

Felice Manganiello

Curriculum Vitae

Clemson University
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Positions held

- Since Aug 2019 **Associate Professor**, School of Mathematical and Statistical Sciences, Clemson University, USA.
- Aug 2019 - Aug 2020 **Visiting Scientist**, *Cybersecurity Research Lab*, Ted Rogers School of Management, Ryerson University, Canada.
- Oct 2013 - Aug 2019 **Assistant Professor**, School of Mathematical and Statistical Sciences, Clemson University, USA.
- Sep 2011 - Aug 2013 **Postdoctoral Fellow**, Department of Electrical and Computer Engineering, University of Toronto, Canada.
- Jan 2006 - May 2011 **Graduate/Teaching Assistant**, University of Zurich, Switzerland.

Education

- Oct 2011 **Ph.D. in Mathematics**, *University of Zurich*, Switzerland, Defense title: Spread Codes and more General Network Codes.
Advisor: Prof. J. Rosenthal
- Oct 2005 **M.S. (Laurea) in Mathematics**, *University of Pisa*, Italy, Defense title: Calcolo della distribuzione dei pesi nei codici ciclici accorciati.
Advisor: Prof. P. Gianni - Co-advisor: Prof. C. Traverso

Areas of interest

Communication, Cybersecurity, Distributed Systems.

Selected awards and grants

- Aug 2019 - 2022 **Encrypted Control for Privacy-Preserving and Secure Cyber-Physical Systems**, *Co-PI*, NSF Grant ECCS-1912702, \$380,000 (\$38,000).
Yongqiang Wang (PI), ECE Department, Clemson University
- Mar 2019 2019 Simons Visiting Professor - MFO
- Dec 2018 CU - College of Science - Science Online Development Grant, \$7,500.
- Aug 2016 - 2021 **RTG: Coding Theory, Cryptography, and Number Theory**, *PI*, NSF Grant DMS-1547399, \$2,126,971 (\$425,394).
Jim Brown (former PI), Shuhong Gao (Co-PI), Kevin James (Co-PI), Gretchen Matthews (former Co-PI)
- Mar 2016 Grant for organizing a Shannon Centennial Event at Clemson University from IEEE, \$2650, (2016)
- Sep 2012 - Feb 2013 **Codes, Algorithms And Cryptography For Random Linear Network Coding**, *PI*, Swiss NSF Grant 138738, Fellowships for prospective researchers.
- Sep 2011 - Aug 2012 **Codes, Algorithms And Cryptography For Random Linear Network Coding**, *PI*, Swiss NSF Grant 135934, Fellowships for prospective researchers.

