

LUMINATE Final Round Lightning Presentations

Accuret LLC	Filipp Ignatovich	QuickPic is a small held-help retinal camera that is intended to replace the direct ophthalmoscope as a routine fundus inspection tool and enable healthcare professional to diagnose vision problems in the early stage, and thus not only improve the quality of life for many patients but also reduce associated treatment costs. Currently, there is no routine retinal inspection tool exists that produces an examination record (picture of the retina).
Arovia, Inc.	Alexander Wesley	Arovia has created the Spontaneous Pop-Up Display (SPUD), the first collapsible display. SPUD allows users to quickly “pop-up” a 24-inch screen (though other screen sizes and many other variations planned) that connects to any of your mobile devices, and then fold it to the size of a book for immediate portability. Our vision is to create a TV-sized tablet that fits in your pocket. SPUD can be conceptualized as a portable projector connected to an umbrella.
Bounce Imaging	Francisco Aguilar	We make 360/VR throwable tactical cameras for first-responders. The enabling technology for that is highly-efficient, noise-resistant, stabilized panoramic video processing. Instead of relying on traditional SIFT/SURF feature-matching methods, which are computationally expensive and sensitive to image quality problems, we use a training algorithm at manufacture that allows for a pixel-level panoramic reconstruction of a scene in 360/VR that is 200X faster than other approaches.
Chromacity	Christopher Leburn	Chromacity’s patented core technology exploits ytterbium gain media to allow us to construct high efficiency, high brightness, short-pulsed pump sources which can then be incorporated into our range of broadly tunable optical parametric oscillator (OPO) platforms, giving coverage across the near-infrared, and extending into the mid-infrared. The core technology originally produced 500 mW of optical power. Through a programme of development this core technology can now deliver >2.5 W of optical power for our high average power OPO platform.

Dimensional Energy

Jason Salfi

Dimensional Energy is developing HI-LIGHT, a photo-thermocatalytic reactor for the production of liquid fuels (i.e. methanol) and chemical feedstocks (i.e. syngas). We base our reactor design on a classic shell and tube reactor in which the tubes (energy supply) are replaced by optical waveguides.

Double Helix LLC

Leslie Kimerling

As 3D information is increasingly incorporated into real-world applications, a major challenge has been integrating depth information with increased resolution. Double Helix's novel Light Engineering™ technology renders overcomes these limitations, providing improvement in depth resolution where current technologies fail, particularly in near field imaging. Specifically, our sensors dominate the competition for high precision ranging at distances under 30 cm and for objects as small as 20 nanometers.

Intelon Optics, Inc.

Dominik Beck

We specialize in developing head mounted eye-tracking software and hardware in four specific market segments:

- 1) Human Adults: - Eye-tracking adult participants for academic research in psychology, physiology, and applied/commercial studies in shopper research (i.e. Proctor & Gamble), neuro-marketing research, sports, and training.
- 2) Human Infant and Children - Eye-tracking infants (+5 months and up) and children (~4-10 yrs old) often for the purposes of helping to diagnose or better understand Autism and Autism related disorders. Our systems have also been used in research labs for studying baby psychology and physiology (i.e. motor development, cognition, and learning).
- 3) Animal Research - Researchers want to gain insight into animal behavior. We develop customized eye-tracking solutions to meet this growing demand.
- 4) Uniformed Services (Army, Military, DOD, Police, Fire, CoastGuard etc.) - The Army Research Labs is interested in Soldier situational dynamics. Eye-tracking tools can used for training and special operations research. Additionally, we can configure our system to work with First Person View (FPV) systems to evaluate UAV / Drone pilot performance.

LighTopTech Corp.	Cristina Canavesi	Our technology is called Gabor-domain optical coherence microscopy (GD-OCM). Similar to ultrasound, GD-OCM allows you to see inside human tissue, below the surface. GD-OCM uses near infrared light and interferometry to build an image of tissue below the surface. This allows us to see below the surface of nontransparent materials with high definition, at the micrometer scale. In biological materials and tissues, we can see individual cells throughout the volume being imaged. We can also display two-dimensional cross sections of the image for easy comparison with conventional imaging techniques such as microscopy, or biopsy and histology.
Lumenora	Rose Haft	Lumenora has developed a freeform optic to have a compact headset that makes it possible to combine augmented and virtual reality into the same headset. This design is unique to Lumenora and makes it possible to have a lightweight, low cost, optical system with a wide field of view, that prevents blockage in the peripheral vision areas.
Lumotune	Matin Esfahani	Lumotune makes Digital Glass, see-through digital displays with glasslike transparency. Digital Glass can show digital content on windows without obstructing views or daylight. It can also turn fully-opaque or -transparent. Content on the displays appear like ordinary opaque-white frosting on glass, making it reflective and easy to read in direct sunlight.
MagAssemble, LLC	John Busch	MagAssemble employs its patented pattern transfer nanomanufacturing (PTNM™) technology as a platform to create two-dimensional optical patterns with ~10 nanometer resolution and centimeter areas. These patterns can then be imprinted into fused silica, glass, sapphire, polymers or the end face of a fiber.

