

4/1/2016 8:01 AM Entry #18

Status: Complete 

## Student Information

**Name**

Dr Matthew Ross Golder

**Address**

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(508) 317-1650

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goldermr@mit.edu

**Phone International****Thesis Summary**

Cycloparaphenylenes (CPPs) can be considered the smallest possible fragment of an armchair carbon nanotube (CNT), yet they were envisioned as synthetic targets almost 70 years before CNTs were discovered. Having succumbed to total synthesis in the past decade, these strained carbon-rich macrocycles have emerged as both interesting materials for applications in organic electronics as well as promising candidates to seed the "bottom-up" growth of CNTs. Herein I first report methodology that has facilitated the rapid construction of CPPs from simple building blocks. With the ability to access CPPs in unprecedented quantities, some interesting physical organic properties were revealed through oxidation and subsequent optoelectronic characterization. Efforts then turned towards the synthesis of more rigid CNT fragments, resulting in the synthesis of two [8]CPP dimers. Lastly, progress towards aromatic belts through methodology that combines both ring-closing metathesis and reductive aromatization is presented.

## Essay Submission

*Please write a 1000-word essay describing your thesis work. No longer than 1000, please!*

**Please upload your 1000-word essay describing your thesis work.**



Golder\_IUPAC\_Essay.pdf  
222.20 KB

**Figures**

Golder\_IUPAC\_Figures.pdf  
643.38 KB



## Academic Background

**Institution Granting your PhD**

University of Oregon

**Date of PhD received**

9/5/2015

**Field of Study**

Synthetic Organic Chemistry and Organic Materials

**Thesis Title**

Synthesis and Characterization of Small Molecule Carbon Nanotube Fragments

**PhD Thesis Advisor**

Ramesh Jasti

**Department**

Chemistry and Biochemistry

**Thesis Advisor Email Address**

rjasti@uoregon.edu

**Academic Degree-2**

Masters of Art (MA) in Chemistry

**Date Received**

6/30/2015

**Institution**

Boston University

**Field of Study**

Organic Chemistry

**Academic Degree-3**

Bachelors of Science (BS)

**Date Received**

5/14/2010

**Institution**

University of Rochester

**Field of Study**

Chemistry

## PhD Thesis Committee Members

*Please list all members of your Thesis Committee along with their affiliation and current email address***Committee Member 1**

David Tyler

**Department Affiliation**

Chemistry and Biochemistry

**Email**

dtyler@uoregon.edu

**Phone Number**

(541) 346-4649

**Committee Member 2**

Michael Haley

**Department Affiliation**

Chemistry and Biochemistry

**Email**

haley@uoregon.edu

**Phone**

(541) 346-0456

**Committee Member 3**

John Halliwill

**Department Affiliation**

Human Physiology

**Email**

halliwil@uoregon.edu

**Phone**

(541) 600-4337

## Academic and Professional Awards

*Please list all awards received while a student*

### Received While a Student 1

**Award Title**

Graduate Research Symposium Invited Speaker

**Award Date**

July 2014

**Award from Institution or Organization**

ACS Division of Organic Chemistry

**Description of Award**

Selected to attend as a speaker for Division of Organic Chemistry GRS in Irvine, CA.

**Award Title**

Vertex Graduate Fellowship

**Award Date**

2013-2014

**Award from Institution or Organization**

Vertex

**Description of Award**

Graduate fellowship awarded for my fourth year of PhD studies.

**Award Title**

Office of Science Graduate Fellowship Finalist

**Award Date**

May 2012

**Award from Institution or Organization**

Department of Energy

**Description of Award**

Selected as a finalist for a DOE Graduate Fellowship (ca. 250 out of over 1300 applicants) for the 2012 application cycle.

**Award Title**

Feldman Travel Award

**Award Date**

2012-2013

**Award from Institution or Organization**

Boston University

**Description of Award**

Provided funding to travel to several conferences (ACS and Gordon) during 2012 and 2013 to present my PhD research.

**Award Title**

Dean's Fellowship

**Award Date**

2010-2011

**Award from Institution or Organization**

Boston University

**Description of Award**

One of three incoming Organic Chemistry PhD students awarded a Dean's Fellowship that funded my first year of PhD studies.