Publications

- [1] Frank Kschischang, Felice Manganiello, Alberto Ravagnani, and Kristen Savary. Interference alignment in multiple unicast networks over finite fields. to be submitted.
- [2] Emma Andrade, Jessalyn Bolkema, Thomas Dexter, Harrison Eggers, Tori Lynn, and Felice Manganiello. Coss-t code with non-vanishing rates from reed-muller codes. to be submitted.
- [3] Shuhong Gao, Felice Manganiello, Christopher McMahan, and Yuyuan Ouyang. Secure distributed matrix multiplication. to be submitted.
- [4] Brian Goncalves, Felice Manganiello, and Atefeh Mashatan. Less+me. submitted.
- [5] Travis Baumbaugh and Felice Manganiello. Recursive edge toggling for construction of de Bruijn sequences. submitted.
- [6] Travis Baumbaugh, Haley Colgate, Timothy Jackman, and Felice Manganiello. Batch codes from cartesian codes. submitted.
- [7] A. Ahmadi, F. Manganiello, A. Khademi, and M. C. Smith. A parallel jacobi-embedded gauss-seidel method. *IEEE Transactions on Parallel and Distributed Systems*, 32(6):1452–1464, 2021.
- [8] Jim Brown, Beren Gunsolus, Jeremy Lilly, and Felice Manganiello. Hilbert modular forms and codes over \mathbb{F}_{p^2} . *Finite Fields and Their Applications*, 67:101731, 2020.
- [9] Angelina Grosso, Felice Manganiello, Shiwani Varal, and Emily Zhu. Multicast triangular semilattice network. *Involve*, 12(8):1307–1328, 2019.
- [10] Travis Baumbaugh and Felice Manganiello. Matroidal root structure of skew polynomials over finite fields. *Journal of Discrete Mathematical Sciences and Cryptography*, 22(3):377–389, 2019.
- [11] Hiram H. López, Felice Manganiello, and Gretchen L. Matthews. Affine cartesian codes with complementary duals. *Finite Fields and Their Applications*, 57:13 – 28, 2019.
- [12] Yariana Diaz, Travis Baumbaugh, Sophia Friesenhahn, Felice Manganiello, and Alexander Vetter. Batch codes from Hamming and Reed-Muller codes. *Journal of Algebra Combinatorics Discrete Structures and Applications*, 5:153 – 165, 2018.
- [13] Sarah E. Anderson, Wael Halbawi, Nathan Kaplan, Hiram H. López, Felice Manganiello, Emina Soljanin, and Judy L. Walker. Representations of the multicast network problem. In Everett W. Howe, Kristin E. Lauter, and Judy L. Walker, editors, *Algebraic Geometry for Coding Theory and Cryptography*, pages 1–23. Springer International Publishing, 2017.
- [14] Shuhong Gao, Fiona Knoll, Felice Manganiello, and Gretchen Matthews. Codes for distributed storage from 3-regular graphs. *Discrete Applied Mathematics*, 229:82 – 89, 2017.
- [15] Siyu Liu, Felice Manganiello, and Frank R. Kschischang. Matroidal structure of skew polynomial rings with application to network coding. *Finite Fields and Their Applications*, 46:326 – 346, 2017.
- [16] Siyu Liu, Felice Manganiello, and Frank R. Kschischang. Construction and decoding of generalized skew-evaluation codes. In *14th Canadian Workshop on Information Theory (CWIT14)*, 2015. 2nd ranked as "Best student paper award".
- [17] Felice Manganiello and Anna-Lena Trautmann. Spread decoding in extension fields. *Finite Fields and Their Applications*, 25(0):94 – 105, 2014.
- [18] Anna-Lena Trautmann, Felice Manganiello, Michael Braun, and Joachim Rosenthal. Cyclic orbit codes. *Information Theory, IEEE Transactions on*, 59(11):7386–7404, 2013.
- [19] Siyu Liu, Felice Manganiello, and Frank R. Kschischang. Kötter interpolation in skew polynomial rings. *Designs, Codes and Cryptography*, pages 1–16, 2013.
- [20] Elisa Gorla, Felice Manganiello, and Joachim Rosenthal. An algebraic decoding approach for spread codes. *Adv. Math. Commun.*, 6(4):442–466, 2012.

- [21] Felice Manganiello, Anna-Lena Trautmann, and Joachim Rosenthal. On conjugacy classes of subgroups of the general linear group and cyclic orbit codes. In *Proceedings of the 2011 IEEE International Symposium on Information Theory*, Saint Petersburg, Russia, 2011.
- [22] Anna-Lena Trautmann, Felice Manganiello, and Joachim Rosenthal. Orbit codes – a new concept in the area of network coding. In *Proceedings of the 2010 IEEE Information Theory Workshop*, Dublin, Ireland, 2010.
- [23] Felice Manganiello, Elisa Gorla, and Joachim Rosenthal. Spread codes and spread decoding in network coding. In *Proceedings of the 2008 IEEE International Symposium on Information Theory*, pages 851–855, Toronto, Canada, 2008.
- [24] Felice Manganiello. Computation of the weight distribution of CRC codes. *Applicable Algebra in Engineering, Communication and Computing*, 19(4):349–363, August 2008.

