

Elchanan Solomon

Curriculum Vitae

PERSONAL DETAILS

Full Name Yitzchak Elchanan Solomon
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OVERVIEW

Assistant Research Professor of Mathematics at Duke University, working on applied geometry and topology. My research focus is on stability and inverse results for topological and geometric transforms, as well as applications to data fusion.

EDUCATION

PhD. Mathematics 2013-2019
Brown University
Advised by Jeffrey Brock (Brown, now Yale) and Steve Oudot (INRIA Saclay).

B.S. and M.A. Mathematics 2010-2013
UCLA

PUBLICATIONS AND PREPRINTS

Geometric Fusion via Joint Delay Embeddings 2020
Co-authored with Paul Bendich, submitted to Fusion 2020.

Intrinsic Topological Transforms via the Distance Kernel Embedding 2019
Co-authored with Clément Maria Steve Oudot, submitted to SOCG.

Survey on Inverse Problems in Applied Topology 2018
Co-authored with Steve Oudot, submitted to Proceedings of Abel Symposium.

Barcode Embeddings for Metric Graphs 2018
Co-authored with Steve Oudot, arXiv
Inverse results for a topological transform on intrinsic metric spaces.

Relaxing the Integral Test: A Challenge for the Advanced Calculus Student 2017
Co-authored with Paul Carter, College Mathematics Journal

CONFERENCES AND SEMINARS ORGANIZED

**TRIPODS Summer Bootcamp:
Topology and Machine Learning**
ICERM

2018

On the conference organizing committee. Gave introductory talks and developed code content.

Brown Applied Topology and Geometry Seminar
Co-organized with Melissa McGuirl,

2017-2018

<http://www.dam.brown.edu/people/mmcguirl/ATBrown.html>

Hosted a variety of speakers whose research lies at the intersection of geometry and topology with data science, biostatistics, and engineering.

TALKS AND CONFERENCE PRESENTATIONS

UFTDA 2020
UF Gainesville

2020

Spoke about my work with Clément Maria and Steve Oudot on kernel embeddings and topological transforms.

Applied Topology Research Network
Online

2018

Spoke about my work with Steve Oudot on the intrinsic persistent homology transform.

Theory and Foundations of TGDGA
MBI, Columbus, Ohio

2018

Presented poster.

Brown AMS Graduate Student Conference
Providence, RI

2018

Spoke about my work with Steve Oudot on the intrinsic persistent homology transform.

TAGS: Linking Topology to Algebraic Geometry and Statistics
Max Planck Institute, Leipzig

2018

Presented poster.

Applied Algebraic Topology
Sapporo, Japan

2017

Presented poster.

TEACHING AND MENTORING

Teaching

Mathematical Statistics and Data Science, co-instructor (2019).
Multivariable Calculus Instructor (2018).
Data Science Masters Program: Probability and Statistics TA (2017).
Linear Algebra Instructor (2017).
Multivariable Calculus TA (2016).
Calculus I instructor (2015).
Graduate Algebraic Topology TA (2014).

Mentoring Calculus I TA (2014).
Capstone Project Manager for Duke Master in Data Science (MIDS).
Directed Reading Program in applied topology (2017).
Summer @ ICERM REU in Topological Data Analysis TA (2017).
Directed Reading Program in differential topology (2017).
Sponsor for independent study in Model Theory (2015).

Summer Courses Summer @ Brown Combinatorics TA (2016).
Brown Pre-College STEM program. Developed and taught courses in physics, geometry, probability, and dynamics. (2014,2015,2016).

CODE

Python Computing Euler Characteristic Curves for Greyscale Images. Written for the TRIPODS Summer Bootcamp in TDA and ML. GitHub: Elchanan-Solomon/EulerCurves.

SKILLS

Languages English (mother tongue)
Hebrew (fluent)
Spanish, Catalan (proficient)
Yiddish, French (conversational)
Mandarin (HSK3)

Software PYTHON (presently), JAVA (past experience), C++ (past experience)
MATLAB, L^AT_EX