**Shani Stern, Ph.D.**
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## Work and research experience

- 2020: **Principal Investigator, Sagol Department of Neurobiology, University of Haifa.** My lab focuses on modeling bipolar disorder and Parkinson's disease with human neurons derived using induced pluripotent stem cells and brain organoids. Additionally, we have started to model a few neurodevelopmental disorders and we are investigating their neurophysiological modifications. We are also searching for biomarkers for drug response in bipolar disorder and employ machine learning for the classification of drug responsiveness.

- 2003-2007: **MOTOROLA Communications Israel**
  **Team leader** of the speech processing team in the New Technologies Department. My team developed and implemented speech processing algorithms such as VAD (Voice Activity Detector) for very low SNR conditions (less than 0 dB), a few vocoder protocols, DOA (Direction of Arrival) Estimator for a microphone array, and Noise Suppressor for a microphone array. Our work included research, algorithm development, simulation, and implementation for different cellular environments (Digital Signal processors by TI). I filed 3 patents as the lead inventor and received the Motorola CEO Award for research and development in Motorola Israel in 2005.

- 2000-2003: **INTEL – cellular division, Israel**
  2003: **Team leader** in the MODEM group in the 3-pt project. My team developed the Acquisition (Initial synchronization) for GSM, GPRS, and EGPRS protocols. The work included high-level design, algorithm development, simulation, implementation (on MSA processor), and lab integration with higher layers. The algorithms implemented were embedded in 2$^{nd}$ and 2.5$^{nd}$ cellular phones.
  2000 – 2002: **Team leader** in the MODEM group in the WBCDMA project. My team developed the Low-Level Receiver for WBCDMA (3GPP protocol – 3$^{rd}$ generation cellular phones). The Low-Level Receiver controls the HW rake fingers, receives the samples from the HW rake fingers, performs rake, channel estimation, time correction for the rake fingers, and combines the received signals into bits of information to be transferred to the Viterbi or turbo decoder. My team also developed a compressed mode for WBCDMA. The work included high-level design, algorithm development, simulation, implementation on Palm (Digital Signal Processor by TI), and lab integration with HW and higher layers. The algorithms implemented were embedded in 3$^{rd}$ generation cellular phones.

- 1999-1999: **Information Storage Devices (ISD) company**

**DSP team leader**. The work included research, algorithm development, and implementation of Acoustical and Electrical Echo Canceller for hands-free telephones (DECT protocol) on an Analog Devices Digital Signal Processor.

- 1997-1998: **MOTOROLA Communications Israel**
  **DSP engineer**. Research, development, and implementation for several speech processing algorithms such as VAD (Voice Activity Detector), CNG (Comfort Noise Generator), Acoustical Echo canceller for TETRA system (cellular environment) on a Digital Signal Processor by Motorola (Onyx). The algorithms implemented were embedded in TETRA: mobile for the European defense forces.

## Education

- Sep 2015-2019: **Postdoctoral fellow**, **The Salk Institute for Biological studies**
  Postdoctoral fellow in the lab of Prof. Fred (Rusty) Gage (the president of the Salk Institute). I studied the cellular mechanisms underlying a few psychiatric disorders and Parkinson's disease using patient-derived neurons with induced pluripotent stem cell (iPSC) technology along with computational models that described the neurophysiology of these neurons. I used whole-cell patch-clamp, biophysical, and genetic assays to unravel mechanisms underlying physiological changes of neurons derived from bipolar disorder and schizophrenia patients. Using machine learning, I classified subtypes of bipolar disorder and predicted with a low error rate the response of the patient to lithium treatment. On another project, I studied the early phenotypes associated with several mutation-associated as well as idiopathic Parkinson's disease. I was also involved in the following projects in the lab: human schizophrenia patients, patients with autism spectrum disorder, epilepsy, NGLY1 intellectual disability mutation, IMPA1 intellectual disability, Tyro-1 knockout, and more. Alongside my work on brain disorders, I participated in the development of new differentiation protocols including CA3 pyramidal neurons, dopaminergic neurons, and inhibitory neurons.

- 2011-2015: **Ph.D. Physics** of Complex Systems department at the Weizmann Institute of Science in the lab of Prof. Elisha Moses with close collaboration with Prof. Menahem Segal from the Neurobiology department. Thesis title: "Ion channels and excitation of neuronal networks in health and disease". I received the Menashe Milo Memorial Prize for academic excellence and scientific accomplishments for my Ph.D. research.

- 2008-2010: **M.Sc.** Weizmann Institute of Science at the bioinformatics track in the **Computer Science** department in the lab of Prof. Amos Tanay. Thesis title: "A computational model for prediction of Polycomb recruitment elements in fruit flies' embryos".

- 1996-1997: Courses from the M.Sc. program of Electrical Engineering in Tel-Aviv University in the signal processing department.

- 1991-1995: **B.Sc.** in **Electrical Engineering** in Tel-Aviv University (cum laude).