

# Chrysanthe Preza

## Contact Information

### *Office*

Department of Electrical and Computer Engineering  
206 Engineering Science Bldg  
The University of Memphis, Memphis, TN 38152-3180  
Email: [cpreza@memphis.edu](mailto:cpreza@memphis.edu)  
Phone: (901) 678-4369; FAX: (901) 678-5469  
<http://cirl.memphis.edu>

### *Home*

1942 Brigance Cove  
Germantown, TN 38139  
Phone: (901) 624-9088  
Mobile:(901) 283-1238

## Education

*Washington University in St. Louis, St. Louis, MO:*

- Doctor of Science in Electrical Engineering, August 1998. Dissertation title: “Phase Estimation Using Rotational Diversity for Differential Interference Contrast Microscopy.” Advisor: Donald L. Snyder.
- Master of Science in Computer Science, August 1991. Focus on artificial intelligence, digital image processing, computer systems organization, and formal concepts in computer science.
- Master of Science in Electrical Engineering, August 1990. Thesis title: “A Regularized Linear-Reconstruction Method for Optical Sectioning Microscopy.” Advisor: Michael I. Miller.
- Bachelor of Science in Computer Science, cum laude, May 1987.
- Bachelor of Science in Electrical Engineering, cum laude, May 1987.

## Professional Experience

Conducting research in information-theoretic computational imaging applied to light microscopy and spectroscopy, and teaching a variety of electrical and computer engineering courses. Extensive experience in developing physics-based imaging models and processing methods for real imaging applications and implementation and testing of the methods via software engineering. Development and evaluation of optical systems and computational methods using the computational optical sensing and imaging (COSI) paradigm for different applications. Projects include: a) three-dimensional computational imaging microscopy for two different modalities: fluorescence, and differential interference contrast (DIC aka Nomarski); b) instrument development of an adaptive multimodal microscope system suitable for high-resolution thick sample imaging; c) development of sensors for material identification, detection and characterization; and d) development of an image-plane coded aperture terahertz imaging device for biological applications.

### **a. Summary of Appointments**

2017 – Present	<b>Professor and Chair</b> , The University of Memphis, Dept. of Electrical and Computer Engineering (primary)
2017 – Present	<b>Professor</b> , The University of Memphis, Dept. of Biomedical Engineering
2010 – 2017	<b>Associate Professor</b> , The University of Memphis, Dept. of Electrical and Computer Engineering (primary) and Dept. of Biomedical Engineering
2006 – 2010	<b>Assistant Professor</b> , The University of Memphis, Dept. of Electrical and Computer Engineering (primary) and Dept. of Biomedical Engineering

2006 – Present	<b>Adjunct Faculty</b> , The University of Tennessee Health Science Center, Orthopedic Surgery and Biomedical Engineering
2000 - 2006	<b>Research Associate</b> , Washington University, Electronic Signals and Systems Research Laboratory, Dept. of Elect. and System Engineering
2000 - 2006	<b>Instructor</b> , Washington University, Dept. of Elect. and System Engineering
2003 - 2004	<b>Visiting Assistant Professor</b> , University of Cyprus, Dept. of Electrical and Computer Engineering
1998 - 2000	<b>Research Associate</b> , Washington University, Institute for Biomedical Computing (IBC)
1987 - 1998	<b>Research Assistant</b> , Washington University, IBC

## **b. Responsibilities and Activities**

### ***The University of Memphis, Memphis TN:***

Professor Department of Electrical and Computer Engineering (ECE), primary appointment and Dept. of Biomedical Engineering, Aug. 2017-present.

- Chair of the ECE Department: Aug. 2017 – present.
- Principal Investigator of the Computational Imaging Research Laboratory: Aug. 2006 – present

Associate Professor, Department of Electrical and Computer Engineering (primary) and Dept. of Biomedical Engineering, Aug. 2010 – 2017; Assistant Professor, Department of Electrical and Computer Engineering (primary) and Dept. of Biomedical Engineering, Aug. 2006 – present.

- Establishment of the Computational Imaging Research Laboratory (CIRL), 2006.
- Conducting research in computational imaging applied to light microscopy. Investigations include: modeling for 3-D depth-variant and space-variant fluorescence microscopy imaging and model-based algorithm development for the correction of sample-induced aberrations; 3-D patterned illumination microscopy, point-spread function engineering and integrated algorithm development for improved system performance. Experimental validation on commercial modified microscope and instrument development on optical table.
- Model and algorithm development for quantitative DIC (Nomarski) microscopy. Experimental validation on commercial microscope modified with liquid crystal devices.
- Continuous development, maintenance and dissemination of the Computational Optical Sectioning Microscopy Open Source (COSMOS) platform-independent software package written in C++ with a VTK graphical user interface (<http://cirl.memphis.edu/cosmos>).
- Participation in completed collaborative projects with faculty (R. Piestun and C. Cogswell) at the University of Colorado, Boulder
- Involvement in collaborative and interdisciplinary research in bioimaging with Christopher M. Waters at the University of Tennessee Health Science Center (UTHSC) in Memphis.
- Involvement in collaborative and interdisciplinary research in biological investigations with collaborator Omar Skalli (Biological Sciences Dept. at the University of Memphis).
- Participated in a project for the development of an image-plane coded aperture terahertz imaging device for biological applications with Orge Fuxhi and Eddie Jacobs.
- Participated in a project for the development of sensors for material identification, detection and characterization with S. T. Griffin (PI) and A. Robinson (co-PI).
- Participated in a project that studied Nyquist limited infrared detectors. The research team included E. Jacobs (PI), C. Harlford, A. Robinson, S. Chari and C. Preza.
- Participation in preparation and submission of external and internal grant proposals (see **External Research Support** listed below).

- Dissemination of research results through publications, conference presentations and invited seminars.
- Supervising and coordinating research activities of post-doctoral fellows, graduate and undergraduate students.
- Participation in the MemphiSTEM Undergraduate Research Program, 2010 – 2015.
- Teaching a variety of electrical and computer engineering courses. A list of courses is provided below under **Courses Taught**.
- Recruitment of talented graduate students.
- Recruitment of students from underrepresented groups to Electrical and Computer Engineering.
- Academic advising and mentoring of undergraduate and graduate students and post-doctoral fellows.
- Graduate Program Coordinator of the ECE Department: Aug 2013 – 2016.
- Associate Chair of the ECE Department: Jan. 2016 – 2017.
- Serving on numerous Committees within the Department, the College and the University.
- Organization of the ECE Departmental Seminar Series.
- Participation in the scientific program committee and organization committee of the Memphis BioImaging Symposium (2007-2013) <http://www.membis.org/>.
- Participation in the Girls Experiencing Engineering program at the University of Memphis.
- Affiliate faculty in the Center of Advanced Sensors in the Herff College of Engineering.
- Affiliate faculty in the Center for Research on Women (CROW) and participation in the Women's Academic Network (Jan. 2009 –2015).

***Washington University in St. Louis, MO:***

Research Associate, Electronic Systems and Signals Research Laboratory, Sept. 2000 – Aug. 2006.

- Development of computational methods for measuring 3-Dimensional Cell Attributes with DIC microscopy as part of the development of a quantitative DIC microscope.
- Participation in the development of a noninvasive hyperspectral device for real time imaging and characterization of living tissues and systems of biomedical importance. The device will integrate interferometric sensors, focal plane arrays, a computer cluster, and novel computational methods for data processing to extract spectral information.
- Development of calibration methods for data acquired with focal plane arrays in high performance environments.
- Development of a maximum-likelihood restoration method based on a depth-variant imaging model for three-dimensional fluorescence microscopy.
- Participation in the information-theoretic signal and image processing research thrust of the Center for Security Technologies (<http://www.cst.wustl.edu>).
- Participation in the development of an imaging model for the hyperspectral-imaging sensor Discrete Array Scanning Interferometer (DASI) and in spectrum estimation from quantum-limited interferograms acquired with the DASI.
- Investigation of possible improvements for parametric blind deconvolution methods applied to fluorescence microscopy.
- Participation in the preparation of grant proposals.

Instructor, Electrical and Systems Engineering Department, Sept. 2000 – Aug. 2006.

- Taught one or two courses per semester; A list of courses is provided below under **Courses Taught**. Served on the committee preparing for the 2006 ABET renewal of the 3 degree programs in the

Electrical and Systems Engineering department. Collection and organization of the required material and participation in writing the Self-study Questionnaire Report.

Research Associate, Institute for Biomedical Computing (IBC), August 1998 - June 2000.

- Participation in the development and evaluation of a Computational Optical-Sectioning Microscopy (COSM) data-acquisition system equipped with two CCD cameras allowing concurrent dual imaging at two different emitted wavelengths.
- Development and testing of improved COSM restoration methods. Updating the XCOSM software package and maintaining its dissemination through the Internet (<http://www.essrl.wustl.edu/~preza/xcosm>).
- Continued development and testing of phase estimation methods for Differential Interference Contrast (DIC) Microscopy.
- Participation in the preparation of grant proposals.

Research Assistant, Biomedical Computer Laboratory, IBC, July 1987- July 1998.

- Participated in the development and evaluation of a COSM system: a conventional light microscope equipped with a computer-controlled stepping motor and cooled CCD camera that enables three-dimensional data acquisition over time.
- Development and testing of imaging models and image-restoration methods for the reduction of out-of-focus light in three-dimensional images acquired with optical-sectioning fluorescence microscopy.
- Participation in the development, dissemination, and maintenance of the XCOSM software package; XCOSM features five COSM restoration methods.
- Development and evaluation of imaging models for Nomarski DIC Microscopy. Development of a robust phase estimation method based on these models and utilizing rotationally diverse DIC images (i.e. DIC images acquired by rotating the underlying specimen around the optical axis).
- Participation in the preparation of successfully funded grant proposals for Research Projects 1-3 listed below under **Completed Research Support**.

***University of Cyprus, Nicosia, Cyprus:***

Contributing to the development of the Electrical and Computer Engineering (ECE) Department of the newly established School of Engineering at the University of Cyprus, while full filling the home-country residency immigration requirement for permanent residency in the USA. Title and responsibilities were:

Visiting Assistant Professor, Electrical and Computer Engineering Dept., Sept. 2003 – June 2004

- Instruction of one course per semester.
- Development of the ECE curriculum and graduate programs.
- Investigation of possible improvements of *fluorescence in situ hybridization* (FISH) images from chromosomes by computational methods in collaboration with the Cyprus Institute of Neurology and Genetics.

