Daniel Milkie, PhD

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SUMMARY OF QUALIFICATIONS

Physicist with 12+ years in innovating from custom product inspection to microscopy science

- Creator and builder of control software and hardware
- Accelerant to tech development, steering projects to milestones and end goals
- Co-author of seven Science/Cell manuscripts

EDUCATION

University of Pennsylvania, Philadelphia, PA
PhD, Physics, May 2008
Thesis: *Optical, magnetic, and electrical properties of single-walled carbon nanotubes*

College of William and Mary, Williamsburg, VA
Bachelor of Science in Physics, May 2002
Thesis: *Polarization and Polarimetry of 3He*

EXPERIENCE

*Howard Hughes Medical Institute**,** Janelia Research Campus* ……..…….. Ashburn, VA

Senior Scientist, Nobel Laureate Eric Betzig's Group …..……..…… October 2015 - Present

- ➢ Invented microscopy tech to study cells *in motion* and *in their native state*
- ➢ Programmed entire software and integrated the hardware on all microscope projects
- ➢ Collaborated on experiment design, data, and people/project management.

Sciotex/Coleman Technologies ..……..……... Newtown Square, PA

Vice President of Scientific Software……..……..…… May 2008 - October 2015

- ➢ Solved automation challenges for product inspection and scientific research
- ➢ Established a business specialization niche in computer vision/imaging
- ➢ Led on projects, contracts, budgets, sales, marketing, recruiting, small teams, and timelines.

SELECTED PROJECTS

Adaptive Optics Multifunction Fluorescence Microscope (MOSAIC)

- Fused Adaptive Optics with our microscopy innovations into a single, unified microscope "product", buildable by non-specialists.
- Created the microscope operation system including software, hardware, and FPGA
- Eliminated expensive costs, bringing total price within labs' reach. ~$500k
- Built 320TB, >GB/s data storage system, interface to processing pipelines
- Headed documentation of assembly and operation, BOM
- Launched >15 builds across the world (still prior to official advertisement)

Lattice Light Sheet Microscope

- Stimulated critical new ideas with immediate software solutions & rapid prototyping
- Leveraged bleeding edge tech (SLMs, FPGAs, GPUs) for performance
- 50+ scopes commercially replicated or hand-build by research labs
- 100+ research licensees
- Led key portions in two highly-attended "build and experience" workshops

Part Inspection Systems

- Produced turn-key inspection systems for a wide spectrum of products including: dinnerware, truck brakes, agriculture seeds, optical fiber, and mass flow controllers
- Designed vision-based metrology systems including: Point-cloud 3D laser height mapping, bright & dark field imaging, Area scan and Conveyor-based line scan cameras
- Constructed precision motion control and custom part handling solutions
- Coordinated customer communication, specifications, marketing

Transmission Electron Microscopy for Fly Connectome

- Engineered acquisition system and algorithms which TEM scanned the 7,062 brain slices (23 million images, 115 TB on disk, >1.5 years of daily operation), a critical data input to an institution-wide team effort to obtain the wiring diagram of the fruit fly brain
- Led the control design of a custom pick and place robot that obtained 1/5 of the images without a single unrecoverable failure.

SKILLS

- Automation, Vision, Image Analysis, Adaptive Optics, >GB/s data acq & processing
- *Programming*: LabVIEW, FPGA, C++, CUDA, Matlab, Python, AutoDesk Inventor, Amira
- *Hardware*: Metal machining, pulsed/CW laser systems, CCD/CMOS cameras, vacuum, cryogenics, spatial light modulators, deformable mirrors, galvanometers, wavefront sensors, superconducting magnets, clean room fab
- *Microscopy*: Super-resolution microscopy, spectroscopy, Lattice Light Sheet Microscopy, Structured Illumination Microscopy, Expansion Microscopy, PALM, Confocal, Image Scan Microscopy/AiryScan