BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.

Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: Maier, John

eRA COMMONS USER NAME (agency login): MAIERJ

POSITION TITLE: Director, Novel Core

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of Notre Dame, Notre Dame, IN	BS	05/1990	Physics
University of Illinois at Urbana-Champaign, Urbana, Il	MS	09/1991	Physics
University of Illinois at Urbana-Champaign, Urbana, IL	MD	12/1998	Medicine
University of Illinois at Urbana-Champaign, Urbana, IL	PHD	05/1998	Physics
University of Pittsburgh, Pittsburgh, PA	Resident	02/2002	Family Medicine Residency

A. Personal Statement

John Maier is an Assistant Professor and the Director of Research and Development in the Department of Family Medicine at the University of Pittsburgh. John is a Co-Director of the Innovation as a Discipline Component at the Clinical and Translational Science Institute where he is also the director of the Pitt Innovation Challenge. He completed his PhD in Physics and MD at the University of Illinois at Urbana-Champaign where his research focused on light-tissue interaction and its application to in-vivo spectroscopy.

After completing the Medical Scholars Program at Illinois he went on to the UPMC Shadyside Family Medicine Residency from 1999 to 2002. From 2002 to 2011 he worked at ChemImage Corporation in Pittsburgh as the leader of Biomedical research and a member of the management team. In 2011 he returned to the University of Pittsburgh as a member of the faculty in the Department of Family Medicine where he serves on the executive committee and provides leadership and support to projects that span the range from medical education research to health care system delivery innovation in community based settings. Dr. Maier is a co-inventor on over 50 US patents and co-author on 14 peer reviewed publications and numerous proceedings, abstracts and presentations.

“My position in the department of Family Medicine allows me to leverage my technical background in imaging and measurement science; my broad based primary care clinical background; and my experience in the industrial setting as I provide integration support and leadership to the complex work of translating academic and technical advances into clinical medicine.”

B. Positions and Honors

Positions and Employment

2002 - 2007 Senior Biomedical Scientist, ChemImage Corporation, Pittsburgh, PA
2007 - 2011 Vice-President Biomedical Applications, ChemImage Corporation, Pittsburgh, PA
2011 - Assistant Professor, University of Pittsburgh, School of Medicine, Pittsburgh, PA
2014 - Director, Novel Core, Clinical Translational Science Institute (CTSI), University of Pittsburgh, Pittsburgh, PA
2014 - CTSI representative, Center for Medical Innovation, University of Pittsburgh, Pittsburgh, PA

Other Experience and Professional Memberships

2002 - Licensed Physician and Surgeon, Commonwealth of Pennsylvania
2014 - Member, UpPrize Advisory team

Honors

2007 Bloomfield Fellowship, University of Illinois at Urbana-Champaign, Medical Scholars Program

C. Contribution to Science

1. As a graduate student at the University of Illinois my work was on the study of light transport by highly scattering materials with a specific focus in applications in clinical medicine. I contributed to our research group's work establishing and validating a frequency domain approach to measuring light transport and ultimately translating that into use in animals.

    a. Fitzpatrick N, Maier J, Yasko L, Mathias D, Qua K, Wagner E, Miller E, Reis S, The Pitt Innovation Challenge (PInCh): Driving Innovation in Translational Research Through an Incentive-Based, Problem-Focused Competition, Academic Medicine, in press 2016

    b. Gratton G, Maier JS, Fabiani M, Mantulin WW, Gratton E. Feasibility of intracranial near-infrared optical scanning. Psychophysiology. 1994 Mar;31(2):211-5. PubMed PMID: 8153259.

    c. Maier JS, Walker SA, Fantini S, Franceschini MA, Gratton E. Possible correlation between blood glucose concentration and the reduced scattering coefficient of tissues in the near infrared. Opt Lett. 1994 Dec 15;19(24):2062-4. PubMed PMID: 19855740.

    d. Gratton E, Maier J, Franceschini MA, Fantini S, Walker SA. , inventors. Board of Trustees of the University of Illinois (Chicago, IL), assignee. Determining material concentrations in tissues. United States 5,492,118. 1996 February 20.

    e. Cerussi AE, Maier JS, Fantini S, Franceschini MA, Mantulin WW, Gratton E. Experimental verification of a theory for the time-resolved fluorescence spectroscopy of thick tissues. Appl Opt. 1997 Jan 1;36(1):116-24. PubMed PMID: 18250652.

2. At ChemImage Corporation my work focused on the use of Raman imaging spectroscopy in evaluation of cells and tissues. This work explored the use of Raman imaging as a potential diagnostic tool that did not depend on complex reagents for chemical specificity.