**Consulting and Industrial Experience**

***Ikonisys, Inc., New Haven, CT, September 2004 - January 2005:***

Assessing the quality of three-dimensional data acquired with wide field fluorescence optical-sectioning microscopy for the identification of chromosomes in fluorescence in situ hybridization

(FISH) images. Processing FISH images with our computational methods, in order to remove degradations due to the optical system, the CCD camera, and fluorescence photo bleaching.

### **External Research Support**

The external funding from NSF for which I am the principal investigator (PI) to date totals **\$1,927,706**. *I participated in the preparation of the following proposal(s) and in carrying out the research involved:*

1. Title: “*IDBR TYPE A - Improving 3D resolution and reducing sensitivity to spherical aberration in live, thick sample cellular imaging using novel methods in optical sectioning microscopy*”, PI: C. Preza; co-PI: O. Skalli, Univ. of Memphis; Collaborators: G. Saavedra and M. Martinez-Coral, Univ. of Valencia, Spain; C. Waters, Univ. of Tennessee Health Science Center  
Source of Support: National Science Foundation Type: Instrument Development  
Total Award Amount: **\$ 750,096**  
Total Award Period Covered: 09/01/14 - 08/31/19 (includes no-cost extension)  
Location of Project: The University of Memphis  
Person-Months Per Year Committed to the Project: 1.71 Summer months on the average  
This project is to develop a robust and flexible computational optical system with improved 3D resolution and reduced sensitivity to depth-induced aberrations that will greatly extend the capabilities of optical-sectioning microscopy for use in a wide range of biological applications.
2. Title: “*CAREER: Integrated computational optical framework for quantitative space-variant imaging in live-cell fluorescence microscopy*”, PI: Chrysanthe Preza, Collaborators: C. Waters, Univ. of Tennessee Health Science Center, O. Skalli, Univ. of Memphis.  
Agency: National Science Foundation; Type: CAREER  
Period: 03/01/09 - 2/28/15; Funds: **\$ 791,402** (includes a 1 year no-cost extension)  
Person-Months Per Year Committed to the Project: 2 summer months  
The goal of this project was to develop new computational methods to account for aberrations due to “thick” biological specimens. The methods developed were integrated with a novel optical non-scanning imaging system design to enable fast live-cell fluorescence microscopy imaging with high, isotropic 3D resolution.
3. Title: “*Collaborative Research: Multimode adaptive 3D microscopy for quantitative analysis of live-cellular dynamic processes in thick samples*”, PI: Chrysanthe Preza,  
PI at University of Colorado at Boulder (leading institution): R. Piestun.  
Collaborators: C. Waters, UTHSC, R. Fischer NBHL  
Agency: National Science Foundation; Type: Instrumentation and Instrument Development  
Period: 06/01/09 - 05/31/13 (includes a year of no-cost extension); Funds for C. Preza: **\$168,952**  
Person-Months per Year Committed to the Project: 0 summer months  
The goal of this project was to investigate, develop, and evaluate a multi-modal microscope with greatly enhanced three-dimensional resolution to enable visualization and measurement of live-cellular dynamic processes in thick samples that might otherwise go undetected.
4. Title: “*Collaborative Research: Quantitative DIC Microscope for Measuring 3-Dimensional Cell Attributes*”, PI: Chrysanthe Preza; PI at University of Colorado Boulder, C. Cogswell.

Agency: National Science Foundation; Type: Instrumentation and Instrument Development  
Period: September 1, 2005 – August 31st, 2009 (includes 1-year no-cost extension);  
Funds for Preza: \$ **217,256**

Person-Months Per Year Committed to the Project: 2 summer months

Goal: This project developed an integrated optical and digital system that greatly extends the capabilities of differential interference contrast (DIC) microscopy for use in a wide range of biological applications.

### **Academic Honors**

- Named Fellow of the SPIE professional society, 2019.
- Featured in the ECEDHA newsletter *Source*, January 2019.
- Recipient of the Ravi and Eleanor Kanuri Professorship, The University of Memphis, 2018 -
- Recipient of the Ralph Faudree Professorship, The University of Memphis, 2015-2017.
- Herff Outstanding Faculty Research Award, Herff College of Eng., the Univ. of Memphis, 2010 & 2015.
- University of Memphis PI Millionaire, 2014.
- NSF CAREER Award, 2009.
- Featured in the OSA's 2017 Women in Optics Monthly Planner
- Minorities and Women in Science Interview Series, OSA, April 2012.
- Ring Faculty Award, Herff College of Engineering, 2011-2013.
- Montclair Who's Who in Collegiate Faculty, 2010-2011.
- Marquis Who's Who in America, 65<sup>th</sup> Edition, 2011.
- Best Poster Award, *Memphis BioImaging Symposium*, 2009.
- Journal of the Optical Society of America Publications Award, July 1999.
- B.S.E.E. cum laude, B.S.C.S. cum laude, 1987.
- Tau Beta Pi and Eta Kappa Nu, Engineering Honoraries, 1986.
- Undergraduate Studies Scholarship, the Cyprus-America Scholarship Program (CASP) of the Cyprus Fulbright Commission, awarded for academic excellence and providing full tuition at Washington University in St. Louis and monthly stipend, 1983-1987.

### **Additional Professional Activities**

- Co-Chair, *Data Analysis Program Subcommittee, Quantitative BioImaging*, Cambridge, UK, Jan. 6-9, 2020.
- Co-chair, *Workshop on Computational Optical Imaging*, at the *2020 IEEE International Symposium on Biomedical Imaging (ISBI 2020)* Iowa City, Iowa, April 4-8, 2020.
- Invited Participant, *NSF Workshop on Enabling Biological Discovery Through Innovations in Imaging and Computation*, Marine Biological Laboratory, Woods Hole, MA, Nov. 26-28, 2018.
- Associate Editor for *IEEE Transactions on Computational Imaging (TCI)*, 2018 – present.
- Topical Editor for *Applied Optics*, 2016 – present.
- Lead Guest Editor, feature issue on "Modern Imaging" in *Applied Optics*, 2016-2017.
- Instructor, Tutorial on "Digital Imaging Principles", *Optical Microscopy and Imaging in Biomedical Sciences Course* at the Marine Biological Laboratory, Woods Hole, MA, 2016

- & 2017.
- Discussion Leader, *Gordon Research Conference (GRC) on Image Science*, June 17 -22, Stonehill College in Easton, MA, 2018.
  - Co-Chair (2015 and 2016) and Program Committee Member, *Computational Optical Sensing and Imaging*, part of the Optical Society of America (OSA), Imaging and Applied Optics Congress, 2011, 2014 – 2017.
  - Co-Chair (2020) and Program Committee Member, *Computational Imaging*, Imaging and Data Visualization, SPIE Defense and Commercial Sensing (DCS), Commercial and Scientific Sensing and Imaging, 2017 - present
  - Program Committee Member, *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing*, BiOS, SPIE Photonics West, 2008 – present
  - Conference Session Chair, Focus in Microscopy 2014, Sydney, Australia.
  - Conference Session Chair, *Phase: Multimodal microscopy*, in *Focus on Microscopy*, Maastricht, the Netherlands, 2013.
  - Invited Participant, *IEEE Engineering in Medicine and Biology Society (EMBS) Forum on Grand Challenges in Biomedical Imaging*, March 1-2, Bethesda, Maryland, 2012.
  - Program Committee Member, *IEEE International Conference of Electro/Information Technology*, IUPUI, Indianapolis, May 6-8, 2012.
  - Invited Participant, *Workshop on Computationally Enhanced Optical Imaging*, Northeastern University, Boston, MA, Aug. 30, 2011.
  - Invited Lecturer, *I-CAMP 2011 School*, Argentina-Uruguay, May 28-June 17, 2011.
  - Conference Session Chair, *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing*, BiOS, SPIE Photonics West, CA, 2003, 2008, 2010-2014, & 2016.
  - Conference Session Chair, *Medical Image Processing I*, Digital Image Processing and Analysis (DIPA), OSA Imaging and Applied Optics Congress, Tucson, Arizona, 2010.
  - Program Committee Member, *International Conference on Computational Photography (ICCP)*, IEEE, MIT, 2010.
  - Conference Session Chair, *Confocal, Multiphoton, and Nonlinear Microscopic Imaging*, European Conferences on Biomedical Optics, OSA and SPIE, Munich, 2007.
  - Scientific and Organizing Committee Member, *Memphis BioImaging Symposium (MemBIS)*, 2007 – 2013; Conference Co-Chair, 2011-2013; Scientific Program Chair, 2010; Pre-conference Workshop Chair, 2009; Student Program co-Chair, 2008.
  - Participant, *National Effective Teaching Institute (NETI-1B)*, Tampa, FL, January 4-6, 2013.
  - Invited Participant, *NSF ADVANCE Community Building Workshop for Junior Women Faculty in Engineering*, Virginia Beach, VA, July 21 – 24, 2009.
  - **Scientific Reviewer/Participation in Proposal Review Panels** for the following:
    - Journal of the Optical Society of America, Applied Optics, Optics Express,*
    - IEEE Transactions on Image Processing, Journal of Microscopy,*
    - Central European Journal of Physics,*
    - IEEE International Symposium on Biomedical Imaging*, 2011, 2012
    - NSF Proposals in Advances in Bio Informatics* 2010
    - NSF Proposals in Instrument Development for Biological Research* 2014, 2015

- **Professional Affiliations** (Current and Past)
  - Fellow, International Society for Optical Engineering (SPIE)
  - Senior Member, Optical Society of America (OSA)
  - Member, Institute of Electrical and Electronics Engineers (IEEE)
  - Member, IEEE Women in Engineering
  - Member, The Society of Women Engineers (SWE)
  - Member, American Society for Engineering Education (ASEE)
  - Member, Microscopical Society of America

### **Patent**

Preza, C., Doblas, A., Martínez-Corral, M., Saavedra, G., and Barreiro, J. C., “Multi-focal light-sheet structured illumination fluorescence microscopy system,” US utility Patent No. 62/527,232 (2018).

