August 24, 2025

Michael E. O'Sullivan

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Education

PH.D. MATHEMATICS: University of California at Berkeley, 1996.

M.S. MATHEMATICS: Portland State University, 1985.

B.A. MATHEMATICS: Reed College, 1981.

Employment

PROFESSOR, EMERITUS: Department of Mathematics and Statistics, San Diego State University (8/2023 - present). Early retirement program, employed half-time.

CHAIR: Department of Mathematics and Statistics, San Diego State University (8/2014 - 8/2022). Main achievements: (1) tightly coordinated Precalculus and Calculus 1, 2 classes using same syllabus, exams and grading rubric, improved placement and course sequencing, and a thorough teaching assistant training program; (2) creation of a mathematics learning center integrated with the department and with a department faculty member as director; (3) improved upper division mathematics course structure including a core mathematical computing course; (4) streamlining of the graduate mathematics program.

PROFESSOR: Department of Mathematics and Statistics, San Diego State University (6/2011 - 2023). Emeritus (202

ASSOCIATE PROFESSOR: Department of Mathematics and Statistics, San Diego State University (6/2006 - 6/2011).

ASSISTANT PROFESSOR: Department of Mathematics and Statistics, San Diego State University (8/2000 - 6/2006).

RESEARCHER Center for Communications Research, Institute for Defense Analysis, San Diego, CA, (6-8/2009, 6-8/2011).

VISITING COLLEGE LECTURER: National University of Ireland, Cork, Ireland, (8/1998 - 8/2000).

VISITING RESEARCH ASSISTANT PROFESSOR: Coordinated Science Laboratory, University of Illinois, Urbana-Champaign (6/1998 - 7/2002).

ASSISTANT PROFESSOR OF MATHEMATICS: University of Puerto Rico, Mayaguez (8/1996 - 7/1998).

MATHEMATICIAN: O'Sullivan Consulting Incorporated (6/1989 - 6/1997).

Grants and Awards

Transfer Success-Social and Career Support for Math Majors California State University 2021 Student Support and Early Degree Planning Program Awards (2021-22).

The President's Leadership Fund Excellence Award for implementing a new initiative toward goals outlined in the University's Strategic Plan, *Building on Excellence* (2017). Awarded for leadership of the department as chair.

National Science Foundation Division of Undergraduate Education "Student Engagement in Mathematics through an Institutional Network for Active Learning (SEMINAL)" awarded to APLU, SDSU, University of Nebraska-Lincoln, University of Colorado-Boulder. SDSU PI: Rasmussen, CoPIs: Bowers, O'Sullivan (8/2016-8/2022). Research on active learning and department leadership at University of Nebraska-Lincoln, University of Chicago-Illinois, CSU Fullerton, CSU East Bay and other institutions.

Provost's Innovation for Excellence Award "Improving Student Success and Conceptual Understanding in Calculus," PI: M. E. O'Sullivan, CoPIs: J. Bowers, R. Carretero, S. Kirshvink, C. Rasmussen, (6/2016-9/2016).

President's Leadership Fund "A Discrete Mathematics Problem Library for Online Homework," PI: M. E. O'Sullivan (1/2013-7/2015).

President's Leadership Fund "Incorporating Computational Software into Mathematics Courses," (1/2010 - 9/2012).

National Science Foundation Directorate for Computer and Information Science and Engineering, "Decoding of Algebraic Geometry Codes: Theoretical Analysis, Efficient Algorithms, Practical Implementation," PI: M. E. O'Sullivan, (7/2009 - 6/2012).

National Science Foundation Directorate for Computer and Information Science and Engineering, "Collaborative Research: Improving Low-Density Parity-Check Codes Through Algebraic Analysis of the Sum-Product Algorithm,"
PIs: M. E. O'Sullivan, J. Brevik (CSULB), R. Wolski (UCSB) (2/2007 - 2/2010).

Korea Research Foundation, Postdoctoral Foreign Study Grant, PI M. E. O'Sullivan (7/2005 - 6/2006).

SDSU Travel Grant, "Research Collaboration in Applied Algebra with the National University of Ireland." (5-6/2004).

National Science Foundation Division of Networking and Communication Research and Infrastructure: "High-Performance Decoding of Algebraic Codes beyond their Packing Radii," PI R. Blahut (UIUC) (8/2000 - 7/2003). Investigator.

National Science Foundation Division of Networking and Communication Research and Infrastructure grant, "Implementation and Applications of Practical Codes on Curves," PI R. Blahut (UIUC), Co-PI M. E. O'Sullivan, (7/1998 - 6/2000).