Selected invited and solicited talks (out of 35)

- Jan 2021 **Limits of Reed-Muller Codes for Quantum Fault-Tolerance, I and II**, Virginia Tech, Blacksburg, Virginia.
- Nov 2020 **Graphs and Algebra in Modern Communication**, Graphs@Ryerson, Ryerson University, Toronto, Canada.
- May 2020 **Graphs and Finite Fields in Modern Communication**, Carleton Finite Fields eSeminar, Carleton University, Ottawa, Canada.
- Feb 2020 **Interference Alignment over Finite Fields**, Digital Communication Group seminar - University of Toronto, Toronto, Canada.
- Nov 2019 **Reed-Muller codes with application to quantum computation and information retrieval**, Colloquium, Cleveland State University, Cleveland, OH, USA.
- Jul 2019 **Batch properties of Affine Cartesian Codes**, SIAM Conference on Applied Algebraic Geometry (AG19), Bern, Switzerland.
- May 2019 **Algebraic aspects of Network Communication and Other Problems in Coding Theory**, Eindhoven University of Technology, Eindhoven, Netherlands.
- Mar 2019 **Batch Codes from Evaluation Codes**, University of St. Gallen, St. Gallen, Switzerland.
- Apr 2018 **Batch Codes from Hamming and Reed-Muller Codes**, Code-Based Crypto Workshop, Davie, FL, USA.
- Aug 2017 **Codes for Distributed Storage from 3-regular Graphs**, SIAM Conference on Applied Algebraic Geometry (AG17), Atlanta, GA, USA.
- Jul 2017 **Representations of the Multicast Network Problem**, Mathematical Congress of the Americas (MCA 2017), Montréal, QC, Canada.
- May 2017 **Representations of the Multicast Network Problem**, Seminar in coding theory and cryptography - University of Neuchâtel, Neuchâtel, Switzerland.
- Sep 2016 **Communication over networks from an algebraic point of view**, Colloquium, College of Charleston, Charleston, SC, USA.
- Nov 2015 **Theory and applications of skew polynomial rings**, The First Colombian Workshop on Coding Theory (CWC 2015), Universidad del Norte, Barranquilla, Colombia.
- Aug 2015 **On communication over networks via skew polynomials**, SIAM Conference on Applied Algebraic Geometry (AG15) - CAMP, Daerjeon, South Korea.
- Jun 2015 **Theory and Applications of skew polynomial rings**, Seminar in coding theory and cryptography - University of Zürich, Zürich, Switzerland.
- Apr 2015 **On communication over networks via skew polynomials**, Seminars on Information Theory - University of Toronto, Toronto, ON, Canada.
- Mar 2015 **On communication over networks via skew polynomials**, Rocky Mountain Algebraic Combinatorics Seminar - Colorado State University, Fort Collins, CO, USA.

- Nov 2014 **On communication over networks via skew polynomials**, *Communications/ICWS Seminar - University of Illinois at Urbana-Champaign*, Urbana, IL, USA.
- Jul 2014 **Network Coding via Skew Polynomials**, *Applications of Computer Algebra (ACA) 2014 - Fordham University*, New York, NY, USA.
- May 2014 **Spread Codes and Their Role in Communication**, *22nd Ontario Combinatorics Workshop - York University and Fields institute*, Toronto, ON, Canada.
- Oct 2013 **Kötter interpolation in skew polynomial rings.**, *AMS Fall Southeastern Section Meeting*, *University of Louisville*, Louisville, KY, USA.
- Jan 2013 **Network coding**, *Colloquium - Clemson University*, Clemson, SC, USA.
- Apr 2012 **Constant dimension codes for linear random network coding**, *Discrete Math Seminar - University of Lincoln Nebraska*, Lincoln, NE, USA.

Teaching experiences

Undergraduate Instructorships at Clemson University

- Fall 2020 **Hybrid - MATH1060 - Calculus of One Variable I.**
- Summer 2020 **Online - MATH3110 - Linear Algebra - Online**, (as well in Summer 2019).
- Spring 2019 **MATH2190 - Introduction to Mathematical Cryptography**, (as well in Spring 17).
- Fall 2018 **MATH3110 - Linear Algebra**, (as well in Fall 14, Spring 14, Fall 15, Fall 16 and Fall 17).

