Ali Shokoufandeh

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Education

Ph.D. in Computer Science, Rutgers University, 1999,
- Thesis Topic: *Graph Theoretical Methods in Object Recognition and Related Problems in Extremal Graph Theory*
- Advisors: Endre Szemerédi and Sven Dickinson

Diploma Certificate in Cognitive Science, Rutgers University, 1999.
M.S. in Computer Science, Rutgers University, 1996.
B.Sc. in Computer Science, University of Tehran, 1989.

Administrative Appointments

Interim Dean, College of Computing and Informatics, Drexel University, 2025 to present.
Senior Associate Dean for Academic Affairs and Operations, College of Computing and Informatics, Drexel University, 2020 to 2025.
Senior Associate Dean for Research and Operations, College of Computing and Informatics, Drexel University, 2016 to 2020.
Associate Dean for Research, College of Computing and Informatics, Drexel University, 2015 to 2016.
Associate Department Head for Graduate Studies, Department of Computer Science, College of Computing and Informatics, Drexel University, 2009 to 2014.

Academic Appointments

Professor, Department of Computer Science, Drexel University, 2010 to present.
Associate Professor, Department of Computer Science, Drexel University, 2005 to 2010.
Assistant Professor, Department of Computer Science, Drexel University, 1999 to 2005.

Leadership Training

Certificate, "Organizational Change and Uncertainty: A leadership Program for Higher Education". Harvard Graduate School of Education. June 2021.
Certificate, "Aligning Strategic Priorities with Financial Resources in Higher Education". Harvard Graduate School of Education. July 2021.

Fellowships

Fellow, European Centre for Living Technology, Site: University of Venice, 2017-present.

Visiting Positions

Visiting Research Assistant Professor, The Wistar Institute, 2003 to 2005.
Visiting Assistant Professor, Department of Computer and Information Science,University of Pennsylvania , 1999 to 2002.

Refereed Journal Publications

1. D. Schwartz, D.V. Poerio, M.C. Grady, A. Calabria, A. Shokoufandeh, and M. Soroush. "Artificial intelligence for paints/coatings manufacturing", Artificial Intelligence in Manufacturing, 1-28. (2024).

2. D. Schwartz, T. Nguyen, Z. Chen, Z., K.k. Lau, M.C. Grady, A. Shokoufandeh, and M. Soroush. " Data-driven prediction and optimization of liquid wettability of an initiated chemical vapor deposition-produced fluoropolymer". AIChE Journal, 68(6), p.e17674 (2022).

3. S.Haag, D. Schwartz, B. Shakibajahromi, M. Campagna, A. Shokoufandeh. "A fast algorithm to delineate watershed boundaries for simple geometries". Environ. Model. Softw. 134: 104842 (2020).

4. S. Haag, D. Tarboton, M. Smith, and A. Shokoufandeh. "Fast summarizing algorithm for polygonal statistics over a regular grid". Computers & Geosciences. 142:104524 (2020).

5. T. Shortell and A. Shokoufandeh. " Secure signal processing using fully homomorphic encryption". *IET Information Security*, 14(1): 51-59 (2020).

6. S. Haag and A. Shokoufandeh. "Development of a data model to facilitate rapid Watershed Delineation". *Environmental Modelling and Software*, 122 (2019).

7. S. Haag, B. Shakibajahromi, and A. Shokoufandeh. "A new rapid watershed delineation algorithm for 2D flow direction grids". *Environmental Modelling and Software*, 109: 420–428 (2018).

8. S. Ontañón and A. Shokoufandeh. "Refinement operators for directed labeled graphs with applications to instance-based learning". *Knowl.-Based Syst.* 161: 425–441 (2018).

9. A.T. Murray, X. Feng, and A. Shokoufandeh. "Heterogeneous Skeleton for Summarizing Continuously Distributed Demand in a Region". *GIScience*, 12:1–11 (2018).

10. Y. Osmanlioglu and A. Shokoufandeh. "Multilayer Matching of Metric Structures Using Hierarchically Well-separated Trees". *Pattern Recognition Letters*, 87: 63-70 (2017).

11. G.W. Schwartz, A. Shokoufandeh, S. Ontanon, and U. Hershberg. "Using a novel clumpiness measure to unite data with metadata: finding common sequence patterns in immune receptor germline V genes". *Pattern Recognition Letters*, 74: 24-29 (2016).

12. B. Csaba, T. Plick, and A. Shokoufandeh. "Optimal random matchings, tours, and spanning trees in hierarchically separated trees". *Theor. Comput. Sci.*, 500: 68-89 (2013).

13. A. Shokoufandeh, Y. Keselman, M.F. Demirci, D. Macrini, and S. Dickinson. "Many-to-many feature matching in object recognition: a review of three approaches". *IET Computer Vision*, 6(6): 500–513 (2012).

14. T. Plick, B. Csaba, and A. Shokoufandeh. "A note on the Caro-Tuza bound on the independence number of uniform hyper-graphs". *Australia. J. Combinatorics*, 52:235–242 (2012).

15. M. Fatih Demirci, Y. Osmanlioglu, A. Shokoufandeh, and Sven J. Dickinson. "Efficient many-to-many feature matching under the ℓ_1 norm". *Computer Vision and Image Understanding*, 115(7): 976–983 (2011).

16. J. Abrahamson and A. Shokoufandeh. "Euclidean TSP on Two Polygons". *Theoretical Computer Science.* 411 (7-9):1104–1114 (2010).

17. F. Demirci, A. Shokoufandeh, and S. Dickinson. "Skeletal Shape Abstraction from Examples". *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI).* 31(5): 944–952 (2009).

