

## Ozan Oktay, Ph.D.

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CONTACT INFORMATION	344 Huxley Building, SW7 2AZ, London, U.K.	<i>E-mail:</i> o.oktay13@imperial.ac.uk <i>Web:</i> www.doc.ic.ac.uk/~oo2113 <i>GitHub:</i> github.com/ozan-oktay
FIELDS OF EXPERTISE	Medical Image Processing, Machine Learning, Computer Vision, Natural Language Processing, Applied Mathematics, Non Linear Optimization and Statistical Analysis.	
EDUCATION	<b>Imperial College London</b> , London, United Kingdom Ph.D., Computing Department, Nov 2013 - Dec 2017 <ul style="list-style-type: none"><li>• Thesis Title: “<i>Learning Anatomical Image Representations for Cardiac Imaging</i>”</li><li>• Thesis Supervisors: Prof. Dr. Daniel Rueckert, and Prof. Dr. Jo Hajnal</li><li>• Research Lab: Biomedical Image Analysis Group, Imperial College London</li><li>• Specialisation: Convolutional Neural Networks (CNNs), Image Super-Resolution, Semantic Image Segmentation, Object Localisation in Images, Multi-modal Image Registration, Uncertainty Analysis in CNNs, Anatomical Shape Modelling.</li></ul> <b>Ecole Polytechnique Federale de Lausanne (EPFL)</b> , Lausanne, Switzerland M.Sc., Computer and Communication Sciences, Sept 2010 - April 2013 <ul style="list-style-type: none"><li>• Thesis Topic: <i>Biomechanical Image Registration for Laparoscopic Surgery</i></li><li>• Thesis Grade: 6.00/ 6.00 - GPA: 5.48/ 6.00</li><li>• Specialization: Signals, Images and Interfaces, Wireless Communications.</li></ul> <b>Middle East Technical University (METU)</b> , Ankara, Turkey B.Sc., Electrical and Electronics Engineering, Sept 2006 - June 2010 <ul style="list-style-type: none"><li>• <i>Summa cum Laude</i>, with High Honours in Engineering.</li><li>• Specialization: Digital Signal Processing and Telecommunications.</li><li>• GPA: 3.98/ 4.00</li></ul>	
INDUSTRY EXPERIENCE	<b>HeartFlow Inc</b> July 2018 - Present Research Scientist, London, UK & Redwood City, CA <ul style="list-style-type: none"><li>• Medical Imaging Analysis Group<ul style="list-style-type: none"><li>– Design and implementation of algorithms and machine learning models for automated medical image processing.</li><li>– Implementation and testing of clinical software used in healthcare services.</li></ul></li><li>• Projects and Responsibilities<ul style="list-style-type: none"><li>– Coronary Vessel Centreline Extraction: Design and delivery of solutions that are based on machine learning models to our clinical customers. Experimentation and testing of software tools and models in a cloud environment.</li><li>– Automated Image Quality Assessment: Project planning and execution, technical leadership, and design of machine learning models for problem solution.</li></ul></li></ul> <b>ThinkSono Ltd</b> Apr 2017 - Mar 2018 Technical Consultant and Project Lead, London, UK <ul style="list-style-type: none"><li>• <b>Image Analysis &amp; Machine Learning Group</b><ul style="list-style-type: none"><li>– Design and development of neural network models for clinical decision support.</li><li>– Automatic analysis frameworks for ultrasound (US) imaging: image plane detection, transducer navigation, pathology classification.</li><li>– Ultrasound image analysis for the detection of deep vein thrombosis (DVT).</li></ul></li></ul>	

