Curriculum Vitae

Gregory L. McColm
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or
Department of Mathematics & Statistics
University of South Florida
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Tampa, FL 33620
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December 8, 2011

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 and Pascal

Vocations.
USF–Tampa
Associate Professor of Mathematics, Acad. Yrs. 1992-
Assistant Professor of Mathematics, Acad. Yrs. 1986-1992

Activities.
Member, American Mathematical Society
Member, Association for Computing Machines
Member, Institute for Combinatorics and its Applications
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 III, Finite Mathematics, Precalculus Trigonometry
- *Upper division.* Bridge to Abstract Mathematics, Differential Equations, Discrete Mathematics, Early History of Mathematics, Elementary Number Theory, Introduction to Probability, Modern Geometry, Problem Solving using Pascal or C, Set Theory, Vector Calculus
- *Graduate level.* Advanced Linear Algebra, Advanced Set Theory, 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 various Selected Topics courses.

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 [2010; 20DOI: 10.1007/s11047-009-9169-1] (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, 16 August 2011 (Communication), DOI 10/ 1021/ cg200172j.

Other Academic Journal Publications

A University's Dilemma in the Age of National Security

(with Sherman Dorn)

Thought & Action, Fall 2005 (National Education Assocation, 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.

Manuscripts under Review

Generating Graphs Using Automorphisms

Submitted for publication.

Periodic Euclidean Graphs on Integer Points

Submitted for publication; 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. Prez-Jimnez, 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)

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

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

Jupitor 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, (October 22, 2011), Metro p. 15.

Presentations

Restrictions on simple fixed points of **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, NL; 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 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 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 Mathematics Association of America
Polk State College, 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 Mathematics Association of America
University of 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 Mathematics Association of America

Florida Southern College, Florida, Florida, December 2011

Plus numerous seminars and colloquia.

Continuing Web-Postings

Taking College Courses

USF Department of Mathematics Web-page:
`http://www.math.usf.edu/∼mccolm/pedagogy/`

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

Department Publicity Chair
1995-

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

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

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

University of South Florida; service through the years:

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

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 - present