Elena Grigorescu

+1 765 496 1185
elena-g@purdue.edu
https://www.cs.purdue.edu/homes/egrigore/

Education

2006–2010 **Ph.D.**, *Massachusetts Institute of Technology*, Cambridge, MA
Thesis: *Symmetries in Algebraic Property Testing*. Advisor: Madhu Sudan

2004–2006 **M.S.**, *Massachusetts Institute of Technology*, Cambridge, MA

2000–2004 **B.A.**, *Bard College*, Annandale, NY

Professional experience

2018–present **Associate Professor**, *Purdue University*, West Lafayette, IN

2012–2018 **Assistant Professor**, *Purdue University*, West Lafayette, IN

2010–2012 **Postdoctoral Fellow**, *Georgia Tech*, Atlanta, GA

Other academic positions

Feb-May 2020 **Visiting Faculty**, *Northeastern University*, Boston, MA

Sep-Dec 2019 **Visiting Faculty**, *EPFL*, Lausanne, Switzerland

Jul 2019 **Visiting Scientist**, *Simons Institute*, Berkeley, CA, Summer Cluster: Error-Correcting Codes and High-Dimensional Expansion

2008–2008 **Research Visitor**, *CWI*, Amsterdam, Netherlands

2003-2003 **Intern**, *IBM Almaden*, San Jose, CA

2001-2001, 2002-2002 **REU Participant**, *University of Minnesota*, Duluth, MN

Research Interests

Sublinear-time and sublinear-space algorithms; Error-correcting codes and lattices; Computational complexity; Learning theory

Publications

Journal papers - published

1. Limitations of Mean-Based Algorithms for Trace Reconstruction at Small Edit Distance E. Grigorescu, M. Sudan, M. Zhu *IEEE Transactions on Information Theory*, 69 (10), 6790-6801 (2022)

2. The Maximum Binary Tree Problem K. Chandrasekaran, E. Grigorescu, G. Istrate, S. Kulkarni, Y. Lin, M. Zhu: *Algorithmica* 83(8): 2427-2468 (2021)

3. Relaxed Locally Correctable Codes in Computationally Bounded Channels J. Blocki, V.

Gandikota, E. Grigorescu, S. Zhou. *IEEE Trans. Inf. Theory* 67(7): 4338-4360 (2021)

4. Periodicity in Data Streams with Wildcards. F. Ergün, E. Grigorescu, E. Sadeqi Azer, S. Zhou. *Theory of Computing Systems.* 64(1): 177-197 (2020) (Invited paper)

5. Flipping out with Many Flips: Hardness of Testing k-Monotonicity. E. Grigorescu, A. Kumar, K. Wimmer. *SIAM J. Discrete Math* 33(4): 2111-2125 (2019)

6. Testing k-Monotonicity C. Cannone, E. Grigorescu, S. Guo, A. Kumar, K. Wimmer. *Theory of Computing* 15 (1) 2019

7. Nearly Optimal Sparse Group Testing. V. Gandikota, E. Grigorescu, S. Jaggi, S. Zhou. *IEEE Transactions on Information Theory*, 65(5): 2760-2773 (2019)

8. Structural Results on Matching Estimation with Applications to Streaming. M. Bury, E. Grigorescu, A. McGregor, M. Monemizadeh, C. Schwiegelshohn, S. Vorotnikova, S. Zhou. *Algorithmica* (2019) 81 (1), 367–392.

9. NP-Hardness of Reed-Solomon Decoding, and the Prouhet-Tarry-Escott Problem. V. Gandikota, B. Ghazi, E. Grigorescu. *SIAM Journal on Computing*, 47(4): 1547-1584 (2018)

10. AC0 - MOD2 Lower Bounds for the Boolean Inner Product Function. M. Cheraghchi, E. Grigorescu, B. Juba, K. Wimmer, N. Xie. *Journal of Computer and System Sciences*, 97: 45-59 (2018).

11. Local Testing of Lattices. K. Chandrasekaran, M. Cherachghi, V. Gandikota, E. Grigorescu. *SIAM J. Discrete Math.* 32(2): 1265-1295 (2018)

12. Statistical Algorithms and a Lower Bound for Planted Clique. V. Feldman, E. Grigorescu, L. Reyzin, S. Vempala, Y. Xiao. *Journal of the ACM*, 64(2): Article 8, 2017.

