

Curriculum Vitae

Gregory L. McColm
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13 February 2022

Position.

Associate Professor of Mathematics, USF–Tampa

Education.

University of California at Los Angeles

Ph.D. awarded in Fall, 1986

M.A. awarded in Spring, 1982

Field: Mathematical Logic

Specialty: Abstract Recursion and Descriptive Complexity

Dissertation Advisor: Yiannis N. Moschovakis

Dissertation: *Simple and Simultaneous Recursive Fixed Points*

Oberlin College

B.A. awarded in Spring, 1980

Major: Mathematics

Fields.

Mathematical Logic & Theoretical Computer Science:

Finite Model Theory

Computational and Descriptive Complexity Theory

Combinatorics:

Combinatorial (& Logical) Game Theory

Finite and Infinite Ramsey Theory and Extremal Graph Theory

Random Graph Theory, and Probabilistic Methods and Random Processes

Geometry:

Polyhedral / Combinatorial Geometry, Tilings, Tessellations and Theoretical Crystallography

Computational Geometry and Computer Implementations

Mathematics Education and Mathematical Philosophy

Annotations.

Knowledge of the computer languages C, ForTran, LisP, Maple, Pascal and Python and of the markup language HTML

Vocations.

USF–Tampa

Associate Professor of Mathematics, Acad. Yrs. 1992-

Assistant Professor of Mathematics, Acad. Yrs. 1986-1992

Activities.

Member, American Chemical Society

Member, American Association of University Professors

Member, American Mathematical Society

Member, Association for Computing Machines

Associate Member, International Union of Crystallography

Member, Mathematical Association of America

Member, Society for Industrial and Applied Mathematics

Courses Taught:

- *Lower division.* Basic Statistics, Calculus I, Calculus II, Calculus III, College Algebra, College Trigonometry, Elementary Calculus II, Engineering Calculus I, Engineering Calculus III, Finite Mathematics, Precalculus Trigonometry.
- *Upper division.* Bridge to Abstract Mathematics, Differential Equations, Discrete Mathematics, Early History of Mathematics, Elementary Abstract Algebra I, Elementary Abstract Algebra II, Elementary Number Theory, Introduction to Probability, Modern Geometry, Problem Solving using Pascal or C, Set Theory, Symbolic Computations in Mathematics, and Vector Calculus.
- *Graduate level.* Advanced Linear Algebra, Combinatorics I, LISP: programming with Algebraic Applications, Mathematical Logic and Foundations I, Mathematical Logic and Foundations II, Probability Theory I, Probability Theory II, Theory of Computing, and special topics courses on set theoretic forcing, computational complexity, and geometry, and Teaching College Mathematics, and independent study in category theory, mathematical crystallography, and mathematical logic.

Technical Journal Publications

Some restrictions on simple fixed points of the integers

J. Symb. Logic **54:6** (1989), 1324–1345.

Parametrization over inductions with a bounded number of variables

Ann. Pure & Appl. Logic **48** (1990), 103–134.

When is arithmetic possible?

Ann. Pure & Appl. Logic **50** (1990), 129–151.

A Ramseyian theorem for products of trees

J. Comb. Th.–A **57:1** (1991), 68–75.

Eventual Periodicity and One-Dimensional Queries

Notre Dame J. Formal Logic **33:2** (1992), 273–290.

