

# Elena Grigorescu

---

## Education

- 2006–2010 **Ph.D.**, *Massachusetts Institute of Technology*, Cambridge, MA.  
2004–2006 **M.S.**, *Massachusetts Institute of Technology*, Cambridge, MA.  
2000–2004 **B.A.**, *Bard College*, Annandale, NY.

## Ph.D. Thesis

Title: *Symmetries in Algebraic Property Testing*  
Advisor: Madhu Sudan

## Professional positions

- 2012–present **Assistant Professor**, *Purdue University*, West Lafayette, IN.  
2010–2012 **Postdoctoral Fellow**, *Georgia Tech*, Atlanta, GA.  
Hosts: Chris Peikert and Santosh Vempala

## Research Interests

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

## 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

## Professional experience

- Jul-Aug, 2008 **Centrum Wiskunde & Informatica (CWI)**, *Amsterdam*, Netherlands.  
Visitor; host: Ronald de Wolf  
Jun-Aug, 2003 **IBM Almaden**, *San Jose*, CA.  
Intern

Jun-Aug, **University of Minnesota, Duluth, MN.**  
2001, 2002 REU participant; mentor: Joseph Gallian

## Teaching experience

### *Purdue University*

Algorithm Design and Analysis (CS 580); Fall 2017 (graduate, 70 students)  
Theory of Computation/Complexity Theory (CS 584 ); Springs 2017 (graduate, 29 students)  
Algorithm Design and Analysis (CS 580); Fall 2016 (graduate, 76 students)  
Intro to the Theory of Computation (CS 483); Spring 2016 (undergraduate, 12 students)  
Algorithm Design and Analysis (CS 580); Fall 2015 (graduate, 74 students)  
Sublinear Algorithms (CS 590); Spring 2015 (graduate, 15 students)  
Intro to the Analysis of Algorithms (CS 381); Fall 2014 (undergraduate, 93 students)  
Theory of Computation/Complexity Theory (CS 584 ); Spring 2014 (graduate, 10 students)  
Algorithm Design and Analysis (CS 580); Fall 2013 (graduate, 51 students)  
Theory of Computation/Complexity Theory (CS 584 ); Springs 2013 (graduate, 10 students)  
Current Topics in Theoretical Computer Science (CS 590); Fall 2012 (graduate, 15 students)

Research Seminar for First Year Students (CS 591) Guest lecturer Fall 2014, Fall 2015.  
Honors Freshman Seminar (CS 197). Guest lecturer, Spring 2013  
Honors Seminar (CS 397). Guest lecturer, Fall 2013, Fall 2015

### *Georgia Tech*

Discrete Fourier Analysis and Applications. Co-Instructor, Spring 2012 (graduate)  
Introduction to Information Theory. Guest lecturer, Spring 2012 (undergraduate)  
Computational Complexity. Guest lecturer, Fall 2011 (graduate).

## Publications

### Journal papers - accepted

- Testing k-Monotonicity (The Rise and Fall of Boolean Functions.) C. Cannone, E. Grigorescu, S. Guo, A. Kumar, K. Wimmer. *Theory of Computing*, 2017.

