Ronen Talmon

Curriculum Vitae
January 2024

Personal Information

Address: Viterbi Faculty of Electrical and Computer Engineering, Technion – Israel Institute of Technology

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Academic Degrees

Technion - Israel Institute of Technology
Ph.D. at the Faculty of Electrical Engineering, direct course   *2006–2011*
Under the supervision of Prof. Israel Cohen and Prof. Sharon Gannot
Thesis title: "Supervised Speech Processing Based on Geometric Analysis"

The Open University
B.A. in Mathematics and Computer Science, Cum Laude   *2001–2005*
during military service

Academic Appointments

Technion - Israel Institute of Technology
Tenured Associate Professor in the Faculty of Electrical and Computer Engineering   *2019–*

Technion - Israel Institute of Technology
Assistant Professor in the Faculty of Electrical Engineering   *2014–2018*

Yale University
Gibbs Assistant Professor in the Mathematics Department   *2011–2013*

Research Interests

Signal processing, mathematics of data science, manifold and geometric learning, spectral and kernel methods, sensor fusion, dynamical systems

Teaching Experience

Structure of Operating Systems
Teaching assistant   *2006–2008*
Faculty of Electrical Engineering, Technion - Israel Institute of Technology

Signal and Image Processing Lab (SIPL)
Undergraduate project supervisor   *2007–2011*
Faculty of Electrical Engineering, Technion - Israel Institute of Technology
Supervising 20 projects (2 appears in international conf. papers)

Introduction to Digital Signal Processing
Teaching assistant in charge   *2008–2011*
Faculty of Electrical Engineering, Technion - Israel Institute of Technology

Digital Speech Processing in Noisy Environments (Graduate Course)
Teaching assistant   *2009–2011*
Faculty of Electrical Engineering, Technion - Israel Institute of Technology

Calculus of Functions of One Variable I
Lecturer   *2012–2013*

Mathematics Department, Yale University

Ordinary Differential Equations
Lecturer *2013*
Mathematics Department, Yale University

Harmonic Analysis of Graphs with Applications to Information Organization (Graduate Course)
Lecturer *2013*
Mathematics Department, Yale University

Nonlinear Signal Processing using Geometric Methods (Graduate Course)
Lecturer *2014–2016*
Faculty of Electrical Engineering, Technion - Israel Institute of Technology

Introduction to Digital Signal Processing
Lecturer *2015–*
Faculty of Electrical Engineering, Technion - Israel Institute of Technology

Networks, Graphs and Signal Processing (Graduate Course)
Lecturer *2019–2020*
Faculty of Electrical Engineering, Technion - Israel Institute of Technology

Geometric Learning (Graduate Course)
Lecturer *2020–2022*
Faculty of Electrical Engineering, Technion - Israel Institute of Technology

Geometric Data Processing and Analysis (Graduate Course)
Lecturer *2023–*
Faculty of Electrical Engineering, Technion - Israel Institute of Technology

Departmental Activities

Department meetings secretary, 2014–2015, *EE Faculty, Technion*.

Member, Undergraduate studies committee, 2016–2021, *EE Faculty, Technion*.

Counselor for students in poor academic standing, 2016–2018, *EE Faculty, Technion*.

Member, Math undergraduate studies sub-committee, 2018–2021, *EE Faculty, Technion*.

Undergraduate studies program coordinator, 2020–2021, *EE Faculty, Technion*.

Counselor for graduate international students, 2022–, *ECE Faculty, Technion*.

Member, Preparatory Committee, 2022–, *ECE Faculty, Technion*.

Professional Activities

Associate Editor, IEEE Trans. Information Theory, 10.2019–9.2022.

Elected member, IEEE audio and acoustic signal processing technical committee, 2018–2020.

