

## Jennifer T. Choy

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<b>Education</b>	<b>Harvard University</b> , Cambridge, MA PhD, Applied Physics (Advisor: Marko Lončar) 2013 MS, Applied Physics 2008
	<b>Massachusetts Institute of Technology (MIT)</b> , Cambridge, MA BSc, Nuclear Science and Engineering 2007 BSc, Physics 2007
<b>Positions</b>	<b>University of Wisconsin-Madison</b> Assistant Professor Department of Engineering Physics (primary affiliation) Jan 2019– Grainger Institute of Engineering Jan 2019– Department of Electrical and Computer Engineering April 2019– Department of Materials Science and Engineering October 2019– Wisconsin Quantum Institute 2019–
	<b>Draper Laboratory, Electro-optics and Instruments group</b> 2013–2018 Principal Member of the Technical Staff (2016–2018), Senior Member of the Technical Staff (2013–2016) <ul style="list-style-type: none"><li>• Developed quantum, optical, and mechanical sensors for guidance and navigation</li><li>• Technical director on Chip-scale Combinatorial Atomic Navigator (C-SCAN) program funded by DARPA</li><li>• Program manager on Precise Robust Inertial Guidance for Munitions (PRIGM) programs funded by DARPA</li></ul>
	<b>Harvard University, Laboratory for Nanoscale Optics</b> 2008–2013 Graduate student and post-doctoral researcher under Prof. Marko Lončar
	<b>MIT, Nuclear Magnetic Resonance Laboratory</b> 2004–2007 Undergraduate researcher under Prof. David G. Cory
<b>Awards</b>	Grainger Institute Faculty Scholar Award, UW-Madison (2018) Outstanding Contribution Award, Draper (2015, 2016, 2017, 2018) Outstanding Task Leader Award Finalist, Draper (2016) Materials Research Society Graduate Student Silver Award (2012) National Science Foundation Graduate Research Fellowship (2007–2012) First place winner (as part of a team of five) of the American Nuclear Society Undergraduate Student Design Competition (2007) Roy Axford Award, Department of Nuclear Science and Engineering, MIT (2007) Barry M. Goldwater Scholarship (2006) Irving Kaplan Award, Department of Nuclear Science and Engineering, MIT (2006)

**Presentations  
(speaker only)**

21. "Atom-based quantum sensors: applications to navigation." *Grainger Friday Seminar*, University of Wisconsin-Madison, Madison, WI, November 2019
20. "Atoms reveal the hidden workings of the universe." *SoundWaves: Hidden Worlds of the Universe*, University of Wisconsin-Madison, Madison, WI, April 2019
19. "Cold atom inertial sensors." Briefing presented to the Defense Science Board, Cambridge, MA, May 2018
18. "A hybrid atom interferometer accelerometer-gyroscope." Contributed talk. *IEEE/ION Position Location and Navigation Symposium*, Monterey, CA, April 2018
17. "Atomic and solid-state quantum sensing." Seminar talk. *Department of Engineering Physics Seminar*, University of Wisconsin-Madison, Madison, WI, March 2018
16. "A hybrid atom-interferometer-based inertial measurement unit." Contributed talk. *Joint Navigation Conference*, Dayton, OH, June 2017
15. "A cold atom accelerometer-gyroscope." Invited talk. *First Meeting of the NATO Sensors and Electronics Technology Panel on "Mobile Quantum Sensors for Navigation, Timing, and Gravitation"*, Paris, France, April 2017
14. "Engineering light-matter interactions with atom-like systems." Seminar talk. *R.G. Herb Condensed Matter Seminar*, University of Wisconsin-Madison, Madison, WI, September 2016
13. "Cold atom inertial sensors." Briefing presented to the Utility of Quantum System Study Panel of the Air Force Scientific Advisory Board, Cambridge, MA, March 2015
12. "Plasmonic gratings for improving single photon collection for color centers in diamond." Contributed talk. *Material Research Society (MRS) Fall Meeting*, Boston, MA, November 2012
11. "Single photon sources based on nanostructured diamond." Invited talk. *Quantum Innovators Workshop*, Institute for Quantum Computing, Waterloo, Canada, September 2012
10. "Diamond-silver apertures with plasmonic gratings." Contributed talk. *Conference on Lasers and Electro-Optics (CLEO)*, San Jose, CA, May 2012
9. "Single photon sources based on diamond-silver apertures." Seminar talk. *Center for Nanoscale Systems Seminar*, Harvard University, Cambridge, MA, December 2011
8. "Integrated optical resonators in titanium dioxide thin films for the visible wavelengths." Poster. *MRS Fall Meeting*, Boston, MA, November 2011
7. "Diamond nanophotonics and quantum optics." Invited talk. *International Materials Research Congress (IMRC)*, Cancun, Mexico, August 2011
6. "Enhanced single photon emission by diamond-plasmon nanostructures." Contributed talk. *CLEO*, Baltimore, MD, May 2011
5. "Diamond nanophotonics." Seminar talk. *Nanoscale Science and Engineering Center Applied Physics 298r Seminar*, Harvard University, Cambridge, MA, April 2011
4. "Enhanced single photon emission by diamond-plasmon nanoapertures." Poster. *WE-Heraeus-Seminar in Diamond: Spintronics, Photonics, Bio-Applications*, Bad Honnef, Germany, April 2011
3. "Optical characterization of diamond nanoparticles and their applications." Contributed talk. *MRS Fall Meeting*, Boston, MA, November 2010

