

# CURRICULUM VITAE

## KIMANI CHRISTOPHER TOUSSAINT, JR.

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### EDUCATION

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Ph.D., Electrical Engineering, Boston University 2004

M.S., Electrical Engineering, Boston University 1999

B.A., African-American Studies, Physics/Math (minor), University of Pennsylvania 1996

### EMPLOYMENT

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*Senior Associate Dean for Research and Strategic Initiatives*, School of Engineering, Brown University, September 2022-present

*Senior Associate Dean*, School of Engineering, Brown University, August 2020-August 2022

*Professor*, School of Engineering, Brown University, September 2019-present

*Adjunct Professor*, Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, August 2019-2021

*Professor* (promoted with distinction), Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, August 2019

*Associate Professor* (tenured), Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, Jan. 2013-August 2019

*Associate Professor [0% appointment]*, National Center for Supercomputing Applications (NCSA), University of Illinois at Urbana-Champaign, May 2018-August 2019

*Associate Professor [0% appointment]*, Carle Illinois College of Medicine University of Illinois at Urbana-Champaign, March 2018-August 2019

*Associate Professor [0% appointment]*, Department of Bioengineering, University of Illinois at Urbana-Champaign, December 2016-August 2019

*Dr. Martin Luther King, Jr. Visiting Associate Professor*, Department of Mechanical Engineering, Massachusetts Institute of Technology, 2014-2015

*Affiliate Faculty*, University of Illinois at Urbana-Champaign  
Department of Electrical and Computer Engineering, 2007-August 2019  
Department of Bioengineering, 2008-2016  
Beckman Institute for Advanced Science and Technology, 2009-August 2019

*Affiliate Faculty*, University of Illinois at Chicago  
Department of Ophthalmology and Visual Sciences, 2009-present

*Assistant Professor*, Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, Aug. 2007-Dec. 2012

*NSF Minority Postdoctoral Fellow in Biology*, James Franck Institute, University of Chicago, Aug. 2005- Jul. 2007

*Postdoctoral Research Associate*, James Franck Institute, University of Chicago, Apr. 2004- Jul. 2005

## **HONORS AND AWARDS**

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National Academies Convergent Manufacturing [*Invited speaker*], 2021  
National Academy of Sciences Intersections [*Selected to attend meeting*], 2021  
AIMBE Fellow, 2021  
African Academy of Sciences (AAS) Fellow, 2020  
Campus Distinguished Promotion Award, 2019  
MechSE Two-Year Effective Teaching Award, 2019  
Optica (formerly OSA) Fellow Lecturer [*Selected to serve as “OSA Ambassador” during trip to visit and lecture in Quito, Ecuador*], 2018  
SPIE Fellow, 2018  
Optica (formerly OSA) Fellow, 2018  
National Academies Keck Futures Initiative Beyond Boundaries  
    [*Selected as one of 150 participants from America*], 2017  
Everitt Award for Teaching Excellence (UIUC), 2017  
Research Advisory Board, Carle-Illinois College of Medicine, 2017-present  
National Academies’ 3<sup>rd</sup> Arab-American Frontiers of Science, Engineering, and Medicine  
    [*Selected as one of 30 participants from America*], 2015  
Dean’s Award for Excellence in Research (UIUC), 2015  
Martin Luther King, Jr. Visiting Associate Professor at MIT, May 2014-May 2015  
National Academies Keck Futures Initiative Grant Awards, 2011  
    [*Selected for 2 separate research awards out of 13 awarded projects*]  
8<sup>th</sup> Annual National Academies Keck Futures Initiative, 2010  
    [*Selected as one of 150 participants in America*]  
2010 NSF Faculty Early Career Development Award (CAREER)  
National Academy of Science’s 18<sup>th</sup> Annual Kavli Frontiers of Science Symposium, 2006  
    [*Selected as part of top 100 young scientists under 45 in America*]  
UIUC List of Teachers Ranked as Excellent by Their Students  
    Spring 2019, Fall 2018, Spring 2018, Fall 2017, Spring 2017, Fall 2016, Spring

*2016, Fall 2015, Fall 2013, Spring 2013, Fall 2012, Fall 2011, Fall 2010, Fall 2009, Fall 2008*

NSF Minority Postdoctoral Fellowship in Biology, 2005-2007

Gates Millennium Scholarship, 2000-2004

## **PATENTS**

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(5) “Optical determination of a cardiovascular variability parameter independent of skin contributions,” with R. Jakachira, M. Diouf, J. Burrow, and Z. Lin. Provisional Patent filed.

(4) “Nanoindenter Multimodal Microscope Objective for Mechanobiology,” with A. Wagoner Johnson, W. L. Wilson, and M. P. Ferreira. US Patent Number 9588327 (16 claims), issued on 3/7/17.

(3) “Second-Order Nonlinear Susceptibility of a Nanoparticle Using Coherent Confocal Microscopy,” with S. Tripathi, B. J. Davis, and P. S. Carney. US Patent Number 8334976 (14 claims), issued on 12/18/12.

(2) “Vector Beam Generator Using A Passively Phase Stable Optical Interferometer,” with S. Park, J. E. Jureller, and N. F. Scherer. US Patent Number 7,599,069 (26 claims), issued 10/6/09.

(1) “Entangled-Photon Ellipsometry,” with A. F. Abouraddy, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich. U.S. Patent Number 6,822,739 (67 claims), issued 11/23/04.

## **SELECTED MAGAZINE ARTICLES AND POPULAR PRESS**

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(15) “COVID-19 made pulse oximeters ubiquitous. Engineers are fixing their racial bias,” NPR Short Wave (February 13, 2023).

(14) “Meet the scientists who want to make medical devices work for everyone, finally,” Inverse (February 2, 2023).

(13) “A quick remedy proves elusive for lifesaving pulse oximeter’s problems with darker skin,” Forbes (January 31, 2023).

(12) “Key medical devices are failing to diagnose Black patients accurately, research shows,” Yahoo News (November 30, 2022).

(11) “FDA advisers meet on racial disparities in pulse oximeters,” Associated Press (November 2022).

(10) “From nonlinear optical imaging to pulse oximeters,” *Optics and Photonics News* (November 2022).

(9) “Fixing racial bias in a key COVID diagnostic tool,” Bloomberg (September 29, 2022).

(8) “Investigating claims that oximeters give inaccurate readings to patients with darker skin,” NBC News Now (September 16, 2022).

(7) “Inaccurate pulse oximeter readings tied to less supplemental oxygen for darker-skinned ICU patients,” STAT+ (July 11, 2022).

(6) “When it comes to darker skin, pulse oximeters fall short,” National Public Radio (July 11, 2022).

- (5) “Scientists are searching for solutions after studies show pulse oximeters don’t work as well for people of color,” CNN (July 11, 2022).
- (4) “A blood-oxygen detector without racial bias,” Boston Globe (July 5, 2022).
- (3) “Flawed oxygen readings may be behind Covid-19’s toll on people of color,” Politico (July 2, 2022).
- (2) “New technique for DIY optics,” *Optics and Photonics News* 11 (April 2016) [Featured in Newsroom]. Appears on online edition in February 2016.
- (1) K. C. Toussaint, Jr., B. J. Roxworthy, H. Chen, A. M. Bhuiya, and Q. Ding, “Plasmonic nanoantennas: From nanotweezers to plasmonic photography,” *Optics and Photonics News* 24-31 (June 2015) [cover article].

### **JOURNAL ARTICLES (\*denotes publications with students)**

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- \*(80) M. Harling, V. Kelkar, A. F. Abouraddy, and K. C. Toussaint Jr., “Reversible coherence conversion across optical degrees-of-freedom: a tutorial,” *Journal of Optics* 25, 053502 (2023).
- \*(79) E. S. Hwang, D. J. Morgan, J. Sun, M. E. Hartnett, K. C. Toussaint, and B. Coats, “Confocal reflectance microscopy for mapping collagen fiber organization in the vitreous gel of the eye,” *Biomed. Opt. Express* 14, 932-944 (2023).
- \*(78) A. Ostadi Moghaddam, M. R. Arshee, Z. Lin, M. Sivaguru, H. Phillips, B. L. McFarlin, K. C. Toussaint, and A. J. Wagoner Johnson “An indentation-based framework for probing the glycosaminoglycan-mediated interactions of collagen fibrils,” *Journal of the Mechanical Behavior of Biological Materials* 140, 105726 (2023).
- \*(77) M. Diouf, J. A. Burrow, and K. C. Toussaint, Jr. “Elusive phase wave caught,” *Nat. Phys.* (2023). <https://doi.org/10.1038/s41567-022-01861-z>
- \*(76) C. Wang, Q. Liu, Y. Hu, F. Xie, K. Krishna, N. Wang, L. Wang, Y. Wang, K. C. Toussaint, Jr., J. Cheng, H. Chen, and Z. Wu, “Realization of high-dynamic-range broadband magnetic-field sensing with ensemble nitrogen-vacancy centers in diamond,” *Review of Scientific Instruments* 94, 015109 (2023). <https://doi.org/10.1063/5.0089908>
- \*(75) A. Ostadi Moghaddam, M. R. Arshee, Z. Lin, M. Sivaguru, H. Phillips, B. L. McFarlin, K. C. Toussaint, and A. J. Wagoner Johnson “Orientation-dependent indentation reveals the crosslink-mediated deformation mechanisms of collagen fibrils,” *Acta Biomaterialia* ISSN 1742-7061 (2023). <https://doi.org/10.1016/j.actbio.2023.01.005.2>, 14064
- \*(74) M. Diouf, Z. Lin, M. Harling, and K. C. Toussaint, Jr. “Demonstration of speckle resistance using space–time light sheets,” *Sci Rep* 12, 14064 (2022). <https://doi.org/10.1038/s41598-022-18153-4>
- \*(73) M. Diouf, J. A. Burrow, K. Krishna, R. Odessey, A. F. Abouraddy, and K. C. Toussaint, “Excitation of surface plasmon polaritons by diffraction-free and vector beams,” *Appl. Opt.* 61, 7469-7473 (2022).

- \*(72) M. Harling, V. Kelkar, C. Okoro, M. Diouf, A. F. Abouraddy, and K. C. Toussaint, "Reversible inter-degree-of-freedom optical-coherence conversion via entropy swapping," *Opt. Express* 30, 29584-29597 (2022).
- \*(71) R. Jakachira, M. Diouf, Z. Lin, J. A. Burrow, A. Howes, T. Oguntolu, R. Carter III, S. I. Dunsiger, and K. C. Toussaint, "Single-wavelength, single-shot pulse oximetry using an LED-generated vector beam". *Opt. Express* 30, 27293-27303 (2022).  
<https://doi.org/10.1364/OE.461871>
- (70) X. Chen, D. Chen, E. Ban, K. C. Toussaint, P. A. Janmey, R. G. Wells, V. B. Shenoy. "Glycosaminoglycans modulate long-range mechanical communication between cells in collagen networks". *PNAS*, 2022 Vol. 119 No. 15, e2116718119,  
<https://doi.org/10.1073/pnas.2116718119>
- \*(69) Y. Yang, V. A. Kelkar, H. S. Rajput, A. C. Salazar Coaritic, K. C. Toussaint, C. Shao, "Machine-learning-enabled geometric compliance improvement in two-photon lithography without hardware modifications," *Journal of Manufacturing Processes*, Volume 76, 2022, Pages 841-849, ISSN 1526-6125,  
<https://doi.org/10.1016/j.jmapro.2022.02.046>.
- \*(68) A. C. Salazar Coariti, M. S. Fabien, J. Guzman, J. A. McGuire, R. De Vita, K. C. Toussaint, "Fluid mechanics approach to analyzing collagen fiber organization," *J. Biomed. Opt.* **27**(1), 016503 (2022), doi: 10.1117/1.JBO.27.1.016503. [**cover article**]
- \*(67) A. Ostadi Moghaddam, Z. Lin, M. Sivaguru, H. Phillips, B.L. McFarlin, K.C. Toussaint, A. J. Wagoner Johnson, "Heterogeneous microstructural changes of the cervix influence cervical funneling," *Acta Biomaterialia*, 2021,  
<https://doi.org/10.1016/j.actbio.2021.12.025>.
- \*(66) M. Diouf, M. Harling, M. Yessenov, L. A. Hall, A. F. Abouraddy, and K. C. Toussaint, "Space-time vector light sheets," *Opt. Express* 29, 37225-37233 (2021).
- \*(65) J. A. McGuire, J. L. Monclova, A. C. Salazar Coariti, C. A. Stine, K. C. Toussaint, J. M. Munson, D. A. Dillard, R. De Vita, "Tear Propagation in Vaginal Tissue under Inflation," *Acta Biomaterialia*, 2021, ISSN 1742-7061,  
<https://doi.org/10.1016/j.actbio.2021.03.065>.
- \*(64) W. Lee, A. Ostadi Moghaddam, S. Shen, H. Phillips, B. L. McFarlin, A. J. Wagoner Johnson, K. C. Toussaint Jr. "An optomechanogram for assessment of the structural and mechanical properties of tissues," *Sci Rep* 11, 324 (2021).  
<https://doi.org/10.1038/s41598-020-79602-6>
- \*(63) C. R. Ocier, C. A. Richards, D. A. Bacon-Brown, Q. Ding, R. Kumar, T. J. Garcia, J. van de Groep, J. Song, A.J. Cyphersmith, A. Rhode, A. N. Perry, A. J. Littlefield, J. Zhu, D. Xie, H. Gao, J. F. Messinger, M. L. Brongersma, K. C. Toussaint Jr., L. L.

