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**RPPR Final Report**  
as of 03-Jan-2019

Agency Code:

Proposal Number: 71004CHCF

**Agreement Number: W911NF-17-1-0209**

**INVESTIGATOR(S):**

**Name:** Ph.D Kevin JT Noonan  
**Email:** noonan@andrew.cmu.edu  
**Phone Number:** 4122683128  
**Principal:** Y

Organization: **Carnegie Mellon University**

Address: 5000 Forbes Avenue, Pittsburgh, PA 152133589

Country: USA

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**Final Report** for Period Beginning 15-Apr-2017 and Ending 14-Apr-2018

**Title:** Non-Conventional Building Blocks in Conjugated Materials: Innovative Design and New Applications

**Begin Performance Period:** 15-Apr-2017

**End Performance Period:** 14-Apr-2018

**Report Term:** 0-Other

Submitted By: Ph.D Kevin Noonan

Email: noonan@andrew.cmu.edu

Phone: (412) 268-3128

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

**STEM Degrees:** 0

**STEM Participants:** 0

**Major Goals:** The goal of this symposium was to bring together new and established researchers in the field of organic electronic materials. The symposium theme was centered on incorporation of unusual building blocks in these architectures (motifs that go beyond typical aromatic and heteroaromatic rings). The incorporation of heavy elements, transition metals and non-aromatic structures into oligomers and polymers were of particular interest.

**Accomplishments:** A PDF is included as an attachment.

**Training Opportunities:** A student session was held with 10 contributed talks from students. Additionally, a small set of posters in the poster session were dedicated to this symposium.

**Results Dissemination:** The "Non-Conventional Building Blocks in Conjugated Materials" symposium was held at a national meeting of the American Chemical Society and was available to any person or persons, foreign or domestic, who registered for the meeting. In addition to the presentations themselves, abstracts of those talks are made available, and published through the American Chemical Society. These are all searchable through Scifinder and Web of Science.

**Honors and Awards:** The symposium was highlighted by C and E news

<https://cen.acs.org/articles/95/i37/Chemists-build-a-zoo-of-new-polymer-building-blocks.html>

**Protocol Activity Status:**

**Technology Transfer:** Nothing to Report

**PARTICIPANTS:**

**Participant Type:** PD/PI

**Participant:** Kevin JT Noonan

**Person Months Worked:** 1.00

**Funding Support:**

Project Contribution:

International Collaboration:

International Travel:

National Academy Member: N

**RPPR Final Report**  
as of 03-Jan-2019

Other Collaborators:

**Final Report**  
**Request for Symposia Support - Non-Conventional Building Blocks in Conjugated Materials: *Innovative Design and New Applications***

Principal Investigator:	Kevin J. T. Noonan
Organization:	Carnegie Mellon University Department of Chemistry 4400 Fifth Ave 15213
Proposal Number:	71004CHCF
Agreement Number:	W911NF1710209
Period Covered by Report:	04/15/2017 – 04/14/2018
Author of Report:	Kevin J. T. Noonan

### Summary

In this symposium, the PI (Kevin Noonan), Frieder Jäkle and Agostino Pietrangelo endeavored to bring together researchers from a range of fields and backgrounds interested in electronic materials. The meeting was focused specifically on the use of unusual building blocks, as these motifs can have a profound impact on solid-state organization and bulk properties. Unusual building blocks are defined as conjugated motifs beyond phenyl rings and heteroaromatics such as thiophene, furan or pyrrole. These structures often consist of heavier main group elements; transition metals and they may be non-aromatic. These structural variations offer unique properties, making them crucial to the design of next generation devices.

This symposium brought together both new and established researchers in this field. There was a strong national and international presence. The *Non-Conventional Building Blocks in Conjugated Materials: Innovative Design and New Applications* symposium was held at the 254<sup>th</sup> ACS National Meeting and Exposition, August 20<sup>th</sup> – 24<sup>th</sup>, 2017 in Washington, DC. The Division of Polymer Chemistry (POLY) and Division of Polymeric Materials Science and Engineering served as co-sponsors. The lectures were well attended (near 50 people per day in the sessions). The symposium was highlighted with an article in C and E news:

<https://cen.acs.org/articles/95/i37/Chemists-build-a-zoo-of-new-polymer-building-blocks.html>

### Topics Covered

- Unusual Organic Building Blocks
- Main Group Hybrids
- Metal-Containing Hybrids
- New Polymerization Methods
- Optical and Electronic Materials
- Energy-related Applications
- Chemo- and Biosensors

- Biomedical Applications

## **Relation to ARO**

The organic electronic materials discussed at this symposium have a wide range of applications. They may be useful as lightweight sensors incorporated into optical protective equipment for Army uniforms. Additionally, one can imagine using the materials to create charging stations as part of the uniform. Biosensors may also be possible to monitor the vital signs of soldiers. Overall, the proposed materials have potential application in chemical and biological sensing, energy conversion, and displays.

## **Chairpersons**

The chairpersons/organizers for this symposium were:

- Kevin Noonan, Assoc. Professor, Carnegie Mellon University, noonan@andrew.cmu.edu
- Agostino Pietrangelo, Asst. Professor, Rutgers – Newark, a.pietrangelo@rutgers.edu
- Frieder Jäkle, Professor, Rutgers – Newark, fjaekle@andromeda.rutgers.edu

## **Invitees**

The chairpersons invited presenters individually. The symposium in its entirety consisted of 34 talks over 5 sessions (2.5 days). For training and professional development, there was a student session of talks (10 total). A small portion of posters from the ACS poster session were also linked with the symposium.

A list of the invited speakers (alphabetical order) who attended and spoke is given below:

- Trisha Andrew (UMass Amherst)
- Thomas Baumgartner (U Calgary)
- Luis Campos (Columbia U)
- Derek Gates (UBC)
- Jamie Grunlan (Texas A&M)
- Martin Heeney (Imperial College)
- Frieder Jäkle (Rutgers)
- Mallika Jeffries-El (Boston U)
- Yuning Li (U Waterloo)
- Kevin Noonan (Carnegie Mellon)
- Joji Ohshita (Hiroshima University)
- Frank Pammer (Universität Ulm)
- Agostino Pietrangelo (Rutgers)
- John Protasiewicz (Case Western)
- Yang Qin (U New Mexico)
- Genevieve Sauvé (Case Western)
- Dwight Seferos (U Toronto)
- Tim Swager (MIT)
- Kazuo Tanaka (Kyoto University)

- Ben-Zhong Tang (UST Hongkong)
- Samuel Thomas (Tufts University)
- J. D. Tovar (Johns Hopkins)
- Wei You (U North Carolina)

### **Dissemination of Results**

The “*Non-Conventional Building Blocks in Conjugated Materials*” symposium was held at a national meeting of the American Chemical Society and was available to any person or persons, foreign or domestic, who registered for the meeting. In addition to the presentations themselves, abstracts of those talks are made available, and published through the American Chemical Society. These are all searchable through Scifinder and Web of Science.

### **Cost of Proposal and Use of Funds**

\$5000 was awarded from the ARO to support this symposium, which was used to either fully or partially reimburse speaker registration costs. Speakers travelling longer distances were reimbursed the entire cost of registration (\$440) while speakers from areas near Washington, DC were reimbursed partial registration costs (\$250). The reimbursements were all completed by the support staff at Carnegie Mellon.