### Journal papers - published

- 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): 8:1-8:37 (2017).
- List Decoding Barnes-Wall Lattices. E. Grigorescu, C. Peikert. *Computational Complexity*, 26(2): 365-392 (2017).
- Deciding Orthogonality in Construction-A Lattices. K. Chandrasekaran, V. Gandikota, E. Grigorescu. *SIAM J. Discrete Math.*, 1244-1262 (2017).
- A Unified Framework for Testing Linea-Invariant Properties. A. Bhattacharyya, E. Grigorescu, A. Shapira. *Random Structures and Algorithms* 46(2): 232-260 (2015)
- 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)
- 2-Transitivity is Insufficient for Local Testability E. Grigorescu, T. Kaufman, M. Sudan. *Journal of Computational Complexity* 22(1): 137-158 (2013).
  - Error-Correcting Data Structures. V. Chen, E. Grigorescu, R. de Wolf. *SIAM Journal on Computing* 42(1): 84-111 (2013).
  - A Lower-Variance Randomized Algorithm for Approximate String Matching. M. J. Atallah, E. Grigorescu, Y. Wu. *Information Processing Letters*, 113(18): 690-692 (2013).
  - Succinct Representation of Codes with Applications to Testing. E. Grigorescu, T. Kaufman, M. Sudan. *SIAM Journal on Discrete Mathematics* 26(4): 1618-1634 (2012).
  - Transitive-Closure Spanners. A. Bhattacharyya, E. Grigorescu, K. Jung, S. Raskhodnikova, D. Woodruff. *SIAM Journal on Computing* 41(6): 1380-1425 (2012)
  - 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)
  - Testing Odd-Cycle Freeness in Boolean Functions. A. Bhattacharyya, E. Grigorescu, P. Raghavendra, A. Shapira. *Combinatorics, Probability and Computing* 21(6): 835-855, 2012
  - Explicit-Low Weight Bases for BCH Codes. E. Grigorescu, T. Kaufman. *IEEE Transactions of Information Theory* 58(1): 78-81, 2012.
  - A Local Decision Test for Sparse Polynomials. E. Grigorescu, K. Jung, R. Rubinfeld. *Information Processing Letters* 110(20): 898-901, 2010.
  - The Insulation Sequence of a Graph. E. Grigorescu. *Discrete Applied Mathematics* 134(1-3): 77-90, 2004.
  - Decreasing the Diameter of Cycles, E. Grigorescu. *Journal of Graph Theory* 43(4): 299-303, 2003.
- Journal papers - submitted
- Streaming Weighted Matchings: Optimal Meets Greedy. E. Grigorescu, M. Monemizadeh, S. Zhou. <http://arxiv.org/abs/1608.01487>.
  - Structural Results on Matching Estimation with Applications to Streaming. M. Bury, E. Grigorescu, A. McGregor, M. Monemizadeh, C. Schwiegelshohn, S. Vorotnikova, S. Zhou (superceeding manuscript <http://arxiv.org/abs/1604.07467>)
  - NP-Hardness of Reed-Solomon Decoding, and the Prouhet-Tarry-Escott Problem. V. Gandikota, B. Ghazi, E. Grigorescu.
  - AC<sup>0</sup>-MOD<sub>2</sub> Lower Bounds for the Boolean Inner Product Function. M. Cheraghchi, E. Grigorescu,

B. Juba, K. Wimmer, N. Xie.

- Local Testing of Lattices. K. Chandrasekaran, M. Cherachghi, V. Gandikota, E. Grigorescu.  
*Papers in refereed conferences*
- Communication-Efficient Distributed Learning of Discrete Distributions Ilias Diakonikolas, Elena Grigorescu, Jerry Li, Abhiram Natarajan, Krzysztof Onak, Ludwig Schmidt. *Proceedings of NIPS, 2017, Oral presentation (to appear)*.
- Maximally Recoverable Codes: the Bounded Case. Venkata Gandikota, Elena Grigorescu, Clayton Thomas, Minshen Zhu. *Proceedings of Allerton Conference on Communication, Control, and Computing, 2017. (to appear)*
- Longest Alignment with Edits in Data Streams. Elena Grigorescu, Erfan Sadeqi Azer, Samson Zhou. *Proceedings of Allerton Conference on Communication, Control, and Computing, 2017 (to appear)*
- Streaming Periodicity with Mismatches Funda Ergun, Elena Grigorescu, Erfan Sadeqi Azer, Samson Zhou. *Proceedings of RANDOM 2017 (to appear)*
- Testing k-Monotonicity (The Rise and Fall of Boolean Functions.) C. Cannone, E. Grigorescu, S. Guo, A. Kumar, K. Wimmer. *Proceedings of Innovations in Theoretical Computer Science (ITCS), 2017. (to appear)*
- Local Testing of Lattices. K. Chandrasekaran, M. Cherachghi, V. Gandikota, E. Grigorescu. *Proceedings of FSTTCS, 2016*
- Nearly Optimal Sparse Group Testing V. Gandikota, E. Grigorescu, S. Jaggi, S. Zhou. *Proceedings of the Allerton Conference on Communication, Control and Computing, 2016*.
- 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*.
- AC<sub>0</sub>-MOD<sub>2</sub> 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), 2016*.
- Deciding Orthogonality in Construction-A Lattices. K. Chandrasekaran, V. Gandikota, E. Grigorescu. *Foundations of Software Technology and Theoretical Computer Science (FSTTCS) 2015*.
- On the NP-hardness of Bounded Distance Decoding of Reed-Solomon Codes. V. Gandikota, B. Ghazi, E. Grigorescu. *IEEE International Symposium on Information Theory (ISIT) 2015*.
- Tight Lower Bounds for Testing Linear Isomorphism. E. Grigorescu, K. Wimmer, N. Xie. *Proceeding of the International Workshop on Randomization and Computation (RANDOM) 2013*.

