Curriculum Vitae

ARIE SHEINKER

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EDUCATION

All academic degrees were earned at the Department of Electrical and Computer Engineering (ECE) in the Ben-Gurion University (BGU) of the Negev, Israel.

2009 Ph.D. Dissertation: "Advanced methods for magnetic search"
(Professor B. Z. Kaplan and Dr. Lev Frumkis– BGU,
Dr. B. Ginzburg and Dr. N. Salomonski – SOREQ NRC).

2003 M.Sc. Thesis: "Target detection using optimal search theory"
(Prof. Hugo Guterman).

1993 B.Sc. Project: "AC/DC current clamp based on magnetoresistors"
(Prof. Sam Ben-Yaakov)

CURRENT RESEARCH INTERESTS

- Precise magnetic measurements.
- Magnetometers and low noise instrumentation.
- Quasi-static magnetic fields and applications in robotics, communication, and indoor localization.
- Magnetic signal processing and applications: detection, estimation, and noise cancelation.
- Magnetic navigation.
- Space magnetometry.
- Nonlinear systems and statistical learning.

EMPLOYMENT AND PROFESSIONAL EXPERIENCE

2004-present Researcher with the magnetic sensing group, SOREQ NRC, Israel.
(Ph.D. research student 2004 - 2006).

2014-2015 Research Fellow with the Department of Climate and Space Sciences and Engineering, College of Engineering, University of Michigan, Ann Arbor, USA. (Prof. Mark B. Moldwin).

2000-2003 Teaching assistant at the Ben-Gurion University of the Negev, Israel.

1993-1999 Communication systems engineering officer at the Israeli Air Force (IAF) staff, Israeli Defense Force (IDF).

TEACHING EXPERIENCE

2014 – 2015 Mentoring students with the laboratory of Prof. Mark Moldwin, Climate and Space Sciences and Engineering, College of Engineering, University of Michigan, Ann Arbor, USA.

2000 – 2003 Teaching assistant with the Department of ECE at BGU
-Digital Systems.
-Electronics.
-Assistant in the Lab. of autonomous robots and AI (Prof. Guterman).

AWARDS

2018 Israel Defense Prize named after Eliyahu Golumb
- awarded by the president of Israel.
2017 Award for creative thinking from the Head of Directorate of Israeli Defense R&D (MAFAT).
2010 Excellent team award from SOREQ NRC general manager.
2010 Award for outstanding scientist of the division of Applied Physics, SOREQ NRC.
2009 Award for creative thinking from the Head of Directorate of Israeli Defense R&D (MAFAT).
2007 Award from the head of the Electromagnetic propulsion division, SOREQ NRC.
2005 Best paper presentation award - International Conference on Sensing Technology (ICST), Palmerston North, New Zealand, 2005.
2005 Award from the head of the Electromagnetic propulsion division, SOREQ NRC.
2004 GEM student essay competition in magnetics – 5th place award.
2004 Award from the head of the Electromagnetic propulsion division, SOREQ NRC.

SCHOLARSHIPS

2014-2015 Postdoctoral fellowship from the Climate and Space Sciences and Engineering, College of Engineering, University of Michigan, Ann Arbor, USA.
2008-2014 KATZIR fellowship for promising Israeli scientists specializing in Engineering.
2001-2003 BGU scholarship for graduate students and teaching assistants.

MEMBERSHIP IN PROFESSIONAL AND SCIENTIFIC SOCIETIES

2006-present IEEE member

REVIEWER FOR SCIENTIFIC JOURNALS

2008 - 2019 IEEE Transactions on Industrial Electronics
IEEE Transactions on Instrumentation and Measurement
IEEE Transactions on Magnetics
IEEE Transactions on Geoscience and Remote Sensing Letters
IEEE Sensors Journal
Journal of Sensors and Actuators A: Physical
Journal of Circuits, Systems and Signal Processing
Journal of Measurement
Journal of Natural Gas Science & Engineering

REFEREED ARTICLES IN SCIENTIFIC JOURNALS

[1] **Sheinker A.**, Ginzburg B., Salomonski N. and Engel A., "Localization of a mobile platform equipped with a rotating magnetic dipole source", *IEEE Transactions on Instrumentation and Measurement*, Vol. 68, Issue: 1, 2019, 116-128.

[2] Leonardo H. Regoli L. H, Moldwin M. B., Pellioni M., Bronner B., Hite K., **Sheinker A.**, and Ponder B. M., *Geoscientific Instrumentation Methods and Data Systems*, Vol. 7, 2018, 129-142.