**Publications** (Available online at <http://cirl.memphis.edu> )

### **Invited Book Chapter**

Preza, C., King, S. V., Dragomir, N. M., Cogswell, C. J., “Phase Imaging Microscopy – Beyond Darkfield, Phase and Differential Interference Contrast (DIC) Microscopy,” in *Handbook of Biomedical Optics*, Boas, D. A., Pitris C., and Ramanujam, N., eds., Taylor and Francis Books, 2011.

### **Journal Publications**

1. Shabani, H., Doblas, A., Saavedra, G. and **Preza, C.**, “Optical transfer function engineering for a tunable 3D structured illumination microscope,” *Optics Letters*, **44**(7), 1560-1563, 2019.
2. Doblas, A., Bedoya, S., and **Preza, C.**, “Wollaston prism-based structured illumination microscope with tunable-frequency,” *Applied Optics*, **58**(7), B1-B8, 2019.
3. Doblas, A., Shabani, H., Saavedra, G. and **Preza, C.**, “Tunable-frequency three-dimensional structured illumination microscopy with reduced data acquisition,” *Optics Express*, **26**(23), 30476-30491, 2018.
4. King, S. V., Yuan, S. and **Preza C.**, “Performance evaluation of extended depth of field microscopy in the presence of spherical aberration and noise”, *J. Biomed. Opt.*, 23(3) 036016 2018.
5. Patwary, N., Doblas, A., and **Preza, C.**, “Image restoration approach to address reduced modulation contrast in structured illumination microscopy,” *Biomed. Opt. Express* **9**(4), 1630-1647, 2018.
6. Shabani, H., Doblas, A., Saavedra, G., **Preza, C.**, “Improvement of two-dimensional structured illumination microscopy with an incoherent illumination pattern of tunable frequency,” *Applied Optics*, **57**(7), B92-B101, 2018.
7. Patwary, N., Shabani, H., Doblas, A., Saavedra, G., and **Preza, C.**, “Experimental validation of a customized phase mask designed to enable efficient computational optical sectioning microscopy through wavefront encoding,” *Applied Optics, Modern Imaging feature*, **56**(9), D14-D23, doi: [10.1364/AO.56.000D14](https://doi.org/10.1364/AO.56.000D14), 2017.



8. Patwary, N., King, S. V., Saavedra, G., and **Preza, C.**, Reducing effects of aberration in 3D fluorescence imaging using wavefront coding with a radially symmetric phase mask”, *Optics Express*, 24(12), 12905-12921, doi: [10.1364/OE.24.012905](https://doi.org/10.1364/OE.24.012905), 2016.
9. Ghosh, S. and Preza, C., “Three-Dimensional Block-Based Restoration Integrated with Wide-field Fluorescence Microscopy for the Investigation of Thick Specimens with Spatially Variant Refractive Index,” *J. Biomed. Opt.*, 21(4), 046010, doi: [10.1117/1.JBO.21.4.046010](https://doi.org/10.1117/1.JBO.21.4.046010), 2016.
10. King, S. V., Doblas, A., Patwary, N., Saavedra, G., Martinez-Corral, M. and **Preza, C.**, “Spatial light modulator phase mask implementation of wavefront encoded 3D computational-optical microscopy”, *Applied Optics*, 54(29), 8587-8595, doi: [10.1364/AO.54.008587](https://doi.org/10.1364/AO.54.008587), 2015.
11. Patwary, N., and **Preza, C.**, “Image restoration for three-dimensional fluorescence microscopy using an orthonormal basis for efficient representation of depth-variant point-spread functions”, *Biomed. Opt. Express* 6(10), 3826-3841, doi: [10.1364/BOE.6.003826](https://doi.org/10.1364/BOE.6.003826), 2015.
12. Ghosh, S. and **Preza, C.**, “Fluorescence microscopy point spread function model accounting for aberrations due to refractive index variability within a specimen,” *J. Biomed. Opt.*, 20(7), 075003, doi: [10.1117/1.JBO.20.7.075003](https://doi.org/10.1117/1.JBO.20.7.075003), 2015.
13. Ghosh, S. and **Preza, C.**, “Characterization of a 3D DH-PSF for fluorescence microscopy in the presence of spherical aberration,” *Journal of Biomedical Optics*, 18(3):036010, doi: [10.1117/1.JBO.18.3.036010](https://doi.org/10.1117/1.JBO.18.3.036010), 2013.
14. Furxhi, O., Jacobs, E. L. and **Preza, C.**, “Image plane coded aperture for Terahertz imaging,” *Optical Engineering*, 51(9), doi:[10.1117/1.OE.51.9.091612](https://doi.org/10.1117/1.OE.51.9.091612), 091612-1, 2012.
15. Yuan, S. and **Preza, C.**, “Point-spread function engineering to reduce the impact of spherical aberration on 3D computational fluorescence microscopy imaging,” *Optics Express*, 19(23), 23298-23314, doi: [10.1364/OE.19.023298](https://doi.org/10.1364/OE.19.023298), 2011.
16. King, S. V., Libertun, A. R., Piestun, R., Cogswell, C. J., **Preza, C.**, "Quantitative phase microscopy through differential interference imaging," *Journal of Biomedical Optics*, Vol. 13(2), 024020, doi: [10.1117/1.2907328](https://doi.org/10.1117/1.2907328), 2008.
17. Fox, D. J. Jr., Tysver Velde, H., **Preza, C.**, O’Sullivan, J. A., Smith, W. H., and Woolsey, T. A., “Computational hyperspectral interferometry for studies of brain function: proof of concept,” *Applied Optics*, Vol. 45, No. 13, 3009-3021, doi: [10.1364/AO.45.003009](https://doi.org/10.1364/AO.45.003009), 2006.
18. Preza, C. and Conchello, J.-A. “Depth-Variant Maximum-Likelihood Restoration for Three-Dimensional Fluorescence Microscopy,” *Journal of the Optical Society of America A*, Vol. 21, No. 9, 1593-1601, September, 2004.
19. Fuhrmann, D. R., **Preza, C.**, O’Sullivan, J. A., Snyder, D. L., and Smith, W.H., “Spectrum Estimation from Quantum-Limited Interferograms,” *IEEE Transactions on Signal Processing*, 52(4), 950-961, April, 2004.
20. Homem, M. R. P., Mascarenhas, N. D. A., Costa, L. F., and **Preza C.**, “Biological Image Restoration in Optical-Sectioning Microscopy Using Prototype Image Constraints,” *Real Time Imaging*, special issue on *Imaging in Bioinformatics*, 8(6), 475-490, 2002.
21. Preza, C., “Rotational-diversity phase estimation from differential-interference-contrast microscopy images,” *Journal of the Optical Society of America A*, 17(3), 415-424, 2000.
22. Preza, C., Snyder, D. L., and Conchello, J.-A. “Theoretical development and experimental evaluation of imaging models for differential-interference-contrast microscopy,” *Journal of the Optical Society of America A*, 16(9), 2185-2199, 1999.
23. McNally, J. G., **Preza, C.**, Conchello, J.-A. and Thomas, Jr., L. J., “Artifacts in Computational Optical-Sectioning Microscopy,” *Journal of the Optical Society of America A*, 11(3):1056-1067, 1994.
24. Preza, C., Ollinger, J. M., McNally, J. G., and Thomas, Jr., L. J., “Point-Spread Sensitivity

Analysis for Computational Optical-Sectioning Microscopy,” *Micron and Microscopica Acta*, Special issue, 23(4):501-513, 1992. (Invited paper).

25. Preza, C., Miller, M. I., Thomas, Jr., L. J., and McNally, J. G., “Regularized Linear Method for Reconstruction of Three-Dimensional Microscopic Objects from Optical Sections,” *Journal of the Optical Society of America A*, 9(2):219-228, 1992.

#### **Journal Publications under Review/Revision**

1. Van, C. T. S., Shabani, H., and **Preza, C.**, “3D SIM restoration with reduced data using a model-based approach”, *to be submitted* 2019.

#### **Journal Publications under Preparation**

1. Preza, C., Schaefer L. H., Schuster, D., Patwary, N. and Ghaffar, A., “Model-based approach to account for spherical aberration in structured illumination microscopy,” *to be submitted*.
2. Preza, C. and O’Sullivan, J. A., “Quantitative phase and amplitude imaging using an alternating minimization algorithm developed for Nomarski differential interference contrast (DIC) microscopy”, *to be submitted*.
3. Preza, C., “Quantitative 3D cell imaging with fluorescence microscopy using the COSMOS software package”, *to be submitted*.

#### **Peer-Reviewed Conference Publications**

1. Shabani, H., Labouesse, S., Sentenac, A. and **Preza, C.**, “Three-dimensional deconvolution based on axial-scanning model for structured illumination microscopy,” *2019 IEEE 16<sup>th</sup> International Symposium on Biomedical Imaging (ISBI 2019)*, Venice, Italy, pp. 552-555, 2019.
2. Doblaz, A., Shabani, H., Saavedra, G., and **Preza, C.**, “Recent advances in tunable 3D structured illumination microscopy,” *2018 20<sup>th</sup> International Conference on Transparent Optical Networks ICTON*, Bucharest, Romania, 2018, pp. 1-4, [doi: 10.1109/ICTON.2018.8473675](https://doi.org/10.1109/ICTON.2018.8473675).
3. Bedoya, S., Doblaz, A., Saavedra, G., and **Preza, C.**, “Tunable structured illumination system based on a Wollaston prism,” *Imaging and Applied Optics Congress 2018 (IS)*, *OSA Technical Digest (Optical Society of America, 2018)*, paper ITu2B.3, 2018.
4. Sola-Pikabea, Doblaz, A., Saavedra, G., Martinez-Corral, M., and **Preza, C.**, “Optimal design of incoherent tunable-frequency structured illumination microscope scheme,” *2018 IEEE 15<sup>th</sup> International Symposium on Biomedical Imaging (ISBI 2018)*, [10.1109/ISBI.2018.8363613](https://doi.org/10.1109/ISBI.2018.8363613), 2018.
5. Doblaz, A., Dutta, A., Saavedra, G. and **Preza, C.**, “Tradeoff between insensitivity to depth-induced spherical aberration and resolution of 3D fluorescence imaging due to the use of wavefront encoding with a radially symmetric phase mask,” *Proc. SPIE 10499, Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXV*, 104990F, 2018.
6. Shabani, H., Doblaz, A., Saavedra, G. and **Preza, C.**, “Preprocessing method to correct illumination pattern in sinusoidal-based structured illumination microscopy,” *Proc. SPIE 10499, Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXV*, 104991Z, 2018.
7. Shabani, H., Doblaz, A., Saavedra, G. and **Preza, C.**, “3D structured illumination microscopy using an incoherent illumination system based on a Fresnel biprism,” *Proc. SPIE 10499, Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXV*, 1049903, 2018.

