

# *Biographical Sketch*

## **Min Ouyang**

### **Professional Appointment**

07/2010-present	Associate Professor of Physics (with tenure), University of Maryland - College Park
09/2004-06/2010	Assistant Professor of Physics, University of Maryland - College Park

### **Academic Record**

2002-2004	CNSI Postdoctoral Fellow in Physics, UCSB
Nov. 2001	Ph.D. in Chemistry, Harvard University
1999	A.M. in Chemistry, Harvard University
1997	M.S. in Electronics, Peking University
1996	B.S. in Electronics, Peking University

### **Professional Honors & Awards (2005- present)**

2010	University of Maryland CMPS Discovery Award
2007	Beckman Young Investigator Award
2007	ONR Young Investigator Award
2006	Ralph E. Powe Award
2006	Alfred P. Sloan Fellow
2006	NSF CAREER Award

### **Grant Support Activities (>\$360K/yr single PI grant)**

DOD ONR N000140710787 P00005 Grant (single PI): \$84,225  
NSF DMR0547194 Grant (single PI): \$500,000  
DOD ONR N000140710787 Grant (single PI): \$374,773  
Beckman Foundation 0609259093 Grant (single PI): \$300  
NSF MRSEC Seed Grant (single PI): \$78,000  
Sloan Foundation BR4615 Grant (single PI): \$45,000  
ORAU 0605017971 Grant (single PI): \$10,000  
NSF MRI0619191 Grant (Co-PI): \$490,000

### **Publications**

*Selected* publications are:

35. J. Zhang, Y. Tang, K. Lee & M. Ouyang, Tailoring Light-Matter-Spin Interactions in Colloidal Hetero-Nanostructures. *Nature* **466**, 91 (2010).

(related news article: New Type of Light-Matter Interaction: Advance in Quantum Computing and Energy Conversion Technology. <http://www.sciencedaily.com/releases/2010/07/100702152409.htm>).

34. J. Zhang, Y. Tang, K. Lee & M. Ouyang, Nonepitaxial Growth of Hybrid Core-Shell Nanostructures with Large Lattice Mismatches. *Science* **327**, 1634 (2010).

(related news article: Chemical Thermodynamics Overtakes Epitaxy. <http://www.computescotland.com/3191.php>)

33. Y. Tang, A.F. Goncharov, V.V. Struzhkin, R.J. Hemley & M. Ouyang, Spin of Semiconductor Quantum Dots under Hydrostatic Pressure. *Nano Lett.* **10**, 358 (2010).

32. J. Zhang, Y. Tang, L. Weng & M. Ouyang, Versatile Strategy for Precisely Tailored Core@Shell Nanostructures with Single Shell Layer Accuracy: the Case of Metallic Shell. *Nano Lett.* **9**, 4061 (2009).

31. Y. Zhang, Y. Tang, K. Lee & M. Ouyang, Catalytic and Catalyst-free Synthesis of CdSe Nanostructures with Single-Source Molecular Precursor and Related Device Application. *Nano Lett.* **9**, 437 (2009).

30. K. Lee, Y. Tang & M. Ouyang, Self-ordered, Controlled Structure Nanoporous Membranes Using Constant Current Anodization. *Nano Lett.* **8**, 4624 (2008).

29. Y. Tang & M. Ouyang, Tailoring Properties and Functionalities of Metal Nanoparticles through Crystallinity Engineering. *Nature Materials* **6**, 754 (2007)

(related News & Views article: Is perfect better? *Nature Materials* **6**, 716 (2007)).

26. M. Ouyang & D.D. Awschalom, Coherent Spin Transfer between Molecularly Bridged Quantum Dots. *Science* **301**, 1074 (2003)

(related news article: Quantum dots chemically wired for spintronics, *Science* **301**, 580 (2003)).

25. M. Ouyang, J.-L. Huang & C.M. Lieber, Fundamental Electronic Properties and Applications of Single-Walled Carbon Nanotubes. *Acc.Chem.Res.* **35**, 1018 (2002) (invited review).

24. M. Ouyang, J.-L. Huang & C.M. Lieber, Scanning Tunneling Microscopy Studies of the One-Dimensional Electronic Properties of Single-Walled Carbon Nanotubes. *Annu.Rev.Phys.Chem.* **53**, 091801 (2002) (invited review).

23. M. Ouyang, J.-L. Huang & C.M. Lieber, Determination of One Dimensional Energy Dispersion of Single-Walled Carbon Nanotubes by Resonant Electron Scattering. *Phys.Rev.Lett.* **88**, 066804 (2002).

