Alexander R. Small

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Academic Positions

2017-Present: Professor (with tenure), Department of Physics and Astronomy, California State Polytechnic University, Pomona

2012-2017: Associate Professor of Physics, California State Polytechnic University, Pomona

2007-2012: Assistant Professor of Physics, California State Polytechnic University, Pomona

2005-2007: Postdoctoral Research Fellow, National Institute of Child Health and Human Development, National Institutes of Health (NICHD/NIH) (Bethesda, MD).
Supervisor: Amir Gandjbakhche (Laboratory of Integrative and Medical Biophysics)

2006: Adjunct Professor of Physics, Georgetown University (Washington, DC)

2004-2005: Lecturer, Brooks Institute of Photography (Santa Barbara, CA)

1999-2005: Graduate Student Researcher, University of California at Santa Barbara
Supervisor: David Pine

2000-2005 (intermittent): Teaching Assistant, University of California, Santa Barbara

1994-1998: Undergraduate Research Assistant, University of Southern California.
Supervisors: Melvin Daybell (1994-1996), Anupam Madhukar (1996-1998)

Education

Ph.D. Physics, 2005, **University of California at Santa Barbara**
Dissertation: ***Scattering, Emission, and Localization of Light in Complex Dielectrics***
Advisor: David Pine

M.A. Physics, 2002, **University of California at Santa Barbara**
GPA 3.71/4.00

B.S. Physics (Economics minor), 1998, **University of Southern California**
GPA 4.0/4.0, Summa Cum Laude, Co-Salutatorian

Classes Taught:

Cal Poly Pomona:

- Upper division physics: Computational Physics, Applied Optics, Classical Mechanics (including Lagrangians), Biophysics, Statistical Physics.
- Introductory physics: Calculus-based and algebra-based, freshman and sophomore, lecture and lab.
- Freshman Seminar: College survival skills and science career planning.

Georgetown University: Materials Physics (Graduate course)
Brooks Institute of Photography: Optics for Photographers.
UC Santa Barbara: Teaching assistant for calculus-based physics (labs and discussions)

Journal articles and selected conference papers:

* Denotes a student author

23. Jorand, R., Biswas, S., Wakefield, D. L., Tobin, S. J., Golfetto, O., Hilton, K., Ko, M., Ramos, J. W., Small, A. R., Chu, P., Singh, G., Jovanovic-Talisman, T. Molecular signatures of mu opioid receptor and somatostatin receptor 2 in pancreatic cancer, *Molecular Biology of the Cell*, **2016**, 27, 3559-3672, doi:10.1091/mbc.E16-06-0427
22. Small, A. R. Multifluorophore localization as a percolation problem: limits to density and precision, *Journal of the Optical Society of America-A*, **2016**, 33, B21-B30.
21. *Yoo, T. Y., *Tran, J., *Stahlheber, S. P., *Kaainoa, C. E., *Djepang, K., Small, A. R., Site percolation on lattices with low average coordination numbers, *Journal of Statistical Mechanics: Theory and Experiment*, **2014**, P06014. doi:10.1088/1742-5468/2014/06/P06014
20. Small, A.R., Parthasarathy, R., Superresolution Localization Methods, *Annual Review of Physical Chemistry*, **2014**, 65, 107-125. doi:10.1146/annurev-physchem-040513-103735
19. *Stahlheber, S.P., Small, A.R., Fluorophore Localization Algorithms for Superresolution Microscopy, *Nature Methods*, **2014**, 11, 267-279. doi:10.1038/nmeth.2844