National Science Foundation Small Business Innovations Research Grant, "Construction of a Decoder for an Algebraic Geometry Code," PI M. E. O'Sullivan. Phase I (2-10/1993), Phase II (7/1994 - 9/1996).

Book Chapters

M. E. O'Sullivan, M. Voigt, C. Rasmussen. "Crossroads University" in *Transformational Change Efforts: Student Engagement in Mathematics through an Institutional Network for Active Learning*, Wendy Smith, Matthew Voigt, April Ström, David C. Webb, and W. Gary Martin, Eds., AMS/CBMS, 2021.

M. E. O'Sullivan, W. Smith, R. Tubbs. "Leadership" in *Transformational Change Efforts: Student Engagement in Mathematics through an Institutional Network for Active Learning*, Wendy Smith, Matthew Voigt, April Ström, David C. Webb, and W. Gary Martin, Eds., AMS/CBMS, 2021.

M. Williams, D. Grant, W. G. Martin, M. E. O'Sullivan. "Sustainability: Lessons Learned from Six Universities That Sustained Active Learning Changes" in *Transformational Change Efforts: Student Engagement in Mathematics through an Institutional Network for Active Learning*, Wendy Smith, Matthew Voigt, April Ström, David C. Webb, and W. Gary Martin, Eds., AMS/CBMS, 2021.

Y. Aubry, Y., W Castryck, S. R. Ghorpade, G. Lachaud, M. E. O'Sullivan, S. Ram. "Hypersurfaces in weighted projective spaces over finite fields with applications to coding theory," pp. 25–61 of *Algebraic Geometry for Coding Theory and Cryptography* (Association for Women in Mathematics Series, vol 9), Springer, 2017.

M. E. O'Sullivan, M. Bras-Amoros: "The Key Equation for One-Point Codes," Chapter 3, pp. 99–152, of *Advances in Algebraic Geometry Codes*, E. Martinez-Moro, C. Munuera, D. Ruano (eds.), World Scientific, 2008.

Articles in Refereed Journals

M. E. O'Sullivan, K. Hasenstab, Aleks PPL Scores as a Predictor of Success in Calculus, *PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies*, 34 (2024), no. 10, pp. 1025-1049. M. E. Pilgrim, N. Apkarian, H. Milbourne, M. E. O'Sullivan, From rough waters to calm seas: The challenges and successes of building a graduate teaching assistant professional development program. *PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies*, 31 (2021), no. 3-5, pp. 594-607.

M. Bras-Amorós, M E. O'Sullivan, "The Symmetric Key Equation for Reed–Solomon Codes and a New Perspective on the Berlekamp-Massey Algorithm," *Symmetry* 11 Special Issue on Interactions between Group Theory, Symmetry and Cryptology, (2019), no. 11.

N. Apkarian, J. Bowers, M. E. O'Sullivan, C. Rasmussen, "A case study of change in the teaching and learning of Precalculus to Calculus 2: What we are doing with what we have," *PRIMUS*, 28 (2018) no. 6, pp. 528–549.

K. Bari, M. E. O'Sullivan, "The Hamiltonian problem and t-path traceable graphs," *Involve* 10 (2017), no. 5, pp. 801–812.

K. Lee, M. Bras-Amorós, M. E. O'Sullivan, "Unique decoding of general AG codes," *IEEE Transactions on Information Theory*, 60 (2014), no. 4, pp. 2038–2053.

F. Hernando, M. E. O'Sullivan, D. Ruano, "List decoding of repeated codes," *Applicable Algebra in Engineering, Communications and Computing*, 24 (2013), no. 3-4, pp. 237–253.

F. Hernando, K. Marshall, M. E. O'Sullivan, "The dimension of subcode-subfields of shortened generalized Reed-Solomon codes," *Designs, Codes, Cryptography*, 69 (2013), pp. 131–142.

K. Lee, M. Bras-Amoros, M. E. O'Sullivan, "Unique Decoding of Plane AG Codes via Interpolation," *IEEE Transactions on Information Theory*, 58 (2012) no. 6, pp. 3941–3950.

K. Lee, M. E. O'Sullivan, "Algebraic Soft-Decision Decoding of Hermitian Codes" *IEEE Transaction on Information Theory*, 56 (2010), no 6, pp. 2587–2600.

K. Lee, M. E. O'Sullivan, "List Decoding of Hermitian Codes using Groebner Bases" *Journal of Symbolic Computation*, 40 (2009), no. 12, pp. 1662–1675.

