

# Robert J. Walters, PhD

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## Experience

- From 2008 Postdoctoral Scholar under Prof.dr. Albert Polman,  
The FOM-Institute for Atomic and Molecular Physics (AMOLF), Amsterdam, The Netherlands
- 2007 Staff Scientist, The Golem Group LLC, Santa Monica, CA, USA  
Staff Scientist, Tanner Research Inc., Monrovia, CA, USA
- Until 2007 Graduate Research Assistant under Prof. Harry Atwater,  
California Institute of Technology, Pasadena, CA, USA

## Education

- Ph.D. Applied Physics, California Institute of Technology, Pasadena, CA, USA, May 2007  
Thesis: *Silicon Nanocrystals for Silicon Photonics* (available online at <http://etd.caltech.edu>)
- M.S. Applied Physics, California Institute of Technology, Pasadena, CA, USA, June 2003
- B.S. Physics, Harvey Mudd College, Claremont, CA, USA, May 2001

## Publications

- 2010 "A silicon-based electrical source of surface plasmon polaritons," *Nature Materials*, **9**(1), 3 — 4 (2010).  
R. J. Walters, R. V. A. van Loon, I. Brunets, J. Schmitz and A. Polman
- 2010 "Light trapping in ultrathin plasmonic solar cells," *Optics Express*, **18**(S2), A237 — A245 (2010).  
V. E. Ferry, M. A. Verschuuren, H. B. T. Li, E. Verhagen, R. J. Walters, R. E. I. Schropp, H. A. Atwater, and A. Polman
- 2009 "Enhanced spontaneous emission rate in annular plasmonic nanocavities," *Applied Physics Letters*, **95**, 263106 (2009).  
E. J. A. Kroekenstoel, E. Verhagen, R. J. Walters, L. Kuipers, and A. Polman
- 2008 "Universal optical transmission features in periodic and quasiperiodic hole arrays," *Optics Express*, **16**(12), 9222 — 9238 (2008).  
D. Pacifici, H. J. Lezec, L. A. Sweatlock, R. J. Walters, and H. A. Atwater
- 2006 "Silicon nanocrystal field-effect light-emitting devices," *IEEE JSTQE: Silicon Photonics*, **12**(6-2), 1647 — 1656 (2006).  
R. J. Walters, J. Carreras, T. Feng, L. D. Bell, and H. A. Atwater
- 2006 "Photoluminescence quantum efficiency of dense silicon nanocrystal ensembles in SiO<sub>2</sub>," *Physical Review B*, **73**, 132302 (2006).  
R. J. Walters, J. Kalkman, A. Polman, H. A. Atwater, and M. J. A. de Dood
- 2005 "Field-effect electroluminescence in silicon nanocrystals," *Nature Materials*, **4**(2), 143 — 146 (2005).  
R. J. Walters, H. A. Atwater, and G. I. Bourianoff
- 2004 "Silicon optical nanocrystal memory," *Applied Physics Letters*, **85**(13), 2622 — 2624 (2004).  
R. J. Walters, P. G. Kik, J. D. Caspersen, H. A. Atwater, R. Lindstedt, M. Giorgi, and G. Bourianoff
- 2004 "Determination of energy barrier profiles for high- $\kappa$  dielectric materials utilizing bias-dependent internal photoemission,"  
*Applied Physics Letters*, **85**(18), 4134 — 4136 (2004).  
J. D. Caspersen, R. J. Walters, L. D. Bell, D. B. Farmer, R. G. Gordon, H. A. Atwater
- Publications in Robotics:
- 2006 "The Golem Group/University of California at Los Angeles Autonomous Ground Vehicle in the DARPA Grand Challenge," *Journal of Field Robotics*, **23**(8), 527 — 553 (2006). R. Mason, J. Radford, D. Kumar, R. Walters, B. Fulkerson, E. Jones, D. Caldwell, J. Meltzer, Y. Alon, A. Shashua, H. Hattori, N. Takeda, E. Frazzoli, and S. Soatto
- 2006 "Autonomous Off-Road Driving in the DARPA Grand Challenge," *Proceedings of the IEEE: ION Position, Location, and Navigation Symposium*, 366 — 371 (2006). E. Jones, B. Fulkerson, E. Frazzoli, D. Kumar, R. Walters, J. Radford, and R. Mason

## Patents

- 2010 "Integrated plasmonic nanocavity sensing device" (E.U. Application #10159175.8-2204)
- 2005 "Sequentially Charged Nanocrystal Light Emitting Device" (U.S. #7,301,172)
- 2003 "Electro-Optical Nanocrystal Memory Device" (U.S. #7,121,474)
- 2003 "Nanocrystal Based High-Speed Electro-Optic Modulator" (U.S. #6,771,410)