    In addition to the publications listed below this work led to 53 US patents assigned to ChemImage Corporation.

    a. Escoriza MF, Vanbriesen JM, Stewart S, Maier J. Studying bacterial metabolic states using Raman spectroscopy. Appl Spectrosc. 2006 Sep;60(9):971-6. PubMed PMID: 17002820.

    b. Escoriza MF, VanBriesen JM, Stewart S, Maier J. Raman spectroscopic discrimination of cell response to chemical and physical inactivation. Appl Spectrosc. 2007 Aug;61(8):812-23. PubMed PMID: 17716399.

    c. Tollefson M, Magera J, Sebo T, Cohen J, Drauch A, Maier J, Frank I. Raman spectral imaging of prostate cancer: can Raman molecular imaging be used to augment standard histopathology?. BJU Int. 2010 Aug;106(4):484-8. PubMed PMID: 20201840.

    d. Shapiro A, Gofrit ON, Pizov G, Cohen JK, Maier J. Raman molecular imaging: a novel spectroscopic technique for diagnosis of bladder cancer in urine specimens. Eur Urol. 2011 Jan;59(1):106-12. PubMed PMID: 21035247.

3. At the University of Pittsburgh I have worked in the area of image analysis in multiplex stained tissue sections. This work focuses on the use of image data to learn about and visually depict signalling pathways that are active in sections of tissue that are being evaluated.

    a. Isse K, Lesniak A, Grama K, Maier J, Specht S, Castillo-Rama M, Lunz J, Roysam B, Michalopoulos G, Demetris AJ. Preexisting epithelial diversity in normal human livers: a tissue-tethered cytometric analysis in portal/periportal epithelial cells. Hepatology. 2013 Apr;57(4):1632-43. PubMed PMID: 23150208; PubMed Central PMCID: PMC3612393.

4. Since October 2013 I have worked with the University of Pittsburgh Clinical Translational Science institute to implement the Pitt Innovation Challenge. This is one of the early steps we are taking at the University of

Pittsburgh to develop and nurture an innovation ecosystem. The Pitt Innovation Challenge (PInCh) brings together best practices: "problem focused innovation" and "incentive challenges" to stimulate new proposals and the creation of new teams focused on clinical translational science. We have developed t he process and optimized IT system in a way that it can be shared and deployed in other settings.

The process has been used to support 3 innovation challenges in addition to the Pitt Innovation Challenges. This includes a challenge run by BNY Mellon to solicit and select social impact investment opportunities.

A publication currently under review in Academic Medicine will report our initial experience.

D. Research Support

Completed Research Support

2005/01/01-2006/01/01
W81XWH-05-2-0071, DARPA Seedling grant
Maier, John (PI)
Digitizing Biology
In this study, we have employed Raman spectroscopy and Raman chemical imaging, along with chemometric techniques, to distinguish apoptotic cells from non-apoptotic cells in two prostate cancer cell lines, PC3 and LnCAP. Initial results indicate that Raman spectra of apoptotic and non-apoptotic cells are different in both cell lines. Furthermore, chemometric analysis of the data shows that the spectra separate into two distinct populations, apoptotic and non-apoptotic. Traditional fluorescence based apoptotic assays confirm the results. This work provides ample evidence that Raman spectroscopy is a valuable tool in biomedical imaging.
Role: PI

2004/03/01-2004/08/31
EPD04032, EPA Phase 1 SBIR
Shona Stewart (PI)
Noncontact, Optical Molecular Method for Detection and Identification of Cryptosporidium parvum Oocysts in Drinking Water
ChemImage Corporation will employ Raman spectroscopy and imaging to detect and identify Cryptosporidium parvum cysts in drinking water. ChemImage Corporation also will demonstrate that Raman imaging, in combination with chemometric techniques, can identify small numbers of the oocysts and differentiate between oocysts and other interferents present in drinking water. This proof of concept will be a critical first step to implementation of a new, important class of continuous, online detection strategies that will increase the safety of the water supply.
Role: CoPI

1996/07/01-1998/12/31
F0MH11432, National Institutes of Health
Maier, John (PI)
Noninvasive Near Infrared Neonatal Brain Hemoximitry
Near-infrared tissue spectroscopy is advancing toward clinical use in many areas of medicine. The study of the brain both in terms of hemoximetry and neurophysiological signals is the primary focus of much of the current research in this area. Our laboratory has pioneered the development of a near-infrared tissue spectrometer for clinical use based on the physical understanding of how light travels in tissues. This physical model assumes a homogenous infinite tissue bounded by a flat plane. I propose to investigate two of the fundamental problems involved with application of this model to near-infrared spectroscopy of the brain: the problem of the curved surface of the skull, and the problem of light piping by the cerebrospinal fluid (CSF). Though these problems

are present in both adults and infants I will focus on them in the neonatal case. Neonatal brain hemoximetry is of interest because of the correlation of long term pathology including cerebral palsy, attention deficit disorder and mental retardation, with ischemic and hemodynamic insults to neonates. I will investigate the accuracy of a simple model for curved surfaces through in vitro laboratory experiments on tissue simulating phantoms. I will also explore, through Monte Carlo modeling and experimental studies on in vitro laboratory samples, the degree to which the CSF is expected to affect the measurement protocols currently in place.
Role: PI