OMER SHIMON SELLA (ZILBERBOIM)
CURRICULUM VITAE

Website: https://www.cl.cam.ac.uk/∼oss22/
Mobile: +447480329022
e-Mail: omer.s.sella@gmail.com
Languages: English, Hebrew

Research Interests. From a theoretical mathematician's point of view the theory of Error Correction Coding is completely understood thanks to C. Shannon. For a practitioner, however, there is a lot we do not understand about Low Density Parity Check (LDPC) codes and their construction. My research aims to use machine learning to construct system specific LDPC codes.

I am also interested in treating error traces as data, to be explained by a learned model. Finally I am interested in integration between neural networks and LDPC decoders, as well as on the fly learning in the presence of error correcting codes.

Higher Education.

2017-present University of Cambridge, Doctrate research supervised by Prof. Andrew W. Moore and advised by Prof. Jon Crowcroft.
I am a Microsoft Research funded Ph.D. student.
My research is in emerging systems for cloud archival storage. This mainly means storage using nano-structures in fused Quartz and coding information in DNA molecules. Archival storage in the cloud presents a lot of oppurtunities to disaggregate resources (e.g.: read head from write head) and design storage systems from scratch to last hundreds of years, occupy less space and have nearly zero power footprint. For this to happen we need methods to construct good error correcting codes that take into account the fact that the system is disaggregated and distributed.

2009-2011 Hebrew University of Jerusalem, M.Sc. in Mathematics. GPA 91.46. Thesis Topic: On the Lowenheim-Skolem-Tarski Cardinal of the Equi-Cardinality Logic. Adviser: Prof. Menachem Magidor.
My thesis is an improved result over previous work regarding the LST cardinal of the equi-cardinality logic. A method of proof was devised, and was used to prove that it is consistent, relative to some large cardinals existence, that the LST cardinal of of the equi-cardinality logic is the first out of two inaccessible cardinals. The method is easily extended to any finite number of inaccessible cardinals.

2005-2008 Hebrew University of Jerusalem, B.Sc. in Mathematics. GPA 90.18.
My main interest was Mathematical Logic and Set Theory. I attended the logic
seminar starting the final year of my B.Sc. as well as the Jerusalem seminar on Set
Theory.

Summer School - Asian Initiative for Infinity, National University of Singapore.
- Year attended 2011
- Website http://www2.ims.nus.edu.sg/Programs/011aiiss/index.php

Summer School - Asian Initiative for Infinity, National University of Singapore.
- Year attended 2010
- Website http://www2.ims.nus.edu.sg/Programs/010aiiss/index.php

Scholarships and awards.
- Wiseman award 2019
- Microsoft Research (Cambridge) PhD programme 2017 - 2020
- Rudin scholarship recipient 2010
- Rudin scholarship recipient 2011

Conferences
.

- *Local organiser* - IEEE International Conference on Network Protocols
  2018, September at Cambridge.
- *Local organiser* - IEEE/ACM Symposium on Architecture for Networking
  and Communication Systems 2019, September at Cambridge.
- Speaker - SIGCOMM NEAT 2018. Topic: FEC killed the cut-through
  switch
- *Speaker* - A preliminary to Prof. Magidor's workshop on PCF, given in AII
  2010 Summer School. Lecture notes could be found here. *Topic: Towards
  PCF*

Publications.

FEC killed the cut-through switch. Accepted to SIGCOMM 2018 NEAT workshop.

High speed adaptive rack-scale fabrics (poster). Accepted to SIGCOMM 2018.

Adaptive rack-scale interconnect (talk + poster). Accepted to ARM summit 2018.

Löwenheim-Skolem-Tarski Cardinal for the Equi-Cardinality Logic L(I). Accepted
to the Archive for Mathematical Logic, Springer.

A Coupling Between Spatial Hadamard Modulation and Erasure Codes. In prepa-
ration, to be submitted to the IEEE Transactions on Signal Processing

Hardware Optimization for Synthesis of Linear Recursion. In preparation, to be
submitted to the IEEE Transactions on Information Theory

Review of CA-N Data. Presented at the IEEE as part of the developement of the
802.3by standard 2016 (25Gbps passive copper channels) - link

Consensus proposal for Rx tolerance tests changes in clauses 110 and 111. Coau-
thored, presented at the IEEE as part of the developement of the 802.3by standard
2016 (25Gbps passive copper channels) - link

Patents.

Offloading node CPU in distributed redundant storage systems. US9459957B2

The main purpose of this patent is to accelerate RAID 6 (and beyond) implementation in a distributed system.

Methods and systems for error-correction decoding. US9344117B2

The main purpose of this patent is to allow faster decoding of Reed-Solomon codes under certain error model assumptions.

Systems, methods, and apparatuses for implementing smartphone based dynamic depth camera calibration. US20180286079A1

The main purpose of this patent application is the use of a mobile device to calibrate depth cameras, primarily after they are deployed or integrated into a system.

Professional Experience.

2016-2017 Intel Corporation, Perceptual computing. Engineer, Algorithms.
- Depth camera using light radar.
- Image filtering (MATLAB).

2012-2016 Mellanox Technologies, Sr. Engineer, Algorithms.
- Physical layer algorithms (C, C++).
- Error correcting codes (MATLAB, C++).
- Company representative at the IEEE 802.3 group, and IEEE Standards Association member.

2009-2012 Hebrew University of Jerusalem. Teaching Assistant.
- Linear Algebra I (Grader).
- Logic of Mathematical Structures (Tutor).
- Mathematics for Chemistry and Earth Sciences (Tutor).
- Reviewer of papers in preparation (Example: http://shelah.logic.at/files/312.pdf under the name Omer Zilberboim).

2003-2005 Israel Airport Authority. Section Manager.

Mandatory Service in the IDF.

2000-2003 Rank at discharge: First Sergeant. Medical Corps, Medic.