18. Small, A. R., Fung, J., Manoharan, V.N., Generalization of the optical theorem for light scattering from a particle at a planar interface, *Journal of the Optical Society of America A*, **2013**, 12, 2519-2525. doi:10.1364/JOSAA.30.002519
17. *Tran, J., *Yoo, T. Y., *Stahlheber, S. P., Small, A. R., Percolation thresholds on 3-dimensional lattices with 3 nearest neighbors, *Journal of Statistical Mechanics: Theory and Experiment*, **2013**, P05014. doi:10.1088/1742-5468/2013/05/P05014
16. *Starr, R.A., *Stahlheber, S.P., Small, A.R., Fast maximum likelihood algorithm for localization of fluorescent molecules, *Optics Letters*, **2012**, 37, 413-415. doi:10.1364/OL.37.000413
15. Small, A.R., Model of bleaching and acquisition for superresolution microscopy controlled by a single wavelength, *Biomedical Optics Express* **2011**, 2, 2934-2949. doi:10.1364/BOE.2.002934
14. Small, A.R., Lam, K.S., Simple derivations of the Hamilton-Jacobi equation and the eikonal equation without the use of canonical transformations, *American Journal of Physics*, **2011**, 79, 678-681. doi:10.1119/1.3553462
13. *Shore, E.W., Small, A.R., Optimal acquisition scheme for subwavelength localization microscopy of bleachable fluorophores, *Optics Letters* **2011**, 36, 289-291. (Selected for inclusion in the *Virtual Journal of Biomedical Optics*, February 2011) doi:10.1364/OL.36.000289
12. *Nguyen, T. A., *Mansell, M. A., Small, A. R., Theoretical Investigation of Optical Patterning of Monolayers with Subwavelength Resolution, *Physics Letters A* **2010**, 374, 2681-2687. doi:10.1016/j.physleta.2010.04.038
11. Small, A. R. Theoretical Limits on Speed, Errors, and Resolution in Microscopy with Switchable Fluorophores, *OSA Technical Proceedings, Conference: Novel Techniques in Microscopy*, **2009**, paper NMB4. doi:10.1364/NTM.2009.NMB4
10. Small, A. R. Theoretical Limits on Errors and Acquisition Rates in Microscopy of Switchable Fluorophores. *Biophysical Journal* **2009**, 96, L16-L18. doi:10.1016/j.bpj.2008.11.001
9. Amyot, F.; Small, A.R.; Boukari, H.; Camphausen, K.; Gandjbakhche, A. Effect of the Topology of the Heterogeneous Nature of the Extracellular Matrix On Stochastic Model of Tumor Induced Angiogenesis *Microvascular Research* **2009**, 77, 87-95. doi:10.1016/j.mvr.2007.11.001
8. Small, A.R.; Neagu, A.; Amyot, F.; Sackett, D.; Chernomordik, V.; Gandjbakhche, A. Spatial Distribution of VEGF Isoforms and Chemotactic Signals in the Vicinity of a Tumor. *Journal of Theoretical Biology* **2008**, 252, 593-607. doi:10.1016/j.jtbi.2008.02.009
7. Amyot, F.; Small, A.R.; Boukari, H.; Sackett, D.; Elliott, J.; McDaniel, D.; Plant, A.; Gandjbakhche, A.; Thin Films of Oriented Collagen Fibrils for Cell Motility Experiments. *Journal of Biomedical Materials Research: Pt. B* **2008**, 86, 438-443. doi:10.1002/jbm.b.31039
6. Small, A.R.; Pine, D.J. Delocalization of Classical Waves in Highly Anisotropic Random Media. *Physical Review E* **2007**, 75, 016617. doi:10.1103/PhysRevE.75.016617
5. Small, A.R.; Ilev, I.; Chernomordik, V.; Gandjbakhche, A. Enhancing Diffraction-Limited Images Using Properties of the Point Spread Function. *Optics Express* **2006**, 14, 3193-3203. doi:10.1364/OE.14.003193
4. Small, A.R.; Hong, S.; Pine, D.J. Scattering Properties of Core-Shell Particles in Plastic Matrices. *Journal of Polymer Science Part B-Polymer Physics* **2005**, 43, 3534-3548. doi:10.1002/polb.20624
3. Moon, J.H.; Small, A.R.; Yi, G.R.; Lee, S.K.; Chang, W.S.; Pine, D.J.; Yang, S.M. Patterned Polymer Photonic Crystals Using Soft Lithography and Holographic Lithography. *Synthetic Metals* **2005**, 148, 99-102. doi:10.1016/j.synthmet.2004.09.019
2. Imamoglu, A.; Awschalom, D.D.; Burkard, D.; DiVincenzo, D.P.;Loss, D.; Sherwin, M.; Small, A.R. Quantum Information Processing Using Quantum Dot Spins and Cavity QED, *Physical Review Letters* **1999**, 83, 4204-4207. doi:10.1103/PhysRevLett.83.4204 *Erdos Number = 4
1. Chen, P., Wang, C., Madhukar, A., Khan, T., Small, A., Yan, Z., Viswanathan, R., Reflection High-Energy Electron Diffraction as an Intrinsic Material Property Sensor for Machine Condition Transfer Function in Molecular Beam Epitaxial Growth of III-V Compound Semiconductors. *Materials Research Society Symposium Proceedings* **1998**, 47, 502.

