John Hutchens Curriculum Vitae

University of San Francisco
Mathematics & Statistics

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Education:

- PhD, Mathematics, North Carolina State University, Raleigh, NC, August 2013.
  - Dissertation title: Isomorphy classes of k-involutions of algebraic groups of type G_2 and F_4, under the advisement of Dr. Aloysius Helminck.
- MS, Data Science and Artificial Intelligence, University of San Francisco, San Francisco, CA, 2026.
- MS, Mathematics, North Carolina State University, Raleigh, NC, 2010.
- BS, Mathematics, North Carolina State University, Raleigh, NC, 2003.

Employment:

- Visiting Assistant Professor, University of San Francisco, San Francisco, Fall 2026-present
- Visiting AI Research Scientist, UC San Francisco, Capra Lab, San Francisco, Fall 2025-Summer 2026
- Adjunct Professor, University of San Francisco, Fall 2023-Spring 2025
- Lecturer, San Francisco State University, San Francisco, Fall 2024
- Associate Professor, Winston-Salem State University, Fall 2019 - Spring 2023
- Assistant Professor, Winston-Salem State University Fall 2016- Spring 2019
- Assistant Professor, Southern Arkansas University, Fall 2013-Spring 2016

Software and programming:

Python, SQL, Sklearn, Pytorch, TensorFlow, Sage, Mathematica, Maple, PySpark, Postgres, Docker, FastAPI, Crontab, Google Cloud Services, etc.

Publications:

- *The Classification of Graphs on 8 vertices with Coinciding Zero Forcing number and Maximum Nullity* (with W. Barrett, M. Hunnell, and J. Sinkovic). The Electronic Journal of Linear Algebra 41 (2025): 643-668.

- *Reconfiguration of Minimum PSD Forcing Sets and Minimum Skew Forcing Sets* (with N Bong, M Flagg, M Hunnell, R Moruzzi, H Schuerger, B. Small)[accepted with revisions Linear and Multilinear Algebra 2025] `https://arxiv.org/abs/2501.03642`.
- *Topological symmetry groups of generalized Petersen graphs* (with A. Álvarez, E. Flapan, M. Hunnell, E. Lawrence, P. Lewis, C. Price, R. Vanderpool), Algebraic & Geometric Topology **25** (2025). `https://msp.org/agt/2025/25-8/p13.xhtml`
- *Compatible forts and maximum nullity of graphs* (with V. Furst, L. Mitchell, Y. Zhang), Graphs and Combinatorics, vol. **41**:3 (2025).
- *Fixed point groups of involutions of* $\mathrm{O}(\mathrm{q}, k)$ *over fields of characteristic* 2 (with M. Hunnell), Linear and Multilinear Algebra **73**:2 (2025).
- *Sparks of Symmetric Matrices and their Graphs* (with L. Deaett, S.Fallat, V. Furst, L. Mitchell, Y. Zhang), Electronic Journal of Linear Algebra, vol. **39**, 591-606 (2023).
- *On involutions of* $\mathrm{O}(\mathrm{q}, k)$ *over fields of characteristic two* (with M.Hunnell and N. Schwartz), Linear Algebra and its Applications, vol. **593** (2020).
- *Involutions of type* G_2 *over fields of even characteristic* (with N. Schwartz), Algebras and Representations, vol. **21** (2017).
- *Isomorphism classes of* k*-involutions of algebraic groups of type* E_6, Beiträge zur Algebra und Geometrie, vol. **57**:3 (2016).
- *Isomorphism classes of* k*-involutions of algebraic groups of type* F_4, Journal of Lie Theory, vol. **25**:4 (2015).
- *Isomorphy classes of* k*-involutions of* G_2, Journal of Algebra and its Applications, vol. **13**:7(2014).

Talks:

- JMM, *TBD*, Invited Talk at *AIM Special Session for IEPG-ZF Aim Research Community*, January 2027.
- JMM, *Maximum Nullity and Compatible Forts*, Invited Talk at *AIM Special Session on Applications and Generalizations of Zero Forcing*, January 2025.
- JMM , *Spark and rank of symmetric matrices associated with a graph*, Invited Talk at *AIM Special Session on Graphs and Matrices*, January 2024.
- JMM , *Involutions of orthogonal groups over fields of characteristic 2*, *Groups, Loops and Semigroups*, April 2022.
- WSSU-Scholarship Week, *Topological symmetry groups of generalized Petersen graphs*, *Mathematics Showcase* March 2021.