13. Deciding Orthogonality in Construction-A Lattices. K. Chandrasekaran, V. Gandikota, E. Grigorescu. *SIAM J. Discrete Math.*, 1244-1262, 2017.

14. List Decoding Barnes-Wall Lattices. E. Grigorescu, C. Peikert. *Computational Complexity*, 26(2): 365-392 (2017)

15. A Unified Framework for Testing Linear-Invariant Properties. A. Bhattacharyya, E. Grigorescu, A. Shapira. *Random Structures and Algorithms* 46(2): 232-260 (2015)

16. Steiner Transitive-Closure Spanners of Low-Dimensional Posets. P. Berman, A. Bhattacharyya, E. Grigorescu, S. Raskhodnikova, D. Woodruff, G. Yaroslavtsev. *Combinatorica* 34(3): 255-277 (2014)

17. 2-Transitivity is Insufficient for Local Testability E. Grigorescu, T. Kaufman, M. Sudan. *Journal of Computational Complexity* 22(1): 137-158 (2013).

18. Error-Correcting Data Structures. V. Chen, E. Grigorescu, R. de Wolf. *SIAM Journal on Computing* 42(1): 84-111 (2013).

19. A Lower-Variance Randomized Algorithm for Approximate String Matching. M. J. Atallah, E. Grigorescu, Y. Wu. *Information Processing Letters*, 113(18): 690-692 (2013).

20. Succinct Representation of Codes with Applications to Testing. E. Grigorescu, T. Kaufman, M. Sudan. *SIAM Journal on Discrete Mathematics* 26(4): 1618-1634 (2012).

21. Transitive-Closure Spanners. A. Bhattacharyya, E. Grigorescu, K. Jung, S. Raskhodnikova, D. Woodruff. *SIAM Journal on Computing* 41(6): 1380-1425 (2012)

22. Lower Bounds for Monotonicity Reconstruction from Transitive-Closure Spanners. A. Bhattacharyya, E. Grigorescu, M. Jha, K. Jung, S. Raskhodnikova, D. Woodruff. *SIAM Journal on Discrete Mathematics* 26(2): 618-646 (2012)

23. Testing Odd-Cycle Freeness in Boolean Functions. A. Bhattacharyya, E. Grigorescu, P. Raghavendra, A. Shapira. *Combinatorics, Probability and Computing* 21(6): 835-855, 2012

24. Explicit-Low Weight Bases for BCH Codes. E. Grigorescu, T. Kaufman. *IEEE Transactions of Information Theory* 58(1): 78-81, 2012.

25. A Local Decision Test for Sparse Polynomials. E. Grigorescu, K. Jung, R. Rubinfeld. *Information Processing Letters* 110(20): 898-901, 2010.

26. The Insulation Sequence of a Graph. E. Grigorescu. *Discrete Applied Mathematics* 134(1-3): 77-90, 2004.

27. Decreasing the Diameter of Cycles, E. Grigorescu. *Journal of Graph Theory* 43(4): 299-303, 2003.

Journal papers - submitted

28. Online Directed Spanners and Steiner Forest E. Grigorescu, Y. Lin, K. Quanrud; *Invited to Special Issue of Theory of Computing for APPROX 2021.*

29. Exponential Lower Bounds for Locally Decodable Codes Correcting Insertions and Deletions, J. Blocki, K. Cheng, E. Grigorescu, X. Li, Y. Zheng, M. Zhu.

30. Hardness of Maximum Likelihood Learning of DPPs. E. Grigorescu, B. Juba, K. Wimmer, N. Xie

31. On computing Ollivier-Ricci Curvatures of Graphs: Fine-Grained Reductions and Local Algorithms. B. DasGupta, E. Grigorescu, T. Mukherjee

32. Streaming Periodicity with Mismatches. F. Ergün, E. Grigorescu, S. Zhou.

Papers in refereed conferences

1. Learning-Augmented Algorithms for Online Linear and Semidefinite Programming. E. Grigorescu, Y. Lin, S. Silwal, M. Song, S. Zhou *NeurIPS 2022*