Commentary Articles

7. Small, A. R., Tips for Managing Curmudgeons, *Chronicle of Higher Education*, October 24, **2016**. (http://www.chronicle.com/article/Tips-for-Managing-Curmudgeons/238163)
6. Small, A.R., What I'm Reading: 'China's Examination Hell', *Chronicle of Higher Education*, November 8, **2015**. (http://chronicle.com/article/What-Im-Reading-China-s/234092)

5. Small, A.R., A Geek's Guide to Academic Committee Work, *Chronicle of Higher Education*, October 13, **2015**. (http://chronicle.com/article/A-Geeks-Guide-to-Academic/233725)
4. Small, A.R., In Defense of the Lecture, *Chronicle of Higher Education*, May 27, **2014**. (http://chronicle.com/article/In-Defense-of-the-Lecture/146797/)
3. Small, A.R., Faster and more versatile tools for super-resolution fluorescence microscopy, *Nature Methods*, **2012**, 9, 655-656. (Invited) doi:10.1038/nmeth.2079
2. Salik, E., Small, A.R. How to Build a Thriving Undergrad Physics Program, *Optics and Photonics News*, **2012** vol 23, issue 6 (June), p. 10-11. (Invited)
1. Small, A.R. Scientific Python for Both Expert and Novice Programmers, *Computing in Science and Engineering*, **2012**, vol. 14, issue 2, p. 6-7. (Book review)

Book Chapter

1. Small, A.R. and *Stahlheber, S.P., "The Role of Image Analysis Algorithms in Super-Resolution Localization Microscopy", in *Advanced Fluorescence Microscopy*, edited by Michael Conn and Anda Cornea, published by Elsevier, **2014**, p. 227-242. (Invited)

Published Fiction:

"Revise and Resubmit" (as R. S. Alexander), 365 Tomorrows, September 24, 2016
(http://365tomorrows.com/2016/09/24/revise-and-resubmit/)

Television Appearance

Win Ben Stein's Money, October 25, 2001 (#5086), Winning Contestant ($850)
*Bacon Number = 2
∴ Bacon-Erdos Number = 6

Mentoring accomplishments (partial list):

Ongoing: Through my involvement in the Optical Society of Southern California, I have introduced several Cal Poly graduates to the local optics industry, resulting in numerous job placements. Three alumni have served as voting Board members (Martin Sanchez, Rachel Ulanch, and Matt Samson).
2012: Award to Shane Stahlheber, undergraduate student in my research group, received a Student Research Scholarship from the Microscopy Society of America to cover his research expenses in the summer of 2012.
2010: Masters student, Edward Shore (Applied Mathematics program, thesis defended Nov. 2010)
2010: Award to Forrest Hippensteel, undergraduate student in my research group, received a Student Research Award from the Biological Fluorescence Subgroup of the Biophysical Society. Award presented at 2010 Biophysical Society Annual Meeting, when Forrest gave an invited talk.

