Curriculum Vitae

Dr. P. Christopher Staecker

Last update: September 21, 2024

Address
Fairfield University
1703 North Benson Rd
Fairfield CT, 06824-5195

Email: cstaecker@fairfield.edu
Web: http://faculty.fairfield.edu/cstaecker

Education

- PhD, UCLA, Mathematics 2005
- BS, Bates College, Mathematics 2000

Appointments

- **Professor, Fairfield University** Fall 2020 – present
  Associate Professor, Fairfield University Fall 2012 – Spring 2019
  Assistant Professor, Fairfield University Fall 2009 – Spring 2012
  Mathematics and computer science, 6 courses (18 credit hours) per year
- **Assistant Professor, Messiah College** Fall 2005 - Spring 2009
  Undergraduate mathematics, 7 courses (21 credit hours) per year

Articles

- Johnson, Wayne and Lee, Dae Woong, and Staecker, P. Christopher *On digital H-spaces* Arxiv preprint 2408.10087 Submitted August 2024
- Kapoor, Nicholas and Staecker, P. Christopher *Ahead of the Count: An Algorithm for Probabilistic Prediction of Instant Runoff (IRV) Elections* Arxiv preprint 2405.09009 Submitted May 2024

- Lupton, Gregory and Musin, Oleg and Scoville, Nicholas and Staecker, P. Christopher and Treviño-Marroquín Jonathan *A second homotopy group for digital images* Arxiv preprint 2310.08706 Journal of Algebraic Combinatorics, 2024

- Lee, Dae Woong and Staecker, P. Christopher *Digital topological groups* Arxiv preprint 2208.10748. Topology and its Applications **338**, 108644, 2023

- Staecker, P. Christopher *The Reidemeister trace of an n-valued map* Arxiv preprint 2111.08467. Topology and its Applications **337**, 108628, 2023.

- Jamil, Samira and Staecker, P. Christopher and Ali, Danish *Computability of digital cubical singular homology of c_1-digital images* Arxiv preprint 2205.07457. Submitted May 2022.

- Abdullahi, Muhammad Sirajo and Kumam, Poom and Staecker, P. Christopher *Lefschetz numbers and fixed point theory in digital topology* Arxiv preprint 2004.07550. Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales. Serie A. Matemáticas **116**, 2022.

- Staecker, P. Christopher, *Digital homotopy relations and digital homology theories* Arxiv preprint 2106.01171. Applied General Topology **22**, Issue 2, 2021.

- Brown, Robert F. and Dekimpe, Karel and Deconinck, Charlotte and Staecker, P. Christopher, *Lifting classes for the fixed point theory of n-valued maps* Arxiv preprint 1711.02722. Topology and its Applications **274**, p 107–125, 2020.

- Boxer, Laurence and Staecker, P. Christopher, *Fixed point sets in digital topology, I* Arxiv preprint 1901.11093. Applied General Topology **21**, Issue 1, 2020.

- Boxer, Laurence and Staecker, P. Christopher, *Remarks on Fixed Point Assertions in Digital Topology* Arxiv preprint 1806.06110. Applied General Topology **20**, p. 135–153, 2019.

- Boxer, Laurence and Staecker, P. Christopher, *Remarks on pointed digital homotopy*. Arxiv preprint 1503.03016. Topology Proceedings **51**, p 19-37, 2018.

- Staecker, P. Christopher, *Axioms for the fixed point index of an n-valued map, and some applications*. Arxiv preprint 1707.09799. Journal of Fixed Point Theory and Applications **20**, 2018.

- Boxer, Laurence and Staecker, P. Christopher, *Homotopy relations for digital images*. Arxiv preprint 1509.06576. Note di Matematica **37**, p 99-126, 2017.

- Lee, Jong Bum and Staecker, P. Christopher, *An averaging formula for the coincidence Reidemeister trace*. Arxiv preprint 1610.09035. Bulletin of the Belgian Mathematical Society Simon Stevin **24**, Issue 4, p 591-612, 2017.

- Kim, Seungwon and Staecker, P. Christopher, *The asymptotic density of Wecken maps on surfaces with boundary*. Arxiv preprint 1204.4808. Mathematics Research Letters **24**, Issue 4, p 1133-1145, 2017.

