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14. ABSTRACT

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RPPR Final Report
as of 19-Feb-2019

Agency Code:

Proposal Number: 70790LSCF

Agreement Number: W911NF-17-1-0031

INVESTIGATOR(S):

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DUNS Number: 044387793

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Report Date: 02-Apr-2018

Date Received: 18-Sep-2018

Final Report for Period Beginning 03-Jan-2017 and Ending 02-Jan-2018

Title: Support of Fourteenth Conference on the Foundations of Nanoscience

Begin Performance Period: 03-Jan-2017

End Performance Period: 02-Jan-2018

Report Term: 0-Other

Submitted By: John Reif

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Distribution Statement: 1-Approved for public release; distribution is unlimited.

STEM Degrees: 0

STEM Participants: 87

Major Goals: This contract was for partial support of honoraria and registration fees for speakers and other expenses at the Conference on Foundations of Nanoscience, Snowbird, Utah from Monday, April 10 – Thursday, April 13, 2017.

Objectives: The Foundations of Nanoscience meeting (FNANO) was established by the International Society for Nanoscale Science, Computation, and Engineering in 2004 as a venue for the wide range of researchers interested in various aspects of self-assembly as it relates to nanoscience and nanotechnology. The meeting features 12 tracks covering recent work in different types of self-assembled architectures and devices, at scales ranging from nano-scale to meso-scale. Methodologies include both experimental as well as theoretical approaches. The conference spanned traditional disciplines including chemistry, biochemistry, physics, computer science, mathematics, and various engineering disciplines including MEMS/NEMS systems. The emphasis is on basic, rather than applied research.

Why the conference was appropriate at the time, date and location chosen: The time and date was chosen to not be in conflict with other related conferences. The location was chosen to a location easily evaluable via air-flight, with a short distance to the nearest airport in Salt Lake City, and with very affordable hotel rooms.

Accomplishments: The Conference on the Foundations of Nanoscience had a mixture of invited talks by distinguished nanoscientists as well as contributed posters and open discussion periods to enhance attendee interaction with the goal of creating vibrant intellectual community in the area of self-assembly.

Relevance to DOD: Nanoscience has the potential to revolutionize the development of materials, devices and detectors at the molecular scale.

Impact of Funding of the FNANO Conference

This contract significantly enhanced interdisciplinary basic research in the area of nanoscience and allow researchers to initiate and maintain cross-discipline collaborations.

Scientific significance of FNANO: Nanoscience is at the core of an emerging discipline that brings together researchers from all the branches of engineering as well as from chemistry, physics, biology, computer science, and even mathematics. These cross-disciplinary interactions are crucial for the advancement of nanoscience, but often work that is published in one area is not readily accessible to researchers in another area. Fostering such interactions between individual researchers is the main goal for the FNANO conference series. By bringing top researchers from a variety of fields together in a stimulating environment, with an emphasis on breaking results and discussion, the conference helps researchers communicate new ideas and techniques swiftly and form research collaborations.

RPPR Final Report as of 19-Feb-2019

The common focus for the FNANO meeting was self-assembly, which many nanoscientists think has enormous potential to revolutionize nanofabrication. Top-down methods for construction of nanostructures, such as e-beam lithography, have inherent limitations in scale. Bottom-up methods such as self-assembly appear to have no such scale limitations. While top-down methods are well understood and widely used in engineering and manufacturing processes, self-assembly is a much less well-understood construction process. Although self-assembly is the cornerstone of biological complexity, the “rational” self-assembly methods that can be applied to arbitrary materials/structures (for example, for the self-assembly of lipid or polymer layers) result in structures with limited complexity.

Impact of prior Funding of the FNANO Conference:

The prior FNANO meetings (FNANO04, FNANO05, FNANO06, FNANO07, FNANO08, FNANO09, FNANO10, FNANO11, FNANO12 and FNANO13, FNANO14, FNANO15, FNANO16) had a significant impact on the emerging fields of nanoscience and self-assembly by bringing together leading nanoscientists and researchers working in a wide variety of areas of self-assembly.

Impact of Funding of the current FNANO 2017 Conference:

The 13th Conference on Foundations of Nanoscience had a mixture of invited talks by distinguished nanoscientists as well as contributed posters and open discussion periods to enhance attendee interaction with the goal of creating vibrant intellectual community in the area of self-assembly.

This contract significantly enhanced interdisciplinary basic research in the area of nanoscience and allow researchers to initiate and maintain cross-discipline collaborations.

Insuring Technical Quality of the Conference: The high quality of the conference was ensured by:

- 1) Track chairs who are responsible for selection of excellent presenters with new results to share,
- 2) Vigorous discussions managed by the track chairs, and
- 3) Annual review of and changes in the track topics to keep them fresh and up to date.

