

LANA PANASYUK, PhD, MBA
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SCIENTIST

Applied Physicist & Entrepreneur, MATLAB expert & C/C++, System-level R&D Leader with > 25 years of scientific, technical & management experience in Sensor & Scientific Instrument industries, Medical Device & Application Software. Enthusiastic cross-discipline team player delivering technology from discovery to commercialization in dynamic work environments.

System Design, Analysis, Modeling, Optimization, Statistics of Multidimensional Data from Complicated Systems in Electro-Optical, Infrared, and Multi-Sensor Technologies for DoD, DHS, Space Surveillance & Medical Applications.

Detection and Tracking Algorithms for timely & predictive information about objects of interest utilizing signal and image processing across hyperspectral domains, Neural Networks, Bayesian statistics, data fusion & Fuzzy Logic.

Full cycle of product development including product vision, requirement gathering & specification, architecture & design, prototype, build, high precision device calibration, deployment & support.

PROFESSIONAL EXPERIENCE

RESPIRATORY MOTION INC.

Watertown, MA 11/2019 to current

Fast growing medical device company, specializing in non-invasive monitoring of respiratory status using electrical impedance across a patient thorax and sophisticated mathematical algorithms.

Co-founder, interim VP of Research & Product Development leading a team of engineers and clinical specialists to develop and deliver multiple generations of product line, to provide medical research and data analysis supporting clinical studies and customers with fielded monitors.

BAE SYSTEMS INC., FAST Labs

Burlington, MA 2/2020 to 11/2020

Research and Development Group at a multinational defense, security, and aerospace company.

Senior Principal Scientist II in Autonomy, Controls, & Estimation Group developing multi-target, multi-sensor tracking, identification and fusion algorithms, approaches, and systems.

MIT LINCOLN LABORATORY via APEX INC

Lexington, MA 4/2009 to 10/2019

Space Systems & Technology Division, Advanced Sensors and Techniques Group

- Recognized, predicted, designed, and implemented a 50% system-level improvement in Space Surveillance Telescope operation. Tested and verified performance for observed satellites and space debris across multiple environmental and target position scenarios. Ported MATLAB algorithm to C/C++. Collaborated with SW team to incorporate the improvement into legacy C-package controlling telescope operations. Introduced, developed, and verified performance with google test environment, across MATLAB & C implementations. Led final stages of modernization with updates of archaic functionality.
- Developed MATLAB library to simulate astrodynamics and telescope observations for any time/location and telescope characteristics (drive type and field of view). Generalized for multiple operating telescopes.
- Optimized the Simplified General Perturbations (SGP4) propagator for MATLAB that resulted in 30-to-100 times speed up across different task scenarios, allowing for efficient astrodynamics simulations and system-level performance evaluation.
- Facilitated development of the CONUS based Support Center for Data Processing by defining requirements and interface-control-documents across multiple components of the acquisition system, provided initial planning and operational support.
- Designed a plan to improve robustness of data support and image processing for multiple Radar Imaging Sensors. Initiated unit testing, executables generation, access to GIT repository system and LLGrid super-computing environments.

Space Systems & Technology Division, Integrated Systems and Concepts Group

- Spearheaded development of tracking algorithm that enabled commercialization of LL-prototyped wide-area surveillance system. Initiated, designed and developed the detection, tracking and classification suite of algorithms for wide-area surveillance systems, Hybrid Tracker & Classifier. Lead and contributed in porting MATLAB algorithms onto C++ fielded passive IR system to cue additional resources (pointer-camera and/or radar) in real-time to enable and facilitate human-in-the-loop ground-based scenarios of situational awareness. Lead technology transfer to a commercial entity.
- Explored space-based wide-area surveillance data delivered by an optical satellite for real-time weak target detection and tracking, suggested way forward for further development of concept.
- Designed, built, implemented and established color calibration methodology including hardware, electronics, and software development for three systems performing wide-area surveillance.
- Developed, characterized, and tested in a fielded sensor system detection-guided compression – a new image compression algorithm for air-born wide-area surveillance imagery.

