Neil R. Nicholson, Ph.D.

North Central College
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Positions Held

Associate Professor of Mathematics, North Central College, 2016-
Assistant Professor of Mathematics, North Central College, 2010-2016
Assistant Professor of Mathematics, William Jewell College, 2007-2010
Adjunct Instructor, Maple Woods Community College, 2008-2009
Algorithm Development Contractor, Houghton Mifflin Company, 2007
Presidential Fellow, The University of Iowa, 2002-2007
Graduate-Level Grader, The University of Iowa, 2005-2007
Teaching Assistant, The University of Iowa, 2003-2006
Instructor, Kirkwood Community College, 2004-2005

Education

Ph.D., Mathematics, The University of Iowa, May 2007
Dissertation: On Knots and Their Invariants
Advisor: Dr. Richard Randell
B.A., Mathematics, Computer Science minor, Summa cum Laude, Phi Beta Kappa, Lake Forest College, 2002
Additional
Institute for Mathematics and Its Applications Summer Program in Topology and its Applications, Mississippi State University, 2006
American College of Sports Medicine Continuing Education, Road Runners Club of America Coaching Certification, 16 credit hours, 2014

Research Interests

- Primary: topology, specifically knot theory and the relationships between knot invariants and knot polynomials, the space of piecewise linear knots, and knots and links in projective space (AMS Subject Classifications 57M27, 57M25, 57M15)
- Secondary: knot theory and algorithmic music writing, graph theory, discrete and computational geometry with combinatorics

Research with Undergraduates:

Visibility preserving functions with Jack Billings, North Central College, 2017 (paper submitted)

Patterns in the weak visibility of lattice points with Jack Billings, North Central College, 2015 (presented at Joint Mathematics Meetings MAA Poster Session, Seattle, 2016)

Piecewise-linear pseudodiagrams with Molly Durava, Kelleigh Kuehl, and Jackson Ramsey, North Central College, 2014

Weakly viewing lattice points with Rebecca Rachan, North Central College, 2014 (paper to appear; presented at Joint Mathematics Meetings MAA Poster Session (Top 3 award), San Antonio, 2015)

Determining piecewise-linear pseudoknots with Molly Durava and Jackson Ramsey, North Central College, 2013 (paper in preparation; preprint available at http://arxiv.org/abs/1308.6776; presented at National Council of Undergraduate

Research (Durava), The University of Kentucky, April 2014, Rall Symposium (Durava) May 2014)
Weakly viewing triangles with Christopher Halverson and Jackson Ramsey, North Central College, 2012
Tiling with Tyler Schroeder, North Central College, 2012 (presented at Joint Mathematics Meetings 2013, National Council of Undergraduate Research, University of Wisconsin-La Crosse, April 2013)
Mathematics of the Rubik's Cube with Kacy Kane and Julien Milcent, North Central College, 2012
Resolutions and Bridge Number with Donglun Liu, Steven Mackey, Tyler Schroeder, and Kyle Thomas, North Central College, 2011 (Pi Mu Epsilon Prime Time Colloquium Spring 2011, Rall Symposium (Schroeder) May 2012), Journal of Knot Theory and its Ramifications, 22(10): 8 pp., 2013.
Weakly viewing lattice points with Christopher Sharp, William Jewell College, 2008, Involve: A Journal of Mathematics, 3(1), 9—16, 2010.
Age, gender, and knot tying with Elizabeth Waterland, William Jewell College, 2008-2009
Universe resolutions and bridge number with Jacob Dunham, Illinois Wesleyan University, 2008
Dissecting link invariants with Jerrad Hansen, William Jewell College, 2008

Teaching Experience

North Central College

Courses Taught:

Finite Mathematics; First Year Experience, Integrated Calculus I – Calculus of Limits; Integrated Calculus II – Calculus of Derivatives; Calculus I; Calculus II, Calculus III, Calculus IV, Nature of Proof in Mathematics, Problem Solving Seminar, Topology, Senior Seminar, Interdisciplinary Studies: The Ethics of Statistical Manipulation

Courses Designed and Taught:

Seminar on Leadership Theory: The Ethics of Statistical Manipulation, 2013

William Jewell College:

Courses Taught:

Abstract Algebra; Advanced Mathematics Seminar: The Art of Problem Solving I and II; Applied Calculus and Statistics; Applied Linear Algebra; Calculus II; Calculus III; Math Model Building and Statistics

Courses Designed and Taught:

History of Mathematics (New course), 2009
Mathematical Theoretical Development (Independent Study), 2009
The Art of Problem Solving, 2008
12 Great Theorems (Independent Study), 2008
Statistics and Advanced Inferences (Independent Study), 2008

Publications

Weak visibility preserving functions, with Jack Billings, submitted, 2017.
Visualizing Euclidean Rhythms using Tangle Theory, with Jonathon Kirk, Polymath: An Interdisciplinary Arts & Sciences Journal, 6(1): 10 pp., 2016.
Review of *The Two-Wheeled World of George B. Thayer* by K. J. Hayes, *Journal of Sport History*, 43(2), 2016

On weak lattice point visibility, with Rebecca Rachan, Involve: A Journal of Mathematics, 9(3), 411—414, 2016.