22. M. Ouyang, J.-L. Huang, C.L. Cheung & C.M. Lieber, Atomically Resolved Single-Walled Carbon Nanotube Intramolecular Junctions. *Science* **291**, 97 (2001).

21. M. Ouyang, J.-L. Huang, C.L. Cheung & C.M. Lieber, Energy Gaps in “Metallic” Single-Walled Carbon Nanotubes. *Science* **292**, 702 (2001)

(related news article: Burn and Interrogate, *Science* **292**, 650 (2001)).

20. J.T. Hu\*, M. Ouyang\*, P.D. Yang & C.M. Lieber, Controlled Growth and Electrical Properties of Heterojunctions of Carbon Nanotubes and Silicon Nanowires. *Nature* **399**, 48 (1999). \**Contributed equally to this work*

• **Manuscripts Under-Review and In-Preparation**

36. J. Zhang, Y. Tang & M. Ouyang, Layer-by-Layer Engineering of Fundamental Electron and Phonon Coupling Interactions at the Nanoscale. *Nature Materials* (in-depth review, 2010).

37. Y. Tang, J. Zhang & M. Ouyang, Magnetic Core@Metal Shell Nanostructures with Layer-by-Layer Shell Control and Tunable Magnetism. (submitted to *JACS*, 2010).

**Patents**

1. Invention Disclosure 2009 (#PS-2009-088): A General Strategy for Versatile Core-Metallic Shell Nanostructures with Single Layer Tunability.

2. Invention Disclosure 2010 (#PS-2010-031): A General Non-Epitaxial Synthetic Strategy for Growing Monocrystalline Semiconductor Based Zero-, One- and Two- Dimensional Hybrid Hetero-Structures.

**Invited Presentations**

Dr. Ouyang has presented more than 60 *invited* talks in national and international conferences & in institutes and universities. *Selected* presentations are:

2011 The 38<sup>th</sup> Conference on the Physics and Chemistry of Surfaces and Interfaces (PCSI), San Diego, January

2011 The 3<sup>rd</sup> International Topical Meeting on Nanophotonics and Metamaterials, Austria, January

2010 The 4<sup>th</sup> International Workshop on Nanomaterials, Devices and Physics Properties, Beijing, June

*Title:* Precisely Tailored Zero-Dimensional Nanostructures

2009 American Physical Society meeting, Pittsburgh, March

*Title:* Controlled Crystallinity and Fundamental Coupling Interactions in Nanocrystals

2008 The 3<sup>rd</sup> International Workshop on Nanomaterials, Devices and Physics Properties, Beijing, July

*Title:* Spin Dynamics of Semiconductor Nanostructures

2007 The 2<sup>nd</sup> International Workshop on Nanomaterials, Devices and Physics Properties, Beijing, July

*Title:* Molecularly Engineered Crystallinity, Property and Functionality of Metal Nanoparticles

2005 The 229<sup>th</sup> ACS National Meeting, San Diego, March

- Title: Spin Dynamics in Molecularly-Wired Quantum Dots and Quantum Wells*
- 2004 The 3<sup>rd</sup> International Conference on Physics and Applications of Spin-Related Phenomena in Semiconductors (*PASPS III*), July
- Title: Molecular Wiring of Spin Coherence between Semiconductor Quantum Dots*
- 2004 American Physical Society meeting, Montreal, March
- Title: Coherent Spin Transfer between Molecularly Bridged Quantum Dots*
- 2004 FNANO (Foundations of Nanoscience: Self-Assembled Architectures and Devices) Conference, Utah, April
- Title: Molecular Wiring of Semiconductor Nanostructures for Quantum Information Processing*
- 2004 Aspen Workshop on Condensed Matter Physics, Colorado, January
- Title: Coherent Spin Transfer between Molecularly Bridged Quantum Dots*
- 2003 Gordon Research Conference (condensed matter physics), Connecticut, July
- Title: Molecular Spin Bridges: the “Wiring” for Spin Communication between Colloidal Quantum Dots*
- 2001 Materials Research Society fall meeting, Boston, November
- Title: Fundamental Electronic Properties of Single-Walled Carbon Nanotubes*
- 2001 American Physical Society meeting, Seattle, March
- Title: Curvature Induced Gaps and Pseudo Gaps in “Metallic” Single-Walled Carbon Nanotubes*
- Title: Coherent Spin Transfer between Molecularly Bridged Quantum Dots*

