

# Changhuei Yang

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## *EDUCATION*

**Massachusetts Institute of Technology**, B.Sc. 1997 Physics  
**Massachusetts Institute of Technology**, B.Sc. 1997 EECS  
**Massachusetts Institute of Technology**, M.Eng. 1997 EECS  
**Massachusetts Institute of Technology**, B.Sc. 2002 Mathematics  
**Massachusetts Institute of Technology**, Ph. D. 2002 EECS

## *AWARDS*

MIT Lester Wolfe Fellowship (1997-2001).  
Institut National de la Sante et de al Recherche Medicale Post-doctoral Fellowship (2002).  
Singapore Agency for Science, Technology and Research Post-doctoral Fellowship (2002-2003).  
NSF CAREER award (2006).  
Coulter Foundation Early Career Translational Research Awards (2006).  
Discover Magazine ‘Best Brains in Science’ (2008).  
MIT Dasari Speaker (2009).  
NIH New Innovator Award (2010)  
Coulter Fellow (2010)  
American Institute for Medical and Biological Engineering Fellow (2013)

## *APPOINTMENTS*

Assistant Professor, California Institute of Technology (2003 – 2009)  
Associate Professor, California Institute of Technology (2009 -2011)  
Professor, California Institute of Technology (2011 -present)  
Associate Director of the Center for Optofluidic Integration (2004 – 2008)  
Option Representative for Electrical Engineering, California Institute of Technology (2010 -2011)  
Option Representative for Bioengineering, California Institute of Technology (2013 - present)

## *PEER REVIEWED PUBLICATIONS*

Citation Count = 3400  
h-index = 25

1. Kyungwon An, Changhuei Yang, Ramachandra R. Dasari and Michael S. Feld; "Cavity ring-down technique and its application to measurement of ultraslow velocities," *Optics Letters* 20 (9), pp. 1068-1070 (1995)
2. Changhuei Yang and Kyungwon An; "Quantum trajectory analysis of a thresholdlike transition in the microlaser," *Physical Review A* 55, pp. 4492 (1997)
3. Changhuei Yang, Kyungwon An, Lev T. Perelman, Ramachandra R. Dasari and Michael S. Feld; "Spatial coherence of forward-scattered light in a turbid medium," *Journal of the Optical Society of America A* 16, pp. 866 (1999)
4. Changhuei Yang, Kyungwon An, Lev T. Perelman, Adam Wax, Ramachandra R. Dasari and Michael S. Feld; "Feasibility of field-based light scattering spectroscopy," *Journal of Biomedical Optics* 5, pp. 138 (2000)
5. Changhuei Yang, Adam Wax, Irene Georgakoudi, Eugene B. Hanlon, Kamran Badizadegan, Ramachandra R. Dasari and Michael S. Feld; "Interferometric phase dispersion microscopy," *Optics Letters* 25 (20), pp. 1526-28 (2000).
6. Changhuei Yang, Adam Wax and Michael S. Feld; "Measurement of anomalous phase velocity of ballistic light in a random medium using a novel interferometer," *Optics Letters* 26 (4), pp. 235-37 (2001)
7. Changhuei Yang, Adam Wax, Ramachandra R. Dasari, Michael S. Feld; "Phase dispersion optical tomography," *Optics Letters* 26 (10), pp. 686-88 (2001)
8. Changhuei Yang, Adam Wax, Mariah Hahn, Kamran Badizadegan, Ramachandra R. Dasari, Michael S. Feld; "Phase-referenced interferometer with subwavelength and subhertz sensitivity applied to the study of cell membrane dynamics," *Optics Letters* 26 (16), pp. 1271-73 (2001).
9. Adam Wax, Changhuei Yang, Ramachandra R. Dasari, Michael S. Feld; "Measurement of angular distributions using low-coherence interferometry for light-scattering spectroscopy," *Optics Letters* 26 (6), pp. 322-24 (2001)
10. Adam Wax, Changhuei Yang, Ramachandra R. Dasari, Michael S. Feld; "Path-length-resolved dynamic light scattering: modeling the transition from single to diffusive scattering," *Applied Optics* 40 (24), pp. 4222-27 (2001)
11. Changhuei Yang, Adam Wax, Ramachandra R. Dasari, Michael S. Feld; " $2\pi$  ambiguity-free optical depth ranging with sub-nanometer precision using a novel phase-crossing low coherence interferometer," *Optics Letters* 27 (2), pp. 77-79 (2002) PMID: 18007717
12. Adam Wax, Changhuei Yang, Vadim Backman, Maxim Kalashnikov, Ramachandra R. Dasari and Michael S. Feld; "Determination of particle size using the angular distribution of backscattered light as measured with low-coherence interferometry," *Journal of the Optical Society of America A* 19 (4), pp. 737-44 (2002) PMID: 11934166
13. Adam Wax, Changhuei Yang, Vadim Backman, Kamran Badizadegan, Charles W. Boone, Ramachandra R. Dasari, Michael S. Feld; "Cellular organization and sub-structure measured using angle-resolved low coherence interferometry," *Biophysical Journal* 82 (4), pp. 2256-64 (2002) PMCID: PMC1302018
14. Changhuei Yang and Jerome Mertz; "Transmission confocal laser scanning microscopy with a virtual pinhole based on nonlinear detection," *Optics Letters* 28 (4), pp. 224-26 (2003) PMID: 12661526
15. Adam Wax, Changhuei Yang, Markus G. Müller, Ronald Nines, Charles W. Boone,