Average bridge number of shadow resolutions, with Donglun Liu, Steven Mackey, Tyler Schroeder, and Kyle Thomas, Journal of Knot Theory and its Ramifications, 22(10): 8 pp., 2013.

Lasting Learning: Measuring impact and success through sustainability, with Mary Embry and Deborah Scarfino, in Service-Learning in Higher Education: Connecting the Global to the Local, eds. Phylis Lan Lin and Mark R. Wiegand. Indianapolis: University of Indianapolis Press, 2013. 29—43.

Piecewise-linear virtual knots, Journal of Knot Theory and its Ramifications, 20(9):1271—1284, 2011.

Weakly viewing lattice points, with Christopher Sharp, Involve: A Journal of Mathematics, 3(1):9—16, 2010.

Nonalternating knots and Jones polynomials, Journal of Knot Theory and its Ramifications, 17(8):983—1003, 2008.

On Knots and Their Invariants, Ph.D. dissertation, The University of Iowa, Iowa City, IA, 2007

Piecewise-linear pseudoknots, with Molly Durava and Jackson Ramsey, http://arxiv.org/abs/1308.6776)

Grants

North Central College FPDC Research & Writing Grant, $2625, *Proofs Textbook, Continued,* 2016

North Central College FPDC General Education Curriculum Grant, $750, *Instructional Development: IDS 125 (Real World Problems and Math Modeling Solutions)*, 2016

North Central College FPDC Research & Writing Grant, $3000, *Proofs Textbook: First Steps*, 2015

Mathematical Association of America Dolciani Mathematics Enrichment Grant, $3400, *$E^2$ (Expository Engagement): North Central Math Circle*, 2015

Mathematical Association of America Dolciani Mathematics Enrichment Grant, $5300, *$E^2$ (Expository Engagement): North Central Math Circle*, 2014

Enactus Sam's Club Step Up for Small Business Challenge, $1500 Grant, *Delicious Empowerment: Arbor Vitae,* 2014

Gael D. Swing Fund for Creativity Grant, $1000, *Athletics Entrepreneurship Panel*, North Central College, 2013

Enactus Walmart Women's Economic Empowerment Project Partnership, $1500 Grant, *Hopi Enetrepreneurs*, 2013

Coca-Cola Uncap Opportunities for Women, $1500 Grant, *Hopi Entrepreneurs*, 2013

Mathematical Association of America Dolciani Mathematics Enrichment Grant, $6000, *$E^2$ (Expository Engagement): North Central Math Circle*, 2013

North Central College FPDC Research & Writing Grant, $2775, *Invariants of Classical and Virtual Pseudoknots*, 2013

Enactus Lowe's Community Improvement Partnership Project, $2000 Grant, *Ann Reid Learning Gardens,* Co-Faculty Sponsor, North Central College, 2013

North Central College FPDC Research & Writing Grant, $2250, *External Grant Proposal Preparation*, 2012

North Central College FPDC Research & Writing Grant, $3000, *Enhancement of Maple Modules for the Integrated Calculus Sequence*, 2011

SIFE Sam's Club Challenge, $1000, *Environmental Impact Assessments*, Faculty Sponsor, North Central College, 2011

SIFE Sam's Club Challenge, $1000, *Marriot Hotel and City of Gladstone Improvements*, Faculty Sponsor, William Jewell College, 2010

Hall Family Foundation Collaborative Learning Grant, $1200, William Jewell College, 2009

Summer Research Grant, $1000, William Jewell College, 2008

Selected Presentations

More or Less?
Waubonsee Community College Math Circle, Waubonsee Community College, March 2016
Waubonsee Community College Math Circle, Waubonsee Community College, March 2015

Counting and Cardinality
E²: North Central Math Circle, North Central College, January 2015

Euclidean Rhythms and Tangles
with Jonathon Kirk, MAA Special Session, "At the Intersection of Mathematics and the Arts," Joint Mathematics Meetings, Baltimore, January 2014

Knotty or Nice?
E²: North Central Math Circle, North Central College, November 2013

Photographing Points
Illinois Section of the MAA Spring Meeting, Roosevelt University, April 2013

The Mathematics of Knots
A Promising Start: Excellence In Scholarship Mini-Conference, North Central College, September 2012

