*Curriculum Vitae*

**Ji Hun Oh, Ph.D.**

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**FOCUS OF RESEARCH**

Image Processing (Registration, Segmentation, and Texture Feature Analysis), Image Fusion, Augmented Reality, Computer Vision, GPU-based Data Parallel Processing (CUDA, OpenCL), Pattern Recognition, Machine Learning, PDE, Optimization

**EDUCATION**

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| Ph.D. | **Georgia Institute of Technology** – Electrical and Computer Engineering Major: Medical Image Processing, Minor: Mathematics Dissertation: *“Contrast-Enhanced Magnetic Resonance Liver Image Registration, Segmentation, and Feature Analysis for Liver Disease Diagnosis”* Advisor: Prof. Xiaoping Hu, Cumulative GPA: 3.75/4.00 | Atlanta,GA | Dec. 2012 |
| M.S. | **Georgia Institute of Technology** – Electrical and Computer Engineering Major: Digital Signal Processing Advisor: Oskar Skrinjar, Ph.D. | Atlanta,GA | May 2009 |
| B.S. | **Hanyang University** – Electrical and Computer Engineering Cumulative GPA: 3.83/4.50  | Seoul,Korea | Feb. 2007 |
|  | **University of California, Irvine** - Embedded System Program  | Irvine, CA | Feb.2005-Aug.2005 |

**EXPERIENCES**

* **Post-doc Research Fellow** Jan. 2013 - Present

**Children's National Medical Center, Washington DC**

Researching on image fusion (Laparoscopic 3D Ultrasound + Stereoscopy) and augmented reality for minimally invasive pediatric surgery, and continuous hands-free 3D ultrasound reconstruction/rendering.

* **Internship (IT-informatics)** June 2012 – Aug. 2012

**Merck & Co., Boston, MA**

Researched on automated quantification of tumor burden in vivo in pathologic mice lung micro-CT time series using pre-dose lung segmentation to guide the segmentation at later time points.

* **Graduate Research Assistant** Aug. 2008 – Dec. 2012

**Georgia Institute of Technology, Atlanta, GA**

Researched on building up a computer-aided diagnostic system to detect liver-related tumors or disease with Emory Healthcare. With DCE-MR liver volume sequences, we develop not only fast, but also accuracy-guaranteed image registration and analyze the intensity time course and texture features to find highly correlated features to chronic liver disease.

* **Graduate Teaching Assistant** May. 2008 – Aug. 2008, Aug. 2011 – May. 2012

**Georgia Institute of Technology, Atlanta, GA**

Assisted teaching the course lab of ECE 2025, Introduction to Signal Processing. Related to discrete-time and continuous-time signals, filtering, frequency response, Fourier transform, z-Transform. Laboratory emphasizes computer-based signal processing.

* **Part-time Employee** Sep. 2007 – Dec. 2007

**Georgia Institute of Technology, Atlanta, GA**

Worked on making figures or sample images demonstrating the theoretical knowledge using MATLAB script, to be inserted in the image processing textbook published by Dr. Yucel Altunbasak.

* **Internship** Jun. 2005 – Aug. 2005

**University of California, Irvine, CA**

Worked on designing a web database application for managing school-equipments using PHP and MySQL.

**RESEARCH PROJECTS**

* **Real time fusion of stereoscopic video with ultrasound for laparoscopic surgery** in a research with Children's National Medical Center, Jan. 2013 ~ Present - To develop the complete laparoscopic video with continuous hands-free 3D ultrasound system for the OR-use in minimally invasive laparoscopic surgery.
* **Automatic segmentation and feature analysis on DCE-Liver MRI sequences**  in a research with Emory Healthcare, Aug. 2011 ~ Dec. 2012 - To develop segmentation algorithm based on coupling of edge-based and region-based active contour to be robust in medical images and find highly correlated MR texture features that help automatically score the severity of chronic liver disease (CLD), measured as fibrotic score. (MATLAB)
* **Liver 2d histology-3d MRI image registration** in a research with Emory Healthcare**,** Jan. 2010 ~ July. 2011 - To register Liver images with two different modalities in order to find the corresponding oblique and warped plane in MRI volume to the histology plane image of the liver. (MATLAB)
* **Accelerating GPU-based Liver MRI image registration system** in a research with Emory Healthcare, June 2010 ~ Dec. 2010 - To implement computationally extensive image registration algorithm on a graphics processing unit (GPU) using OpenCL.
* **Virtual biopsy interface software development** in a research with Emory Healthcare, July 2009 ~ May. 2010 **-** To develop a software to help radiologists mark over suspicious regions of DCE Liver MRI using manual spline curve with corresponding liver disease scores for research use and export the coordinate of spline curve and its score into txt file. (Python, VTK)
* **Contrast uptake time course analysis on DCE Liver MR image sequences** in a research with Emory Healthcare, Aug. 2008 ~ June 2009 - To analyze the contrast uptake time courses extracted over the liver parenchyma and the aorta. (MATLAB)

**COMPUTER SKILLS**

* Languages**:** C/C++, Python
* APIs**:** OpenCV, OpenCL, CUDA, OpenGL, Visualization Toolkit (VTK), Insight Segmentation and Registration Toolkit (ITK), Qt, MFC
* Medical Imaging Tool: Brainsuite, ImageJ, AIR
* OS: Linux, Window
* Scientific/Drawing Applications**:** MATLAB, MS Visual Studio, 3D studio MAX, Photoshop
* Office Applications: Microsoft Power Point, Word, Excel, Visio, Latex
* **Embedded Systems Certificate, University of California, Irvine** Feb. 2005 - Aug. 2005

Trained microprocessor-based control systems, to system-on-chip (SoC) design, and device software development. Learned the essential concepts of embedded systems development through a practical hands-on approach utilizing industry design automation (EDA) tools and design kits.