Graduate Instructorships at Clemson University

- Spring 2021 **Online - MATH9740 - Privacy-aware Artificial Intelligence.**
- Spring 2021 **Online - MATH8570 - Cryptography**, (as well in person in Spring 15).
- Spring 2018 **MATH8560 - Information Theory and Coding Theory**, (as well in Spring 14, Spring 16).
- Fall 2015 **MATH8530 - Matrix Analysis.**
- Spring 2015 **MATH8570 - Cryptography.**
- Fall 2014 **MATH8510 - Abstract Algebra I.**

Other Instructorships

- Fall 2012 **CSC192H1 - Computer Programming, Algorithms, Data Structures and Languages**, *University of Toronto*, Engineering Science.
- Spring 2011 **Computer Algebra**, *University of Zurich*, Mathematics.
- Summer 2008 **Seminar on Computer Algebra**, *University of Zurich*, Mathematics.

Workshops and conferences

Online organized

- Apr 2020 - **ACCESS - Algebraic Coding and Cryptography on the East coast Seminar Series**, *Joint effort designed to highlight world-class research in coding theory, cryptography, and related areas and to encourage collaboration among its participants*, founder and organizer, homepage. in collaboration with Virginia Tech and Florida Atlantic University

Organized (last 6 years)

- Apr 25-30, 2022 **CMO-BIRS Workshop “Algebraic Methods in Coding Theory and Communication”**, *Casa Matemática Oaxaca-BIRS*, Oaxaca, Mexico. (together with E. Gorla, M. Greferath and H. López)
- Oct 10-11, 2020 **Sessions on “Coding Theory, Cryptography, and Number Theory”**, *AMS Fall Southeastern Virtual Sectional Meeting*. (together with R. Cartor, S. Gao and K. James)
- Jan 15-18, 2020 **Sessions on “Coding Theory and Applications”**, *AMS Joint Mathematics Meetings*, Denver, CO, USA. (together with A. Beemer, I Blake and C. Kelley)
- Jan 24-28, 2019 **RTG: 2019 Early Career Research Workshop in coding theory, cryptography, and number theory**, *Clemson University*, Clemson, SC, USA.