Goddard, P. V. Braun, “Direct Laser Writing of Volumetric Gradient Index Lenses and Waveguides,” *Light Sci Appl* **9**, 196 (2020). <https://doi.org/10.1038/s41377-020-00431-3>

\*(62) W. Lee , A. O. Moghaddam, Z. Lin , B. L. McFarlin , A. J. W. Johnson, K. C. Toussaint, “Quantitative Classification of 3D Collagen Fiber Organization from Volumetric Images,” *IEEE Trans Med Imaging*. 2020;PP:10.1109/TMI.2020.3018939. doi:10.1109/TMI.2020.3018939 (2020).

\*(61) C. Hu, J. J. Field, V. Kelkar, B. Chiang, K. Wernsing, K. C. Toussaint, R. A. Bartels, G. Popescu, “Harmonic optical tomography of nonlinear structures,” *Nat. Photonics*, <https://doi.org/10.1038/s41566-020-0638-5> (2020).

\*(60) H. S. Rajput, M. M. Kabir, V. A. Kelkar, A. C. Salazar Coariti, K. C. Toussaint, “Demonstration of flat-top beam illumination in widefield multiphoton microscopy,” *J. Biomed. Opt.* **25**, 014503 (2019).

\*(59) Q. Ding and K. C. Toussaint, Jr., “Relaying of the local enhanced electric-field using stacked gold bowtie nanoantennas,” *Nanotechnology* **30**, 365202 (2019).

\*(58) Q. Ding, K. Jacobs, A. Choubal, G. Mensing, Z. Zhang, K. Yamada, N. Kincaid, R. Tirawat, G. Zhu, T. Wendelin, L. Jay Guo, P. Ferreira, and K. C. Toussaint, Jr., “Feasibility analysis of nanostructured planar focusing collectors for concentrating solar power applications,” *ACS Appl. Energy Mater.* DOI: 10.1021/acsaem.8b01328 (2018).

\*(57) C. Okoro, V. Kelkar, M. Sivaguru, R. Emmadi, and K. C. Toussaint, Jr., “Second-harmonic patterned polarization-analyzed reflection confocal microscopy of stromal collagen in benign and malignant breast tissues,” *Scientific Reports* **8**, 16243 (2018).

\*(56) W. Liu, K. C. Toussaint, Jr., C. Okoro, D. Zhu, Y. Chen, C. Kuang, and X. Liu, “Breaking the axial diffraction limit: A guide to axial super-resolution fluorescence microscopy,” *Laser & Photonics Reviews*, 1700333; DOI:10.1002/lpor.201700333 (2018).

\*(55) M. Kabir, A. Choubal, and K. C. Toussaint, Jr., “Application of a reflective microscope objective for multiphoton microscopy,” *Journal of Microscopy* **00** (0), 1–7; DOI: 10.1111/jmi.12702 (2018).

\*(54) W. Lee and K. C. Toussaint, Jr., “Quantitative analysis of the effect of environmental-scanning electron microscopy on collagenous tissues,” *Scientific Reports* **8**, 8491; DOI:10.1038/s41598-018-26839-x/srep08491 (2018).

\*(53) G. Zhao, C. Kuang, C. Zheng, R. Zhou, M. M. Kabir, K. C. Toussaint Jr., W. Wang, L. Xu, H. Li, P. Xiu, and X. Liu, “Nonlinear focal modulation microscopy,” *PRL* **120**, 193901 (2018) [cover article].

- \*(52) C. Okoro and K. C. Toussaint, Jr., “The second-harmonic patterned polarization-analyzed reflection confocal microscope,” *J. Biomed. Opt.* 22(8), 086007 doi: 10.1117/1.JBO.22.8.086007 (2017).
- \*(51) C. Okoro, H. E. Kondakci, A. F. Abouraddy, and K. C. Toussaint, Jr., “Demonstration of an optical-coherence converter,” *Optica* 4 (9), 1052-1058 (2017). **[Selected for the Research Highlights segment of the September 2017 issue of Nature Photonics (volume 11, pg. 612).]**
- \*(50) G. Zhao, M. M. Kabir, K. C. Toussaint Jr., C. Kuang, C. Zheng, Z. Yu, and X. Liu, “Saturated absorption competition (SAC) microscopy,” *Optica* 4 (6), 633-636 (2017).
- \*(49) H. Majeed, C. Okoro, A. Kajdacsy-Balla, K. C. Toussaint Jr, and Gabriel Popescu, “Quantifying collagen fiber orientation in breast cancer using quantitative phase imaging,” *J. Biomed. Opt.* 22(4), 046009 doi:10.1117/1.JBO.22.4.046009 (2017).
- \*(48) M. Sivaguru, M. Kabir, M. Rangan Gartia, D. S. C. Biggs, B. S. Sivaguru, V. A. Sivaguru, G. A. Fried, G. Logan Liu, S. Sadayappan, and K. C. Toussaint, Jr., “Application of an advanced maximum likelihood estimation restoration method for enhanced-resolution and contrast in second-harmonic generation microscopy,” *Journal of Microscopy* 00 (0), 1–12 doi: 10.1111/jmi.12579 (2017).
- \*(47) W. Lee, H. Rahman, M. E. Kersh, and K. C. Toussaint, Jr. “Application of quantitative second-harmonic generation microscopy to posterior cruciate ligament for crimp analysis studies,” *J. Biomed. Opt.* 22(4), 046009 doi:10.1117/1.JBO.22.4.046009 (2017).
- \*(46) C. Okoro, A. Vartanian, and K. C. Toussaint, Jr., “Development of a handheld smart dental instrument for root canal imaging,” *J. Biomed. Opt.* 21(11), 114002 doi:10.1117/1.JBO.21.11.114002 (2016). [invited]
- (45) T. Xiao, O. Cifci, S. Bhargava, H. Chen, T. Gissibl, W. Zhou, H. Giessen, K. C. Toussaint, Jr, E. Yablonovitch, and P. Braun, “Diffractive spectral-splitting optical element designed by adjoint-based electromagnetic optimization and fabricated by femtosecond 3D direct laser writing,” *ACS Photonics* 3 (5), 886–894 doi: 10.1021/acsp Photonics.6b00066 (2016).
- \*(44) W. Lee, M. Kabir, R. Emmadi, and K. C. Toussaint, Jr., “Third-harmonic generation imaging of breast tissue microarrays,” *Journal of Microscopy* doi:10.1111/jmi.12427 (2016).
- \*(43) C. Okoro and K. C. Toussaint, Jr., “Experimental demonstration of two-photon Mueller-matrix-second-harmonic generation microscopy,” *Journal of Biomedical Optics* 21, 016011 (2016).

- \*(42) H. Chen, A. M. Bhuiya, Q. Ding, Harley T. Johnson, and K. C. Toussaint, Jr. "Towards do-it-yourself planar optical components using plasmon-assisted etching," *Nature Communications* 7:10468 doi: 10.1038/ncomms10468 (2016).
- (41) S. You, C. Kuang, K. C. Toussaint, Jr., R. Zhou, X. Xia, and X. Liu "Iterative phase retrieval method for generating stereo array of polarization-controlled focal spots," *Optics Letters* 40, 3532-3535 (2015).
- (40) B. Ge, Y. Ma, C. Kuang, D. Zhang, K. C. Toussaint, S. You, and X. Liu "Resolution-enhanced surface plasmon-coupled emission microscopy," *Optics Express* 23, 13159-13171 (2015).
- \*(39) H. Chen, A. M. Bhuiya, Q. Ding, and K. C. Toussaint, Jr. "Plasmon-Assisted Audio Recording," *Scientific Reports* 5, 9125; DOI:10.1038/srep09125 (2015).
- \*(38) M. M. Kabir, ASM Jonayat, S. Patel, and K. C. Toussaint, Jr. "GPU-Based Quantitative Second-Harmonic Generation Imaging," *Journal of Biomedical Optics* 19, 096009 (2014).
- \*(37) H. Chen, A. M. Bhuiya R. Liu, D. M. Wasserman, and K. C. Toussaint, Jr. "Design, Fabrication, and Characterization of Near-IR Gold Bowtie Nanoantenna Arrays," *Journal of Physical Chemistry C* 118, 20553–20558 (2014).
- \*(36) B. J. Roxworthy, A. M. Bhuiya, V. V. G. K. Inavalli, H. Chen, and K. C. Toussaint, Jr., "Multifunctional Plasmonic Film for Recording Near-Field Optical Intensity," *Nano Letters* 14, 4687–4693 (2014).
- \*(35) B. J. Roxworthy, A. M. Bhuiya, X. Yiu, E. K. C. Chow, and K. C. Toussaint, Jr., "Reconfigurable nanoantennas using electron-beam manipulation," *Nature Communications* 5:4427 doi: 10.1038/ncomms5427 (2014).
- \*(34) B. J. Roxworthy, M. T. Johnston, F. L. Montiel, R. H. Ewoldt, P. I. Imoukhuede, and K. C. Toussaint, Jr. "Plasmonic Optical Trapping in Biologically Relevant Media" *PlosOne*, 9(4): e93929. doi:10.1371/journal.pone.0093929 (2014).
- \*(33) H. Chen and K. C. Toussaint, Jr., "Application of flat-top focus to 2D trapping of large particles," *Optics Express* 22, 6653-6660 (2014).
- \*(32) S. Tripathi and K. C. Toussaint, Jr., "Harnessing randomness to control the polarization of light transmitted through highly scattering media," *Optics Express* 22, 4412-4422 (2014).
- \*(31) H. Chen, S. Tripathi, and K. C. Toussaint, Jr., "Demonstration of flat-top focusing under radial polarization illumination," *Optics Letters* 39, 834-837 (2014).



- \*(30) B. J. Roxworthy and K. C. Toussaint, Jr., "Simultaneously tuning the electric and magnetic plasmonic response using capped bi-metallic nanoantennas," *Nanoscale* 6, 2270-2274 (2014).
- \*(29) B. J. Roxworthy, A. M. Bhuiya, S. P. Vanka, and K. C. Toussaint, Jr., "Understanding and controlling plasmon-induced convection," *Nature Communications* 5:3173 doi: 10.1038/ncomms4173 (2014).
- \*(28) S. Tripathi and K. C. Toussaint, Jr., "Quantitative control over the intensity and phase of light transmitted through highly scattering media," *Optics Express* 21, 25890-25900 (2013). [Selected for the January 2014 issue of *The Virtual Journal for Biomedical Optics (Volume 9, issue 1).*]
- \*(27) M. M. Kabir, V. V. G. K. Inavalli, T. Y. Lau, and K. C. Toussaint, Jr., "Application of quantitative second-harmonic generation microscopy to dynamic conditions," *Biomedical Optics Express* 4, 2546-2554 (2013). [invited] [Selected for *Novel Techniques in Microscopy special issue.*]
- \*(26) T.-Y. Lau, H. K. Sangha, E. K. Chien, B. L. McFarlin, A. J. Wagoner-Johnson, and K. C. Toussaint, Jr., "Application of Fourier transform-second-harmonic generation imaging to the rat cervix," *Journal of Microscopy*; DOI: 10.1111/jmi.12046 (2013).
- \*(25) B. J. Roxworthy and K. C. Toussaint, Jr., "Femtosecond-pulsed plasmonic nanotweezers," *Scientific Reports* 2, 660; DOI:10.1038/srep00660 (2012).
- \*(24) T.-Y. Lau, R. Ambekar, and K. C. Toussaint, Jr., "Quantification of collagen fiber organization in 3D using three dimensional Fourier transform-second harmonic generation imaging," *Optics Express* 20, 21821-21832 (2012). [Selected for the October 31, 2012 issue of *The Virtual Journal of Biological Physics Research.*]
- \*(23) R. Ambekar, T-Y Lau, M. Walsh, R. Bhargava, and K. C. Toussaint, Jr., "Quantifying collagen structure in breast biopsies using second-harmonic generation imaging," *Biomedical Optics Express* 3, 2021-2035 (2012).
- \*(22) S. Tripathi, R. Paxman, T. Bifano, and K. C. Toussaint, Jr., "A vector transmission matrix for the polarization behavior of light propagation in highly scattering media," *Optics Express* 20, 10788-10795 (2012).
- (21) C. Stockbridge, Y. Lu, J. Moore, S. Hoffman, R. Paxman, K. C. Toussaint, Jr., and T. Bifano, "Focusing through dynamic scattering media," *Optics Express* 20, 15086-15092 (2012). [Selected for the August 2012 issue of *The Virtual Journal for Biomedical Optics.*]
- \*(20) S. Tripathi and K. C. Toussaint, Jr., "Versatile generation of optical vector fields using a non-interferometric approach," *Optics Express* 20, 10788-10795 (2012).

