

Craig Tennenhouse

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Professional Appointments

Interim Academic Director	School of Mathematical and Physical Sciences, UNE	2021-Present
Associate Professor	Mathematical Sciences, University of New England, Biddeford, ME	2016-Present
Assistant Professor	Mathematical Sciences, University of New England, Biddeford, ME	2010-2016
Teaching Assistant	University of CO 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
<i>Some extensions of graph saturation to edge-colored, oriented, and subdivided graphs</i>	
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

2019	- CETL Teaching Scholars Program, <i>Inquiry-Based Learning</i> , \$5500
2017	- VPRS Faculty Mini-Grant, <i>Collaborative Research in Impartial Combinatorial Games</i> , \$3252
2016	- Excellence in Academic Advising (awarded by students annually)
2013	- NSF S-STEM SUCCESS Grant, \$620,788 <i>Co-PI</i>
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	Courses taught
<p>Interim Academic Director Director for the School of Mathematical and Physical Sciences (Applied Mathematics, Data Science, Chemistry, Biochemistry, Lab Science, and Physics programs)</p> <p>Core Curriculum Assessment Coordinator Coordination of all assessment efforts in general education among faculty in the college. 2 years.</p> <p>Curriculum development Development of new courses and curricula</p> <p>Core Area Coordinator for Mathematics Coordination of assessment for the Core in CAS</p> <p>Referee for multiple peer-reviewed academic journals</p> <p>Host & organizer for multiple mathematics meetings</p>	<p>Mathematics for Liberal Arts</p> <p>College Algebra</p> <p>Math Applications for Management</p> <p>Precalculus</p> <p>Calculus I, II, III</p> <p>Discrete Mathematics, Intro to Proofs</p> <p>Graph Theory</p> <p>Geometry (Euclidean and non-Euclidean)</p> <p>Modern Algebra</p> <p>Topology</p> <p>Real Analysis</p> <p>Complex Analysis</p> <p>Network ecology (team-taught)</p> <p>Mathematics research seminar</p> <p>Mathematics of Games and Puzzles</p>

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*

1. M. Huggan, **C. Tennenhouse**, “Genetically modified games”, *Integers* **21b**, (2021)
2. K. Burke, M. Ferland, M. Fisher, V. Gledel, **C. Tennenhouse**, “The Game of Blocking Pebbles”, *Integers* **21b**, (2021)
3. S. Heubach, M. A. Huggan, R.J. Nowakowski, and **C. Tennenhouse**, “Cyclic Subtraction Set Games”, *Crux Mathematicorum*, Vol. **46:8**, (2020) 413 - 414.
4. J. McDonald, G. J. Puleo, **C. Tennenhouse**, “Packing and covering directed triangles”, *Graphs & Comb.*, (2020) 1-5.
5. **C. Tennenhouse**, “Edge-critical G, H colorings”, *Ars Combinatoria*, Vol. **138**, (2018) 403-413.
6. 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).
7. **C. Tennenhouse**, “Impartial poker nim”, *Intern. J. of Game Th.*, Vol. **47:2**, (2016) 695-705.
8. **C. Tennenhouse**, “Induced subgraph-saturated graphs”, *Th. and Appl. of Graphs*, Vol. **3:2**, (2016).
9. C. J. Byron, **C. Tennenhouse**, “Commonality in structure among food web networks”, *Network Biology*, Vol. **5:4**, (2015) 146-162.
10. J. Quinlan, **C. Tennenhouse**, “Perceived utility of typesetting homework in post-Calculus mathematics courses”, *PRIMUS*, Vol. **26:1**, (2015) 53-66.
11. **C. Tennenhouse**, “A new parameter on resolving sets with a realizable triple”, *Australasian J. of Combin.*, Vol. **63:1**, (2015) 115-129.
12. 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.
13. M.S. Jacobson, **C. Tennenhouse**, “Oriented graph saturation”, *JCMCC*, Vol. **80**, (2012) 157-169.
14. 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

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

Academic presentations

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

28. *Oriented Graph Saturation*. (invited)
Paths, Cycles, & Graph Structures Workshop, 2009 SIAM Annual Meeting – Denver, CO, Apr 2009
29. *Oriented Graph Saturation*, Fortieth SEIC-CGTC– Boca Raton, FL, Mar 2009.