- Jan 10-13, 2019 **Sessions on “Coding Theory and Applications”**, *AMS Joint Mathematics Meetings*, Baltimore, MD, USA.
(together with H. López and G. Matthews)
- Jul 31-Aug 4, 2017 **Minisymposia on “Coding theory”**, *SIAM Conference on Applied Algebraic Geometry (AG17)*, Atlanta, GA, USA.
- Mar 10-12, 2017 **Sessions on “Coding Theory, Cryptography, and Number Theory”**, *AMS Sectional Meetings*, Charleston, SC, USA.
(together with J. Brown, S. Gao, K. James and G. Matthews)
- Dec 2, 2016 **Shannon Centennial Event at Clemson**, Clemson, SC, USA.
(together with G. Matthews and S. Gao)
- April 9, 2016 **Meeting on Algebraic Geometry for Applications (MAGA16)**, Clemson, SC, USA.
(together with M. Burr and S. Poznanovikj)
- Aug 3-8, 2015 **Minisymposia on “Coding theory”**, *SIAM Conference on Applied Algebraic Geometry (AG15)*, Daejeon, South Korea.
(together with A. Ravagnani)
- Jan 10-13, 2015 **Sessions on “Advances in coding theory”**, *AMS Joint Mathematics Meetings*, San Antonio, TX, USA.
(together with G. Matthews and J. Walker)
- Attended (last 6 years)
- Jun 7-9, 2021 **Third PQC Standardization Conference**, NIST, USA.
- Jan 6-9, 2021 **AMS Joint Mathematics Meetings**, USA.
- Jan 15-18, 2020 **AMS Joint Mathematics Meetings**, Denver, CO, USA.
- Jul 9-13, 2019 **SIAM Conference on Applied Algebraic Geometry (AG19)**, Bern, Switzerland.
- Mar 17-23, 2019 **Oberwolfach Workshop on Contemporary Coding Theory**, *Mathematisches Forschungsinstitut Oberwolfach (MFO)*, Oberwolfach, Germany.
- Jan 10-13, 2019 **AMS Joint Mathematics Meetings**, Baltimore, MD, USA.
- Dec 16–21, 2018 **Dagstuhl Seminar on Algebraic Coding Theory for Networks, Storage, and Security**, *Schloss Dagstuhl – Leibniz–Zentrum für Informatik*, Wadern, Germany.
- Nov 12–16, 2018 **Workshop on “Nonlinear Algebra in Applications”**, *Institute for Computational and Experimental Research in Mathematics (ICERM)*, Providence, RI, USA.
- Nov 1-2, 2018 **RTG PI Meeting**, Alexandria, VA, USA.
- July 5-6, 2018 **PQCrypto - Code-Based Cryptography Workshop (CBC 2018)**, *Florida Atlantic University*, Fort Lauderdale, FL, USA.
- Jul 24-28, 2017 **Mathematical Congress of the Americas (MCA 2017)**, *Montréal, QC*, Canada.
- Oct 28-30, 2016 **AMS Fall Central Section Meeting**, *University of St. Thomas*, Minneapolis, MN, USA.
- Aug 7–12, 2016 **Dagstuhl Seminar on Coding Theory in the Time of Big Data**, *Schloss Dagstuhl – Leibniz–Zentrum für Informatik*, Wadern, Germany.
- Feb 22-26, 2016 **Algebraic Geometry for Coding Theory and Cryptography**, *Institute for Pure & Applied Mathematics (IPAM)*, Los Angeles, CA, USA.
- Nov 23-27, 2015 **The First Colombian Workshop on Coding Theory (CWC)**, *Universidad del Norte*, Barranquilla, Colombia.

- Jul 13-17, **The 12th International Conference on Finite Fields and Their Applications (Fq12)**,
2015 *Skidmore College*, Saratoga Spring, NY, USA.
- Jul 8-11, **Fields-Carleton Finite Fields Workshop**, *Carleton University*, Ottawa, ON, Canada.
2015

Advising and Supervision Duties

Postdoctoral fellows

Ryann Cartor, since Aug 2019.

Hiram Lopez Valdez, from Aug 2016 to Dec 2018.

Now Assistant Professor at Cleveland State University.

Graduate students

Trinity White, *Ph.D.*, expected graduation 2025.

Luke Szramowski, *Ph.D.*, expected graduation 2026.

Past graduate students

Travis Baumbaugh, *Ph.D.*, defended in May 2020.

First employment: Cryptographer at ToposWare

Harrison Eggers, *Master*, defended December 2020.

Alexander Joyce, *Master*, defended May 2019.

Kristen Savary, *Master*, defended May 2019.

Travis Baumbaugh, *Master*, defended May 2016.

External Examiner on Ph.D. Dissertations

Rutuja Kschirsagar, *Virginia Tech*, expected graduation 2022.

Benjamin Case, *Clemson University*, defended August 2020.

Fiona Knoll, *Clemson University*, defended August 2017.

Sarah Anderson, *Clemson University*, defended April 2015.

Michael Dowling, *Clemson University*, defended April 2016.

External Examiner on Masters Dissertations

Soumendra Ganguly, *Clemson University*, defended Aug 2019.

Candace Barnes, *Clemson University*, defended May 2019.

Seth Selken, *Clemson University*, defended May 2019.

Todd Morra, *Clemson University*, defended November 2018.

Benjamin Case, *Clemson University*, defended November 2018.

Akeel Kulkarni, *Clemson University*, defended January 2015.