- \*(19) B. J. Roxworthy and K. C. Toussaint, Jr., "Plasmonic nanotweezers: strong influence of adhesion layer and nanostructure orientation on trapping performance," *Optics Express* 20, 9591-9603 (2012). [Selected for the May 2012 issue of *The Virtual Journal for Biomedical Optics*.]
- \*(18) N. I. Maniscalco, K. D. Ko, K. C. Toussaint, Jr., and W. P. King, "Microcantilever with Integrated Light-Emitting Schottky-Barrier Avalanche-Breakdown Diodes," *Micro and Nano Letters* 7, 314-316 (2012).
- \*(17) B. J. Roxworthy, K. D. Ko, A. Kumar, K. H. Fung, E. K. C. Chow, G. L. Liu, N. X. Fang, and K. C. Toussaint, Jr., "Optical trapping, stacking, and sorting using plasmonic bowtie nanoantenna arrays," *Nano Letters* 12, 796-801 (2012). [selected as highly cited in *Web of Science* as of Feb. 2018, placing it in the top 1% of published articles in the physics category annually for the most recent 10 years.]
- \*(16) R. Ambekar, M. Chittenden, I. Jasiuk, and K. C. Toussaint, Jr., "Investigation of age-related structural changes in porcine cortical bone using quantitative second-harmonic generation microscopy," *Bone* 50, 643-650 (2012).
- \*(15) S. Tripathi, B. J. Davis, K. C. Toussaint, Jr., and P. Scott Carney, "Determination of the second-order nonlinear susceptibility of a single nanoparticle using coherent optical microscopy," *Journal of Physics B* 44, 015401 (2011).
- \*(14) K. D. Ko, A. Kumar, K. H. Fung, R. Ambekar, G. L. Liu, N. X. Fang, and K. C. Toussaint, Jr., "Nonlinear optical response from arrays of Au bowtie nanoantennas," *Nano Letters* 11, 61-65 (2011).
- \*(13) R. Ambekar, K. C. Toussaint, Jr., and A. Wagoner Johnson, "The effect of keratoconus on the structural, mechanical, and optical properties of the cornea," *Journal of the Mechanical Behavior of Biomedical Materials* 4, 223-236 (2011) [invited] [Listed as one of the top 25 downloaded articles from April to June 2011].
- \*(12) M. Sivaguru, S. Durgam, R. Ambekar, D. Luedtke, G. Fried, A. Stewart, and K. C. Toussaint, Jr., "Quantitative analysis of collagen fiber organization in injured tendons using Fourier transform-second harmonic generation imaging," *Optics Express* 18, 24983-24993 (2010). [Selected for the Editor's Choice segment of the December 2010 special issue of *Science* (volume 330, issue 6011, pg. 1589) .]
- \*(11) B. J. Roxworthy and K. C. Toussaint, Jr., "Optical trapping with  $\pi$  – phase cylindrical vector beams," *N. J. Phys.*, 12, 073012 (2010).
- \*(10) R. A. Rao, M. R. Mehta, S. Leithem, and K. C. Toussaint, Jr., "Quantitative analysis of forward and backward second-harmonic images of collagen fibers using Fourier transform-second-harmonic generation microscopy," *Optics Letters*, 34, 3779-3781, 2009. [Selected for the January 2010 issue of *The Virtual Journal for Biomedical Optics*.]

\*(9) S. Tripathi and K. C. Toussaint, Jr., "Rapid Mueller matrix polarimetry based on parallelized polarization state generation and detection," *Optics Express* 17, 21396-21407 (2009).

\*(8) R. A. Rao, M. R. Mehta, and K. C. Toussaint, Jr., "Fourier transform-second-harmonic generation imaging of biological tissues," *Optics Express* 17, 14534-14542 (2009). [Selected for the October 2009 issue of *The Virtual Journal for Biomedical Optics*.]

\*(7) K. D. Ko and K. C. Toussaint, Jr. "A simple GUI for modeling the optical properties of single metal nanoparticles," *Journal of Quantitative Spectroscopy and Radiative Transfer* 110, 1037-1043 (2009).

(6) K. C. Toussaint, Jr., M. Liu, M. Pelton, J. Pesic, P. Guyot-Sionnest, and N. F. Scherer, "Plasmon resonance-based optical trapping of single and multiple Au nanoparticles," *Optics Express* 15, 12017-12029 (2007). [Selected for the October 2007 issue of *The Virtual Journal for Biomedical Optics*.]

(5) A. F. Abouraddy and K. C. Toussaint, Jr., "Three-dimensional polarization control in microscopy," *Physical Review Letters* 96, 153901 (2006). [Selected for the May 1, 2006 issue of *Virtual Journal of Biological Physics Research*.]

(4) K. C. Toussaint, Jr., S. Park, J. E. Jureller, and N. F. Scherer, "Generation of optical vector beams with a diffractive optical element interferometer," *Optics Letters* 30, 2846-2848 (2005).

(3) K. C. Toussaint, Jr., G. Di Giuseppe, K. J. Bycenski, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, "Quantum ellipsometry using correlated-photon beams," *Physical Review A* 70, 023801 (2004).

(2) A. F. Abouraddy, K. C. Toussaint, Jr., A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, "Entangled-photon ellipsometry," *Journal of the Optical Society of America B* 19, 656-662 (2002), quantum physics eprint on Los Alamos National Laboratory server (2002) (eprint quant-ph/0202088).

(1) A. F. Abouraddy, K. C. Toussaint, Jr., A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, "Ellipsometric measurements using photon pairs generated by spontaneous parametric down-conversion," *Optics Letters* 26, 1717-1719 (2001), quantum physics eprint on Los Alamos National Laboratory server (2001) (eprint quant-ph/0110085).

## GRANT AWARDS

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(\$999,211) National Science Foundation (co-PI), PIPP Phase I: Mobility Analysis for Pandemic Prevention Strategies (MAPPS), 2022-2023

(\$50,000) Brown University Office of the Vice President for Research Seed Award (PI), *Vector Beam Pulse Oximetry*, 2022-2023

(\$100,000) National Science Foundation (PI), *CELL-MET: Imaging Techniques That Quantify Sarcomere Structure and Organization As A Measure Of Engineered Heart Tissue Maturity*, 2021-2022

(\$100,000) National Science Foundation (PI), *Planning Grant: Engineering Research Center for the Next-generation Enterprise to Engineer Diagnostics at Low-cost for the home-Ecosystem (NEEDLE)*, 2021-2024

(\$500,000) National Science Foundation (PI), *Collaborative Research: A Digital Manufacturing Platform to Democratize Biological Tissue Access Using Smart Two-Photon Polymerization*, 2021-2024

(\$7,500,000) Office of Naval Research (co-PI), *Classical entanglement in structured optical fields*, 2020-2025

(\$150,000) National Science Foundation (PI), *Eager: Demonstration of Space-Time Surface Plasmon Polaritons*, 2020-2022

(\$1,500) OSA Fellow Lecturer Grant (PI), *Visit and Lecture in Quito, Ecuador*, 2018

(\$600,000) Burroughs Wellcome Fund (PI), *Investigating the mechanobiology of cervical remodeling using a novel combination of optical microscopy and nanoindentation*, 2017 – 2021

(\$4,000,000) National Science Foundation (PI), *Network for Computational Nanotechnology - Hierarchical nanoMFG Node*, 2017 – 2022 (PI declined to continue beyond August 2019 in move to new institution)

(\$822,896) National Science Foundation (co-PI), *Collaborative Research: The Redshirt in Engineering Consortium*, 2016 – 2021 (co-PI declined to continue beyond August 2019 in move to new institution)

(\$1,381,880) Department of Energy (PI), *Development of a planar focusing collector for CSP*, 2016 – 2018

(\$8,500) MIT Lincoln Laboratory (PI), *Design of a small form-factor solar-thermal hybrid system*, 2016

(\$300,000) Carver Trust (PI), *Development of an optomechanical microscope*, 2015 –

(\$30,000) UIUC Campus Research Board (PI), *Development of a real-time plasmonic based lab-on-a-chip*, 2015 – 2016

(\$49,444) Moon Ark (PI), NIH SBIR: *Design of a digital pulpascope*, 2014 - 2015

(\$9,548) NSF IDBR Supplement for CAREER (PI), *Novel quantitative second-harmonic*

*generation microscope for fundamental study of collagen fibers in the eye, Summer 2014*

(\$20,000) UIUC Strategic Instructional Initiatives Program (co-PI), *Visually rich Interactive course delivery and problem solving using integrated modeling, signal processing, instrumentation, and control approach, 2013-2014*

(\$75,000) National Academies Keck Futures Initiative (co-PI), *Coupling smart spatial visualization interfaces with real-time second-harmonic generation microscopy, 2011-2012*

(\$610,872) NSF IDBR CAREER (PI), *Novel quantitative second-harmonic generation microscope for fundamental study of collagen fibers in the eye, 2010-2015*

(\$449,999) NSF, Energy, Power, and Adaptive Systems (PI), *Optimizing the nonlinear optical response from nanoantenna arrays for frequency up-conversion for solar cells, 2010-2013*

(\$50,000) National Academies Keck Futures Initiative (PI), *Optical propagation through impenetrable materials using mems, 2011-2012*

(\$49,000) NSF IDBR Research Starter Grant (PI), *Three dimensional polarization second-harmonic generation microscopy, 2008-2010*

(\$9,800) NSF IDBR Research Starter Grant (PI), *Three dimensional polarization second-harmonic generation microscopy, 2008-2010*

(\$75,000) Network for Computational Nanotechnology (sponsored by NSF, co-PI), *A molecular and cellular mechanics infrastructure: experiments and computations, 2008-2009*

(\$67,627) Center for Nanoscale Chemical-Electrical-Mechanical Manufacturing Systems (sponsored by NSF, co-PI), *UIUC collaborative project with NanoCEMMS incorporating optical technologies from Toussaint Lab for characterizing nanostructures, 2008-2009*

(\$52,680) Network for Computational Nanotechnology (sponsored by NSF, co-PI), *UIUC Nano-Biophotonics Summer School Nanostructures, 2008*

(\$120,000) NSF IDBR (PI), *Minority Postdoctoral Fellowship, 2005-2007*

## **BOOK CHAPTERS**

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(2) M. R. Mehta, R. A. Rao, and K. C. Toussaint, Jr., "Second-harmonic generation imaging of collagen-based systems," Ch. 12 in *Nano-Biophotonics*, edited by G. Popescu (McGraw-Hill, New York), 271-285 (2010).

(1) R. A. Rao and K. C. Toussaint, Jr., "Theory of second-harmonic generation," Ch. 6 in *Nano-Biophotonics*, edited by G. Popescu (McGraw-Hill, New York), 97-114 (2010).

## **CONFERENCE PROCEEDINGS AND PUBLICATIONS**

---

(50) M. Diouf, Z. Lin, and K. C. Toussaint, Jr., "Interferometric phase stability using space-time wave packets," *Conference on Lasers and Electro-Optics (CLEO) JW2A.144* (2023).

