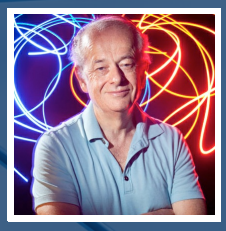
Transcending Optical Physics: Creative Approaches to Science and Engineering



Federico Capasso

Robert L. Wallace Professor of Applied Physics and Vinton Hayes Senior Research Fellow in Electrical Engineering, School of Engineering and Applied Sciences, Harvard University

CURRENT RESEARCH

Interweaving the disciplines of science to head research off with the right questions

Too often scientific research, which is meant to be venturing past the walls of our current understanding of nature, winds up confining itself to a box drawn by the specific discipline it strives to be distinguished within. Scientists aim to discover new phenomena and pen new theories whereas engineers pride themselves on their inventions that benefit humanity. It is rare to come across a researcher like Dr. Federico Capasso of Harvard University, who encompasses both roles and focuses on providing discoveries and inventions that can broadly benefit mankind instead of to any one particular field of science. With this new open-ended approach to research -- which is a reprise of how research was approached in the days of the Renaissance -- Dr. Capasso tackles larger, more complex projects that occur at the intersection of multiple disciplines, including physics, engineering, materials science and others. Leading with the problem at hand is what has driven Dr. Capasso to design artificial nanomaterials which led him to invent and fabricate the first quantum cascade lasers (QCL), revolutionary light source which have a wide range of applications that benefit mankind. By taking a broader approach to optics and rethinking the ways in which light can be reflected and refracted, Dr. Capasso has invented "flat optics" with the promise of revolutionizing optical technology to include sleek, ultra-thin lenses never seen before. These are only a few examples of the boundless innovation his research has delivered so far.

With more than 40,000 citations to date, and of that, more than 16,000 since 2010, it is evident that Dr. Capasso's work has been garnering interest exponentially. For his advancement of optical...

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AFFILIATION

Harvard University

EDUCATION

- Ph.D., in Physics Department, 1973 , Universita' degli Studi di Roma "La Sapienza" (University of Roma, "la Sapienza")

AWARDS

- Gold Medal of SPIE, 2013
- European Physical Society Quantum Electronics and Optics Award, 2013
- Humboldt Research Award, 2013
- Jan Czochralski Award of the European Materials Research Society, 2011
- Galileo Galilei Medal of the Italian Society for Optics and Photonics, 2011

RESEARCH AREAS

Technology, Electronics / Sensors, Materials Science / Physics, Nanotechnology

FUNDING REQUEST

Your contributions will support the $1M/year research cost necessary to sustain the incredible momentum going in Dr. Capasso's group. Many projects are on the verge of a major breakthrough but lack the funding to make it through the final stretch of experimentation, due to the high cost of highly skilled postdocs and of the state-of-the-art equipment. By choosing to donate, you will not only give these projects the final push they need to impact many applications but also open the door to exploring other cutting-edge topics in science.

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