8. Patwary, N., Doblas, A., Saavedra, G. and **Preza, C.**, “Evaluation of the use of wavefront encoding to reduce depth-induced aberration in structured illumination microscopy” Proc. SPIE 10499, *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXV*, 104991A, 2018.
9. Shabani, H., Doblas, A. and **Preza, C.**, "Simultaneous optical sectioning and super resolution in 2D-SIM using tunable structured illumination," in *Imaging and Applied Optics 2017 (COSI)* of OSA Technical Digest Series (Optical Society of America, 2017), paper CW4B, 2017.
10. Doblas, A. and **Preza, C.**, "Incoherent-based tunable frequency structured illumination microscopy," in *Imaging and Applied Optics 2017 (IS)* of OSA Technical Digest Series (Optical Society of America, 2017), paper ITh4, 2017.
11. Patwary, N., Doblas, A., and **Preza, C.**, “Computational approach to address reduced modulation contrast in structured-illumination microscopy,” in *Imaging and Applied Optics 2017 (COSI)* of OSA Technical Digest Series (Optical Society of America, 2017), paper [JTU5A](#), 2017.
12. King S. V., Taylor, C. A., Doblas, A., Shabani, H., Patwary, N., Saavedra, G. and **Preza, C.**, “Implementation of an incoherent 3-D patterned illumination design in a Structured Illumination Microscope,” Proc. SPIE 10070, *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXIV*, 1007004, [doi:10.1117/12.2252910](https://doi.org/10.1117/12.2252910), 2017.
13. Shabani, H., Patwary, N., Doblas, A., Saavedra, G. and **Preza, C.**, “Comparison of two structured illumination techniques based on different 3D illumination patterns,” Proc. SPIE 10070, *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXIV*, 1007013, [doi:10.1117/12.2253199](https://doi.org/10.1117/12.2253199), 2017.
14. Doblas, A., Saavedra, G. and **Preza, C.**, “Comparison of 3D structured patterns with tunable frequency for use in Structured Illumination Microscopy,” Proc. SPIE 10070, *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXIV*, 100700H, [doi:10.1117/12.2252109](https://doi.org/10.1117/12.2252109), 2017.
15. Patwary, N., King, S. V., Shabani Hasti and **Preza, C.**, “Experimental Implementation of Wavefront Encoding in 3D Widefield Fluorescence Microscopy Using a Fabricated Phase Mask Designed to Reduce System Depth Variability,” *Imaging and Applied Optics Congress, Computational Optical Sensing and Imaging (COSI)*, OSA Technical Digest (online) paper CW2D.3, [doi: 10.1364/COSI.2016.CW2D.3](https://doi.org/10.1364/COSI.2016.CW2D.3), 2016.
16. Ghosh, S. and **Preza, C.**, “Block-Based Restoration Method for Wide-field Microscopy of Samples with Variable Refractive Index,” *Imaging and Applied Optics Congress, Computational Optical Sensing and Imaging (COSI)*, OSA Technical Digest (online) paper CM3D.3, [doi: 10.1364/COSI.2016.CM3D.3](https://doi.org/10.1364/COSI.2016.CM3D.3), 2016.
17. Patwary, N. and **Preza, C.**, “Reducing restoration artifacts in 3D computational microscopy using wavefront encoding,” in *Computational Imaging XIV*, IS&T International Symposium on Electronic Imaging, 1-6(6), [doi: 10.2352/ISSN.2470-1173.2016.19.COIMG-157](https://doi.org/10.2352/ISSN.2470-1173.2016.19.COIMG-157), 2016.
18. Shabani, H., Sánchez-Ortiga, E., **Preza, C.**, “Investigating the performance of reconstruction methods used in structured illumination microscopy as a function of the illumination pattern’s modulation frequency,” Proc. SPIE 9713, *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXIII*, 9713, 971305, [doi: 10.1117/12.2213411](https://doi.org/10.1117/12.2213411), 2016.
19. Patwary, N. and **Preza, C.**, “Wavefront encoded computational optical sectioning microscopy reduces depth variability in 3D imaging,” *Imaging and Applied Optics Congress, Computational Optical Sensing and Imaging (COSI)* Conference, OSA Technical Digest (online) paper CM2E.4, [doi:10.1364/COSI.2015.CM2E.4](https://doi.org/10.1364/COSI.2015.CM2E.4), 2015.
20. King, S. V., Hossain, Md S., and **Preza, C.**, “Dual acquisition of fluorescence and quantitative phase microscopy with high-speed switchable optics for DIC,” *Optics in the Life Sciences*, OSA Technical Digest (online), *Novel Techniques in Microscopy*, paper NW3C.4.,

- doi:[10.1364/NTM.2015.NW3C.4](https://doi.org/10.1364/NTM.2015.NW3C.4), 2015.
21. Ghosh, S., and **Preza, C.**, “Space-Variant Image Formation for 3D Fluorescence Microscopy Using a Computationally Efficient Block-Based Model,” 2015 IEEE 12th International Symposium on Biomedical Imaging (ISBI) From Nano to Macro, 7163990, 789-792, doi: [10.1109/ISBI.2015.7163990](https://doi.org/10.1109/ISBI.2015.7163990), 2015.
  22. Ghosh, S., and **Preza, C.**, “A block-based forward imaging model for improved sample volume representation in computational optical sectioning microscopy,” Proc. SPIE 9330, Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXII, 93300T, doi:[10.1117/12.2077001](https://doi.org/10.1117/12.2077001), 2015.
  23. Patwary, N., King, S. V. and **Preza, C.**, “3D microscope imaging robust to restoration artifacts introduced by optically thick specimens,” Proc. SPIE 9330, Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXII, 93300O, doi:[10.1117/12.2077845](https://doi.org/10.1117/12.2077845), 2015.
  24. Hossain, Md S., King, S. V. and **Preza, C.**, “An integrated approach to determine prior information for improved wide-field imaging models from computational interference microscopy,” SPIE 9330, Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXII, 933014, doi:[10.1117/12.2077322](https://doi.org/10.1117/12.2077322), 2015.
  25. Patwary, N. and **Preza, C.**, “Computationally tractable approach to PCA-based depth-variant PSF representation for 3D microscopy image restoration,” Classical Optics, OSA Technical Digest (online), Computational Optical Sensing and Imaging, paper CW1C.5, Optical Society of America, doi: [10.1364/COSI.2014.CW1C.5](https://doi.org/10.1364/COSI.2014.CW1C.5), 2014.
  26. Preza, C., “Computational imaging for 3D fluorescence microscopy,” Imaging and Applied Optics, OSA Technical Digest (online), Imaging Systems and Applications, paper IW2C, doi: [10.1364/ISA.2014.IW2C.1](https://doi.org/10.1364/ISA.2014.IW2C.1), 2014.
  27. Hossain, Md S., King, S. V. and **Preza, C.**, “Enhanced Extended Depth-of-Field Microscopy via modeling of SLM effects on the applied phase mask,” Imaging and Applied Optics, OSA Technical Digest (online), Imaging Systems and Applications, paper IW4C.4, Optical Society of America, doi: [10.1364/ISA.2014.IW4C.4](https://doi.org/10.1364/ISA.2014.IW4C.4), 2014.
  28. King, S. V., Doblas, A., Patwary, N., Saavedra, G., Martínez-Corral, M. and **Preza, C.**, “Implementation of PSF Engineering in High-Resolution 3D Microscopy Imaging with a LCoS (Reflective) SLM,” *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXI*, BiOS, SPIE 8949-39, doi:10.1117/12.2040723, 2014.
  29. Doblas, A., King, S. V., Patwary, N., Saavedra, G., Martínez-Corral, M. and **Preza, C.**, “Investigation of the SQUBIC phase mask design for depth-invariant widefield microscopy point-spread function engineering,” *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXI*, BiOS, SPIE 894914, (doi:10.1117/12.2038610), 2014.
  30. Patwary, N., Doblas, A., King, S. V. and **Preza, C.**, “Reducing depth-induced spherical aberration in 3D widefield fluorescence microscopy by wavefront coding using the SQUBIC phase mask,” *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXI*, BiOS, SPIE 8949-37, doi:10.1117/12.2040191, 2014.
  31. Ghosh, S., Schaefer, L., Schuster, D. and **Preza, C.**, “Further developments in addressing depth-variant 3D fluorescence microscopy imaging,” *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXI*, BiOS, SPIE 8949-26, 2014.
  32. King, S. V. and **Preza, C.**, “Experimental Verification of PSF Engineering Using a Spatial Light Modulator,” *OSA Computational Optical Sensing and Imaging (COSI) Conference*, Arlington, Virginia, 2013.
  33. Yuan, S. and Preza, C., “Computational 3D Microscopy Imaging Using a PCA Depth-Variant PSF Model,” *OSA Imaging Systems and Applications (IS) Conference*, Arlington, Virginia, 2013.