Tutorials and Demos

Speech Modeling and Enhancement Using Diffusion Maps
The 37th International Conference on Acoustics, Speech, and Signal Processing (ICASSP'12)
With I. Cohen and S. Gannot

Speech Enhancement for Acoustic Communication using Multiple Microphones and Diffusion Maps
The 20th European Signal Processing Conference (EUSIPCO'12)
With I. Cohen, S. Gannot, and E. Habets

Manifold Learning for Data-driven Dynamical System Analysis
The 44th International Conference on Acoustics, Speech, and Signal Processing (ICASSP'19)
With K. Shiran, G. Kinberg, O. Yair and Y. Moshe

Multi-Microphone Source Localization on Manifolds
The 27th European Signal Processing Conference (EUSIPCO'19)
With B. Laufer-Goldstein and S. Gannot

Invited Talks

2013 DOE Applied Mathematics Program Meeting in Albuquerque, NM, Aug. 2013

TCE International Conference, Technion - IIT, May. 2014

SIAM Conference on Computational Science and Engineering (CSE), Salt Lake City UT, Mar. 2015

Workshop on Mathematics for Signal Processing, Hausdorff Research Institute for Mathematics, Bonn, Mar. 2016

Workshop on Applied Harmonic Analysis, Massive Data Sets, Machine Learning, and Signal Processing, Banff International Research Station – Casa Matematica Oaxaca (CMO), Oaxaca, Mexico, Oct. 2016

Dagstuhl Seminar on Functoriality in Geometric Data, Schloss Dagstuhl, Germany, Jan 2017

SIAM conference on applications of dynamical systems, Snowbird, Utah, May 2017

NSF-CRCNS annual meeting, ICERM, Providence RI, June 2017

Applied Harmonic Analysis and Data Processing Workshop, Oberwolfach, Germany, March 2018

Manifold Discovery in Neural Data Workshop, Simons Foundation, NYC, April 2018

IPAM Geometry of Big Data Workshop, LA, May 2019

Workshop on Applied Harmonic Analysis and Data Science, Banff International Research Station – Casa Matematica Oaxaca (CMO), Oaxaca, Mexico, Oct. 2019

7th IMA Conference on Numerical Linear Algebra and Optimization – University of Birmingham, Birmingham, UK, Jun. 2022

SIAM conference on applications of dynamical systems, Portland, Oregon, May 2023

Modern Applied and Computational Analysis Workshop, ICERM, Providence, RI, June 2023

Seminars and Talks

Applied Math Seminar, Mathematics Department, Yale University, Apr. 2010

Applied Math Seminar, Mathematics Department, Yale University, Apr. 2012

IDeAS Seminar, The Program in Applied and Computational Mathematics, Princeton University, Apr. 2012

Applied Math Seminar, Mathematics Department, Duke University, Oct. 2012

Signal Processing Seminar, Electrical and Computer Engineering, Rice University, Dec. 2012

Applied Mathematics Seminar, Tel Aviv University, Dec. 2012

Colloquium, Faculty of Engineering, Bar-Ilan University, Dec. 2012

EE Colloquium, Electrical Engineering Department, Tel Aviv University, Dec. 2012

Electrical Engineering Department, Technion - IIT, Dec. 2012

Colloquium, Electrical and Computer Engineering Department, Ben Gurion University, Jan. 2013

The Learning Club, The Hebrew University of Jerusalem, Jan. 2013

Faculty of Mathematics and Computer Science, Weizmann Institute of Science, Jan. 2013

Statistics and Topology Seminar, Electrical Engineering Department, Technion - IIT, May. 2014

Electrical and Computer Engineering Department, NC State University, Aug. 2014

The Learning Club, The Hebrew University of Jerusalem, May. 2015

Applied Mathematics Seminar, Tel Aviv University, May. 2015

Nonlinear Analysis and Optimization Seminar, Mathematics Department, Technion, June. 2015

Applied Math Seminar, Mathematics Department, Yale University, Dec. 2015

Tel Aviv University Annual Meeting on Alzheimer's disease, Tel Aviv, Israel, Jun. 2016

ICML workshop on Multi-View Representation Learning, New York, NY, Jun. 2016

EEI Colloquium, Friedrich-Alexander-University Erlangen-Nurnberg, Erlangen, Germany, July 2016

EE Colloquium, Tel Aviv University, April 2017

Faculty of Mathematics and Computer Science, Weizmann Institute of Science, July 2017

Faculty of Mathematics and Computer Science, Weizmann Institute of Science, Jan 2019

Learning Club, Faculty of Engineering, Bar-Ilan University, May 2022

Misc.