## Honors and Fellowships

- 2007 Demetriades-Tsafka Prize for the Best Thesis in Nanotechnology (Caltech)
- 2006 Materials Research Society Graduate Student Silver Award
- 2005 – 2007 Intel Foundation Fellowship
- 2001 – 2004 National Defense Science and Engineering Graduate Fellowship

## Presentations

- 6/2010 E-MRS Spring Meeting, Strasbourg, France  
*A silicon-based electrical source of surface plasmon polaritons* [invited]
- 4/2010 SPIE Photonics Europe, Brussels, Belgium  
*A silicon-based electrical source of surface plasmon polaritons*
- 4/2010 MRS Spring Meeting, San Francisco, CA, USA  
*A silicon-based electrical source of surface plasmon polaritons* [invited]
- 9/2009 6th International Conference on Group IV Photonics, San Francisco, CA, USA  
*A silicon-based electrical source of surface plasmon polaritons*
- 6/2009 Fourth International Conference on Surface Plasmon Photonics ("SPP4"), Amsterdam, The Netherlands  
*Electrical excitation of surface plasmon polaritons*
- 6/2009 E-MRS Spring Meeting, Strasbourg, France  
*Electrical excitation of surface plasmon polaritons*
- 4/2009 MRS Spring Meeting, San Francisco, CA, USA  
*Silicon-on-Insulator Waveguide Integrated Plasmonic Antennae* [poster]  
*Electrical excitation of surface plasmon polaritons* [poster]
- 1/2009 2nd European Topical Meeting on Nanophotonics and Metamaterials ("Nanometa"), Seefeld, Austria  
*Silicon-on-Insulator Waveguide Integrated Plasmonic Antennae* [poster]
- 9/2008 5th International Conference on Group IV Photonics, Sorrento, Italy  
*Luminescence properties of silicon nanocrystals in Al<sub>2</sub>O<sub>3</sub> grown by low temperature atomic layer deposition*
- 7/2008 Gordon Research Conference on Plasmonics, Tilton, NH, USA  
*Electrical excitation of surface plasmon polaritons* [poster]
- 4/2008 Sensitized Er-Doped Waveguides, Amplifiers, and Lasers Workshop, Levico Terme, Italy  
*Opportunities for Sensitized Erbium Microphotonic Devices* [invited]
- 4/2007 MRS Spring Meeting, San Francisco, CA, USA  
*Simulating Light Emission in Silicon Nanocrystal Field Effect Light Emitting Devices* [poster]
- 1/2007 SPIE Photonics West, San Jose, CA, USA  
*Field Effect Light Emitting Devices (FELEDs)* [invited]
- 4/2006 MRS Spring Meeting, San Francisco, CA, USA  
*Silicon Nanocrystals in Field Effect Light Emitting Devices (FELEDs)*  
*PbSe Nanocrystal Excitation by a Silicon Nanocrystal Field Effect Light Emitting Device*
- 12/2005 MRS Fall Meeting, Boston, MA, USA  
*Field Effect Electroluminescence in Silicon Nanocrystal Arrays*  
*Photoluminescence Quantum Efficiency of Dense Silicon Nanocrystal Ensembles in SiO<sub>2</sub>* [poster]  
*Electroluminescent Device based on Energy Transfer from Si Nanocrystals to PbSe Nanocrystals* [poster]
- 8/2005 SPIE Nanophotonics, San Diego, CA, USA  
*Silicon Nanocrystal Field Effect Light Emitting Device (FELED)* [invited]
- 5/2005 APS March Meeting, Los Angeles, CA, USA  
*Silicon Nanocrystal Field Effect Light Emitting Device (FELED)*  
*Silicon Nanocrystal Internal Quantum Efficiency via Local Optical Density of States*

5/2004 E-MRS Spring Meeting, Strasbourg, France  
*Erbium Doped Silicon Nanocrystal Optical Memory*

4/2004 MRS Spring Meeting, San Francisco, CA, USA  
*Silicon Nanocrystal Optical Modulator* [invited]

12/2003 MRS Fall Meeting, Boston, MA, USA  
*Reading and Programming a Silicon Nanocrystal Optical Memory*

4/2003 MRS Spring Meeting, San Francisco, CA, USA  
*Silicon Optical Nanocrystal Memory*

11/2002 MRS Fall Meeting, Boston, MA, USA  
*Optical Nanocrystal Memory*