David A. Nash

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Education	**Ph.D. in Mathematics**, University of Oregon, Eugene, June 2005–June 2010. Advisor, Professor Alexander Kleshchev.
	M.S. in Mathematics, University of Oregon, Eugene, December 2005.
	B.S. in Mathematics and Physics, graduated Magna Cum Laude from Santa Clara University, Santa Clara, June 2004.
Academic Positions	**Department Chair**, Fall 2017 – present. Department of Mathematics & Computer Science, Le Moyne College.
	Associate Professor, Fall 2016 – present. Department of Mathematics & Computer Science, Le Moyne College.
	Assistant Professor, Fall 2010 – Summer 2016. Department of Mathematics & Computer Science, Le Moyne College.
	Adjunct Professor, Summer 2010. Department of Mathematics, University of Oregon.
	Graduate Teaching Fellow, Fall 2004 – Spring 2010. Department of Mathematics, University of Oregon.
	Summer School Teacher, Mercy High School Burlingame, 2003, 2004, 2006, 2007. Courses: Math Enrichment, 7th Grade Tools for School, Basic Arithmetic, Pre-Algebra.
Awards	**Le Moyne College Summer Research Stipend**, 2012, 2013. Several tenured and tenure-track faculty are selected to receive funding each year from those who apply by submitting a research proposal.
	Spring 2012 Le Moyne College Course Development Stipend This funding was awarded based on my proposal to create a new Mathematics Core Course entitled *Mathematics for Decision Making* which ran for the first time Spring 2014.
	2008 Frank W. Anderson Award Winner Honors an advanced graduate student in mathematics with the department's most outstanding teaching record.
	2005 Richard V. Andree Award Given annually to undergraduate authors of papers that have been judged by the officers and councilors of Pi Mu Epsilon to be the best that appeared in the Pi Mu Epsilon Journal that year.
	2004 Inductee into Phi Beta Kappa Society Phi Beta Kappa celebrates and advocates excellence in the liberal arts and sciences. Its campus chapters invite for induction the most outstanding arts and sciences students at America's leading colleges and universities. The Society sponsors activities to advance these studies - the humanities, the social sciences, and the natural sciences - in higher education and in society at large.
Research Interests	recreational mathematics, magic shapes, combinatorics, Markov chains, representation theory, finite groups, symmetric groups, Hecke algebras, category theory, diagram categories, Brauer algebras, Lie algebras, cellular algebras, $GL(n,q)$, partition algebras, q-partition algebras.
Reviewer for	Mathematical Reviews, Mathematics Magazine, Mathematics Journal (MDPI), Symmetry Journal, Entropy Journal

Publications   **Cross set: An Alternative Latin Squares Puzzle**, *in preparation* (2020).

A New Take on Classic 'Pen Problems', `arXiv:1912.05646`, *submitted for publication* (2019).

Markov Chains and Prime Climb, with Shaun Ceci, *in preparation* (2019).

Markov Chains and Trouble, with Shaun Ceci, *in preparation* (2019).

Non-magic Hypergraphs, with Benjamin Ellis, Jonathan Needleman, and Michael Raney, `arXiv:1802.10392`, *submitted for publication* (2017).

A Friendly Introduction to Group Theory, 2nd Edition. CreateSpace, Seattle Washington, (2017).

Minimal and maximal Numbrix puzzles, with Mary Grace Hanson, *The Pi Mu Epsilon Journal* , **14**, No. 8, Spring 2018, 505–514.

How do you fix an oval track puzzle?, with Sara Randall, *Mathematics Magazine*, **91** (2018) No. 5, 348–358.

A Friendly Introduction to Group Theory. CreateSpace, Seattle, Washington, (2016).

When are finite projective planes magic?, with Jonathan Needleman, *Mathematics Magazine*, **89** (2016) No. 2, 83–91.

On Magic Finite Projective Space, with Jonathan Needleman, `arXiv:1412.1545` Preprint (2014).

A basis theorem for the affine oriented Brauer category and its cyclotomic quotients, with Jonathan Brundan, Jonathan Comes, and Andrew Reynolds, *Quantum Topology.* **8** (2017), No. 1, 75–112.