Maverick Photonics, LLC	Dane Hileman	This new digital color surveillance video camera technology is optimized for very low lighting conditions. The digital color camera works in lighting conditions as low as five mlux. It uses a 2/3" CMOS single plate detector with five-micron pixel sizes. It is an HD camera with about 2.2M effective pixels (1972x1100). The camera has an Infrared mode, only allowing the infrared light out to 1100nm to hit the sensor and with utilizing an Infrared illuminator for light conditions less than five mlux, can see past a km depending on the optional commercial camera lens that is used. The output of the Infrared mode is a monochrome scene.
Misceo Grand Technology, Inc	Mahesh Galgalikar	Providing ACCESSIBLE and IN-SIGHTFUL Cardiac ICU monitoring in a technologically advanced yet low-cost, portable device. Simple, Accurate, Mobile Monitoring. Misceo empowers hospitals and cardiologists with advance remote ICU capabilities to extend their services in remote locations where public don't have access to high quality medical services. Misceo's product is a rare combination of an Accurate Medical device and a versatile activity monitor. Misceo Access is the only product currently available in the market with capability to monitor 6 Lead Clinical ECG, Skin Temperature, Oxygen Saturation and Cuffless BP.
Molecular Glasses, Inc.	Michel (Mike) Molaire	Molecular Glasses has developed an entirely new class of organic semiconductors for Organic Light Emitting Diode (OLED) applications. Our unique materials will reduce power consumption in mobile applications, provide higher display resolution, and reduce cost by material simplification and by enabling lower cost manufacturing processes. These innovative materials are drop-in for current display manufacturing processes.
Mosaic Microsystems LLC	Paul Ballentine	We are developing a new packaging technology that can be used for microelectronic, photonic, sensor, and other heterogeneous small scale integrated systems. Our technology is based on ultra-thin glass substrates, commonly known as glass interposers.

MotionSavvy	Wade Kellard	MotionSavvy is bringing gesture recognition technology to the deaf community, propelling our future into the 21st century and beyond. Improved sensors will create better accessibility when communicating with a hearing person by applying commercial, innovative techniques to explore communication. We will develop software and equipment that takes advantage of the motion sensing potential of existing optics technology to open the world of sign language.
Multicore Photonics	Jody Wilson	The core of Multicore Photonics' NOx sensor is not how we measure data instantaneously and accurately with fiber optics, but instead it's how we place our sensor in the exhaust flow - just as how a mammalian tongue detects the components of the ingestion stream. Both accomplish this feat through pattern recognition.
Persistence Data Mining, Inc.	Penelope Nagel	We are using hyper spectral imaging to map soil nutrients for agricultural customers to replace traditional soil sampling. Our data reduction techniques and proprietary algorithms enable us to map nutrients directly in the soil. Our patent pending process will reduce input costs, increase yields while protecting the environment.

Positive Science

Jason Babcock

We specialize in developing head mounted eye-tracking software and hardware in four specific market segments: 1) Human Adults: a) Eye-tracking adult participants for academic research in psychology, physiology, and applied/commercial studies in shopper research (i.e. Proctor & Gamble), neuro-marketing research, sports, and training. b) Shopping research example video (Duracell vs Energizer battery selection process): <https://youtu.be/7CiGNE-j3PU> c) Driving research <https://youtu.be/AqxX1qmoJ0g> 2) Human Infant and Children: Eye-tracking infants (+5 months and up) and children (~4-10 yrs old) often for the purposes of helping to diagnose or better understand Autism and Autism related disorders. Our systems have also been used in research labs for studying baby psychology and physiology (i.e. motor development, cognition, and learning). 3) Animal Research: Researchers want to gain insight into animal behavior. We develop customized eye-tracking solutions to meet this growing demand. a) Orangutan: <https://youtu.be/Uof8X-Bued0> (free roaming in a Malaysian zoo) <https://www.nottingham.ac.uk/news/pressreleases/2012/november/seeing-through-the-eyes-of-an-orangutan.aspx> b) Peahen (The Washington Post): <http://goo.gl/vBiELo> a) Lemur: <http://positivescience.com/LemurShortForWeb/LemurShortForWeb.html> 4) Uniformed Services (Army, Military, DOD, Police, Fire, CoastGuard etc.) The Army Research Labs is interested in Soldier situational dynamics. Eye-tracking tools can be used for training and special operations research. Additionally, we can configure our system to work with First Person View (FPV) systems to evaluate UAV / Drone pilot performance. <https://www.youtube.com/user/positivescience>