- Vernon E. Steele, Gary D. Stoner, Ramachandra R. Dasari and Michael S. Feld; “*In Situ* detection of neoplastic transformation and chemopreventive effects in rat esophagus epithelium using angle-resolved low-coherence interferometry,” *Cancer Research* 63 (13), pp. 3556-59 (2003) PMID: 12839941
16. Adam Wax, Changhuei Yang and Joseph Izatt; “Fourier-domain low coherence interferometry for light-scattering spectroscopy,” *Optics Letters* 28 (14), pp. 1230-32 (2003) PMID: 12885030
  17. Michael Choma, Marinko Sarunic, Changhuei Yang, Joseph Izatt; “Sensitivity advantage of swept source and Fourier domain optical coherence tomography,” *Optics Express* 11 (18), pp. 2183-89 (2003) PMID: 19466106
  18. Michael Choma, Changhuei Yang, Joseph Izatt; “Instantaneous quadrature low-coherence interferometry with 3x3 fiber-optic couplers,” *Optics Letters* 28 (22), pp. 2162-64 (2003) PMID: 14649928
  19. Changhuei Yang, Siavash Yazdanfar and Joseph Izatt; “Amplification of optical delay by use of matched linearly chirped fiber Bragg gratings,” *Optics Letters* 29 (7), pp. 685-87 (2004) PMID: 15072358
  20. Changhuei Yang, Michael Choma, Laura Lamb, John Simon, Joseph Izatt; “Protein based molecular contrast OCT with phytochrome as the contrast agent,” *Optics Letters* 29 (12), pp. 1396-98 (2004) PMID: 15233447
  21. Changhuei Yang, Michael Choma, Brian Applegate, John Simon and Joseph Izatt; “Spectral triangulation molecular contrast optical coherence tomography with indocyanine green as the contrast agent,” *Optics Letters* 29 (17), pp. 2016-18 (2004) PMCID: PMC1283115
  22. Brian Applegate, Changhuei Yang, Andrew Rollins and Joseph Izatt; “Polarization resolved second harmonic generation optical coherence tomography in collagen,” *Optics Letters* 29 (19), pp. 2252-54 (2004) PMID: 15524371
  23. Marinko V. Sarunic, Michael A. Choma, Changhuei Yang and Joseph A. Izatt; “Instantaneous complex spectral domain OCT using 3x3 fiber couplers,” *Optics Express* 13 (3), pp. 957-67 (2005) PMID: 19494959
  24. Siavash Yazdanfar, Changhuei Yang, Marinko V. Sarunic and Joseph A. Izatt; “Frequency estimation precision in Doppler optical coherence tomography using the Cramer-Rao lower bound,” *Optics Express* 13 (2), pp. 410-16 (2005) PMID: 19488367
  25. Changhuei Yang; “Molecular contrast OCT: A review,” *Photochemistry and Photobiology* 81 (2), pp. 215-37 (2005) PMCID: PMC1283114
  26. Andrew Ahn, Changhuei Yang, Adam Wax, Gabriel Popescu, Chris Fang-Yen, Kamran Badizadegan, Ramachandra Dasari and Michael Feld; “Harmonic phase-dispersion microscope with a Mach-Zehnder interferometer,” *Applied Optics* 44 (7), pp. 1188-1190 (2005) PMID: 15765698
  27. Brian E. Applegate, Changhuei Yang and Joseph A. Izatt; “Theoretical comparison of the sensitivity of molecular contrast optical coherence tomography techniques,” *Optics Express* 13 (20), pp. 8146-63 (2005) PMID: 19498844
  28. Michael A. Choma, Audrey K. Ellerbee, Changhuei Yang and Joseph A. Izatt; “Spectral-domain phase microscopy,” *Optics Letters* 30 (10), pp. 1162-1164 (2005) PMID: 15945141

