ERAN SEGEV, PhD

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Senior Technological Leader in R&D of Biomedical Devices

- Technology **leader** in industry and **research expert** with over **ten years** as experimental researcher in **academe**
- Extensive expertise in the development, prototyping, and **preclinical *in vivo*** validation of **implantable devices**
- Solid background in system engineering with expertise in **transferring technological concepts to applied technology,** followed by **integration** into **complex systems**
- **Management** skills acquired as a **team manager** and **task leader** in the industry, and as an officer at the Israeli defense forces
- Expertise in **measurement and analysis techniques** of **electrical (RF +Microwave)**, **optical** and **MEMS devices**, as well as **imaging techniques**

PROFESSIONAL EXPERIENCE

Caltech – California Institute of Technology, USA **– Kavli nanoscience fellow** and **senior post-doc**, Departments of Applied Physics and Bioengineering (Adv. Prof. Michael Roukes) **2013 – Present**

- Develop from concept and prototype **photonic neural-probes** for **optogenetic brain research**
- Execute ***in vivo*** technology validation in **collaboration** with several neuroscience research groups.
- **Mentor** graduate and undergraduate students.

Elbit Systems ltd., Israel - **Technological group leader**, Aerospace Division **2010 – 2012**

- Developed from basics an **opto-inertial tracking** technology that met strict constraints of aviation standards. Led the **system integration** of this technology, and its dissemination within the division
- **Managed** cross-discipline professional groups, such as **hardware, software, and algorithms**
- **Supported high-level integration** between the company's products and the customers' systems

Marvell Semiconductors Ltd., Israel - **System validation engineer** **2000 – 2003**

- **Developed and executed** validation plans for Ethernet communication chips. **Design-to-manufacture** reference-design PCB's. **Embedded programing** of CPU's and FPGA's.

EDUCATION

PhD, Technion – Israel Institute of Technology, Electrical Engineering Department, Israel **2006 – 2010**

- Research focus: Quantum phenomena in superconducting microwave resonators and MEMS devices
- **Published more than 20 peer-reviewed and conference papers**. Received several awards and fellowships

MSc, **BSc**, **Technion,** Electrical Engineering Department, graduated with honor **2006, 2002**

MISCELLANEOUS

- Patents – One pending patent application
- CAD tools
  - Cad **– AutoCAD**, Solidworks
  - Analysis **- Matlab**
  - Programming **– C, C#, embedded.**
  - Simulation **- Lumerical**, MEEP, **HFSS, COMSOL**
  - Hardware design **–** Cadence, VHDL/Verilog
- Experimental techniques
  - Extensive knowledge in **instrumentation** and characterization methods of **digital, analog,** and **photonic** circuits, **navigation** devices such as **accelerometers, rate gyros,** and **GPS**, pressure **sensors**, and more
  - **Neurotechnology** experimental methods: 1P and **2P *in vivo* imaging** techniques, **fluorescence**, **electrophysiology** recording, **optogenetic** neural activation, and rodent **recovery experiments**
  - **Cryogenic** and high vacuum experimental techniques
  - 10-year of hands-on experience in microelectronics, MEMS, and photonic **fabrication (cleanroom** work**)** as well as **biocompatible packaging** techniques.

PUBLICATIONS

- Patents

  Patent Application

  1. E. Segev, T.M. Fowler, A. Faraon, and M.L. Roukes 'Implantable, highly collimated light-emitters for biological applications', US patent application number 15/295991.