18. F. Demirci, B. Platel, A. Shokoufandeh, L. Florack, and S. Dickinson. "The Representation and Matching of Images using Top Points". *Journal of Mathematical Imaging and Vision (JMIV).* 35(2): 103–116 (2009).

19. T. Denton, A. Shokoufandeh, J. Novatnack, and K. Nishino. "Canonical subsets of image features". *Computer Vision and Image Understanding*. 112(1): 55–66 (2008).

20. J. Novatnack, N. Cornea, A. Shokoufandeh, D. Silver, S. Dickinson, P. Kantor, and B. Bai. "A Generalized Family of Fixed-Radius Distribution-Based Distance Measures for Content– Based fMRI Image Retrieval". *Pattern Recognition Letters*, 29(12): 1726– 1732 (2008).

21. K. Siddiqi, J. Zhang, D. Macrini, A. Shokoufandeh, S. Bouix, R. Chen, and S. Dickinson. "Retrieving Articulated 3-D Models Using medial Surfaces". *Machine Vision and Applications (MVA)*. 19(4): 261–275 (2008).

22. C. Gomez, A. Shokoufandeh, and W. Sun. "Unit-Cell Based Design and Modeling in Tissue Engineering Applications". *Computer-Aided Design & Applications*, 4(5): 649–659 (2007).

23. D. Bespalov, W. C. Regli, and A. Shokoufandeh. "Local feature extraction and matching partial objects". *Computer-Aided Design*, 38(9): 1020–1037 (2006).

24. M. F. Demirci, A. Shokoufandeh, Y. Keselman, L. Bretzner, and S. Dickinson. "Object Recognition as Many-to-Many Feature Matching". *International Journal of Computer Vision*, 69(2): 203–222 (2006).

25. A. Shokoufandeh, L. Bretzner, D. Macrini, M. F. Demirci, C. Jonsson, and S. Dickinson. "The representation and matching of categorical shape". *Computer Vision and Image Understanding*, 103(2): 139–154 (2006).

26. P. Sala, R. Sim, A. Shokoufandeh, and S. J. Dickinson. "Landmark Selection for Vision-Based Navigation". *IEEE Transactions on Robotics*, 22(2): 334–348 (2006).

27. Z. Fang, C. Yan, W. Sun, A. Shokoufandeh, and W. Regli. "Homogenization of Heterogeneous Tissue Scaffold: A comparison of mechanics, asymptotic homogenization, and finite element approaches". *Journal of Applied Bionics and Biomechanics*, 2(1) 17–29 (2005).

28. B. Starly, Z. Fang, A. Shokouafndeh, W. Sun, andW. Regli. "Three-Dimensional Reconstruction for Medical-CAD Modeling". *Journal of Computer-Aided Design and Application*, 2(1-4), 431–438 (2005).

29. J. Abrahamson, A. Shokoufandeh, and P. Winter. "Euclidean TSP Between Two Nested Convex Obstacles". *Information Processing Letters*, 95(2) 370–375: 2005.

30. C. Schroeder, W. C. Regli, A. Shokoufandeh and W. Sun. "Computer-Aided Design of Porous Artifacts". *Computer-Aided Design*, 37(3): 339–353 (2005).

31. A. Shokoufandeh, S. Mancoridis, M. Maycock, and L. Denton. "Spectral and Meta-heuristic Algorithms for Software Clustering". *The Journal of Systems and Software*, 77(3): 213–223 (2005).

32. A. Shokoufandeh, D. Macrini, S. Dickinson, K. Siddiqi, and S. Zucker. "Indexing of Hierarchical View Structures using Graph Spectra". *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 27(7): 1125–1140 (2005).

33. A. Shokoufandeh and Y. Zhao. "On a Tiling Conjecture of Komlós for 3-Chromatic Graphs". *Discrete Mathematics*, 277(1-3): 171–191 (2004).

34. D. Bespalov, A. Shokoufandeh, W. C. Regli, and W. Sun. "Scale-Space Representation and Classification of 3D Models". *Trans. of ASME: Journal of Computing and Information Science in Engineering*, 3(4): 315–324 (2003).

35. A. Shokoufandeh and Y. Zhao. "Proof of a Tiling Conjecture of Komlós". *Random Structures and Algorithms*, 23(2): 180–205 (2003).

36. B. Csaba, A. Shokoufandeh, and E. Szemerédi, "Proof of a Conjecture of Bollobás and Eldridge for Graphs of Maximum Degree Three". *Combinatorica*, 23(1): 35–72 (2003).

37. W. M. Y. Goh, P. Hitczenko, and A. Shokoufandeh. "s-partitions". *Information Processing Letters*, 82(6): 327–329 (2002).

38. D. McWherter, M. Peabody, A. Shokoufandeh, and W. Regli. "Solid Model Databases: Techniques and Empirical Results". *Trans. of ASME J. Computing and Information Science in Engineering*, 1(4): 300–310 (2001).

39. J. L. Popyack, A. Shokoufandeh, and P. Zoski. "Software design and implementation in the introductory CS course: JavaScript and virtual pests". *Journal of Computing in Small Colleges*, 15(5): 166–177 (2000).

40. K. Siddiqi, A. Shokoufandeh, S. Dickinson, and S. Zucker. "Shock Graphs and Shape Matching". *International Journal of Computer Vision*, 35(1): 13–32 (1999).

41. A. Shokoufandeh, I. Marsic, and S. Dickinson. "View-Based Object Recognition Using Saliency Maps". *Image and Vision Computing*, 17(5–6), 445–460 (1999).

42. B. Kalantari, L. Khachiyan, and A. Shokoufandeh. "On the Complexity of Matrix Balancing". *SIAM Journal on Matrix Analysis and Applications*, 18: 450–463 (1997).

