David M. Austin

Department of Mathematics
Grand Valley State University
Allendale, MI 49401
(616) 331-3431
austind@gvsu.edu

EDUCATION

Ph.D., Mathematics, University of Utah	1989
M.A., Mathematics, Rice University	1984
B.A., Mathematics, Rice University	1983
B.A., Physics, Rice University	1983

EMPLOYMENT

Professor, Grand Valley State University	2005 –
Associate Professor, Grand Valley State University Awarded tenure, 2002	1999 – 2005
Assisant/Associate Professor, University of British Columbia Awarded tenure and promoted to Associate Professor, 1995	1990 – 1999
Research Member, Institute for Advanced Study	1989 – 1991
Teaching and Research Fellow, University of Utah	1984 – 1989

GRANTS AND AWARDS

Deborah and Franklin Tepper Haimo Award, MAA	2021
Outstanding Teacher Award, GVSU	2012
Pew Teaching with Technology Award, GVSU	2004
Teaching Development and Renewal Grant Faculty Teaching and Learning Center, GVSU	2003
Teaching Initiatives Grant Faculty Teaching and Learning Center, GVSU	2000
Research in the Mathematical Sciences Operating Grant National Science and Engineering Research Council, Canada	1991 – 2000
Faculty of Science Teaching Award University of British Columbia	1996
Visiting Fellowship St. Catherine's College, University of Oxford	1995
Postdoctoral Research Fellowship National Science Foundation	1989 – 1991

GRADUATE STUDENT AND POSTDOCTORAL SUPERVISION

Olivier Collin, Postdoctoral Fellow	1997 – 1999
Vaughn Anderson, Ph.D.	1995
Peter Milley, M.Sc.	1998

MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Mathematical Society (AMS)
American Indian Science and Engineering Society
Mathematical Association of America (MAA)
Soceity of Industrial and Applied Mathematics

SELECTED PRESENTATIONS

Math for Data Science, Panelist	2021, June
National Workshop on Data Science Education	
"Supporting Indigenous Students' Mathematical Identities"	2021, May
University of Texas Dana Center Launch Years Conference	
"Stories my Students Taught Me"	2021, January
Joint Mathematics Meetings	
"A tale of trees, teeth, and time"	2020, February
Brigham Young University, Provo, UT	
"Making Linear Algebra Meaningful"	2019, July
Two presentations to 2017 Project NExT Fellows at MathFest	
"Stacking dominos"	2019, June
2019 Navajo Math Camp, Farmington, NM	
"Making Linear Algebra Meaningful"	2018, July
Two presentations to 2017 Project NExT Fellows at MathFest	
"Sequences, Spirals, and Seeds"	2018, June
Keynote address at 2018 Navajo Math Camp, Farmington, NM	
"Game. SET. Line."	2018, March
Calvin College Mathematics Colloquium	
"Understanding Linear Algebra, a new open-access textbook"	2018, January
Joint Mathematics Meetings, San Diego, CA	
"Making Linear Algebra Meaningful"	2017, July
Two presentations to 2017 Project NExT Fellows at MathFest	
"Tangles and Square Dances"	2017, July
Summer math camp at Wester State Colorado University	
"Tangles and Square Dances"	2017, July
Role model presentation at the Navajo Math Circle	
"Resources and Ideas for Teaching AP Calculus"	2017, May
Advanced Placement Teaching and Learning Conference (with Matt Boelkins)	
"The Game of SET	2017, March
Albion College Mathematics Colloquium	
"Making Linear Algebra Meaningful"	2016, August
Two presentations to 2016 Project NExT Fellows at MathFest	
"Re-energize your career"	2016, August
Panelist at 2016 MathFest	
"The Stern-Brocot tree: a tale of trees, teeth, and time"	2014, September
Calvin College Mathematics Colloquium	
"How to make a 3D print"	2014, April
Hope College Mathematics Colloquium	

