

Optics and Photonics Subcommittee of the Mathematics and Physical Sciences Advisory Committee

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Background

- In 2012, the National Research Council published its draft report on Optics and Photonics, *Optics and Photonics: Essential Technologies for Our Nation*.
- The report has identified five overarching technological grand challenges for optical networking, photonics-electronics integration, surveillance and other defense applications, solar power, and optical sources and imaging tools in advanced manufacturing. Strong emphasis on technology and economic impact

Our Charge

- The subcommittee is asked to address the *adequacy of the current MPS portfolio in optics and photonics*, and to identify a set of basic research grand challenges that would enable new technological advances.
- In addition, the subcommittee should *identify basic research opportunities* as well as the need, if any, for *investments in the development of research infrastructure* to support optics and photonics.
- The report should also address *education-related research efforts* needed to support the professional development of the next generation of the U.S. optics and photonics workforce.
- The report should identify, insofar as possible, optics and photonics *scientific priorities* within each discipline.

Subcommittee Support from NSF Staff

Clark Cooper

Charles Ying

Denise Caldwell

IT: Paul Spyropoulos and Keith Bennett

Our report

- The final written report is Feb 3, 2014 with a presentation to the MPSAC at its January 2014 meeting.
- The final report should be 25-50 pages, suitable for publication and wide distribution, and should treat the five MPS disciplines (Astronomy, Materials Science, Mathematics, Physics and Chemistry) in a balanced manner.

Committee Activities

- Currently having online meetings, with every committee member presentating highlights of gaps and opportunities in their fields of expertise.
- Based on this initial set of meetings, we will identify areas requiring greater discussion and may invite expert guests in areas not adequately covered or considered to be of special importance.
- All committee members will then contribute to written input for the draft report.

Schedule of Presentations for OPSC Online Workshop: 4 x 2 hr meetings

July 9

- Molecular materials
- Nanooptics and plasmonics

July 16

- Spintronics and quantum information
- Frontiers of quantum optics
- Ultrafast x-ray science: Quantum physics at an extreme and applications in materials and nanoscience

July 23

- Coherence and control
- Optics and photonics for chemical physics and reaction dynamics

July 30

- Optical detectors: technology and applications
- Molecular and cellular imaging
- Mathematical frontiers in optics