Magic Fano Planes, with Benjamin Miesner, *The Pi Mu Epsilon Journal*, **14** (2014), No. 1, 23–29.

An interpretation of the Lascoux-Leclerc-Thibon algorithm and graded representation theory, with Alexander Kleshchev, *Communications in Algebra*, **38** (2010), No. 12, 4489–4500.

Local Sensitivity Analysis for Observed Hydrocarbons in a Jupiter Photochemistry Model, with G. P. Smith, *Icarus*, **182**, 181 (2006)

Cayley Graphs of Symmetric Groups Generated by Reversals, *The Pi Mu Epsilon Journal*, **12:3**, 143–147 (Fall 2005).

Presentations   **A New Take on Classic 'Pen Problems'**, 15 minute contributed paper talk, Joint Mathematics Meeting: MAA Contributed Paper Session on Recreational Mathematics: Puzzles, Card Tricks, Games, and Gambling II, January 16, 2020.

Markov Plays Prime Climb, 10 minute contributed paper talk, Joint Mathematics Meeting: MAA General Session on Probability and Statistics I, January 18, 2019.

Markov Chains & Board Games, 50 minute invited talk, Le Moyne College Math Club Lecture Series, April 10, 2018.

How do you fix an oval track puzzle?, 10 minute contributed paper talk, Joint Mathematics Meeting: MAA General Contributed Paper Session on Algebra I, January 10, 2018.

When are finite projective planes magic?, 10 minute contributed paper talk, Joint Mathematics Meeting: MAA General Contributed Paper Session on Algebra I, January 7, 2016.

Geometry over $\mathbb{F}_1$, Invited 50 minute talk, Algebra Seminar, University at Buffalo SUNY, April 11, 2011.

On Graded Characters and Graded Decomposition Numbers Over Hecke Algebras and Symmetric Groups, Invited 30 minute talk, AMS 2010 Fall Eastern Sectional: Special Session on Lie Algebras and Representation Theory II, Syracuse University, Syracuse, NY, October 2, 2010.

An interpretation of the LLT algorithm, 10 minute contributed paper talk, Joint Mathematics Meeting: AMS Session on Group Theory I, January 13, 2010.

The Hook Length Formula, Invited 50 minute talk, Mathematics Colloquim, Santa Clara University, March 4, 2008.

University of Oregon Ring Theory Seminar, University of Oregon
Frequent speaker giving 2-5 talks annually since Winter 2006, on topics including semisimple Lie algebras, varieties, Lie groups, finite W-algebras, Hecke algebras, and cellular algebras.

Cayley Graphs and Expanders, Invited 50 minute talk, Mathematics Colloquim, Santa Clara University, May 18, 2004.

Conference Participation   **Joint Mathematics Meeting**, Denver Convention Center, Denver, CO, January 15 – 18, 2020. Co-organizer of the MAA Contributed Paper Session on Recreational Mathematics: Puzzles, Card Tricks, Games, and Gambling.

Joint Mathematics Meeting, Baltimore Convention Center, Baltimore, MD, January 16 – 19, 2019.

Joint Mathematics Meeting, San Diego Convention Center, San Diego, CA, January 10 – 13, 2018.

Joint Mathematics Meeting, Washington State Convention Center, Seattle, WA, January 5 – 9, 2016.

AMS 2010 Fall Eastern Sectional Meeting, Syracuse University, Syracuse, NY, October 2 – 3, 2010.

