman and E. L. Green), *Houston J. Math.* 6 (1980), 455-470.
- 50. The 2-class group of certain biquadratic fields II (with C. J. Parry), *Pacific Journal of Mathematics* 78 (1978), 11-26.
- 51. The 2-class group of certain biquadratic number fields (with C. J. Parry), *J. reine und angew Math.* 295 (1978), 61-71.
- 52. Diophantine equations of the form $ax^2 + Db^2 = y^p$, J. reine und angew. Math. 291 (1977), 118-127.
- 53. The Diophantine equation $x^2 + 3 = 7^m$, J. reine und angew. Math. 288 (1977), 74-76.
- 54. Representations of discriminantal divisors by binary quadratic forms II, *J. reine und angew. Math.* (1976), 132-137.
- 55. Diophantine equations of the form $x^2 + D = y^m$, J. reine und angew. Math. 274/275 (1975), 385-389.
- 56. Class numbers of quadratic fields, Symposia Matematica 15 (1975), 403-411.
- 57. The imaginary bicyclic biquadratic fields of class number one (with C. J. Parry), *J. reine und angew. Math.* 266 (1974), 118-120.
- 58. A lemma of Stark, *J. reine und angew. Math.* 265 (1974), 201.
- 59. Class numbers of real quadratic number fields, Transactions Amer. Math. Soc. 190 (1974), 90-107.
- 60. Class numbers of complex quadratic fields, J. Number Theory 6 (1974), 185-191.
- 61. The power of 2 dividing the class number of a binary quadratic discriminant, J. Number Theory 5 (1973), 413-419.
- 62. Biquadratic reciprocity laws, Proc. Amer. Math. Soc. 37 (1973), 374-376.
- 63. Class numbers of imaginary quadratic fields having exactly three discriminantal divisors (with C. J. Parry), *J. reine und angew. Math.* 260 (1973), 31-34.
- 64. Quasiperfect numbers (with H. L. Abbott, C. E. Aull, and D. Suryanarayana), *Acta Arithmetica* 22 (1973), 489-497.
- 65. Binary quadratic forms of determinant -pq. J. Number Theory 4(1972), 408-410.
- 66. Doubly regular tournaments are equivalent to skew-Hadamard matrices (with K. B. Reid), *J. Combinatorial Theory (Series A)* 12 (1972), 332-338.
- 67. A class of planar four-colorable graphs (with L. W. Johnson), Israel J. Math. 11 (1972), 53-56.
- 68. Discriminantal divisors and binary quadratic forms, Glasgow Math. J. 13 (1972), 69-73.
- 69. Quadratic forms and biquadratic reciprocity, J. reine und angewandte Mathematik 253 (1972), 214-220.
- 70. The class number of Q(-p), for $p \equiv 1 \pmod{8}$ a prime, *Proceedings AMS* 31 (1972), 381-383.
- 71. A theorem on biquadratic reciprocity, *Proceedings of the AMS*. 30 (1971), 220-222.
- 72. Theory of bivectors (with J. D. Zund), Tensor (New Series) 22 (1971), 179-185.
- 73. Representations of discriminantal divisors by binary quadratic forms, *J. Number Theory* 3 (1971), 213-225.

Books

- The Unity of Combinatorics (with Richard K. Guy), MAA Carus Monograph Series #36, AMS/MAA Press, published in 2020.
- Biscuits of Number Theory, a collection of expository articles on number theory, co-editor with Arthur Benjamin. Dolciani Mathematical Expositions #34, Mathematical Association of America, Washington DC, 2009. xiii+311 pp.
- Regiomontanus: His Life and Work, a translation of Ernst Zinner's "Leben und Werken des Johann Mueller von Koenigsberg, genannt Regiomontanus". North-Holland, Amsterdam-New York, 1990. x+402 pp.

Book Chapters

- "Getting involved with the MAA: A Path Less Traveled," in A Century of Advancing Mathematics (Stephen Kennedy, ed.), MAA Press Washington DC, 2016
- "What I Wish They'd Told Me: Notes from the Trenches of Academe", in Teaching Excellence at a Research

University (E. Scott Geller and Philip K. Lehman, editors), Chapter 8 (pp.49-54), Pearson Custom Publishing, Boston. 2007.