2. “Diamond nanophotonics.” *Poster*. *Harvard Smithsonian Institute of Theoretical Atomic and Molecular Physics (ITAMP) Seminar Series*, Cambridge, MA, November 2010
1. “Design for a compact neutron interferometer.” *Team presentation*. *American Nuclear Society Winter Meeting*, Washington, DC, November 2007

## Publications

19. I Huang, J Holzgrafe, R Jensen, J Choy, M Bawendi, and M Lončar, “10 nm Gap Bowtie Plasmonic Nanoresonators Fabricated by Modified Lift-off Process,” *Appl. Phys. Lett.*, **109**, 133105 (2016)
18. RA Jensen, I Huang, O Chen, JT Choy, TS Bischof, M Lončar, MG Bawendi, “Optical Trapping and Two-Photon Excitation of Colloidal Quantum Dots using Bowtie Apertures,” *ACS Photonics*, **3** (3), 423–427 (2016)
17. S Meesala, YI Sohn, HA Atikian, S Kim, MJ Burek, JT Choy, M Lončar, “Enhanced strain coupling of nitrogen vacancy spins to nanoscale diamond cantilevers,” *Phys. Rev. Applied*, **5**, 034010 (2016)
16. HA Atikian, A Eftekharian, AJ Salim, MJ Burek, JT Choy, AH Majedi, M Lončar, “Superconducting nanowire single photon detector on diamond,” *Appl. Phys. Lett.*, **104** (12), 122602 (2014)
15. K Bayat, J Choy, M Farrokh Baroughi, S Meesala, M Lončar, “Efficient, Uniform, and Large Area Microwave Magnetic Coupling to NV Centers in Diamond Using Double Split-Ring Resonators,” *Nano Lett.*, **14** (3), 1208–1213 (2014)
14. R Mahfouz, DL Floyd, W Peng, JT Choy, M Lončar, OM Bakr, “Size-controlled fluorescent nanodiamonds: a facile method of fabrication and color-center counting,” *Nanoscale*, **5** (23), 11776–11782 (2013)
13. JT Choy, I Bulu, B Hausmann, and M Lončar, “Plasmonic gratings for improving single photon collection for color centers in diamond,” *Appl. Phys. Lett.*, **103** (16), 161101 (2013)
12. JDB Bradley, CC Evans, JT Choy, O Reshef, PB Deotare, F Parsy, KC Phillips, M Lončar, and E Mazur, “Submicrometer-wide amorphous and polycrystalline anatase TiO<sub>2</sub> waveguides for microphotonic devices,” *Opt. Express*, **20**, 23821–23831 (2012)
11. BJM Hausmann, JT Choy, TM Babinec, BJ Shields, I Bulu, MD Lukin, and M Lončar, “Diamond nanophotonics and applications in quantum science and technology,” *Phys. Status Solidi A*, **209**, 1619–1630 (2012)
10. BM Hausmann, B Shields, Q Quan, P Maletinsky, M McCutcheon, JT Choy, TM Babinec, A Kubanek, A Yacoby, MD Lukin, M Lončar, “Integrated diamond networks for quantum nanophotonics,” *Nano Lett.* **12** (3), 1578–1582 (2012)
9. JT Choy, JDB Bradley, PB Deotare, IB Burgess, CC Evans, E Mazur, and M Lončar, “Integrated TiO<sub>2</sub> resonators for visible photonics,” *Opt. Lett.* **37**, 539–541 (2012)
8. JT Choy, BM Hausmann, TM Babinec, I Bulu, M Khan, P Maletinsky, A Yacoby, and M Lončar, “Enhanced single photon emission from a diamond-silver aperture,” *Nature Photon.* **5**, 738–743 (2011)
7. Y Zhang, C Hamsen, JT Choy, Y Huang, JH Ryou, RD Dupuis, and M Lončar, “Photonic crystal disk lasers,” *Opt. Lett.* **36** (14), 2704–2706 (2011)
6. TM Babinec, BM Hausmann, JT Choy, M Khan, PR Hemmer, and M Lončar, “Quantum photonics with diamond,” *IEEE Photon. Soc. Newslett.* **25**, 13–18 (2011)