"Using the JPEG algorithm in a first linear algebra course" 2011, August
MathFest, the summer meetings of the Mathematical Association of America
"Pixar's Harmonious Functions" 2010, July
Summer REU Undergraduate Conference, Grand Valley State University
"Frequency Modulation and Music Synthesis" 2010, March
Albion College Mathematics Colloquium
"Frequency Modulation and Music Synthesis" 2009, October
Calvin College Mathematics Colloquium
"Frequency Modulation and Music Synthesis" 2009, March
Hope College Mathematics Colloquium
Sage Days 9, Mathematical Graphics and Visualization Workshop 2008, August
Delivered three lectures over a one-week summer school
"Wiki Math" 2008, January
One-hour presentation at the Joint Meetings of the AMS and MAA
"Circle Packings from Penrose Tilings" 2007, November
Calvin College Mathematics Colloquium
"Seeds and Tiles: A Golden Tale" (with Matt Boelkins) 2007, September
Invited talk at the Kalamazoo Area Math and Science Center
"Circle Packings from Penrose Tilings" 2007, May
Invited Address at the Michigan MAA Spring Conference
"Playing Penrose's Tile Game" 2006, September
Public lecture in Allendale, Michigan
"Discovering the Cauchy-Riemann Equations" 2006, August
Mathfest, the summer meeting of the MAA
"Playing Penrose's Tile Game" 2005, June
Public lecture in Portland, Oregon
MSRI Summer School on Mathematical Graphics 2005, June-July
Delivered five lectures over a two-week summer school
Department of Mathematics Colloquium 2005, March
Hope College
MSRI Summer School on Mathematical Graphics 2003, June
Delivered five lectures over a two-week summer school
Lower Michigan Mathematics Competition 2000
Grand Valley State University
Canadian Undergraduate Conference 1998
Canadian Mathematical Society
Fields, Strings and Particles 1997
Pacific Institute of Mathematics
Global Analysis and Differential Geometry Seminar 1995
University of Oxford
Global Analysis and Differential Geometry Seminar 1994
University of Oxford
West Coast Topology Conference 1994
Stanford University
Global Analysis and Differential Geometry Seminar 1993
University of Oxford
Global Analysis and Topology Seminar 1993
University of Texas
Mathematisches Forschungsinstitut Oberwolfach 1992
Topology Seminar 1989

Princeton University

CONFERENCES, SUMMER SCHOOLS, AND LECTURE SERIES (CO-)ORGANIZED

Workshop for Oklahoma Teachers of Indigenous Students	2019
Navajo Math Camp	2019
Navajo Math Camp	2018
Navajo Math Circle	2017
Sage Days 9, Mathematical Graphics and Visualization	2008
"The Art of Mathematics," a series of four public lectures	2006
MSRI Summer School on Mathematical Graphics	2005
MSRI Summer School on Mathematical Graphics	2003
Pacific Rim Geometry Conference	1998
Cascade Topology Seminar	1997
Pacific Northwest Geometry Seminar	1997
Cascade Topology Seminar	1994
Pacific Northwest Geometry Seminar	1994
AMS Special Session	1993

SELECTED PUBLICATIONS

Group Theory in the Bedroom, and Other Mathematical Diversion, A Book Review, The Notices of American Mathematical Society, Vol. 56, No. 2, (2009) 237-239, a solicited book review.

What is ... JPEG?, The Notices of American Mathematical Society, Vol. 55, No. 2, (2008) 226-229, a solicited and refereed article.

A new method for computing the center of population, The Professional Geographer, Vol. 58, No. 1 (2006) 65-69 (with Edward Aboufadel), refereed.

Up and Down the Tiles, The Notices of American Mathematical Society, Vol. 52, No. 6, (2005) 610-611, a solicited and refereed article.

Enhancing the Mathematical Understanding of Prospective Teachers: Using Standards*-Based, Grades K-12 Activities,* in Perspectives on the Teaching of Mathematics, National Council of Teachers of Mathematics (2004), 151-163 (with C.E. Beckmann, P.J. Wells, J. Gabrosek, E.M.H. Billings, E.F. Aboufadel, P. Curtiss, W. Dickinson and A. Champion), refereed.

The Mathematical Explorer: An interactive mathematics book, The Notices of the American Mathematical Society, June/July 2002, a solicited book review.

Hamiltonian paths in Cartesian powers of directed cycles. Graphs and Combinatorics, Vol. 19 (2003) 459-466 (with Heather Gavlas and David Witte), refereed.

The Alexander polynomial and the homotopy of knots, Canadian Bulletin of Mathematics, Vol. 42, No. 3 (1999) 257-262 (with Dale Rolfsen), refereed.