- On the complexity of deadlock-free programs on a ring of processors*
(with W. E. Clark & W. R. Stark)
J. Parallel & Dist. Comp. **16** (1992), 67–71.
- Some Ramsey theory in boolean algebra for complexity classes*
Z. math. Logik Grund. Math. **38** (1992), 293–298.
- Deterministic versus nondeterministic transitive closure*
(with E. Grädel)
Inform. & Comp. **119:1** (1995), 129–135.
- The dimension of the negation of transitive closure*
J. Symb. Logic **60:2** (1995), 392–414.
- Dimension versus Number of Variables, and Connectivity, Too*
Math. Log. Qtrly **41** (1996), 111–134.
- Pebble games and the fine structure of least fixed point logic*
Inf. & Comp. **122:2** (1995), 201–220.
- Hierarchies in transitive closure logic, stratified Datalog, and infinitary logic*
(with E. Grädel)
Ann. Pure & Appl. Logic **77** (1996), 169–199.
- An application of spanning trees to k -point separating families of functions*
(with W. E. Clark & B. Shekhtman)
Proc. London Math. Soc. **58:2** (1998), 297–310.
- A splitting inequality*
The Ramanujan J. **2** (1998), 511–519.
- First Order Zero-One Laws for Random Graphs on the Circle*
Random Struct. Alg. **14** (1999), 239–266.
- MSO zero-one laws on random labelled acyclic graphs*
Discrete Mathematics **254** (2002), 331–347.
- Introducing Random Trees*
Research on Language and Computation **1** (2003), 203–226.
- An Anti-Ramsey Theorem on Posets*
Bulletin of the ICA **38** (2003), 84–100.
- On the Structure of Random Unlabelled Acyclic Graphs*
Discrete Mathematics **277** (2004), 147–170.
- Guarded Quantification in Least Fixed Point Logic*
J. Logic, Language and Information **13** (2004), 61–110.
- Threshold Functions for Random Graphs on a Line Segment*
Combinatorics, Probability and Computing **13** (2004), 373–387.
- When is Betweenness Preserved?*
(with X.-D. Hou)
Rocky Mountain J. Mathematics **38:1** (2008), 123–137.
- Complexity Classes for Self-Assembling Flexible Tiles*
(with N. Jonoska)
Theor. Comp. Sci. **410:4-5** (2009), 332–346.
- On Stoichiometry for the Assembly of Flexible Tile DNA Complexes*
(with Ana Staninska and Natasha Jonoska)

Natural Computing **10:3** (2011), pp. 1121 - 1141.

Crystal Engineering using a “Turtlebug” Algorithm, a de novo approach to the design of binodal metal-organic frameworks

(with W. E. Clark, M. Eddaoudi, L. Wojtas & M. Zaworotko)

Crystal Growth & Design **11:9**, (2011), pp. 3686 - 3693.

Generating Graphs Using Automorphisms

J. Graph Alg. Appl. **16:2** (2012), pp. 507 - 541.

Automatically Generated Periodic Graphs

Z. Kristallographie - Crystalline Materials **230:12** (2015), 699 - 708.

Counter machines and crystallographic structures

(with N. Jonoska & M. Krajcevski)

Natural Computing **15:1** (2016), 97-113.

Cut-and-project graphs and other complexes

Theoretical Computer Science **894:26** (2021), 172 - 189.

Other Academic Journal Publications

A University’s Dilemma in the Age of National Security

(with Sherman Dorn)

Thought & Action, Fall 2005 (National Education Association, Fall 2005), 163 – 177.

A Metaphor for Mathematics Education

Notices of the American Mathematical Society (April, 2007), 499 - 502.

Is Logic Necessary?

Logica Universalis **4:2** (2010), 241-254.

Prospects for Mathematical Crystallography

Acta Crystallographica A **70:2** (2014), 95 - 105.

Manuscripts in process

Periodic Euclidean Graphs on Integer Points

Under revision; draft posted at **ArXiv.org** as arXiv:1105.2328.

Conference Publications

Deterministic versus nonDeterministic Transitive Closure

(with E. Grädel)

7th IEEE Symposium on the Foundations of Computer Science (LICS’92)

Santa Cruz, CA; June, 1992.

Hierarchies in Transitive Closure Logic, Stratified Datalog, and Infinitary Logic

(with E. Grädel)

33rd IEEE Symposium on the Foundations of Computer Science (FOCS’92)

Pittsburgh, PA; October, 1992.

Zero-One Laws for Gilbert Graphs

11th IEEE Symposium on Logic in Computer Science (LICS’96)

New Brunswick, NJ; July, 1996.