29. Jigang Wu, Michael Conry, Chunhui Gu, Fei Wang, Zahid Yaqoob and Changhuei Yang; "Paired Angle Rotation Scanning Optical Coherence Tomography (PARS-OCT) forward-imaging probe," *Optics Letters* 31 (9), pp. 1265-1267 (2006) PMID: 16642080
30. Zahid Yaqoob, Jeff Fingler, Xin Heng and Changhuei Yang; "Homodyne en face optical coherence tomography," *Optics Letters* 31 (12), pp. 1815-17 (2006) PMID: 16729080
31. Demetri Psaltis, Steven Quake and Changhuei Yang; "Developing optofluidic technology through the fusion of microfluidics and optics," *Nature* 442 (7101), pp. 381-86 (2006) PMID: 16871205
32. Xin Heng, David Erickson, Larry R. Baugh, Zahid Yaqoob, Paul W. Sternberg, Demetri Psaltis and Changhuei Yang; "Optofluidic microscopy: A Method for Implementing High Resolution Optical Microscope on a Chip," *Lab on a Chip* 6 (10), pp. 1274-76 (2006) PMID: 17102839
33. Xiquan Cui, Xin Heng, Jigang Wu, Zahid Yaqoob, Axel Scherer, Demetri Psaltis and Changhuei Yang; "Slanted Hole Array Beam Profiler (SHArP) - A high resolution on-chip beam profiler based on a linear aperture array," *Optics Letters* 31 (21), pp. 3161-63 (2006) PMID: 17041668
34. Zahid Yaqoob, Jigang Wu, Xiquan Cui, Xin Heng, and Changhuei Yang; "Harmonically-related diffraction gratings-based interferometer for quadrature phase measurements," *Optics Express* 14 (18), pp. 8127-37 (2006) PMID: 19529185
35. Zahid Yaqoob, Emily McDowell, Jigang Wu, Jeff Fingler, Xin Heng, Changhuei Yang; "Molecular contrast optical coherence tomography: A pump-probe scheme using indocyanine green as a contrast agent," *Journal of Biomedical Optics* 11 (5), pp. 054017 (2006) PMID: 17092166
36. Zahid Yaqoob, Jigang Wu, Emily J. McDowell, Xin Heng and Changhuei Yang; "Methods and application areas of endoscopic optical coherence tomography," *Journal of Biomedical Optics* 11 (6), pp. 063001 (2006) PMID: 17212523
37. Xin Heng, Xiquan Cui, David W. Knapp, Jigang Wu, Zahid Yaqoob, Emily J. McDowell, Demetri Psaltis and Changhuei Yang; "Characterization of light collection through a subwavelength aperture from a point source," *Optics Express* 14 (22): pp. 10410-425 (2006) PMID: 19529440
38. Jigang Wu, Zahid Yaqoob, Xin Heng, Lap Man Lee, Xiquan Cui and Changhuei Yang; "Full field phase imaging using a harmonically matched diffraction grating pair based homodyne quadrature interferometer," *Applied Physics Letters* 90 (15), pp. 151123 (2007)
39. Emily J. McDowell, Xiquan Cui, Zahid Yaqoob and Changhuei Yang; "A generalized noise variance analysis model and its application to the characterization of 1/f noise," *Optics Express* 15 (7), pp. 3833-48 (2007) PMID: 19532627
40. Emily J. McDowell, Marinko V. Sarunic, Zahid Yaqoob and Changhuei Yang; "SNR enhancement through phase dependent signal reconstruction algorithms for phase separated interferometric signals," *Optics Express* 15 (16), pp. 10103-22 (2007) PMID: 19547360
41. Jeff Fingler, Dan Schwartz, Changhuei Yang, Scott E. Fraser; "Mobility and transverse flow visualization using phase variance contrast with spectral domain optical coherence tomography," *Optics Express* 15 (20), pp. 12636-53 (2007) PMID: 19550532