K. Lee, M. E. O'Sullivan, " Sudan's List Decoding of Reed-Solomon Codes from a Groebner Basis Perspective" *Journal of Symbolic Computation*, 43 (2008), no. 9, pp. 645–658.

M. Bras-Amorós, M. E. O'Sullivan, "Redundancies of Correction-Capability-Optimized Reed-Muller Codes" *Discrete Applied Mathematics* 156 (2008), no. 15, pp. 3005–3010.

M. Bras-Amorós, M. E. O'Sullivan, "Duality for Several Families of Evaluation Codes," *Advances in the Mathematics of Communications*, 2 (2008), no. 1, pp. 15–33.

M. Bras-Amorós, M. E. O'Sullivan, "The Order Bound on the Minimum Distance of the One-Point Codes Associated to a Garcia-Stichtenoth Tower of Function Fields" *IEEE Transactions on Information Theory*, 53, (2007), no. 11, pp. 4241–4245.

M. Bras-Amorós, M. E. O'Sullivan, "On Semigroups Generated by Two Consecutive Integers and Improved Hermitian Codes," *IEEE Transactions on Information Theory*, 53 (2007), no. 7, pp. 2560–2566.

E. Byrne, M. Greferath, M. E. O'Sullivan, "The Linear Programming Bound for Codes over Finite Frobenius Rings," *Designs, Codes and Cryptography*, 42 (2007), no. 3, pp. 289–301.
"Errata for: 'The linear programming bound for codes over finite Frobenius rings' " *Designs, Codes and Cryptography*, 45 (2007), no. 2, pp. 269–270.

M. Greferath, G. McGuire, M. E. O'Sullivan, "On Plotkin Optimal Codes over Finite Frobenius Rings," *Journal of Algebra and Its Applications*, (2006), no. 6, pp. 799–815.

M. Bras-Amorós, M. E. O'Sullivan, "The Correction Capability of the Berlekamp-Massey-Sakata Algorithm with Majority Voting," *Applicable Algebra in Engineering, Communications and Computing* 17 (2006), no. 5, pp. 315–335.

M. E. O'Sullivan, "Algebraic Construction of Sparse Matrices with Large Girth," *IEEE Transactions on Information Theory*, 52 (2006), no. 2, pp. 718–727.

M. Greferath, M. E. O'Sullivan, "On Bounds for Codes over Frobenius Rings under Homogeneous Weights," *Discrete Mathematics* 289 (2005) pp. 11–24.

M. E. O'Sullivan, "On Koetter's Algorithm and the Computation of Error Values," *Designs, Codes and Cryptography*, 31 (2004) pp. 169-188.

M. E. O'Sullivan, "The Key Equation for One-Point Codes," *Journal of Pure and Applied Algebra*, 169 (2002) pp. 295–320.

M. E. O'Sullivan, "New Codes for the Berlekamp-Massey-Sakata Algorithm," *Finite Fields and Their Applications*, 7 (2001) pp. 293–317.

M. E. O'Sullivan, "Decoding of Hermitian Codes: The Key Equation and Efficient Error Evaluation," *IEEE Transactions on Information Theory*, 46 (2000), no. 2, pp. 512–523.

M. E. O'Sullivan, "Decoding of Codes Defined by a Single Point on a Curve," *IEEE Transactions on Information Theory*, special issue on algebraic geometry codes, 41 (1995), no. 6, pp. 1709–1719.

Articles in Refereed Proceedings

X. Zhang, M. E. O'Sullivan, "Ultra-Compressed Three-Error-Correcting BCH Decoder," *2018 IEEE International Symposium on Circuits and Systems (ISCAS).*

S. Lampoudi, J. Brevik, M. E. O'Sullivan, "Combinatorial Properties as Predictors for the Performance of the Sum-Product Algorithm," *12th Canadian Workshop on Information Theory, (CWIT)* pp .134–138, 17-20 May 2011.

F. Hernando, M. E. O'Sullivan, E. Popovici, S. Srivastava, "Subfield-subcodes of Generalized Toric Codes," *Proceedings IEEE International Symposium on Information Theory*, pp. 1125–1129, June 2010.

M. Bras-Amoros, M. E. O'Sullivan: "From the Euclidean Algorithm for Solving a Key Equation for Dual Reed-Solomon Codes to the Berlekamp-Massey Algorithm," *Applied Algebra, Algebraic Algorithms and Error-Correcting Codes*, M. Bras-Amoros, T. Hóholdt (eds.), Springer, Lecture Notes in Computer Science, 5527, pp. 32–42, June, 2009.