43. S. Ajoodani-Namini, G. B. Khosrovshahi, and A. Shokoufandeh. "Intersection of Triple Systems: Small Orders". *Journal of Combinatorial Mathematics and Combinatorial Computing*, 20: 33–52 (1996).

Archival Conference Publications

1. J. Parlett, A. Jeyapratap, A. Shokoufandeh B. Tunc, and Y. Osmanlioglu. "Subnet Communicability: Diffusive Communication Across the Brain Through a Backbone Subnetwork". MICCAI 2023 Workshop on Computational Diffusion MRI. October 8, 2023.

2. D Schwartz, T Nguyen, Z Chen, K Lau, MC Grady, A Shokoufandeh, and M. Soroush. "Machine Learning-Based Prediction and Optimization of Liquid Wettability of an iCVD-Produced Fluoropolymer". 2023 AIChE Annual Meeting. November 7, 2023.

3. D. Schwartz, D. Poerio, M.C. Grady, A. Calabria, A. Shokoufandeh, M. Soroush. "AI-Guided Manufacturing of Paints/Coatings". 2023 AIChE Annual Meeting. November 8, 2023.

4. D. McDonald, S. Mahajan, R. Vallett, G. Dion, A. Shokoufandeh, E. Solovey. "Interaction with Touch-Sensitive Knitted Fabrics: User Perceptions and Everyday Use Experiments". CHI 2022: 426:1-426:20.

5. M. Campagna, S. Haag, B. Evans, L. Perez, and A. Shokoufandeh. "Regional Watershed Management to Achieve Nutrient Reduction Estimates Based on Localized Drainage and Land Use Information". AGU Fall Meeting Abstracts 2021, H23H-08.

6. B. Shakibajahromi, S. Shayestehmanesh, D. Schwartz, and A. Shokoufandeh. "Hynet: 3d segmentation using hybrid graph networks". to appear in 2021 International Conference on 3D Vision (3DV). IEEE, 12 2021.

7. D. Qori McDonald, R. Vallett, E. Solovey, G. Dion, A. Shokoufandeh. "Knitted Sensors: Designs and Novel Approaches for Real-Time, Real-World Sensing". Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 4(4): 145:1-145:25 (2020).

8. R. Vallett, D. Qori McDonald, G. Dion, Y. Kim, and A. Shokoufandeh. "Toward Accurate Sensing with Knitted Fabric: Technical Considerations and Application Potential". *12^{th} ACM SIGCHI Symposium on Engineering Interactive Computing Systems, EICS*, June 23–26 (2020).

9. A.W.E. McDonald, A. Shokoufandeh. "Sparse Super-Regular Networks". *18th IEEE International Conference on Machine Learning and Applications, ICMLA*, (2019).

10. Y. Osmanlioglu, B.Tunç, J. A. Alappatt, D. Parker, J. Kim, Ali Shokoufandeh, and R. Verma. "A Graph Representation and Similarity Measure for Brain Networks with Nodal Features". *GRAIL/Beyond-MIC MICCAI*, 14–23 (2018).

11. T. Shortell and A. Shokoufandeh. "Secure Fast Fourier Transform using Fully Homomorphic Encryption". *FTC 2017*, 29-30 November 2017, Vancouver, Canada.

12. Y. Osmanlioglu, B. Shakibajahromi, and Ali Shokoufandeh."Autonomous Multi-camera Tracking Using Distributed Quadratic Optimization". *EMMCVPR*, 175–188 (2017).

13. S. Ontanon and A. Shokoufandeh. "Refinement-based Similarity Measures for Directed Labeled Graphs". *ICCBR 2016*, 311-326.

14. Y. Osmanlioglu, S. Ontanon, U. Hershberg, and A. Shokoufandeh."Efficient Approximation of Labeling Problems with Applications to Immune Repertoire Analysis". *ICPR* 2410–2415 (2016).

15. Y. Osmanlioglu, A. Shokoufandeh. "On Automatic Question Answering Using Efficient Primal-Dual Models". *MPRSS*, 73–84 (2016).

16. A. R. Rajanna, K. Aryafar, A. Shokoufandeh, and R. Ptucha. "Deep Neural Networks: A Case Study for Music Genre Classification". *ICMLA*, 655-660 (2015).

17. J. Wildman, Y. Osmanlioglu, S. Weber, and A. Shokoufandeh. "A primal-dual approach to delay minimizing user association in cellular networks". *Proc. 52nd Annu. Allerton Conf. Commun., Control, and Computing (Allerton)*, (2015).

18. T. Shortell and A. Shokoufandeh. "Secure Signal Processing using Fully Homomorphic Encryption". *Advanced Concepts for Intelligent Vision Systems, ACIVS*, 93–104 (2015).

19. Y. Osmanloglu, S. Dickinson, and A. Shokoufandeh. "Unsupervised Motion Segmentation Using Metric Embedding of Features". *Proceedings, 3rd International Workshop on Similarity-Based Pattern Analysis and Recognition (SIMBAD)*: 133–145 (2015).

20. Y. Osmanlioglu and A. Shokoufandeh. "Multi-layer Tree Matching Using HSTs". *GbRPR 2015*, 198–207 (2015).

21. J. Wildman, Y. Osmanlioglu, S. Weber, and A. Shokoufandeh. "Delay minimizing user association in cellular networks via hierarchically well-separated trees". *ICC*, 4005–4011 (2015).

22. Y. Alkhorshid, K. Aryafar, G. Wanielik, and A. Shokoufandeh. "Camera-Based Lane Marking Detection for ADAS and Autonomous Driving". *ICIAR 2015*: 514–519 (2015).