42. Guoan Zheng, Lixin Ran and Changhuei Yang; "Electromagnetic equivalent model for phase conjugate mirror based on the utilization of left-handed material," *Optics Express* 15 (21), pp. 13877-85 (2007) PMID: 19550659
43. Matthew Lew, Xiquan Cui, Xin Heng and Changhuei Yang; "Interference of a four-hole aperture for on-chip quantitative two-dimensional differential phase imaging," *Optic Letters* 32 (20), pp. 2963-65 (2007) PMID: 17938667
44. David T. Raphael, Changhuei Yang, Nancy Tresser, Jigang Wu, Yaoping Zhang and Linda Rever; "Images of Spinal Nerves and Adjacent Structures with Optical Coherence Tomography: Preliminary Animal Studies," *The Journal of Pain* 8 (10), pp. 767-73 (2007) PMID: 17586098
45. Snow H. Tseng and Changhuei Yang; "2-D PSTD Simulation of optical phase conjugation for turbidity suppression," *Optics Express* 15 (24), pp. 16055-16 (2007) PMID: 19550887
46. Xin Heng, Edward Hsiao, Demetri Psaltis and Changhuei Yang; "An optical tweezer actuated, nanoaperture-grid based Optofluidic Microscope implementation," *Optics Express* 15 (25), pp. 16367-75 (2007) PMID: 19550927
47. Jigang Wu, Zahid Yaqoob, Xin Heng, Xiquan Cui and Changhuei Yang; "Harmonically matched grating-based full-field quantitative high-resolution phase microscope for observing dynamics of transparent biological samples," *Optics Express* 15 (26), pp. 18141-55 (2007) PMID: 19551112
48. Zahid Yaqoob, Demetri Psaltis, Michael S. Feld and Changhuei Yang; "Optical phase conjugation for turbidity suppression in biological samples," *Nature Photonics* 2 (2), pp. 110-15 (2008) PMID: PMC2688902
49. Jigang Wu, Xiquan Cui, Lap Man Lee and Changhuei Yang; "The application of Fresnel zone plate based projection in optofluidic microscopy," *Optics Express* 16 (20), pp. 15595-602 (2008) PMID: 18825198
50. Xiquan Cui, Matthew Lew and Changhuei Yang; "Quantitative differential interference contrast microscopy based on structured-aperture interference," *Applied Physics Letters* 93 (9), pp. 091113 (2008) PMID: 111214
51. Xiquan Cui, Lap Man Lee, Xin Heng, Weiwei Zhong, Paul W. Sternberg, Demetri Psaltis and Changhuei Yang; "Lensless high-resolution on-chip optofluidic microscopes for *Caenorhabditis elegans* and cell imaging," *Proceedings of the National Academy of Science* 105 (31), pp. 10670-75 (2008) PMID: PMC2488383
52. Shuo Han, Marinko V. Sarunic, Jigang Wu, Mark Humayun and Changhuei Yang; "Handheld forward-imaging needle endoscope for ophthalmic optical coherence tomography inspection," *Journal of Biomedical Optics* 13 (2), pp. 020505 (2008) PMID: 18465947
53. Emily J. McDowell, Jian Ren and Changhuei Yang; "Fundamental sensitivity limit imposed by dark 1/f noise in the low optical signal detection regime," *Optics Express* 16 (10), pp. 6822-32 (2008) PMID: 18545385
54. Guoan Zheng, Xin Heng and Changhuei Yang; "A Phase Conjugate Mirror Inspired Approach for Building Cloaking Structures with Left-handed Materials," *New Journal of Physics* 11 (4), pp. 033010-25 (2009) PMID: PMC2814323
55. Lap Man Lee, Xiquan Cui and Changhuei Yang; "The Application of on-chip Optofluidic Microscopy for Imaging *Giardia lamblia* Trophozoites and Cysts," *Biomedical Microdevices* 11 (5), pp. 951-58 (2009) PMID: PMC2888668