Awards, Grants, and Recognition

- 2015 Wall of COOL: Campus recognition for innovative use of technology in teaching (for my upper-division computational physics course)
- 2014 Outstanding Reviewer Award, Optical Society of America
- Provost's Teacher-Scholar Award (California State Polytechnic University, provided summer salary support in 2011 and 2012)
- Seed Grant ($14,936) from California State Program for Education and Research in Biotechnology (CSUPERB) (Project title: Computational Methods for Fluorescence Imaging of Cells with Nanometer Resolution) (2010)
- Anacapa Scholar (2010) (Award from Anacapa Society, a national organization for theoretical physicists in undergraduate institutions)
- KITP Scholar (Kavli Institute for Theoretical Physics, Santa Barbara, CA) (2009-2011)
- Cottrell College Science Award: $28,000 Grant from Research Corporation (2008) (Project title: Beating the Diffraction Limit in Photochemistry and Photolithography: A Feasibility Study With Computer Simulations)
- Fellows Award for Research Excellence (National Institutes of Health) (2007)
- National Science Foundation Graduate Fellowship (1998-2001)
- QUEST Fellowship, Broida Fellowship (UC Santa Barbara) (1998-1999)

Professional Service (partial list)

- American Physical Society: Member of Committee on Careers and Professional Development (2018-2020)
- Optical Society of Southern California:
  - Grants Chair (2017-Present)
  - Immediate Past President (voting board member) (2016-2017)
  - President (2015-2016)
  - Vice President (2014-2015)
  - Secretary (2013-2014)
  - Programs Chair (2011-2013)
- External Program Reviewer: University of San Diego Department of Physics and Biophysics, December 2016
- Kavli Institute for Theoretical Physics:
  - Member of organizing committee, "Theory in Undergraduate Institutions" (program held June 22–July 3, 2015)
- Anacapa Society:
  - Member of advisory board, Anacapa Society Southeastern Regional Meeting (December 15, 2013)
  - Conference Chair, Anacapa Society West Coast Meeting (December 2010)
  - Chair of Scholar Selection Committee, 2011-2013
- Grant Reviewer:
  - NIH Study Section Member, SBIB (10), Biomedical Imaging (March 2018, June 2017, March 2017, November 2016, June 2016, June 2015, October 2014, June 2014, February 2014, October 2013, June 2013). Panel reviews SBIR/STTR grants related to clinical and laboratory biomedical imaging.
- Biophysical Society:
  - Member of Education Committee (2013-2018)
  - Panelist, "Research Programs at PUIs: Finding, Establishing, and Maintaining a Program", Biophysical Society Annual Meeting 2016
- Optical Society of America:
  - Session Presider, "Novel Techniques in Microscopy" (Vancouver, British Columbia, 2015)
  - Conference blogger for Optics and Photonics Congress on "Optics in the Life Sciences" (Kona, Hawaii, 2013)
  - Session Presider, "Novel Techniques in Microscopy" (Vancouver, British Columbia, 2009)
- Reviewer for journals:
  - *Nature Methods*, *Journal of Biomedical Optics*, *Optics Letters*, *Biomedical Optics Express*, *Optics Express*, *American Journal of Physics*, *Journal of the Optical Society of America-A, Applied Optics, Bioinformatics, Optical Engineering, Journal of Optics, Central European Journal of Physics, Scientific Reports, Frontiers in Physics, PLOS ONE, ACS Photonics, Photonics Research, PHotoni, The Open Optics Journal*.
- Reviewer for textbook publishers:
  - McGraw-Hill, Wiley, Pearson
- National Institutes of Health Intramural Program:
  - Chief Judge, Chemistry and Biophysics Study Section, 2008 FARE Awards (NIH)
  - Steering Committee, 2007 Fellows Retreat, NICHD

Department, College, and University Service (partial list):

- Department Course Scheduling Coordinator (2016-Present)
- Coordinator, redesign of department curriculum for quarter to semester conversion (2014-2018)
- Academic Senate:
  - Senator, 2014-Present
  - Chair of Academic Programs Committee, 2015-Present
  - Member of Academic Programs Committee, 2012-Present (non-Senators can serve on committees)
- Departmental Tenure Committee, Member (2018-2019, 2012-2013, 2014-2015)
- Departmental Search Committee, Experimental Biophysics, Member (2017-2018)