23. T. Shortell and A. Shokoufandeh. "Secure brightness/contrast filter using fully homomorphic encryption". *IPSN 2015*: 346–347 (2015).

24. K. Aryafar and A. Shokoufandeh. "Multimodal Sparsity-Eager Support Vector Machines for Music Classification". *ICMLA 2014*: 405–408 (2014).

25. K. Aryafar and A. Shokoufandeh. "Multimodal Music and Lyrics Fusion Classifier for Artist Identification". *ICMLA 2014*, 506–509 (2014).

26. K. Aryafar and A. Shokoufandeh. "Fusion of Text and Audio Semantic Representations Through CCA". *MPRSS 2014*: 66–73 (2014).

27. D. Bespalov, Y. Qi, B. Bai, and A. Shokoufandeh. "Large-scale image classification using supervised spatial encoder". *ICPR 2012*: 581–584 (2012).

28. K. Aryafar, S. Jafarpour, and A. Shokoufandeh. "Automatic musical genre classification using sparsity-eager support vector machines", *ICPR 2012*: 1526–1529 (2012).

29. D. Bespalov, Y. Qi, B. Bai, and A. Shokoufandeh. "Sentiment Classification with Supervised Sequence Embedding". *ECML/PKDD (1) 2012*: 159–174 (2012).

30. D. Bespalov, B. Bai, Y. Qi, and A. Shokoufandeh. 'Sentiment classification based on supervised latent n-gram analysis". Proceedings of the 20th ACM Conference on Information and Knowledge Management, *CIKM 2011*, Glasgow, United Kingdom, October 24-28, 2011, 375–382 (2011).

31. K. Aryafar, A. Shokoufandeh. "Music genre classification using explicit semantic analysis". *Proceedings of the 1st international ACM workshop on Music information retrieval with user-centered and multimodal strategies,MIRUM 2011*, Scottsdale, AZ, USA, November 28 - December 01, 2011, 33–38.

32. D. Bespalov, A. Lindbjerg Dahl, B. Bai, A. Shokoufandeh. "On Inferring Image Label Information Using Rank Minimization for Supervised Concept Embedding". *Image Analysis - 17th Scandinavian Conference, SCIA 2011*, Ystad, Sweden, 103–113 (2011).

33. D. Bespalov, A. Dahl, and A. Shokoufandeh. "Geometric Total Variation for Texture Deformation". *In Proceedings of the 20th IAPR International Conference on Pattern Recognition (ICPR)*, Turkey (2010).

34. W. Mankowski, A. Shokoufandeh, and D. Salvucci. "Canonical Patterns of Oriented Topologies". *In Proceedings of the 20th IAPR International Conference on Pattern Recognition (ICPR)*, 1104–1107 (2010).

35. E. Sultanik, A. Shokoufandeh, W.C. Regli. "Dominating sets of agents in visibility graphs: distributed algorithms for art gallery problems". *9th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, Toronto, Canada, May 10-14, 797–804 (2010).

36. W. Mankowski, P. Bogunovich, A. Shokoufandeh, and D.D. Salvucci. "Finding canonical behaviors in user protocols". *Proceedings of the 27th International Conference on Human Factors in Computing System (CHI)*, Boston, MA, USA, April, 1323–1326 (2010).

37. W. Mankowski, P. Bogunovich, A. Shokoufandeh, and D.D. Salvucci. "On computing canonical subsets of graph-based behavioral representations". *In Proceedings of Seventh IAPR Workshop on Graph-based Representations in Pattern Recognition*, Venice, Italy, 215–222 (2009).

38. A. B. Dahl, P. Bogunovich, and A. Shokoufandeh. "Texture Segmentation by Contractive Decomposition and Planar Grouping". *In Proceedings of Seventh IAPR Workshop on Graphbased Representations in Pattern Recognition*, Venice, Italy, 343–352 (2009).

39. J. Abrahamson, B. Csaba, A. Shokoufandeh. "Optimal Random Matchings on Trees and Applications". *In Proceedings of 11th International Workshop Approximation, Randomization and Combinatorial Optimization (APPROX-RANDOM)*, Boston, MA, USA, 254–265 (2008).

40. J. Kothari, D. Bespalov, S. Mancoridis, and A. Shokoufandeh. "On Evaluating the Efficiency of Software Feature Development Using Algebraic Manifolds". *In Proceedings of 4th IEEE International Conference on Software Maintenance (ICSM)*, Beijing, China, 7–16 (2008).

41. B. Bai, P. Kantor, A. Shokoufandeh. "Effectiveness of the Finite Impulse Response Model in Content-based fMRI Image retrieval". *In Proceedings of 10th International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, Brisbane, Australia, 742–750 (2007).

42. J. Kothari, T. Denton, A. Shokoufandeh, and S. Mancoridis. "Reducing Program Comprehension Effort in Evolving Software by Recognizing Feature Implementation Convergence". *In Proceedings of 5th International Conference on Program Comprehension (ICPC)*, Banff, Alberta, Canada, 17–26 (2007).

43. F. Kanters, T. Denton, A. Shokoufandeh, L. Florack, B. M. ter Haar Romeny. "Combining Different Types of Scale Space Interest Points Using Canonical Sets". *In Proceedings of 1st International Conference on Scale Space and Variational Methods in Computer Vision (SSVM)*, Ischia, Italy, 374–385 (2007).

44. J. Kothari, T. Denton, A. Shokoufandeh, and S. Mancoridis. "On Computing the Canonical Features of Software Systems". *In Proceedings of the 13th Working Conference on Reverse Engineering (WCRE)*, Benevento, Italy, 93–102 (2006).