56. Ying Min Wang, Guoan Zheng and Changhuei Yang; "Characterization of acceptance angles of small circular apertures," *Optics Express* 17 (26), pp. 23903-13 (2009) PMID: 20052101
57. Jian Ren, Jigang Wu, Emily J. McDowell and Changhuei Yang; "Manual-scanning optical coherence tomography probe based on position tracking," *Optics Letters* 34 (21), pp. 3400-02 (2009); also published in *Virtual Journal of Biological Physics Research* 18 (11) Instrumentation Development (2009) PMID: 19881607
58. Meng Cui, Emily J. McDowell and Changhuei Yang; "Observation of polarization-gate based reconstruction quality improvement during the process of turbidity suppression by optical phase conjugation," *Applied Physics Letters* 95 (12), pp. 123702 (2009) PMID: 19859580; PMCID: PMC2766401
59. Guoan Zheng, Xiquan Cui and Changhuei Yang; "Surface-Wave-Enabled Darkfield Aperture: A Method for Suppressing Background During Weak Signal Detection," *Proceedings of the National Academy of Science* 107 (20), pp. 9043-48 (2010) PMCID: PMC2889114
60. Emily J. McDowell, Meng Cui, Ivo M. Vellekoop, Vahan Senekerimyan, Zahid Yaqoob and Changhuei Yang; "Turbidity suppression from the ballistic to the diffusive regime in biological tissues using optical phase conjugation," *Journal of Biomedical Optics* 15 (2), pp. 025004 (2010) PMCID: PMC2874046
61. Meng Cui and Changhuei Yang; "Implementation of a digital optical phase conjugation system and its application to study the robustness of turbidity suppression by phase conjugation," *Optics Express* 18 (4), 3444-55 (2010) PMCID: PMC3378352
62. Shuo Pang, Xiquan Cui, John DeModena, Ying Min Wang, Paul Sternberg and Changhuei Yang; "Implementation of a color-capable optofluidic microscope on a RGB CMOS color sensor chip substrate," *Lab on a Chip* 10 (4), p. 411-14 (2010) PMID: 20126679
63. Meng Cui, Emily J. McDowell and Changhuei Yang; "An in vivo study of turbidity suppression by optical phase conjugation (TSOPC) on rabbit ear," *Optics Express* 18 (1), pp. 25-30 (2010) PMID: 20173817; PMCID: PMC3369536
64. Guoan Zheng and Changhuei Yang; "Improving Weak-Signal Identification via Predetection Background Suppression by a Pixel-Level, Surface-Wave Enabled Dark-Field Aperture," *Optics Letters* 35 (15), pp. 2636-38, (2010) PMID: 20680083
65. Xiquan Cui, Jian Ren, Guillermo Tearney and Changhuei Yang; "Wavefront Image Sensor Chip," *Optics Express* 18 (16), pp. 16685-701 (2010) PMCID: PMC3408896
66. Guoan Zheng, Ying Min Wang and Changhuei Yang; "Pixel level optical-transfer-function design based on the surface-wave-interferometry aperture," *Optics Express* 18 (16), 16499-506 (2010) PMCID: PMC3408955
67. Jigang Wu, Lap Man Lee and Changhuei Yang; "Focus grid generation by in-line holography," *Optics Express* 18 (14), 14366-74 (2010) PMID: 20639921
68. Jigang Wu, Xiquan Cui, Guoan Zheng, Ying Min Wang, Lap Man Lee and Changhuei Yang; "Wide field-of-view microscope based on holographic focus grid illumination," *Optics Letters* 35 (13), pp. 2188-90 (2010) PMID: 20596189
69. Jigang Wu, Guoan Zheng, Zheng Li and Changhuei Yang; "Focal plane tuning in wide-field-of-view microscope with Talbot pattern illumination," *Optics Letters* 36 (12), pp. 2179-81 (2011) PMID: 21685959