Organizer of the Applied Mathematics Seminar, 2011–2013, *Yale University*

Reviewer for IEEE Transactions on Signal Processing, IEEE Transactions on Audio, Speech and Language

Processing, IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on on Neural Systems and Rehabilitation Engineering, IEEE Transactions on Signal and Information Processing over Networks, IEEE Signal Processing Letters, Applied and Computational Harmonic Analysis, SIAM Journal on Mathematics of Data Science, JMLR, Signal Processing, EURASIP Journal on Advances in Signal Processing, Machine Learning, Artificial Intelligence, IEEE Transactions on Cybernetics, Acta Acoustica, ICML, NeurIPS, AAAI, ECML, and for other signal processing and machine learning conferences

Reviewer of proposals for the European Research Council (ERC), Israel Science Foundation (ISF), Ministry of Science, Technology and Space (MOST), Pazy foundation, Natural Sciences and Engineering Research Council of Canada (NSERC), Swiss National Science Foundation (SNF), the United States - Israel Binational Science Foundation (BSF), and for many others.

Scholarships and Awards

Dean's List (cum laude)
The Open University *2001, 2002*

President's List (summa cum laude)
The Open University *2004, 2005*

Excellence in Teaching Award for Outstanding TAs
Technion - IIT *2008, 2011*

SIPL Distinguished Supervisors Award
Signal and Image Processing Lab, Technion - IIT *2010*

Irwin and Joan Jacobs Fellowship
Technion - IIT *2011*

Gibbs Assistant Professorship
Yale University *2011–2014*

Viterbi Fellowship for Nurturing Future Faculty Members
Department of Electrical Engineering, Technion - IIT *2011–2013*

Students Cooperation in Research Award
Technion - IIT *2012*

AMS-Simons Travel Grant
American Mathematical Society *2012–2014*

Horev Fellowship
Technion - IIT *2014–2016*

Distinction for Excellence in Teaching
Technion - IIT *2018, 2021, 2023*

Norman Seiden Prize for Academic Excellence
Technion - IIT *2020*

Schmidt Career Advancement Chair in Artificial Intelligence
Technion - IIT *2021-2023*

Graduate Students and Postdocs

Graduate Students In Progress

1: Amitay Bar, Ph.D. (Prof. Ron Meir – Co-supervisor) "Riemannian Geometry and Manifold Analysis in Reinforcement Learning, Signal Processing, and Optimization".

2: Ya-Wei Lin, Ph.D. "Hyperbolic Geometry in Machine Learning".

3: Ido Cohen, Ph.D. "Multi-graph signal Processing".

4: Emil Bronstein, Ph.D. (Prof. Doron Shilo – Principal supervisor) "Novel methods for measurement and data-driven analysis of acoustic and magnetic emissions".

5: David Cohen, Ph.D. "Geometric Methods with Applications to Feature Selection and Individual Treatment Effect".

6: Yehonatan-Itay Segman, Ph.D. "Time-frequency Representation Using the Geometry of Time-delay Embedding".

7: Adi Arbel, M.Sc., "Holomorphic interpolation schemes for multimodal manifold learning".

8: Gal Maman, M.Sc., "Optimal Domain Adaptation on Riemannian Manifolds using Procrustes Analysis".

9: Bar Weiss, M.Sc., "Scalable Sensor Fusion via a Reference Subset"

10: Or Cohen, M.Sc..

11: Harel Mendelman, M.Sc.

12: Yoav Haris, M.Sc. (Dr. Hadas Benisty – Co-supervisor) "Sparse dictionary learning optimized for behavior prediction: an integrated framework for learning sparse neuronal events encoding behavior".

Research Associates:

1: Dr. Joseph Picard

Graduated Students and Postdocs

1: Ori Katz, M.Sc., "Diffusion-based nonlinear filtering for multimodal data fusion",
Graduation date: 8.2017.