Winning…
Pi Mu Epsilon Prime Time Colloquium, North Central College, February 2012

Lasting Learning: Measuring impact and success through sustainability
Fourth International Symposium on Service-Learning, Ningbo, Zhejiang, China, September 2011, with Mary Embry and Deborah Scarfino

Linear Algebra Games: Merlin
Illinois Section of the MAA Spring Meeting, North Central College, April 2011

Chess, Church, and Knots: Statistics Through Service and Research
MAA General Contributed Papers Session, Joint Mathematics Meetings, San Francisco, January 2010

Nonalternating Knots and the Jones Polynomial
Invited Special Session, Joint Mathematics Meetings, New Orleans, January 2007

Conferences Attended (recent)

Illinois Section of the MAA Spring Meeting, Illinois College, April 2016
Illinois Section of the MAA Spring Meeting, Southern Illinois University, March 2014
Joint Mathematics Meetings, Baltimore, January 2014
Illinois Section of the MAA Spring Meeting, Roosevelt University, April 2013
Illinois Section of the MAA Spring Meeting, North Central College, April 2011

Computer Skills

Experienced user in standard platforms and programs
Fluent in LaTeX, C++, HTML, Java, Mathematica, Maple languages
Knowledge of ML, MATLAB, Visual Basic, SQL languages

Service

Faculty Athletic Representative to the NCAA, North Central College, 2016-
Chaplain Advisory Council, North Central College, 2016-
Grievance Panel, North Central College, 2016 -
Director-at-Large, Illinois Section of the Mathematical Association of America, 2014-
FCC Amateur Radio Technician, Technician Class license (KC9VIG), 2012-
NCC Cycling & Multisport Club, Faculty Advisor, North Central College, 2011-
Enactus/Students In Free Enterprise (SIFE), Sam Walton Faculty Fellow, William Jewell College, 2008-2010, North Central College, 2010-
Reviewer, *Mathematical Reviews*, 2006-
Co-chair, Co-Curricular Subcommittee for the Strategic Plan, North Central College, 2016-

Calendar Task Force, North Central College, 2016-
Book Review (non-published), *Diagram Genus, Generators and Applications*, A. Stoimenow, CRC Press/Chapman and Hall, 2015
Faculty Chair, Committee on Enrollment Management, Athletics and Student Affairs, North Central College, 2014 - 2016
Project Co-Director, *E^2(Expository Engagement): North Central Math Circle*, North Central College, 2013-2015
Coleman Foundation Faculty Fellow, North Central College, 2013-2015
Cultural Events Committee, North Central College, 2013-2014
Faculty Committee on Enrollment Management, Athletics, and Student Affairs, North Central College, 2012-2013
Advisory Panel, American Mathematics Competition, The Mathematical Association of America, 2008-2013
Faculty Mentor, North Central College Wrestling, North Central College, 2010-2013
Curriculum and Educational Policy Committee (CEPC), William Jewell College, 2009-2010
CEPC Transfer Policy Subcommittee, William Jewell College, 2009-2010
Area Coordinator, Applied Critical Thought & Inquiry Department, William Jewell College, 2009-2010
Active Engagement Committee, Applied Critical Thought & Inquiry Department, William Jewell College, 2009-2010
Pryor Leadership Committee, William Jewell College, 2009-2010
Rotoract, Faculty Advisor, William Jewell College, 2009-2010
Faculty Sponsor, Student Mathematics Competition Teams, William Jewell College, 2008-2010
NC Outward Bound School Pryor Leadership Faculty Participant, Florida Everglades, 2008-2009
Athletic Council, William Jewell College, 2008-2009
College Conduct Committee, William Jewell College, 2008-2009
Sophomore Experience Faculty Liaison, William Jewell College, 2007
Statistical Reviewer, Departments of Education and Nursing, William Jewell College, 2007-2008
Referee, *Journal of Prosthodontics*, 2005

Professional Memberships

Mathematical Association of America (MAA), Society for Industrial and Applied Mathematics (SIAM), Council on Undergraduate Research (CUR), Pi Mu Epsilon, Faculty Athletics Representatives Association (FARA)

Honors and Awards

Phi Beta Kappa Society Inductee and Member, 2002-
Clarence F. Dissinger Award for Distinguished Teaching and Mentoring, North Central College, 2015
Enactus Sam's Club Step Up for Small Business Challenge, National Finalist, $1000, Faculty Sponsor, North Central College, 2015
SIFE Lowe's Community Improvement Project National Finalist, $5000, Faculty Sponsor, North Central College, 2012
SIFE Sam's Club Challenge Top 3 National Finalist Faculty Sponsor, $2000, William Jewell College, 2010
President's Volunteer Service Award, 2009
The University of Iowa Presidential Fellowship, 2002-2007

References

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