

Stephenson School of Biomedical Engineering
Seminar Series Presents

**ANTITUMOR IMMUNE RESPONSES INDUCED BY LASER
IMMUNOTHERAPY FOR TREATMENT OF METASTATIC CANCERS**



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9 a.m., Thursday, January 9, 2020
Gallogly Hall, Room 126

ABSTRACT:

For the past 25 years, my research has been focused on the development of laser immunotherapy (LIT) to treat metastatic cancers. LIT uses a combination of local laser irradiation and local administration of an immunostimulant to induce tumor-specific immune responses. Our pre-clinical studies and preliminary clinical trials demonstrated that the synergy of phototherapy and immunotherapy could not only destroy the treated primary tumors but also eradicate untreated metastases, leading to long-term survival and tumor resistance. To further investigate the immunological mechanism of LIT, we treated MMTV-PyMT breast tumors with LIT and performed single cell RNA sequencing (scRNAseq) on the tumor-infiltrating leukocytes. We observed a global change in the tumor microenvironment after LIT treatment as both innate and adaptive immune cells demonstrated proinflammatory phenotypes. In this talk, the components and procedures of LIT will be introduced and the preliminary clinical trials for breast cancer and melanoma patients will be reported. Furthermore, the scRNAseq analysis will be presented, along with our recent in vivo studies on the effect of CD8+ T cells and type I IFN on LIT treatment of metastatic mammary tumors and metastatic melanoma.

BIO:

Wei Chen is a Professor of Biomedical Engineering and Dean of the College of Mathematics and Science at the University of Central Oklahoma. He received his Ph.D. degree in theoretical high-energy particle physics from the University of Oregon in 1988. In 1994, Chen changed his research focus to cancer. He is the co-inventor of laser immunotherapy, a novel treatment method for metastatic cancers. LIT has been developed from a simple benchtop concept to a potential bedside clinical tool, with promising outcomes in preliminary clinical trials for late-stage, metastatic melanoma and breast cancer. He has published more than 160 peer-reviewed articles (with an h-index of 46) and has been awarded nine US patents and multiple international patents, with several more pending. Chen has received more than \$7 million in funding from state and federal agencies, foundations, and industrial sponsors. In 2006, Chen established and has since served as the Chair of the international conference “Biophotonics and Immune Responses”, Photonics West of SPIE (International Society of Optics and Photonics). He was elected as a SPIE Fellow in 2007. In 2000, he led the effort at UCO to establish the Biomedical Engineering undergraduate degree program and served as its program director from 2000 to 2006. In 2010, he established the Center for Interdisciplinary Biomedical Education and Research at UCO and has served as its director since its inception. He received the 2008 US Professor of the Year award, the 2011-2012 US Fulbright Lecturing/Research Award, the 2011 Oklahoma Medal for Excellence in Teaching, and the 2012 SPIE Educator Award. Chen has dedicated his career to cancer research and education.