2: David Dov, Ph.D. (Prof. Israel Cohen – Principal supervisor), "Multimodal signal processing on manifolds",
Graduation date: 8.2018. Now: Postdoc at Duke University.

3: Ariel Schwartz, M.Sc., "Deep learning for intrinsic manifold regularization in dynamical systems",
Graduation date: 9.2017.

4: Hadas Benisty, Postdoc (Prof. Ron Meir - Co-host), "Neuronal activity data analysis", 11.2015-8.2018.
Now: Assistant Professor, Faculty of Medicine, Technion.

5: Noam Bloom, M.Sc, "Covariance matrix estimation for geometric modeling of signals",
Graduation date: 11.2018.

6: Maya Harel, M.Sc. (Prof. Ron Meir – Co-supervisor), "Analyzing neuronal signals using geometric methods",
Graduation date: 12.2018.

7: Ya-Wei Lin, M.Sc., "Graph Analysis for Multiplexed Data with Application to Image Mass Cytometry",
Graduation date: 5.2020.

8: Ido Cohen, M.Sc., "Unsupervised Anomaly and Target Detection using Manifold Learning with Application to Deep Brain Stimulation",
Graduation date: 6.2020.

9: Or Yair, Ph.D. (direct track), "Geometric Analysis of Signals and Systems",
Graduation date: 8.2020.

10: Bracha Laufer-Goldshtein, Ph.D. (Prof. Sharon Gannot – Principal supervisor), "Geometry-Based Data Analysis for Speech Processing",
Graduation date: 8.2020.
Now: Assistant Professor at TAU EE.

11: Joumana Silbak, M.Sc., (Prof. Ron Meir – Co-supervisor) "Geometric Analysis of the Dynamic Connectivity of Biological and Artificial Neural Networks",
Graduation date: 10.2020.

12: Aviad Wiegner, M.Sc., "Data Driven Koopman Operator Analysis Based on Noisy Augmented Observations",
Graduation date: 12.2020.

13: Tal Shnitzer, Ph.D. (direct track), "Time-series analysis based on geometric signal modeling and filtering",
Graduation date: 12.2020.
Now: Researcher at the Broad Institute (Harvard-MIT).

14: Lior Aloni, M.Sc. (Prof. Omer Bobrowski – Principal supervisor), "Joint Geometric and Topological Analysis of Hierarchical Datasets",
Graduation date: 6.2021.

15: Ohad Rahamim, M.Sc., "Aligning Sets of Temporal Signals with Riemannian Geometry and Koopman Operator",
Graduation date: 7.2021.

16: Almog Lahav, Ph.D. (direct track), "Optimal transport on manifolds for domain adaptation and metric

learning",
Graduation date: 7.2022.

17: Shay Shimonov, M.Sc., "Kernel Scale Selection with Geometric Approximation for Multimodal Data Analysis",
Graduation date: 10.2022.

18: Avigail Cohen-Rimon, M.Sc. (Prof. Jackie Schiller – Co-supervisor), "Geometry-based Dynamic Connectivity Analysis of Biological Neural Networks",
Graduation date: 1.2023.

19: Itay Zach, M.Sc., (Dr. Zvi Dvorkind – Co-supervisor) "Graph Signal Interpolation and Extrapolation Based on Continuous Domain Analysis",
Graduation date: 1.2023.

20: Ori Katz, Ph.D. "Geometric Methods for Multimodal Data Analysis and Domain Adaptation",
Graduation date: 2.2023

21: Tamir Yampolsky, M.Sc., "Domain Adaptation Using Multi-Kernel Matching",
Graduation date: 9.2023.

International Graduated Students

1: Tabea Kossen, M.Sc., TU Berlin, Graduation date: 12.2017.

2: Lukas Forster, M.Sc., University Erlangen-Nuremberg, Graduation date: 6.2018.

3: Jonas Laake, M.Sc., University Erlangen-Nuremberg, Graduation date: 6.2018.

