Robert N. Talbert

CONTACT INFORMATION

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RESEARCH INTERESTS

Cryptography; applied algebra and number theory; scholarship of teaching and learning; use of technology in undergraduate education; use of inquiry-based, active learning, and peer instruction techniques in undergraduate education.

EDUCATION

Vanderbilt University, Nashville, Tennessee USA

Ph.D., Mathematics (August 1997)

- Dissertation: *Stratified and equivariant homology via homotopy colimits*
- Advisor: Efstratios Prassidis
- Area of Study: Applications of category theory to generalized homology theories and geometric topology.

M.S., Mathematics (May 1994)

- Qualifying Paper: "The Leray-Serre spectral sequence, equivariance, and cohomology"
- Advisors: Bruce Hughes and Efstratios Prassidis
- Qualifying Exam Areas: Abstract algebra; universal algebra and lattice theory; category theory; algebraic topology; point-set topology.

Tennessee Technological University, Cookeville, Tennessee USA

B.S., Mathematics (May 1992)

- *Magna cum laude*, *in cursu honorum* (completed Honors curriculum)
- Minors in Psychology and English
- Wilbur Raatz Arts and Sciences Scholarship winner; Music scholarship recipient

HONORS

Franklin College

- Nominee, Faculty Award for Outstanding Scholarship, 2010

Vanderbilt University

- Outstanding Teaching Assistant Award, 1997
- Master Teaching Fellow, Vanderbilt University Center for Teaching, 1996–1997
- B. F. Bryant Prize for Excellence in Teaching, 1996

Tennessee Technological University

- R. H. Moorman Mathematics Award, 1991
- Kappa Mu Epsilon scholarship, 1991

PROFESSIONAL EXPERIENCE

Franklin College, Franklin, Indiana USA

Assistant Professor of Mathematics and Computing Science **2001–2006**
Associate Professor of Mathematics and Computing Science **2006–present**

- Taught average course load of 24 credit hours per academic year.

- Departmental courses taught:

Quantitative Reasoning	Methods of Problem Solving
Functions and Models	Topics in Geometry
Calculus	Modern Algebra
Calculus II	Topics in Mathematics: Cryptology
Calculus III	Computer Tools for Problem Solving
Differential Equations	Operations Research
Linear Algebra	

- Interdisciplinary courses taught: Cryptology, Privacy, and Leadership (Winter Term); The Life and Works of C. S. Lewis (Winter Term); New Student Transition cohort classes.
- Independent studies and undergraduate research supervised:

Risk Management and Forecasting	Number Theory
Hyperbolic Geometry and Trigonometry	Mathematical Methods in Artificial Intelligence
Elliptic Curve Cryptography	Taxicab Geometry
Computer Investigations in Geometry	Finite Fields and Applications
Technology Law	Computer Modeling of Hyperbolic Geometry
Geometry in Art, Architecture, and Nature	

- **Director, Dual-Degree Engineering Program** (2006–present)
  - Worked with Purdue School of Engineering and Technology at Indiana University-Purdue University-Indianapolis to develop dual-degree program in engineering with Franklin College. Designed curricular programming to allow completion of two degrees in five years.
  - Collaborated with IUPUI engineering department to coordinate course content, internship and co-op experiences, and curricular development.
  - Worked with Franklin College admissions department to target and contact potential students regarding the program.
  - Created promotional materials and recruited interested high school students through personal contacts, telephone interviews, and email.
  - Managed logistics for Franklin College students commuting to IUPUI to take engineering courses.
  - Developed one-credit hour course in MATLAB for engineering students and mathematics majors.
- **Promotion and Tenure Committee** (2006–present; chair, 2008–2009; Senior Faculty Review Subcommittee 2009–present)
  - Oversaw review of materials for all faculty eligible for promotion or tenure during AY 2008–2009 and coordinated writing of recommendations to the Vice President for Academic Affairs regarding promotion and tenure decisions.
  - Designed a faculty development workshop on the promotion and tenure process at Franklin College specifically for first- and second-year faculty.
  - As member of Senior Faculty Review Subcommittee, oversaw evaluation of materials for faculty undergoing five-year post-tenure reviews and writing of recommendation letters to the VPAA.
  - Provided leadership in college-wide reassessment of tenure-granting process.
  - Collaborated with college Steering Committee to design course evaluation instruments for travel courses and Winter Term courses.
- **Mentor Professor for High School Dual-Enrollment Programs** (2007–2010)
  - Collaborated with teachers at Whiteland Community High School (Whiteland, IN) and Center Grove High School (Greenwood, IN) to modify existing AP Calculus courses to earn Franklin College credit.
  - Designed curricular units for high school courses on using spreadsheets in calculus.

