Ruei-Jr Wu

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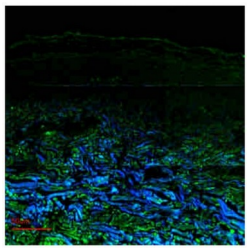
Educations

- **National Taiwan University** — **Taipei, Taiwan**
  Physics, B.S. — *2001-2005*
- **Indiana University of Bloomington,** — **Bloomington, IN, USA**
  Physics, M.A. — *2008-2011*
  - Motion Planning and Non-Linear Dynamic Control
- **Boston University** — **Boston, MA, USA**
  MS, Biomedical Engineering — *2012-2014*
  - Hybrid System, AI and Machine Learning

Experiences

- **National Taiwan University Hospital** — **Taipei, Taiwan**
  Research Assistant — *2007-2008*

  - Quantitative Determination of Photoaging

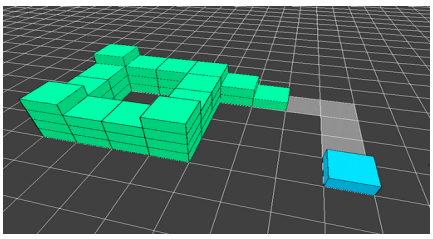
  The photoaging process of facial skin is investigated by use of multi-photon fluorescence (MPF) and Second Harmonic Generation (SHG) microscopy. I obtained the auto fluorescence (AF) and SHG images of superficial dermis to quantify the age of human facial skin by applying object recognition of different tissues of skin.

  - Cancer Detection by Label-free microscopy

  We had achieved the development of the non-invasive and label free cancer detection by using Second Harmonic Generation microscopy.

- **Indiana University Bloomington** — **Bloomington, IN, USA**
  Teaching Assistant — *2008-2011*

  - Simulation of Collective Construction in Mound-building Termites Robot

  In this project, I created a package to simulate the collective behavior of mult-agents termites robot. This simulation provides a motion plane for each termite robotics to build a given 3D structure.

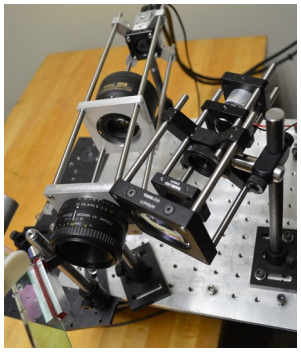
  - Computational Simulation of Skin Formation

  I built a computational Reaction-diffusion model for studying the mechanical properties of skin with aging. The simulation provides visual results demonstrating the formation and density of collagen of skin under the various conditions. This can help in the consideration of proper measures for a cosmetic product for the skin.

For more details, please visit my portfolio

- **Boston University** **Boston, MA, USA**
  Research Assistant *2012-2014*

  - Digital Dual Purkinje Image Eye-tracker (**DDPI**)

  Traditional Dual Purkinje Image ((DPI)) eye-tracker is composed by sets of moving optical lens which introduce noise and artifacts. I developed DDPI eye-tracker to eliminate the complexity of design and increase the stability and accuracy of results. DDPI is using Dualtrack, an object recognition algorithm, to achieve high resolution tracking at high speed.

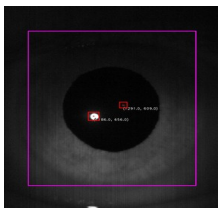
  - Binocular-EyeRIS

  DPI eye-tracker (Generation 6 by Fourward Technologies), is a device that can measure ocular motion with high resolution at hight speed. With two DPI eye-tracker, we can measure binocular eye movement. I developed the interface in C++ to control Binocular eye tracker and measure eye movement.

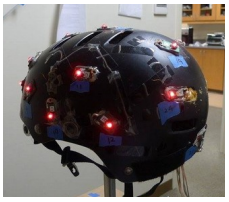
- **APLab, Boston University** **Boston, MA, USA**
  Biomedical Engineer *2015-*

  - Dualtrack

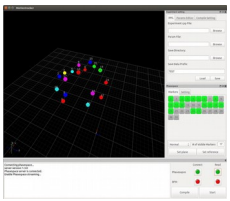
  Dualtrack is an hight speed object recognition and tracking algorithm implement on Nvidia GPU.

  - PhaseSpaceVirtualReality (**PSvr**)

  Psvr is a system which integrates PhaseSpace and Head Mount Display (HMD). PhaseSapce system use active infrared optical markers to capture precise body motion. PSvr is able to measure small head motion at high speed and present image to HMD to achieve precise Virtual Reality.

  - APEnv

  APEnv is an OpenGL based experimental 3D software which can render image to Virtual Reality or monitor. APEnv is design to integrate DDPI, Psvr and Binocular-EyeRIS and facilitate the process of experiments designe.

Earned Patent

US 20110178410 A1: Method of Quantitative Analysis Utilizing Multiphoton Microscopy

Skills

Programming Languages: C, C++, Fortran, Java, Javascript, Labview, Matlab, Python, VHDL

Libraries: Boost, Eigen, OpenCV, OpenGL, Qt, SDL, Volkan

CAD: Solidwork, Freecad

For more details, please visit my portfolio

Publication

1. *Wang CC, Wu R Jr et al.*, **Label-free discrimination of normal and pulmonary cancer tissues using multiphoton fluorescence ratiometric microscopy**, Appl. Phys. Lett. 97, 2010

2. *Lin SJ, Hsu CJ, Wu R Jr et al.*, **Quantitative multiphoton imaging for guiding basal-cell carcinoma removal**, Proceedings of SPIE, 2007

3. *Lin SJ, Wu R Jr et al.*, **Evaluating cutaneous photoaging by use of multiphoton fluorescence and second-harmonic generation microscopy**, Opt Lett. 2005

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