2. Hardness of Maximum Likelihood Learning of DPPs. E. Grigorescu, B. Juba, K. Wimmer, N. Xie. *COLT 2022*.

3. Privately Estimating Graph Parameters in Sublinear Time, J. Blocki, E. Grigorescu, and T. Mukherjee. *ICALP 2022*.

4. Exponential Lower Bounds for Locally Decodable Codes Correcting Insertions and Deletions, J. Blocki, K. Cheng, E. Grigorescu, X. Li, Y. Zheng, M. Zhu. *FOCS 2021.*

5. Online Directed Spanners and Steiner Forest,s E. Grigorescu, Y. Lin, K. Quanrud; *APPROX 2021 - Invited to Special Issue of Theory of Computing.*

6. List Learning with Attribute Noise, M. Cheraghchi, E. Grigorescu, B. Juba, K. Wimmer, N. Xie; *AISTATS 2021*

7. Differentially Private Sublinear-Time Clustering, J. Blocki, E. Grigorescu, and T. Mukherjee; *ISIT* 2021.

8. Limitations of Mean-Based Algorithms for Trace Reconstruction at Small Distance, E. Grigorescu, M. Sudan, M. Zhu; *ISIT* 2021

9. Locally Decodable/Correctable Codes for Insertions and Deletions, J. Blocki, A. Block, E. Grigorescu, S. Kulkarni, M. Zhu; *FSTTCS* 2020

10. Fixed-Parameter Algorithms for Longest Heapable Subsequence and Maximum Binary Tree K. Chandrasekaran, E. Grigorescu, G. Istrate, S. Kulkarni, Y. Lin, M. Zhu; *IPEC* 2020.

11. The Maximum Binary Tree Problem K. Chandrasekaran, E. Grigorescu, G. Istrate, S. Kulkarni, Y. Lin, M. Zhu. Proceedings of *European Symposium on Algorithms (ESA)*, 2020.

12. Relaxed Locally Correctable Codes in Computationally Bounded Channels. J. Blocki, V. Gandikota, E. Grigorescu, S. Zhou: *Brief Announcement: International Colloquium on Automata, Languages and Programming (ICALP, Track A) 2018*: 106:1-106:4; Proceedings of the *IEEE International Symposium on Information Theory (ISIT) 2019.*

13. Nearly Optimal Distinct Elements and Heavy Hitters on Sliding Windows. V. Braverman, E. Grigorescu, H. Lang, D. P. Woodruff, S. Zhou: Proceedings of *International Conference on Approximation Algorithms for Combinatorial Optimization Problems* 2018: 7:1-7:22

14. Flipping out with Many Flips: Hardness of Testing k-Monotonicity. E. Grigorescu, A. Kumar, K. Wimmer: Proceedings of *International Conference on Randomization and Computation (RANDOM)* 2018: 40:1-40:17

15. Periodicity in Data Streams with Wildcards. F. Ergun, E. Grigorescu, E. Sadeqi Azer, S. Zhou: Proceedings of *Computer Science in Russia (CSR)* 2018: 90-105

16. Lattice-Based Locality Sensitive Hashing is Optimal. K. Chandrasekaran, D. Dadush, V. Gandikota, E. Grigorescu. Proceedings of *Innovations in Theoretical Computer Science (ITCS), 2018.*

17. Relaxed Locally Correctable Codes in Computationally Bounded Channels. J. Blocki, V. Gandikota, E. Grigorescu, S. Zhou: *Brief Announcement: ICALP 2018*: 106:1-106:4;

18. Communication-Efficient Distributed Learning of Discrete Distributions. I. Diakonikolas, E. Grigorescu, J. Li, A. Natarajan, K. Onak, L. Schmidt. Proceedings of *Conference on Neural Information Processing Systems (NIPS)*, 2017 (oral presentation).

19. Streaming Periodicity with Mismatches. F. Ergün, E. Grigorescu, E. Sadeqi Azer, S. Zhou. Proceeding of *the International Workshop on Randomization and Computation* (RANDOM), 2017.

20. Streaming for Aibohphobes: Longest Palindrome with Mismatches. E. Grigorescu, E. Sadeqi Azer, S. Zhou. Proceedings of *Foundations of Software Technology and Theoretical Computer Science* (FSTTCS), 2017.