(49) M. Diouf, Z. Lin, M. Harling, and K. C. Toussaint, Jr., "Speckle resistance from space-time light sheets" *CLEO/QELS JTh2P.3* (2022).

(48) Z. Lin, B. T. Wilks, J. Morgan, and K. C. Toussaint, "Fiber diameter analysis in second-harmonic generation images of collagen construct" *Frontiers in Optics / Laser Science JTU4A.72* (2022).

(47) M. Harling, V. Kelkar, E. Okoro, M. Diouf, A. F. Abouraddy, and K. C. Toussaint, Jr., "A reversible optical-coherence converter" *Laser Science JW4A.7* (2022).

(46) K. Krishna, M. Diouf, J. A. Burrow, R. Odessey, K. C. Toussaint, "Excitation of surface plasmon polaritons by space time wave packets," *QELS Fundamental Science FTh2B.3* (2022).

(45) V. A. Kelkar and K. C. Toussaint, "Compressive second-harmonic generation imaging" *OSA Imaging and Applied Optics Congress*, edited by H. Hua, B. Javidi, M. Martinez-Corral, O. Matoba, A. Stern, S. Thibault, T. Alieva, J. Ke, F. Willomitzer, F. Okten, P. Silveira, P. Banerjee, E. Stoykova, D. Chu, J. Park, F. Imai, C. Joo, M. Digman, D. Gardner, S. Gladysz, D. LeMaster, S. Basu, and O. Korotkova, eds., OSA Technical Digest, CTh2F.4 (2021).

(44) H. Majeed, C. Okoro, A. Balla, K. C. Toussaint, Jr., and G. Popescu, "Quantifying collagen orientation in breast tissue biopsies using SLIM" *Proceedings of the SPIE 10074*, edited by G. Popescu; Y. Park [Quantitative Phase Imaging III], 10074Z doi: 10.1117/12.2250713 (2017).

(43) M. Sivaguru, M. Kabir, M. Rangan Gartia, D. S. C. Biggs, B. S. Sivaguru, V. A. Sivaguru, Z. T. Berent, A. J. Wagoner Johnson, G. A. Fried, G. Logan Liu, S. Sadayappan, and K. C. Toussaint, Jr., "Enhancing resolution and contrast in second-harmonic generation microscopy using maximum likelihood estimation restoration method" *Proceedings of the SPIE 10069*, edited by A. Periasamy, P. T. C. So, K. Konig, Z. S. Xie [Multiphoton Microscopy in the Biomedical Sciences XVII], 1006908 doi: 10.1117/12.2256534 (2017).

(42) Q. Ding, A. Choubal, K. C. Toussaint, Jr., "Design of a nanopatterned long focal-length planar focusing collector for concentrated solar power," *Proceedings of the SPIE 10112*, edited by Ali Adibi, Shawn-Yu Lin, Axel Scherer [Photonic and Phononic Properties of Engineered Nanostructures VII], 101120O doi: 10.1117/12.2251538 (2017).

- (41) C. Okoro and K. C. Toussaint, Jr., “Two-photon Mueller matrix-second-harmonic generation microscopy of porcine samples,” *Frontiers in Optics* OSA Technical Digest, FM2C.3 (2015).
- (40) Q. Ding, H. Chen, A. Bhuiya, and K. C. Toussaint, Jr., “Plasmon-assisted etching for fabrication of planar optical components,” *Frontiers in Optics* OSA Technical Digest, FTh4F.3 (2015).
- (39) H. Chen, Q. Ding, B. J. Roxworthy, A. M. Bhuiya, and K. C. Toussaint, Jr., “Optical trapping with pillar bowtie nanoantennas,” *Proceedings of the SPIE* 9164, edited by K. Dholakia, G. C. Spalding [Optical Trapping and Optical Micromanipulation XI], 91641M (2014).
- (38) M. M. Kabir, A.S.M. Jonayat, Sanjay Patel and K. C. Toussaint, Jr., “GPU-based quantitative second-harmonic generation imaging,” OSA Technical Digest, JTU5A.44 (2014).
- (37) B. J. Roxworthy, K. C. Toussaint, Jr., and S. P. Vanka, “Optically induced natural convection in a cylinder using conducting metal oxide films,” *66th Annual Meeting of the APS Division of Fluid Dynamics*, Vol. 58 (18) (2013).
- (36) K. C. Toussaint, Jr., “Vector Beams and Vector Fields: A Look at Methods of Generation and Potential Applications,” *Frontiers in Optics* OSA Technical Digest, FW4F.1 (2013).
- (35) T. Y. Lau, M. M. Kabir, V. V. G. K. Inavalli, and K. C. Toussaint, Jr., “Real-time Fourier transform-second-harmonic generation imaging of collagen-based biological tissues,” *Imaging and Applied Optics: OSA Optics & Photonics Congress*, OSA Technical Digest (Quantitative Medical Imaging), QW3G.3 (2013).
- (34) T. Y. Lau, H. K. Sangha, E. K. Chien, B. L. McFarlin, A. J. Wagoner-Johnson, and K. C. Toussaint, Jr., “Quantification of rat cervical microstructure using Fourier transform-second-harmonic generation imaging,” *Conference on Lasers and Electro-Optics Applications and Technology (CLEO\_AT)* AW11.3 (2013).
- (33) T. Y. Lau and K. C. Toussaint, Jr., “Quantitative metrics for SHG imaging of collagen-based biological structures,” *Optics in the Life Sciences (Novel Technique in Microscopy)*, OSA Technical Digest, NT1B.4 (2013).
- (32) B. J. Roxworthy and K. C. Toussaint, Jr., “Plasmonic nanotweezers for applications in life sciences,” *Optics in the Life Sciences (Optical Trapping Applications)*, OSA Technical Digest, TW4D.4 (2013).
- (31) B. Jackson, T. Y. Lau, D. Schroeder, K. C. Toussaint Jr., and D. F. Keefe, “A lightweight tangible 3D interface for interactive visualization of thin fiber structures,”

*IEEE Transactions on Visualization and Computer Graphics [Proceedings of Scientific Visualization / Information Visualization]* (2013).

(30) B. J. Roxworthy and K. C. Toussaint, Jr., "Femtosecond plasmonic optical tweezers using gold bowtie nanoantenna arrays," *Frontiers in Optics* OSA Technical Digest, FW1G.3 (2012).

(29) S. Tripathi, R. G. Paxman, T. Bifano, and K. C. Toussaint, Jr., "Controlling polarization of light transmitted through highly scattering media" *Frontiers in Optics* OSA Technical Digest, FTu4F.3 (2012).

(28) T. Y. Lau, R. Ambekar, and K. C. Toussaint, Jr., "Three-dimensional Fourier-transform second-harmonic generation microscopy for quantification of collagen fiber organization in biological tissues" *Frontiers in Optics* OSA Technical Digest, FM3D.7 (2012).

(27) T. Bifano, C. Stockbridge, Y. Lu, J. Moore, S. Hoffman, K. Toussaint, and R. Paxman, "Focusing through dynamic disordered media using a MEMS spatial light modulator," *Computational Optical Sensing and Imaging*, OSA Technical Digest, CTu4B.5 (2012).

(26) T. Bifano, Y. Lu, C. Stockbridge, A. Berliner, J. Moore, R. Paxman, S. Tripathi, K. Toussaint, "MEMS spatial light modulators for controlled optical transmission through nearly opaque materials," *Proceedings of the SPIE* 8253, edited by S. S. Olivier, T. G. Bifano, J. Kubby [MEMS Adaptive Optics VI], 82530L (2012).

(25) S. Tripathi and K. C. Toussaint, Jr., "Non-interferometric generation of vector beams," *Frontiers in Optics* OSA Technical Digest, FThC2 (2011).

(24) R. Ambekar and K. C. Toussaint, Jr., "Investigation of collagen fiber organization in cornea and sclera using quantitative SHG microscopy," *Frontiers in Optics* OSA Technical Digest, FTuQ2 (2011).

(23) B. J. Roxworthy, K. D. Ko, A. Kumar, K. H. Fung, G. L. Liu, N. X. Fang, and K. C. Toussaint, Jr., "Bowtie nanoantennas for plasmonic optical trapping," in *Optical Trapping Applications*, OSA Technical Digest (CD), OTMA2 (2011).

(22) B. J. Roxworthy and K. C. Toussaint, Jr., "Optical trapping efficiencies from n-phase cylindrical vector beams," *Proceedings of the SPIE* 7950 edited by D. Andrews, E. Galvez, J. Gluckstad [Complex Light and Optical Forces 79500X (2011)].

(21) K. D. Ko, A. Kumar, K. H. Fung, R. Ambekar, G. L. Liu, N. X. Fang, and K. C. Toussaint, Jr., "Investigation of the nonlinear optical response from arrays of Au bowtie



nanoantennas," *Proceedings of the SPIE 7946*, edited by A. Adibi, S-Yu Lin, A. Scherer [Photonic and Phononic Properties of Engineered Nanostructures], 794626 (2011).

(20) M. Sivaguru, S. Durgam, R. Ambekar, D. Luedtke, G. Fried, A. Stewart, and K. C. Toussaint, Jr., "Quantitative analysis of diseased horse tendons using Fourier-transform-second-harmonic generation imaging," *Proceedings of the SPIE 7903*, edited by A. Periasamy, K. Konig, P. So [Multiphoton Microscopy in the Biomedical Sciences XI], 79030J (2011).

(19) B. J. Roxworthy and K. C. Toussaint, Jr., " $\pi$  - Phase cylindrical vector beams in optical tweezers," *Frontiers in Optics OSA Technical Digest, FTuM2* (2010).

(18) R. Ambekar and K. C. Toussaint, Jr., "Development of quantitative metrics for second-harmonic generation imaging of collagen-based structures," *Frontiers in Optics OSA Technical Digest, BSuD63* (2010).

(17) S. Tripathi and K. C. Toussaint, Jr., "Parallelization of polarization state generation and detection for fast Mueller matrix polarimetry," *Proceedings of the SPIE 7672*, edited by D. B. Chenault, D. H. Goldstein [SPIE Defense, Security, and Sensing (Polarization: Measurement, Analysis, and Remote Sensing IX)], 76720H (2010).

(16) R. A. Rao, M. R. Mehta, S. Leithem, and K. C. Toussaint, Jr., "Fourier transform-second-harmonic generation imaging of collagen fibers in biological tissues," *Biomedical Optics, OSA Technical Digest, BSuD63* (2010).

(15) R. A. Rao, M. R. Mehta, S. Leithem, and K. C. Toussaint, Jr., "Comparison of forward and backward SHG images using Fourier transform-second-harmonic generation imaging," *Conference on Lasers and Electro-Optics, OSA Technical Digest, JWA67* (2010).

(14) R. A. Rao, M. R. Mehta, and K. C. Toussaint, Jr., "Quantitative analysis of biological tissues using Fourier transform-second-harmonic generation imaging," *Proceedings of the SPIE 7569*, edited by A. Periasamy, P. T. So, and K. Konig [Multiphoton Microscopy in the Biomedical Sciences X], 75692G (2010).

(13) S. Tripathi and K. C. Toussaint, Jr., "Protocol for obtaining noise-immune absolute ellipsometric measurements with high spatial resolution," *Frontiers in Optics OSA Technical Digest, FWB2* (2009).

(12) R. A. Rao, M. R. Mehta, and K. C. Toussaint, Jr., "Quantitative Fourier analysis of SHG images of porcine cornea," *Frontiers in Optics OSA Technical Digest, FMK7* (2009).

(11) K. C. Toussaint, Jr., M. Liu, M. Pelton, J. Pesic, P. Guyot-Sionnest, and N. F. Scherer, "Near-resonance plasmonic trapping of single and multiple Au nanoparticles," *Abstracts of papers of the American Chemical Society*, 461-PHYS 233 (2007).