45. J. Kothari, T. Denton, A. Shokoufandeh, S. Mancoridis, and A. E. Hassan. "Studying the Evolution of Software Systems Using Change Clusters". *In Proceedings of the 14th International Conference on Program Comprehension (ICPC)*, Athens, Greece, 46–55 (2006).

46. J. Novatnack, K. Nishino, and A. Shokoufandeh. "Extracting 3D shape features in discrete scale-space". *In Proceedings of Third International Symposium on 3D Data Processing (3DPVT)*, Chapel Hill, 946–953 (2006).

47. J. Abrahamson and A. Shokoufandeh. "Lazy Robots Constrained by at Most Two Polygons". *In Proceedings IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Edmonton, Alberta, 2762–2767 (2005).

48. J. Novatnack, T. Denton, A. Shokoufandeh, and L. Bretzner. "Stable Bounded Canonical Sets and Image Matching". *In Proceedings of 5th International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR)*, St. Augustine, Florida, 316–331 (2005).

49. J. Zhang, K. Siddiqi, D. Macrini, A. Shokoufandeh, and S. Dickinson. "Retrieving Articulated 3-D Models Using Medial Surfaces and their Graph Spectra". *In Proceedings of 5th International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR)*, St. Augustine, Florida, 285–300 (2005).

50. M. Salah, T. Denton, S. Mancoridis, A. Shokoufandeh and F. Vokolos. "Scenariographer: A Tool for Reverse Engineering Class Usage Scenarios from Method Invocation Sequences". *In Proceedings of International Conference on Software Maintenance (ICSM)*, Budapest, Hungary, 155–164 (2005).

51. N. D. Cornea, M. Fatih Demirci, D. Silver, A. Shokoufandeh, S. Dickinson, and P. B. Kantor. "3D Object Retrieval using Many-to-many Matching of Curve Skeletons". *In Proceedings of International Conference on Shape Modeling and Applications (SMI)*, 368–373 (2005).

52. B. Platel , M. Fatih Demirci, A. Shokoufandeh, L.M.J. Florack, F.M.W. Kanters, and S.J. Dickinson. "Discrete Representation of Top Points via Scale-Space Tessellation". *In Proceddings of 5th International Conference on Scale-Space*, 73–84 (2005).

53. S. Dickinson, A. Shokoufandeh, Y. Keselman, M. Fatih Demirci, and D. Macrini. "Object Categorization and the Need for Many-to-Many Matching". *In Proceddings of 27th Annual meeting of the German Association for Pattern Recognition (DAGM)*,Vienna, Austria, 501–510 (2005).

54. C. Gomez, M. F. Demirci, A. Shokoufandeh, W. Sun, and W. C. Regli. "Two-Phase Structure Representation and Design: Tissue Engineered 3-D Construct Connectivity Study". *In Proceedings of Bio-Medical Engineering Society Annual Meeting* 1148–1152 (2004).

55. P. L. Sala, R. Sim, A. Shokoufandeh, and S. J. Dickinson. "Landmark Selection for Vision- Based Navigation". *In Proceedings of IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 3131–3138 (2004).

56. B. Starly, A. Darling, C. Gomez, J. Nam, W. Sun , A. Shokoufandeh, and W. Regli. "Image Based Bio-CAD Modeling and Its Applications to Biomedical and Tissue Engineering". *In Proceedings of the ACM Symposium on Solid Modeling and Applications*, 273–278 (2004).

57. T. Denton, M. Fatih Demirci, J. Abrahamson, A. Shokoufandeh, and S. Dickinson. "Selecting Canonical Views for View-Based 3-D Object Recognition". *In Proceedings 17th IAPR International Conference on Pattern Recognition (ICPR)*, 273–276 (2004).

58. T. Denton, J. Abrahamson, and A. Shokoufandeh. "Approximation of Canonical Sets and their Applications to 2D View Simplification". *In Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 550–557 (2004).

59. M. Fatih Demirci, A. Shokoufandeh, Y. Keselman, S. Dickinson, and L. Bretzner. "Many-to-Many Feature Matching Using Spherical Coding of Directed Graphs". *In Proceedings of 8th European Conference on Computer Vision (ECCV)*, 322–335 (2004).

60. M. Fatih Demirci, A. Shokoufandeh, Y. Keselman, S. Dickinson, and L. Bretzner. "Many-to-Many Matching of Scale Space Feature Hierarchies using Metric Embedding". *In Proceedings of 4th International Conference on Scale-Space theories*, 17–32 (2003).

61. A. Shokoufandeh, Y. Keselman, M. Fatih Demirci, and S. Dickinson. "Many-to-Many Graph Matching via Metric Embedding". *In Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, 850–857 (2003).

62. C. Y. Ip, W. C. Regli, L. Sieger, and A. Shokoufandeh. "Automated Learning of Model Classifications". *In Proceedings of ACM Symposium on Solid Modeling and Applications*, 322–327 (2003).

63. C. Schroeder, W. C. Regli, A. Shokoufandeh, and W. Sun. "A Methodology for Representation of Heterogeneous Artifacts for BioMedical Applications". *In Proceedings of ACM Symposium on Solid Modeling and Applications*, 254–257 (2003).

64. D. Bespalov, A. Shokoufandeh, W. C. Regli, and Wei Sun. "Scale-Space Representation of 3D Models and Topological Matching". *In Proceedings of ACM Symposium on Solid Modeling and Applications*, 208–215 (2003).

65. Z. Fang, C. Yan, W. Sun, A. Shokoufandeh, and W. Regli. "Asymptotic Homogenizationbased Process for Characterization of Tissue Scaffold". *In Proceedings of 29th Annual Northeast Bioengineering Conference of the IEEE Engineering in Medicine and Biology Society*, 227–229 (2003).