5. I Bulu, TM Babinec, B Hausmann, JT Choy, M Lončar, “Plasmonic resonators for enhanced diamond NV-center single photon sources,” *Opt. Exp.* **19**, 5268–5276 (2011)
4. BM Hausmann, TM Babinec, JT Choy, JS Hodges, S Hong, I Bulu, A Yacoby, M Lukin and M Lončar, “Single color centers implanted in diamond nanostructures,” *New J. Phys.* **13**, 045004 (2011)
3. TM Babinec, JT Choy, KJM Smith, M Khan, and M Lončar, “Design and focused ion beam fabrication of single crystal diamond nanobeam cavities,” *J. Vac. Sci. Technol. B* **29**, 010601 (2011)
2. LE Fernandes, JT Choy, DR Khanal, DG Cory, “Experimental realization of electromagnetically induced transparency in liquid-state NMR,” *Concept Magn. Reson. A* **30A (5)**, 236–245 (2007)
1. J Choy, W Ling, A Jerschow, “Selective detection of ordered sodium signals via the central transition,” *J. Magn. Reson.* **180**, 105–109 (2006)

**Book Chapter**

JT Choy, BJM Hausmann, MJ Burek, T. Babinec, M Lončcar, “Nanofabrication of photonic devices from single crystal diamond for quantum information processing (QIP),” invited book chapter in *Quantum Information Processing with Diamond*, edited by S Praver and I Aharonovich, Woodhead Publishing (2014)

**Patent**

A Gill, SJ Byrnes, J Choy, CY Wang, MA Sinclair, A Kelsey, D Johnson, “An optical design for atom-interferometric inertial sensors with enhanced stability”, US Patent Application 15/685330, filed August 2017, granted December 2018

**Professional activities**

Program committee member for the 2020 Optical Society of America Novel Optical Materials and Applications (OSA NOMA) conference  
 NSF panelist (March 2019)  
 Briefings to the *Defense Science Board* (2018) and *Air Force Scientific Advisory Board* (2015)  
 Participation in the *NATO Sensor Electronics and Technology Panel* on “Mobile Quantum Sensors for Navigation, Timing, and Gravitation” (2017)  
 Referee for *Nature*, *Optical Materials Express*, *Nano Letters*, *Scientific Reports*, *Optics Express*, *Optics Letters*