34. Rahman, M. M., Schaefer, L., Schuster, D. and **Preza, C.**, "Comparison of computational methods developed to address depth-variant imaging in fluorescence microscopy," *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XX*, BiOS, SPIE 8589, id. 85890A 7, doi: 10.1117/12.2005227, 2013.
35. Yuan, S. and **Preza, C.**, "Improved Extended Depth-of-Field Microscopy through PSF Engineering and Robust Processing," in *Imaging and Applied Optics Technical Papers*, OSA Technical Digest (online) (Optical Society of America, 2012), paper CM2B.3.
36. Yuan, S. and **Preza, C.**, "Computational optical sectioning microscopy using an engineered PSF with reduced depth variability - proof of concept," *IEEE 9<sup>th</sup> International Symposium on Biomedical Imaging (ISBI)*, 6235916, 1739 – 1742, 2012.
37. Ghosh, S., Quirin, S., Grover, G., Piestun, R. and **Preza, C.**, "Computational imaging for fluorescence microscopy using double helix PSF engineering," *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XIX*, BiOS, SPIE 8227, 82270F, 2012.
38. Yuan, S. and **C. Preza**, "Point-spread function engineering to reduce the impact of depth-induced aberrations on high-NA 3D extended depth-of-field microscopy," *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XIX*, BiOS, SPIE 8227, 822702, doi: 10.1117/12.908908, 2012.
39. Yuan, S. and **C. Preza**, "Performance evaluation of an image estimation method based on principal component analysis (PCA) developed for quantitative depth-variant fluorescence microscopy imaging," *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XIX*, BiOS, SPIE 8227, 82270H, doi: 10.1117/12.909638, 2012.
40. Yuan, S. and C. Preza, "PSF Engineering to Reduce the Impact of Depth-Induced Aberrations on Wide-field Microscopy Imaging," in *Imaging and Applied Optics*, OSA Technical Digest (CD) (Optical Society of America, 2011), paper CTuA3, 2011.
41. Ghosh, S. and **C. Preza**, "Frequency content of the double-helix PSF for 3D microscopy in the presence of spherical aberration," in *Imaging and Applied Optics*, OSA Technical Digest (CD) (Optical Society of America, 2011), paper CTuB3, 2011.
42. Preza, C., "Simulating Structure Illumination Microscopy in the Presence of Spherical Aberrations," *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XVIII*, BiOS, SPIE 7904, 79040D, 2011.
43. Yuan, S. and **Preza, C.**, "3D Fluorescence Microscopy Imaging Accounting for Depth-Varying Point Spread Functions Predicted by a Strata Interpolation Method and a Principal Component Analysis", *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XVIII*, BiOS, SPIE 7904, 79040M, 2011.
44. Ghosh, S., Grover, G., Piestun, R. and **Preza, C.**, "Effect of double-helix point-spread functions on 3D imaging in the presence of spherical aberrations," *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XVIII*, BiOS, SPIE 7904, 79041D, 2011.
45. Yuan, S., Chen, Y., **Preza, C.**, and Tang, C., "Study on blood-flow pulsation using laser speckle contrast imaging", *Dynamics and Fluctuations in Biomedical Photonics VI*, BiOS, SPIE 7898-15, 2011.
46. Mukherjee, A. and **Preza, C.**, "Computational 3D Fluorescence Microscopy Imaging", *Imaging Systems (IS)*, *Imaging and Applied Optics*, OSA Optics and Photonics Congress, IWC2, 2010.
47. Myneni, V. and **Preza, C.**, "3D Reconstruction of Fluorescence Microscopy Image Intensities Using Multiple Depth-Variant Point-Spread Functions", *Digital Image Processing and Analysis (DIPA)*, *Imaging and Applied Optics*, OSA Optics and Photonics Congress, DTuA2, 2010.

48. Preza, C. and O'Sullivan, J. A., "Implementation and evaluation of a penalized alternating minimization algorithm for computational DIC microscopy", *Computational Imaging VIII*, IS&T/SPIE Electronic Imaging, SPIE 7533, pp. 75330E-1 to 75330E-11, 2010.
49. Preza, C. and Myneni, V., "Quantitative depth-variant imaging for fluorescence microscopy using the COSMOS software package," *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XVII*, BiOS, SPIE 7570, pp. 757003-1 to 757003-8, 2010.
50. Mukherjee, A., Myneni, V., Crosby, L. M., Waters, C. M., and **Preza, C.**, "Improved 3-D microscope imaging through computational methods", *Memphis BioImaging Symposium*, 2009.
51. Myneni, V. and **Preza, C.**, "Computational depth-variant imaging for quantitative fluorescence microscopy," in *Computational Optical Sensing and Imaging (COSI)*, OSA Technical Digest (CD), Optical Society of America, paper # CThC4, 2009.
52. Preza, C. and O'Sullivan, J. A., "Computational Differential Interference Contrast (DIC) Microscopy for Quantitative Imaging," in *Computational Optical Sensing and Imaging (COSI)*, OSA Technical Digest (CD), Optical Society of America, paper # CThB5, doi: [10.1364/COSI.2009.CThB5](https://doi.org/10.1364/COSI.2009.CThB5), 2009.
53. Preza, C. and O'Sullivan, J. A., "Quantitative phase and amplitude imaging using differential-interference contrast (DIC) microscopy", in *Computational Imaging VII*, Charles A. Bouman, Eric L. Miller, Ilya Pollak, eds., Electronic Imaging, Proc. SPIE Vol. 7246, 724604, 2009.
54. O'Sullivan, J. A. and **Preza, C.**, "Alternating Minimization Algorithm for Quantitative Differential-Interference Contrast (DIC) Microscopy", in *Computational Imaging VI*, Charles A. Bouman, Eric L. Miller, Ilya Pollak, eds., Electronic Imaging, Proc. SPIE Vol. 6814, 68140Y 2008.
55. Preza, C. and O'Sullivan, J. A., "Quantitative determination of specimen properties using computational differential-interference contrast (DIC) microscopy", in *Confocal, Multiphoton, and Nonlinear Microscopic Imaging III*, Tony Wilson, Ammasi Periasam, eds., Proc. SPIE-OSA Biomedical Optics, Proc. SPIE Vol. 6630, 66300E, 2007.
56. King, S. V., Libertun, A. R., **Preza, C.**, and Cogswell, C. J., "Calibration of a phase-shifting DIC microscope for quantitative phase imaging", in *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XIV*, Proc. SPIE Vol. 6443, 64430M, 2007.
57. Preza, C., King, S. V., and Cogswell, C. J., "Algorithms for extracting true phase from rotationally-diverse and phase-shifted DIC images," in *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XIII*, Proc. SPIE Vol. 6090, 60900E, 2006.
58. Fox, D. J. Jr., Woolsey, T. A., **Preza, C.**, O'Sullivan, J. A., Tysver Velde, H., and Smith, W. H., "Computational Hyperspectral Microscopy for Studies of Neural and Biological Function," in *Adaptive Optics: Analysis and Methods/Computational Optical Sensing and Imaging / Information Photonics / Signal Recovery and Synthesis Topical Meetings on CD-ROM* (The Optical Society of America, Washington, DC), presentation # CTuB2, 2005.
59. Preza, C., Patsalis, C. P., Sismani C., Evangelidou P., and Pitris, C., "Three-dimensional FISH Imaging of Chromosomes Using Computational Optical Sectioning Microscopy", in *Diagnostic Imaging and Image Analysis, II Mediterranean Conference on Medical Physics*, Limassol, Cyprus, April, 2004.
60. Preza, C. and Conchello, J.-A., "Image Estimation Accounting for Point-Spread Function Depth-Variation in Three-Dimensional Fluorescence Microscopy," in *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing X*, C. J. Cogswell, J.-A. Conchello, T. Wilson, eds., Proc. SPIE Vol. 4964, pp. 135-142, 2003.
61. Preza, C., van Munster, E. B., Aten, J. A., Snyder, D. L., and Rosenberger, F. U., "Determination of Direction-Independent Optical Path-Length Distribution of Cells Using Rotational-Diversity

- Transmitted-Light Differential Interference Contrast (DIC) Images,” in *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing*, C. J. Cogswell, J.-A. Conchello, T. Wilson, eds., Proc. SPIE 3261A, 60-70, 1998.
62. Preza, C., Snyder, D. L., Rosenberger, F. U., Markham, J., and Conchello, J.-A., “Phase Estimation from Transmitted-Light DIC Images Using Rotational Diversity,” in *Image Reconstruction and Restoration II*, T. J. Schulz, ed., Proc. SPIE 317097-107, 1997.
  63. Preza, C., Snyder, D. L., and Conchello, J.-A., “Image Reconstruction for Three-Dimensional Transmitted-Light DIC Microscopy,” in *Three-Dimensional Microscopy: Image Acquisition and Processing IV*, C. J. Cogswell, J.-A. Conchello, T. Wilson, eds., Proc. SPIE 2984220-231, 1997.
  64. Preza, C., Snyder, D. L., and Conchello, J.-A., “Imaging Models for Three-Dimensional Transmitted-Light DIC Microscopy,” In Proceedings of the IS&T/SPIE Symposium on Electronic Imaging: Science & Technology, volume 2655, 245-257, 1996.
  65. Preza, C., Miller, M. I., and Conchello, J.-A., “Image Reconstruction for 3-D Light Microscopy with a Regularized Linear Method Incorporating a Smoothness Prior,” in *Biomedical Image Processing and Biomedical Visualization*, R. S. Acharya and D. B. Goldgof, Eds., Proc. SPIE 1905:129-139, 1993.
  66. Preza, C., Ollinger, J. M., McNally, J. G., and Thomas, Jr., L. J., “Point-Spread Sensitivity Analysis for 3-D Fluorescence Microscopy,” in *Biomedical Image Processing and Three-Dimensional Microscopy*, R. S. Acharya, C. J. Cogswell, and D. B. Goldgof, Eds., Proc. SPIE, 1660:158-169, 1992.

#### Other Conference Publications and Presentations

1. Preza, C., “Recent Advances in 3D structured illumination microscopy with reduced data-acquisition”, *Computational Imaging XVIII, Electronic Imaging 2020*, Burlingame, CA, January 27-28, 2020.
2. Van, C. T. S., Shabani, H. and **Preza, C.**, “3D model-based restoration methods for 3D-SIM,” *Quantitative BioImaging (QBI) 2020*, Oxford, UK, January 6-9, 2020.
3. Shabani, H., Doblas, A., Saavedra, G., and **Preza, C.**, “Tunable 3D Structured Illumination Microscope Using a Fresnel Biprism: OTF Design,” *Focus on Microscopy*, P2-B-1/20, London, England, April 16, 2019.
4. Shabani, H., Doblas, A., Saavedra, G., and **Preza, C.**, “Investigating the impact of structured illumination design on the synthetic optical transfer function’s compact support”, *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXVI, San Francisco, CA*, February 5, 2019.
5. Bedoya, S., Doblas, A., Saavedra, G. and **C. Preza**, “Tunable structured illumination system based on a Wollaston prism,” *Image Science Gordon Research Conference*, Easton, MA, June 17-22, 2018.
6. Shabani, H., Doblas, A., Saavedra, G., and **Preza, C.**, “Novel structured illumination improves 3-D resolution in fluorescence microscopy,” *Image Science Gordon Research Conference*, Easton, MA, June 17-22, 2018.
7. Doblas, A., Sola-Pikabea, J., Shabani, H., Saavedra, G., Martinez-Corral, M., and **Preza, C.**, “Incoherent structured illumination system with a tunable 3D pattern,” *Computational Imaging III, SPIE Commercial & Scientific Sensing and Imaging*, talk 10669-12, Orlando, FL, 15 April 2018.
8. Shabani, H., Doblas, A., Saavedra, G., and **Preza, C.**, “3D Tunable structured illumination microscope using a Fresnel biprism,” *Focus on Microscopy*,” Singapore, March 27, 2018.