66. A. Shokoufandeh, S. Mancoridis, and M. Maycock. "On the Application of Spectral Methods to the Software Clustering". *In Proceedings ofWorking Conference on Reverse Engineering*, 3–10 (2002).

67. D. Macrini, A. Shokoufandeh, S. Dickinson, K. Siddiqi, and S. Zucker. "View-Based 3-D Object Recognition using Shock Graphs". *In Proceedings of International Conference on Pattern Recognition*, 3024–3028 (2002).

68. D. Macrini, A. Shokoufandeh, S. Dickinson, K. Siddiqi, and S. Zucker. "Spectral Methods for View-Based 3-D Object Recognition using Silhouettes". *In Proceedings of Joint IAPR InternationalWorkshop on Syntactical and Structural Pattern Recognition (SSPR/SPR)*, 1–14 (2002).

69. R. Dugan Jr., E. Glinert, and A. Shokoufandeh. "The Sisyphus Database Retrieval Performance Anti-pattern". *In Proceedings ACM-SIGSOFT of International Symposium on Software Testing and Analysis*, 10–16 (2002).

70. A. Shokoufandeh, S. J. Dickinson, C. Jönsson, L. Bretzner, and T. Lindeberg. "On the Representation and Matching of Qualitative Shape at Multiple Scales". *In Proceddings of European Conference on Computer Vision (ECCV)*, 759–775 (2002).

71. D. McWherter, M. Peabody, A. Shokoufandeh, and W. C. Regli. "Database Techniques for Archival of Solid Models". *In the Proceedings of 6th ACM/SIGGRAPH Symposium on Solid Modeling and Applications*, 78–87 (2001).

72. A. Shokoufandeh and S. Dickinson. "A Unified Framework for Indexing and Matching Hierarchical Shape Structures". *In Proceedings of 4th International Workshop on Visual Form*, 67–84 (2001).

73. A. Shokoufandeh, S. Dickinson, K. Siddiqi, and S. Zucker. "Indexing Using a Spectral Encoding of Topological Structure". *In Proceddings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 491–497 (1999).

74. A. Shokoufandeh, I. Marsic, and S. Dickinson. "View-Based Object Matching". *In Proceedings of IEEE International Conference on Computer Vision (ICCV)*, 588–595 (1998).

75. K. Siddiqi, A. Shokoufandeh, S. Dickinson, and S. Zucker. "Shock Graphs and Shape Matching". *In Proceedings of IEEE International Conference on Computer Vision (ICCV)*, 222–229 (1998).

Book Chapters

1. M. Campagna, S. Haag, B.M. Evans, A. Shokoufandeh. "Stormwater Best Management Practice (BMP) Opportunity Mapping in Lancaster, PA". AGU, Fall Meeting 2022.
2. J. Pennington, R. Hartman, A. Davison, A. Shokoufandeh, J. Payton, D. Chen, A. Dietrich. "Online education for data science: Opportunities and challenges". AMIA 2022.
3. M. Fatih Demirci, Ali Shokoufandeh, and Sven J. Dickinson. "Many-to-Many Graph Matching". *Computer Vision, A Reference Guide*, 472–477 (2014).
4. Sven J. Dickinson, Ali Shokoufandeh, and Kaleem Siddiqi. "Shock Graph". *Computer Vision, A Reference Guide*, 729–737 (2014).
5. K. Siddiqi, J. Zhang, D. Macrini, S. Dickinson, and A. Shokoufandeh. "3-D Model Retrieval Using Medial Surfaces". *Medial Representations: Mathematics, Algorithms and Applications*. K. Siddiqi and S. Pizer (eds.), Kluwer, Boston, 309–326 (2008).
6. A. Shokoufandeh, Y. Keselman, M.F. Demirci, D. Macrini, and S. Dickinson. "Many-to- Many Feature Matching in Object Recognition". *Cognitive Vision Systems: Sampling the Spectrum of Approaches*. H. Christensen and H.-H. Nagel (eds.), Springer Lecture Notes in Computer Science, 107–125 (2006).
7. A. Shokoufandeh and S. J. Dickinson. "Graph-Theoretical Methods in Computer Vision". *Theoretical Aspects of Computer Science*. Lecture Notes in Computer Science 2292, Springe, ISBN 3-540-43328-7, 148–174 (2002).
8. J. Komlós, A. Shokoufandeh, M. Simonovits, and E. Szemerédi. "The Regularity Lemma and Its Applications in Graph Theory". *Theoretical Aspects of Computer Science*. Lecture Notes in Computer Science 2292, Springe, ISBN 3-540-43328-7, 84–112 (2002).

Contracts and Grants

- Advanced Functional Fabrics of America (AFFOA)/US Army. Technical Textiles for Wearable Sensors: Capacitive Touch Sensor (CTS) Technology to Control Fabric-Based Sensors. PI: Ali Shokufandeh. Award Amount: $825000.00. Period Covered: 8/2022–9/2024.
- National Science Foundation. FMRG: Cyber: A Cyber Nanomanufacturing Platform for Large-scale Production of High-quality MXenes and Other Two-dimensional Nanomaterials. PI: Masoud Soroush. Senior : Ali Shokoufandeh. Award Amount: $3000000.00. Period Covered: 10/2021–9/2025.
- Advanced Functional Fabrics of America (AFFOA)/US Army. Technical Textiles for Wearable Sensors: Capacitive Touch Sensor (CTS) Technology to Control Fabric-Based Sensors. PI: Ali Shokoufandeh. Award Amount: $458583.67. Period Covered: 12/2019–1/2021.
- National Institute of Health. Education Pathways for Biomedical Data Science (R25). Drexel PI: Ali Shokoufandeh. Total Award Amount: $165,892. Period Covered: 07/2021–12/2024.
- Open Space Institute Land Trust. Modelling Project Impact Assessment for land preservation in Watershed. PI: Ali Shokoufandeh, Co-PI: Lin Perez. Total Award Amount: $97,664. Period Covered: 12/2019–1/2022.