- Refereed Papers in Professional Journals

  Published papers

  1. E. Segev, J. Reimer, L.C. Moreaux, T.M. Fowler, D. Chi, Maisie Lo, Karl Deisseroth, A.S. Tolias, A. Faraon, and M.L. Roukes, 'Precisely localized multi-point stimulation via photonic nanoprobes for deep brain optogenetics', Neurophotonics 4, (2017).
  2. E. Segev, O. Suchoi, O. Shtempluck, Fei Xue, and E. Buks *'Metastability in a nano-bridge based hysteretic DC-SQUID embedded in superconducting microwave resonator'*, Phys. Rev. B **83**, 104507 (2011).
  3. E. Segev, O. Suchoi, O. Shtempluck, Fei Xue, and E. Buks *'Hysteresis and intermittency in a nano-bridge based suspended DC-SQUID'*, Appl. Phys. Lett. **98**, 052504 (2011).
  4. Oren Suchoi, Baleegh Abdo, Eran Segev, Oleg Shtempluck, Miles Blencowe and Eyal Buks, *'Intermode Dephasing in a Superconducting Stripline Resonator*', Phys. Rev. B **81**, 174525 (2010).
  5. E. Segev, O. Suchoi, O. Shtempluck, and E. Buks *'Self-oscillations in a superconducting stripline resonator integrated with a dc superconducting quantum interference device'*, Appl. Phys. Lett. **95**, 152509 (2009).
  6. B. Abdo, O. Suchoi, E. Segev, O. Shtempluck, M. Blencowe and E. Buks, *'Intermodulation and parametric amplification in a superconducting stripline resonator integrated with a dc-SQUID'*, Europhys. Lett. **85**, 68001 (2009).
  7. G. Bachar, E. Segev, O. Shtempluck, S. W. Shaw and E. Buks, *'Noise Induced Intermittency in a Superconducting Microwave Resonator'*, Europhys. Lett. **89**, 17003 (2009).
  8. E. Segev, B. Abdo, O. Shtempluck, and E. Buks *'Stochastic Resonance with a Single Metastable State: Thermal instability in NbN superconducting stripline resonators'*, Phys. Rev. B **77**, 012501 (2008).
  9. E. Buks, E. Segev, S. Zaitsev, B. Abdo, and M. P. Blencowe, *'Quantum Nondemolition Measurement of Discrete Fock States of a Nanomechanical Resonator',* EuroPhys. Lett., **81** 10001 (2008).
  10. E. Segev, B. Abdo, O. Shtempluck, and E. Buks *'Utilizing Nonlinearity in a Superconducting NbN Stripline Resonator for Radiation Detection'* , IEEE Trans. Appl. Sup., **17**, pp. 271-274 (2007).
  11. E. Segev, B. Abdo, O. Shtempluck, and E. Buks *'Novel Self-Sustained Modulation in Superconducting Stripline Resonators',* Europhys. Lett. **78**, 57002 (2007).
  12. E. Segev, B. Abdo, O. Shtempluck, and E. Buks *'Thermal Instability and Self-Sustained Modulation in Superconducting NbN Stripline Resonators',* J. Phys. Cond. Matt. **19**, 096206 (2007).
  13. E. Segev, B. Abdo, O. Shtempluck, and E. Buks *'Extreme Nonlinear Phenomena in NbN Superconducting Stripline Resonators', Phys. Lett. A **366***, pp. 160-164 (2007).
  14. E. Segev, B. Abdo, O. Shtempluck, E. Buks, and B. Yurke *'Prospects of Employing Superconducting Stripline Resonators for Studying the Dynamical Casimir Effect Experimentally'*, Phys. Lett. A **370**, pp. 202-206 (2007).
  15. E. Buks, S. Zaitsev, E. Segev, B. Abdo, and M. P. Blencowe, *'Displacement Detection with a Vibrating RF SQUID: Beating the Standard Linear Limit'*, Phys. Rev. E **76**, 026217 (2007).
  16. B. Abdo, E. Segev, O. Shtempluck, and E. Buks, *'Escape rate of metastable states in a driven NbN superconducting microwave resonator'*, J. App. Phys., **101**, 083909 (2007).
  17. B. Abdo, E. Segev, O. Shtempluck, and E. Buks, *'Signal Amplification in NbN superconducting resonators via Stochastic Resonance'*, Phys. Lett. A **370**, p. 449 (2007).
  18. E. Segev, B. Abdo, O. Shtempluck, and E. Buks, *'Fast Resonance Frequency Modulation in Superconducting Stripline Resonator'*, IEEE Trans. Appl. Sup., **16** (3), P. 1943 (2006).
  19. B. Abdo, E. Segev, O. Shtempluck, and E. Buks, *'Observation of Bifurcations and Hysteresis in Nonlinear NbN Superconducting Microwave Resonators*', IEEE Trans. Appl. Sup., **16** (4), p. 1976, (2006).
  20. B. Abdo, E. Segev, O. Shtempluck, and E. Buks, *'Nonlinear dynamics in the resonance line-shape of NbN superconducting resonators'*, Phys. Rev. B **73**, 134513 (2006).
  21. B. Abdo, E. Segev, O. Shtempluck, and E. Buks, *'Intermodulation gain in nonlinear NbN superconducting microwave resonators'*, App. Phys. Lett. **88**, 022508 (2006).

- Conference Papers

  Presented papers

1. E. Segev, T. Fowler, A. Faraon, M. Roukes, 'Visible Array Waveguide Gratings for Applications of Optical Neural Probes', SPIE Photonic West, (2015).

Co-authored papers

1. B. Abdo, E. Segev, O. Shtempluck, and E. Buks, 'Unusual Nonlinear Dynamics Observed in NbN Superconducting Microwave Resonators', J. Phys.: Conference Series (EUCAS05), 43, p. 1346 (2006).
2. B. Abdo, E. Segev, O. Shtempluck, and E. Buks, 'Nonlinear effects in superconducting NbN stripline resonators', ENOC proceedings, (2005).

- Dissertation

  'Metastability and self-oscillations in superconducting microwave resonators integrated with a dc-SQUID', Research dissertation, Submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in electrical engineering, Technion, 2011.

- Master Thesis

  'Novel Self-Sustained Oscillations and Giant Nonlinearity in Superconducting Resonators', Research Thesis, Submitted in partial fulfillment of the requirement for the degree of Master of science in electrical engineering, Technion, 2006.