ANDREW MURAY

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NEW COMPASS HEADING

My journeys have been navigating the semiconductor/photonics industries through the treacherous waters of the nano-world. The end goal of these journeys is now in site, namely, full chip design and production at the nanoscale routinely accomplished by the end customer.   Using a new generation of design tools, customization of highly complex ICs' can be routinely achieved at high yield. Welcome to the era of solid state intelligent chips (AI). Yet, there are non-silicon intelligent systems as well. They are liquid water based with complex organic molecules, and we don't understand the fundamental quantum physics yet. I plan to lead in developing tools to measure and visualize fundamental phenomena in this uncharted sea.

EXPERIENCE

CTO, Nanoport Technologies; Portland, OR — 2007–Present

Founder of startup company specializing in ultra stable measurement tools for optical properties of light sources and materials. Pioneering work on mobile tools for quantitative measurement of reflected light properties of organic materials. Sole provider of stable optical detectors to NIST.

Principal Engineer, Portland Technology Development., Intel, Hillsboro, Oregon — 1995–2007

Primarily focused on advanced lithography and development of lithography simulation tools for correcting optical proximity producing generations of leading edge microprocessors. Multiple patents.

Senior Staff Engineer, Advanced Technology Development, ETEC, Hayward, CA — 1988–1995

Developed commercial simulation tools for electron beam lithography system evaluation, electron beam proximity correction and optical phase shift masks impact in optical lithography.

Design Staff Engineer, Advanced Products, Fairchild Test and Measurement (Schlumberger Technologies), Santa Clara, CA — 1986–1988

Co-invented/developed new tool for debugging and measuring semiconductor device properties on full chips using voltage contrast microscopy (IDS 5000).

Senior Engineer, California Technology Development, Intel, Santa Clara, CA — 1984–1986

Award for yield analysis that led to correction of critical manufacturing process. Authored publications on optical lithography performance.

EDUCATION

Cornell University — Ph,D in Applied Physics, 1985

Thesis Topic: Mechanism and Resolution Limits of High Resolution Electron Beam Resists.

Cornell University — Master of Science in Physics, 1982

NSF grant recipient: teaching assistant for electron optics, microanalysis and physics. Completion of solid state physics track.

U.C. Berkeley — B.A. Physics, 1980

With Honors. Senior Thesis: Measurement of the Lifetime of a Metastable State in Ag using a Time of Flight Technique

George August University, Goettingen, Germany — Quantum Physics (U.C. Foreign Exchange Program), 1977–1978

U.C. Berkeley and University of Washington Continuing Education — Computer Science and Microbiology, 1990–2014

TECHNICAL SKILLS

Design and construction of electron and atomic beam sources, electron lens, pulsed NMR detection system. Research and development work using Scanning Transmission Electron Microscope (STEM), Reactive Ion Etching, Ion Milling, UHV systems, photolithography, SEM and TEM analysis. Software and hardware design of e-beam systems, secondary electron detectors, data acquisition electronics, pattern generators and control systems. Computer modeling of electron and ion interactions with thin films and system optics. Software development in languages: Basic, Fortran, C, C++ and Swift.

RESEARCH INTERESTS

Characterizing patterning resolution limits of charged particle beam and photonic systems, resists, (such as the Metal Halides and PMMA), radiation interaction and damage mechanisms of materials (using Energy Loss Spectroscopy, for example). Experimental measurement and theoretical calculations of the transmission and radiation field properties of light through nanometer scale structures.

SELECT PATENTS AND PAPERS

Patent: Stabilized high brightness LED suitable as calibration standards, https://patents.google.com/patent/US8686642B2/en

Patent: Border modification for proximity effect correction in lithography, https://patents.google.com/patent/US6436607B1/en

Patent: Discrete phase shift mask writing, https://patents.google.com/patent/US5246800

Steven K. Dunbrack, Andrew J. Muray, ..., John L. Nistler, William H. Arnold, David F. Kyser, Anna Maria Minvielle, Moshe E. Preil, Bhanwar Singh, Michael K. Templeton, Phase-shift mask technology: requirements for e-beam mask lithography

N. Richardson and A. Muray, An improved magnetic-collimating secondary electron energy filter for very large scale integrated diagnostics

M. Isaacson and A. Muray, In Situ Vaporization of Very Low Molecular Weight Resists Using 1/2 nm Diameter Eleetron Beams, J. Vac. Sei. Tech. 19, 1117 (1981). Also, Proc. 16th Sym. EIPBT (Dallas, 1981)

A. Muray, l. Adesida, M. Isaacson, B. Whitehead, Fabrication of Apertures, Slots and Grooves at the 8-80 nm Scale in Silicon and Thin Metal Films, J. Vac. Sei. Tech. Nov/Dee 1983

l. Adesida, A. Muray, M. Isaacson, E. Wolf, Very High Resolution Ion Beam Lithography, Int. Conf. on Microlitho., (Microcireuit Engineering Cambridge, England 1983)

A. Lewis, M. Isaaeson, A. Harootunian, and A. Muray, Development of a 500 A partial light microscope. l. Light is efficiently transmitted through /16 diameter aperture~.Ultramicroscope 1983""

A. Muray, M. Isaacson, E. Kirkland, 'Direct Measurement of the Range of Secondary Electrons in Low Atomic Number Materials, Proc. 42nd EMSA Meeting (1984)

A. Muray, M. Isaacson, E. Kirkland, Measurement of the Secondary Electron Range in PMMA, Proc. MAS Meeting (1984)

A. Muray, M. Isaacson and l. Adesida, A1F3- A New Very High Resolution Electron Beam Resist, Appl. Phys. Lett.

OTHER ACTIVITIES

Angel investment in startup technology companies, real estate Investment, sailing, hiking, traveling, automobile enthusiast, and conga drumming