Research Grants

Current:

1: **Nonlinear Data and Signal Analysis with Diffusion Operators**
ERC Starting Grant, **PI: R. Talmon, 2018–2025 (1,260,000 Euros for 5 years)**

Past:

1: The Integration of Data-Mining with Multiscale Engineering Computations
National Science Foundation (*NSF*), PIs: R. R. Coifman (Yale University) and I. G. Keverekidis (Princeton University), CoPI: R. Talmon, 2013–2016 ($250,000 per year for 4 years)

2: Acoustic Scene Identification
MAFAT, PIs: R. Talmon and S. Gannot, 2016–2017 (50,000NIS)

3: Analysis and Modeling of Noisy Signals
Elbit Systems, PI: R. Talmon, 2016–2017 (90,000NIS)

4: Empirical Intrinsic Modeling for Nonlinear Signal Processing
Marie Curie Actions – Career Integration Grants (*CIG*), *European Research Council*, PI: R. Talmon, 2014–2018 (25,000 Euros per year for 4 years)

5: Environment-Aware Data-Driven Acoustic Signal Processing
Kamin, PIs: R. Talmon and S. Gannot, 2017–2019 (1,320,000NIS)

6: Cyber defense of industrial control systems and critical infrastructure by intrinsic sensor data analysis
Hiroshi Fujiwara Cyber Security Research Center, Technion, PI: R. Talmon, 2017–2020 (300,000NIS)

7: Sensory-Motor Integration in the Mammalian Brain: experiment, data-analysis and modeling
BSF-NSF-NIH Program in Computational Neuroscience, PIs: R. Talmon, J. Schiller, R. Meir and R. R. Coifman, 2016–2021 (Israeli part: $80,000 per year for 4 years)

8: Common Manifold Learning for Nonlinear Signal Processing
ISF, PI: R. Talmon, 2016–2021 (280,000NIS per year for 4 years)

9: Multiscale Graph Neural Networks
Intel, PI: R. Talmon, 2021 ($50,000)

10: Data-driven High-dimensional Multimodal Data Fusion with Applications to Anomaly Detection and Condition Monitoring
Pazy Foundation, PIs: R. Talmon and Alon Amar (Rafael), 2019–2023 (200,000 NIS per year for 4 years)

Publications

Journal Publications

Published:

1: R. Talmon, I. Cohen, and S. Gannot, "Relative transfer function identification using convolutive transfer function approximation," *IEEE Trans. on Audio, Speech and Language Processing*, Vol. 17, Issue 4, pp. 546-555, 2009.

2: R. Talmon, I. Cohen, and S. Gannot, "Convolutive transfer function generalized sidelobe canceler," *IEEE Trans. on Audio, Speech and Language Processing*, Vol. 17, Issue 7, pp. 1420-1434, 2009.

3: R. Talmon, I. Cohen, and S. Gannot, "Transient noise reduction using nonlocal diffusion filters," *IEEE Trans. on Audio, Speech and Language Processing*, Vol. 19, Issue 6, pp. 1584-1599, 2011.

4: R. Talmon, D. Kushnir, R. R. Coifman, I. Cohen, S. Gannot, "Parametrization of linear systems using diffusion kernels," *IEEE Trans. on Signal Processing*, Vol. 60, Issue 3, pp. 1159-1173, 2012.

5: R. Talmon, I. Cohen, S. Gannot, and R. R. Coifman, "Supervised graph-based processing for sequential transient interference suppression," *IEEE Trans. on Audio, Speech and Language Processing*, Vol. 20, Issue 9, pp. 2528-2538, 2012.

6: R. Talmon, I. Cohen, and S. Gannot, "Single-channel transient interference suppression with diffusion maps," *IEEE Trans. on Audio, Speech and Language Processing*, Vol. 21, Issue 1, pp. 132-144, 2013.

7: D. Duncan, R. Talmon, H. P. Zaveri, and R. R. Coifman, "Predicting seizures in intracranial EEG data using diffusion kernels," *Special Issue in the Mathematical Biosciences and Engineering (MBE)*, vol. 10, no. 2, pp. 579-590, 2013.

8: R. Talmon and R. R. Coifman, "Empirical intrinsic geometry for nonlinear modeling and time series filtering," *Proc. Nat. Acad. Sci. (PNAS)*, vol. 110, no. 31, pp. 12535-12540, 2013.