- Qualified and quantified, developed and tested numerous video-processing algorithms for visible and IR sensors, including video-based compression, sub-pixel resolution demosaicing, flat-field and non-uniformity correction, high-dynamic range processing and reduction, characterization and minimization of video and sensor artifacts such as vignetting, “ghost-image” reflectance, hot-pixel, spectral and random Telegraph Noise.
- Completed and delivered to sponsors two stand-alone SW products: ClearWater and customIIS. Full development cycle included requirement gathering, specification, architecture, design, prototype, build, deployment, customer support & product upgrade. The ClearWater enables visual target identification in turbid media with variable lightning conditions via new FFT-based video registration and SNR-reduction algorithm. The customIIS enables custom optical design for IIS-type sensor delivering specifications of COTS system components to satisfy requirements for regional wide-area surveillance via projecting optical paths outward (applicable in both indoor and outdoor environments).
- Designed, evaluated and proposed new stereo system to expand capabilities of existing IR sensor.
- Led collaboration program with LLNL on persistence surveillance, supported sponsor’s visits and program management reviews, presented ideas, concepts, results and proposals to a wide spectrum of audiences at Group, Laboratory, and sponsor meetings. Wrote white papers, co-authored a patent, submitted technical disclosure.

JEF CORE, INC. **Weston, MA** **2007 to 2009**
 Consulting company focusing on integrating business, technology & medicine.
Chief Technology Officer Evaluated technical solutions, pricing strategy in new product development, delivered market analysis. Prepared grant applications and business plans for early development.

HYPERMED, INC. **Waltham, MA** **2004 to 2007**
 Fast growing medical device company, commercializing novel imaging modality that combines advanced optics with sophisticated mathematical algorithms to identify subtle changes in composition.
Co-founder, Senior Vice President of Research & Development Spearheaded development of hyperspectral imaging technology for medical applications. Devised several generations of product to enhance accuracy, improve customer satisfaction, and ease market penetration. Led development of proprietary software platform, ensured GMP compliance and timely product/service delivery to early customers. Assembled hardware and software engineering teams and led product development from a pilot, through technical and clinical validation, to a commercial, FDA-cleared product. Led ground-breaking research projects, published in leading journals, conferences, trade shows. Authored & developed several patents.

DIMENSIONAL PHOTONICS, INC. **Southborough, MA** **2003 to 2004**
 Developer of 3D digital shape scanning systems, based on Accordion Fringe Interferometry (LLMIT), acquired by FARO.
Senior Scientist Re-formulated AFI approach to triple product accuracy & precision, reaching limits of existing hardware. Led engineering team to reconfigure product. Designed & implemented calibration for receiver, detector, interference sources, triangulation positioning system, image-processing algorithms at production-level to streamline user interface.

ARGOSE, INC. **Waltham, MA** **2002 to 2003**
 Medical device startup developing non-invasive glucose monitors for detecting and monitoring glucose, out of business.
Senior Scientist, Director of Calibration Designed algorithms to analyze fluorescence spectra & images via chemometrics & multivariate analysis, Monte Carlo numerical simulation of photon propagation in turbid media, classification & regression.

THE MATHWORKS, INC. **Natick, MA** **2000 to 2002**
 The leading developer and supplier of technical computing software in the world.
Software developer in Image Processing. Developed deconvolution library, Java prototype of image processing GUI using object-oriented analysis & design. Assisted in defining Remote Sensing project, product features, planning, customer visits.

Early Career (details on request):

- Fellowship Scientist, Harvard University* (1998-2001) Developed model of Earth structure & planet deformation using data/model uncertainty based optimization techniques. Led international collaboration.
- RA, TA, and Management Assistant, MIT* (1992-1998) Taught in Geodynamics, Gravity, Phase transitions, Continuum Mechanics, GeoSystems, Satellite Geodesy, GPS data & error analysis, instrument control, Matlab programming. Organized, participated & facilitated meetings in Washington DC, Cape Code, Boston, Kirgizia, and Kazakhstan.
- Visiting Scientist, Caltech, UCLA* (1990) Participated in seismology & GPS experiments to measure San Andreas Fault.
- Research Scientist, Russian Academy of Sciences* (1985-1992) Developed numerical simulation of acoustic waves propagation from a long phased array in a layered media, calculated and analyzed intensity and sensitivity profiles.

EDUCATION

MS, Applied Physics and Technology	<i>Moscow Institute of Physics & Technology (MIPT)</i>	1988
PhD, Geophysics	<i>Massachusetts Institute of Technology (MIT)</i>	1998
Postdoctoral Fellowship, Geophysics	<i>Harvard University</i>	2000
MBA, Entrepreneurship	<i>Babson College</i>	2008

Patents & publications are available on request.