**PUBLICATIONS**

* **Ji Hun Oh**,"Contrast-Enhanced Magnetic Resonance Liver Image Registration, Segmentation, and Feature Analysis for Liver Disease Diagnosis," Ph.D. Dissertation, *Georgia Institute of Technology*, December, 2012.
* **J. Oh**, X. Kang, E. Wilson, C. Peters, T. Kane, R. Shekhar, "Stereoscopic Augmented Reality using Ultrasound Volume Rendering for Laparoscopic Surgery in Children," *SPIE Medical Imaging 2014, accepted.*
* X. Kang, **J. Oh**, E. Wilson, Z. Yaniv, T.D. Kane, C. Peters, R. Shekhar, "Towards A Clinical Stereoscopic Augmented Reality System for Laparoscopic Surgery," *MICCAI CLIP 2013, Sept. 22nd, \*****Best paper*.**
* **J. Oh**, D. Martin, and X. Hu, "Signal Intensity and Texture Feature Analysis in Contrast-Enhanced Liver MRI for Chronic Liver Disease Diagnosis," *ISMRM 2013, April 20-26th.*
* **J. Oh**, D. Martin, and O. Skrinjar, "Liver 2D Histology to 3D MR Image Registration using Segmentation and Point Landmarks," *Proc. SPIE Medical Imaging 2012, Accepted*.
* **J. Oh**, D. Martin, and O. Skrinjar, "GPU-based Motion Correction of Contrast-Enhanced Liver MRI Scans: An OpenCL Implementation*," IEEE International Symposium on Biomedical Imaging (ISBI) 2011, March 30th- April 2nd*.
* **J. Oh**, D. Martin, and O. Skrinjar, "LCC demons with divergence term for liver MRI motion correction," *Proc. SPIE, Vol. 7623, 76232T (2010),* *Medical Imaging 2010, Feb. 13-18th*.

**PRESENTATIONS**

* **J. Oh**, "Signal Intensity and Texture Feature Analysis in Contrast-Enhanced Liver MRI for Chronic Liver Disease Diagnosis," ISMRM 2013, Salt Lake, Utah, April 22 2013.
* **J. Oh**, "SonoTable: Continuous hands-free 3D US to guide pediatric laparoscopic surgery," *Research and Education Week 2013 in Children's National Medical Center, Washington DC, April 16 2013.*
* **J. Oh**, "GPU-based Motion Correction of Contrast-Enhanced Liver MRI Scans: An OpenCL Implementation," *IEEE International Symposium on Biomedical Imaging (ISBI) 2011, Chicago, IL, March 31 2011.*
* **J. Oh**, "LCC demons with divergence term for liver MRI motion correction," *Proc. SPIE, Medical Imaging 2010, San Diego, CA, February 15 2010.*
* **J. Oh**, "Contrast-Enhanced Liver MRI Motion Correction Using Accelerated Local Correlation Coefficient Demons," *Georgia Tech Research Innovation Conference (GTRIC) 2010, Atlanta, GA, February 8 2010.*

**PATENTS**

* SmartPupillometer (Provisional patent #: 61879707, 9/19/2013~9/18/2014)

**HONORS**

* 1st place, Venture Intrapreneurship Program, Children’s National Medical Center July 2013
* Scholarship of IT Research study, Ministry of Information and Communication of S. Korea, 2005
* Scholarship, Hanyang University, Seoul, South Korea Aug. 2000 – Jun. 2001

**ACTIVITIES**

* **President,** Young Adult Group of Atlanta Chung-Ang Presby. Church, Atlanta, GA

Oct. 2011 - Dec. 2012

* **Vice president**, Hanyang Calligraphy Club, Seoul, South Korea Jan. 2001 – Dec. 2001

**PROFESSIONAL AFFILIATIONS**

* SPIE Medical Imaging
* IEEE Engineering in Medicine and Biology Society
* International Society for Magnetic Resonance in Medicine (ISMRM)

**REFERENCES**

* **Prof. Xiaoping Hu, PhD,** Professor and Georgia Research Alliance endowed eminent scholar in Imaging Coulter Department of Biomedical Engineering at Georgia Tech and Emory University, Atlanta, GA.

E-mail: xhu3@emory.edu

* **Prof. Diego R. Martin, MD, PhD, FRCPC,** The Cosden Professor and Chair of Radiology, University Medical Center of University of Arizona, Tucson.

E-mail: dmartin@radiology.arizona.edu

* **Oskar Skrinjar, PhD,** The principal of Scientific Imaging And Visualization LLC, Atlanta, GA. Worked as Assistant Professor in Biomedical Engineering at Georgia Tech, Atlanta, GA.

E-mail: oskar@scientificiv.com

* **Sangeetha Somayajula, PhD,** Research Scientist atMerck Research Laboratories, Boston, MA.

E-mail: sangeetha\_somayajula@merck.com

* **Sinyeob Ahn, PhD,** Field Application Scientist at Siemens, San Francisco, CA.

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