9: R. Talmon, I. Cohen, S. Gannot, and R. R. Coifman, "Diffusion maps for signal processing," *Special Issue on Advances in Kernel-based Learning for Signal Processing in the IEEE Signal Processing Magazine*, vol. 30, no. 4, pp. 75-86, 2013 (invited paper).

10: C. J. Dsilva, R. Talmon, N. Rabin, R. R. Coifman, I. G. Kevrekidis, "Nonlinear intrinsic variables and state reconstruction in multiscale simulations," *The Journal of Chemical Physics*, vol. 139, 2013.

11: R. Talmon and R. R. Coifman, "Intrinsic modeling of stochastic dynamical systems using empirical geometry," *Applied and Computational Harmonic Analysis*, Vol. 39, No.1, pp. 138-160, 2015.

12: G. Mishne, R. Talmon, and I. Cohen, "Graph-based supervised automatic target detection," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 53, No. 5, pp. 2738 -2754, 2015.

13: H.-T. Wu, R. Talmon, and Y.-L. Lo, "Assess sleep stage by modern signal processing techniques," *IEEE Transactions on Biomedical Engineering*, Vol. 62, No. 4, pp. 1159-1168, 2015.

14: D. Dov, R. Talmon, and I. Cohen, "Audio-visual voice activity detection using diffusion maps," *IEEE Trans. on Audio, Speech and Language Processing*, Vol. 23, No. 4, pp. 732-745, 2015.

15: W. Lian, R. Talmon, H. Zaveri, L. Carin, and R. R. Coifman, "Multivariate time-series analysis and diffusion maps," *Signal Processing*, Vol. 116, pp. 13-28, 2015.

16: R. Talmon, S. Mallat, H. Zaveri, and R. R. Coifman, "Manifold learning for latent variable inference in dynamical systems," *IEEE Trans. Signal Processing*, Vol. 63, No.15, pp. 3843-3856, 2015.

17: C. J. Dsilva, R. Talmon, R. R. Coifman, and I. G. Kevrekidis, "Parsimonious representation of nonlinear dynamical systems through manifold learning: a chemotaxis case study," *Applied and Computational Harmonic Analysis*, Vol. 44, No. 3, pp. 759-773, 2018 (accepted for publication in 2015).

18: R. R. Lederman and R. Talmon, "Learning the geometry of common latent variables using alternating-diffusion," *Applied and Computational Harmonic Analysis*, Vol. 44, No. 3, pp. 509-536, 2018 (accepted for publication in 2015).

19: C. J. Dsilva, R. Talmon, C. W. Gear, R. R. Coifman, and I. G. Kevrekidis, "Data-driven reduction for a class of multiscale fast-slow stochastic dynamical systems," *SIAM J. Appl. Dyn. Syst.*, 15(3), 1327-1351, 2016.

20: B. Laufer-Goldstein, R. Talmon, S. Gannot, "Semi-supervised sound source localization based on manifold regularization," *IEEE Trans. Audio, Speech, Lang. Proces.*, 24(8), 1393–1407, 2016.

21: G. Mishne, R. Talmon, R. Meir, J. Schiller, U. Dubin, M. Lavzin, R. R. Coifman, "Hierarchical coupled-geometry analysis for neuronal structure and activity pattern discovery," *IEEE Journal of Selected Topics in Signal Processing*, 10(7), 1238-1253, 2016

22: D. Dov, R. Talmon, I. Cohen, "Kernel Method for Voice Activity Detection in the Presence of Transients," *IEEE/ACM Trans. Audio Speech Lang. Process.*, 24(12), 2313-2326, 2016.

23: <u>D. Dov</u>, R. Talmon and I. Cohen, "Kernel-based sensor fusion with application to audio-visual voice activity detection," *IEEE Trans. Signal Process.*, 64(24), 6406-6416, 2016.

24: J. Sulam, Y. Romano and R. Talmon, "Dynamical systems classification with diffusion embedding for ECG-based person identification," *Signal Processing*, 130, 403-411, 2017.

