ARMENAK PETROSYAN, PH.D.

+615 877 6302 ◇ apetrosyan3@gatech.edu ◇ www.petrosyan.page

SUMMARY

My research is primarily in Applied Harmonic Analysis and Machine Learning. I study problems related to recovery of systems of signals under sparse or structural assumptions, and approximation and representation capabilities of artificial neural networks.

PROFESSIONAL EXPERIENCE

· **Hale Visiting Assistant Professor** Aug 2020 - Present
School of Mathematics
Georgia Institute of Technology, Atlanta, GA, USA
Mentor: Prof. Christopher Heil

· **Postdoctoral Research Associate** Aug 2017 - Jul 2020
Computer Science and Mathematics Division
Oak Ridge National Laboratory, TN, USA
Mentor: Prof. Clayton Webster

FORMAL EDUCATION

· **PhD in Mathematics** Aug 2012 - Aug 2017
Vanderbilt University, Nashville, TN, USA
PhD advisor: Prof. Akram Aldroubi

· **Master's degree in Mathematics** Sep 2010 - May 2012
Yerevan State University, Armenia
Master's advisor: Prof. Artur Sahakian

· **Bachelor's degree in Mathematics** Sep 2006 - May 2010
Yerevan State University, Armenia

PUBLICATIONS

· A. Petrosyan, K. Pieper, and H. Tran
A proximal Lagrange-function Gradient method for rank-aware joint sparse regularization.
In preperation

· A. Aldroubi, V. Baily, I. Krishtal, and A, Petrosyan
Dynamical sampling on networks.
In preperation

· K. Pieper and A. Petrosyan
Non-convex penalization for shallow neural networks.
arXiv:2004.11515, 2021

· A. Aldroubi, C. Cabrelli, U. Molter, and A. Petrosyan
Local-to-global frames and applications to dynamical sampling problem.
Excursions in Harmonic Analysis, Volume 6, pp. 211-220. Birkhäuser, Cham, 2021

· K. Hamm, B. Hayes, and A. Petrosyan
An operator theoretic approach to the convergence of rearranged Fourier series.
Journal d'Analyse Mathématique, 143(2), pp.503-534, 2021

· A. Dereventsov, A. Petrosyan, and C. Webster
Neural network integral representations with the ReLU activation function.
Mathematical and Scientific Machine Learning, pp. 128-143. PMLR, 2020.

· K. Hamm, B. Hayes, and A. Petrosyan
Rearranged Fourier Series and Generalizations to Non-Commutative Groups.
13th International Conference on Sampling Theory and Applications (SampTA), pp. 1-4. IEEE, 2019.

· A. Aldroubi, L. Huang, A. Petrosyan
Frames induced by the action of continuous powers of an operator.
Journal of Mathematical Analysis and Applications, 478(2), 1059-1084, 2019

· A. Petrosyan, H. Tran, and C. Webster
Reconstruction of jointly sparse vectors via manifold optimization.
Applied Numerical Mathematics, 144, p. 140-150, 2019

· A. Aldroubi, C. Cabrelli, A. F. Cakmak, U. Molter, and A. Petrosyan
Iterative actions of normal operators.
Journal of Functional Analysis, 272(3), p. 1121-1146, 2017

· A. Aldroubi and A. Petrosyan
Dynamical sampling and systems from iterative actions of operators
Frames and Other Bases in Abstract and Function Spaces, pp. 15-26. Birkhäuser, Cham, 2017.

· R. Aceska, A. Aldroubi, J. Davis, and A. Petrosyan
Dynamical sampling in shift-invariant spaces
AMS Contemporary Mathematics (CONM) book series, p. 139-148, 2013

GRANTS AND AWARDS

· Georgia Tech-ORNL seed grant ($4000).

· Member of the Grand Prize winner team for ORNL SNS Neutral Scattering Ugly Data challenge competition. Details can be found at `https://datadays.pages.ornl.gov/SNS/`.

CONFERENCE AND SESSION ORGANIZATION

· **Focus program on Data Science, Approximation Theory, and Harmonic Analysis**
co-organized with Akram Aldroubi, Keaton Hamm and Javad Mashreghi, Fields Institute, 2022

· **Fast Algorithms, Sparsity and Approximation, Part I-III**
16th International Conferences on Approximation Theory
co-organized with with Bosu Choi and Mark Iwen, University of Tennessee at Knoxville, September 21-22, 2019

· **Reduced and Parametric Methods for Function Approximations**
16th International Conferences on Approximation Theoryco-organized with with Anton Dereventsov, Vanderbilt University, TN, May 19, 2019

RECENT PRESENTATIONS

· CodEx Seminar
Online, September 7, 2021
Title: "Integral neural networks with weight penalization."

· Mathematical and Scientific Machine Learning (MSML 2020),
Princeton University (held online), July 21, 2020.
Title: "Integral neural networks with the ReLU activation function."

· Applied Mathematics Seminar,
University of California, Los Angeles, March 4, 2020.
Title: "Neural network integral representations and sparse networks."

· Conference on Computational Mathematics and Applications,
University of Nevada, Las Vegas, October 25 - 27, 2019.
Title: "Neural network integral representations."

· SIAM SEAS 2019 Annual Meeting,
University of Tennessee, Knoxville, September 20-22, 2019.
Title: "Neural network integral representations on the sphere for the ReLU activation function."

· 13th SampTA (Sampling Theory and Applications),
University of Bordeaux, France, July 8-12, 2019.
Title: "Rearranged Fourier Series and Generalizations to Non-commutative Groups."

· Signal Processing with Adaptive Sparse Structured Representations (SPARS) workshop,
ENSEEIHT, Toulouse, France, July 1-4, 2019.
Title: "Joint sparse recovery through manifold optimization."

· 16th International Conferences on Approximation Theory,
Vanderbilt University, Nashville, TN, May 19-22, 2019.
Title: "Rearranged Fourier Series and Generalizations to Non-commutative Groups."

· AMS Fall Western Sectional Meeting,
San Francisco State University, San Francisco, CA, October 27-28, 2018.
Title: "Joint sparse recovery through manifold optimization."

· 7th International Conference on Computational Harmonic Analysis and 60th Birthday Workshop for Akram Aldroubi,
Nashville TN, May 14-19, 2018.
Title: "Joint sparse recovery through manifold optimization."

· BIRS Numerical Analysis and Approximation Theory meets Data Science,
Banff, Canada, April 22-28, 2018.
Title: "Joint sparse recovery through manifold optimization."

TEACHING

· **Statistical Theory**
Georgia Institute of technology
Spring 2022.

- **Discrete Mathematics and Graph Theory**
  Georgia Institute of technology
  Fall 2021.

- **Probability and Statistics**
  Georgia Institute of technology
  Fall 2020, Spring 2021, Summer 2021.