Game Representations of Complexity Classes

European Summer School on Logic, Language and Information

Helsinki, Finland; August, 2001

Expectation and Variance of Self-Assembled Graph Structures

(with N. Jonoska & A. Staninska; S. Staninska presenting)

11th International Meeting on DNA Computing

London, Canada; May, 2005

A Computational Model for Self-assembling Flexible Tiles

(with N. Jonoska; N. Jonoska presenting)

4th International Conference on Unconventional Computation

Sevilla, Spain, October 2005

Proceedings LNCS 3699; ed. by Cristian S. Calude, Michael J. Dinneen, Gheorghe

Paun, Mario J. Pérez-Jiménez, Grzegorz Rozenberg; pp. 142 - 156

Flexible versus Rigid Tile Assembly

(with N. Jonoska; G. McColm presenting)

5th International Conference on Unconventional Computation

York, England, September 2006

Proceedings LNCS 4135; ed. by Cristian S. Calude et al; pp. 139 – 151

Describing Self-assembly of Nanostructures (with N. Jonoska presenting)

Villiam Geffert, Juhani Karhunki, Alberto Bertoni, eds., **SOFSEM 2008: Theory and Practice of Computer Science** (Proc. LNCS 4910, Nový Smokovec, Slovakia, 2008), 66 – 73.

Languages Associated with Crystallographic Symmetry (with N. Jonoska presenting & M. Krajcevski)

Oscar H. Ibarra, Lila Kari, Steffen Kopecki, eds. **Unconventional Computation and Natural Computation (UCNC 2014)** (Proc. LNCS 8553, London, ON, Canada, 2014), 216 – 228.

Traversal Languages Capturing Isomorphism Classes of Sierpiński Gaskets (with N. Jonoska presenting & M. Krajcevski)

Martin Amos & Ann Condon, eds. **Unconventional Computation and Natural Computation (UCNC 2016)** (Proc. LNCS 9726, London, ON, Canada, 2016), 155 – 167.

Other Publications

The Sentries

Palm Prints (University of South Florida, December, 2001), 11.

Broken Bonds

Palm Prints (University of South Florida, December, 2002), 40.

Coffee

Wordsmith 14 (Tampa Writer's Alliance, 2003), 52.

Jihad

Wordsmith 14 (Tampa Writer's Alliance, 2003), 87.

Gift of the Rivers

The New Floridian 1:1 (Dec. 2005 & Jan. 2006), 12.

Teach Meaningful Work, Not Test Skills

The Lakeland Ledger, June 26, 2006.

Tall Grass

Wordsmith 18 (2007; winner, Tampa Writer's Alliance 2006 Writing Contest: 3rd place for fiction), 81 - 84.

Return of the Trees

The Pepper Tree: A Literary Magazine (Feb., 2007), 18 - 19.

The Importance of Color

The Pepper Tree: A Literary Magazine (Nov./Dec., 2007), 9.

Abandoning Education

The Tampa Tribune (July 13, 2008), Views 1.

FNANO 2008 Report # 1: Nanoscience Prize

ISNSCE Newsletter (September 2008), 2 - 3.

FNANO 2008 Report # 3: Nanomathematics

ISNSCE Newsletter (September 2008), 5 - 7.

Florida Economics 101: Tapping Federal Stimulus Dollars to Invest in Re-Educating the Workforce and Reinforcing a Weak Educational System Will Help Ensure a Stronger Future for the State

The Tampa Tribune (March 8, 2009), Views 1, 5.

Figuring Out the Pattern of Math: In ways great and small, our lives and the world are built on the foundation of mathematics

The Tampa Tribune (April 5, 2009), Views 1, 5.

Bring back unions, keep the middle class

The Tampa Tribune (May 16, 2009). Views 1, 5.

The Plain of Good and Evil

Shelter of Daylight, ed. by Tyree Campbell (Sam's Dot Publishing, April, 2009), 60 - 66.

Math gene debate not adding up: It looks as if the disparity between male and female performance was a result of culture

The Tampa Tribune (August 29, 2009), Views 1, 5.

From baseball to the census: Statistics tell us what's going on

The Tampa Tribune (April 11, 2010), Views 1, 5.

Florida struggles to keep good teachers: Attacking job security won't work when tough conditions and inadequate pay make attrition a major problem

The Tampa Tribune (July 24, 2010), Views pp. 1, 5.

Because it was there

The Pepper Tree: A Literary Magazine (Oct. Nov. & Dec. 2010), p. 5.

WikiLeaks: Where have we heard this before?

The Tampa Tribune (Dec. 28, 2010), <http://www2.tbo.com/content/2010/dec/28/MEOPINO2-wikileaks-where-have-we-heard-this-before/news-opinion-commentary/>

For Love

Jupiter XXXI: Aitne (Jan., 2011), pp. 20 - 26.