  - Produced series of YouTube videos for training high school students on using spreadsheets.
  - Evaluated course materials authored by participating high school teachers.
  - Served as guest instructor for high school courses (3 visits per semester).
  - Hosted campus visits by dual-enrollment students.
- **Curricular Assessment and Planning Committee** (2002–2006; chair, 2003–2006)
  - Reviewed curriculum proposals involving additions or significant alterations of academic programs and courses.
  - Oversaw evaluation of academic departments undergoing program review.
  - Worked with the VPAA and academic division heads to facilitate curricular design.
- Academic advisor to average of 15 students per year, including all students pursuing dual-degree engineering program and co-advisor to all Mathematics Education majors.
- Led the creation of Math Study Center and led training for MSC student workers.
- Developed monthly departmental Colloquium lecture series.

Bethel College, Mishawaka, Indiana USA
Assistant Professor of Mathematics **1997–2001**

- Taught average course load of 24 credit hours per academic year.
- Departmental courses taught: College Algebra; Applied Calculus; Calculus I; Calculus II; Calculus III; Differential Equations; Modern Geometry; Abstract Algebra I; Abstract Algebra II; Topology.
- Interdisciplinary courses taught: Christianity and the Life of the Mind (honors introductory course).
- Independent studies and student research supervised: Cryptology; Advanced Topics in Differential Equations; Differential Geometry.
- **Administrative Committee** (1999–2001). Assisted President and Vice President for Academic Affairs in oversight of campus administration and infrastructure.
- **Strategic Planning Committee** (1998–2001). Assisted President, VPAA, and trustees in developing long-term vision and strategies for the college.
- **Director, Honors Program** (1998–2001).
  - Designed and managed co-curricular program for academically high-achieving students.
  - Created interdisciplinary colloquium series and coordinated involvement of outside speakers.
  - Coordinated sessions on graduate and professional school opportunities.
- **Financial Aid Committee** (1997–1998).
- Created Mathematics Tutorial Hours program and trained student workers to provide mathematics tutoring assistance.
- Designed freshman orientation experience for incoming mathematics and computer science majors.
- Created and maintained Mathematical Sciences Career Center.
- Directed Differential Geometry Seminar involving students and faculty at Bethel College and Saint Mary's College (Notre Dame, IN).

Vanderbilt University Center for Teaching, Nashville, Tennessee USA
Master Teaching Fellow **1996–1997**

- Participated in four-week training workshop on professional and pedagogical development.
- Designed and led Teaching Assistant training workshop for all first-year graduate students in Mathematics and Economics.

- Spoke as panelist in large-group discussion forum for all new Teaching Assistants at Vanderbilt University.
- Assisted in preparation for Teaching Assistant workshop for academic year 1997–1998.
- Conducted small-group analyses of Teaching Assistants courses (in all disciplines) and provided pedagogical feedback and diagnosis in one-on-one follow-up sessions.
- Conducted classroom observations of graduate students in the Divinity School and led debriefing sessions.
- Worked one-on-one with Chinese graduate students in Physics, Engineering, and Chemistry on pedagogy and language skills.

Vanderbilt University Mathematics Department, Nashville, Tennessee USA
Graduate Teaching Scholar **1993–1997**

- Maintained teaching load of 9 credit hours per year with full classroom responsibilities.
- Courses taught: Calculus for Business and Life Science; Calculus I (Liberal Arts track); Calculus II (Liberal Arts track); Calculus II (Science and Engineering track); Calculus III (Science and Engineering track).
- Courses assisted: Modern Algebra.
- Served as teaching mentor for first- and second-year graduate students in the Mathematics Department.

Nashville State Community College (formerly Nashville State Technical Institute), Nashville, Tennessee USA
Adjunct Mathematics Faculty **1995–1996**

- Courses taught: Algebra; Elementary Statistics; Business Mathematics.

Publications

R. Talbert. Teaching MATLAB to a Non-Canonical Audience. To appear in *Proceedings of the Twenty-second International Conference on Technology in Collegiate Mathematics*.

J. Gash and R. Talbert. Integrating spreadsheets, visualization tools, and computational knowledge engines in a liberal arts calculus course. To appear in *Proceedings of the Twenty-second International Conference on Technology in Collegiate Mathematics*.

R. Talbert. Review of *A First Course in Linear Algebra* by Robert Beezer. To appear in compendium of free mathematics textbooks provided by Center for Public Interest Research Group, Washington, D.C.

R. Talbert. The hiring process as risk management. *Concerns of Young Mathematicians*, http://concerns.youngmath.net/story/2008/10/17/63325/416, 17 October 2008.

R. Talbert. Review of *Elliptic Curves: Number Theory and Cryptography* for MAA Reviews. MAA Reviews, http://tinyurl.com/4cr5r3, 22 August 2008.