Equivariant Floer theory and gluing Donaldson polynomials, Topology, Vol. 35, No. 1 (1996) 167-200 (with Peter Braam), refereed.

Equivariant Floer groups for binary polyhedral spaces, Mathematische Annalen, Vol. 302 (1995) 295-322, refereed.

Equivariant Homology, Mathematical Proceedings of the Cambridge Philosophical Society, Vol. 118 (1995) 125-139 (with Peter Braam), refereed.

Bott-Morse theory and equivariant cohomology, in The Memorial Volume to Andreas Floer, edited by Hofer, Taubes, Weinstein, Birkhauser 1995, 123-185 (with Peter Braam), refereed.

Boundary values of hyperbolic monopoles, Nonlinearity, Vol. 3 (1990) 809-823 (with Peter Braam), refereed.

$SO(3)$*-instantons on* $L(p,q) \times \mathbf{R}$, Journal of Differential Geometry, Vol. 32 (1990) 383-413, refereed.

EDITORSHIP

Feature Column, a monthly online column published by the American Mathematical Society, one of four contributing co-editors (`www.ams.org/featurecolumn`)

Articles written for the *Feature Column* (not referred):

Lost (and found) in space, March 2021
Pooling strategies for Covid-19 testing, November 2020
Transmitting data with polar codes, June 2020
What's the 411?, February 2020
You're in for a shock, December 2019
Puppies, kittens, and the golden ratio, August 2019
Non-negative matrix factorizations, March 2019
Upgrading slums using topology, December 2018
Getting in sync, August 2018
Neural nets and how they learn, March 2018
How to differentiate with a computer, December 2017
Untangling your square dance, August 2017
Patterns in permutations, March 2017
Finding holes in the data, December 2016
Game. SET. Polynomial., August 2016
Knot quandries quelled by quandles, March 2016
Petals, flowers, and circle packings, December 2015
Game. SET. Line., August 2015
The stable marriage problem and school choice, March 2015
How to grow and prune a classification tree, December 2014
Congressional redistricting and gerrymandering, August 2014
How to make a 3D print, March 2014
Fedorov's Five Parallelohedra, December 2013
The Frobenius Problem: How I bought Chicken McNuggets with exact change August 2013
Using Projective Geometry to Correct a Camera, March 2013
Who's Number 1? Hodge Theory Will Tell Us, December 2012
It's a Small World After All, August 2012
A (Very Short) Detour for the Traveling Salesman, March 2012

Arrangements and duality or How I learned to slice a Sandwich, December 2011
The Shadow Knows: How to Measure Time with a Sundial, August 2011
Aligning Sequence Reads to Solve the Genome Puzzle, March 2011
How many times do I need to shuffle this deck, December 2010
Multiplication is easier when it's complex, August 2010
Moving Remy in harmony: Pixar's use of harmonic functions, March 2010
Puzzling over Exact Cover Problems, December 2009
We Recommend a Singular Value Decomposition, August 2009
No Static at All: Frequency modulation and music synthesis, March 2009
Trees, Teeth, and Time: The mathematics of clock making, December 2008
Percolation: Slipping through the cracks, August 2008
Random Numbers: Nothing left to chance, March 2008
Pulling digits out of Pi, December 2007
Image Compression: Seeing What's Not There, August 2007
That knotty DNA, March 2007
How Google Finds Your Needle in the Web's Haystack, December 2006
Voronoi Diagrams and a Day at the Beach, August 2006
When kissing involves trigonometry, March 2006
Penrose tilings tied up in ribbons, December 2005
Penrose tiles talk across miles, August 2005
The center of population of the United States, February 2005

Editorial board member, Open Textbook Initiative, sponsored by the American Institute of Mathematics, Fall 2010 – present

BOARD OF DIRECTORS

Alliance of Indigienous Math Circles, 2017 – present

TEXTBOOKS

Understanding Linear Algebra, `http://gvsu.edu/s/0Cl`, an open-access, open-source linear algebra textbook. 2017 – present

Contributed illustrations and text for *Multivariable Active Calculus*, an open-access calculus textbook. With Steve Schlicker and Matt Boelkins. 2014 – 2015.

Contributed a chapter to *Active Calculus*, Matt Boelkins' open-access calculus textbook, 2013.