Education for the 21st Century Requires Willing Minds

The Tampa Tribune (Feb. 24, 2011), Metro p. 13.

Meeting challenges involves understanding complexities

The Tampa Tribune (April 6, 2011), Metro p. 11.

Getting ahead by not going along

- The Tampa Tribune** (June 5, 2011), Views & News p. 1.
Are we becoming a can't do nation?
The Tampa Tribune (Oct. 22, 2011), Metro p. 15.
Art skills needed in today's math classrooms
The Tampa Tribune (Jan. 9, 2012), Metro p. 9.
Who pays for college and why
The Tampa Tribune (Feb. 25, 2012), Views p. 1.
Focus on Teaching Techniques, Not Teachers,
Florida Voices (My Turn, Mar. 20, 2012), <http://floridavoices.com/myturn/focus-teaching-techniques-not-teachers>
What do you want to know? Navigating the sea of data,
The Tampa Tribune (Apr. 8, 2012), Views p. 2.
Footprint,
Jupiter XXXVI: Sponde (April, 2012), 16 – 24.
Want to be major players in Legislature, Democrats? Try showing up,
The Tampa Tribune (Feb. 17, 2013), Views p. 2.
The Winter of Our Revenge
Jupiter XLV: Helike (July, 2014), 45 – 51.
Molecular architects: how scientists design new materials
The Conversation (27 April 2016).
The Building Blocks of the Integers
IUCr Newsletter 26:2 (2018).

Presentations

- Restrictions on simple fixed points of \mathbf{N}*
 WinterConference, Association for Symbolic Logic
 Anaheim, CA; January, 1984.
When is recursion necessary?
 UCLA logic conference
 Los Angeles, CA; January, 1988.
Applications of monotone induction to computer science
 4th SIAM Conference in Discrete Mathematics
 San Francisco, CA; June, 1988.
Finite automata and one-dimensional inductions
 Winter Conference, Association for Symbolic Logic
 Los Angeles, CA; January, 1989.
The predictability of random events
 15th MAA Florida Suncoast Meeting
 Tampa, FL; December, 1990.
Ramsey Theory on Products of Posets
 22nd Southeastern International Conference on Combinatorics, Graph Theory,
 Computing
 Baton Rouge, LA; February, 1991.
Fixedpoint Logics Defined by Pebble Games

865th Meeting of the AMS
Tampa, FL; March, 1991.

The Great Barrier Reef of Computer Science
16th MAA Florida Suncoast Meeting
St. Petersburg, FL; December, 1991.

Games Logicians Play
23rd Southeastern International Conference on Combinatorics, Graph Theory,
Computing
Boca Raton, FL; February, 1992.

About the partition relation on infinite posets
872nd Meeting of the AMS
Tuscaloosa, AL; March, 1992.

Pebble games defining logical queries
NSF-INRIA Workshop on Databases and Finite Model Theory
San Diego, CA; June, 1992.

Least Fixed Point Logic on Chain-Like Structures
Dagstuhl-Seminar 9323 on Semantics of Programming Languages and Algebra
Dagstuhl, Germany; June, 1993.

P, NP, and all that
18th MAA Florida Suncoast Meeting
Venice, FL; December, 1993.

Games and Truth
19th MAA Florida Suncoast Meeting
St. Petersburg, FL; December, 1994

Weak Threshold Functions
26th Southeastern International Conference on Combinatorics, Graph Theory,
Computing
Boca Raton, FL; March, 1995.

A General View of Weak Threshold Functions
7th Conference on Random Structures and Algorithms (RANDOM'95)
Atlanta, GA; May, 1995.

Zero-One Laws for First Order and Least Fixed Point Logics
DIMACS Workshop on Logic and Random Structures
New Brunswick, NJ; November, 1995.

Reality, Fiction, and Probability
20th MAA Florida Suncoast Meeting
Tampa, FL; December, 1995.

Pebble Games and Zero-One Laws
DIMACS Workshop on Descriptive Complexity and Finite Models
Princeton, NJ; January, 1996.

Matching, Majorization, and Thresholds
8th SIAM Conference on Discrete Mathematics
Baltimore, MA; June, 1996.