- Co-Chair of Search Committee for Associate Dean, College of Science (2017)
- Chair of Departmental Search Committee, Theoretical Biophysics (2016-2017)
- Chair of Department Committee to select textbook for a redesigned Physics for Life Sciences course (Spring 2016)
- Departmental Search Committee, Theoretical High Energy Physics, Member (2015-2016)
- University Search Committee, President's Chief of Staff, Member (2015)
- Founder (2008) and organizer (2008-2013) of Summer Research Seminars
- Founder (2009) and organizer (2009-2013) of department SPIN UP group (ad hoc committee of junior and mid-career faculty working to recruit and retain more physics majors and minors)
- University Research Council, Member (2012-2013)
- Chair of Department Curriculum Committee (2010-2011, Fall 2013, 2014-2018)
- Chair of Department Seminar Committee (2008-2009, 2009-2010, 2011-2012, 2012-2013, 2014-2015)
- Chair of University Advisory Committee for Graduation Writing Test (2008-2010)

Responsible Volunteer Positions

- **Religious Education, Saint Elizabeth's Church,** 2006-2007: 1st grade Sunday School.
- **Shelter Manager and Computer Lab Assistant, Transition House** (homeless shelter), 2000-2005. Responsible for assisting clients with job searches, handling client concerns, assisting other volunteers, and organizing meals.
- **Precinct Inspector, Santa Barbara County Elections Office**, 2002-2004. Supervised 4 clerks, responsible for integrity and security of ballots.
- **Director of Promotions and Facilities, Isla Vista Juggling Festival** (charitable event), 2000-2002. Implemented new publicity campaign, boosted profits 50%.

Invited Presentations

* indicates student presenter or author

33. ***Theoretical Limits to Localization Microscopy Beyond Single Molecules***
    Novel Techniques in Microscopy (OSA Conference), Vancouver, BC, April 13, 2015
32. ***Theoretical Limits to Superresolution Fluorescence Microscopy***, California State University Dominguez Hills, Department of Physics, September 15, 2014
31. ***Image Analysis Issues For Superresolution Fluorescence Microscopy***, Rigaku Automation Inc., April 25, 2014
30. ***Theoretical Limits to Superresolution Fluorescence Microscopy***, University of Oregon, Department of Physics, April 17, 2014
29. ***Theoretical Limits to Superresolution Fluorescence Microscopy***, Harvey Mudd College, Department of Physics, February 4 2014
28. ***Superresolution microscopy: Practical Applications, Fundamental Limits, and the Role of Computation***, Southern California Institute of Environmental Science and Technology, June 5, 2013
27. ***Theoretical Limits to Superresolution Fluorescence Microscopy***, Occidental College, Department of Physics, November 5, 2012
26. ***Theoretical Limits to Superresolution Fluorescence Microscopy***, Harvard University, Department of Physics, July 23, 2012
25. ***Theoretical and Computational Limits to Superresolution Microscopy***, California State University, Fresno, Department of Physics, April 27, 2012
24. ***Theoretical and Computational Limits to Superresolution Microscopy***, UC Irvine, Beckman Laser Institute, November 17, 2011
23. ***Imaging live cells with nanometer resolution: Theoretical, computational, and statistical limits***, Reed College, Department of Physics, September 14, 2011
22. ***Theoretical and computational issues in fluorescence microscopy beyond the diffraction limit***, University of Massachusetts-Amherst, Physics Department, June 23, 2011
21. ***Theoretical and computational issues in fluorescence microscopy beyond the diffraction limit***, National Institute of Standards and Technology, June 17, 2011
20. ***Theoretical and computational issues in fluorescence microscopy beyond the diffraction limit***, National Institutes of Health, Section on Cell Biophysics, June 16, 2011
19. ***Theoretical and computational issues in fluorescence microscopy beyond the diffraction limit***, Harvard University, Department of Physics, June 10, 2011