J. Brevik, M. E. O'Sullivan, A, Umlauf, R. Wolski: "Simulation of the Sum-Product Algorithm Using Stratified Sampling," *Applied Algebra, Algebraic Algorithms and Error-Correcting Codes*, M. Bras-Amoros, T. Hóholdt (eds.), Springer, Lecture Notes in Computer Science, 5527, pp. 65–72, June, 2009.

D. Monarres, M. E. O'Sullivan: "A Generalization of the Zig-zag Product by Means of the Sandwich Product," *Applied Algebra, Algebraic Algorithms and Error-Correcting Codes*, M. Bras-Amoros, T. Hóholdt (eds.), Springer, Lecture Notes in Computer Science, 5527, pp. 231–234, June, 2009.

M. Bras-Amoros, M. E. O'Sullivan: "Extended Norm-Trace Codes with Optimized Correction Capability," *Applied Algebra, Algebraic Algorithms and Error-Correcting Codes*, P. V. Kumar, T. Hóholdt, H. Janwa (eds.), Springer, Lecture Notes in Computer Science, 4851, pp. 337–346, Dec., 2007.

M. E. O'Sullivan, J. Brevik, R. Wolski, "The Sum-Product Algorithm on Small Graphs," in *Advances in Coding Theory and Cryptology*, T. Shaska, W. C. Huffman, D. Joyner, V. Ustimenko eds., Series on Coding Theory and Cryptology, 2. World Scientific Publishing Co., 2007, 160–180.

E. Byrne, M. Greferath, M. E. O'Sullivan, "Duality of Ring-Linear Codes and a Linear Programming Bound," *International Workshop on Coding and Cryptography*, Versailles, France, 2007.

R. Agarwal, E. Popovici, B. O'Flynn, M. E. O'Sullivan, "A Parallel Architecture for Hermitian Decoders: Satisfying Resource and Throughput Constraints," *IEEE Proc., International Symposium on Circuits and Systems*, ISCAS 2007.

R. Moberly, M. E. O'Sullivan and K. Waheed, "LDPC Decoder with a Limited-Precision FPGA-based Floating-Point Multiplication Coprocessor," *Proceedings SPIE Advanced Signal Processing Algorithms, Architectures, and Implementations*, August 2007.

R. Moberly, M. E. O'Sullivan, "Representing Probabilities with Limited Precision for Iterative Soft-Decision LDPC Decoding", *Proceedings Wireless and Personal Multimedia Conference*, September 2006.

R. Moberly, M. E. O'Sullivan, "Computational Performance of Various Formulations of the Iterative Soft-Decision Decoder Algorithm", *Proceedings IEEE International Symposium on Information Theory*, July 2006.

K. Lee, M. E. O'Sullivan "Groebner Bases for Soft-Decision Decoding of Reed-Solomon Codes" *2006 IEEE International Symposium on Information Theory*, Seattle, WA, July, 2006, pp. 2032–2036.

M. E. O'Sullivan, J. Brevik, R. Wolski "The Performance of LDPC codes with Large Girth," *Proc. 43rd Allerton Conference on Communication, Control and Computing*, Univ. Illinois, 2005.

A. Byrne, E. Popovici, M. E. O'Sullivan, "Versatile Architectures for Decoding a Class of LDPC Codes," *IEEE European Conference on Circuit Theory and Design*, 2005.

M. Greferath, M. E. O'Sullivan, R. Smarandache, "Construction of Good LDPC Codes Using Dilation Matrices," *Proc. IEEE International Symposium on Information Theory*, Chicago, Illinois, p. 237, 2004.

M. E. O'Sullivan, R. Smarandache, "High-rate, Short Length, (3, 3s)-regular LDPC Codes of Girth 6 and 8," *Proc. IEEE International Symposium on Information Theory*, Yokohama, Japan, p. 59, 2003.

M. E. O'Sullivan, M. Greferath, R. Smarandache, " Construction of LDPC Codes from Affine Permutation Matrices," *Proc. 40th Allerton Conference on Communication, Control and Computing*, Univ. Illinois, pp. 1159–1167, 2002.

E. Popovici, P. Fitzpatrick, R. Koetter, M. E. O'Sullivan, "Implementation of a Hermitian decoder," *Proc. IEEE Int. Symp. Information Theory* , Washington D. C., p. 311, 2001.

M. E. O'Sullivan, "Alternative Approaches to the Computation of Error Values for Hermitian Codes," *Proc. 37th Allerton Conference on Communication, Control and Computing*, Univ. Illinois, pp. 557–566, 1999.

M. E. O'Sullivan, "Decoding of Codes on Surfaces," *Proceedings, IEEE Information Theory Workshop*, Killarney, Ireland, pp. 33–34, 1998.