- (10) M. Pelton, M. Liu, K. C. Toussaint, Jr., H. Y. Kim; G. Smith; J. Pesic, P. Guyot-Sionnest, and N. F. Scherer, "Plasmon-enhanced optical trapping of individual metal nanorods" *Proceedings of the SPIE* 6644, edited by K. Dholakia, G. C. Spalding (Optical Trapping and Optical Micromanipulation IV), 66441C-1-14 (2007).
- (9) K. C. Toussaint, Jr., S. Park, J. E. Jureller, and N. F. Scherer, "Vector beam generation from a passively phase stable diffractive optical element interferometer," *Conference on Lasers and Electro-Optics and 2006 Quantum Electronics and Laser Science Conference, CLEO/QELS*, 4627718 (2006).
- (8) A. F. Abouraddy and K. C. Toussaint, Jr., "Arbitrary focal-field polarization control for optical microscopy," *Conference on Lasers and Electro-Optics and 2006 Quantum Electronics and Laser Science Conference, CLEO/QELS*, 4628648 (2006).
- (7) A. F. Abouraddy and K. C. Toussaint, Jr., "Three-dimensional polarization tuning at the focal field of a lens," *Biomedical Optics*, OSA Technical Digest, Tul48 (2006).
- (6) K. C. Toussaint, Jr., G. Di Giuseppe, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, "Experimental demonstration of quantum ellipsometry," *Conference on Quantum Electronics and Laser Science (QELS) - Technical Digest Series 89*, QMH6/1-QMH6/5 (2003).
- (5) K. C. Toussaint, Jr., G. Di Giuseppe, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, "An experimental report on correlated-photon ellipsometry" *Proceedings of the SPIE* 5158, edited by J. A. Shaw, J. S. Tyo (Polarization Science and Remote Sensing), 168-175 (2003).
- (4) A. V. Sergienko, A. F. Abouraddy, K. C. Toussaint, Jr., B. E. A. Saleh, and M. C. Teich "Entangled-photon ellipsometry," *Proceedings of the SPIE* 4829, edited by G. C. Righini and A. Consortini (The 19th Congress of the International Commission for Optics (ICO), Optics for the Quality of Life), 286-287 (2003).
- (3) K. C. Toussaint, Jr., M. Corbo, A. F. Abouraddy, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, "Polarization-entangled photon pairs obviate need for calibration in material characterization," *Proceedings of The 6th International Conference on Quantum Communication, Measurement and Computing*, edited by J. H. Shapiro and O. Hirota (Rinton, Princeton), 99-102 (2002).
- (2) K. C. Toussaint, Jr., A. F. Abouraddy, M. T. Corbo, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, "Quantum ellipsometry," *Conference on Quantum Electronics and Laser Science(QELS) - Technical Digest Series 74*, 31 (May 2002).
- (1) K. C. Toussaint, Jr., A. F. Abouraddy, M. T. Corbo, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, "Polarization-entangled twin-photon ellipsometry," *Proceedings of the*

*SPIE* 4819, edited by D. H. Goldstein and D. B. Chenault (Polarization Measurement, Analysis, and Applications V), 157-166 (2002).

## **INVITED SEMINARS**

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(74) “Challenges and opportunities in developing an equitable pulse oximeter,” Brown Pulmonary Research Conference, Rhode Island Hospital, Providence, RI (March 2023).

(73) “From SHG microscopy to space-time vector fields: highlights from the probe lab at brown university,” Biomedical Engineering Seminar, Tufts University, Medford, MA (February 2023).

(72) “Leveraging metrics from quantitative second-harmonic generation imaging for assessment of collagenous tissues,” Optics and Photonics in Medicine and Biology, Gordon Research Conference, Lewiston, ME (July 2022). [virtual]

(71) “The impact of diversity, equity, and inclusion on TEM in the U.S,” LLNL Summer Seminar, Lawrence Livermore National Laboratory, Livermore, CA (July 2022). [virtual]

(70) “Assessing Collagen-Fiber Organization with Quantitative Second-Harmonic Generation Microscopy,” Center for Engineering Mechanobiology, University of Pennsylvania, Philadelphia, PA (June 2022). [virtual]

(69) “My journey to becoming an engineer,” ABLE Speaker Series, Lawrence Livermore National Laboratory, Livermore, CA (February 2022). [virtual]

(68) “Harnessing the optical microscope: from tissue imaging to nanotweezing,” Mechanical Engineering Seminar, Northwestern University, Evanston, IL (January 2021). [virtual]

(67) “The development and application of multifunctional plasmonic nanoantennas,” Physics and Optical Science Seminar, University of North Carolina at Charlotte, Charlotte, NC (November 2020).

(66) “A look at optical nanoantennas and quantitative second-harmonic generation microscopy,” Electrical Engineering Seminar, Harvard University, Cambridge, MA (November 2020).

(65) “How can advances in engineering impact telehealth?” Center for Digital Health Seminar, Brown University, Providence, RI (September 2020).

(64) “Quantitative second-harmonic generation microscopy for assessment of collagenous tissues?” Addressing Chemical Complexity with Nonlinear Optical Microscopy, ACS National Meeting, San Francisco, CA (August 2020).

(63) “My journey to becoming an engineer,” 2<sup>nd</sup> Annual Bouchet Speaker Series, Brookhaven National Lab, Brookhaven, NY (February 2020).

(62) “Harnessing multifunctional plasmonic bowtie nanoantennas?” Department of Chemistry Friday Colloquium, Brown University, Providence, RI (February 2020).

(61) “From quantitative second-harmonic generation microscopy to multifunctional plasmonic nanoantennas?” Photonics and Optics Physics Session, National Society of Black Physicists, Providence, RI (November 2019).

(60) “Polarimetric-based quantitative second-harmonic generation microscopy,” The 13<sup>th</sup> Pacific Rim conference on lasers and electro-optics, Hong Kong, China (July 2018).

(59) “Recent developments in quantitative second-harmonic generation microscopy,” Engineering Seminar, Brown University, Providence, RI (May 2018).

(58) “Quantitative second-harmonic generation microscopy and its applications,” Electrical and Systems Engineering Seminar, University of Pennsylvania, Philadelphia, PA (April 2018).

(57) “From Quantitative second-harmonic generation microscopy to multifunctional plasmonic nanoantennas: a look at the PROBE Lab at Illinois,” Physics Seminar, National Polytechnic University (EPN), Quito, Ecuador (March 2018).

(56) “Harnessing plasmonic nanoantennas for multifunctional applications,” Physics Seminar, Universidad San Francisco de Quito (USFQ), Quito, Ecuador (March 2018).

(55) “Introduction to NSF hierarchical nanomanufacturing node,” Carle Illinois college of medicine inaugural medmakerlab workshop, University of Illinois at Urbana-Champaign, Urbana, IL (December 2017).

(54) “How to effectively tell your story,” Mavis fellows program, University Of Illinois at Urbana-Champaign, Urbana, IL (December 2017).

(53) Kinetic keynote, National Academies Keck Futures Initiative Beyond Boundaries, Irvine, CA (November 2017).

(52) “Harnessing light for applications at multiple scales,” Carle Illinois College Of Medicine Open House, University Of Illinois at Urbana-Champaign, Urbana, IL (November 2017).

(51) “Harnessing light for applications at multiple scales,” National Academies Keck Futures Initiative Beyond Boundaries, Irvine, CA (November 2017). [poster presentation].

(50) “NSF Network For Computational Nanotechnology – Hierarchical Nanomanufacturing Node,” NSF Kick-Off Meeting (October 2017).

- (49) “Investigating the mechanobiology of cervical remodeling using a novel combination of optical microscopy and nanoindentation,” Burroughs Wellcome Fund awardee networking meeting, Durham, North Carolina (October 2017).
- (48) “Harnessing plasmonic nanoantennas for multifunctional applications,” NREL Seminar, National Renewable Energy Lab, Golden, CO (May 2017).
- (47) “Table-top fabrication of plasmonics-based ultrathin optical components,” Photonics Media (April 2017).
- (46) “Novel applications of plasmonic bowtie nanoantennas in the presence of heating,” UC Merced Physics Colloquia, University of California, Merced, Merced, CA (December 2016).
- (45) “Development of multifunctional plasmonic nanoantenna arrays,” Colloquium on Frontiers of Optics and Photonics, Zhejiang University, Hangzhou, China (November 2016).
- (44) “Developing Quantitative Second-Harmonic Generation Microscopy and Multifunctional Plasmonic Nanoantennas at the PROBE Lab at UIUC,” Photonics Seminar, Brown University, Providence, RI (February 2016).
- (43) “Developing Quantitative Second-Harmonic Generation Microscopy and Multifunctional Plasmonic Nanoantennas at the PROBE Lab at UIUC, Optics Colloquium, Rochester, NY (January 2016).
- (42) “Plasmonic bowtie nanoantennas: From optical manipulation to plasmon-assisted audio recording, iOptics Seminar, University of Illinois at Urbana-Champaign, Urbana, IL (December 2015).
- (41) “Plasmonic bowtie nanoantennas: From optical manipulation to plasmon-assisted audio recording,” University of Rochester Institute of Optics, Optics Colloquium, Rochester, NY (November 2015).
- (40) “Multifunctional plasmonic nanoantennas,” Sesquicentennial Year of Maxwell's Equations and International Year of Light, University of Illinois at Urbana-Champaign, Urbana, IL (September 2015).
- (39) “Introduction to the PROBE lab at the University of Illinois at Urbana-Champaign: from second-harmonic generation microscopy to optical nanoantennas,” Lincoln Labs Seminar, MIT Lincoln Labs, Lexington, MA (April 2015).
- (38) “Introduction to the PROBE lab at the University of Illinois at Urbana-Champaign: from second-harmonic generation microscopy to optical nanoantennas,” Modern Optics and Spectroscopy Seminar, MIT, Cambridge, MA (April 2015).

- (37) “Development of multifunctional plasmonic nanoantenna arrays” MechSE Spring Seminar, Carnegie Mellon University, Pittsburgh, PA (February 2015).
- (36) “Introduction to the PROBE lab at the University of Illinois at Urbana-Champaign” MIT Dr. Martin Luther King, Jr. Visiting Professors and Scholars Program, Massachusetts Institute of Technology, Cambridge, MA (February 2015).
- (35) “Toward multifunctional plasmonic nanoantennas” Mechanical Engineering Micro-Nano Seminar Series, Massachusetts Institute of Technology, Cambridge, MA (December 2014).
- (34) “Development of multifunctional plasmonic nanoantenna arrays,” Mechanical Engineering Colloquium Series, Massachusetts Institute of Technology, Cambridge, MA (November 2014).
- (33) “Photonics research for bio/nano environments: from plasmonics to nonlinear optical imaging,” Computational optical sensing and imaging (COSI) Seminar, University of Colorado Boulder, Boulder, CO (March 2014).
- (32) “Developments in quantitative second-harmonic generation microscopy,” Techniques in Biophotonic Imaging Webinar, Photonics Media (March 2013).
- (31) “Second-harmonic generation imaging,” Advanced Microscopy Workshop, University of Illinois at Urbana-Champaign, Champaign, IL (March 2013).
- (30) “Quantitative imaging of collagen fibers using second-harmonic generation,” Biointerest Group Seminar, University of Illinois at Urbana-Champaign, Champaign, IL (September 2012).
- (29) **Keynote Speaker**, Boston University College of Engineering 20<sup>th</sup> Ph.D. Hooding Ceremony, Boston University, Boston, MA (May 2012).
- (28) “Photonics research of bio/nano environments: applications to biophotonics and nanophotonics,” Optics and Electronics Seminar (Ginzton Laboratory/Applied Physics Seminar Series), Stanford University, Stanford, CA (April 2012).
- (27) “Developments in quantitative second-harmonic generation microscopy,” MIT Industrial Liaison Program, Massachusetts Institute of Technology, Cambridge, MA (April 2012).
- (26) **Keynote Speaker**, Fifth Annual Illinois Scholars Undergraduate Research Symposium, University of Illinois at Urbana Champaign, Champaign, IL (April 2012).
- (25) “Development of second-harmonic generation microscopy for quantification of fibrillar collagen organization at cellular and molecular scales,” Mechanical Engineering

& Materials Science Colloquium, Washington University in St. Louis, Saint Louis, MO (April 2012).

(24) “Photonics research of bio/nano environments: applications to nanophotonics and biophotonics,” Center for Nanoscale Systems Seminar Series, Cornell University, Ithaca, NY (March 2012).

(23) “Photonics research for bio/nano environments: applications to nanophotonics and biophotonics,” Nano Device Seminar Series, University of Pennsylvania, Philadelphia, PA (February 2012).

(22) “Development of second-harmonic generation microscopy for quantification of fibrillar collagen organization at cellular and molecular scales,” Bioengineering Seminar, University of California, San Diego, La Jolla, CA (February 2012).