- Staecker, P. Christopher, *Nice Neighbors: a brief adventure in mathematical gamification*. Arxiv preprint 1602.03392. Math Horizons **23** no. 4, p. 5–7, 2016.
- Boxer, Laurence and Staecker, P. Christopher, *Fundamental Groups and Euler Characteristics of Sphere-like Digital Images*. Arxiv preprint 1602.00240. Applied General Topology 17, Issue 2, p 139-158, 2016.
- Boxer, Laurence and Staecker, P. Christopher, *Connectivity Preserving Multivalued Functions in Digital Topology*. Arxiv preprint 1504.02174. Journal of Mathematical Imaging and Vision **55**, p. 370–377, 2016.
- Staecker, P. Christopher, *A Borsuk-Ulam theorem for digital images*. Arxiv preprint 1506.06426. 2015.
- Haarmann, Jason, Murphy, Meg P., Peters, Casey S., Staecker, P. Christopher, *Homotopy equivalence of finite digital images*. Arxiv preprint 1408.2584. Journal of Mathematical Imaging and Vision **53** p. 288–302, 2015.
- Bernhardt, Chris and Staecker, P. Christopher, *Generalizing the rotation interval to vertex maps on graphs*. Arxiv preprint 1209.4996. Transactions of the American Mathematical Society **367** p. 4235–4252, 2015.
- Staecker, P. Christopher, *Axioms for the Lefschetz number as a lattice valuation*. Arxiv preprint 1307.2131. Advances in Fixed Point Theory **4**, p. 149–159, 2014.
- Kim, Seungwon and Staecker, P. Christopher, *Dynamics of random selfmaps of surfaces with boundary*. Arxiv preprint 1107.4312. Discrete and Continuous Dynamical Systems A **34**, p. 599-611, 2014.
- Heath, Philip and Staecker, P. Christopher, *A Nielsen theory for coincidences of iterates*. Arxiv preprint 1107.5510. Topology and its Applications **159**, 2012, p. 3685–3706.
- Gonçalves, Daciberg L. and Staecker, P. Christopher, *Axioms for the coincidence index of maps between manifolds of the same dimension*. Arxiv preprint 1102.1223. Topology and its Applications **159**, 2012 p. 3760–3776.
- Brimley, Jacqueline and Griisser, Matthew and Miller, Allison and Staecker, P. Christopher, *The Wecken property for random selfmaps on surfaces with boundary*. Arxiv preprint 1109.0218. Topology and its Applications **159**, 2012, p. 3662–3676.
- Staecker, P. Christopher, *Nielsen equalizer theory*. Arxiv preprint 1008.2154. Topology and its Applications **158**, 2011, p. 1615–1625.

  See also *Addendum to Nielsen equalizer theory*, Topology and its Applications **158**, 2011, p. 2256 (included in arxiv version above).
- Staecker, P. Christopher, *Maps on bouquets of circles can be deformed to be coincidence-free*. Arxiv preprint 1006.5220. Topological Methods in Nonlinear Analysis **37**, 2011, p. 377–381.

- Staecker, P. Christopher, *Remnant inequalities and doubly-twisted conjugacy in free groups*. Arxiv preprint 0806.4687. Journal of Pure and Applied Algebra **215**, 2011, p. 1702–1710.
- Staecker, P. Christopher, *Typical elements in free groups are in different doubly-twisted conjugacy classes*. Arxiv preprint 0808.0277. Topology and its Applications **157**, 2010, p. 1736–1741.
- Staecker, P. Christopher, *A formula for the coincidence Reidemeister trace of selfmaps on bouquets of circles*. Arxiv preprint 0710.2521, Topological Methods in Nonlinear Analysis **33**, 2009, 41–50.
- Staecker, P. Christopher, *Computing twisted conjugacy classes in free groups using nilpotent quotients*. Arxiv preprint 0709.4407.
- Staecker, P. Christopher, *Axioms for a local Reidemeister trace in fixed point and coincidence theory on differentiable manifolds*. Arxiv preprint 0704.1891, Journal of Fixed Point Theory and Applications **5**, 2009, 237–247.
- Staecker, P. Christopher, *On the uniqueness of the coincidence index on orientable differentiable manifolds*. Arxiv preprint math.GN/0607751. Topology and its Applications, **154** 2007, 1961–1970.

Academic Presentations

- *The configuration space of at most n points on the circle* a 25 minute research talk given at the 8th Symposium on Nonlinear Analysis, at Nicolaus Copernicus University in Toruń, June 19, 2024.
- *Thoughts on configurations of at most n points* a 25 minute research talk given at a meeting on Topological Invariants in Fixed Point Theory and Dynamical Systems, at Gdańsk University of Technology, January 30, 2024.
- *A higher homotopy group for digital images* a 20 minute research talk given at the Joint Math Meetings in San Francisco, AMS Special Session on Discrete Homotopy Theory, January 4, 2024.
- *Bob Brown's n-valued Nielsen Theory, and a bit more*, a 50 minute invited tribute to my PhD advisor Robert F. Brown (1935-2022) presented at the conference on Nielsen Theory and Related Topics, in Ostend Belgium. June 4, 2023.
- *Gerber's Great Graphical Gizmos*, a 6 minute talk given at Gathering 4 Gardner 14 in Atlanta, April 8 2022.
- *Nielsen theory in classical and digital topology*, a series of 3 hour talks given at the Fixed Point Theory Lab, King Mongkut's University of Technology Thonburi, Bangkok Thailand, October 11, 14, 15, 2019.