Teaching Mathematics as a Liberal Art
21st MAA Florida Suncoast Meeting

- Bradenton, FL; December, 1996.
- Zero-One Laws for Homogeneous Models of Random Graphs*
28th Southeastern International Conference on Combinatorics, Graph Theory,
Computing
Boca Raton, FL; March, 1997.
- Models of Random Graphs*
Biannual Aachen-Freiburg-Mainz Seminar on Finite Model Theory
Aachen, Germany; April, 1997
- The Mathematics of Databases*
22nd MAA Florida Suncoast Meeting
St. Petersburg, FL; December, 1997.
- Quantification with Pointers*
Endliche Modelltheorie, Mathematisches Forschungsinstitut Oberwolfach
Oberwolfach, Germany; February, 1998.
- On the evolution of random structures*
Joint SIAM/Discrete Mathematics Conference
Toronto, Canada; July, 1998.
- Going by the book*
23rd MAA Florida Suncoast Meeting
Brandon, FL; December, 1998.
- Combinatorial games in finite model theory*
Logic and Cognitive Workshop at the University of Pennsylvania
Philadelphia, Pennsylvania; April, 1999.
- The Zen of Mathematics Homework*
MAA Florida Section
Tampa, FL; March, 2000
- Splitting and Weak (Coarse) Thresholds*
28th Southeastern International Conference on Combinatorics, Graph Theory,
Computing
Boca Raton, FL; March, 2000.
- Weak Thresholds in the Evolution of Random Structures*
SIAM Conference on Discrete Mathematics
Minneapolis, Minnesota; June, 2000.
- Random Trees*
European Summer School on Logic, Language and Information
Birmingham, England; August, 2000
- Of induction and recursion*
25th Suncoast MAA meeting
Saint Petersburg, FL; December, 2000
- Ramsey numbers on posets (of boolean algebras)*
Horizons in Combinatorics
Nashville, Tennessee; May, 2001
- Of Calculus and Cold Water*
26th Suncoast MAA meeting
Venice, FL; December, 2001

Weak Thresholds for Gilbert Graphs

30th Southeastern International Conference on Combinatorics, Graph Theory,
Computing

Boca Raton, FL; March, 2002.

The Mathematics of ‘When Will It Happen.’

Globalization Research at USF

Tampa, FL; September, 2002

Logics of Many Worlds

27th MAA Suncoast Meeting

Lakeland, FL; December, 2002

How Sharp is Immerman’s Theorem?

Finite Model Theory 2003

Bedlewo, Poland; March/April, 2003

What are grades for, anyway?

28th Annual Meeting of the Suncoast Region of the Florida Section of the MAA

Tampa, Florida; December, 2003

Modelling the Evolution of Random Structures

SIAM Conference in Discrete Mathematics

Nashville, Tennessee; June, 2004

The Problems with Reality

29th Annual Meeting of the Suncoast Region of the Florida Section of the MAA

Clearwater, Florida; December, 2004

What’s this about weak thresholds? The evolution of random structures

12th International Conference on Random Structures and Algorithms

Poznan, Poland; August, 2005

When does it happen?

30th Annual Meeting of the Suncoast Region of the Florida Section of the MAA

Sarasota, Florida; December, 2005

Two Hundred Algebra Students (Oh My)

31st Annual Meeting of the Suncoast Region of the Florida Section of the MAA

Brandon, Florida; December, 2006

What is Really “Real”? A Metaphor for Skeptical Realists

USF Science in Humanities – Humanities in Science – Human Scientists Conference

Tampa, Florida; March, 2007

Algebraic Descriptions of Complex Geometric Shapes

1024th (Regional) Meeting of the American Mathematical Society: Special Session
on Computational and Combinatorial Aspects of Tiling and Substitutions

Charlotte, North Carolina; March, 2007

Guarded Quantification

2007 Annual Meeting of the Association for Symbolic Logic

Gainesville, Florida; March, 2007

Formalizing Nanostructure Description

(with N. Jonoska; G. McColm presenting)

4th Conference on Foundations of Nanoscience

Snowbird, Utah, April 2007

Of Birds, Bugs, and Crystals

32nd Annual Meeting of the Suncoast Region of the Florida Section of the Mathematics Association of America

St. Petersburg, FL, December 2007

What is a Crystal?