9. Preza, C., “3D Image Restoration Using Multiple Space-Varying Point Spread Functions,” in *Mathematics in Imaging Conference, Imaging and Applied Optics Congress*, Optical Society of America, *invited talk*, 2017.
10. Preza, C., Patwary, N., Shabani, H., Doblas, A., and Saavedra, G., “PSF engineering using a fabricated SQUBIC phase mask to reduce the effect of spherical aberration in 3D wide field fluorescence Imaging,” *Focus on Microscopy, Bordeaux, France*, April 10 2017.
11. Doblas, A., Shabani, H., Saavedra, G., and **Preza, C.**, “Improvement of 2D-SIM achieved based on tunable structured illumination,” *Focus on Microscopy, Bordeaux, France*, April 10 2017.
12. Shabani, H., Patwary, N., Doblas, A., Saavedra, G. and **Preza, C.**, “Investigating the effect of different 3D illumination patterns on structured illumination microscopy performance,” *Quantitative BioImaging (QBI)*, Texas A&M University, College Station, TX, Jan. 5-7, 2017.
13. Patwary, N., Shabani, H., Doblas, A., Saavedra, G. and **Preza, C.**, “Implementation of PSF engineering using a fabricated phase mask to reduce the effect of spherical aberration in 3D wide field fluorescence microscopy,” *Quantitative BioImaging (QBI)*, Texas A&M University, College Station, TX, Jan. 5-7, 2017.
14. Ghosh, G. and **Preza, C.**, “Imaging thick specimens using optical-sectioning microscopy coupled with block-based 3D image restoration,” *Quantitative BioImaging (QBI)*, Texas A&M University, College Station, TX, Jan. 5-7, 2017.
15. Ghosh, G. and **Preza, C.**, “An  $N$ -Interface point spread function model suitable for wide-field fluorescence imaging of thick specimen with variable refractive index,” *Quantitative BioImaging (QBI)*, Texas A&M University, College Station, TX, Jan. 5-7, 2017.
16. Ghosh, S. and **Preza, C.**, “Enabling imaging of optically thick samples using computational optical sectioning microscopy,” *Image Science Gordon Research Conference*, Stonehill College, Easton, MA, June 5-10, 2016.
17. Shabani, H., Sánchez-Ortiga, E. and **Preza, C.**, “Assessing super-resolution and optical sectioning capability in structured illumination microscopy,” *Image Science Gordon Research Conference*, Stonehill College, Easton, MA, June 5-10, 2016.
18. Patwary, N., King, S. V., Shabani, H. and **Preza, C.**, “Reducing the effect of depth-induced aberration in 3D fluorescence imaging using wavefront encoding” *Image Science Gordon Research Conference*, Stonehill College, Easton, MA, June 5-10, 2016.
19. Preza, C., “Advances in Computational imaging for quantitative 3D fluorescence microscopy,” *Golden Jubilee Annual Meeting of the Israeli Society for Microscopy (ISM)*, Haifa, Israel, 2016.
20. Ghosh, S. and **Preza, C.**, “Imaging thick specimens using wide-field fluorescence microscopy coupled with block-based 3D image restoration,” *Focus on Microscopy*, Taipei, Taiwan, 2016.
21. King, S. V., Patwary, N. and **Preza, C.**, “Quantitative wide-field fluorescence and phase microscopy using liquid crystal and display technology,” *EMN Meeting on Liquid Crystal*, Orlando, Florida, 2016.
22. King, S. V., Skalli, O. and **Preza, C.**, “3D imaging suitable for cellular uptake of spherical nanoparticles by accounting for spherical aberration,” *Focus on Microscopy*, Göttingen, Germany, 2015.
23. Patwary, N., King, S. V. and **Preza, C.**, “Improving 3D fluorescence imaging using a computational-optical approach to account for depth-induced aberrations,” *Quantitative BioImaging 2015*, Institut Pasteur, Paris, France, 2015.
24. Preza, C., Patwary, N., Doblas, A., King, S.V., Saavedra, G. and Martinez-Coral, M., “Addressing Depth-Induced Spherical Aberration in Computational Optical Sectioning Microscopy Using Wavefront Coding,” *Focus on Microscopy*, Sidney, Australia, April 13-16, 2014.



25. King S. V., Yuan, S., Dong, D. and **Preza, C.**, “Reducing the impact of spherical aberration on 3D microscopy imaging using programmable PSF engineering,” *Focus on Microscopy*, Maastricht, the Netherlands, March 24-27, 2013.
26. Yuan, S., and **Preza, C.**, “A new approach based on PSF engineering to reduce depth-induced aberration in 3-D fluorescence microscopy”, *Quantitative BioImaging 2013*, University of New Mexico, Albuquerque, New Mexico, 2013.
27. Yuan, S., and **Preza, C.**, “Reducing the impact of depth-induced spherical aberration on extended depth-of-field microscopy using PSF engineering”, *Quantitative BioImaging 2013*, University of New Mexico, Albuquerque, New Mexico, 2013.
28. Preza, C., Schaefer, L. H., Schuster, D., Ghaffar, A.-U., Yuan, S., and Lobo, G. J., “Impact of Spherical Aberration on Structured-Illumination Microscopy”, *Focus on Microscopy*, Singapore, April 1-4, 2012.
29. Preza, C. and Yuan, S., “Reducing the Impact of Spherical Aberration on Extended depth-of-field Microscopy Using PSF Engineering”, in *Focus on Microscopy*, Singapore, April 1-4 2012.
30. Preza, C., Yuan, S., Sporer, M. H., Mukherjee, A., Crosby, L. M., and Waters, C. M., “Investigating the use of structured-illumination microscopy as implemented in the Zeiss ApoTome attachment to image thick lung tissue slices”, *Focus on Microscopy*, Konstanz, Germany, April 2011.
31. Yuan, S., and **Preza, C.**, “A new approach to reduce depth-introduced aberration in 3-D microscopy”, *Memphis BioImaging Symposium (MemBIS)*, Memphis, 2011.
32. Preza, C., Ghosh, S., Grover, G., Quirin, S., Piestun, R., “Extraction of depth information in the presence of spherical aberration using double-helix point spread function coding in 3D fluorescence microscopy imaging”, in *Focus on Microscopy*, Konstanz, Germany, April 2011.
33. Preza, C., Mukherjee, A., Myneni, V., Crosby, L. M., and Waters, C. M., “3D cell imaging with computational optical-sectioning microscopy and structured-illumination microscopy”, *Focus on Microscopy*, Shanghai, China, March 2010.
34. Ghosh, S., Grover, G., Piestun, R. and **Preza, C.**, “A New Paradigm in 3D Imaging Systems for Microscopy- Double-Helix Point Spread Functions”, *Memphis BioImaging Symposium (MemBIS)*, Memphis, 2010.
35. Mukherjee, A., Yuan, S., Sporer, M. H., Crosby, L. M., Waters, C. M., and **Preza, C.**, "A Study of Image Resolution in Images Acquired from Thick Rat Lung Slices Using Structured Illumination Microscopy”, *Memphis BioImaging Symposium (MemBIS)*, Memphis, 2010.
36. Yuan, S., Chen, Y., **Preza, C.**, and Tang, C.M., “Phantom Study on Blood-Flow Pulsation Using Laser Speckle Contrast Imaging”, *Memphis BioImaging Symposium (MemBIS)*, Memphis, 2010.
37. Myneni, V. and **Preza, C.**, “Computational imaging for depth-variant fluorescence microscopy,” in *Focus on Microscopy*, Krakow, Poland, April 2009.
38. Preza, C., King S. V., Libertun, A. R., and Cogswell C. J., “Computational Imaging for DIC Microscopy: Current Use in Live-Cell Imaging”, *Focus on Microscopy*, Osaka-Awaji, Japan, April 2008.
39. Cogswell C. J., King S. V., Libertun, A. R., Piestun, R., and **Preza, C.**, “Quantitative DIC Microscopy: Improving Versatility for Live-Cell Imaging,” *Focus on Microscopy*, Valencia, Spain, April 2007.

