Robert W. Schoonover

Born 31 October, 1981 in Macomb, Illinois. US citizen.

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Employment History

- Research Assistant to Prof. P. Scott Carney in the Department of Electrical and Computer Engineering at the University of Illinois Urbana–Champaign, June 2004–Present.
- Lab Assistant to Prof. Douglas Beck in the Department of Physics at the University of Illinois Urbana–Champaign, September 2003–May 2004.
- Intern, Software Test Engineering at Motorola, September 2003–April 2004.
- Undergraduate Teaching Assistant in the Department of Electrical and Computer Engineering at the University of Illinois Urbana–Champaign, September 2002–December 2003.
- Intern, Systems Engineering at Motorola, June 2000–August 2000, May 2001–August 2001, May 2002–August 2002, May 2003–August 2003.

Education

- Ph.D in Electrical and Computer Engineering, University of Illinois Urbana-Champaign, September 2009 (*expected*)
  Thesis: Statistical Optics for Pulsed Fields
  Advisor: P. Scott Carney
- Ph.D in Electrical Engineering, Delft University of Technology, May 29,2009
  Thesis: Studies in Singular Optics and Coherence Theory
  Advisor: Taco D. Visser
- M.S. in Electrical and Computer Engineering, University of Illinois Urbana–Champaign, December 2006
  Thesis: Singular Optics of Focused Fields
  Advisor: P. Scott Carney
- B.S. in Electrical and Computer Engineering, University of Illinois Urbana–Champaign, May 2004

Honors

- Raj Mittra Outstanding Research Award, 2009
- Fulbright Scholar (The Netherlands), 2005–2006.
- Donald L. Bitzer and H. Gene Slottow Creativity Award, 2003.
- Robert C. Byrd Honors Scholarship, 2000–2004
- James Scholar, UIUC, 2000–2004.

Teaching Assistantships

- Junior level electromagnetics (ECE 329), UIUC, Fall 2004.
- Senior Design (ECE 445), UIUC, Spring 2007, Fall 2008
- Graduate physical optics (ECE 569), UIUC, Fall 2004, Fall 2006, Fall 2007
- Graduate nonlinear and quantum optics (ECE 570), UIUC, Spring 2008.

Principal areas of research

- Singular optics [2, 3, 5, 10](see Peer reviewed publications below)

  Studied the fine (sub-wavelength) structure of focal fields. Explained the relationship between singular structures within different approximations of electromagnetics (scalar optics, coherence theory, vector optics).

- Fundamental optical physics [1, 4, 7, 9]

  Proposed a method to determine nonlocal responses in small scatterers. Extended work on the geometrical propagation of coherence functions to the case of vector fields. Introduced computationally efficient algorithms for calculating the modal structure of partially coherent fields.

- Statistical optics with pulsed fields [6, 8, 11]

  Proposed and investigated novel propagation effects for periodic (cyclostationary) optical fields, including diffraction effects and coherence-dependent propagation-induced spectral changes. Investigated the non-uniqueness of interferometric data for cyclostationary fields. Introduced generalized spectra for analysis of spectral shifts and spectral correlation shifts.

Peer reviewed publications

[1] **R.W. Schoonover**, J.M. Rutherford, O. Keller, P.S. Carney, "Nonlocal constitutive relations and the quasi-homogeneous approximation," Phys. Lett. A. **342**, 363-367 (2005).

[2] D.W. Diehl, **R.W. Schoonover**, and T.D. Visser, "The structure of focused, radially polarized fields," Opt. Express **14**, 3030–3038 (2006)

[3] **R.W. Schoonover** and T.D. Visser, "Polarization singularities of focused, radially polarized fields," Opt. Express **14**, 5733–5745 (2006).

[4] **R.W. Schoonover**, T.D. Visser, "The power radiated by two correlated sources," Opt. Commun. **271**, Issue 2, 323–326 (2007).

[5] T.D. Visser, **R.W. Schoonover**, "A cascade of singular field patterns in Young's interference experiment," Opt. Commun. **281**, Issue 1, 1–6 (2008).

[6] **R.W. Schoonover**, B.J. Davis, R.A. Bartels, P.S. Carney, "Optical interferometry with pulsed fields," Journ. Mod. Opt., **55**, 1541-1556 (2008).

[7] **R.W. Schoonover**, A.M. Zysk, P.S. Carney, J.C. Schotland, E. Wolf, "Geometrical limits of stochastic electromagnetic fields," Phys. Rev. A **77**, 043831 (2008).

[8] **R.W. Schoonover**, B.J. Davis, P.S. Carney, "The generalized Wolf shift for cyclostationary fields," Opt. Express **17**, 4705–4711 (2009).

[9] B.J. Davis and **R.W. Schoonover**, "Computationally efficient methods for calculating coherent-mode representations," Opt. Lett. **34**, 923–925 (2009).

[10] **R.W. Schoonover**, T.D. Visser, "Creating polarization singularities with an N-pinhole interferometer," Phys. Rev. A **79**, 043809 (2009).

[11] **R.W. Schoonover**, B.J. Davis, R.A. Bartels, P.S. Carney, "Propagation of spatial coherence in fast pulses," *accepted J. Opt. Soc. Am. A*.

Contributed conference talks and posters

1. **Robert W. Schoonover**, Brynmor J. Davis, Randy A. Bartels , P. Scott Carney, "Partially Coherent Cyclostationary Pulses in Young's Interference Experiment," Frontiers in Optics, OSA Annual Meeting, October 2008, Rochester, NY.

2. **Robert W. Schoonover**, Brynmor J. Davis, Randy A. Bartels , P. Scott Carney, "Optical Interferometry with Pulsed Fields," Frontiers in Optics, OSA Annual Meeting, September 2007, San Jose, CA.

3. **Robert W. Schoonover**, Brynmor J. Davis, Randy A. Bartels, P. Scott Carney,"Optical Interferometry with Pulsed Fields," Conference on Conherence and Qunatum Optics 9 (CQO9), June 2007, Rochester, NY.

4. Taco D. Visser, **Robert W. Schoonover**, "A cascade of singularities in Young's interference experiment," Conference on Conherence and Qunatum Optics 9 (CQO9), June 2007, Rochester, NY.

5. **Robert W. Schoonover**, Taco D. Visser, "Polarization singularities of focuses, radially polarized fields," Frontiers in Optics, OSA Annual Meeting, October 2006, Rochester, NY.

6. **Robert W. Schoonover**, Joseph M. Rutherford, Ole Keller, P. Scott Carney, "Nonlocal constitutive relations," Frontiers in Optics, OSA Annual Meeting, October 2005, Tucson, AZ.

7. **Robert W. Schoonover**, Joseph M. Rutherford, Ole Keller, P. Scott Carney, "Nonlocal Susceptibilities and Novel Scattering Effects," International Workshop on Nanophotonics and Nanobiotechnology June 28-July 8, 2005, Koc University, Istanbul, Turkey.