Pi Mu Epsilon Induction Banquet

Jacksonville, FL, April 2008

Thresholds and Achlioptas Games

Thirty-Ninth Southeastern International Conference on Combinatorics, Graph Theory, and Computing

Boca Raton, March 2008

A Formal Crystal Description System

(with W. E. Clark & M. Eddaoudi; G. McColm presenting)

5th Conference on Foundations of Nanoscience

Snowbird, Utah, April 2008

Tales of the Math Gene

33rd Annual Meeting of the Suncoast Region of the Florida Section of the Mathematics Association of America

St. Leo, Florida, December 2008

Using a Net Generator to Survey Crystal Nets

(with M. Eddaoudi & M. Zaworotko; G. McColm presenting)

6th Conference on Foundations of Nanoscience

Snowbird, Utah, April 2009

The Geometry of Blueprints of Crystals

34th Annual Meeting of the Suncoast Region of the Florida Section of the Mathematics Association of America

Polk State College, Lakeland, Florida, December 2009

Periodic Graphs and Crystal Design

Forty-first Southeastern International Conference on Combinatorics, Graph Theory, and Computing

Boca Raton, March 2010

Using Physics to Motivate Calculus

35th Annual Meeting of the Suncoast Region of the Florida Section of the Mathematics Association of America

University of Tampa, Tampa, Florida, December 2010

Humanism, Realism, and Folk Mathematics: the Case of Reticular Geometry

MAA Session on Humanistic Mathematics; Joint Meeting of the AMS, MAA, and SIAM

New Orleans, Louisiana, January 2011

Polyhedra and Mr. Dangerfield

36th Annual Meeting of the Suncoast Region of the Florida Section of the Mathematics Association of America

Florida Southern College, Lakeland, Florida, December 2011

Mastering Mathematics (and Other Things)

Quality Enhancement Plan: Math, The Bridge to Success

Polk State College, Lakeland, Florida, April 2012

The Academically Adrift Controversy

37th Annual Meeting of the Suncoast Region of the Florida Section of the Mathematics Association of America

State College of Florida, Bradenton, Florida, December 2012.

What do we Teach When We Teach Geometry?

Special Session on Geometry, 38th Annual Meeting of the Suncoast Region of the Florida Section of the Mathematics Association of America

Hillsborough Community College - SouthShore Campus, Ruskin, Florida, December 2013.

Free to Choose? It's 3 AM on Cloud Nine

Plenary Session, 38th Annual Meeting of the Suncoast Region of the Florida Section of the Mathematics Association of America

Hillsborough Community College - SouthShore Campus, Ruskin, Florida, December 2013.

Generating Crystal Nets in Euclidean Space

Special Session on Discrete Geometry in Crystallography, 1,098th Meeting of the American Mathematical Society

University of Maryland - Baltimore County, Baltimore, Maryland, March 2014.

Crystal Prediction Using the Point Groups: An Application of Group Theory

23rd Congress and General Assembly of the International Union of Crystallography
Montreal, Canada, August 2014.

Mathematics for Designing Materials and Nanostructures

39th Annual Meeting of the Suncoast Region of the Florida Section of the Mathematics Association of America

University of South Florida - Sarasota / Manatee, Sarasota, Florida, December 2014.

Polyhedra, Complexes, and Symmetry

Joint Annual Meeting of the Mathematical Association of America (Florida Section) and the Florida Two-Year College Mathematical Association

Eckerd College, St. Petersburg, Florida, January 2015

Free to Choose? 3 AM on Cloud Nine

Henry C Hartje, Jr. Lecture

Florida Southern College, Lakeland, Florida, April 2015.

Computers, Calculus, and Organizational Skills

40th Annual Meeting of the Suncoast Region of the Florida Section of the Mathematics Association of America

Florida Polytechnic University, Florida, December 2015.

Geometry, Art and Illusion

Joint Annual Meeting of the Mathematical Association of America (Florida Section) and the Florida Two-Year College Mathematical Association

St. Leo University, St. Leo, Florida, February 2016

The Geometry of the Human Form

41st Annual Meeting of the Suncoast Region of the Florida Section of the Mathematics Association of America

St. Petersburg College, Seminole, Florida, December 2016.