70. Jian Ren, Henrick K. Gille, Jigang Wu and Changhuei Yang; "Ex vivo optical coherence tomography imaging of collector channels with a scanning endoscopic probe," *Investigative Ophthalmology & Visual Science* 52 (7), pp. 3921-25 (2011) PMID: 21357387
71. Seung Ah Lee, Ricardo Leitaó, Guoan Zheng, Samuel Yang, Ana Rodriguez and Changhuei Yang; "Color Capable Sub-Pixel Resolving Optofluidic Microscope and Its Application to Blood Cell Imaging for Malaria Diagnosis," *PLoS ONE* 6 (10), e26127 (2011) PMID: PMC3191177
72. Guoan Zheng, Christopher Kolner and Changhuei Yang; "Microscopy refocusing and dark-field imaging by using a simple LED array," *Optics Letters* 36 (20), pp. 3987-89, (2011) PMID: 22002361
73. Guoan Zheng, Seung Ah Lee, Yaron Antebi, Michael B. Elowitz and Changhuei Yang; "The ePetri dish, an on-chip cell imaging platform based on subpixel perspective sweeping microscopy (SPSM)," *Proceedings of the National Academy of Science* 108 (41), pp. 16889-94, (2011) PMID: PMC3193234
74. Shuo Pang, Chao Han, Lap Man Lee and Changhuei Yang; "Fluorescence microscopy imaging with a Fresnel zone plate array based optofluidic microscope," *Lab on a Chip* 11 (21), pp. 3698-702, (2011) PMID: PMC3710399
75. Shuo Pang, Chao Han, Mihoko Kato, Paul W. Sternberg and Changhuei Yang; "Wide and scalable field-of-view Talbot-grid-based fluorescence microscopy," *Optics Letters* 37 (23), pp. 5018-20 (2012) PMID: PMC3718313
76. Roarke Horstmeyer, Richard Y. Chen, Benjamin Judkewitz and Changhuei Yang; "Markov speckle for efficient random bit generation," *Optics Express* 20 (24), pp. 26394-410 (2012) PMID: 23187494
77. Ivo M. Vellekoop, Meng Cui and Changhuei Yang; "Digital optical phase conjugation of fluorescence in turbid tissue," *Applied Physics Letters* 101 (8), 81108, (2012) PMID: PMC3436909
78. Ying Min Wang, Benjamin Judkewitz, Charles A. DiMarzio and Changhuei Yang; "Deep-tissue focal fluorescence imaging with digitally time-reversed ultrasound-encoded light," *Nature Communications* 3, Article number: 928, (2012) PMID: PMC3621452
79. Seung Ah Lee, Guoan Zheng, Nandini Mukherjee and Changhuei Yang; "On-chip continuous monitoring of motile microorganisms on an ePetri platform," *Lab on a Chip* 12 (13), pp. 2385-90 (2012) PMID: PMC3371133
80. Jian Ren, Xiquan Cui, Lap Man Lee and Changhuei Yang; "Quantitative surface normal measurement by a wavefront camera," *Optics Letters* 37 (2), pp. 199-201 (2012) PMID: 22854466
81. Chao Han, Shuo Pang, Danielle V. Bower, Patrick Yiu and Changhuei Yang; "Wide Field-of-View On-Chip Talbot Fluorescence Microscopy for Longitudinal Cell Culture Monitoring from within the Incubator," *Analytical Chemistry* 85 (4), pp. 2356-60 (2013) PMID: PMC3587116
82. Joseph L. Hollmann, Roarke Horstmeyer, Changhuei Yang and Charles A. DiMarzio; "Analysis and modeling of an ultrasound-modulated guidestar to increase the depth of focusing in a turbid medium," *Journal of Biomedical Optics* 18 (2), pp. 025004 (2013) PMID: 23400416

83. Shuo Pang, Chao Han, Jessey Erath, Ana Rodriguez and Changhuei Yang; "Wide field-of-view Talbot grid-based microscopy for multicolor fluorescence imaging," *Optics Express* 21 (12), pp. 14555-65 (2013) PMID: PMC3726246
84. Mooseok Jang, Anne Sentenac and Changhuei Yang; "Optical phase conjugation (OPC)-assisted isotropic focusing," *Optics Express* 21 (7), pp. 8781-92 (2013) PMID: PMC3641024 [Available on 2014/4/2]
85. Seung Ah Lee, Xiaoze Ou, J. Eugene Lee and Changhuei Yang; "Chip-scale fluorescence microscope based on a silo-filter complementary metal-oxide semiconductor image sensor," *Optics Letters* 38 (11), pp. 1817-19 (2013) PMID: PMC3740726
86. Benjamin Judkewitz, Ying Min Wang, Roarke Horstmeyer, Alexandre Mathy and Changhuei Yang; "Speckle-scale focusing in the diffusive regime with time-reversal of variance-encoded light (TROVE)," *Nature Photonics* 7 (4), pp. 300-05 (2013) PMID: PMC3692396
87. Guoan Zheng, Roarke Horstmeyer and Changhuei Yang; "Wide-field, high-resolution Fourier ptychographic microscopy," *Nature Photonics* 7 (9), pp. 739-45 (2013)
88. Guoan Zheng, Xiaoze Ou, Roarke Horstmeyer and Changhuei Yang; "Characterization of spatially varying aberrations for wide field-of-view microscopy," *Optics Express* 21 (13), pp. 15131-43 (2013) PMID: PMC3724395
89. Xiaoze Ou, Roarke Horstmeyer, Changhuei Yang and Guoan Zheng; "Quantitative phase imaging via Fourier ptychographic microscopy," *Optics Letters* 38 (22), pp. 4845-48 (2013) PMID: 24322147
90. Roarke Horstmeyer, Benjamin Judkewitz, Ivo M. Vellekoop, Sid Assawaworrarit and Changhuei Yang; "Physical key-protected one-time pad," *Nature Collections Scientific Reports* 3, Article number 3543 (2013) PMID: PMC3866593
91. Guoan Zheng, Xiaoze Ou and Changhuei Yang; "0.5 gigapixel microscopy using a flatbed scanner," *Biomedical Optics Express* 5 (1), pp. 1-8 (2014) PMID: PMC3891323
92. Roarke Horstmeyer and Changhuei Yang; "A phase space model of Fourier ptychographic microscopy," *Optics Express* 22 (1), pp. 338-58 (2014)