**Grants and contracts**

5. Program: Quantum probes of the materials origins of decoherence  
Sponsor: Department of Energy  
Institutions: University of Wisconsin-Madison, Lawrence Livermore National Laboratory  
Years: 9/2019–8/2022  
Amount: \$4,000,000 (Choy portion ~\$450,000)  
Role: co-PI, with PI Shimon Kolkowitz and co-PIs Victor Brar, Jonathan DuBois, Mark Eriksson, Lara Faoro, Mark Friesen, Alex Levchenko, Vincenzo Lordt, Robert McDermott, Keith Ray, Yaniv Rosen
4. Program: Miniaturized Inertial Measurement Unit (mini-IMU)  
Sponsor: Office of Naval Research  
Institution: Draper  
Years: 2018–2019  
Role: Technical Director (during proposal and initial months of program)

3. Program: Precise Robust Inertial Guidance for Munitions Navigation-Grade Inertial Measurement Unit (PRIGM:NGIMU)  
Sponsor: DARPA  
Institution: Draper (as subcontractor to Honeywell)  
Years: 2016–2017  
Role: Program Manager (2017)
2. Program: Precise Robust Inertial Guidance for Munitions: Advanced Inertial Micro Sensors (PRIGM:AIMS)  
Sponsor: DARPA  
Institution: Draper  
Years: 2016–2017  
Role: Program Manager (2017)
1. Program: Chip-Scale Combinatorial Atomic Navigator (C-SCAN)  
Sponsor: DARPA  
Institution: Draper  
Years: 2013–2017  
Role: Task Lead (2013–2015); Technical Director (2015–2017)

## Teaching

### University of Wisconsin-Madison

NE 427: Nuclear Instrumentation Laboratory      Spring 2019, Fall 2019, Spring 2020

- Undergraduate course consisting of both lecture and laboratory components. Topics include: counting statistics and error propagation, interactions of radiation with matter, Geiger-Mueller and other gas-filled counters, scintillation counters, neutron detection, gamma spectroscopy, range of radiation particles, coincidence measurements, and neutron activation analysis.

### Harvard University

SPU 25: Science of the Physical Universe: Energy (Teaching Fellow)      Spring 2010

### Educational Studies Program, MIT

High School Studies Program course “Elementary Nuclear Physics”      Spring 2006

### Department of Physics, MIT

8.03: Wave Mechanics (Grader)      Fall 2005

8.01L: Classical Mechanics (Tutor)      Fall 2004

## Research advising PhD Students

### at UW-Madison

Xuting Yang (Materials Science and Engineering, January 2019-present)

Ricardo Vidrio (Nuclear Engineering and Engineering Physics, April 2019-present)

Sarah Francis (Nuclear Engineering and Engineering Physics, September 2019-present)

### Undergraduates

Zhengzhi Chen (Electrical and Computer Engineering, January 2019-present)

John Doyle (Electrical and Computer Engineering, February 2019-present)

Mazna Aljneibi (Nuclear Engineering and Engineering Physics, February 2019-present)

### PhD Defense Committee

Zhenyang Xia (Electrical and Computer Engineering, 2019)

### Preliminary Exam Committees

Alireza Shahsafi (Electrical and Computer Engineering, 2019); Jad Salman (Electrical and Computer Engineering, 2019); Nathan Strachen (Electrical and Computer Engineering, 2019)

**Outreach  
activities**

Faculty guest at *Women in Science & Engineering* dinner, October 2019

*Engineering Possibilities Showcase*, Draper, Oct 2017

NeXXt scholar program fellow, New York Academy of Sciences, 2013–2014

Volunteer, *Cambridge 8th grade Science and Engineering Showcase*, Harvard, May 2012

Volunteer, *NanoDays*, Museum of Science, Boston, MA, March 2012

“Diamonds and light.” Podcast. *Museum of Science Podcast*, Boston, MA, January 2012

Cambridge School Volunteers, Cambridge Rindge and Latin School, 2008–2010