R. Talbert. A tale of two wikis: Upper-level mathematics meets Web 2.0. *Proceedings of the Twentieth International Conference on Technology in Collegiate Mathematics*, http://archives.math.utk.edu/ICTCM/i/20/C009.html, Spring 2009.

R. Talbert. Review of *Finite Fields and Applications*. MAA Reviews, http://tinyurl.com/4w5eqt, 21 May 2008.

J. Boats, E. Cho, R. Talbert, V. Vakarchuk, K. Woods, L. Zhang. Data analytics for the liberal arts. Submitted to DIMACS Educational Modules Series, February 2008.

R. Talbert. *Test Bank* to accompany *A Mathematical View of Our World*. Thomson Higher Education, Belmont, CA 2007.

R. Talbert. Open letter to a preservice teacher. Published at edspresso.com, 1 August 2006. Article no longer available online but available from author on request.

R. Talbert. The cycle structure and order of the rail fence cipher. *Cryptologia*, **30**(2):159–172, 2006.

R. Talbert. An isomorphism between Bredon and Quinn homology via homotopy colimits. *Forum Mathematicum*, **11**:591–616, 1999.

R. Talbert *Stratified and equivariant homology via homotopy colimits.* Ph.D. thesis, Vanderbilt University, August 1997.

Invited Talks

"Three Things Technology Can Help You Do This Semester". Presentation to Franklin College Faculty Development Workshop, Franklin, IN, August 2009. http://prezi.com/owg9k2ddunde/

"Deconstructing Columnar Transposition Ciphers". Department of Mathematical Sciences Faculty Colloquium; Ball State University, Muncie, IN, April 2009. http://www.slideshare.net/rtalbert/deconstructing-columnar-transposition-ciphers

"The Digital Signature Algorithm". Guest lecture to MATH 390: Cryptography class; Benedictine University, Lisle, IL, April 2008. http://www.slideshare.net/rtalbert/introduction-to-digital-signatures-548692

"Protecting Ourselves with Mathematics: An Overview of Cryptology". Presentation to Benedictine University Math Club; Benedictine University, Lisle, IL, April 2008.

"Factoring and the Division Algorithm: Modern Uses of an Old Idea". Workshop for elementary and middle school teachers at Indiana Council of Teachers of Mathematics Conference; Indianapolis, IN, October 2006. Also given as a elementary/middle school teacher workshop at Project SEAM meeting; University of Indianapolis, June 2006.

"Bringing Lucy Home: A Story of Adoption from China". Franklin College Campus Exchange; Franklin, IN, October 2005.

"Dimensions of Adoptive Parenting". Guest lecture to SOC 119: Principles of Sociology class at Franklin College; Franklin, IN, March 2005.

"Mathematical Applications in Codemaking and Codebreaking". Franklin College Campus Exchange; Franklin, IN, October 2004.

"Faith is the Final Value". Franklin College convocation address; Franklin, IN, September 2004.

"Primality Testing: Past, Present, and Future". Mathematics Department Open House; Saint Mary's College, Notre Dame, IN, September 2003.

"The Algebra Code: How Matrices and Linear Systems Help Protect (and Invade) Our Privacy". Franklin College Math Day; Franklin, IN, October 2001.

"Hill Encryption and Matrices over a Ring". Franklin College, Franklin, IN, October 2000.

"Matrices and Linear Systems with Strange Entries". Undergraduate Mathematics Colloquium; Ball State University, Muncie, IN, September 2000.

"In Him All Things Hold Together: Christian Thinking in a Christian College". Bethel College chapel address; Mishawaka, IN, October 1999.

"Bredon and Quinn Homology and the K-Theoretic Isomorphism Conjecture". Special Session on K-Theory and Motivic Cohomology, American Mathematical Society meeting; DePaul University, Chicago, IL, September 1998.

"Mathematics, Faith, and Teaching". Guest talk to Division of Religion and Philosophy; Bethel College, Mishawaka, IN, April 1998.

Contributed Talks

"Teaching MATLAB to a Non-Canonical Audience". International Conference on Technology in Collegiate Mathematics; Chicago, IL, March 2010. http://prezi.com/1-kndewyznal/

"Integrating Spreadsheets, Visualization Tools, and Computational Knowledge Engines in a Liberal Arts Calculus Course" (with J. Gash). International Conference on Technology in Collegiate Mathematics; Chicago, IL, March 2010.

"A Tale of Two Wikis: Upper-Level Mathematics Courses meet Web 2.0". International Conference on Technology in Collegiate Mathematics; San Antonio, TX, March 2008.

"Analyzing Transposition Ciphers with Permutations". Mathematical Association of America, Indiana section meeting; Indiana State University, Terre Haute, IN, April 2004.