**Received While a Student 2****Award Title**

ACS Rochester Section Award

**Award Date**

May 2010

**Award from Institution or Organization**

ACS Rochester, NY Section

**Description of Award**

Awarded to an outstanding member of the graduating Chemistry class. Invited to present talk on undergraduate research at the Rochester Division ACS Meeting.

**Award Title**

Ayman Amin-Salem Memorial Award

**Award Date**

May 2010

**Award from Institution or Organization**

University of Rochester

**Description of Award**

Selected as one of two members of the entire 2010 graduating class (ca. 1100 students) to receive this award based on good character and good citizenship, such as decency, reliability, responsibility, and congeniality.

**Award Title**

RISE Scholar

**Award Date**

Summer 2009

**Award from Institution or Organization**

Deutscher-Akademischer Austausch Dienst (DAAD)

**Description of Award**

Selected as a DAAD RISE Scholar to conduct research in Prof. Stefan Hecht's laboratory (hechtlab.de) at Humboldt Uni. in Berlin, Germany.

**Award Title**

All-Academic Recognition

**Award Date**

2007-2010

**Award from Institution or Organization**

University Athletic Association

**Description of Award**

As a member of the University of Rochester's swim team, I was selected for All-Academic recognition for upholding a 3.5 or better GPA during the previous season.

**Award Title**

Dean's Scholarship for Academic Excellence

**Award Date**

2006-2010

**Award from Institution or Organization**

University of Rochester

**Description of Award**

Funded a portion of my undergraduate studies at the University of Rochester.

## Selected Publications

*Please provide reference to selected publications. Maximum is 8.*

### Item 1

#### List of 8 Selected Publications



MatthewGolder\_Publications.pdf  
116.67 KB

**Publication #1**

Golder, M. R.; Colwell, C. E.; Wong, B. M.; Zakharov, L. N.; Zhen, J.; Jasti, R. "An Iterative Ring-Closing Metathesis/Reductive Aromatization Strategy Towards Strained Aromatic Belts." J. Am. Chem. Soc. 2016, Manuscript Submitted.

**Publication #2**

Golder, M. R.; Jasti, R. "Synthesis and Characterization of the Smallest Carbon Nano hoops." Acc. Chem. Res. 2015, 48, 557.

**Publication #3**

Chen, H.; Golder, M. R.; Wang, F.; Doorn, S.; Jasti, R.; Tretiak, S.; Swan, A. K. "Raman-active Modes of Even-numbered Cycloparaphenylenes: Comparisons between Experiments and DFT Calculations with Group Theory Arguments" J. Phys. Chem. C 2015, 119, 2879.

**Publication #4**

Adamska, L.; Nayyar, I.; Chen, H.; Swan, A. K.; Oldani, N.; Fernandex-Alberti, S.; Golder, M. R.; Jasti, R.; Doorn, S. K.; Tretiak, S. "Self-Trapping of Excitons, Violation of Condon Approximation, and Efficient Fluorescence in Conjugated Cycloparaphenylenes" Nano Lett. 2014, 14, 6539.

**Publication #5**

Chen, H.; Golder, M. R.; Wang, F.; Jasti, R.; Swan, A. K. "Raman Spectroscopy of Carbon Nano hoops." Carbon 2014, 67, 203.

**Publication #6**

Golder, M. R.; Wong, B. M.; Jasti, R. "Photophysical and Theoretical Investigations of the [8] Cycloparaphenylene Radical Cation and its Charge-Resonance Dimer." Chem. Sci. 2013, 4, 4285.

**Publication #7**

Xia, J.; Golder, M. R.; Foster, M. E.; Wong, B. M.; Jasti, R. "Synthesis, Characterization, and Computational Studies of Cycloparaphenylene Dimers." J. Am. Chem. Soc. 2012, 134, 19709.

**Publication #8**

Sisto, T. J.; Golder, M. R.; Hirst, E. S.; Jasti, R. "Selective Synthesis of Strained [7] Cycloparaphenylene: An Orange-Emitting Fluorophore." J. Am. Chem. Soc. 2011, 133, 15800.

**I hereby affirm that the information contained in this application is accurate and complete to the best of my knowledge**  
Yes

**I hereby affirm that I have/will have received my PhD in 2015**

Yes

**Name and Affiliation**

Matthew R. Golder, Massachusetts Institute of Technology

**Upload Letter of Support**



Golder\_Support Letter\_Haley3.pdf  
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**Upload Letter of Support**



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