### Conference Publications under Preparation or Review

1. Van, C. T. S., Shabani, H., and Preza, C., “3D model-based restoration with positivity constraint using a reduced number of 3D-SIM images,” *2020 IEEE International Symposium on*

- Biomedical Imaging (ISBI 2020)*, Iowa City, Iowa, April 4-8, 2020. (submitted)
2. Focus on Microscopy conference 2020
  3. Gordon Imaging Science conference 2020

### **Invited Presentations given by C. Preza**

1. "Recent Advances in 3D structured illumination microscopy with reduced data-acquisition", *Invited talk to be presented at the Recent Progress in Computational Microscopy session of the Computational Imaging XVIII Conference*, Burlingame, CA, Jan 28, 2020.
2. "Recent advances in 3D structured illumination microscopy," *Invited talk presented at the Dept. of Physics Seminar Series, The University of Houston*, Houston, TX, November 13, 2018.
3. "Recent advances in tunable 3D structured illumination microscopy," *Invited talk presented at 20th Anniversary International Conference on Transparent Optical Networks ICTON 2018*, University Politehnica Bucharest, Bucharest, Romania, July 1-5, 2018.
4. "Computational and computational-optical approaches to improve 3D imaging in fluorescence microscopy," *Invited talk presented at SPIE Commercial & Scientific Sensing and Imaging*, Orlando, Florida, April 15-19, 2018.
5. "Computational 3D microscopy: beyond deconvolution microscopy," *Invited talk presented at the 25<sup>th</sup> Symposium of SPIE Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXV*, San Francisco, CA, January 29, 2018.
6. "3D Image Restoration Using Multiple Space-Varying Point Spread Functions," *Invited talk presented at Mathematics in Imaging of the OSA Imaging and Applied Optics Congress*, San Francisco, CA, June 26-29, 2017.
7. "Computational microscopy of optically thick samples," *Invited talk presented at the International Conference on Computational Photography (ICCP) 2017*, Stanford University, Palo Alto, CA, May 12-14, 2017.
8. "Computational imaging for 3-D microscopy of thick samples," *Invited talk presented at the 14<sup>th</sup> Annual Advanced Imaging Methods (AIM) Workshop*, University of California at Berkeley, Berkeley, CA, January 24-27, 2017.
9. "Digital Imaging Principles," *Invited Lecture to be presented at the Optical Microscopy and Imaging in Biomedical Sciences course at the Marine Biology Laboratory*, Woods Hole, MA, September 12, 2016 and September 11, 2017.
10. "Advances in computational imaging for quantitative 3D fluorescence microscopy," *Invited talk presented at the Golden Jubilee Annual Meeting of the Israeli Society for Microscopy (ISM)*, Haifa, Israel, May 2016. (<http://www.ismicroscopy.org.il/ism2016/plenary-speakers/>)
11. "Imaging Thick Specimens with Spatially-Variant Refractive Index Using Wide-field Fluorescence Microscopy and Block-Based 3D Image Restoration," *Invited seminar given at the Joint Biomedical Engineering Program of The Univ. of Memphis & The Univ. of Tennessee, Health Science Center*, Memphis, Tennessee, February 26, 2016.
12. "Computational imaging for quantitative 3D fluorescence microscopy," *Invited seminar organized by IEEE Kolkata Section and IET(UK) Kolkata Network*, Meghnad Saha Institute of Technology, Kolkata, India, December 19, 2015.
13. "Computational imaging for 3D fluorescence microscopy: beyond deconvolution microscopy," *Invited tutorial presentation at the Quantitative BioImaging 2015*, Institut Pasteur, Paris, France, 2015. (<http://www.quantitativebioimaging.com/program/talks/>)
14. "Computational imaging for 3D fluorescence microscopy," *Invited talk at Imaging Systems and Applications*, of the Imaging and Applied Optics Congress, OSA, Seattle, 2014.

15. "Computational Imaging for 3D Fluorescence Microscopy," *Invited seminar given at the Seminar Series of the Physics Dept.*, Rhodes College, January 24, 2014.
16. "3D point spread function characterization for widefield fluorescence microscopy," *Invited tutorial presentation at the Quantitative BioImaging 2013*, University of New Mexico, Albuquerque, New Mexico, 2013.
17. "Advances in 3D Computational Imaging for Structured-Illumination Microscopy," *Invited seminar given at the Joint Biomedical Engineering Program of The Univ. of Memphis & The Univ. of Tennessee, Health Science Center*, Memphis, Tennessee, September 14, 2012.
18. "3D Fluorescence Microscopy Imaging Using Double-Helix Point-Spread Function Engineering," *Invited seminar given at the Optical Fibers and Signal Processing Group*, The Univ. of Valencia, Spain, July 5, 2012.
19. "New Computational Methods for Structured-Illumination Microscopy," *Invited seminar given at the Dept. of Optics*, The Univ. of Valencia, Spain, April 30, 2012.
20. "Quantitative 3D Fluorescence Microscopy Imaging Using Computational Methods," *Invited seminar given at the Seminar Series of the Dept. of Biological Sciences*, The Univ. of Memphis, Memphis, November 10, 2011.
21. "Computational Imaging Overview and Application to Microscopy," *Three invited lectures given at the I-CAMP 2011 School*, School of Engineering at the University of the Republic, Montevideo, Uruguay, May 28 - June 3, 2011.
22. "Correction of Depth-Induced Aberrations in 3D Fluorescence Microscopy Imaging," *Invited seminar given at the Seminar Series of the Physics Dept.*, The Univ. of Mississippi, Oxford, April 26, 2011.
23. "Correction of Depth-Induced Aberrations in 3D Fluorescence Microscopy Imaging," *Invited seminar given at the Seminar Series of the Department of Electrical and Computer Engineering, Purdue School of Engineering and Technology*, Indiana University / Purdue University at Indianapolis, December 9, 2010.
24. "Correction of Depth-Induced Aberrations in 3D Fluorescence Microscopy Imaging," *Invited seminar given at the Seminar Series of the Department of Electrical and Computer Engineering*, The University of Alabama, Tuscaloosa, Alabama, November 19, 2010.
25. "Correction of Depth-Induced Aberrations in 3D Fluorescence Microscopy Imaging," *Invited seminar given at the Seminar Series of the Physics Dept.*, The Univ. of Memphis, Memphis, October 14, 2010.
26. "Alternating Minimization Algorithm for Quantitative Differential-Interference Contrast (DIC) Microscopy," *Invited seminar given at the Computational Optical Imaging and Sensing Seminar Series of the Electrical & Comp. Eng. Dept.*, Univ. of Colorado, Boulder, October 13, 2008.
27. "Computational Imaging for Microscopy," *Invited seminar given at the Chemical Engineering Departmental Seminar Series*, Tennessee Technological University, Cookeville, Tennessee, September 30, 2008.
28. "Computational Optical Sectioning Microscopy," *Invited seminar given at the Electrical & Comp. Eng. Departmental Seminar Series*, Univ. of Colorado, Boulder, Colorado, March 6, 2007.
29. "Computational Imaging for Light Microscopy," *Invited seminar given at the Joint Biomedical Engineering Program of The Univ. of Memphis & The Univ. of Tennessee, Health Science Center*, Memphis, Tennessee, September 8, 2006.
30. "Computational Imaging for Depth-Varying Fluorescence Microscopy," *Invited seminar given at CDM Optics, Inc.*, Boulder, Colorado, March 17, 2006.

31. "Computational Imaging for Microscopy," *Invited seminar given at the Electrical & Comp. Eng. Dept.*, University of Colorado, Boulder, Colorado, March 14, 2006.
32. "Computational Imaging for Microscopy," *Invited seminar given at the Electrical & Comp. Eng. Dept.*, Michigan Technological Univ., Houghton, Michigan, February 16, 2006.
33. "Computational Imaging for Microscopy," *Invited seminar given at the Electrical & Comp. Eng. Dept.*, Texas A&M University, College Station, Texas, Nov. 4, 2005.
34. "Computational Imaging for Fluorescence Microscopy," *Invited seminar given at Ikonisys, Inc.*, New Haven, Connecticut, July 9, 2004.
35. "Computational Imaging for Microscopy," *Invited seminar given at the Electrical & Comp. Eng. Dept.*, Purdue University, West Lafayette, Indianapolis, May 5, 2003.
36. "Computational Imaging for Microscopy," *Invited seminar given at the Electrical and Computer Engineering Department*, University of Cyprus, Nicosia, Cyprus, March, 2003.
37. "Progress in Quantitative Differential-Interference-Contrast Microscopy Using Rotational-Diversity Phase Estimation," presented at *The Donald L. Snyder Workshop*, Washington University, St. Louis, MO, 2000.
38. "Phase Estimation Using Rotational Diversity for Differential Interference Contrast Microscopy," *Invited seminar given at the Electrical, Computer, & Systems Engineering Department*, Rensselaer Polytechnic Institute, Troy, New York, February 26, 1998.
39. "Computational Microscopy," *Invited seminar given at The Cyprus Institute of Neurology and Genetics*, Nicosia, Cyprus, October 23, 1997.
40. "Imaging Models for Transmitted-Light DIC Microscopy", *Invited seminar given at the Center for Light Microscope Imaging and Biotechnology*, Carnegie Mellon University, Pittsburgh, Pennsylvania, July 10, 1996.
41. "Comparison of Image Restoration Algorithms," *Invited presentation given at the IBC's Tutorial on Image Restoration for Three-Dimensional Microscopy*, Institute for Biomedical Computing, Washington University, St. Louis, MO, April 26-27, 1996.
42. "Regularized Linear Method for Computational Optical-Sectioning Microscopy," *Invited seminar given at the Center for Light Microscope Imaging and Biotechnology*, Carnegie Mellon University, Pittsburgh, Pennsylvania, April 2, 1992.

## **Service**

### ***At the Univ. of Memphis***

University of Memphis Research Council (UMRC)	Nov. 2018 – present
Herff College of Engineering Administrative Council	Jan. 2018 – present
University Council for Graduate Studies	Aug. 2014 – May 2016
Faculty Advisory Committee for Research	Jan. 2009
Center for Research on Women (CROW)- Affiliate Faculty	Jan 2012 - 2016
Herff College of Engineering Student Handbook Committee	Fall 2007
Herff College of Engineering Diversity Committee, Chair since 2018	Aug. 2006 – 2010, 2018
Herff College of Engineering Retention Committee	Aug. 2010 - 2013
Herff College of Engineering Graduate Coordinators Committee	Aug. 2013 - 2016
HCOE Graduate Studies Workflow Team	Aug. 2013 – 2016
Associate Chair, Electrical and Computer Eng. (ECE) Dept.	Jan. 2016 – Aug. 2017

Coordinator for Graduate Studies, ECE Dept.	Aug. 2013 – Aug. 2016
ECE Undergraduate Curriculum Committee	Aug. 2006 - 2013
ECE Graduate Curriculum Committee	Aug. 2006 – 2016
ECE Executive Committee	Aug. 2014 - present
Technical Area Group / ABET Committee	Jan. 2007 - present
Capstone Design Committee	2007 & 2009
ECE Seminar Series Committee	Aug. 2007 – present
MemphiSTEM Undergraduate Research Program	Jan. 2010 - 2015
Girls Experiencing Engineering (GEE) – HCOE outreach education program	June 2010 & 2012

***At Washington University***

ABET Committee	Sep. 2004 - June 2006
----------------	-----------------------

**Outreach Activities**

- Local Chapter of the Daughters of Penelope, Education Committee, Chair, 2007- present  
Responsibility: Review applications for University Education Scholarships and recommend scholarship recipient (<http://www.daughtersofpenelope.org/> ).