21. Longest Alignment with Edits in Data Streams. E. Grigorescu, E. Sadeqi Azer, S. Zhou. Proceedings of *the Allerton Conference on Communication, Control and Computing*, 2017.

22. Maximally Recoverable Codes: the Bounded Case. V. Gandikota, E. Grigorescu, C. Thomas, Minshen Zhu. Proceedings of *the Allerton Conference on Communication, Control and Computing*, 2017.

23. Testing k-Monotonicity (The Rise and Fall of Boolean Functions.) C. Canonne, E. Grigorescu, S. Guo, A. Kumar, K. Wimmer. Proceedings of *Innovations in Theoretical Computer Science (ITCS), 2017.*

24. Local Testing of Lattices. K. Chandrasekaran, M. Cherachghi, V. Gandikota, E. Grigorescu. Proceedings of *Foundations of Software Technology and Theoretical Computer Science* (FSTTCS), 2016.

25. Nearly Optimal Sparse Group Testing. V. Gandikota, E. Grigorescu, S. Jaggi, S. Zhou. Proceedings of *the Allerton Conference on Communication, Control and Computing*, 2016.

26. NP-Hardness of Reed-Solomon Decoding, and the Prouhet-Tarry-Escott Problem. V. Gandikota, B. Ghazi, E. Grigorescu. Proceedings of the *IEEE Symposium on Foundations of Computer Science* (FOCS), 2016.

27. AC0-MOD2 Lower Bounds for the Boolean Inner Product Function. M. Cheraghchi, E. Grigorescu, B. Juba, K. Wimmer, N. Xie. Proceedings of *International Colloquium on Automata, Languages, and Programming* (ICALP), Track A, 2016.

28. Deciding Orthogonality in Construction-A Lattices. K. Chandrasekaran, V. Gandikota, E. Grigorescu. Proceedings of *Foundations of Software Technology and Theoretical Computer Science* (FSTTCS) 2015.

29. On the NP-Hardness of Bounded Distance Decoding of Reed-Solomon Codes. V. Gandikota, B. Ghazi, E. Grigorescu. Proceedings of *IEEE International Symposium on Information Theory* (ISIT) 2015.

30. Tight Lower Bounds for Testing Linear Isomorphism. E. Grigorescu, K. Wimmer, N. Xie. Proceeding of *the International Workshop on Randomization and Computation* (RANDOM)

2013.

31. Statistical Algorithms and a Lower Bound for Planted Clique. V. Feldman, E. Grigorescu, L. Reyzin, S. Vempala, Y. Xiao. Proceedings of *the ACM Symposium on Theory of Computing* (STOC), 2013.

32. List Decoding Barnes-Wall Lattices. E. Grigorescu, C. Peikert. Proceedings of *the Conference on Computational Complexity (CCC)*, 2012.

33. Testing Odd-Cycle Freeness in Boolean Functions. A. Bhattacharyya, E. Grigorescu, P. Raghavendra, A. Shapira. Proceedings of *the ACM-SIAM Symposium on Discrete Algorithms* (SODA), 2012.

34. On Sums of Locally Testable Affine Invariant Properties. E. Ben-Sasson, E. Grigorescu, G. Maatouk, A. Shpilka, M. Sudan. Proceedings of *the International Workshop on Randomization and Computation* (RANDOM), 2011.

35. On Noise Tolerant Learning of Sparse Parities and Related Problems. E. Grigorescu, L. Reyzin, S. Vempala. Proceedings of *the International Conference on Algorithmic Learning Theory*, 2011.

36. Steiner Transitive-Closure Spanners of Low-Dimensional Posets. P. Berman, A. Bhattacharyya, E. Grigorescu, S. Raskhodnikova, D. Woodruff, G. Yaroslavtsev. Proceedings of *the International Colloquium on Automata, Languages and Programming* (ICALP, Track A), 2011.

37. A Unified Framework for Testing Linear Invariant Properties. A. Bhattacharyya, E. Grigorescu, A. Shapira. Proceedings of *the Symposium on Foundations of Computer Science* (FOCS), 2010.

38. Lower Bounds for Monotonicity Reconstruction from Transitive-Closure Spanners. A. Bhattacharyya, E. Grigorescu, M. Jha, K. Jung, S. Raskhodnikova, D. Woodruff. Proceedings of *the International Workshop on Randomization and Computation* (RANDOM), 2010.