[3] Ponder B**.** M.**, Sheinker A**., and Moldwin M. B., "Using Cellphone Magnetometers for Science on CubeSats", *Journal of small satellites (JoSS)*, Vol. 5, No. 2, 2016, 449-456.

[4] **Sheinker A.**, and Moldwin M. B., "Adaptive Interference Cancelation using a Pair of Magnetometers", *IEEE Transactions on Aerospace and Electronic System*, Vol. 52, No. 1, 2016, 307-318.

[5] **Sheinker A.**, and Moldwin M. B., "Magnetic anomaly detection (MAD) of ferromagnetic pipelines using principal component analysis (PCA)", *Measurement Science and Technology*, Vol. 27, No. 4, 2016, 045104.

[6] **Sheinker A.**, Ginzburg B., Salomonski N., Frumkis L., Kaplan B. Z., and Moldwin M. B., "A method for indoor navigation based on magnetic beacons using smartphones and tablets", *Measurement*, Vol. 81, 2016, 197-209.

[7] **Sheinker A.**, Ginzburg B., Salomonski N., Frumkis L., and Kaplan B. Z., "Remote tracking of a magnetic receiver using low frequency beacons", *Measurement Science and Technology*, Vol. 25, 2014, 105101.

[8] **Sheinker A.**, Ginzburg B., Salomonski N., Frumkis L., and Kaplan B. Z., "Localization in 3D using beacons of low frequency magnetic field", *IEEE Transactions on Instrumentation and Measurement*, Vol. 62, Issue 12, 2013, 3194-3201.

[9] **Sheinker A.**, Ginzburg B., Salomonski N., Frumkis L., and Kaplan B. Z., "Localization in 2D using beacons of low frequency magnetic field", *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing* (*JSTARS*), Vol. 6, 2013, 1020-1030.

[10] **Sheinker A.**, Ginzburg B., Salomonski N., Dickstein P. A., Frumkis L., and Kaplan B. Z., "Magnetic Anomaly Detection (MAD) using High Order Crossing (HOC) Method", *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 50, 2012, 1095-1103.

[11] Kaplan B. Z., Suissa U., Yardeny D., and **Sheinker A**., "Classifying EM Sensors According to the Frequency of Operation", *Radio Science Bulletin*, September, 2010, 58-63.

[12] **Sheinker A.**, Frumkis L., Ginzburg B., Salomonski N., and Kaplan B. Z, "Magnetic Anomaly Detection using a Three-Axis Magnetometer", *IEEE Transactions on Magnetics*, Vol. 45, 2009, 160-167.

[13] **Sheinker A.**, Salomonski N., Ginzburg B., Frumkis L., and Kaplan B. Z., "Remote sensing of a magnetic target utilizing population based incremental learning", *Sensors and Actuators A: Physical*, Vol. 143, 2008, 215-223.

[14] Ginzburg B., Frumkis L., Kaplan B. Z., **Sheinker A.**, and Salomonski N., "Investigation of advanced data processing technique in magnetic anomaly detection systems", *International Journal on Smart Sensing and Intelligent Systems*, Vol. 1, 2008, 110-122.

[15] **Sheinker A.**, Salomonski N., Ginzburg B., Frumkis L., and Kaplan B. Z., "Magnetic anomaly detection using entropy filter", *Measurement Science and Technology*, Vol. 19, 2008, 045205.

[16] **Sheinker A.**, Lerner B., Salomonski N., Ginzburg B., Frumkis L., and Kaplan B. Z., "Localization and magnetic moment estimation of a ferromagnetic target by simulated annealing", *Measurement Science and Technology*, Vol. 18, 2007, 3451-3457.

[17] **Sheinker A.**, Shkalim A., Salomonski N., Ginzburg B., Frumkis L., and Kaplan B. Z., "Processing of a scalar magnetometer signal contaminated by $1/f^{\alpha}$ noise", *Sensors and Actuators A: Physical*, Vol. 138, 2007, 105-111.

CONFERENCES

[1] Ginzburg B., Persky E., **Sheinker A.**, Salomonski N., Yaniv A., Noiman A., Naim A., and Wolf M.: "Estimation of a Vessels Magnetic Signature using Magnetic Moment Modeling Method", *International Conference on Marine Electromagnetics (MARELEC)*, Woods Hole, MA, USA, October, (2019).

[2] Yaniv A., **Sheinker A.**, Ginzburg B., Salomonski N., Ashkenazy J., and Kutsher Y., "Exploration of Earth's Magnetic Field by High Altitude Balloons", *24th ESA Symposium on European Rocket and Balloon Programs and Related Research*, Essen, Germany, June 16-20, 2019.