(21) “Photonics research of bio/nano environments: Applications to nanophotonics and biophotonics,” Electrical and Computer Engineering Seminar, Georgia Institute of Technology, Atlanta, GA (November 2011).

(20) “Photonics research of bio/nano environments: Bio-imaging to plasmonic nanoantennas,” Center for Ultrafast Optical Science (CUOS) Seminar, University of Michigan, Ann Arbor, MI (November 2011).

(19) “Next-generation nonlinear optical microscopy for enhancing quantitative assessment of specimens,” National Academies Keck Futures Initiative conference, Irvine, CA (November 2010). [poster presentation]

(18) “Quantitative second-harmonic generation microscopy of collagen fibers,” 6th Annual Memphis Bioimaging Symposium (MemBIS) Preconference Workshop, University of Memphis, Memphis, TN (November 2009).

(17) “Describing your research in five minutes or less,” Institute of Teaching and Mentoring, Arlington, VA (October 2009).

(16) “Anatomy of a chalk talk,” Institute of Teaching and Mentoring, Arlington, VA (October 2009).

(15) “Anatomy of a chalk talk,” Institute of Teaching and Mentoring, Tampa, FL, (October 2008).

(14) “Control of the polarization of a focused optical field,” Electrical and Computer Engineering 590 Seminar, University of Illinois Urbana-Champaign, Champaign, IL (February 2008).

- (13) “Enhanced spatial resolution in optical microscopy II: Moving beyond the diffraction limit,” Environmental and Biological applications of Lasers, US-African Advanced Studies Institute, Cairo, Egypt (January 2008).
- (12) “Enhanced spatial resolution in optical microscopy I: Moving beyond the diffraction limit,” Environmental and Biological applications of Lasers, US-African Advanced Studies Institute, Cairo, Egypt (January 2008).
- (11) “The Nano-Bio Optical Platform: Utilizing the Polarization Degree-of-Freedom in Microscopy and Quantum Metrology,” Condensed Matter Physics Seminar, University of Pennsylvania, Philadelphia, PA (February 2007).
- (10) “The Nano/Bio Optical Platform: Utilizing the Polarization Degree-of-Freedom in Microscopy and Quantum Metrology,” Electrical and Computer Engineering Seminar, Purdue University, West Lafayette, IN (February 2007).
- (9) “The Nano/Bio Optical Testbed: Utilizing the Polarization Degree-of-Freedom in Microscopy and Quantum Metrology,” Bioengineering Seminar, University of California, Riverside, Riverside, CA (February 2007).
- (8) “Optical Techniques for Characterizing Single Nanoparticles,” US-Africa Workshop on Nanosciences, Cape Town, South Africa (January 2007).
- (7) “The Nano-optical Testbed: Utilizing the Polarization Degree-of-Freedom in Microscopy and Quantum Metrology,” Mechanical Science and Engineering Seminar, University of Illinois Urbana-Champaign, Champaign, IL (January 2007).
- (6) “Accessing the Polarization Degree-of-Freedom in Optical Microscopy and Quantum Metrology,” Electrical and Computer Engineering Seminar, Georgia Institute of Technology, Atlanta, GA (December 2006).
- (5) “Quantum ellipsometry: a technique for ellipsometric measurements at low-light levels,” Chemistry Department, University of Chicago, Chicago, IL (November 2003).
- (4) “Quantum ellipsometry: a technique for ellipsometric measurements at low-light levels,” Center for Quantum Devices, Northwestern University, Chicago, IL (November 2003).
- (3) “Performing accurate ellipsometric measurements at low light levels: quantum ellipsometry using photon pairs from spontaneous parametric downconversion,” Chemistry Division Seminar, Argonne National Laboratory, Argonne, IL (August 2003).
- (2) “Absolute optical metrology: quantum ellipsometry using photon pairs from SPDC,” Quantum Lunch Seminar Series, Los Alamos National Laboratory, Los Alamos, NM (May 2003).



(1) **Keynote Speaker**, 2003 Annual Awards Banquet, Boston University Minority Engineers' Society (NSBE), Boston, MA (April 2003).

## **CONFERENCE AND WORKSHOP PRESENTATIONS**

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(85) M. Diouf, Z. Lin, K. Krishna, and K. C. Toussaint, Jr. "Multiphoton imaging using a quantitative CMOS camera," SPIE BIOS, San Francisco, CA (March 2022).

(84) R. Jakachira, M. Diouf, Z. Lin, and K. C. Toussaint, Jr. "Rapid blood-oxygenation-saturation measurement using radially polarized light from light-emitting diodes," SPIE BIOS, San Francisco, CA (March 2022).

(83) M. Diouf, Z. Lin, and K. C. Toussaint, Jr. "Metrology of tissue pathology using optical self-healing," SPIE BIOS, San Francisco, CA (March 2022).

(82) K. C. Toussaint, Jr. "Leveraging convergence to democratize biomanufacturing," National Academies of Science, Engineering, and Medicine Convergent Manufacturing Workshop [virtual meeting] (November 2021).

(81) M. Diouf, M. Harling, M. Yessenov, L. A. Hall, A. Abouraddy, and K. C. Toussaint, "One-dimensional space-time vector light sheet," Frontiers in Optics, Washington, D.C. (November 2021).

(80) K. C. Toussaint, Jr., "Quantifying 3D collagen-fiber organization," American Society for Matrix Biology Meeting, St. Louis, MO (September 2021). [invited]

(79) V. A. Kelkar and K. C. Toussaint, Jr., "Compressive second-harmonic generation imaging," Computational Optical Sensing and Imaging, Washington, D.C. (July 2021).

(78) K. C. Toussaint, Jr. "A case for convergence microscopy," NSF Future of Semiconductors and Beyond Workshop (Materials, Devices, and Integration), [virtual meeting] (March 2021).

(77) V. A. Kelkar, C. Okoro, K. C. Toussaint, Jr., and A. F. Abouraddy, "Demonstration of intrinsic non-separability and locked entropy in partially coherent vector optical fields," Frontiers in Optics, Washington, D.C. (September 2019).

(76) W. Lee, A. O. Moghaddam, B. L. McFarlin, A. J. Wagoner Johnson, and K. C. Toussaint, Jr., "Analysis of 3D Collagen Organization in Non-pregnant Rat Cervix Tissue," Frontiers in Optics, Washington, D.C. (September 2019).

(75) W. Lee and K. C. Toussaint, Jr., "Quantitative Second-harmonic Generation Imaging of Tissue Damage from Environmental-scanning Electron Microscopy," Frontiers in Optics, Washington, D.C. (September 2018).

- (74) Q. Ding, S. Barna, K. Jacobs, A. Choubal, G. Mensing, Z. Zhang, K. Yamada, R. Tirawat, N. Kincaid, G. Zhu, T. Wendelin, L. Jay Guo, P. Ferreira, and K. C. Toussaint, Jr., “A Metasurface-inspired Focusing Collector for Concentrated Solar Power Applications,” *Frontiers in Optics*, Washington, D.C. (September 2018).
- (73) C. Okoro, H. Esat Kondacki, Ayman F. Abouraddy, and Kimani C. Toussaint, Jr., “Experimental demonstration of an optical-coherence converter,” *Conference on Lasers and Electro-Optics*, San Jose, CA (May 2018).
- (72) C. Okoro and K. C. Toussaint, Jr., “Second-harmonic patterned polarization-analyzed reflection confocal (SPPARC) microscopy of collagen,” *Frontiers in Optics*, Washington, D.C. (September 2017).
- (71) W. Lee and K. C. Toussaint, Jr., “Crimp analysis of connective tissue using quantitative second-harmonic generation,” *Frontiers in Optics*, Washington, D.C. (September 2017).
- (70) “Exploring plasmonic nanoantenna arrays as a platform for biosensing,” *SPIE Biosensing and Nanomedicine X*, San Diego, CA (August 2017). [invited]
- (69) H. Majeed, C. Okoro, A. Balla, K. C. Toussaint, Jr., and G. Popescu, “Quantifying collagen orientation in breast tissue biopsies using SLIM” *SPIE BIOS*, San Francisco, CA (February 2017).
- (68) M. Sivaguru, M. Kabir, M. Rangan Gartia, D. S. C. Biggs, B. S. Sivaguru, V. A. Sivaguru, Z. T. Berent, A. J. Wagoner Johnson, G. A. Fried, G. Logan Liu, S. Sadayappan, and K. C. Toussaint, Jr., “Enhancing resolution and contrast in second-harmonic generation microscopy using maximum likelihood estimation restoration method” *SPIE BIOS*, San Francisco, CA (February 2017).
- (67) Q. Ding, A. Choubal, K. C. Toussaint, Jr., “Design of a nanopatterned long focal-length planar focusing collector for concentrated solar power,” *SPIE OPTO*, San Francisco, CA (February 2017)
- (66) “Novel applications of plasmonic bowtie nanoantennas in the presence of enhanced local heating,” *2016 Frontiers in Optics/Laser Science Conference*, Rochester, NY (October 2016).
- (65) C. Okoro and K. C. Toussaint, Jr., “Development of a handheld smart dental instrument for root canal imaging” *SPIE Translational Biophotonics 2016*, Houston, TX (May 2016).
- (64) K. C. Toussaint, Jr., “A look at the probe lab at Illinois: from plasmonic nanoantennas to second-harmonic generation microscopy” *National Academy of Science’s 3<sup>rd</sup> Arab-American Frontiers of Science, Engineering and Medicine symposium on sensing technologies, networks and applications*, Thuwal, Saudi Arabia (December 2015).

- (63) “Development of multifunctional plasmonic nanoantenna arrays,” Colloquium on Frontiers of Optics and Photonics, Zhejiang University, Hangzhou, China (October 2015). [invited]
- (62) “Developing quantitative second-harmonic generation microscopy,” IEEE/8th International Conference for Advanced Infocomm Technology, Hangzhou, China (October 2015). [invited]
- (61) C. Okoro and K. C. Toussaint, Jr., “Two-photon Mueller matrix-second-harmonic generation microscopy of porcine samples,” Frontiers in Optics, San Jose, CA (October 2015).
- (60) Q. Ding, H. Chen, A. Bhuiya, and K. C. Toussaint, Jr., “Plasmon-assisted etching for fabrication of planar optical components,” Frontiers in Optics, San Jose, CA (October 2015).
- (59) W. Lee and K. C. Toussaint, Jr., “Third-harmonic generation microscopy of breast biopsies,” Third International Conference on Optical Angular Momentum, New York, NY (August 2015).
- (58) C. Okoro and K. C. Toussaint, Jr., “Mueller-matrix second-harmonic generation microscopy of breast biopsies,” Third International Conference on Optical Angular Momentum, New York, NY (August 2015).
- (57) “Harnessing multifunctional metal nanoantennas,” Third International Conference on Optical Angular Momentum, City College of New York, New York, NY (August 2015). [invited]
- (56) H. Chen, Q. Ding, B. J. Roxworthy, A. M. Bhuiya, and K. C. Toussaint, Jr., “Optical trapping with pillar bowtie nanoantennas,” SPIE Optics + Photonics (Optical Trapping and Optical Micromanipulation XI), San Diego, CA (August 2014).
- (55) “Identification of biologically relevant quantitative metrics for harmonic imaging,” with K. C. Toussaint Jr., M. M. Kabir, W. Lee, C. O. Okoro, and V. V. G. Inavalli, Gordon Research Conference: Lasers in Medicine and Biology, Holderness School, Holderness, NH (July 2014).
- (54) K. C. Toussaint Jr., M. M. Kabir, W. Lee, C. O. Okoro, and V. V. G. Inavalli “Identification of Biologically Relevant Quantitative Metrics for Harmonic Imaging,” Label-Free Spectroscopic Imaging Workshop, Purdue University, West Lafayette, IN (July 2014).
- (53) M. M. Kabir, A.S.M. Jonayat, Sanjay Patel and K. C. Toussaint, Jr., “GPU-based quantitative second-harmonic generation imaging,” OSA Classical Optics & Photonics Congress, Computational Optics Sensing and Imaging (COSI), Kohala Coast, HI (June 2014).