25: <u>T. Shnitzer</u>, R. Talmon and J. J. Slotine, "Manifold learning with contracting observers for data-driven time-series analysis," *IEEE Trans. Signal Process.*, 65(4), 904-918, 2017.

26: <u>O. Yair</u> and R. Talmon, "Local canonical correlation analysis for nonlinear common variables discovery," *IEEE Trans. Signal Process.*, 65(5), 1101-1115, 2017.

27: A. Shemesh, R. Talmon, M. Bar, O. Karp, I. Amir, Y. J. Grobman, "Affective Response to Architecture - Investigating Human Reaction to Spaces with Different Geometry," *Architectural Science Review*, 60(2), 116-125, 2017.

28: <u>D. Dov</u>, R. Talmon and I. Cohen, "Multi-modal kernel method for activity detection of sound sources," *IEEE/ACM Trans. Audio, Speech, Lang. Proces.*, 25(6), 1322-1334, 2017.

29: <u>B. Laufer-Goldstein</u>, R. Talmon, S. Gannot, "Semi-supervised source localization on multiple-manifolds with distributed microphones," *IEEE/ACM Trans. Audio, Speech, Lang. Proces.*, 25(7), 1477-1491, 2017.

30: <u>O. Yair</u>, R. Talmon, R. R. Coifman, I. G. Kevrekidis, "Reconstruction of normal forms by learning informed observation geometries from data," *Proceedings of the National Academy of Sciences (PNAS)*, 201620045, 2017.

31: R. Talmon and H.-T. Wu, "Latent common manifold learning with alternating diffusion: Analysis and applications," *Applied and Computational Harmonic Analysis*, 47(3), 848-892, 2019.

32: V. Papyan, R. Talmon, "Multimodal Latent Variable Analysis," *Signal Processing*, Vol. 142, pp. 178-187, 2018.

33: G. Mishne, R. Talmon, I. Cohen, R. R. Coifman, and Y. Kluger, "Data-Driven Tree Transforms and Metrics," *IEEE Transactions on Signal and Information Processing over Networks*, Vol. 4, No. 3, 2018.

34: <u>B. Laufer-Goldstein</u>, R. Talmon, S. Gannot, "A hybrid approach for speaker tracking based on TDOA and data-driven models," *IEEE/ACM Trans. Audio, Speech, Lang. Proces.*, 26(4), 725-735, Apr 2018.

35: <u>D. Dov</u>, R. Talmon and I. Cohen, "Sequential audio-visual correspondence with alternating diffusion kernels," *IEEE Trans. Signal Process.*, Vol. 66, No. 12, pp. 3100-3111, 2018.

36: D. W. Sroczynski, <u>O. Yair</u>, R. Talmon, and I. G. Kevrekidis, "Data-driven evolution equation reconstruction for parameter-dependent nonlinear dynamical systems ," *Israel Journal of Chemistry*, Vol. 58, No. 6-7, Special Issue: Nonlinear Dynamics in Chemical Reaction Engineering, pp. 787-794, 2018.

37: <u>O. Katz</u>, R. Talmon, Y.-L. Lo and H.-T. Wu, "Alternating diffusion maps for multimodal data fusion," *Information Fusion*, Vol. 45, pp. 346-360, 2019.

38: <u>A. Lahav</u>, R. Talmon, Y. Kluger, "Mahalanonbis distance informed by clustering," *Information and Inference: A Journal of the IMA*, iay011, https://doi.org/10.1093/imaiai/iay011, 2018.

39: <u>B. Laufer-Goldstein</u>, R. Talmon, S. Gannot, "Source Counting and Separation Based on Simplex Analysis," *IEEE Trans. Signal Process.*, Vol. 66, No. 24, pp. 6458-6473, 2018.

40 : F. P. Kemeth, S. W. Haugland, F. Dietrich, T. Bertalan, Q. Li, E. M. Bollt, R. Talmon, K. Krischer, and I. G. Kevrekidis. , "An Emergent Space for Distributed Data With Hidden Internal Order Through Manifold Learning," *IEEE Access*, Vol. 6, pp. 77402-77413, 2018.