- National Science Foundation. Planning Grant: Engineering Research Center for Convergence of Scalable and Sustainable Digital Fabrication of Smart Textiles. PI Genevieve Dion, CoPI: Ali Shokoufandeh. Total Award Amount: $50,000. Period Covered: 9/20 - 8/21.
- DARPA (pass through: MIT-AFFOA). Capacitive Touch Sensors. PI: Genevieve Dion, CoPI: Ali Shokoufandeh. Total Award Amount:$100,000. Period Covered: 10/19–10/20.
- Environmental Protection Agency. BMP Planning and Reporting: Scaling Precision Conservation throughout Watershed. PI: Ali SHokoufandeh, Co-PI: Lin Perez. Total Award Amount:$239,085. Period Covered: 12/2018 – 9/2024.
- DARPA (pass through: Lockheed Martin). Development of Aerial Dragnet Measurement Testbed. PI: Kapil Dandekar, Co-PI: Ali Shokoufandeh. Total Award Amount:$475,000. Period Covered: 1/2018 – 10/2019.
- Comcast Research. Enhancing the MAC layer for LoraWAN based IoT Networks. PI: Ali Shokoufandeh, Co-PI: Steven Weber. Total Award Amount:$100,000. Period Covered: 9/2017 – 9/2019.
- William Penn Foundation (pass through: Water Research Center). Model My Watershed: A Tool for Water Resource Management. PI: Ali Shokoufandeh, Co-PI: Scott Haag. Total Award Amount:$218,000. Period Covered: 1/2017 – 1/2019.
- Stroud Water Research Center. Stream Research Assessment Tool (SRAT). PI: Ali Shokoufandeh, Co-PI: Scott Haag. Total Award Amount:$25,000. Period Covered: 08/2016 – 12/2016.
- National Science Foundation. PFI:AIR - TT: A System for 3D Content-based Data Management (+REU). PI: Ali Shokoufandeh, Co-PI: Gaurav Naik, David Breen. Total Award Amount: $199,997 (+$12,000). Period Covered: 09/2016–08/2018.
- National Science Foundation. Similarity Measures Based on Refinement Operators and Metric Embedding Applied to the Analysis of Immune Repertoires. PI: Santiago Ontanon, Co-PI: Ali Shokoufandeh. Total Award Amount: $139,849. Period Covered: 09/2015–08/2016.
- Comcast Corporation. A Machine Learning Framework for measuring user Quality of Experience (QoE). PI: Ali Shokoufandeh. Total Award Amount: $87,550. Period Covered: 11/2015–3/2016.
- National Science Foundation. Center for Visual & Decision Informatics: Information Reterival on Multyiple Data Sources Using Graph-based Methods. Total Award Amount: $30,753. Period Covered: 9/2015–6/2016.
- U.S. Air Force Research Laboratory (AFRL). SPRUCE: Software-Intensive Systems Producibility Initiative. PI: Spiros Mancrodis, Co-PI: Ali Shokoufandeh. Total Award Amount: $300,000. Total Award Period Covered: 1/2008–2/2011.
- Office of Naval Research. ONR-N00014-08-1-0925. Dentification of Canonical Subsets and their Role in Simplification of Complex Patterns. PI: Ali Shokoufandeh. Total Award Amount: $305,549. Total Award Period Covered: 5/2008–6/2011.
- National Science Foundation. The 3D Colonial Philadelphia Project: Digital Restoration of Thin-Shell Objects for Historical Archaeological Research and Interpretation. PI: Fernand Cohen, Co-PIs: Ali Shokoufandeh, Ko Nishino, Patrice Jeppson, and Glen J. Muschio. Total Award Amount: $737,737. Total Award Period Covered: 10/2008–9/2011.
- U.S. Army Research, Communications and Electronics Research, Development and Engineering Center (CERDEC) Night Vision (Task 8.12). Study of Compression Algorithms for the Airborne Infrared Cameras. PI: Ali Shokoufandeh. Total Award Amount: $150,000. Total Award Period Covered: 9/2008–9/2009.
- National Science Foundation. Digital Engineering Archives. PI: William Regli, Co-PIs: Ali Shokoufandeh. Total Award Amount: $480,000. Total Award Period Covered: 7/2005– 8/2008.
- National Institute of Standards and Technology. SURF Program. PI: Ali Shokoufandeh,

Student: Craig Schroeder. Total Award Amount: $5,950. Total Award Period Covered: 7/2005–9/2005.