- Center for Research on Women (CROW), The University of Memphis, Affiliate Faculty, 2009 –2015

Supporting and participating in CROW events.

- Girls Experiencing Engineering (GEE), Instructor, June 2010 & 2012

Designed and instructed a two-day *Imaging Science Focus Session* with hands on activities for high school girls using our COSMOS software package.

**Courses Taught**

*At Washington Univ., the Univ. of Cyprus and since fall 2006 at the Univ. of Memphis.*

***Courses Proposed and Developed***

- **Professional Development/Research Methods**, (required graduate level course) every fall 2014 - present. Electrical and computer engineering research methods, development issues and ethics in academia and engineering practice. Students learn how to conduct literature search, write progress reports, publications, and proposals as well as prepare and give oral and poster presentations.
- **Inverse Problems in Imaging/Computational Methods for Inverse Problems** (special topic graduate level courses), fall 2008, spring 2015. A study of the principles of linear inverse problems, computational methods of their approximate solution, and practical application in imaging. Study of optimization methods and regularization principles for the solution of ill-posed inverse problems.
- **Computational Optical Imaging** (special topic graduate level course), fall 2010. A study of special topics in computational optical imaging including compressive sensing, structured illumination, wavefront encoding to extend the depth of field, correct aberration and provide super resolution in imaging systems.
- **Fourier Methods in Imaging** (special topic graduate level course), spring 2013. Mathematical tools to model and predict the action of imaging systems. Representation of images and systems in both continuous and discrete domains. Characterization of systems and their effect on the

quality of their output images.

- **Signals and Systems I** (required junior level course), fall 2010-2013, spring 2011-2014. Elementary concepts of continuous-time signals and systems. Analysis of linear time-invariant systems: convolution, Fourier series, Fourier transforms and Laplace transforms. Principles of sampling and modulation.
- **Introduction to Electrical and Computer Engineering** (required freshman level course), spring 2003, fall 2003. Fundamental aspects of engineering including physics and physical devices, mathematical modeling, analytical problem solving, engineering design, and laboratory experimentation. Course topics and skills are integrated in design projects on contemporary applications.
- **Introduction to Information Technology** (freshman level course), spring 2004. Basic concepts on information representation (A/D conversion, binary representation), storage (magnetic, optical), transmission (wired, fiber-optic, radio and satellite), and security for various forms of information (audio, image, and video). Basic principles of operation for: high-tech devices (mobile phones, GPS devices etc.), telephone and computer networks, and the World Wide Web.

#### *Courses Revised*

- **Image Processing** (graduate level course), fall 2012, spring 2014 & 2016. Theory and applications of digital image processing, sampling, quantization, enhancement, modeling and restoration of images; use of segmentation, descriptors, and pattern recognition.
- **Fourier Optics** (graduate level course), spring 2007 - 2010. Analysis of two-dimensional linear systems, scalar diffraction theory, Fresnel and Fraunhofer diffraction; Fourier transforming properties of lenses, spatial frequency analysis of optical systems, optical information processing and holography.
- **Transform Methods** (junior level course), fall 2001, 2006-2009 and spring 2010. Elementary concepts of continuous-time and discrete-time signals and systems. Analysis of linear time-invariant systems: convolution, Fourier series, Fourier transforms, Laplace and Z transforms. Principles of sampling and modulation.
- **Communication Theory** (senior level course), spring 2001-2003, 2009 & 2015. Amplitude and angle modulation for the transmission of continuous-time signals. Analog-to-digital conversion and pulse code modulation. Transmission of digital data. Introduction to random signals and noise and their effects on communication. Overview of various communication technologies.

#### *Other Courses*

- **Random Signals and Noise** (graduate level course), fall 2012. Statistical methods for describing and analyzing random signals and noise; auto-correlation, cross-correlation, and spectral density functions; optimal linear filter theory.
- **Electrical Engineering Senior Design Projects** (senior level course), spring 1999. Working in teams, students address design tasks assigned by faculty (this semester, students were given specifications to design and build a motion detector). Projects are chosen to emphasize the design process, with the designers choosing one of several paths to a possible result. Collaboration with industry and all divisions of the University is encouraged.
- **Introduction to Electrical Networks** (sophomore/junior level course), fall 2004, 2005 and spring 2005, 2006. Elements, sources, and interconnects. Ohm's and Kirchhoff's laws, superposition and Thevenin's theorem; the resistive circuit, transient analysis, sinusoidal analysis, and frequency response.
- **Electrical and Electronic Circuits Laboratory** (sophomore level course), spring 2002, 2005

- and fall 2002. Lectures and laboratory exercises on introductory networks and basic electronics.
- Guest Lectures on “Computational imaging for 3D microscopy” as part of **Light Microscopy: Theory and Applications** (graduate level Biology course) spring 2012.
  - Guest Lectures on “Optics of microscopes” as part of **Optical Imaging** (graduate level course), spring 1991, 1994, and 1997.
  - Guest Lecture on “Three-dimensional microscopy and deconvolution” as part of **Optical Bioelectric Imaging** (graduate level course in Biomedical Engineering), fall 2005.

## **Research Assistants Supervised**

### ***Current***

**Post-Doctoral Associates:** Cong Tuan Son Van; Abel Kamagara

**Graduate Students:** Zahra Rezaei Khavas (pursuing PhD)

### ***Past***

*At The Univ. of Memphis*

**Research Assistant Professor:** Ana Doblas; Sharon V. King.

**Post-Doctoral Associates:** Sharon V. King; Shuai Yuan; Jing Zheng

**Graduate Students:** Hasti Shabani (PhD; she was offered a post doc position at UCLA, CA); Nurmohammed Patwary (PhD, Senior Algorithm Engineer, KLA Corporation, CA); Sreya Ghosh (PhD; she accepted post doc position at Univ. of California San Diego)

**MS Students:** Sebastian Bedoya Lopez; Ananya Dutta; Hanieh Shabanian; Bhuvaneshwari Bhaskaran; Christopher A. Taylor; Md. Shohag Hossain; Matthew Bledsoe; Md. Mizanur Rahman; Gregorio Lobo; Monica V. Zugravu; Amaradri Mukherjee; Rakesh Duggirala; Abhilash K. Challa; Vimeetha Myneni; Siva P. Kinthada; Aaryani Tipirneni; Moshur Rahman; Udaya Gollamudi; Yipin Zhou; Daqi Dong; Karththika R. Muthukuri

**Undergraduate Students:** Joshua Kelly; Mark H. Sporer; Andrew Jenkins; Timothy Mathis; Gregorio Lobo; Matthew Fergusson; Christopher A. Taylor

*At Washington University*

**Graduate Students:** Sibon Li; Murillo R. Homem

## **Research Collaborators**

### ***Current***

Jason Braasch – The University of Memphis

Ana Doblas – The University of Memphis

Sharon V. King – St. Jude Children’s Research Hospital

Manuel Martinez-Coral – University of Valencia, Spain

Joseph A. O’Sullivan – Washington University

Genaro Saavedra – University of Valencia, Spain

Lutz H. Schaefer – Advanced Imaging Methodology Consultation, Canada

Dietwald Schuster - Hochschule Regensburg - University of Applied Sciences

Omar Skalli – The University of Memphis

Deborah Tollefsen – The University of Memphis

### ***Past***

Carol J. Cogswell – University of Colorado at Boulder

Jose-Angel Conchello – Harvard University Center for Brain Science

Nicoleta Dragomir –Victoria University, Australia  
Daniel R. Fuhrmann – Michican Tech  
Orges Furxhi – St. Johns Optical Systems  
Steven T. Griffin – The University of Memphis  
Khan M. Iftekharuddin – Old Dominion University  
Stephanie Ivey –The Univ. of Memphis  
Eddie Jacobs – The Univ. of Memphis  
Robert Kozma –The Univ. of Memphis  
James G. McNally – Helmholtz-Zentrum Berlin, Germany  
Michael I. Miller – Johns Hopkins University  
John Ollinger – Walter Reed National Military Medical Center  
Rafael Piestun – University of Colorado at Boulder  
Aaron Robinson –The Univ. of Memphis  
Donald L. Snyder – Washington University  
William H. Smith – Washington University  
Lan Wang –The Univ. of Memphis  
Thomas A. Woolsey – Washington University  
Christopher Waters – Univ. of Tennessee Health Science Center



## References

The following persons can be contacted for more information about Chrysanthe Preza:

- **A former colleague and current collaborator at Washington University in St. Louis**

Dr. Joseph A. O'Sullivan

Professor and Dean of the UMSL/WUSTL Joint Undergraduate Engineering Program

Samuel C. Sachs Professor of Electrical Engineering

Department of Electrical and Systems Engineering

Washington University, Campus Box 1127

1 Brookings Drive, St. Louis, MO 63130-4899

E-mail: [jao@ese.wustl.edu](mailto:jao@ese.wustl.edu), phone: (314) 935-4173, fax: (314) 935-7500

- **Former collaborator at the University of Colorado Boulder**

Dr. Rafael Piestun

Professor

Department of Electrical, Computer, and Energy Engineering

The University of Colorado Boulder

425 UCB, Boulder, CO 80309

E-mail: [rafael.piestun@colorado.edu](mailto:rafael.piestun@colorado.edu), Phone: (303) 492-2947, FAX: (303) 492-2758

- **My former Chair at the University of Memphis**

Dr. David J. Russomanno

Dean, Purdue School of Engineering and Technology, IUPUI

Professor, Dept. of Electrical and Computer Engineering, IUPUI

799 W. Michigan St., ET 219 E

Indianapolis, IN 46202-5160

Email: [drussoma@iupui.edu](mailto:drussoma@iupui.edu), Phone: 317-274-0802 Office; 317-274-4567

- **My doctoral research advisor at Washington University in St. Louis**

Dr. Donald L. Snyder

Senior Professor, Department of Electrical and Systems Engineering

Washington University, Campus Box 1127

1 Brookings Drive, St. Louis, MO 63130-4899

E-mail: [dls@ese.wustl.edu](mailto:dls@ese.wustl.edu), phone: (314) 780-5443