

# SHELDON HEWLETT

5 Saratoga Dr ■■ Wilmington DE 19808

302.831.0943

[shewlett@udel.edu](mailto:shewlett@udel.edu)

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## EDUCATION

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CENTRAL MICHIGAN UNIVERSITY, Mount Pleasant, MI 2018  
**PhD in Science of Advanced Materials**

DOMINICAN UNIVERSITY, River Forest, IL 2009  
**Type 24 Initial Alternative Secondary Certificate**, *endorsed in science*

NORTHWESTERN UNIVERSITY, Evanston, IL 2008  
**Master of Science in Materials Science and Engineering**

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA 2006  
**Bachelor of Science in Materials Science and Engineering**

### **Certification:**

*Chicago Teaching Fellows – ISBE Approved Alternative Certification Program, Chicago Public Schools*  
*Highly Qualified – No Child Left Behind Act*

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## COLLEGIATE TEACHING EXPERIENCE

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UNIVERSITY OF DELAWARE, NEWARK, DE 2018-present  
**ASSISTANT PROFESSOR, DEPARTMENT OF MATERIAL SCIENCE AND ENGINEERING**

- Taught Materials Science for Engineers to 130 sophomore, junior and senior engineering students
- Collaborated with colleagues in Material science to develop Freshman Materials Experience
- Developed recruitment tools for new undergraduate program

CENTRAL MICHIGAN UNIVERSITY, MOUNT PLEASANT, MI 2013-2018  
**Teaching Assistant, School of Engineering and Technology**

- Taught Introduction to Engineering to rotating freshmen engineering sections of 25-30 students
  - Covered introductory material across electrical and mechanical engineering disciplines
  - Implemented frequent quizzes to maintain high expectation of student preparedness
  - Integrated mathematical skills review into existing lesson plans
- Collaborated with engineering professors to design effective laboratory exercises
- Kept twice weekly office hours to offer extra help to students.

MID MICHIGAN COMMUNITY COLLEGE 2012-2013  
**Chemistry Instructor**

- Developed lesson plans for first and second semester General Education Chemistry classes
- Modified existing laboratory curriculum to emphasize practical laboratory skills
- Instituted science “mini-talks” in introductory Chemistry class to encourage science literacy and research

**Teaching Assistant, Introduction to Solid State Chemistry** Fall 2005

- Taught recitation sections to small group of undergraduate students twice per week.
- Hosted weekly office hours to assist students individually.

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## RESEARCH EXPERIENCE

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### **Graduate Research Assistant, Central Michigan University, Mount Pleasant MI** 2013-present

- Engineered solution processed gold metamaterials with high optical absorbance.
  - Developed experimental setup and protocol to measure evolution of absorbance with increasing metamaterial thickness
  - Fabricated gold metamaterials with trilayer structure to improve optical absorbance up to 95%.
- Optimized supercritical fluid deposition to infiltrate glass microcapillaries with silver for optical sensing applications
  - Conducted scanning electron microscopy (SEM) characterization study on infiltrated microcapillaries to determine coating thickness
- Fabricated and characterized silver-polydimethylsiloxane nanocomposites via SEM and energy dispersive spectroscopy
- Directed research teams comprised of secondary educators and engineering undergraduates to design a direct laser writer using DVD optical drives
- Advised undergraduate lab members on photonic research projects

### **Graduate Research Assistant, Northwestern University, Evanston IL** 2006-2008

- Investigated glass transition temperature broadening in polystyrene thin films using ellipsometry and fluorescence techniques.
- Determined diffusion coefficient for small dye molecules in trilayer polymer thin films using fluorescence technique

### **Research Assistant, Massachusetts Institute of Technology, Cambridge MA** 2003-2006

- Conducted synthesis experiments on polymer nanoparticles and developed processing parameters for novel polymer systems.
  - Increased polymer production by 50% by using large scale polymerization technique.
- Performed mechanical characterization of pressure-miscible plastics that can be used as environmentally-friendly alternative to current plastics.
- Coordinated first exploratory experiments using silica nanoparticles to improve properties of pressure-miscible plastics.

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## ADDITIONAL TEACHING EXPERIENCE

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CHICAGO PUBLIC SCHOOLS, Chicago, IL 2009 – 2011

### **Service Learning Coordinator, Lincoln Park High School (2009-Present)**

- Developed new service-learning program utilized by 15 teachers and 500 students.
- Collaborated with educators to develop classroom-based service learning projects.
  - Integrated service projects into current curriculum, resulting in 25% more students completing service projects on time.
- Managed student and parent communication regarding service hours.
- Organized annual Pancake Breakfast fundraiser for UNICEF.

### **Teacher, Physics** 2008-2011

- Taught 5 sections of physics, including advanced- and low-level classes (~130 students yearly).
- Created lesson plans based on long term curricular goals and developed classroom-management system and procedures.
- Participated in professional development workshops and discussions.
- Developed note-taking criteria for lower-level students, improving note-taking skills and mathematical reasoning.