### **Synergistic Activities**

#### 1. External review panels:

- NSF DMR-CMP review Panel (2010);
- NSF MRI/IMR review Panel (2008);
- Proposal reviewer for *NSF*, *U.S. Civilian Research & Development Foundation (CRDF)*, *The Netherlands Organisation for Scientific Research (NOW) funds*, and *World Scientific Press*;
- Journal referee for *Science*, *Nature*, *Nature Materials*, *Nano Lett.*, *Phys.Rev.Lett.*, *J.Phys.Chem.A&B&C*, *J.Solid State Chem.*, *Appl.Phys.Lett.*, *Phys.Rev.B.*, *J.Am.Chem.Soc.*, *IEEE Transactions*, *J.Phys.Cond.Matt.*, *J.Phys.D.*, *ACS Nano*, *Adv.Mater.*, *Acta Materialia*, *J.Nanoscience and Nanotechnology*, *Nanotechnology*, *Rev.Sci.Instru.*, *Nanoscale Res.Lett.*, *Small*, and *etc.*

2. Conference organization: conference session chair of *Seeing at the Nanoscale I* (2003); sorter and program organizer for APS March meeting (2005); and organization committee of

International Workshop on Nanostructure & Nanodevices (2005-present); conference session chair of *NanoMeta* (2011);

3. Communication of excitement of science to non-scientists and educational outreach programs: Summer REU program (one of Dr. Ouyang's summer students, Ms. Paris Alexander, won the first place for Best Poster in the 30<sup>th</sup> Annual National Society of Black Physicists Conference in Boston, 2007); middle school science conferences primarily in the underrepresented groups, multicultural presentation in middle and elementary schools, annual Physics is Phun, annual Maryland Day, annual Nano Day, lab tours for high school students and the community.

### **Department and University Services**

1. Physics council committee (2005-2007)
2. Salary advisory committee (2007-2008)
3. Expanded qualifying examination committee (2007-2009)
4. Qualify examination grader (2004, 2005, 2006, 2007, 2008)
5. University Nanocenter lab manager search committee (2005)
6. Faculty (CM experiment) search committee (2007-2008)
7. CNAM post-doctoral fellowship committee (2007-2009)
8. CNAM central facility committee (2009)
9. CNAM seminar Committee (2007-2010)
10. Undergraduate advising (2005- present)
11. Laboratory committee (2007-present)
12. 1<sup>st</sup> and 2<sup>nd</sup> yrs graduate advisor (2004- present)
13. CNAM colloquium organizer (2007-present)
14. University TEM shared facility oversight committee (2006-present)
15. Qualify examination framer (2010)

### **Teaching Activities**

1. Course and Curriculum Development: Dr. Ouyang has independently developed and opened a new course (2/3 lecture+1/3 laboratory integrated in one semester) for senior undergraduates and graduates in physics, chemistry and engineering (this course is cross-listed in three colleges of physics, chemistry and engineering); Dr. Ouyang has modified two existing lab manuals for undergraduate introductory laboratory courses.

2. Dr. Ouyang has taught a new course developed by himself (Spring 2008, Spring 2009, Spring 2010): PHYS499M/ENMA489X (*Physics, Materials Chemistry and Device Applications at the Nanoscale*).

3. Dr. Ouyang has taught a large introductory physics lecture course for engineering major (~100 students/class) (Spring 2006, Spring 2007): PHYS270 (General Physics: Electrodynamics, Light, Relativity and Modern Physics)
4. Dr. Ouyang has taught two large introductory physics laboratory courses for engineering major (~500 students/semester) (Fall 2007, Fall 2008, Fall 2009): PHYS261 (General Physics Laboratory I: Vibrations, Waves, Heat, Electricity and Magnetism) and PHYS 271 (General Physics Laboratory II: Electrodynamics, Light, Relativity and Modern Physics).
5. Dr. Ouyang has taught a small introductory physics laboratory course for physics major (~30 students/semester) (Fall 2004, Fall 2005, Fall 2006): PHYS275 (Experimental Physics I: Mechanics, Heat and Field).

### **Advising Activities**

1. Postdoctoral researchers: Dr. Youxiang Zhang (associate professor of chemistry in Wuhan University) and Dr. Jiatao Zhang (full professor of materials science in the Beijing Institute of Technology).
2. Graduate students: Dr. Yun Tang (graduated in Summer 2009 and currently is a postdoctoral fellow in MIT), Alex Norman (Physics), Kwan Lee (Materials Science), Lin Weng (Chemical Physics), Huizhi Bai (Chemistry).
3. Undergraduate summer students: Garry Brock (2005), Eric Peterson (2005), Paris Alexander (2006), Lina Gonzalez (2006), Izath Aguilar (2008)