REU (Research Experience for Undergraduates) mentorships

- Summer 2021 **CSS-T codes from Reed-Muller codes**, Students: *Andrade Emma (California State University, Fresno)*, *Dexter Thomas (Texas A&M University)* and *Luongo Victoria (Clemson University)*.
- Summer 2021 **Polar Codes from Higher Alphabets**, Students: *Parson Madelyn (University of Wisconsin-Madison)* and *Skora Emmanuel (Lewis & Clark College)*.
- Summer 2019 **Finite fields interference alignment of muliplte unicast networks**, Students: *Nathan Ak-erhielm (Haverford University)*, *Paige Beidelman – (University of Mary Washington)*, *Kimberly Hancock (Bowdoin College)*, *Kaiwen Lu – (University of Michigan)*, *Pedro Morales – (Montgomery College)*.
- Summer 2018 **Constructing lattices from codes over \mathbb{F}_{p^2}** , Students: *Beren Gunsolus (University of Minnesota Twin Cities)* and *Jeremy Lilly (Oregon State University)*.
co-mentorship with Jim Brown (Occidental College).
- Summer 2018 **Batch codes from affine cartesian codes**, Students: *Haley Colgate (Colorado College)* and *Timothy Jackman (Northeastern University)*.

Summer 2017 **Multicast triangular semilattice network.**, *Students: Angelina Grosso (University of Kentucky), Shiwani Varal (The College of Wooster) and Emily Zhu (Carnegie Mellon University).*

Summer 2017 **Optimal Batch Codes from Hamming and Reed-Muller codes.**, *Students: Yariana Diaz (Amherst College, Mathematics), Friesenhahn Sophia (Willamette University) and Alexander Vetter (Villanova University).*

Continuing Education

Nov 2018 **CONCERT: Clemson ONline CERTification**, by Clemson University.

Description: CONCERT is a five-week professional development training class delivered asynchronously online via Canvas. CONCERT is an introduction to the Canvas course management system and an overview of course design and pedagogical considerations for online teaching and learning. Learners cultivate skills and techniques for online course development.

July 2017 **Machine Learning**, by *Stanford University on Coursera*, Certificate earned on July 29, 2017.

Topics include: (i) Supervised learning (parametric/non-parametric algorithms, support vector machines, kernels, neural networks). (ii) Unsupervised learning (clustering, dimensionality reduction, recommender systems, deep learning). (iii) Best practices in machine learning (bias/variance theory; innovation process in machine learning and AI)

Professional experience and service

Advising and Committee work

2021 Committee member of various faculty positions:

- Cybersecurity, Assistant Professor Tenure Track
- Mathematics, Postdoctoral Fellow
- Coding Theory, Cryptography, and Number Theory, RTG Post Doctoral Fellow

since 2020 *Graduate Affair committee* member of the School of Mathematical and Statistical Sciences

since 2020 *Global Engagement committee* member of the School of Mathematical and Statistical Sciences

2020 Committee member of various faculty positions:

- Mathematics, Postdoctoral Fellow
- Coding Theory, Cryptography, and Number Theory, RTG Post Doctoral Fellow

since 2018 Faculty advisor for the AMS Graduate Students Chapter of Clemson University

since 2016 Undergraduate advisor for students with major in the of the School of Mathematical and Statistical Sciences

2018-2019 Elected member of the founding *Director Search Committee* of the School of Mathematical and Statistical Sciences

2017-2019 Faculty mentor for the AWM Graduate Students Chapter of Clemson University

2017-2018 *Research Committee* member of the School of Mathematical and Statistical Sciences

2014-2016 *Undergraduate Affair Committee* member of the School of Mathematical and Statistical Sciences

Others

2020-21 National Science Foundation (NSF) panelist.

Leaves

Jun-Aug 21 Parental Leave from June 19 to August 15, 2021

Languages

Italian (first language), English, German and French (fluent), Spanish (proficient), Farsi (basic).

June 30, 2021