- 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.
- List Decoding Barnes-Wall Lattices. E. Grigorescu, C. Peikert. *Proceedings of the Conference on Computational Complexity (CCC)*, 2012.
- 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.
- 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.
- 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 (ALT)*, 2011.
- 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.
- 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.
- 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.
- 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.
- 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.
- Transitive-Closure Spanners. A. Bhattacharyya, E. Grigorescu, K. Jung, S. Raskhodnikova, D. Woodruff. *Proceedings of the ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2009.
- 2-Transitivity is Insufficient for Local Testability. E. Grigorescu, T. Kaufman, M. Sudan. *Proceedings of the Conference on Computational Complexity (CCC)*, 2008.
- 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.
- Local Decoding and Testing for Homomorphisms. E. Grigorescu, S. Kopparty, M. Sudan. *Pro-*

ceedings of the International Workshop on Randomization and Computation (RANDOM), 2006.

### Manuscripts

- Nearly Optimal  $\ell_2$ -Heavy Hitters in the Sliding Window Model. Vladimir Braverman, Elena Grigorescu, Harry Lang, Samson Zhou. Submitted 2017.
- Streaming for Aibohphobes: Longest Near-Palindrome under Hamming Distance. Elena Grigorescu, Erfan Sadeqi Azer, Samson Zhou. Submitted 2016.
- 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.

### Conference and invited talks

*Complexity of Computation on Algebraic Data*

- Indiana University; Bloomington, IN; Dec 2016

*Testing  $k$ -Monotonicity: The Rise and Fall of Boolean Functions*

- UIUC; Urbana; IL; Dec 2016
- Workshop on Local Algorithms; Cambridge, MA; Oct 2016.
- Yale University; New Haven, CT; Oct 2016.
- Stony Brook University; NYC, NY; Oct 2016.

*AC0-MOD2 Lower Bounds for the Boolean Inner Product Function*

- International Colloquium on Automata, Languages, and Programming (ICALP); Rome, Italy; Jul 2016.

*NP-Hardness of Reed-Solomon Decoding and the Prouhet-Tarry-Escott Problem*

- IBM Watson, Yorktown, NY; Jun., 2016
- ICERM Workshop on Algebraic Coding Theory; Brown University, RI, Jun. 2016.

*Local Testing of Lattices*

- Georgetown University, Washington, DC; Oct. 2015.

*Tight Lower Bounds for Testing Linear Isomorphism*

- Bertinoro Workshop on Sublinear Algorithms, Bertinoro, Italy; May 2014.

*Lower Bounds for Statistical Algorithms*

- Allerton Conference on Communication, Control, and Computing, UIUC, IL; Oct 2014
- University of Chicago, IL; May 2013
- International University, Miami, FL; Feb 2013

*Spanners, Local Reconstructors and Local Testers.*

MIT, Cambridge, MA; May 2013

*List Decoding Barnes-Wall Lattices*

- SIAM Annual Meetings, Minneapolis, MN; Jul 2012
- Conference on Computational Complexity (CCC), Porto, Portugal; Jun 2012

*Testing Symmetric Properties of Massive Data*

- University of Minnesota, Minneapolis, MN; Mar 2012
- University of Connecticut, Storrs, CT; Mar 2012
- Purdue University, West Lafayette, IN; Mar 2012