18. ***Theoretical Limits to Microscopy Beyond the Diffraction Limit***, Optical Society of Southern California Meeting, May 11, 2011
17. ***Optics beyond the diffraction limit***, Cal State Fullerton Physics Department, September 17, 2010
16. ***Theoretical Limits to Fluorescence Microscopy With Nanometer Resolution***, California State University Los Angeles, Physics Department, April 2010
15. ***Geometric construction of voting methods that protect voters' first choices***, Cal Poly Pomona Political Science Department, April 2010
14. ***Theoretical Limits to Fluorescence Microscopy With Nanometer Resolution***, University of Winnipeg Physics Department, March 19, 2010
13. ***Theoretical Limits to Fluorescence Microscopy With Nanometer Resolution***, Cal Poly Pomona Biology Department, February 2010
12. ***Statistical and Computational Limits to Optical Microscopy With Nanoscale Resolution*** University of New Mexico, Department of Physics, September 2009
11. ***Faster, Smaller, Smarter: Using Light to See Things Smaller Than the Wavelength of Light,*** Harvey Mudd College, Department of Physics, October 2008
10. ***Faster, Smaller, Smarter: Using Light to See Things Smaller Than the Wavelength of Light,*** California State University-Long Beach, Department of Physics, October 2008
9. ***Optics Beyond the Diffraction Limit: Don't believe everything you hear in physics 163,*** University of Southern California, Department of Physics, September 2008
8. ***Physical Modeling of Growth Factors Around Tumors: How Do Tumors Find a Blood Supply?,*** University of Missouri-Columbia, Department of Physics, April 2008
7. ***Localization, delocalization, and resonances: When does a wave see the third dimension?,*** California State University, Los Angeles, November 2007
6. ***A Biophysical Model of Angiogenesis: How Do Growing Tumors Feed and Breathe?,*** University of Denver, Department of Physics, March 2007
5. ***A Biophysical Model of Angiogenesis: How Do Growing Tumors Feed and Breathe?,*** California State Polytechnic University at Pomona, Department of Physics, February 2007
4. ***A Biophysical Model of Angiogenesis: How Do Growing Tumors Feed and Breathe?,*** University of the Sciences in Philadelphia, Department of Physics, January 2007
3. ***Optimizing the Appearance of Plastics with Core-Shell Particles,*** Georgetown University Physics Department, April 2006
2. ***Image Enhancement for Imaging with Fluorescent Probes and Near Field Illumination,*** Optical Imaging Interest Group, National Institutes of Health, December 2005
1. ***Minimizing the Scattering Cross Section of Core-Shell Particles,*** Plastic Additives group of Arkema chemical company, January 2005

Contributed Presentations (*students identified by asterisk)

48. ***Continuum Percolation of Anisotropically-Distributed Disks***
*Thu Chau, *Cary Rock, Alex Small, American Physical Society March Meeting, March 7, 2018 (poster)
47. ***Integrating Ray-Tracing and Other Simulations Into Undergraduate Optics Courses***
Alex Small, American Physical Society March Meeting, March 6, 2018 (talk)
46. ***Opioid Receptors are Organized into Nanodomains in the Plasma Membrane***, Ottavia Golfetto, Sunetra Biswas, Raphael Jorand, Huiying Zhang, Steven Tobin, Daniel Ganjali, Athanasios Sideris, Alexander R Small, Vladana Vukojevic, Tijana Jovanovic-Talisman, Biophysical Society Annual Meeting, March 1, 2016 (poster)
45. ***Superresolution Microscopy as a Percolation Problem: Maximum Achievable Imaging Density and Resolution Cost***, Alex Small, Biophysical Society Annual Meeting, February 28, 2016 (poster)
44. ***Teaching Computation in Optics and Information Literacy in Computation***, Alex Small, University of Arizona College of Optical Sciences Winter School Workshop, January 9, 2016 (talk)
43. ***Auditing Digital Information Sources in a Project-based Physics Course***, Alex Small, California State University Symposium on University Teaching, March 8, 2014 (poster)
42. ***Low-hanging fruit for undergraduates in theoretical and computational physics***, Alex Small, Anacapa Society Meeting, December 14, 2013 (talk)
41. ***Localization precision for imaging single molecules with elliptical point spread functions***, *Wesley Baxter, *Davon Webb, *Shane Stahlheber, Alex Small, Southern California Conference on Undergraduate Research, November 2013 (poster)