- Joint Math Meetings, *Involutions of G_2 over fields* in the AMS special session on Quaternions, January 2019.
- AMS Sectional Meeting-Central/Western, Spring, *k-involutions of type E_6*, March 2019.
- AMS Sectional Meeting-Eastern, Spring, *Involutions of G_2 over fields* in the special session "Noncommutative algebra and representation theory," April 2018.
- Joint Math Meetings, Involutions of G_2 over a field of characteristic 2, January 2016.
- AMS Sectional Meeting-Central, Spring, *$\mathfrak{p}$-adic symmetric spaces of exceptional algebraic groups*, invited speaker for "Combinatorics, Geometry, and Representation Theory of Homogeneous Spaces," March 2015.
- Southeast Lie Theory Workshop 2014, *k-involutions of type F_4*, May 2014.
- AMS Sectional Meeting-Central, Spring, *k-involutions of G_2* April 2014.
- Joint Math Meetings, AMS Special Session on Generalized Symmetric Spaces, *k-involutions of G_2 and F_4*, January 2013.
- North Carolina State University, *k-involutions of Exceptional Algebraic Groups*, November 2013.
- North Carolina State University, *Group Schemes*, September 24, 2012.
- Fields Institute: Workshop on Exceptional Algebras and Groups, *k-involutions of Exceptional Algebraic Groups*, April 20, 2012.

Session organizer:

- Session chair, Joint Math Meetings, *AMS Contributed paper session Groups, Loops and Semigroups*, April 2022.
- Co-organizer, Joint Math Meetings, *AMS Special Session on Lie Group Representations, Discretization and Gelfand Pairs*, January 2017.

Courses taught:

Elementary Statistics, College Algebra, Pre-Calculus, Calculus 1-3, Discrete Math, Linear Algebra, Linear Algebra & Probability, Abstract Algebra 1 & 2, History of Mathematics, Differential Equations 1 & 2, Special topics: Matrix groups, research seminar

Student mentoring:

- Co-advisor student research group on Zero Forcing at WSSU 2019-2023
- Co-advisor to the Math+Stat Club at WSSU Fall 2016-Spring 2024
- Mentored 3 mathematics majors for a summer long project involving topological symmetry groups, Spring 2020

- Mentored 1 mathematics major for a semester long project involving graph automorphisms, Spring 2019
- Mentored 2 senior mathematics majors for a semester long project involving automorphism groups, Spring 2015
- Mentored 4 students for summer research project involving generalized symmetric spaces and group theory, Summer 2012.
- Mentored 2 students for summer research project involving combinatorics and group theory, Summer 2011.

Some conferences and workshops attended:

- American Institute of Mathematics REUF workshop continuation at ICERM, Providence, Summer 2019
- American Institute of Mathematics REUF workshop, San Jose, Summer 2018
- Gerrymandering workshop at Duke University, November 2017
- Southeastern Lie Theory Workshop, Athens GA, May 2014
- Fields Institute, *Workshop on Exceptional Algebras and Groups*, University of Ottawa, Ottawa, April 19-22 2012
- US-Sino Workshop and Summer School on Representation Theory, South China University of Technology, Guangzhou, July 2011
- Triangle Lecture in Combinatorics, Feb 6 (NCSU), Sept 25 (Duke) 2010 ; April 9 (NCSU), Nov 5 2011 (UNC); Feb 11 2012 (Duke); Sept 22 2012 (NCSU)

Grants and awards

- UNC System research grant, Spring 2023
- Research Experience for Undergraduate Faculty continuation, researcher American Institute of Mathematics, Summer 2019
- Research Experience for Undergraduate Faculty, researcher American Institute of Mathematics, Summer 2018
- Mathematical Research Communities, researcher and grant Snowbird Utah, Summer 2016
- Southern Arkansas Univ. internal research grant and fellowship, April 2015
- Southern Arkansas Univ. internal research grant and fellowship, April 2014
- AMS graduate student travel grant, January 2013
- NSF, REG mentor Summer 2011 and 2012
- NSF, REG student researcher Summer 2010

Referee and review:

MathSciNet, Involve, Journal of Lie Theory, Advances in Applied Clifford Algebras, Journal of Algebra and its Applications

References:

- Jennifer Chubb
  Teaching Professor
  Penn State University
  Former Chair of the Department of Mathematics and Statistics
  University of San Francisco
  Supervisor
  jcc31@psu.edu

- Erica Flapan
  Professor (retired)
  Pomona College
  REUF leader
  eflapan@pomona.edu

- Mark Hunnell
  Associate Professor
  Winston-Salem State University
  Former colleague and research collaborator
  hunnellm@wssu.edu

- Felicia Simpson
  Associate Professor and Chair of Mathematics
  Winston-Salem State University
  Former colleague
  griffinfr@wssu.edu

- Aloysius Helminck
  Professor
  Former Dean of Sciences
  University of Hawaii
  Ph.D. advisor
  helminck@hawaii.edu