Alex I. Martin

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SKILLS

- Programming (Advanced, 5+ years): MATLAB/Simulink, Octave, MS Excel, C++, LabVIEW, Arduino, Python
- CAD/FEA (Advanced, 5+ years): SOLIDWORKS, MSC Nastran, ANSYS, AutoCAD, Fritzing
- Manufacturing (Beginner, 2 years): Photolithography, Nanomaterials, Mechatronics, 3D printing, In-line testing
- Non-technical skills (Intermediate, 3+ years): MS Office, Research, Writing, Presentations, Teamwork, Leading

EXPERIENCE

Luminit, LLC **Torrance, CA**

Optomechanical Engineer **January 2018 - Present**

- Co-founding member of Light Shaping Micro-optics group for leading process and production of 3D micro-structures
- Earned *Special Award for Extraordinary Achievements in LSM Bring-up and Development*, 2018
- Established new product lines and technologies, including variable diffusers, DOEs, and stacked holographic panels
- Process development of high-volume manufacturing (exposing, developing, inspection, tooling, and production)
- Design of 2D and 3D greyscale profiling image for photolithography using Direct Write Laser (DWL) toolset
- Responsible for leading weekly engineering group meetings and bi-weekly customer meetings

Research and Development Technician **August 2017 - January 2018**

- Research, writing, and support of SBIR government funded projects and internal research and reports
- Improvements of R2R mass production machines including thermal lamination, UV curing, and automated testing
- Component and housing design of Near-To-Eye LED and laser-based prototypes using SOLIDWORKS and 3D printing
- Image reconstruction for laser-based mixed-color heads up displays using MATLAB

AquaLoco **University of California, Irvine**

Undergraduate Researcher/Project Manager **September 2016 - August 2017**

- Developed a multi-joint biomimetic propulsion system for large oversea and underwater vessels
- Automated control of multi-degree of freedom mechatronic system including 5 motors and over 10 sensors
- Performance testing and modeling of mechanical efficiencies by propulsion mechanism compared to a propeller
- Motion studies of hydraulic performance and movement using machine vision, image tracing, and data analysis

EDUCATION

University of California, Irvine **June 2017**

Bachelor of Science in Mechanical Engineering

Specialization in Design of Mechanical Systems

Minor in Biomedical Engineering

Add'l. Graduate Coursework: Engineering Analysis I (Fall 2017), Haptic System Design (Spring 2018)

PATENTS

1. **A. Martin**. 2019. Micro-optic Cell Design with Randomly Positioned Lenslets and Statistical Reconstruction of a Micro-lens Array. U.S. Patent Application 62800230, filed February 2019. Patent Pending.
2. A. Ang and **A. Martin**. 2018. Optical Element Having a Randomizing Digital Lens Array and a Diffuser. U.S. Patent Application 62758300, filed November 2018. Patent Pending.

PUBLICATIONS

1. A. Gulses, S. Rai, J. Padiyar, S. Crowley, **A. Martin**, G. Islas, R. Kurtz, T. Forrester, D. Guimary. Laser beam shaping with computer-generated holograms for fiducial marking. SPIE Optics + Photonics 2019. PMCID – in progress.

RESEARCH SUPPORT

HQ072718P0029 **A. Gulses (PI)** **August 2018 - February 2019**
Defense Microelectronics Activity (HQ) DMEA/MECA SBIR Phase I
Holographic Projection Laser Marking System (HoloMark)
To address the DMEA need for Through-Lens Fiducial Marking System, Luminit, LLC proposes to develop a new Holographic Projection Laser Marking System (HoloMark). This proposed device is based on a new design that utilizes Luminit-developed mature components like computer-generated hologram technology. The innovation will enable precise, fast and lower cost marks on any substrate, consistent with the solicitation. In Phase I, Luminit will demonstrate the feasibility of HoloMark by designing and building the sub-system that will be attached to the microscopes of the agency. In Phase II, Luminit, LLC plans to integrate HoloMark onto the desired platforms and test afterwards.
Role: Co-Investigator (Pulsing CGH Fabrication)

N68335-18-C-0410 **A. Gulses (PI)** **May 2018 - November 2018**
Navy SBIR Phase I
Uniform Diffuser Composed of Cascaded CGHs (UNIC)
To meet the Navy's need for a Diffractive Optical Element (DOE) for laser beam homogenization at spectral window from 0.9 um to 6 um, Luminit, LLC, proposes to develop the Uniform Diffuser Composed of Cascaded CGHs (UNIC). UNIC, will be composed of several DOEs in a form of Computer Generated Holograms (CGHs), designed digitally and arranged in a stacked setup with separation distance less than a millimeter. Thus, the cascaded CGHs can use free space propagation between these elements to handle the large spectral width and can exhibit a superior performance in uniformizing input beam, regardless of the beams starting spatial configuration. In Phase I, a single diffractive CGH will be demonstrated and spectral dependence will be investigated further. In Phase II, we will fabricate and demonstrate the UNIC system with 3 or 4 elements for the desired parameters for the agency.
Role: Co-Investigator (Monolithic MID-IR CGH Fabrication)

N68335-18-C-0408 **R. Kurtz (PI)** **May 2018 - November 2018**
Navy STTR with Southern Illinois University Phase I
Concrete Materials Characterization (COMAC)
To meet the U.S. Navy, specifically PMA-201, need for nondestructive evaluation (NDE) of concrete, including evaluating its strength, material properties, and damage localization, Luminit, LLC, and Southern Illinois University (SIU) propose to develop a novel Concrete Materials Characterization (COMAC) system, combining several methods of concrete characterization into a single sensor/software combination. The COMAC will use ultrasonic, physical, thermal, and radiographic methods to measure macroscopic values, then combine these measurements to calculate relevant concrete parameters. The combination of complementary measurements will provide a faster and more accurate characterization of the concrete to be measured and will provide data for inclusion into Holmquist-Johnson-Cook modeling and the Navy's hydrocode models. The COMAC will fit within 6 cubic feet, weigh less than 20 pounds, and be capable of a complete operation including setup, test, and packing-up in under 45 minutes. In Phase I, we will analyze the available technologies and determine the minimum set that will provide the complete information needed, ending with a Technology Readiness Level (TRL) 3 laboratory test prototype and software description. During Phase II we will develop this into a fully testable engineering prototype that, after testing by the Navy, will be at TRL 6.
Role: Co-Investigator (Programming Graphical User Interface, GUI)