

# Vahan Huroyan

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CONTACT INFORMATION	Department of Mathematics The University of Arizona 617 N. Santa Rita Ave. Tucson, AZ 85721-0089 USA	<a href="mailto:vahanhuroyan@math.arizona.edu">vahanhuroyan@math.arizona.edu</a>  <a href="http://math.arizona.edu/~vahanhuroyan">http://math.arizona.edu/~vahanhuroyan</a>
EDUCATION	<b>Ph.D. in Mathematics</b> , 2012 -2018, University of Minnesota, Minneapolis, MN Adviser: Gilad Lerman  <b>Masters in Mathematics</b> , 2016, University of Minnesota, Minneapolis, MN Adviser: Gilad Lerman  <b>B.S. in Mathematics</b> , 2008-2012, Yerevan State University, Yerevan, Armenia  <b>Exchange Fellow</b> , 2010-2011, Mathematics, University of Minnesota, Minneapolis MN.	
PRESENT OCCUPATION	The University of Arizona, Department of Mathematics, <i>August 2018 to Present</i> <b>Postdoctoral Research Associate</b>	
PROFESSIONAL EXPERIENCE	<i>MERL – Mitsubishi Research Electric Lab</i> , May 2016 - August 2016 Internship, host: Hassan Mansour  <i>Instigate – Parallel System development</i> , August 2011 - August 2012 <i>Mobile developer (Android/iOS)</i>	
GRANTS, AWARDS AND HONORS	<i>Postdoc Collaborative Research Grant</i> , The University of Arizona (\$1500); Title: <i>Kernel Methods for Manifold Clustering</i> ; with Keaton Hamm, May 2020  <i>SIAM Student Travel Award to attend the 2016 SIAM Annual Meeting (AN16)</i> , MA, July 2016  <i>Graduate Research Fellow at SAMSI (Statistical and Applied Mathematical Sciences Institute)</i> , NC, September 2013 - May 2014  <i>Recipient of the highly competitive Global Undergraduate Exchange Fellowship</i> , U.S. State Department, August 2010 - May 2011  <i>International Math Olympiad 2008</i> in Madrid, Spain - <i>Honorable Mention</i> .  <i>International Zhautykov Olympiad, Mathematics</i> January, 2008 in Almaty, Kazakhstan - <i>Bronze Medal</i> .  <i>International Math Online Ariel Olympiad 2010</i> (Israel/Russia) - <i>Silver Medal</i> .  <i>Putnam Math Competition North America 2011</i> - <i>top 10%</i>	
RESEARCH INTERESTS	Mathematical Data Analysis, Machine Learning, Computer Vision, Distributed Computing, Probability Theory.	
TEACHING EXPERIENCE	<i>Classes taught at University of Arizona</i>  MATH 313 - <i>Introduction to Linear Algebra, Instructor</i> CSc 445 - <i>Introduction to Algorithms, Co-Instructor</i> MATH 574M - <i>Introduction to Statistical Machine Learning, Co-Instructor</i> MATH 466 - <i>Theory of Statistics, Instructor</i> MATH 464 - <i>Theory of Probability, Instructor</i> MATH 310 - <i>Applied Linear Algebra, Instructor</i>	Summer 2022 Spring 2022 Fall 2021 Fall 2020 Fall 2019 Spring 2019

*Classes taught at University of Minnesota*

Math 3283W - *Sequences, Series, and Foundations: Writing Intensive*, Teaching Assistant Spring 2018  
 Math 3283W - *Sequences, Series, and Foundations: Writing Intensive*, Teaching Assistant Fall 2017  
 Math 3283W - *Sequences, Series, and Foundations: Writing Intensive*, Teaching Assistant Spring 2016  
 Math 2243 - *Linear Algebra and Differential Equations*, Instructor Summer 2014  
 Math 1272 - *Calculus 2*, Teaching Assistant Spring 2013  
 Math 1271 - *Calculus 1*, Teaching Assistant Fall 2012

*Class taught at Phymath high school after A. Shahinyan at Yerevan State University, Yerevan, Armenia*

High school *Geometry/Algebra*, Teaching Assistant Spring 2012

OTHER  
TEACHING

Armenian Code Academy (Bootcamp) - *Machine Learning* Dec. 2020-Feb. 2021

ADDITIONAL  
TRAINING

*Summer Graduate School in Modern Harmonic Analysis and Applications*, University of Maryland, July 20 - August 07, 2015

INVITED TALKS,  
PRESENTATIONS,  
POSTERS

SIAM Southeastern Atlantic Section Conference, Mini-symposium in Surrogate modeling for high-dimensional problems and applications, Auburn, AL Sept. 19, 2021  
 Title: Non-Convex Analysis of Matching and Embedding of Image Keypoints

CIMAT/TRIPODS 2021 Summer Conference Aug. 2-4, 2021  
 Title: Non-Convex Analysis of Matching and Embedding of Image Keypoints

IEEE VIS 2020 Virtual Conference Oct. 25-30, 2020  
 Title: Multi-Perspective, Simultaneous Embedding

Data Science Seminars, IMA, The University of Minnesota, Minneapolis, MN Sept. 29, 2020  
 Title: Multi-Perspective, Simultaneous Embedding and Theoretically Guaranteed Projected Power Method for the Multi-way Matching Problem

Science and Technology Convergence Conference 2019, Yerevan, Armenia October, 2019  
 Panel Speaker

Arizona, Los Alamos Days, The University of Arizona, Tucson, AZ April, 2019  
 Title: Non-Convex Analysis of Multi-way Matching