Conference Participation Cont'd	**Combinatorial Representation Theory**, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany, March 21 – 27, 2010. Served as the official Oberwolfach reporter for the workshop, writing report 15/2010.
	Joint Mathematics Meeting, Moscone Center, San Francisco, CA, January 13 – 16, 2010.
	Algebraic Lie Structures with Origins in Physics, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, March 23 – 27, 2009.
	Algebraic Lie Theory: Instructional Workshop, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, January 12 – 23, 2009.
	Topics in Combinatorial Representation Theory, Mathematical Sciences Research Institute, Berkeley, March 17 – 21, 2008.
	Lie Theory, Mathematical Sciences Research Institute, Berkeley, March 10 – 14, 2008.
	Introductory Workshop on the Representation Theory of Finite Groups, Mathematical Sciences Research Institute, Berkeley, February 4 – 8, 2008.
	Introductory Workshop on Combinatorial Representation Theory, Mathematical Sciences Research Institute, Berkeley, January 22 – 25, 2008.
	PIMS Algebra Summer School, Pacific Institute for the Mathematical Sciences, Edmonton, July 30 – August 9, 2007.
Service to the Institution	**Faculty Senate Executive Board Member (at-large)**, Fall 2013 – Spring 2016.
	Faculty Committee on Academic Regulations, Policies, and Procedures (ARPP), Fall 2012 – Fall 2013 and Fall 2016 – Summer 2017.
	Student Conduct Hearing Board, Fall 2012 – Spring 2014.
	Faculty Adviser to the Math Club, Spring 2011 – present.
	Mathematics Department Hiring Committee 2010 – 2011 and 2011 – 2012.
	Chair of Mathematics Department Committee for Student Learning Assessment (SLA), Fall 2010 – Spring 2017.
Service to Students	**Ran Independent Study Course on Advanced Linear Algebra**, Spring 2016.
	Academic Adviser for Class of 2016 Math Majors, Fall 2012 – Spring 2016.
	First Year Adviser for Math and CS Majors, Fall 2012 – Spring 2013.
	Senior Project Adviser, some recent projects include:
	Cross Set, Julia Richey, Fall 2018.
	A Twist on the Two Digits game, Nina Scrimale, Fall 2017.
	Analyzing Numbrix Puzzles, Mary Grace Hanson, Spring 2017. (expanded into a paper submitted to the Pi Mu Epsilon Journal)
	Analyzing the Top Spin Group, Sara Randall, Fall 2016. (expanded into a paper submitted to Math Magazine)
	Package Delivery: A Multi-dimensional Variation of the Traveling Salesman Problem, Tess Dubé, Fall 2014.
	Finding Cayley Graphs Among Digraphs, John Eallonardo, Fall 2013 (presented at the undergraduate poster session of the 2014 Joint Mathematics Meetings.)
	The Magic Fano Plane, Ben Miesner, Fall 2013 (presented at the undergraduate poster session of the 2014 Joint Mathematics Meetings).
Service to the Community	**Judge for WCNY's High School Game Show – Double Down**, 2018 Season.
	Special Award Judge and High School Level Judge for the Central New York Science and Engineering Fair (CNYSEF), Spring 2013, Spring 2014, Spring 2015, Spring 2016, Spring 2017, and Spring 2018.
	Le Moyne College Relay for Life, Spring 2012, 2013, 2014, 2015, 2016, and 2017.
	Le Moyne Dodgeball Tournament for "Colleges Against Cancer", Fall 2013.
	Special Award Judge for the Greater Syracuse Scholastic Science Fair (GSSSF)., Spring 2012.

Course Development

Statistics I: Online Version.
As part of an ongoing partnership with Syracuse University, I have developed an 8-week, online version of this two course for use in an Associates Degree program aimed at active duty military personnel. This course ran for the first time in Fall of 2019.

Abstract Algebra Textbook.
After a few years of teaching Abstract Algebra at Le Moyne, and hearing students complain about the density of our textbook, I decided to overhaul the course and write my own textbook entitled "A Friendly Introduction to Group Theory." I tested the book out as a set of course notes and then went ahead and self-published it through CreateSpace (see Publications list above) before running the course in Fall 2016. The majority of my students have reported that the book has been very helpful to them in our course and thus, based on their more specific feedback, I spent summer of 2017 expanding and updating the book to a 2nd edition.

Calculus I: Online Version.
Through the Jesuit Distance Education Network (JesuitNET) I took part in the CADE (Competency Assessment for Distance Education) course development program. Through that program I developed an online version of our Calculus I course for use during J-Mester, and Summer sessions as necessary.

