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Rajesh Menon combines his expertise in nanofabrication, computation and optical engineering to impact several fields including super-resolution lithography, metamaterials, broadband diffractive optics, integrated photonics, photovoltaics and computational optics. His research has produced over 95 publications, 38 patents, and 3 spin-off companies. By summer 2017, his lab will have graduated 7 PhD students, 3 of whom are women. The lab has had overall funding of over $5M for the past 7 years. Rajesh was recently elected Fellow of the Optical Society of America. Among his other honors are a NASA Early Stage Innovations Award, NSF CAREER Award and the International Commission for Optics Prize. Rajesh currently directs the Laboratory for Optical Nanotechnologies at the University of Utah, where he is a tenured Associate Professor. He received S.M. and Ph.D. degrees from MIT.

Major Research Accomplishments

- Combining expertise in nanofabrication, nanophotonics and computation, Rajesh has designed "free-form" **metamaterials** and **metasurfaces**, resulting in ultra-compact, multi-functional and dense integrated photonics. His group demonstrated the world's smallest polarization beamsplitter, ultra-dense waveguides, free-space- to-waveguide couplers, mode converters, etc. to enable large-scale integration in silicon. Recently, he has applied analogous approaches to dynamic (active) photonics.
- Rajesh established the design, fabrication and characterization of **broadband-diffractive optics** with applications in high-efficiency photovoltaics, liquid-crystal displays (commercialized by *PointSpectrum*), ultra-sensitive color and multi-spectral photography (commercialized by *Lumos Imaging*), and flat lenses for unconventional imaging.
- Rajesh invented a suite of technologies for overcoming the far-field diffraction limit in **optical lithography** potentially reaching macro-molecular resolution. These include Absorbance-Modulation Optical Lithography (AMOL), Patterning via Optical Saturable Transitions (POST), and NanoResolution via NanoTranslation (NRNT). Rajesh was awarded the ICO prize for his invention of AMOL.
- Rajesh is pioneering space-variant point-spread functions for **computational imaging**. Specifically, his group converted a surgical cannula into a diffraction-limited, wide-field fluorescence microscope, a new technology for neuroscience. This elegantly simply and inexpensive approach allows one to image with super-resolution deep within the awake brain with minimal damage. Recently, his lab applied related techniques to demonstrate fully lensless imaging with only a conventional CMOS image sensor.
- Resolution in conventional **super-resolution microscopies** is limited by localization precision, which, in turn is $\propto 1/\mathrm{sqrt}(N)$, where N is the number of collected photons. By using phase information, Rajesh and collaborators showed that localization precision $\propto 1/N$ can be achieved, thereby realizing sub-5nm resolution and fast microscopy.