MENTORING

Consultant for Project NExT, organized by the Mathematical Association of America, 2013 – 2014

SOFTWARE DEVELOPMENT

SuperDeDuper

A C++ program to remove duplicates from DNA sequence reads, May 2011

Incorporated into *statgen*, a software library created by the University of Michigan's School of Public Health for the analysis of genetic data

Spherical Easel, with Will Dickinson, 2002 - 2003

Dynamic geometry software for studying spherical geometry

GRAPHICS WORK

Illustrated the open-access text *Linear algebra: a discovery-based approach*, 2019
written by Steve Schlicker and Feryal Alayont

Illustrated the book *Combinatorial Reciprocity Theorems*, 2017-18
written by Matthias Beck and Raman Sanyal, published by the AMS

Illustrated the second edition of *Computing the Continuous Discretely*, 2013–2014
written by Matthias Beck and Sinai Robins, published by Springer

Illustrated and provided an audio interview for an AMS *Mathematical Moment*, 2011

Designed and produced the cover for the February 2008 issue of the *Notices of the American Mathematical Society*.

Penrose 11, a piece of mathematical art, created with Bill Casselman, exhibited at the Institut Henri Poincare in Paris in 2005, currently part of an exhibit of mathematical art travelling around Europe.

Honorable Mention in the National Science Foundation's Science and Engineering Visualization Challenge, 2005.

UNDERGRADUATE RESEARCH SUPERVISED

Matthew Stamps, "Circle Packings and Penrose Tilings"
Grand Valley State University Summer Student Scholar grant, 2006

E. Drake Parker, "On the new reading of Archimedes' *Method*"
Grand Valley State University Summer Student Scholar grant, 2011

MEDIA APPEARANCES

Interviewed for a report on fraud and lotteries by Jason Clayworth, a reporter for the *Des Moines Register*, January 2019

Interviewed for the podcast *Relativity Prime*, January 2015

Interviewed with Ed Aboufadel by the *Columbia Missourian* about the U.S. center of population, September 2012

SELECTED SERVICE ACTIVITIES

At Grand Valley

Department of Mathematics, Personnel Committee, 2013 – 2015, 2018 – present
Department of Mathematics Alumni Newsletter Co-Editor, 2004 – present
New faculty memtor to Norma Ortiz-Robinson, 2018 – 2019
Applied math task force, 2018 – 2019
Linear algebra task force, 2017 – 2018

Department of Mathematics, Assistant Chair, 2015 – 2018
Department of Mathematics, Unit Head, May 2017
WeBWorK Coordinator, oversee departmental and university use of online homework system, 2011 – 2017
Department of Mathematics Foundations Committee, 2010 – 2014
Affiliate Evaluation Group, Chair, 2010 – 2013
Department of Mathematics Advisory Committee, 2008 – 2010
Department of Mathematics Faculty Mentor for new faculty members, 2000 – 2001, 2002 – 2003, 2009 – 2010
Grand Valley Newspaper Advisory Board, 2009 – 2011
Faculty Personal Policy Committee, 2006 – 2009.
University Teaching Excellence Committee, 2006 – 2009.
Chair, 2007 – 2008
Program Committee, Mathematical Association of America Michigan Section Meeting, 2008
Liaison Coordinator, MAA Michigan Section, 2007 – present
Department of Mathematics Search Committee
2007 – 2008
2001 – 2002
Department of Mathematics Seminar Coordinator, 2006 – 2007
Math In Action Conference, Co-Chair, 2004 – 2006.
Department of Mathematics Personnel Committee, 2003 – 2006
Department of Mathematics Assessment Committee, 1999 — 2005,
Chair, 2001 – 2005
Department of Mathematics Instructional Resources Committee, 2000 – 2004,
Chair, 2002 – 2003
Divisional Curriculum Committee, 2002 – 2003.
Maintained Department of Mathematics faculty and staff web pages, 2001 – 2007
Reader of Junior Level Writing Assessment exams, 1999 – 2007
Teaching Effectiveness Committee, 2000 – 2002
Chair, 2001 – 2002
Transfer Equivalency Committee, 1999 – 2000

Community Service

Mathematical Sciences Research Institute, Human Resources Advisory Committee
Allendale FIRST Robotics, Mentor, 2008 – present
Open Doors Center for Self-Directed Teens, Instructor, Fall 2013