M. E. O'Sullivan, "Decoding Hermitian Codes Beyond $(d_{\min} - 1)/2$" *Proc. IEEE International Symposium on Information Theory*, Ulm, Germany, p. 377, 1997.

M. E. O'Sullivan, "VLSI Architecture for a Decoder for Hermitian Codes" *Proc. IEEE International Symposium on Information Theory*, Ulm, Germany, p. 376, 1997.

Short Courses

Lecturer (8 hours), Soria Summer School on Computational Mathematics: Algebraic Coding Theory, Soria, Spain, July 2-11, 2008.

Lecturer (6 hours), 2004 Summer Program for Graduate Students in Coding and Cryptography, sponsored by the Institute for Mathematics and Its Applications, University of Notre Dame, June 8-26, 2004.

Lecturer (12 hours), "Coding Theory: Code Constructions and Algorithms" Universitat Politècnica de Catalunya, Barcelona, Spain, June 2-6, 2003.

Doctoral and Post-doctoral Students Supervised

Fernando Hernando, Post-doctoral support, Irish Research Council for Science, Engineering and Technology (IRCSET), for research at SDSU, 8/2010-8/2011.

Kwankyu Lee, Post-doctoral support from the Korea Research Foundation, for research at SDSU 8/2005-6/2006.

Raymond Moberly, *Quantization of a Low-Density Parity-Check (LDPC) Decoder: Limited Precision Digital Design of the Sum-Product Algorithm (SPA) for Wireless Voice and Video Communication Channels*, Claremont Graduate University and San Diego State University, 2012.

Maria Bras-Amorós, *Improving Evaluation Codes*, Universitat Politècnica de Catalunya, Barcelona, Spain 2003. I am co-advisor with Sebastià Xambó-Descamps.

Emanuel Popovici, *Algorithms and Architectures for Decoding Reed-Solomon and Hermitian Codes,* National University of Ireland, Cork, Ireland, 2002. I am co-advisor with Patrick Fitzpatrick.

Professional Activities and Service

Intersegmental Committee of the Academic Senates: Mathematics Competencies Subcommittee. Co-chair, 2023-2024. Led a committee of 8 faculty from the UC, CSU and CCC in writing the "Statement of Mathematics Competencies Expected of Entering College Students."

Area C Workgroup of the University of California Board of Admissions and Relations with Schools. Spring, 2024. Contributed to the drafting recommendations to BOARS about Area C (quantitative reasoning) requirements for UC admission.

San Diego State University Council of Chairs and Directors Advisory Group. Member 2020-21, President, 2021-22.

Center for the Advancement of Quantitative Reasoning of the CSU. Advisory Group member, 2019-2022.

Admissions Advisory Council of the CSU. Member, 2019-2022.

Mathematical Association of America Workshop at the Mathematics Joint Meetings, Co-organizer "Championing Master's programs in Mathematics A forum for Advocacy, Networking and Innovation" 01/2018.

Transforming Post-Secondary Education in Mathematics, member of the Mathematics Advisory Group, 1/2016-present, participated in meetings in

03/2016, 10/2016, 03/2017, 06/2018, 09/2019. Chair of the Graduate Education committee, 2021-2023.

CSU Math Council President, 2019-2022. Chair of a Task Force on Calculus Placement, 2016-17. Chair of Task Force to write a charter 2018-19, Member 2014-2022.

CSU Math Council Task Force on Placement chaired a committee to propose a calculus placement instrument, which led to the CSU piloting ALEKS PPL system-wide in AY 2018-19.

SDSU Senate Class Size Task Force committee member July 2014 - January 2015.

SDSU University Senate served as senator 2006-2009, 2011-13.

Institute for Mathematics and Its Applications, University of Minnesota, General membership for the Thematic Year on Applications of Algebraic Geometry, 2006-7.

Conferences: Co-organizer: Special Session on Coding Theory, AMS-MAA Joint Meetings, San Diego, 2002.

Editor: *Advances in the Mathematics of Communications*: Handled ten articles from the period 2007-2011.

Referee: Reviewed articles for the following journals: *Advances in the Mathematics of Communications*; *Designs, Codes and Cryptography*; *Finite Fields and Their Applications*; *Journal of Pure and Applied Algebra*; *Communications in Algebra*; *Applicable Algebra in Engineering, Communication, and Computing*; *Journal of Symbolic Computation*; *IEEE Transactions on Information Theory*; *IEEE Transactions on Communications*.

Memberships: American Mathematical Society; Mathematical Association of America;