Mathematics of Decision Making (Mathematics Core Course).
Making use of a Course Development Stipend that I received in Spring 2012 I developed a new core course for the new Mathematics Core that was first implemented in the 2013-2014 school year. This course aims to study many mathematical topics that all well-informed citizens should have at their disposal. It covers basic logic, probability, statistics, and economics with an eye on real-world applications.

Teaching Experience

Le Moyne College: *During my time at Le Moyne College I have taught the following:*

Abstract Algebra, Each Fall 2010–2019
Introduction to group theory. Cyclic, Abelian, symmetric and product groups. Subgroups, equivalence relations, quotient groups, homomorphisms, and isomorphisms.

Intermediate Problem Solving, Sp 2012, Sp 2018
A working introduction to general heuristic reasoning (including specialization, generalization, analogy and induction) useful in solving mathematical problems.

Topics in Number Theory, F 2016
Elementary properties of integers, divisibility and related concepts, methods of representing integers, functions of number theory, simple diophantine equations, special sequences and series.

Linear Algebra, Each Fall 2012–2019, and Spring 2016
Systems of linear equations, matrix algebra, vectors and vector spaces, linear transformations, inner product spaces, determinants, characteristic values and vectors.

Calculus III, F 2011, Sp 2012, Sp 2015
Multi-variate calculus with vectors. Line integrals and Green's theorem.

Calculus II, F 2010, Sp 2014
A study of differential and integral calculus of one and several variables and applications. Infinite sequences and series.

Teaching Experience Cont'd

Calculus I, Sp 2011 [Online edition run J-Mester 2014, 2015, 2016, 2017 and Summer 2014, 2015, 2016, 2017, 2018.]
A study of differential and integral calculus of one variable and applications.

Discrete Mathematics, Sp 2013
A study of the fundamental mathematical principles relevant to computer science, applied mathematics, and engineering. Topics included are functions, relations, sets, propositional logic, predicate logic, proof techniques, mathematical induction and recursion, graphs, trees, and probability.

Mathematics of Decision Making, Sp 2014, Sp 2015, Sp 2016
See description in course development above.

Brief Calculus, F 2015
Elementary functions, exponential and logarithmic functions, continuity, derivatives, max-min methods and applications. Primarily for students in economics and accounting.

Mathematics for Business Majors, Sp 2013, F 2014, Sp 2016, Sp 2019
Exponential functions and models, mathematics of finance, linear systems and matrices, linear programming, and derivatives. There is particular emphasis on applied problems.

University of Oregon: *As a Graduate Teaching Fellow, I was the instructor of record and in charge of all aspects of the following courses:*

Advanced Linear Algebra, Sum 2010.
Theory of vector spaces over arbitrary fields, theory of a single linear transformation, minimal polynomials, Jordan and rational canonical forms, quadratic forms, quotient spaces.

Linear Algebra II, Sp 2009.
Second course in vector and matrix algebra. Covering abstract real and complex vectors spaces, linear transformations, determinants, eigenvalues and eigenvectors, and inner product spaces.

Intro to Differential Equations, W 2010.
Introduction to (ordinary) differential equations and applications.

Calculus III, Sp 2008, F 2009.
Infinite sequences and series including Taylor series.

Calculus II, Sp 2006, Sp 2007, F 2008.
Integral Calculus including an introduction to improper integrals.

Calculus I, W 2006, W 2007, F 2007.
Differential Calculus and applications.

Fundamentals of Elementary Math II, Sum 2006.
Second course in 3-course sequence designed to cover the mathematics needed to teach grades K-8.

Elementary Functions, Sp 2005, F 2005, F 2006.
Pre-calculus covering exponential, logarithmic, and trigonometric functions.

College Algebra, F 2004, W 2005, Sum 2005, Sp 2008.
Algebra of functions, polynomial, rational, exponential, and logarithmic functions.

Computer Skills

Python (including numerous data science packages), LaTeX, Matlab/Octave, Sage, Groups Algorithms and Programming (GAP), HTML, Blackboard, Canvas, WebWork, Web Assign, C++, C#.

References

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