41: <u>O. Yair</u>, M. Ben-chen, and R. Talmon, "Parallel Transport on the Cone Manifold of SPD Matrices for Domain Adaptation,"*IEEE Trans. Signal Process.*, Vol. 67, no. 7, pp. 1797-1811, 2019.

42: <u>A. Schwartz</u>, and R. Talmon, "Intrinsic isometric manifold learning with application to localization,"*SIAM Journal on Imaging Science*, Vol. 12, No. 3, pp. 1347-1391, 2019.

43: <u>T. Shnitzer</u>, M. Ben-Chen, L. Guibas, R. Talmon and H.-T. Wu, "Recovering Hidden Components in Multimodal Data with Composite Diffusion Operators",*SIAM Journal on Mathematics of Data Science*, Vol. 1. No. 3, pp. 588-616, 2019.

44: M. Taseska, T. V. Waterschoot, E. A. P. Habets and R. Talmon, "Nonlinear Filtering with Variable-Bandwidth Exponential Kernels", *IEEE Trans. Signal Processing*, Vol. 65, pp. 314-326, 2019.

45: <u>T. Shnitzer</u>, R. Talmon and J. J. Slotine, "Diffusion Maps Kalman Filter for a Class of Systems With Gradient Flows," *IEEE Transactions on Signal Processing*, Vol. 68, pp. 2739-2753, 2020.

46: <u>B. Laufer-Goldstein</u>, R. Talmon, S. Gannot, "Global and Local Simplex Representations for Multichannel Source Separation," *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, Vol. 28, pp. 914-928, 2020.

47: F. Aeed, <u>T. Shnitzer</u>, R. Talmon, and Y. Schiller, "Layer- and cell-specific recruitment dynamics during epileptic seizures in-vivo", *Annals of Neurology*, Vol. 87, No. 1, pp. 97-115, 2020.

48: S. Levy, M. Lavzin, H. Benisty, U. Dubin, Z. Brosh, F. Aeed, Y. Schiller, R. Meir, O. Barak, R. Talmon, A. Hantman and J. Schiller, "Cell type and context specific outcome representation in primary motor cortex", *Neuron*, Vol. 107, No. 5, 954-971, 2020.

49: E. Lustig, O. Yair, R. Talmon, M. Segev, "Identifying Topological Phase Transitions in Experiments Using Manifold Learning", *Physical Review Letters (PRL)*, Vol. 125, No. 12, p. 127401, 2020.

50: Y.-W. E. Lin, T. Shnitzer, R. Talmon, F. Villarroel-Espindola, S. Desai, K. Schalper, and Y. Kluger, "Graph of graphs analysis for multiplexed data with application to imaging mass cytometry," *PLOS Computational Biology*, Vol. 17, No. 3, e1008741, 2021.

51: O. Lindenbaum, A. Sagiv, G. Mishne, and R. Talmon, "Kernel-based parameter estimation of dynamical systems with unknown observation functions," *Chaos: An Interdisciplinary Journal of Nonlinear Science*, Vol. 31, No. 4, 043118, 2021.

52: E. Bronstein, L. Z. Toth, L. Daroczi, D. L. Beke, R. Talmon, and D. Shilo, "Tracking twin boundary jerky motion at nanometer and microsecond scales," *Advanced Functional Materials*, 2106573, 2021.

53: G. Pai, A. Bronstein, R. Talmon, and R. Kimmel, "Deep Isometric Maps," *Image and Vision Computing*, 123, 104461, 2022.

54: B. Laufer-Goldstein, R. Talmon, S. Gannot, "Audio source separation by activity probability detection with maximum correlation and simplex geometry," *EURASIP Journal on Audio, Speech, and Music Processing*, 2021.

55: F. Dietrich, O. Yair, R. Mulayoff, R. Talmon, and I. G. Kevrekidis, "Spectral Discovery of Jointly Smooth Features for Multimodal Data," *SIAM Journal on Mathematics of Data Science*, 4(1), 410-430, 2022.

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