40. ***Scaling of resolution with photon number in superresolution microscopy***, Alex Small, Novel Techniques in Microscopy 2013 (talk)
39. ***Issues in the Benchmarking of Image Analysis Algorithms for Superresolution Microscopy***, *Shane Stahlheber, Alex Small, Photonics West/BIOS 2013 (poster)
38. ***Fundamental Limits to Superresolution Fluorescence Microscopy***, Alex Small, Photonics West/BIOS 2013 (talk)
37. ***Fundamental Limits to Superresolution Fluorescence Microscopy***, Alex Small, Conference on Quantitative Bioimaging, University of New Mexico 2013 (poster)
36. ***Percolation Thresholds of Three-Connected Lattices***, *Jonathan Tran, *Ted Yoo, *Shane Stahlheber, Alex Small, Southern California Conference on Undergraduate Research, November 2012
35. ***Issues in the Benchmarking of Image Analysis Algorithms for Superresolution Microscopy***, *Shane Stahlheber, Alex Small, Southern California Conference on Undergraduate Research, November 2012
34. ***Southern California's optics outreach programs grow in several areas: mentoring student chapters, using the web, the local science center and community college***, Donn Silbermann, T. Scott Rowe, Robert Cartland, Alex Small, Brian Monacelli, SPIE Optics Education and Outreach, August 2012 (talk)
33. ***Theoretical Limits to Superresolution Fluorescence Microscopy***, Alex Small, Gordon Conference on Single Molecules in Biology, July 2012 (poster)
32. ***Theoretical Limits to Superresolution Fluorescence Microscopy***, Alex Small, Anacapa Society Meeting, May 2012 (talk)
31. ***Optimizing Single Wavelength Control of Superresolution Microscopy***, Alex Small, Biophysical Society Annual Meeting, 2012 (poster)
30. ***Fast Maximum Likelihood Algorithm for Localization of Fluorescent Molecules***, *Rebecca Starr, *Shane Stahlheber, Alex Small, Biophysical Society Annual Meeting, 2012 (poster)
29. ***Benchmarking QuickPALM and other molecule localization software for super-resolution microscopy***, *Shane Stahlheber, *Rebecca Starr, Alex Small, Biophysical Society Annual Meeting, 2012 (poster)
28. ***Optimal acquisition schemes for superresolution localization microscopy of bleachable fluorophores***, Alex Small, *Edward Shore, Photonics West/BIOS, 2012 (talk)
27. ***Image Simulation for Microscopy Beyond the Diffraction Limit***, *Freddy Ruiz, Alex Small, Southern California Conference on Undergraduate Research, 2011 (poster)
26. ***Fast Maximum Likelihood Algorithm for Localization of Fluorescent Molecules***, *Rebecca Starr, *Shane Stahlheber, Alex Small, Southern California Conference on Undergraduate Research, 2011 (poster)
25. ***Benchmarking QuickPALM and Other Molecule Localization Software for Super-Resolution Microscopy***, *Shane Stahlheber, *Rebecca Starr, Alex Small, Southern California Conference on Undergraduate Research, 2011 (poster)
24. ***Theoretical and Computational Issues in Fluorescence Microscopy Beyond the Diffraction Limit***, Alex Small, *Forrest Hippensteel, *Edward Shore, Southern California Academy of Sciences Meeting, 2011 (talk)
23. ***Optimizing the Gaussian Mask Algorithm***, *Nahom Yirga, Alex Small, Southern California Academy of Sciences Meeting, 2011 (poster)
22. ***Fast, Approximate Gaussian Mask Algorithm***, *Nahom Yirga, Alex Small, Novel Techniques in Microscopy (Optical Society of America), 2011 (poster)
21. ***Benchmarking Image Analysis Algorithms for Superresolution Fluorescence Microscopy***, *Forrest Hippensteel, Alex Small, Novel Techniques in Microscopy (Optical Society of America), 2011 (talk)
20. ***Optimal Acquisition and Analysis of Images for PALM and STORM***, Alex Small, *Edward Shore, *Forrest Hippensteel, *Nahom Yirga, Biophysical Society Annual Meeting, 2011 (poster)
19. ***Improved Simulations of Image Analysis Algorithms for Subwavelength Fluorescence Microscopy with PALM and STORM***, *Forrest Hippensteel, Alex Small, Southern California Conference on Undergraduate Research, 2010, (poster)
18. ***Speeding up the Gaussian Mask Algorithm***, *Nahom Yirga, Alex Small, Southern California Conference on Undergraduate Research, 2010 (talk)