39. Efficient and Error-Correcting Data Structures for Membership and Polynomial Evaluation. V. Chen, E. Grigorescu, R. de Wolf. Proceedings of *the Symposium on Theoretical Aspects of Computer Science* (STACS), 2010.

40. Succinct Representation of Codes with Applications to Testing. E. Grigorescu, T. Kaufman, M. Sudan. Proceedings of *the International Workshop on Randomization and Computation* (RANDOM), 2009.

41. Transitive-Closure Spanners. A. Bhattacharyya, E. Grigorescu, K. Jung, S. Raskhodnikova, D. Woodruff. Proceedings of *the ACM-SIAM Symposium on Discrete Algorithms* (SODA), 2009.

42. 2-Transitivity is Insufficient for Local Testability. E. Grigorescu, T. Kaufman, M. Sudan. Proceedings of *the Conference on Computational Complexity* (CCC), 2008.

43. Decodability of Group Homomorphisms Beyond the Johnson Bound. I. Dinur, E. Grigorescu, S. Kopparty, M. Sudan. Proceedings of *the ACM Symposium on Theory of Computing* (STOC), 2008.

44. Local Decoding and Testing for Homomorphisms. E. Grigorescu, S. Kopparty, M. Sudan. Proceedings of *the International Workshop on Randomization and Computation* (RANDOM), 2006.

Manuscripts

45. How to Make your Approximation Algorithm Private. J. Blocki, E. Grigorescu, T. Mukherjee, S. Zhou.

46. On Relaxed Locally Decodable Codes for Hamming and Insertion-Deletion Errors. A. Block, J. Blocki, K. Cheng, E. Grigorescu, X. Li, Y. Zheng, M. Zhu

47. The Semantics of Local Characterizations for Linear-Invariant Properties. A. Bhattacharyya, E. Grigorescu, J. Nordström, N. Xie. Technical Report TR10-136, Electronic Colloquium on Computational Complexity 2010.

Student research supervising

Current:

1. Tamalika Mukherjee (co-advised with Jeremiah Blocki); Advised: Spring 2020-present
   Degree: PhD (expected Spring 2023). Topic: Differential Privacy and Sublinear Algorithms
   Current Status: post-prelim. Current Support: RA + Bilsland Dissertation Fellow.

2. Maoyuan Raymond Song; Advised: Summer 2022-present Degree: PhD (expected).
   Current status: pre-prelim. Current Support: RA + Ross-Lynn Fellowship

3. Minshen Zhu; Advised: Spring 2017-present;
   Degree: PhD (expected Spring 2023). Topic: Local Codes for Synchronization Channels
   Current Status: post-prelim. Current Support: RA.

4. Nithish Kumar (Fall 2022-present)
   Current status: pre-prelim.

Alumnae

1. Venkata Surya Srik Gandikota. Advised: Fall 2012-Summer 2017.
   Degree: PhD, 2017. Dissertation: Local and Global Computation on Algebraic Data.
   Current position: Assistant Professor EECS Syracuse University

2. Samson Zhou (co-advised with Greg Frederickson). Advised: Fall 2012; Fall 2015-May 2018
   Degree: PhD, 2018. Dissertation: Approximating Properties of Data Streams.
   Current position: Postdoc at UC Berkeley and Rice University.

3. Abhiram Natarajan (co-advised with Saugata Basu). Advised: Fall 2014-2020
   Degree: PhD, 2020. Disertation: Betti Numbers of Deterministic and Random Sets in Semi-Algebraic and O-minimal Geometry.
   Current position: EPSRC Postdoc at the Mathematical Institute, University of Warwick.

4. Young-San Lin (co-advised with Thanh Nguyen); Advised: Fall 2014-2022
   Degree: PhD. Disertation: Online Covering: Efficient and Learning-Augmented Algorithms.
   Current position: Postdoc at Melbourne Business School.

