

Guy Satat

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Education

Massachusetts Institute of Technology (MIT), Cambridge, MA, USA **2013 - 2015**

Master of Science in Media Arts and Science (MAS) program, GPA: 5.0/5.0

Thesis: "Imaging Through Scattering"

Technion – Israel Institute of Technology, Haifa, Israel **2008 - 2013**

Bachelor of Science in Electrical Engineering cum laude and

Bachelor of Science in Physics cum laude

Cumulative average: 94.5/100

Research Experience

Massachusetts Institute of Technology (MIT), Cambridge, MA, USA **09/2013 - present**

Research Assistant, MIT Media Lab, Camera Culture group

Advisor: Prof. Ramesh Raskar

Developing methods for imaging through scattering media. The methods are based on a combination of novel signal processing techniques and modified hardware.

- Demonstrated reconstruction of a scene hidden behind a diffuser, including spatial information and fluorescence lifetime. The method is based on time-resolved measurements (using a Ti:Sapph laser and a streak camera), light transport equations and sparsity-based reconstruction. Work included both optics bench measurements and development of the algorithms. Accepted for *Nature Communications*.
- Developed a device to measure blood flow speed in skin tissue. The device is based on a standard camera and laser diodes. Using computational photography the measurement process is robust, making the technology suitable for practical applications. Currently leading a group of five students in India searching for clinical applications for the technology.

Technion – Israel Institute of Technology, Haifa, Israel **07/2011 - 12/2013**

Undergraduate research projects, EE department

Investigated methods for using Memristors in future computer architectures.

- Researched and invented novel methods for using Memristors as logic elements. Performed quantitative analysis and comparison between different implementations of logic gates with Memristors.
- Implemented an architecture for novel switch-on-event pipeline architecture based on Memristors. The new architecture uses Memristors as on-chip memory. Work included defining the micro-architecture and implementing the full system in Verilog for quantitative performance analysis.

Massachusetts Institute of Technology (MIT), Cambridge, MA, USA **09/2012 - 10/2012**

Visiting student, MIT Media Lab, Camera Culture group

Worked on glasses-free displays: a solution that enables people who wear glasses to read from a monitor without wearing them. The solution was based on pure software and not sophisticated optics as done in the past.

Work Experience

Intel – Israel Development Center, Haifa
CPU system architect

04/2011 - 07/2013

Part of a team developing future computer architectures for mobile processors. Worked on CPU interconnect architecture. Analyzed system behavior in heterogeneous workloads and suggested novel architectural features to improve overall system performance as well as power consumption.

- Invented and defined a method to significantly reduce CPU power consumption while maintaining system performance by dynamic analysis of system bottlenecks.
- Developed a feature for improving network behavior by real time allocation of system resources.
- Designed a general routing schematic that improves the supplied network bandwidth.

Other Experience

Reviewer for scientific journal
Optics Letters (OSA).

2014

Instructor for MIT class
MAS.532 – Inverse problems in imaging

2015

Israeli Air Force
Rank: Major. Served as an air traffic controller.

01/2002 - 07/2007

Managed a team of 50 people (including 20 air traffic control officers) to meet the unit's goals in real time. Responsibilities included safety, training requirements and manpower allocation. Efficiently handled real time crises as central post shift manager. Officer in charge of operational systems development.

Honors and Awards

- MIT Tata Center fellow (full tuition and stipend).
- Intel department award for novel architecture feature.
- Graduated cum laude as part of the Technion's Program for Excellence.
- Technion Dean's list of honors for scholastic achievements for semesters 1, 2, 3, 5, 7.
- Technion President's list of honors for scholastic achievements for semesters 4, 6.
- Technion Oz Mozes Award for the year 2012 for excellent research project.
- Technion Eyal Shapira Fellowship for the year 2012.
- Technion-MIT Internship Program (TMIP) fellowship for the year 2012.
- Intel Award for excellent academic achievements.
- Technion Finzi Award for the year 2011.
- Israel Air Force – chosen excellent officer by the Head of the Aerial Squadrons.
- Israel Air Force – chosen excellent officer of the unit.

Publications and Patents

Journal papers

- **G. Satat**, B. Heshmat, C. Barsi, D. Raviv, O. Chen, M.G. Bawendi and R. Raskar, "Locating and Classifying Fluorescent Tags Behind Turbid Layers Non-Invasively Using Sparsity-Based Time-Resolved Inversion", Accepted *Nature Communications*.
- S. Kvatinsky, D. Belousov, S. Liman, **G. Satat**, N. Wald, E.G. Friedman, A. Kolodny, U.C. Weiser, "MAGIC – Memristor Aided LoGIC," *IEEE Transactions on Circuits and Systems II: Express Briefs*, Vol. 61, No. 11, pp. 1-5, November 2014.
- S. Kvatinsky, **G. Satat**, N. Wald, E. G. Friedman, A. Kolodny, and U. C. Weiser, "Memristor-based Material Implication (IMPLY) Logic: Design Principles and Methodologies," *IEEE Transactions on Very Large Scale Integration (VLSI)*, Vol. 22, No. 10, pp. 2054-2066, October 2014.

Refereed Conference Proceedings (full papers)

- **G. Satat**, C. Barsi and R. Raskar, "Skin Perfusion Photography," *IEEE International Conference on Computational Photography (ICCP)*, pp.1-8, 2-4 May 2014.
- S. Kvatinsky, N. Wald, **G. Satat**, A. Kolodny, U. C. Weiser and E. G. Friedman, "MRL - Memristor Ratioed Logic," *Proceedings of the International Cellular Nanoscale Networks and their Applications*, pp. 1-6, August 2012.

Conferences

- **G. Satat**, C. Barsi, B. Heshmat, D. Raviv, and R. Raskar, "Locating Fluorescence Lifetimes Behind Turbid Layers Non-Invasively Using Sparse, Time-Resolved Inversion," in *CLEO: 2014* (poster).
- B. Heshmat, **G. Satat**, C. Barsi, and R. Raskar, "Single-Shot Ultrafast Imaging Using Parallax-Free Alignment with a Tilted Lenslet Array," in *CLEO: 2014* (oral).
- **G. Satat**, C. Barsi and R. Raskar, "Skin Perfusion Photography," *3rd IEEE International Workshop on Computational Cameras and Displays*, June 2014 (poster).

Patents

- Internal communication interconnect scalability, US patent 13/793,684.
- Adaptive admission control for on die interconnect, US patent 14/142,748.
- A pure memristive logic gate, US patent 14/641,482.