- (52) “Identification of biologically relevant quantitative metrics for harmonic imaging,” with K. C. Toussaint Jr., M. M. Kabir, W. Lee, C. O. Okoro, and V. V. G. Inavalli, Gordon Research Conference: Image Science, Stonehill College, North Easton, MA (June 2014).
- (51) “Quantitative second-harmonic generation microscopy,” NSF IDBR Conference, Arlington, VA (May 2014). [invited]
- (50) M. M. Kabir and K. C. Toussaint, Jr., “Development of quantitative second-harmonic generation imaging,” NSF IDBR Conference, Arlington, VA (May 2014).
- (49) B. J. Roxworthy, K. C. Toussaint, Jr., and S. P. Vanka, “Optically induced natural convection in a cylinder using conducting metal oxide films,” 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, PA (November 2013).
- (48) “Vector beams and vector fields: a look at methods of generation and potential applications,” Frontiers in Optics/Laser Science XXIX, Orlando, FL (October 2013). [invited]
- (47) “Plasmonic nanotweezers based on Au bowtie nanoantenna arrays for manipulation of nano-to-macroscopic objects,” with B. J. Roxworthy, SPIE Optics + Photonics (Optical Trapping and Optical Micromanipulation X), San Diego, CA (August 2013). [invited]
- (46) T. Y. Lau, M. M. Kabir, V. V. G. K. Inavalli, and K. C. Toussaint, Jr., “Real-time Fourier transform-second-harmonic generation imaging of collagen-based biological tissues,” Imaging and Applied Optics: OSA Optics & Photonics Congress, Arlington, VA (June 2013).
- (45) T. Y. Lau, H. K. Sangha, E. K. Chien, B. L. McFarlin, A. J. Wagoner-Johnson, and K. C. Toussaint, Jr., “Quantification of rat cervical microstructure using Fourier transform-second-harmonic generation imaging,” Conference on Lasers and Electro-Optics, San Jose, CA (June 2013).
- (44) T. Y. Lau and K. C. Toussaint, Jr., “Quantitative metrics for SHG imaging of collagen-based biological structures,” Optics in the Life Sciences (Novel Technique in Microscopy), Waikoloa Beach, HI (April 2013).
- (43) B. J. Roxworthy and K. C. Toussaint, Jr., “Plasmonic nanotweezers for applications in life sciences,” Optics in the Life Sciences (Optical Trapping Applications), Waikoloa Beach, HI (April 2013).
- (42) B. J. Roxworthy and K. C. Toussaint, Jr., “Femtosecond plasmonic optical tweezers using gold bowtie nanoantenna arrays,” Frontiers in Optics, Rochester, NY (October 2012).

- (41) S. Tripathi, R. G. Paxman, T. Bifano, and K. C. Toussaint, Jr., "Controlling polarization of light transmitted through highly scattering media" *Frontiers in Optics*, Rochester, NY (October 2012).
- (40) T. Y. Lau, R. Ambekar, and K. C. Toussaint, Jr., "Three-dimensional Fourier-transform second-harmonic generation microscopy for quantification of collagen fiber organization in biological tissues" *Frontiers in Optics*, Rochester, NY (October 2012).
- (39) T. Bifano, C. Stockbridge, Y. Lu, J. Moore, S. Hoffman, K. Toussaint, and R. Paxman, "Focusing through dynamic disordered media using a MEMS spatial light modulator," *Computational Optical Sensing and Imaging*, Monterey, CA (June 2012).
- (38) T. Bifano, Y. Lu, C. Stockbridge, A. Berliner, J. Moore, R. Paxman, S. Tripathi, and K. Toussaint, "MEMS spatial light modulators for controlled optical transmission through nearly opaque materials," *SPIE MOEMS-MEMS*, San Francisco, CA (January 2012).
- (37) S. Tripathi and K. C. Toussaint, Jr., "Non-interferometric generation of vector beams," *Frontiers in Optics*, San Jose, CA (October 2011).
- (36) R. Ambekar and K. C. Toussaint, Jr., "Investigation of collagen fiber organization in cornea and sclera using quantitative SHG microscopy," *Frontiers in Optics*, San Jose, CA (October 2011).
- (35) B. J. Roxworthy and K. C. Toussaint, Jr., "Efficient plasmonic trapping using bowtie nanoantennas," *Frontiers in Optics*, San Jose, CA (October 2011).
- (34) B. J. Roxworthy, K. D. Ko, A. Kumar, K. H. Fung, G. L. Liu, N. X. Fang, and K. C. Toussaint, Jr., "Bowtie nanoantennas for plasmonic optical trapping," *Optical Trapping Applications*, Monterey, CA (April 2011).
- (33) B. J. Roxworthy and K. C. Toussaint, Jr., "Optical trapping efficiencies from n-phase cylindrical vector beams," *SPIE OPTO 2011*, San Francisco, CA (January 2011).
- (32) K. D. Ko, A. Kumar, K. H. Fung, R. Ambekar, G. L. Liu, N. X. Fang, and K. C. Toussaint, Jr., "Investigation of the nonlinear optical response from arrays of Au bowtie nanoantennas," *SPIE OPTO 2011*, San Francisco, CA (January 2011).
- (31) M. Sivaguru, S. Durgam, R. Ambekar, D. Luedtke, G. Fried, A. Stewart, and K. C. Toussaint, Jr., "Quantitative analysis of diseased horse tendons using Fourier-transform-second-harmonic generation imaging," *SPIE BIOS 2011*, San Francisco, CA (January 2011).
- (30) R. Ambekar, M. R. Mehta, S. Leithem, and K. C. Toussaint, Jr., "Comparison of forward and backward SHG images using Fourier transform-second-harmonic generation

imaging," Imaging without Boundaries, the Beckman Institute at the University of Illinois (2010).

(29) B. J. Roxworthy and K. C. Toussaint, Jr., " $\pi$  - Phase cylindrical vector beams in optical tweezers," Frontiers in Optics, Rochester, NY (October 2010).

(28) R. Ambekar and K. C. Toussaint, Jr., "Development of quantitative metrics for second-harmonic generation imaging of collagen-based structures," Frontiers in Optics, Rochester, NY (October 2010).

(27) S. Tripathi and K. C. Toussaint, Jr., "Parallelization of polarization state generation and detection for fast Mueller matrix polarimetry," SPIE Defense, Security, and Sensing, Orlando, FL (April 2010).

(26) R. A. Rao, M. R. Mehta, S. Leithem, and K. C. Toussaint, Jr., "Fourier transform-second-harmonic generation imaging of collagen fibers in biological tissues," Biomedical Optics, Miami, FL (April 2010).

(25) D. Leudtke, R. A. Rao, and K. C. Toussaint, Jr., "Graphical user interface for Fourier transform analysis of second-harmonic generation imaging," Bioengineering at Illinois at the University of Illinois [Student won 1<sup>st</sup> place in undergraduate poster competition] (2010).

(24) R. A. Rao, M. R. Mehta, S. M. Leithem, and K. C. Toussaint, Jr., "Quantitative analysis of biological tissues using Fourier transform-second-harmonic generation imaging," SPIE BIOS 2010, San Francisco, CA (January 2010).

(23) S. Tripathi and K. C. Toussaint, Jr., "Protocol for Obtaining Noise-Immune Absolute Ellipsometric Measurements with High Spatial Resolution," Frontiers in Optics, San Jose, CA (October 2009).

(22) R. Ambekar Ramachandra Rao, M. R. Mehta, and K. C. Toussaint, Jr., "Quantitative Fourier Analysis of SHG Images of Porcine Cornea," Frontiers in Optics, San Jose, CA (October 2009).

(21) M. R. Mehta, R. A. Rao, and K. C. Toussaint, Jr., "Quantitative analysis of collagen fiber organization in porcine tissue using Fourier transform-second-harmonic generation microscopy," Imaging at Illinois Workshop at the Beckman Institute at the University of Illinois (2009).

(20) K. D. Ko and K. C. Toussaint, Jr. "A virtual testbed for the investigation of the effects of size, shape, and composition on the optical properties of single metal nanoparticles," University of Illinois at Urbana-Champaign Center for Nanoscale Science and Technology 2008 nanotechnology workshop (Fall 2008).

- (19) K. C. Toussaint, Jr., M. Liu, M. Pelton, J. Pesic, P. Guyot-Sionnest, and N. F. Scherer “Near-resonance plasmonic trapping of single and multiple Au nanoparticles,” 233<sup>rd</sup> ACS National Meeting, Chicago, Illinois (March 2007).
- (18) “Optical Polarization in Microscopy and Beyond,” 18<sup>th</sup> Annual Kavli Frontiers of Science Symposium, U.S. National Academy of Sciences, Arnold and Mabel Beckman Center, Irvine, CA (November 2006).[invited poster presentation]
- (17) K. C. Toussaint, Jr., S. Park, J. E. Jureller, and N. F. Scherer, “Vector beam generation from a passively phase stable diffractive optical element interferometer,” CLEO/QELS, Long Beach, California (May 2006).
- (16) A. F. Abouraddy and K. C. Toussaint, Jr., “Arbitrary focal-field polarization control for optical microscopy,” CLEO/QELS, Long Beach, California (May 2006).
- (15) A. F. Abouraddy and K. C. Toussaint, Jr., “Three-dimensional polarization tuning at the focal field of a lens,” BIOMED 2006, Fort Lauderdale, Florida (March 2006).
- (14) K. C. Toussaint, Jr. “Applications of optical polarization on the classical and quantum level,” Conference on Photon Interactions with Atoms and Molecules, US-Africa Advanced Studies Institute, Durban, South Africa (November 2005).
- (13) “Applications of Optical Polarization on the Classical and Quantum Level,” Conference on Photon Interactions with Atoms and Molecules, US-Africa Advanced Studies Institute, Durban, South Africa (November 2005). [invited]
- (12) A. V. Sergienko, G. Di Giuseppe, K. C. Toussaint, Jr., M. B. Nasr, B. E. A. Saleh, and M. C. Teich, “Quantum bio-photonics with entangled states,” Latsis Symposium, EPF Lausanne, Switzerland (March 2004).
- (11) K. C. Toussaint, Jr. “Accurate ellipsometric measurements using photon-correlated beams,” National Society of Black Physicists, Washington, DC (February 2004).
- (10) K. C. Toussaint, Jr., G. Di Giuseppe, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, “An experimental report on correlated-photon ellipsometry,” SPIE Annual Meeting: Remote Sensing and Space Technology, San Diego, CA (August 2003).
- (9) A. V. Sergienko, K. C. Toussaint, Jr., G. Di Giuseppe, B. E. A. Saleh, and M. C. Teich, “Demonstration of quantum ellipsometry,” Third International Conference on Spectroscopic Ellipsometry, Vienna, Austria (July 2003).
- (8) A. V. Sergienko, K. C. Toussaint, Jr., G. Di Giuseppe, B. E. A. Saleh, and M. C. Teich, “Experimental demonstration of quantum ellipsometry,” European Quantum Electronics Conference (EQEC), Munich, Germany (June 2003).

(7) K. C. Toussaint, Jr., G. Di Giuseppe, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, “Experimental demonstration of quantum ellipsometry,” CLEO/QELS, Baltimore, Maryland (June 2003).

(6) A. V. Sergienko, A. F. Abouraddy, K. C. Toussaint, Jr., B. E. A. Saleh, and M. C. Teich, “Entangled-photon ellipsometry,” The 19th Congress of the International Commission for Optics (ICO), Optics for the Quality of Life, Firenze, Italy (August 2002).

(5) K. C. Toussaint, Jr., M. Corbo, A. F. Abouraddy, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, “Polarization-entangled photon pairs obviate need for calibration in material characterization,” The 6th International Conference on Quantum Communication, Measurement and Computing, MIT, Boston, MA (July 2002).

(4) K. C. Toussaint, Jr., A. F. Abouraddy, M. T. Corbo, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, “Polarization-entangled twin-photon ellipsometry,” SPIE Annual Meeting: Remote Sensing and Space Technology, Seattle, Washington (July 2002).

(3) K. C. Toussaint, Jr., A. F. Abouraddy, Matt Corbo, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, “Quantum ellipsometry with polarization-entangled photon pairs,” International Quantum Electronics Conference, Moscow, Russia (June 2002).

(2) K. C. Toussaint, Jr., A. F. Abouraddy, M. T. Corbo, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich, “Quantum ellipsometry,” CLEO/QELS, Long Beach, California (May 2002)

(1) A. F. Abouraddy, K. C. Toussaint, Jr., A. V. Sergienko, B. E. A. Saleh, and M. C. Teich “New technique for material characterization using polarized-entangled photons,” SPIE Northeast Regional Meeting on Optoelectronics, Photonics, and Imaging, Rochester, NY (April 2001).