- *Axioms for the fixed point index of an n-valued map*, presented at the conference on Nielsen Theory and Related Topics in Kortrijk Belgium, June 3, 2019.
- *Rotations on graphs and fractional exponents in groups*, presented at the Sogang University Mathematics Colloquium, Seoul, South Korea, March 23, 2017.
- *The expected difference between $N(f)$ and $MF(f)$*, presented at the conference on Nielsen Theory and Related Topics in Rio Claro SP Brazil, July 5, 2016.
- *Some digital topology and a Borsuk-Ulam Theorem*, presented at the Fairfield University Mathematics REU colloquium series, June 23, 2015.
- *Four theorems about the Euler characteristic and some space invaders*, presented at the Fairfield University Mathematics REU colloquium series, June 19, 2014.
- *The rotation number for maps on graphs*, presented at the Mathematics Department Colloquium at the City College of New York, November 21, 2013. Also presented at the Mathematics Department Colloquium, Memorial University, Canada, March 27, 2014.
- *All kinds of big: Hadwiger's Theorem*, presented at the Fairfield University Mathematics REU colloquium series, July 18, 2013.
- *Axioms for the Lefschetz number as a lattice valuation*, presented at the conference on Nielsen Theory and Related Topics in Daejeon, Korea, June 28, 2013.
- *85 years of Nielsen theory*, a series of 3 one-hour "mini-lectures" giving a general survey of Nielsen Fixed Point, Periodic Point, and Coincidence Point theories. Presented at the conference on Nielsen Theory and Related Topics in Daejeon, Korea, June 24-27, 2013.
- *Voting: How it works, and why it doesn't* , presented at the Fairfield University Mathematics & Computer Science Colloquium, November 6, 2012.
- *Dynamics of random selfmaps on surfaces with boundary*, presented at the Joint Mathematics Meetings, Boston, MA, January 7, 2012.
- *Nielsen equalizer theory*, presented at the International conference on Nielsen fixed point theory and related topics, Beijing, China, June 24, 2011.
- *Elegant ideas, and why you should love them*, the Pi Mu Epsilon Karim Faroud Memorial Lecture, Fairfield University, April 17, 2011.
- *Nielsen coincidence theory of iterates*, presented at the AIMS International Conference on Dynamical Systems, Differential Equations and Applications, Dresden, Germany, May 27, 2010.
- *Typical elements in free groups are in different doubly-twisted conjugacy classes*, presented at the 2009 conference on Nielsen Theory and Related Topics, St. John's Newfoundland, June 10, 2009.

- *Nielsen fixed point and related theories*, presented at the University of Pennsylvania Deformation Theory Seminar, February 25, 2009.
- *Generic doubly-twisted conjugacy classes in free groups*, presented at the contributed paper session in group theory, at the AMS/MAA Joint Meetings, Washington D.C., January 8, 2009.
- *Nielsen fixed point and related theories*, presented at the Tetrahedral Geometry/Topology Seminar, November 7, 2008.
- *A gentle introduction to fixed point theory*, presented at the Mathematics and Computer Science Chats at Dickinson College, September 30, 2008.
- *Teaching mathematics using wikis*, presented at the Joint Mathematics Colloquium of Millersville University and Franklin & Marshall College, April 10, 2008.
- *A survey of Nielsen fixed point theory*, presented at the Fall Colloquium of the Mathematics Department at the US Naval Academy at Annapolis, August 22, 2007.
- *Axioms for a local Reidemeister trace in fixed point and coincidence theory*, presented at the meeting on Topological Theory of Fixed and Periodic Points, Będlewo, Poland, July 22, 2007.
- *Wiki in the mathematics classroom*, presented at the MAA session on "Getting students to discuss and to write about mathematics" at the AMS/MAA Joint Meetings, New Orleans LA, January 6, 2007.
- *The uniqueness of the coincidence index on orientable differentiable manifolds*, presented at the AMS special session on "Fixed point theory, dynamics, and group theory" at the AMS/MAA Joint Meetings, New Orleans LA, January 5, 2007.
- *Computation of the Reidemeister trace by nilpotentization*, presented at the AMS special session on "Geometric methods in group theory and topology" in Durham, NH, April 22, 2006.

Significant service work

- Coordinator, Fairfield University Math Department Research Seminar, Fall 2010–present
- Chair, Fairfield University Academic Council, Fall 2018 – Spring 2019.
- Activity host, Math/STEAM night, Osborne Hill Elementary School in Fairfield, 2016, 2017, 2018.
- Member, Educational Planning Committee, Fall 2010–Spring 2013.
- Chair, Fairfield University World Diversity Committee, Spring 2013, Fall 2015, Fall 2016-Spring 2018.

Grants and Awards

- *Fairfield University Summer Research Stipend* Summer 2015.
- *Fairfield University Science Institute Grant*, funded travel with three undergraduate students to the 2011 international conference on Nielsen theory and related topics, Beijing China, June 19-26, 2011.