Craig Tennenhouse

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Professional Appointments

Ludcke Chair of Liberal Arts & Sciences, rotating endowed chair 2022-2023
Professor School of Math. and Phys. Sci., University of New England, Biddeford, ME 2022-Present
Interim Academic Director School of Mathematical and Physical Sciences, UNE 2021-2022
Associate Professor Mathematical Sciences, UNE 2016-2022
Assistant Professor Mathematical Sciences, UNE 2010-2016
Teaching Assistant University of Colorado Denver 2007-2010
Assistant Professor Mathematics, Simpson University, Redding, CA 2003-2007
Assistant Professor Mathematics, Jamestown College, Jamestown, ND 2002-2003
Teaching Assistant University of Colorado, Boulder, CO 1999-2002

Education

Ph.D. Applied Mathematics University of Colorado Denver
Some extensions of graph saturation to edge-colored, oriented, and subdivided graphs
Advisor: Michael S. Jacobson
M.A. Mathematics University of Colorado, Boulder
A.B. Mathematics, *with honors* University of Chicago
Junior Year Abroad University of Edinburgh, Scotland, UK

Awards, Grants & Honors

2022 - Ludcke Chair of Liberal Arts & Sciences (rotating endowed chair)
2019 - CETL Teaching Scholars Program, *Inquiry-Based Learning*, $5500
2017 - VPRS Faculty Mini-Grant, *Collaborative Research in Impartial Combinatorial Games*, $3252
2016 - Excellence in Academic Advising (awarded by students annually)
2013 - NSF S-STEM SUCCESS Grant, $620,788 *Co-PI*
2012 - Debra J. Summers Memorial Award for Teaching Excellence (awarded by students annually)
2008-2010 - NSF GK-12 Fellowship
2007-2008 - Bateman Teaching Assistantship
1999-2002 - UCB Teaching Assistantship

Teaching methodology experience

I have experience in developing and teaching using flipped classrooms, Inquiry-Based Learning, Question Formulation Theory, and teaching through game play. I am currently working on a qualitative research project on the use of IBL in an upper-level mathematics setting, and am in the early stages of a collaborative textbook project using inquiry and Combinatorial Game Theory to guide students through Discrete Mathematics.

Industry knowledge and experience

I am experienced with Python, in particular within the context of Jupyter Notebooks and Sagemath/CoCalc. I also recently worked on a contracted Data Science project using historical data on weather, soil composition, and crop yields from a dozen farms over a decade and employed a number of regression and classification methods (linear, tree-based, and neural nets) to predict future yield. I utilized the packages NumPy, Pandas, GeoPandas, GDAL, MatPlotLib, Pillow, and Scikit-Learn.

Research Interests

Graph and digraph saturation, structural properties of graphs, coloring, Combinatorial Game Theory

Major Academic Service

Interim Academic Director
Director for the School of Mathematical and Physical Sciences (Applied Mathematics, Data Science, Chemistry, Biochemistry, Lab Science, and Physics programs)
Core Curriculum Assessment Coordinator
Coordination of all assessment efforts in general education among faculty in the college. 2 years.
Curriculum development
Development of new courses and curricula
Core Area Coordinator for Mathematics
Coordination of **assessment** for the Core in CAS
Referee for multiple peer-reviewed academic journals
Host & organizer for multiple mathematics meetings

Courses taught

Mathematics for Liberal Arts
College Algebra
Math Applications for Management
Precalculus
Calculus I, II, III
Discrete Mathematics, Intro to Proofs
Graph Theory
Geometry (Euclidean and non-Euclidean)
Modern Algebra
Topology
Real Analysis
Complex Analysis
Network ecology (team-taught)
Mathematics research seminar
Mathematics of Games and Puzzles

Undergraduate research advising

I have had the pleasure of serving as the research advisor for twelve undergraduate projects in mathematics, all involving original research and presentations. I have also served on a number of undergraduate research committees for students performing work outside of mathematics.

Peer-reviewed publications:

Author order alphabetized by convention

14. M. Huggan, **C. Tennenhouse**, "Genetically modified games", *Integers* **21b**, (2021)
13. K. Burke, M. Ferland, M. Fisher, V. Gledel, **C. Tennenhouse**, "The Game of Blocking Pebbles", *Integers* **21b**, (2021)
12. S. Heubach, M. A. Huggan, R.J. Nowakowski, and **C. Tennenhouse**, "Cyclic Subtraction Set Games", *Crux Mathematicorum*, Vol. **46:8**, (2020) 413 - 414.
11. J. McDonald, G. J. Puleo, **C. Tennenhouse**, "Packing and covering directed triangles", *Graphs & Comb.*, (2020) 1-5.
10. **C. Tennenhouse**, "Edge-critical G, H colorings", *Ars Combinatoria*, Vol. **138**, (2018) 403-413.
9. Hodgdon, C.T., **Tennenhouse, C.**, Koh, W., Fox, J., & Sulikowski, J. "Shortnose Sturgeon of the Saco River Estuary: Assessment of a Unique Habitat", *Journal of Applied Ichthyology*, (2018).
8. **C. Tennenhouse**, "Impartial poker nim", *Intern. J. of Game Th.*, Vol. **47:2**, (2016) 695-705.
7. **C. Tennenhouse**, "Induced subgraph-saturated graphs", *Th. and Appl. of Graphs*, Vol. **3:2**, (2016).
6. C. J. Byron, **C. Tennenhouse**, "Commonality in structure among food web networks", *Network Biology*, Vol. **5:4**, (2015) 146-162.
5. J. Quinlan, **C. Tennenhouse**, "Perceived utility of typesetting homework in post-Calculus mathematics courses", *PRIMUS*, Vol. **26:1**, (2015) 53-66.
4. **C. Tennenhouse**, "A new parameter on resolving sets with a realizable triple", *Australasian J. of Combin.*, Vol. **63:1**, (2015) 115-129.
3. M. Ferrara, M. Jacobson, K. Milans, **C. Tennenhouse**, and P. Wenger, "Saturation numbers for families of graph subdivisions", *J. Graph Theory*, Vol. **71:4**, (2012) 416-434.
2. M.S. Jacobson, **C. Tennenhouse**, "Oriented graph saturation", *JCMCC*, Vol. **80**, (2012) 157-169.
1. B. Flesch, **C. Tennenhouse**, "Edge maximal non-interval graphs", *JCMCC*, Vol. **77**, (2011) 33-44.