The Utilitarian Roots of Geometry

Joint Annual Meeting of the Mathematical Association of America (Florida Section) and the Florida Two-Year College Mathematical Association
State College of Florida, Bradenton, Florida, February 2017

The Unreasonable Popularity of Mathematics

42nd Annual Meeting of the Suncoast Region of the Florida Section of the Mathematics Association of America
Eckerd College, St. Petersburg, Florida, December 2017

What is a Difficult Calculus Problem?

invited talk at the minisymposium on *Education in Modern Day Learning Communities*
42nd Annual Meeting of the South East Atlantic Section of the Society of Applied and Industrial Mathematics
UNC, Chapel Hill, North Carolina, March 2018

Enumerating Periodic Graphs

2018 Zassenhaus Groups and Friends Conference
USF, Tampa, Florida, April 2018

Crystal Structure Prediction: From Topology to Geometry

2018 Annual Meeting of the American Crystallographic Association
Toronto, Canada, July 2018

Geometric Graphs and their Symmetries

XLIIth MAA - Florida Suncoast Regional Meeting
USFSP, St. Petersburg, Florida, December 2018

The Geometry of Paradise

(Plenary address) 2019 Joint Meetings of the Florida Section of the Mathematical Association of America and the Florida Two Year College Mathematics Association
Polk College, Lakeland, Florida, February 2019

Finding Your Way

Joint Annual Meeting of the Florida Section MAA & FTYCMA
Virtual Conference via Zoom, February 2021

Plus numerous seminars and colloquia.

Reviews

Finite Model Theory by Heinz-Dieter Ebbinghaus & Jörg Flum
pub. Springer, 1995

J. Symbolic Logic **61:3** (1996), 1049 – 1050.

Geometry of Crystallographic Groups by Andrzej Szczepański
pub. World Scientific, 2012

Acta Crystallographica **A69:5** (2013), 530 – 532.

Symmetry Through the Eyes of the Old Masters by Emil Makovicky
pub. De Gruyter, 2016

Acta Crystallographica **A73:2** (2017), 530 – 532.

Creating Symmetry: the Artful Mathematics of Wallpaper Patterns, by Frank A. Farris
pub. Princeton University Press, 2015

Acta Crystallographica **A73:4** (2017), 370 – 372.

Starry Reckoning: Reference and Analysis in Mathematics and Cosmology, by Emily Rolfe Grosholz

pub. Springer, 2016

MAA Reviews (2017), <https://www.maa.org/press/maa-reviews/starry-reckoning-reference-and-analysis-in-mathematics-and-cosmology>

Islamic Geometric Patterns: Their Historical Development and Traditional Methods of Construction (with a chapter on the use of computer algorithms to generate Islamic geometric patterns by Craig Kaplan), by Jay Bonner

pub. Springer, 2017

Acta Crystallographica A75:6 (2019), 915 – 918.

Topology of Polymers, by Koya Shimokawa, Kai Ishihara, & Yasuyuki Tezuka

pub. Springer, 2019

Math Reviews (2021), <https://www.maa.org/press/maa-reviews/topology-of-polymers>

Sleight of Mind: 75 Ingenious Paradoxes in Mathematics, Physics, and Philosophy, by Matt Cook

pub. MIT Pr., 2020

MAA Reviews (2021), <https://www.maa.org/press/maa-reviews/sleight-of-mind-75-ingenious-paradoxes-in-mathematics-physics-and-philosophy>

Plus numerous article reviews posted in zbMATH

Continuing Web-Postings

Taking College Courses

USF Department of Mathematics Web-page:

<http://www.math.usf.edu/~mccolm/pedagogy/>

Crystal Mathematician

International Union of Crystallography weblog:

<http://blogs.iucr.net/crystalmath/>

Crystal Turtlebug (crystal design program)

Sourceforge:

<http://sourceforge.net/projects/crystalturtlebu/>

Grants Awarded

Mathematical Sciences Research Equipment 1989

(with K. Pothoven, PI, & M. Ismail, J. Pedersen, W. R. Stark, C. Williams)

Awarded \$ 30,000 from the NSF Mathematical Services/ Special Programs, 1989

DMS-8905678, for research equipment

Pebble Games and Expressibility in Finite Model Theory

Awarded \$ 53,395 from the NSF Computer & Computation Research/ Computer Theory, 1994

CCR-9403-463, for 3 years summer support (extended to Nov., 1998)

USF Faculty International Travel Grant

Awarded \$ 898 to travel to CIRM in April, 2000.