17. ***Statistical Theory of PALM/STORM***, Alex Small, *Edward Shore, *Forrest Hippensteel, Gordon Conference on Lasers in Medicine and Biology, 2010 (poster)
16. ***Computational and Statistical Limits to PALM, STORM, and Related Sub-diffraction Microscopy Techniques***, Alex Small, *Edward Shore, *Forrest Hippensteel, Biophysical Society Annual Meeting 2010 (poster)
15. ***Optics Beyond the Diffraction Limit, or, Don't Believe Everything You Hear in Physics 4!***, Alex Small, Morphodynamics 2009, Kavil Institute for Theoretical Physics, Santa Barbara, September 2009. (Available online: http://online.kitp.ucsb.edu/online/morphodyn_m09/small/)
14. ***Theoretical Limits on Speed, Errors, and Resolution in Microscopy of Switchable Fluorophores,*** Alex Small, Novel Techniques in Microscopy (Optical Society of America), 2009 (talk)
13. ***Computer Simulations of Photochemistry Controlled with Subwavelength Resolution, ****Triet Nguyen, Alex Small, American Physical Society March Meeting, 2009 (talk)
12. ***Computational Physics Undergraduate Research Experience: A Case Study***, Homeyra Sadaghiani, Alex Small, American Physical Society March Meeting, 2009 (poster)
11. ***Theoretical Limits To Errors, Acquisition Rates, And Resolution In Microscopy Of Switchable Fluorophores: Replacing The Diffraction Limit With The Algorithm Limit, ****Forrest Requarth, Alex Small, Biophysical Society Meeting, 2009 (poster)
10. ***Computer Simulations of Photochemistry Controlled with Subwavelength Resolution, ****Triet Nguyen, Alex Small, Southern California Conference on Undergraduate Research, 2008 (talk)
9. ***Image Analysis for Subwavelength Microscopy***, *Forrest Hippensteel, Alex Small, Southern California Conference on Undergraduate Research, 2008 (talk)
8. ***Case study: What can you learn by doing research in computational physics?,*** Alex Small, Gordon Research Conference on Computation in Physics Education 2008 (poster)
7. ***Bioavailability of VEGF in the Extracellular Matrix: Mathematical Models,*** Alex Small, Biophysical Society Meeting 2008 (poster)
6. ***Modeling Endothelial Cell Migration in Response to Different VEGF Isoforms,*** Alex Small, Gordon Research Conference on Angiogenesis and Microcirculation 2007 (poster)
5. ***Which Form of VEGF Causes Chemotactic Migration of Endothelial Cells Towards Tumors?,*** Alex Small, Adrian Neagu, Franck Amyot, Dan Sackett, Victor Chernomordik, Amir Gandjbakhche, Biophysical Society Meeting 2007 (poster)
4. ***Enhancing Diffraction-Limited Images Using Correlations Introduced by the Point Spread Function,*** Alex Small, Amir Gandjbakhche, Ilko Ilev, Victor Chernomordik, American Physical Society March Meeting 2006 (talk)
3. ***Scattering Properties of Core-Shell Particles,*** Alex Small, David Pine, Sheng Hong, Canadian-American-Mexican Physics Graduate Student Conference 2005 (talk)
2. ***Delocalization of Waves in Random Multilayer Media,*** Alex Small, David Pine, American Physical Society March Meeting 2005 (talk)
1. ***Delocalization of Waves in Random Multilayer Media,*** Alex Small, David Pine, Frontiers in Optics (Optical Society of America) 2004 (talk)

Peer Reviewed Course Materials:

Alex Small (2010), "Anti-Reflection Coating Assignment," https://nanohub.org/resources/10074