*Testing Odd-Cycle Freeness in Boolean Functions*

- University of Delaware, Newark, DE; Nov 2013
- Symposium on Discrete Algorithms (SODA), Kyoto, Japan; Jan 2012
- TTI, Chicago, IL; Jul 2011
- UIUC, Urbana-Champaign, IL; Jul 2011
- MIT, Cambridge, MA; Apr 2011
- Georgia Tech, Atlanta, GA; Apr 2011

*On Sums of Locally Testable Affine-Invariant Properties*

- Joint Mathematics Meetings, Boston, MA; Jan 2012
- RANDOM, Princeton, NJ; Aug 2011

*Transitive-Closure Spanners and Applications.*

- Georgia Tech, Atlanta, GA; Mar 2011
- Boston University, Boston, MA; Feb 2011
- INFORMS, San Diego, CA; Oct 2009

*Succinct Representation of Codes with Applications to Testing.*

- SIAM Discrete Math Conference, Austin, Texas; Jun 2010
- EPFL, Lausanne, Switzerland; Jan 2010
- RANDOM, San Francisco, CA; Aug 2009
- MIT, Cambridge, MA; Mar 2009
- DIMACS Workshop in Property Testing, Rutgers University, NJ; Apr 2009

*Symmetries in Algebraic Property Testing*

- Dartmouth College, Hanover, NH; Apr 2010
- Northeastern University, Boston, MA; Apr 2010
- Georgia Tech, Atlanta, GA; Feb 2010

*2-Transitivity is Insufficient for Local Testability*

- CWI, Amsterdam, the Netherlands; Aug 2008
- Conference on Computational Complexity (CCC), College Park, MA; Jun 2008

*Local Decoding and Testing for Homomorphisms*

- RANDOM, Barcelona, Spain; Aug 2006

---

## Students

Venkata Surya Srik Gandikota (Sep 2012-May, 2017). (graduated)

Akash Kumar (Aug 2013-present), co-advised with S. Basu.

Young-San Lin (Aug 2014-present), co-advised with T. Nguyen.

Abhiram Natarajan (Aug 2014-present), co-advised with S. Basu.

Samson Zhou (Aug 2015-present), co-advised with G. Frederickson. Expected graduation: 2018.

Minshen Zhu (Jan 2017-present), Masters.  
Clayton Thomas (Jan 2017-present), Undergraduate.

## Funding

NSF EAGER: Complexity of Computation on Codes and Lattices, 2016-2018.  
Purdue Research Foundation grants 2015-2017.

## Professional Service

- Program Committee Member:
  - Computer Science Symposium in Russia (CSR), 2017.
  - International Workshop on Randomization and Computation (RANDOM), 2016.
  - ACM Symposium on Theory of Computing (STOC), 2015.
  - ACM-SIAM Symposium on Discrete Algorithms (SODA), 2014.
  - IEEE Conference on Computational Complexity (CCC), 2014.
- Panelist: NSF CISE Algorithmic Foundations: 2015, 2014, 2013.
- Organizer of the CS Theory/Math Seminar, Purdue University 2012-present.
- Organizer of the Midwest Theory Day, Purdue University, May 3rd 2014.
- Reviewer or external reviewer for:
  - Algorithmica (ALGO), ACM-SIAM Symposium on Discrete Algorithms (SODA) ACM Symposium on Theory of Computing (STOC), ACM Transactions on Algorithms (TALG), ACM Transactions of Computation Theory (TOCT), Conference on Learning Theory (COLT), Discrete Applied Mathematics (DAM), IEEE Computational Complexity Conference (CCC), IEEE Symposium on Foundations of Computer Science (FOCS), IEEE Transactions on Information Theory, Information and Computation, International Colloquium on Automata, Languages and Programming (ICALP), International Workshop on Randomization and Computation (RANDOM). Journal of Computer Science and Technology, Symposium on Theoretical Aspects of Computer Science (STACS) Scandinavian Symposium and Workshops on Algorithm Theory (SWAT), Theory of Computing.