- National Science Foundation. Computer-Aided Tissue Engineering. PI: Wei Sun, Co-PIs: Ali Shokoufandeh, and M. Liebschner. Total Award Amount: $1,000,000. ITR-DMI 0427216. Total Award Period Covered: 10/2004–9/2008.
- Office of Naval Research. ONR-N000140410363. Indexing and Matching Relational Structures for Image Interpretation. PI: A. Shokoufandeh. Total Award Amount: $213,057. Total Award Period Covered: 4/2004–7/2007.
- National Science Foundation. ITRM/M-EIA-02-05178. New Modeling of Dynamic Brain Images for Indexing and Retrieval. (Joint withm Rutgers University). Rutgers PI: Paul Kantor. Drexel PI: A. Shokoufandeh. Total Award Amount: $128,400. Total Award Period Covered: 8/2003–2/2006.
- Nissan Motor Company. An Integrated Approach to Tracking Driver Cognitive State. (No Award Number, Industrial Grant). PI: D. Salvucci, Co-PI: A. Shokoufandeh. Total Award Amount: $60,000. Total Award Period Covered: 5/2003–5/2004.
- State of Pennsylvania. RFA-01-07-26. Automated Histological Grading of Breast Cancer. Joint PIs: S. McKinney, A. Tozeren, A. Shokoufandeh, A. Ghosh, F. Garcia. Total Award Amount: $197,969. Total Award Period Covered: 1/2003–1/2004.
- National Science Foundation. DMI-0219176. ITR: Representation and Design of Heterogeneous Structures. PI: W. Sun, Co-PIs: A. Shokoufandeh, W. Regli. Total Award Amount: $490,806. Total Award Period Covered: 10/2002–9/2005.
- National Science Foundation. CISE/IIS-0136337. SGER: Algorithmic Infrastructure for Knowledge Management. PI: A. Shokoufandeh, Co-PI: W. Regli. Total Award Amount: $50,000. Total Award Period Covered: 10/2001–9/2002.
- National Science Foundation. DEI/MRI-0079830. MRI: Acquisition of a Complete Whole Arm Manipulator (WAM) Robot System, PI: J. P. Desai, Co-PIs: B.C. Chang, H. G. Kwatny, C. T. Laurencin, A. Shokoufandeh.Total Award Amount: $182,177. Total Award Period Covered: 9/2000–9/2003.

Awards

- Best Paper Award, EICS/PACM, 2020.
- Best Scientific Paper Award. IAPR-ICPR Confernce, 2016.
- Best of CHI Award. ACM CHI Conference, 2009.
- Outstanding Teacher Award. Drexel University College of Engineering, 2006.
- DIMACS Graduate Award. The Center for Discrete Mathematics and Theoretical Computer Science (A National Science Foundation and Technology Center), 1999.
- DIMACS Graduate Award. The Center for Discrete Mathematics and Theoretical Computer Science (A National Science Foundation and Technology Center), 1998.
- Annual Scientific Award for Best Undergraduate Research Project. Informatica Society of Iran, 1990.

Student Supervision

Ph.D. Students Completed

- Andrew W. E. McDonald, Ph.D., Computer Science, Drexel University, 2021. Thesis title: *ploiting Graphical Structures of Data and Neural Network Architectures*
- Denisa Qori McDonald, Ph.D., Computer Science, Drexel University, 2021. Thesis title: *On the Real-World Interactivity Potential of Minimalistic Knitted Sensors at the Intersection of Artificial Intelligence and User Experience.*
- Scott Haag, Ph.D. Computer Science, Drexel University, 2019. Thesis title: *Geometric and Combinatorial Methods for Digital Elevation Models.*
- Thomas Shortell, Ph.D. Computer Science, Drexel University, 2018. Thesis title: *Secure Signal Processing and Secure Machine Learning using Fully Homomorphic Encryption.*
- Yusuf Osmanlioglu, Ph.D. Computer Science, Drexel University, 2016. Thesis title: *On the Applications of Metric Trees and Metric Labeling to Hard Combinatorial*

Optimization Problems.

- Kamelia Aryafar, Ph.D. Computer Science, Drexel University, 2015. Thesis title: *Multimodal Information Retrieval and Classification.*
- Dmitriy Bespalov, Ph.D. Computer Science, Drexel University, 2012. Thesis title: *Large-scale Document Labeling using Supervised Sequence Embedding.*
- Walt Mankowski, Ph.D. Computer Science, Drexel University, 2012. Co-supervised with Dr. Dario Salvucci. Thesis title: *Canonical Behavior Patters*
- Thomas Plick, Ph.D. Computer Science, Drexel University, 2012. Thesis title: *Graph Theoretical Methods in Object Recognition and Related Problems in Extremal Graph Theory*
- Evan Sultanik, Ph.D. Computer Science, Drexel University, 2010. Co-supervised with Dr. W.C. Regli. Thesis title: *Automatic Construction, Maintenance, and Optimization of Dynamic Agent Organizations.*
- Jeff Abrahamson, Ph.D., Computer Science, 2007. Thesis title: *Optimal Matching and Deterministic Sampling* .
- Connie Gomez. Ph.D., Mechanical Engineering, 2007. Co-supervised with Dr. W. Sun. Thesis title: *A Unit Cell Based Multi-Scale Modeling and Design Approach for Tissue Engineered Scaffolds.*
- Leet Denton. Ph.D., Computer Science, 2007. Thesis title: *Subset Selection Using Nonlinear Optimization*
- M. Fatih Demirci. PhD. Computer Science, 2005. Thesis title: *Many-to-Many Feature Matching for Structural Pattern Recognition.*

M.Sc. Students Completed

- Stephen Zakrewsky. M.S., Computer Science, 2016. Thesis title: *Item Popularity Prediction in E-commerce Using Image Quality Feature Vectors.*
- Craig Schroeder. M.S., Computer Science, 2006. Thesis title: *Metric Tree Weight Adjustment and Infinite Complete Binary Trees As Groups.*
- Dimitiry Bespalov. M.S., Computer Science, 2005. Co-supervised with Dr. W. C. Regli. Thesis Title:*Scale-sapce Representation of 3D Models.*
- Mitchell Peabody. B.S./M.S., Computer Science, 2002. Co-supervised with Dr. W. C. Regli. Thesis title:*Engineering and Graph Databases.* Science, Drexel University.

Editorial Boards

- Member, Editor, Journal of Pattern Recognition, 2016-present.
- Member, Editorial Board, IET Computer Vision, 2008-2018.
- Member, Editorial Board, Pattern Recognition Letters, 2008-2020.
- Reviewing Editor, Journal of Pattern Recognition, 2006-2008.