### ***NON-PEER REVIEWED PUBLICATIONS***

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2. Changhuei Yang, Demetri Psaltis, "Optofluidic technology creates small, cheap biophotonic devices," *Laser Focus World*, Jul 2006, p. 85-88 (2006)
3. Changhuei Yang, Xin Heng, Demetri Psaltis, "Microscopic microscope," *Laser Focus World*, Dec 2006, (2006)
4. Changhuei Yang, Xin Heng, Demetri Psaltis, "Optofluidic microscope," *Optics and Photonics News*, Dec 2006, (2006)
5. Marinko Sarunic, Shuo Han, Jigang Wu, Zahid Yaqoob, Changhuei Yang, "PARS-OCT endoscopy system," Thorlabs:  
<http://www.thorlabs.us/laserimaging/index.cfm?pageref=31&page=OCT-endoscopy>



6. "Gradient Index Optical Microsystems Visualize Living Cells in Deep Tissue," Dr. Bernhard Messerschmidt, Grintech GmbH, Biophotonics International, September 2007, pp. 36- 38
7. "Optofluidics Emerges from the Laboratory," David Erickson, Cornell University, Changhuei Yang, California Institute of Technology, and Demetri Psaltis, Ecole Polytechnique Federale de Lausanne, Photonics Spectra, February 2008, pp. 74-79

### **BOOK CHAPTERS**

1. Kyungwon An, James J. Child, Changhuei Yang, Michael S. Feld, and Ramachandra R. Dasari, "The microlaser: a quantized Rabi oscillator," *Spectroscopy: Perspective and Frontiers*, A. P. Roy (Ed), Narosa Publishing House, pp. 70 (1997).
2. Adam Wax, Vadim Backman, Changhuei Yang and Michael S. Feld, "Light scattering spectroscopic techniques for examining cellular structure, organization and dynamics," in *Biomedical Optical Engineering*, J.G. Fujimoto and D. Farkas, Eds., Oxford University Press, (2002)
3. X. Heng, X. Cui, D. Psaltis, C. Yang, "The Optofluidic Microscope – Fitting a microscope onto a sensor chip," in *C MOS Biotechnology*, H. Lee, D. Ham, and R. Westervelt, Eds., Springer Press, (2007)

### **BOOK**

1. Yeshaiahu Fainman, Luke Lee, Demetri Psaltis and Changhuei Yang; *Optofluidics: Fundamentals, Devices, and Applications* (Biophotonics) published by McGraw-Hill, 2009 (ISBN-13: 978-0071601566)

### **PATENTS**

1. 11/1/2013 Benjamin Judkewitz, Changhuei Yang, Roarke Horstmeyer, Ying Min Wang; Time-Reversal of Variance-Encoded Light (Trove); 14/070,045 Non-Prov Filed
2. 10/31/2013 Benjamin Judkewitz, Changhuei Yang; Spatial Frequency Swept Interference Illumination; 14/068,818 Non-Prov Filed, IIA
3. 10/28/2013 Guoan Zheng, Changhuei Yang, Roarke Horstmeyer; Fourier Ptychographic Imaging Systems, Devices, and Methods; 14/065,280 Non-Prov Filed, Licensed
4. 10/28/2013 Guoan Zheng, Changhuei Yang, Roarke Horstmeyer; Fourier Ptychographic X-ray Imaging Systems, Devices, and Methods; 14/065,305 Non-Prov Filed, Licensed
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