## **PROFESSIONAL SERVICE AND COMMUNITY OUTREACH**

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### **Editorship**

Journal of Biomedical Optics [Associate Editor]	2022-
Proceedings of the National Academy of Sciences [Guest Editor]	2021-
Science [Board of Reviewing Editors]	2020-
Scientific Reports (Nature Publishing Group) [Editorial Board]	2016-2021
[ <i>Electronics, Photonics and Device Physics</i> ]	
Applied Optics (OSA) [Topical Editor]	2017-2019
[ <i>Plasmonics and Metamaterials</i> ]	
Journal of Nanophotonics (SPIE) [Editorial Board]	2014-2016
Journal of Biomedical Optics (SPIE) [Guest Editor]	2014-2015

### **Advisory Boards and Committees**

National Renewable Energy Lab Concentrated Solar Power Optical and Materials Facilities	2022-
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Heliostat Consortium (HelioCon), National Renewable Energy Lab and Sandia Lab,  
2021-

## **Students Supervised**

### Postdocs

*Current:* Mbaye Diouf, Joshua Burrow

*Former:* Hao Chen, Gopala Krishna Inavalli

### Graduate Students

#### Current

*PhD students:* Zixi Lin (BME), Adriana C. Salazar (BME), Krishangi Krishna (BME), Mitchel Harling (BME), Andrew Howes (Biotech), Jieliyue Sun (ECE), Rutendo Jakachira (Physics)

#### Graduated

*PhD students:* Raghu Ambekar Ramachandra Rao (ECE), Santosh Tripathi (ECE), Brian J. Roxworthy (ECE), Chukwuemeka Okoro (ECE), Woowon Lee (MechSE), Mohammad Mahfuzul Kabir (MechSE), Qing Ding (ECE)

*MS students:* Monal Mehta (MechSE), Nalwanda Shamutete (MechSE), Mehdi Zaman (MechSE), Kaspar D. Ko (MechSE), Erik T. Misawa (MechSE), Brian J. Roxworthy (MechSE), Tung “Tony” Yuen Lau (MechSE), Mohammad Mahfuzul Kabir (MechSE), Abdul Monnaf Bhuiya (ECE), Varun Kelkar (ECE), Hemang Rajput (MechSE), Teniola Oguntolu (BME)

#### Undergraduate Students

*Current:* Sonja Brankovic (MechSE)

*Former:* Naja Edwards (Aero), David Leudtke (BioEng), Donald Magnani (MechSE), David McDonald (MechSE), Rafael Ramirez (MechSE), Sara Rios (Rutgers, ME), Jie Yee Chan (Carnegie Mellon, ECE), Paula Stocco (MechSE)

## **Dissertation Committee**

(16) Qing Ding, “Flat optics based patterned nanostructures for concentrating light,” Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, July 8, 2019 (Advisor: K. C. Toussaint).

(15) Woowon Lee, “Identification of Quantitative SHG Imaging Metrics for Collagenous Tissue,” Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, June 5, 2019 (Advisor: K. C. Toussaint).

(14) Mohammad Mahfuzul Kabir, “Application of beam shaping in second-harmonic generation microscopy,” Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, April 3, 2019 (Advisor: K. C. Toussaint).

- (13) Osman Safa Cifci, “Spectrum management for high efficiency photonic devices,” Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign, June 1, 2018 (Advisor: P. Braun).
- (12) Chukwuemeka Okoro, “Second-harmonic generation-based Mueller matrix polarization analysis of collagen-rich tissues,” Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, June 1, 2018 (Advisor: K. C. Toussaint).
- (11) Yuan Li, “Nonlinear optical microscopy and spectroscopy by pulse shaping of a coherent fiber supercontinuum,” Department of Bioengineering, University of Illinois at Urbana-Champaign, November 21, 2014 (Advisor: S. Boppart).
- (10) Hongxiang Tian, “Experimental determination of the thermoelectric properties of porous silicon nanowires,” Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, November 13, 2014 (Advisor: S. Sinha).
- (9) Brian Roxworthy, “Plasmonic nanoantennas for multipurpose particle manipulation and enhanced optical magnetism,” Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, April 4, 2014 (Advisor: K. C. Toussaint).
- (8) Santosh Tripathi, “Optical polarization control in free space and through random media using wavefront shaping,” Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, July 11, 2013 (Advisor: K. C. Toussaint).
- (7) Ru Wang, “Quantitative light imaging of intracellular transport,” Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, May 3, 2013 (Advisor: G. Popescu).
- (6) Gayathri Mohan, “A new dynamic mode for fast imaging in atomic force microscopes,” Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, March 29, 2013 (Advisor: S. M. Salapaka).
- (5) John Paul Eichorst, “Optimization of fluorescence lifetime imaging microscopy (FLIM) for studying the activity of enzymes in live cancer cells,” Department of Physics, University of Illinois at Urbana-Champaign, February 18, 2013 (Advisors: R. Clegg and Y. Wang).
- (4) Rong Kong, “Characterization of molecular dynamic changes in tissue model systems using Fourier transform infrared spectroscopic imaging,” Department of Bioengineering, University of Illinois at Urbana-Champaign, September 27, 2012 (Advisor: R. Bhargava).
- (3) Raghu Ambekar Ramachandra Rao, “Quantification of collagen fiber organization in biological tissues at cellular and molecular scales using second-harmonic generation imaging,” Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, June 4, 2012 (Advisor: K. C. Toussaint).

(2) Jy-Yun Jung, “Optical modeling off-stoichiometric amorphous Al<sub>2</sub>O<sub>3</sub> thin films deposited by reactive sputtering,” Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, March 13, 2012 (Advisor: M. Q. Brewster)

(1) Yi-Chun Chen, Department of Bioengineering, University of Illinois at Urbana-Champaign, May 24, 2010 (Advisor: R. Clegg).

### **Preliminary Exam Committee**

(9) Qing Ding “Flat optics based on patterned nanostructures for concentrating light”, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, August 21, 2018 (Advisor: K. C. Toussaint).

(8) Yuan Liu, “Generating and pulse shaping a coherent fiber supercontinuum for nonlinear optical microscopy and spectroscopy,” Department of Bioengineering, University of Illinois at Urbana-Champaign, September 5, 2013 (Advisor: S. Boppart).

(7) Brian J. Roxworthy, “Plasmonic nanotweezers: Multipurpose particle manipulation via optical nanoantennas,” Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, March 7, 2013 (Advisor: K. C. Toussaint).

(6) Santosh Tripathi, “Polarization control in free space and through random media using wavefront shaping,” Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, August 7, 2013 (Advisor: K. C. Toussaint).

(5) Gayathri Mohan, “High-speed dynamic mode imaging in atomic force microscopes using control techniques,” Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, March 16, 2012 (Advisor: S. M. Salapaka).

(4) Ru Wang, “Dispersion-relation spectroscopy of intracellular transport,” Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, December 7, 2011 (Advisor: G. Popescu).

(3) Raghu Ambekar Ramachandra Rao, “Quantification of collagen fiber organization in biological tissues at cellular and molecular scales using second-harmonic generation,” Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, May 18, 2011 (Advisor: K. C. Toussaint).

(2) Yi-Chun Chen, Department of Bioengineering, University of Illinois at Urbana-Champaign, November 30, 2009 (Advisor: R. Clegg).

(1) Jy-Yun Jung, Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, August 27, 2010 (Advisor: M. Q. Brewster)

### **Masters Thesis**

(5) Mohammad M. Kabir, “Application of quantitative second harmonic generation imaging to dynamic systems,” Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, December 2014.

(4) Mehdi Zaman, “Development of a plasmon resonance enhanced optical trap for characterization of single metal nanoparticle,” Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, May 2012.

(3) Erik T. Misawa, “Theoretical and experimental assessment of the optical response of planar microlens arrays,” Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, May 2011.

(2) Kaspar D. Ko, “Nonlinear optical emission and near-field enhancement effects in arrays of gold bowtie nano-antennas,” Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, May 2011.

(1) Brian J. Roxworthy, “Novel optical trapping-from enhanced forces via vector beams to characterizing optical properties of trapped microparticles,” Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, May 2011.

### **Conference Committees**

*Scientific Advisory Committee*, Third International Conference on Optical Angular Momentum, 2015

*Technical Subcommittee* (Fundamentals of Nonlinear Optics), International Quantum Electronics Conference/ Conference on Lasers and Electro-Optics (IQEC/CLEO) Pacific Rim Conference, 2011

*Co-organizer*, University of Illinois at Urbana-Champaign Nano-Biophotonics Summer School, June 2009, 2010

### **Conference Session/Section Chairs**

*Session Chair* (Nonlinearities, Topological States, and Scattering), Third International Conference on Optical Angular Momentum, August 2015

*Presider* (Unconventional Polarization and Complex Optical Fields III), Frontiers in Optics (FiO)/Laser Science XXIX (LS), October 2013

*Session Chair (Poster Session)*, University of Illinois at Urbana-Champaign National Science Foundation-National Science Council (NSF-NSC) Biosensing-Bioactuation Summer Institute, July 2010

*Technical Chair (Fluorescence and Nonlinear Microscopy)*, University of Illinois at Urbana-Champaign Nano-Biophotonics Summer School, June 2009, 2010

*Technical Chair, Environmental and Biological Applications of Lasers, US-African Advanced Studies Institute, Cairo, Egypt, January 2008.*

**Professional Society Committees**

*Vice-Chair OSA Polarization Technical Group, 2014-2015*

**Organizing Committee for MIT Lester Wolfe Conference, 2014**

**Organizing Committee for MIT Modern Optics Seminar Series, 2014-2015**

**Co-organizer, University of Illinois at Urbana-Champaign Nano-Biophotonics Summer School, June 2010**

**Proposal Reviewer**

*NIH*

Ad hoc member, NIH Intercellular Interactions (ICI) Study Section, 2013

*NSF*

2008-2011, 2015,  
2017, 2019-2020

*The National Academies*

Ford Fellowship Engineering Panel

2009, 2010

**External Promotion and Tenure Review**

University of California at Riverside, 2015

**Professional Development Workshop Leader**

*Institute on Teaching and Mentoring* (Sponsored by the Compact for Faculty Diversity, “a partnership of regional, federal and foundation programs that focus on minority graduate education and faculty diversity”)

Workshop 1: “Running a successful research program”, 2012-2015

Workshop 2: “Maintaining outreach activities and your professional career”,  
October 2015

Workshop 3: “Anatomy of a chalk talk”, 2008-2010

Workshop 4: “Describing Your Research in Five Minutes or Less”, 2010

**University Committees** (*department, college and campus committees, administration*)

**a. Department**

1. Seminar Committee, 2007-2011
2. Search Committee for a Business and Financial Specialist, 2008
3. Undergraduate Programs Subcommittee, Spring 2009
4. Search Committee for a Graduate Programs Administrator, 2009
5. Search Committee for an Undergraduate Programs Administrator, 2009
6. Search Committee for Director of Facilities and Operations, 2011

**b. College**

1. Review Subcommittee, PHYS 552 “Optical Spectroscopy,” 2007

2. Search Committee for an Assistant Dean for Undergraduate Programs, 2008
  3. Reviewer for Grainger Proposal, 2008
  4. Review Subcommittee, ECE 304 “Photonics,” 2011
- c. University
1. Campus-wide Reviewer for Packard Fellows, 2013
  2. Faculty Senate, 2013 -2014
  3. Faculty Advisory Committee, 2015-present

### **Journal Reviewer**

1. Nature Photonics
2. Nature Nanotechnology
3. Physical Review Letters
4. Optics Express
5. Journal of Physics B
6. Journal of the Optical Society of America A
7. Journal of Biophotonics
8. Journal of Biological Physics
9. Journal of Quantitative Spectroscopy and Radiative Transfer
10. Journal of Biomechanics
11. Journal of the American Chemical Society
12. Scientific Reports
13. Journal of Biomedical Optics
14. Journal of the Mechanical Behavior of Biomedical Materials
15. Nanoscale
16. ACS Nano
17. Biomedical Optics Express
18. Optics Communications
19. Physical Review X

### **Reviewer for Publishing Companies**

1. Cambridge University Press

### **PROFESSIONAL SOCIETY MEMBERSHIPS**

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Optical Society of America (OSA)

International Society for Optical Engineering (SPIE)

American Institute for Medical and Biological Engineering (AIMBE)