"An Upper-Division Geometry Course Designed Around the NCTM Standards". Session on Technology in Mathematics Teacher Preparation Courses, AMS/MAA Joint Meetings; Phoenix, AZ, January 2004.

"Primality Tests: Past, Present, and Future". Mathematical Association of America, Indiana section meeting; Butler University, Indianapolis, IN, March 2003.

"26.2 Miles is Long Enough: The Effects of Weaving During a Marathon". Mathematical Association of America, Indiana section meeting; Anderson University, Anderson, IN, March 2002.

"How Far Does a Marathoner *Really* Run?". Special Session on Using Examples from Sports to Enhance the Teaching of Mathematics, AMS/MAA Joint Meetings; San Diego, CA, January 2002.

"Reading, Music, and Mathematics: Is there a Connection?" (with R. Rhein and P. Wilson). Indiana State Reading Association; Indianapolis, IN, March 1999.

"Relations Between Stratified and Equivariant Homology". Session on Algebraic Topology, AMS/MAA Joint Meetings; San Diego, CA, January 1997.

"Assembly Maps and the Isomorphism Conjecture". Three-part talk for Vanderbilt University Topology Seminar; Nashville, TN, February–March 1996.

Workshops and Coursework

Getting Started in Engineering Education Research. American Society for Engineering Education minicourse; Louisville, KY, June 2010.

MATLAB Fundamentals. Cleveland, OH, April 2009.

Camtasia. Minicourse at International Conference for Technology in Collegiate Mathematics; San Antonio, TX, March 2008.

Data Analytics in Law Enforcement and Homeland Security. Reconnect 2007 workshop, Center for Discrete Mathematics and Theoretical Computer Science; Rutgers University, Piscataway, NJ, July 2007.

The POGIL Classroom: Engaging Students and Developing Learning Skills. NSF Chautauqua short course; Stony Brook University, Stony Brook, NY, June 2005.

Advanced Java. NSF Chautauqua short course; University of Dayton, Dayton, OH, June 2003.

Introduction to Java. NSF Chautauqua short course; University of Dayton, Dayton, OH, May 2003.

Using GAP in Abstract Algebra. Mathematical Association of America online minicourse; July 2003.

Faculty Work and Student Learning: Meeting New Challenges of a World in Transition. Association of American Colleges and Universities; Butler University, Indianapolis, IN, November 2002.

Geometers Sketchpad. Central Indiana Educational Services Center minicourse; Indianapolis, IN, July 2002.

The Mathematics of Cryptology. MAA two-day short course; University of Vermont, Burlington, VT, July 2002.

Real-World Problem Solving Using Technology and Student Projects. MAA minicourse, AMS/MAA Joint Meetings; San Diego, CA, January 2002.

Connected Curriculm Project workshop. Duke University, Durham, NC, June 1999.

Geometry in the Classroom in the Next Millenium. MAA workshop, AMS/MAA Joint Meetings; San Antonio, TX, January 1999.

Using Writing in the Teaching and Learning of Mathematics. MAA minicourse, AMS/MAA Joint Meetings; San Antonio, TX, January 1999.

Notre Dame Topology Seminar. University of Notre Dame, Notre Dame, IN, 1997–1998.

Professional Service

Student Activities Coordinator, Mathematical Association of America, Indiana Section (2007–2010).

- Coordinator for Indiana Collegiate Mathematics Competition.
- Coordinator for student workshops at Indiana MAA sectional meetings.

Nominating Committee, Mathematical Association of America, Indiana Section (2004–2005).

Coordinator for Project NExT-IN, Mathematical Association of America, Indiana Section (2000–2001).

Faculty consultant and reader for Advanced Placement Calculus Exam (2000–2002).

Project NExT Fellow, Mathematical Association of America (1997–present).

Organizer, Special Session on Strategies for Small Departments. Mathematical Association of America MathFest; Brown University, Providence, RI, July 1999.

Technical Skills

Mathematical software: Maple; Mathematica; MATLAB; SAGE; Geometers Sketchpad; Geogebra; GAP; LaTeX; Winplot; Apple Grapher.

Programming languages: Proficient in MATLAB. Basic skills in Java, Python, and HTML.

Operating systems: Windows 2000/XP; Macintosh OS X; Linux.

Web applications: Google Mail; Google Documents and Spreadsheets; Jing; Prezi; Wordpress; Wikispaces.

Office applications: Apple iWork; Microsoft Word, Excel, and Powerpoint.

Other applications: Camtasia and Snapz Pro X (video capture and screencasting); Apple iMovie and iDVD; OmniGraffle (diagramming); the GIMP (image editing); Prezi (presentation tool).

References

Available upon request.