Invited Talks

- Over 100 invited presentations and colloquia on research topics, including a Carriage House
 Distinguished Lecture, MAA Headquarters, Washington DC (2011); invited hour addresses to the
 MD-DC-VA (1999, 2007, 2011), Northeastern (2001, 2004 the Christy Lecture, and 2007),
 EPaDel (2015) and Louisiana-Mississippi (2010 the inaugural R. D. Anderson Lecture) Sections
 of the Mathematical Association of America; banquet keynote address at MathFest 2001; the Student Activities
 Lecture at MathFest (2008); the 46th SE International Conference on Combinatorics, Graph Theory and
 Computing (2015, two one-hour talks)
- Numerous lectures on number theory, cryptography and network security both at Virginia Tech and at other universities, colleges, high schools, and professional organizations; keynote speeches for the Virginia Computer Users Conference (1994), the All-School Colloquium on Mathematics at Woodberry Forest School (1996), and Math Awareness Month at Virginia Tech (1997, 2002) and at Worcester Polytechnic Institute (2002); the Norman W. Johnson Lecture at Wheaton (MA) College (2004); Appeared on "Math: No Problem," a segment of the Virginia Foundation for Humanities radio show With Good Reason, broadcast state-wide the week of January 26-30, 2004

Presentations to Alumni and other University Groups

More than two dozen since 2005, including alumni chapters, class reunions, new faculty orientations, and the Old Guard.

Teacher Development

- Workshop leader, NSF Workshop for High School Teachers on Mathematical Studies in Modeling, Mount St. Mary's College, 1993-96
- Dossier preparation workshop for the Academy of Teaching Excellence, 1997-2011
- GTA Training Workshop (with other Diggs Scholars), 1997-2012

Program Development at Virginia Tech

- Developed (with Lorraine Holub) the Calculus Emerging Scholars Program (ESP), 1996-2001, with grants totaling \$339,540 (for pilot and full-scale projects) from Provost and Dean of Arts & Sciences
- ESP Project Director, 1996-2002
- Developed or revitalized four courses in Mathematics at the senior and graduate level: GraphTheory, History of Mathematics, Advanced Discrete Mathematics, and Cryptography I and II

Unusual Teaching Contributions

- Taught four Freshman Honors Seminars (1971-73), four University Colloquia on Fantasy and Science Fiction (1974, 1975-76, 1978), five University Colloquia on Duke Ellington (1981-85), two University Colloquia on Problem Solving (2001, 2003)
- Teacher of Record, Virginia Tech Jazz Ensemble, 1973-74
- Mentor to Ashley White, University Honors Scholar, 2002; Marshall Scholar, 2005
- Mentor to David Gagnon, Horton Honors Scholar, 2004
- Mentor to Brad Shapiro, Class of 1954 University Honors Scholar, 2006 currently tenured Professor of Marketing at the University of Chicago.

Student Research Projects

- Sixteen M.S. oral presentations, 1995 -- 2009
- Seventeen undergraduate research projects in mathematics and the honors program since 1990
- Mentor to more than fifty students in the Director's Summer, Department of Defense, 1994 2018

Mathematical Association of America Service (highlights)

- Music Director and accompanist, "MAA: The Musical," MathFest 2011, Lexington KY, August 3, 2011; "MAA: The Musical-2," MathFest 2012, Madison WI, August 1, 2012; "MAA: The Musical-2.5," EPaDel Section Meeting, Lancaster PA, March 14, 2015; and "MAA: The Musical-3," MathFest 2015 Meeting, Washington DC, August 8, 2015
- Problems Editorial Board, American Mathematical Monthly, 1995 to present
- Editorial board, Math Horizons, 2004 to 2019

- MAA Carl B. Allendoerfer Award Committee, 2001-2002, 2005-2008; Chair, 2008 (given for articles of expository excellence in *Mathematics Magazine*)
- MAA Merten M. Hasse Award, 2009-2013; Chair, 2011-2013 (given for articles of expository excellence written by a mathematician under 40)
- MAA Search Committee for the Editor of *Math Horizons* (Chair), 2011-2012
- MAA Task Force on the Daniel Solow Author's Award (Chair), 2015-2017
- MAA Task Force on Senior Members and Memberships (Chair), 2017-2018
- MAA MD-DC-VA Section Teaching Award Committee, 1999-2005; Chair, 2000-2005
- Local Arrangements Coordinator, Fall 2001 Section Meeting
- Math Jeopardy Moderator, Spring Section meetings, 2007 to 2019
- Section Program Chair, 2004-2006
- Section Governor (representative to the MAA Board of Governors), 2007-2010

Professional Organizations and Activities

- Mathematical Association of America, 1975-present
- American Mathematical Society, 1969-1975
- Pi Mu Epsilon national mathematics honor society, 2006-present

Community

- Over forty performances with the Virginia Tech Jazz Ensemble, including a year as director
- Sixty performances with the Blacksburg Master Chorale
- Six performances with Opera Roanoke