- Adopted by 3 other teachers and used in 6 classes (~180 students).
- Improved student quiz and exam grades for 20% of participants.
- Collaborated with other teachers to develop laboratory standards for experimentation and lab reporting.
- Integrated technology into classroom activities, including random-name generators for formative assessments, online homework programs, and class wiki pages for information distribution.

## FELLOWSHIPS

King Chavez Parks Future Faculty Fellowship	2016 - present
Chicago Teaching Fellows	2008 – 2011
Northwestern University Graduate School Multicultural Fellowship	2006 – 2007

## PRESENTATIONS

**Hewlett, S.A.** and Mock, A. “Engineering Disordered Metamaterials for Broadband High Optical Absorption”, presentation, 2017 Material Research Society Spring Meeting, Phoenix, AZ, March 2017.

**Hewlett, S.A.** and Mock, A. “Optical Absorption Enhancement via Multiple Scattering in a Dense, Randomly Distributed Nanoparticle Stack”, presentation, 2015 Material Research Society Spring Meeting, San Francisco, CA, March 2015.

**Hewlett, S.A.** et al “Baroplastic Block Copolymer”, poster, 2005 American Physical Society March Meeting, Los Angeles, CA, March 2005.

## VOLUNTEER EXPERIENCE – STEM FOCUS

MID-MICHIGAN COMMUNITY COLLEGE SCIENCE OLYMPIAD, Harrison, MI 2013-2017

### Event Coordinator

- Assessed student performance in “Sound of Music” event, where students build homemade musical instruments, and discuss relevant science principles
- Designed and implemented event where students perform tasks and answer questions in the field of Material Science

MID-MICHIGAN CHAPTER OF THE NATIONAL ORGANIZATION OF BLACK CHEMISTS AND CHEMICAL ENGINEERS SCIENCE BOWL, Saginaw, MI 2012-2014

### Science Bowl Volunteer

- Aided competition planners in set-up and breakdown of event space
- Worked in competition rooms as a time keeper
- Served as a panelist during discussion on how to successfully apply to college

HAVEN AND NORTHWESTERN DISCOVER SCIENCE (HANDS), Evanston, IL 2007 - 2008

### Graduate Student Volunteer

- Conducted twice-monthly visits to Haven Middle School.
- Taught science-based after school lessons to students using portable, simple lab demonstrations.

## ADDITIONAL VOLUNTEER EXPERIENCE

RESONATORS COMPETITIVE DRUMLINE, Midland, MI

2012-present

**Percussion Instructor**

- Instructed middle and high school students in mallet and battery percussion
- Coached marching students on percussion technique and drill
- Organized community performance at Midland Relay for Life
- Served as board secretary

MIT ADMISSIONS, Cambridge, MA

2009 – 2011, 2016

**Education Councilor**

- Interviewed applicants to MIT in the Greater Chicagoland and Mid-Michigan area
- Submitted written reports after interviews regarding students aptitude for success at MIT

MIT HIGH SCHOOL STUDIES PROGRAM, Cambridge, MA

2005 - 2006

**Jazz Music Instructor**

- Designed 8 week curriculum Jazz history, music and improvisation
- Led class of 9 high school students in weekly lessons and performances

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PROFESSIONAL AFFILIATIONS

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Optical Society of America

October 2016-present

Materials Research Society

October 2014-present

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PUBLICATIONS

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**Hewlett, S.A.**, & Mock, A. (2017). Engineering metamaterial absorbers from dense gold nanoparticle stacks. *Journal of Applied Physics*, 122(9), 093103.

**Hewlett, S.A.** & Mock, A.P. Plasmonic Metamaterial Absorbers from Dense Gold Nanoparticle Stacks. *Plasmonics* (2017) 12: 419.

Kim, S., **Hewlett, S. A.**, Roth, C. B., & Torkelson, J. M. (2009). Confinement effects on glass transition temperature, transition breadth, and expansivity: comparison of ellipsometry and fluorescence measurements on polystyrene films. *The European Physical Journal E*, 30(1), 83-92.

Wakabayashi, K., Brunner, P. J., Masuda, J. I., **Hewlett, S. A.**, & Torkelson, J. M. (2010). Polypropylene-graphite nanocomposites made by solid-state shear pulverization: Effects of significantly exfoliated, unmodified graphite content on physical, mechanical and electrical properties. *Polymer*, 51(23), 5525-5531.

Gonzalez-Leon, J. A., Ryu, S. W., **Hewlett, S. A.**, Ibrahim, S. H., & Mayes, A. M. (2005). Core-shell polymer nanoparticles for baroplastic processing. *Macromolecules*, 38(19), 8036-8044.