Elad Hoxter, Ph.D.

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Computer Vision Algorithms Developer

PhD in Electro-Optics and Photonics. Experienced in various areas in the fields of Cameras and Sensing, from the first stages of Fabrication and Testing of the sensors as well as the cameras' Optical Design, through Image Processing pipeline, manipulations and filters application on images, object detection and tracking, to Computer Vision, Machine Learning and Deep Learning realized in Python and Matlab languages. Deep mathematical understanding of Perspectives, Projective Geometry, Homogeneous Transformations, Homography and Multiple View Geometry, as well as extraction and building of the Intrinsic and Extrinsic matrices of a camera. Hands on optical setups and testing, depth sensing cameras - integration, calibration, validation and analysis for eye tracking, robotics and range sensing applications. Track record of theoretical and experimental research of QD-based photodetectors, including publications and conference presentations.

TECHNICAL PROFICIENCIES

Processes:	Light-matter interaction simulations of semiconductors and metals, waveguide dispersion, photonic crystals transmission and reflection, high-speed RF characterization, lithography, lift-off, ion beam milling,
Tools:	MATLAB, Python, R (basics), Simulink, Git bash, C++ and Linux (basics), Zemax, Beam profiler (Spiricon), JMP.
Testing Methodologies:	Optical tests - photoluminescence, transmission, reflection, fluorescence lifetime, electrical tests - four-point probe, responsivity.

Professional Experience

Sixdof Space

Sr. Computer Vision Algorithm Researcher and Project Manager (2019 – Present)

Leading a project of synchronized multiple systems involving algorithms, HW, SW and FW. The project's goal is to develop the SLAM framework of an array of systems, each has a board that optically detects in real time the features mounted on its neighbouring system and calculate its relative 6 degrees of freedom (6DOF).

- Participating in the development of the mathematical model, realized in Matlab, that calculates the 6DOF and fed into the general Simultaneous Localization and Mapping (SLAM).
- Building the real time visualization framework using animation library in python,
- Managing timelines, writing reports summaries and synchronizing between the different subprojects.
- Testing and results analysis.
- Managing the Ethernet and Wi-Fi Communications with the Raspberry Pi (RPi) computers that sit in each system, such as determining their static IP addresses, connect them to the git repositories and writing batch files to automate operations.

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Eyeway-Vision

Sr. Physicist/Electro-Optical Engineer (2018 – 2019)

Orchestrate projects with cross-functional team to conduct R&D of augmented reality system. Facilitate planning meetings, establish timelines affording integration of activities from different groups, and coordinate optical assembly, characterization, and validation. Leverage knowledge of Python, Zemax simulations, Simulink, and real-time systems integrated with optical systems to develop product and troubleshoot problems.

- Completed optical setups, beam stirring, active alignment, and laser-beam coaxial alignment.
- Set up, calibrated, and performed lab experiments on stereo camera-based eye-tracker, achieving proof-of-concept for proprietary technology setting company apart from competitors.

Intel

Computer-Vision, PerC/RealSense and Image Signal Processing intern (2014 – 2018)

Modified images and built setup for 3D-TV; wrote MATLAB metrics to calculate, analyse, and process 3D images; and calibrated units. Measured spherical power distribution from laser-based projector. Regarded for subject matter knowledge and called upon by colleagues for advice and troubleshooting.

- Simulated optical inverse distortion of fish-eye lenses for MTF calculations.
- Created automatic optical setup enabling elliptical polarization measurements while conducting R&D for tracking and range-sensing 3D cameras.

Performed spectral analysis and validations and utilized Fourier analysis to evaluate flickering for different illumination sources. Built MATLAB GUI-based analysis tools including calculation scripts to evaluate product performance.

- Demonstrated profound understanding of optical assembly principles and issues.
- Developed simulation of standard illuminants such as D50 and D65 from integrated sphere multi-channel LED.

Electro-Optics Intern, Silicon Photonics (2012 – 2014)

Prepared testing plans and wrote MATLAB code for Testing group engaged in R&D of integrated optics. Engaged in electrical and optical testing of waveguides and detectors, statistical data analysis and visualization using MATLAB and JMP, and automation tool set-up for switching between visible and IR lasers. Established processes and fabricated optical detectors in clean room for Detectors group. Used ellipsometer, CDSEM, TG, and Opty to complete metrology characterizations.

- Received recognition for contributions to Testing group for successfully supporting testing and providing results analysis for waveguides outside of normal working hours.
- Collaborated with parallel design group in California, managing time zones and culture differences to achieve goals in a timely manner.

Previous military experience: fighter support at Sayeret Shaldag.

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Education

Ben-Gurion University, Electro-Optics and Photonics (2012 - 2018): **Ph.D. & M.Sc. Combined Program.**
Supervisor: Prof. Gabby Sarusi

- Researched, developed, designed, fabricated, and characterized Pb-salts Quantum Dots-based photodetectors used as the absorption section of a miniature, short wavelength infrared (SWIR) beam to visible, direct up-conversion device.
- Followed industry best practices and regulations while conducting electrical and optical tests of absorption device sensitizing layer, modeling and simulating various functions using MATLAB, setting up biased photo-responsive system including user interface (UI), and designing up-conversion device.
- Participating in the establishment of a new lab .

Jerusalem College of Technology, Physics (2006-2011): **B.Sc. in Physics and Medical Engineering**

- Wrote MATLAB code from roentgen data for early detection of osteoporosis; extracted data by Fourier transform.

PUBLICATIONS (click to follow link)

- Electrical and optical characterization of quantum dots PbS/TiO_2 based heterojunction as a SWIR detector and a proposed design of PbS/TiO_2-PeLED as a SWIR to visible upconversion device
- Modeling the PbS quantum dots complex dielectric function by adjusting the E-k diagram critical points of bulk PbS
- Design and measurements of the absorption section of an up-conversion device based on PbSe quantum-dots
- Optical and electrical characterizations of a single step ion beam milling mesa devices of chloride passivated PbS colloidal quantum dots based film
- Electrical conduction mechanisms in PbSe and PbS nano crystals 3D matrix layer
- Architecture, development and implementation of a SWIR to visible integrated up-conversion imaging device

Online courses

- Machine Learning A-Z™: Hands-On Python & R In Data Science
- Python for Computer Vision with OpenCV and Deep Learning
- Deep Learning: Advanced Computer Vision (GANs, SSD, +More!)
- Python, Machine Learning and Algorithmic Trading Masterclass