Undergraduate student research

1. Richard Li – Spring 2021: Heapable Sequences; The Maximum Binary Tree Problem

2. Shubhang Kulkarni–Summer 2018-2019: Heapable Sequences; The Maximum Binary Tree Problem (now a graduate student at UIUC)

3. Clayton Thomas– Spring 2017-Jan 2018: Maximally Recoverable Codes. Received Honorable Mention at the 2018 CRA Outstanding Undergraduate Research Awards (now a graduate student at Princeton University)

Teaching

Purdue University

CS584: Theory of computation/complexity theory, Fall 2022, Fall 2021, Spring 2017, Spring 2014, Spring 2013.
CS182: Foundations of CS, Spring 2022.
CS381: Introduction to the analysis of algorithms, Fall 2020, Spring 2019, Spring 2018, Fall 2014.
CS580: Algorithm design and analysis, Fall 2018, Fall 2017, Fall 2016, Fall 2015, Fall 2013.
CS483: Introduction to the theory of computation, Spring 2016.
CS590STA/SLA: Sublinear algorithms, Spring 2015/Spring 2021.
CS590CTT: Current topics in theoretical computer science, Fall 2012.

Georgia Tech

Discrete Fourier Analysis and Applications. Co-Instructor, Spring 2012

Funding

NSF Fast and Robust Algorithms with Partial Data Access. 2022-2025.
Purdue's Ross-Lynn Felowship (1 student) 2022-2023.
NSF AF: Small: New Efficient Algorithms for Complex Data 2019-2022.
NSF CIF: Small: Ultra-Efficient Codes for Communication and Verifiable Storage (co-PI: Blocki) 2019-2022.
NSF EAGER: Complexity of Computation on Codes and Lattices, 2016-2018.
Purdue Research Foundation grants 2015-2018 (2 students, 2 summers).

Service

Department

Organizer of the CS Theory Seminar, 2012-2019: invited speakers, and have given talks regularly.

Graduate admissions: 2012-2015.

Theory CS hiring committee: 2018-2019.

Foundations Search 2020-2021.

CS Diversity Task Force 2020-2021.

Undergraduate Student Board 2020-2021.

Graduate Student Committee 2022-present

Outreach presentations and other
- CS 197: Topics in Computer Science (Honors), 2013.
- CS 397: Honors Seminar, 2013, 2015.
- CS 591: Research Seminar for Graduate students, 2014, 2015.
- Corporate Partners Program, 2012.
- CSWN events with women students and faculty, since 2012.
- Accompanied CS graduate women to Grace Hopper conference, 2013.

Professional

Program Committee Member:
- ACM Symposium on Theory of Computing (STOC) 2023, 2015.
- Innovations in Theoretical Computer Science (ITCS) 2022, 2020
- Conference on Neural Information Processing Systems (NeurIPS) 2022, 2021, 2019.
- 23rd International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC) 2022, 2021
- CRA Undergraduate Research Award Committee 2018-2020.
- International Workshop on Randomization and Computation (RANDOM) 2021, 2016.
- IEEE Symposium on Foundations of Computer Science (FOCS) 2020
- International Conference on Machine Learning (ICML) 2019.
- ACM-SIAM Symposium on Discrete Algorithms (SODA), 2014.
- IEEE Conference on Computational Complexity (CCC), 2014.

Proposal reviewing: NSF 2020, 2018, 2015, 2014, 2013.

Organizer of Romanian Algorithms Days (1st edition) June 7-8 2021.

Organizer of 4th and 5th TCS Women Meeting at STOC, June 2022, 2021.

Organizer of the Midwest Theory Days, Purdue University, April 26-27 2019.

Organizer of the Midwest Theory Day, Purdue University, May 3rd 2014.

Other: CIFellows 2021 Kickoff Event, lead of a break-out room discussion with fellows

Journal Editor:
- Information Processing Letters, 2019-2021, editorial board member; 2022-present, associate editor.
- SICOMP Special Issue of FOCS 2020 (chair)
- SICOMP editorial board member (starting Jan 2023)

Honors and Awards

Graduate Student Mentoring Award, awarded by the Purdue CS Department, 2015
Computing Innovation Fellowship, awarded by CRA/NSF/CCC, 2010-2012
Akamai Presidential Fellowship, awarded by MIT, 2004-2005
Honorable Mention for the Alice T. Schafer Prize, awarded by the AWM, 2004
IBM/APS Research Internship Award, awarded by the APS, 2003
Sara Gelbart Prize in Mathematics, awarded by Bard College, 2003
Awards in Romanian National Mathematics Olympiads, 1994-2000