Participants and Methods of Announcement or Invitation

The attendees were active researchers from academia, industry, and government labs. Minorities, women, and persons with disabilities were included and encouraged to participate.

Training Opportunities: Nothing to Report

Results Dissemination: Results were disseminated via conference proceedings (in print and CD), provided to the attendees.

Honors and Awards: Nothing to Report

Protocol Activity Status:

Technology Transfer: Nothing to Report

PARTICIPANTS:

Participant Type: PD/PI

Participant: John H Reif

Person Months Worked: 1.00

Funding Support:

Project Contribution:

International Collaboration:

International Travel:

National Academy Member: N

Other Collaborators:

RPPR Final Report
as of 19-Feb-2019

WEBSITES:

URL: <https://www2.cs.duke.edu/FNANO17/>

Date Received:

Title: 14th Annual Conference on FOUNDATIONS OF NANOSCIENCE: SELF-ASSEMBLED ARCHITECTURES AND DEVICES (FNANO17)

Description: This is a yearly conference on the foundations of nanoscience, maintaining the highest scientific standards and providing many opportunities for discussion and informal exchange of information and questions. Key topics include experimental and theoretical studies of self-assembled architectures and devices, at scales ranging from nano-scale to meso-scale. Self-assembly is a central but not exclusive theme: the conference covers a broad range of research into synthetic and natural nanoscale structures, devices and systems.

URL: <https://www2.cs.duke.edu/FNANO17/>

Date Received: 26-Feb-2018

Title: 14th Annual Conference on FOUNDATIONS OF NANOSCIENCE: SELF-ASSEMBLED ARCHITECTURES AND DEVICES (FNANO17)

Description: This is a yearly conference on the foundations of nanoscience, maintaining the highest scientific standards and providing many opportunities for discussion and informal exchange of information and questions. Key topics include experimental and theoretical studies of self-assembled architectures and devices, at scales ranging from nano-scale to meso-scale. Self-assembly is a central but not exclusive theme: the conference covers a broad range of research into synthetic and natural nanoscale structures, devices and systems.

Final Report to ARO:
Contract W911NF-17-1-0031
Support of 14th Annual Conference on the
Foundations of Nanoscience (FNANO 2017)

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Period of Performance: January 1, 2017 to December 31, 2017

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Summary

This contract was for partial support of honoraria and registration fees for speakers and other expenses at the Conference on Foundations of Nanoscience, Snowbird, Utah from April 10-13, 2017.

Objectives: The Foundations of Nanoscience meeting (FNANO) was established by the International Society for Nanoscale Science, Computation, and Engineering in 2004 as a venue for the wide range of researchers interested in various aspects of self-assembly as it relates to nanoscience and nanotechnology. The meeting features 12 tracks covering recent work in different types of self-assembled architectures and devices, at scales ranging from nano-scale to meso-scale. Methodologies include both experimental as well as theoretical approaches. The conference spanned traditional disciplines including chemistry, biochemistry, physics, computer science, mathematics, and various engineering disciplines including MEMS/NEMS systems. The emphasis is on basic, rather than applied research. The meeting attracted 149 registered participants, of which 46 were students. There were 11 keynote speakers and 20 invited speakers.

Topics Covered and FNANO17 CONFERENCE ORGANIZATION:

Conference chair: John Reif (reif@cs.duke.edu, Duke University)

Program chair: Andrew Turberfield (a.turberfield@physics.ox.ac.uk, Oxford University)

Track	Chair	Affiliation
DNA Nanostructures	Nadrian Seeman   ned.seeman@nyu.edu	Dept of Chemistry, New York Univ, New York, NY
Protein & Viral Nanostructures	Nicole Steinmetz   nicole.steinmetz@case.edu	Dept of Biomedical Engineering, Case Western Reserve Univ., OH
Integrated Chemical Systems	Amar Flood   aflood@indiana.edu	Dept of Chemistry, Indiana Univ.
Principles and Theory of Self-Assembly	Rebecca Schulman   rschulm3@jhu.edu	Chemical Biomolecular Engineering, Johns Hopkins Univ, Baltimore, MD
Computational Tools for Self-Assembly	William Shih   William_Shih@dfci.harvard.edu	Depts of Biological Chemistry & Molecular Pharmacology, Harvard Medical School, Boston, MA
Synthetic Biology	Alex Deiters   deiters@pitt.edu	Dept. Chemistry, Univ. of Pittsburgh
Nucleic Acid Nanostructures in Vivo	Yamuna Krishnan   yamuna@uchicago.edu	Dept. Chemistry, Univ. of Chicago
DNA & Analytical Methods	Andrew Ellington   ellingtonlab@gmail.com	Chemistry and Biochemistry Dept, Univ of Texas at Austin
Biomedical Nanotechnology	Thomas LaBean   thlabean@ncsu.edu	Materials Science & Engineering, North Carolina State Univ., Raleigh, NC
Special Track on Modified DNA	Floyd Romesberg   floyd@scripps.edu	Scripps Research Institute, LaJolla, CA
Nanophotonics & Superresolution	Tim Liedl   tim.liedl@physik.lmu.de	Faculty of Physics, Ludwig- Maximilians Univ, Munich, Germany
Molecular Motors	Andrew Turberfield   a.turberfield@physics.ox.ac.uk	Dept of Physics, Oxford Univ, Oxford, UK