USF Faculty International Travel Grant

Awarded \$ 806 to travel to York in September, 2006.

Other Positions

Department Graduate Program Director
1993-95

Students

Doctoral Students

- Ana Staninska, jointly directed with Natasha Jonoska, 2007
A Theoretical Model for Self-Assembly of Tiles

Masters Students

- Deborah Nelson, 2000
Beans and Pots
- Joy D'Andrea, 2011
Fundamental Transversals on the Complexes of Polyhedra
- Lindsay Fields, 2018
Developing a Model to Predict Prevalence of Compulsive Behavior in Individuals with OCD
- Daviel Leyva, 2019
The Systems of Post and Post Algebras: A Demonstration of an Obvious Fact

Undergraduate Students

- Daniel Cruz, 2012
A General Approach to the Production and Geometry of the Square Trigonal Prismatic Crystal Net

Plus service on numerous committees for doctoral and some master's students in chemistry, computer science, mathematics, and psychology

Other Activities

Conference co-organizer

15th MAA Florida Suncoast Meeting
Tampa, FL; December, 1990

Conference co-organizer

20th MAA Florida Suncoast Meeting
Tampa, FL; December, 1995

Conference co-organizer

24th MAA Florida Suncoast Meeting
Tampa, FL; December, 1999

Conference co-organizer

MAA Florida Section Meeting
Tampa, FL; March, 2000

Minisymposium organizer

SIAM Mathematical Aspects of Materials Science Meeting

Minisymposium on Crystal Design using Discrete Structures in Geometry
Philadelphia, PA; May, 2010

Special session co-organizer

1079th Meeting of the American Mathematical Society
Special Session on Modeling Crystalline and Quasi-Crystalline Materials
Tampa, FL; March, 2012

Minisymposium co-organizer

SIAM Mathematical Aspects of Materials Science Meeting
Minisymposia on Mathematical Crystallography I, II, and III
Philadelphia, PA; May, 2013

Special Issue Co-Editor

Acta Crystallographica A
Virtual Issue on Mathematical Crystallography
Articles in Volume 70, Numbers 2, 3, 4

Minisymposium co-organizer

SIAM Mathematical Aspects of Materials Science Meeting
Minisymposia on Mathematical Crystallography I, II, III, and IV
Philadelphia, PA; May, 2016

Special session co-organizer

1152nd Meeting of the American Mathematical Society
Special Session on Crystalline and Highly Symmetric Structures
Gainesville, FL; November, 2019

University of South Florida; service through the years:

- Regular Committees
 - Member, System Faculty Council
 - Member, USF Faculty Senate
 - Member, Council for Faculty Issues
 - Member & Chair, College Faculty Development Committee
 - Member & Chair, Departmental Advisory Committee
 - Member & Chair, Departmental Library Committee
 - Member & Chair, Departmental Publicity Committee
(Editor, *The Quaternion* annual newsletter)
 - Member, Departmental Graduate Committee
 - Member, Departmental Interdisciplinary Committee
 - Member, Departmental Lecture Committee
 - Member, Departmental Undergraduate Committee
- Ad Hoc Committees
 - Member & Chair, Departmental Governance Committee, 2001 & 2006 - 2007
 - Member & Chair, Ad Hoc Senate Committee on Departmental Governance, 2005

– Various textbook committees

Academic Community; service through the years:

- Administrator, International Union of Crystallography weblog *Crystal Mathematician* at <http://blogs.iucr.net/crystalmath/>, 2012 - present
- Consultant, International Union of Crystallography *Commission on Mathematical and Theoretical Crystallography*, 2013 - 2014
- Member, International Union of Crystallography *Commission on Mathematical and Theoretical Crystallography*, 2014 - present

United faculty of Florida; service through the years:

- Member, FEA Delegate Assembly
- Member, UFF Senate
- Secretary, UFF/USF Chapter
- Publicity Chair, UFF/USF Chapter
(Editor, *Uncommon Sense* and the *UFF Biweekly*)

Other activities:

- Editor, *The Life Long Writers' Newsletter*
College of Continuing Education
2002 - 2005
- Webmaster, *International Society for Nanoscale Science, Computation and Engineering*
2009 - 2012