7th International Conference on Computational Harmonic Analysis in conjunction with the 33rd annual Shanks Lecture, Vanderbilt University, Nashville, TN May, 2018  
 Title: Jigsaw Puzzles and Graph Connection Laplacian

Information Theory and Applications (ITA) Workshop, Graduation Day, San Diego, CA February, 2018  
 Title: Jigsaw Puzzles and Graph Connection Laplacian

SIAM Conference on Analysis of Partial Differential Equations (PD17), Baltimore, MA December, 2017  
 Title: Jigsaw Puzzles and Graph Connection Laplacian

Midwest Machine Learning Symposium (MMLS), Chicago, IL June, 2017  
 Title: Distributed Robust Subspace Recovery

Information Theory and Applications (ITA) Workshop, Graduation Day, San Diego, CA February, 2017  
 Title: Distributed Robust Subspace Recovery

SIAM Annual Meeting, Minisymposium on LOBPCG and related methods, Boston, MA July, 2016  
 Title: Distributed Principal Component Analysis and Distributed Robust Subspace Recovery

JOURNAL  
PUBLICATIONS

1. V. Huroyan, G. Lerman, H.-T. Wu ” *Solving Jigsaw Puzzles By The Graph Connection Laplacian*” SIAM Journal on Imaging Sciences (SIIMS), 13 (4), 1717-1753, 2020
2. I. Hossain, V. Huroyan, S. Kobourov, R. Navarrete, “ *Multi-Perspective, Simultaneous Embedding*,” IEEE Transactions on Visualization and Computer Graphics (TVCG), 2020.
3. H. Chen, V. Huroyan, U. Soni, Y. Lu, R. Maciejewski and S. Kobourov, “ *Same Stats, Different Graphs: Exploring the Space of Graphs in Terms of Global Graph Properties*,” IEEE Transactions on Visualization and Computer Graphics, DOI: 10.1109/TVCG.2019.2946558, 10 October, 2019.
4. V. Huroyan, G. Lerman ” *Distributed Robust Subspace Recovery and Distributed Principal Component Analysis*” SIAM Journal on Scientific Computing (SISC) 40(5):A3067-A3090, 2018.

CONFERENCE  
PUBLICATIONS

1. J. Miller, S. Kobourov, V. Huroyan, “ *Browser-based Hyperbolic Visualization of Graphs*,” 15th IEEE Pacific Visualization Symposium (PACIFICVIS), 2022.
2. J. Miller, V. Huroyan, S. Kobourov, “ *Spherical Graph Drawing by Multidimensional Scaling*,” 30th International Symposium on Graph Drawing and Network Visualization (GD), 2022.
3. I. Hossain, V. Huroyan, S. Kobourov, R. Navarrete, “ *Multi-Perspective, Simultaneous Embedding*,” 26th IEEE Symposium on Information Visualization (INFOVIS), 2020.
4. H. Mansour, V. Huroyan, M. Benosman, ” *Crowd Flow Completion From Partial Spatial Observations Using Kernel Dynamic Mode Decomposition*”, Sampling Theory and Applications (SAMPTA), 12th International Conference, July 3 - 7, 2017, Tallinn, Estonia.
5. M. Benosman, H. Mansour, V. Huroyan, ” *Koopman-operator Observer-based Estimation of Pedestrian Crowd Flows*”, The 20th World Congress of the International Federation of Automatic Control (IFAC), 9-14 July 2017, Toulouse, France.

PATENTS

H. Mansour; M. Benosman; V. Huroyan ” *Methods and Systems for Predicting Flow of Crowds from Limited Observations*”, Patent No.: 10,210,398, Issue Date: Feb 19, 2019

WORK UNDER  
REVIEW

*Properties of Erdős-Rényi Graphs* with Hang Chen and Stephen G. Kobourov.

WORK IN  
PROGRESS

*Theoretically Guaranteed Projected Power Method for the Multi-way Matching Problem* with Gilad Lerman and Deepti Pachauri.

*Embedding Neighborhoods Simultaneously t-SNE (ENS-t-SNE)* with S. Kobourov and R. Navarrete.

*Spike Covariance Estimation* with Helen Hao Zhang and Ning Hao.

SERVICE AND  
OUTREACH

Elected Postdoc Representative to the Undergraduate Committee of the Department of Mathematics at the University of Arizona, 2020 - 2021.

Co-organizer (with Keaton Hamm, Faryad Sahneh, Raymundo Navarrete, and Brooke Valmont) of the TRIPODS Southwestern Summer Conference on Data Science, University of Arizona, May 2019.

Organizer of the TRIPODS Metropia Research Group, University of Arizona, May 2019.

Panel Speaker at " *Science and Technology Convergence Conference*", Yerevan, Armenia Oct. 2019.

SIAM 5-Minute Thesis Showcase, SIAM student chapter, University of Minnesota, Dec. 2015.

REVIEW  
EXPERIENCE

*Transactions on Visualization and Computer Graphics (TVCG)* 2021  
*Applied and Computational Harmonic Analysis (ACHA)* 2021  
*IEEE Transactions on Image Processing (TIP)* 2021  
*Mathematics - An Open Access Journal from MDPI* 2021  
*Conference on Graph drawings (GD)* 2020  
*Conference on Automation Science and Engineering (CASE)* 2019  
*Conference on Neural Information Processing Systems (NIPS)* 2016  
*Conference on Neural Information Processing Systems (NIPS)* 2015

COMPUTER  
SKILLS

- Matlab
- Python
- Java
- SDK
- LaTeX
- C++
- Objective C
- Android
- R
- SQL

LANGUAGE  
SKILLS

- *Armenian* (mother tongue)
- *English* (native fluency)
- *Russian* (fluent)