[3] Ginzburg B., **Sheinker A.**, Salomonski A., Wolf M., and Yaniv A, "Underwater to Air Magnetic communication link budget", *International Conference on Marine Electromagnetics (MARELEC)*, Liverpool, UK, June, 2017.

[4] Moldwin M. B., and **Sheinker A.**, "Adaptive interference cancelation using a pair of magnetometers for small satellite applications: no need for a boom", *American Geophysical Union (AGU)*, San Francisco, CA, USA, December, 2015.

[5] Ginzburg B., **Sheinker A.**, Salomonski N., Wolf M., Yaniv A., Noiman A., "UAV to AUV an air-underwater magnetic communication link", *International Conference on Marine Electromagnetics (MARELEC)*, Philadelphia, USA, 2015.

[6] Ginzburg B., **Sheinker A.**, Salomonski N., Frumkis L., and Kaplan B. Z., "Link Model for Underwater Low Frequency Magnetic Communication", *International Conference on Marine Electromagnetics (MARELEC)*, Hamburg, Germany, 2013.

[7] Ginzburg B., **Sheinker A.**, Salomonski N., Frumkis L., and Kaplan B. Z., "Maritime Sensors Network for Magnetic Detection – Preliminary Test", *International Conference on Marine Electromagnetics (MARELEC)*, San Diego, USA, 2011.

[8] **Sheinker A.** , Ginzburg B. , Salomonski N. , Frumkis L. , and Kaplan B. Z. , "Localization and moment estimation using a magnetic sensor array", *IEEE Sensors 2010 Conference*, Hawaii, USA, 2010.

[9] Ginzburg B. , **Sheinker A.** , Salomonski N. , Frumkis L. , Kaplan B. Z. , "Application of target-based and noise-based methods in magnetic anomaly detection systems", *International Conference on Marine Electromagnetics (MARELEC)*, Stockholm, Sweden, 2009.

[10] **Sheinker A.**, Salomonski N., Ginzburg B., Frumkis L., and Kaplan B. Z., "Magnetic Anomaly Eigen-detection", *Progress In Electromagnetics Research Symposium, PIERS,* MA: Cambridge, USA, 2008, 102.

[11] Kaplan B. Z., **Sheinker A.**, and Suissa U., "Fundamental Properties of DC Field Sensors", *Progress In Electromagnetics Research Symposium, PIERS*, MA: Cambridge, USA, 2008, 37.

[12] **Sheinker A.**, Shkalim A., Salomonski N., Ginzburg B., Frumkis L., and Kaplan B. Z., "Network of remote sensors for magnetic detection", *Proceedings of the 4th International Conference on Information Technology: Research and Education, ITRE,* Tel-Aviv, Israel, 2006.

[13] Ginzburg B., **Sheinker A.**, Frumkis L., Kaplan B. Z., and Salomonski N., "Investigation of advanced data processing technique in magnetic anomaly detection systems", *International Conference on Sensing Technology*, *ICST*, Palmerston North, New Zealand, 2005, 561-566.

[14] **Sheinker A.**, Salomonski N., Ginzburg B., Frumkis L., and Kaplan B. Z., "Aeromagnetic Search using Genetic Algorithm", *Progress in Electromagnetic Research Symposium, PIERS*, Hangzhou, China, 2005, 492-495.

SEMINARS, WORKSHOPS, ESSAYS AND INVITED TALKS (A SELECTED LIST)

2015 "Magnetic localization system",
I-Corps, Energy & Transportation, NextEnergy, Detroit, Michigan, USA.

2012 "Precise magnetic measurements"
Department of Atmospheric, Oceanic and Space Sciences, University of Michigan, USA.

2012 "Remote magnetic sensing"
Workshop on Remote Sensing, SOREQ NRC, Israel.

2009 "Magnetic Anomaly detection using a referenced pair of magnetic sensors"
Human, Light Vehicle and Tunnel Detection Workshop at the Army Research Lab (ARL), Maryland, USA.

2008 "Investigation of advanced methods for magnetic search"
Ph. D. seminar at the Department of Electrical and Computer Engineering, BGU, Israel.

2004 "Search and detection of marine wrecks using airborne magnetometer",
international student essay awards in magnetics.

TECHNICAL REPORTS

2015 “Indoor localization system based on magnetic beacons for kinesthetic learning", University of Michigan.

2004 – 2019 Co-author of over 42 SOREQ NRC reports (principal investigator in 29).

PATENTS

2015 Sheinker A., and Moldwin M. B, "Magnetic Beacon Self-Localization Using Mobile Device Magnetometers", US 20160245638A1, February 23, 2015.

2014 Sheinker A., Ginzburg B., and Salomonski N., “Magnetic tracking system”, US 20140239943A1, August 28, 2014.