POSPEA

Qiang Lin

Our optomechanical inertial sensors are based upon novel sensing mechanism, termed nano-optomechanical sensing, where an optical wave confined inside a specifically designed photonic chip is able to extremely sensitively probe the position and motion of micro/nanomechanical elements. This approach is able to offer quantum-limited sensing resolution more than five orders of magnitude better than the conventional electromechanical approaches currently dominantly employed on mainstream MEMS inertial sensors.

SelfArray	Mark Durniak	SelfArray's vision is to rapidly manufacture 1 – 3 mm pitch, chip-on-board (CoB), LED pixel-panels for the direct view LED display market utilizing our novel diamagnetic directed self-assembly (DSA) technology. SelfArray's solution solves the industry need for parallel sorting and assembly of small (<250 μm) LED components, enabling at least 5x higher manufacturing throughput while saving 10–35% on overall cost-of-goods. Our model shows that we can offer the pixel panels at around 1/2 the cost of traditional products AND make a profit.
Sonioptix LLC	Henry Elvis Miller	NP-01 is a unique light-triggered nanoparticle, which incorporates doxorubicin (a widely used chemotherapy agent) within a liposome made of a photosensitive lipid mixture (PoP). NP-01 is designed to be administered intravenously (IV). Following injection, the NP-01 collects inside tumors, which are then illuminated with a specific wavelength (665 nm) of near infrared (NIR) light. The light activates the photosensitizers in the lipid causing them to generate reactive oxygen species (ROS). The ROS permabilizes the tumor vasculature, enhancing the accumulation of NP-01 within the tumor tissue, as well as reducing tumor blood flow. The light activation also causes NP-01 to release the encapsulated doxorubicin, leading to the death of the tumor tissue.
SphereVis LLC	Gary Fletcher	SphereVis has pioneered the development of disposable optical media that enhance the resolution of widely-accessible optical microscopy to nanoscale level. Our materials enable current microscopes to achieve 3x enhanced resolution, bringing sub-diffraction-limit nanoscale resolution to optical microscopy! SphereVis has demonstrated feasibility of imaging biological and photonic structures, with resolution improvement of 3X, by using novel super-resolution microscope slides (SRMS) composed of a monolayer array of microspheres, with high index of refraction, fixed in a transparent elastomer layer.

Tarsier Optics, Inc.

Kelli Booth

Tarsier Optics will manufacture and market cameras that capture air turbulence free images. While air turbulence is popularly associated with oceans and deserts (heat haze), image resolution at distances as low as 150 yards in less extreme environments is impacted. We solve the turbulence problem and as an important side effect, we also improve the resolving power of any lens by 4-10x. We take a series of high speed frames with the two detectors, compare the two images in each frame, and then add up the stack of frames to form our final image. Within each frame, we're measuring the quantum noise between the two detectors. Our patented method uses the 'quantum noise' as our signal. The result is a real-time image (30Hz) that eliminates air turbulence. We call it a Quantum Camera.

Think Biosolution

Shourjya Sanyal

Our product QuasaR™ is a wearable personal fitness trainer that help semi-professional athletes build cardiac endurance and reduce obesity by suggesting the optimal running intensity and durations, using a haptic (voice based) feedback. QuasaR™'s patent pending sensor technology allow users to work out better by measuring multiple fitness parameters available only to professional athletes and their coaches in clinical setting, at the ease and price point of a wristband based fitness tracker.

Visikol Inc

Michael Johnson

We have developed a patented tissue clearing technique for rendering tissues transparent called Visikol HISTO. When paired with fluorescent labeling and 3D microscopy, Visikol HISTO allows for researchers to image tissues in 3D instead of using traditional 2D sliced-based histology.