Popular

C. Tennenhouse, C. Byron, "Mathematical Examinations of Marine Food Webs", *Rising Tide, Research and Scholarship at the University of New England*, (2015) p17.

Books

K. Burke, **C. Tennenhouse**, "Playing Games with Discrete Math", *CC license*, (2021)

Conferences hosted/organized

5. *Sprouts* undergraduate combinatorial game theory conference – *virtual*, April 2022.
4. *Sprouts* undergraduate combinatorial game theory conference – UNE, Biddeford, ME, April 2019.
3. *Disc Math Days of the NE* – UNE, Biddeford, ME, May, 2018.
2. *Sprouts* undergraduate combinatorial game theory conference – PSU, Plymouth, NH, April, 2018.
1. *Sprouts* undergraduate combinatorial game theory conference – UNE, Biddeford, ME, April 2017.

Academic presentations

29. *Using Genetic Programming to inform conjectures in Combinatorial Game Theory*, West Chester University Mathematics Colloquium, Feb 2021.
28. *Genetic Programming for Genetic Algorithm Games*, Virtual Combinatorial Games Seminar, 2020
27. *Towards an impartial short Tafl variant*, Sprouts – UNE, Biddeford, ME, April 2019.
26. *Searching for Nessie and Viking Chess*, Sabbatical Presentation – UNE, Biddeford, ME, Dec 2018.
25. *CGSuite and Combinatorial Games.*
    Sprouts Undergraduate Research Conference in CGT – Plymouth State U, Apr 2018.
24. *Three Graph Reduction Games*, Games and Graphs Workshop – Lyon, France, Oct 2017.
23. *Commonality in structure among food web networks.*
    University of Stirling Mathematics Seminar – Scotland, UK, Oct 2017.
22. *Extremal Value Games*, Fundy and Games Workshop – St. John, New Brunswick, Jul 2017.
21. *A Two-Player Pebbling Game.*
    Combinatorial Game Theory Colloquium 2 –Lisbon, Portugal, Jan 2017.
20. *Penultimate Nim and Conjoined Games*, Games at Dal – Halifax, Nova Scotia, Canada, Aug 2016.
19. *Penultimate Nim and Conjoined Games.* (invited)
    Robert Gordon University Computing Science Dept. – Aberdeen, Scotland, UK, Jun 2016.
18. *SageMathCloud Workshop and Panel.*
    Northeastern section of the MAA Spring meeting – Biddeford, ME, Jun 2016.
17. *Searching for Robots: A New Parameter on Resolving Sets.*
    Plymouth State University Mathematics Dept. Seminar – Plymouth, NH, Oct 2015.
16. *New Bogus Nim Variants*, Games at Dal – Halifax, Nova Scotia, Canada, Aug 2015.
15. *Games for Data Structures*, Combinatorial Game Theory Colloquium 1 – Lisbon, Portugal, Jan 2015.
14. *Colors and Spies: Two New Problems in Graph Theory.* (invited)
    Gordon College Math Forum – Wenham, MA, May 2014
13. *Induced Subgraph Saturated Graphs*, Forty-Fifth SEIC-CGTC – Boca Raton, FL, Mar 2014.
12. *Math as a Creative Act.* (invited), UNE Talks, University of New England – Biddeford, ME, Dec 2013
11. *A Graph Theory Problem, or How I Learned to Stop Worrying and Love the Computer.*
    University of New England Math Club – Biddeford, ME, Nov 2012.
10. *Saturation Numbers for Families of Graph Subdivisions.*
    SIAM Conference on Discrete Mathematics – Halifax, Nova Scotia, Canada, Jun 2012.
9. *Impartial Combinatorial Games: Life After Tic-Tac-Toe.*
    University of New England Math Club – Biddeford, ME, Mar 2012.
8. *Edge-Critical G, H Colorings*, Forty-Second SEIC-CGTC– Boca Raton, FL, Mar 2011.
7. *Graph Theory and its Applications.*
    University of New England Math Club – Biddeford, ME, Feb 2011.
6. *Some Oriented and Colored Extremal Graphs.*
    Mathematical Association of America Northeast Section Meeting – Providence, RI, Nov 2010.
5. *Graph Saturation and Subdivided Cycles.* (invited)
    Mathematical Association of America Rocky Mountain Section Meeting – Ft. Collins, CO, Apr 2010
4. *Non-Hamiltonian Bigraphs with High Minimum Degree.* (invited)
    East China University of Science and Technology – Shanghai, China, Jun 2009

3. *Oriented Graph Saturation.* (invited)
   East China University of Science and Technology – Shanghai, China, Jun 2009
2. *Oriented Graph Saturation.* (invited)
   Paths, Cycles, & Graph Structures Workshop, 2009 SIAM Annual Meeting – Denver, CO, Apr 2009
1. *Oriented Graph Saturation*, Fortieth SEIC-CGTC– Boca Raton, FL, Mar 2009.