Location and Dates and Appropriateness of Timing: Snowbird, Utah, April 10-13, 2017.

Why the conference was appropriate at the time, date and location chosen: The time and date was chosen to not be in conflict with other related conferences. The location was chosen to a location easily evaluable via air-flight, with a short distance to the nearest airport in Salt Lake City, and with very affordable hotel rooms.

FNANO17 Webpage: <http://www.cs.duke.edu/FNANO/FNANO17>

Relevance to DOD: Nanoscience has the potential to revolutionize the development of materials, devices and detectors at the molecular scale.

Impact of Funding of the FNANO Conference

This contract significantly enhanced interdisciplinary basic research in the area of nanoscience and allow researchers to initiate and maintain cross-discipline collaborations.

Scientific significance of FNANO: Nanoscience is at the core of an emerging discipline that brings together researchers from all the branches of engineering as well as from chemistry, physics, biology, computer science, and even mathematics. These cross-disciplinary interactions are crucial for the advancement of nanoscience, but often work that is published in one area is not readily accessible to researchers in another area. Fostering such interactions between individual researchers is the main goal for the FNANO conference series. By bringing top researchers from a variety of fields together in a stimulating environment, with an emphasis on breaking results and discussion, the conference helps researchers communicate new ideas and techniques swiftly and form research collaborations.

The common focus for the FNANO meeting was self-assembly, which many nanoscientists think has enormous potential to revolutionize nanofabrication. Top-down methods for construction of nanostructures, such as e-beam lithography, have inherent limitations in scale. Bottom-up methods such as self-assembly appear to have no such scale limitations. While top-down methods are well understood and widely used in engineering and manufacturing processes, self-assembly is a much less well-understood construction process. Although self-assembly is the cornerstone of biological complexity, the “rational” self-assembly methods that can be applied to arbitrary materials/structures (for example, for the self-assembly of lipid or polymer layers) result in structures with limited complexity.

Impact of prior Funding of the FNANO Conference:

The prior FNANO meetings ([FNANO04](#), [FNANO05](#), [FNANO06](#), [FNANO07](#), [FNANO08](#), [FNANO09](#), [FNANO10](#), [FNANO11](#), [FNANO12](#) and [FNANO13](#), [FNANO14](#), [FNANO15](#), and [FNANO16](#)) had a significant impact on the emerging fields of nanoscience and self-assembly by bringing together leading nanoscientists and researchers working in a wide variety of areas of self-assembly.

Impact of Funding of the current FNANO 2017 Conference:

The 14th Conference on Foundations of Nanoscience had a mixture of invited talks by distinguished nanoscientists as well as contributed posters and open discussion periods to enhance attendee interaction with the goal of creating vibrant intellectual community in the area of self-assembly.

This contract significantly enhanced interdisciplinary basic research in the area of nanoscience and allow researchers to initiate and maintain cross-discipline collaborations.

Insuring Technical Quality of the Conference: The high quality of the conference was ensured by:

- 1) Track chairs who are responsible for selection of excellent presenters with new results to share,
- 2) Vigorous discussions managed by the track chairs, and
- 3) Annual review of and changes in the track topics to keep them fresh and up to date.

Participants and Methods of Announcement or Invitation

The attendees were active researchers from academia, industry, and government labs. *Minorities, women, and persons with disabilities were included and encouraged to participate.*

The Fourteenth Conference on the Foundations of Nanoscience had a mixture of invited talks by distinguished nanoscientists as well as contributed posters and open discussion periods to enhance attendee interaction with the goal of creating vibrant intellectual community in the area of self-assembly.

Conference Chair

PI John Reif (reif@cs.duke.edu, Duke)

FNANO17 Web page: <http://www.cs.duke.edu/FNANO17/>

Dissemination of Meeting Results

Results were disseminated via conference proceedings (in print and CD), provided to the attendees.

Support

This contract was for a total of \$15,000 direct costs (there was no overhead).

These funds were used to pay the registration fees and the travel for 5 keynote speakers, the registration fee for 11 invited speakers and 2 conference assistants. The contract funds were not used to support any expenses of any Federal employees.