	<b>Siemens Corporate Research</b>	Sept 2012 - Aug 2013
	Master's Thesis Project,	Princeton, NJ, USA
	<ul style="list-style-type: none"> <li>• Imaging and Computer Vision Group <ul style="list-style-type: none"> <li>– 3D-3D Image Registration Problem in Minimally Invasive Surgery.</li> <li>– Biomechanical Tissue Modelling, Finite Element Analysis, Tissue Deformation Modelling and Simulation. Discrete Optimisation Techniques for Image Registration Problem.</li> <li>– Supervisors : Prof. Jean-Philippe Thiran (EPFL), Dr. Li Zhang (SCR)</li> </ul> </li> </ul>	
RESEARCH EXPERIENCE	<b>Honorary Research Fellow</b>	Mar 2018 - Present
	Computing Department, Imperial College London,	London, UK
	<ul style="list-style-type: none"> <li>• Biomedical Image Analysis Group (BioMedIA) <ul style="list-style-type: none"> <li>– Principal investigator : Prof. Dr. Daniel Rueckert and Dr. Ben Glocker</li> <li>– Project management and supervision of research staff and PhD students in the BioMedIA group. Broadly equivalent to lecturer.</li> </ul> </li> </ul>	
	<b>Research Assistant/Associate</b>	Nov 2013 - Mar 2018
	Computing Department, Imperial College London,	London, UK
	<ul style="list-style-type: none"> <li>• Biomedical Image Analysis Group (BioMedIA), <ul style="list-style-type: none"> <li>– Transfer learning and domain adaptation of machine learning models for image segmentation and plane localisation in ultrasound images.</li> <li>– Development of machine learning models (e.g. decision trees and deep neural networks) for cardiac image analysis. A few applications include: semantic image segmentation, image super-resolution, object localisation, and automatic quantitative measurements for clinical diagnosis.</li> <li>– Multi-modal image registration and analysis for interventional procedures: Spatial alignment of ultrasound and MR cardiac images.</li> <li>– Automatic object/organ localization in fetal MRI scans using convolutional neural networks and Bayesian network models.</li> <li>– Supervisor : Prof. Dr. Daniel Rueckert</li> </ul> </li> </ul>	
TEACHING EXPERIENCE	<b>Teaching Assistant</b>	Oct 2014 - Dec 2016
	Computing Department, Imperial College London,	London, UK
	<ul style="list-style-type: none"> <li>• Medical Image Computing (4<sup>th</sup> year undergraduate course), <ul style="list-style-type: none"> <li>– Preparation of python notebook modules and c++ libraries (using Scikit-Learn, ITK, VTK, OpenCV) for machine learning and basic medical image analysis tasks. Helping students in tutorial sessions.</li> </ul> </li> <li>• Computer Graphics (3<sup>th</sup> year undergraduate course), <ul style="list-style-type: none"> <li>– Object rendering, shading, ray tracing, OpenGL and BLAS libraries.</li> </ul> </li> <li>• Mathematical Methods (1<sup>st</sup> year undergraduate course)</li> </ul>	
BOOK CHAPTERS	C. Baumgartner, <b>O. Oktay</b> , D. Rueckert. “Fully Convolutional Networks in Medical Imaging: Applications to Image Enhancement and Recognition”. Deep Learning and Convolutional Neural Networks for Medical Image Computing. Edited by Lu, L., Zheng, Y., Carneiro, G., Yang, L. . Springer, 2017.	
SELECTED JOURNAL PUBLICATIONS	<p><b>O. Oktay</b>, et al. “Attention Gated Networks: Learning to Leverage Salient Regions in Medical Images”. Medical Image Analysis, Elsevier, Jan 2019.</p> <p>A. Alansary <b>O. Oktay</b>, et al. “Evaluating Reinforcement Learning Agents for Anatomical Landmark Detection”. Medical Image Analysis, Elsevier, Jan 2019.</p> <p><b>O. Oktay</b>, et al. “Anatomically Constrained Neural Networks (ACNN): Application to Cardiac Image Enhancement and Segmentation”. IEEE Transactions on Medical Imaging (IEEE TMI), Sept 2017.</p>	

**O. Oktay**, et al. “Stratified Decision Forests for Accurate Anatomical Landmark Localization”. IEEE Transactions on Medical Imaging (IEEE TMI) 36.1 (2017).

M. Rajchl, M. Lee, **O. Oktay**, et al. “DeepCut: Object Segmentation from Bounding Box Annotations using Convolutional Neural Networks”. IEEE Transactions on Medical Imaging (IEEE TMI) 36.2 (2017) pp: 674-683.

SELECTED  
CONFERENCE  
PUBLICATIONS

**O. Oktay**, et al. “Attention U-Net: Learning Where to Look for the Pancreas”. International Conference on Medical Imaging with Deep Learning (MIDL), Amsterdam, NL. July 2018. [Oral Presentation]

M. Heinrich, **O. Oktay**, et al. “OBELISK-One Kernel to Solve Nearly Everything: Unified 3D Binary Convolutions for Image Analysis ”. International Conference on Medical Imaging with Deep Learning (MIDL), July 2018. [Best Paper Award]

J. Schlemper, **O. Oktay**, et al. “Cardiac MR Segmentation from Undersampled k-space using Deep Latent Representation Learning”. Medical Image Computing and Computer-Assisted Intervention (MICCAI). Sept 2018. [AR < 30%] [Oral Presentation]

W. Bai, **O. Oktay**, et al. “Semi-Supervised Learning for Network-Based Cardiac MR Image Segmentation”. Medical Image Computing and Computer-Assisted Intervention (MICCAI). September 2017. [AR 27%]

M. Heinrich, **O. Oktay**. “BRIEFnet: Deep Pancreas Segmentation using Sparse Dilated Convolutions”. Medical Image Computing and Computer-Assisted Intervention (MICCAI). September 2017. [AR 27%]

**O. Oktay**, et al. “Multi-Input Cardiac Image Super-Resolution using Convolutional Neural Networks”. Medical Image Computing and Computer-Assisted Intervention (MICCAI) Conference 2016. [AR 28%] [Oral Presentation]

**O. Oktay**, et al. “Structured Decision Forests For Multi-modal Ultrasound Image Registration”. Medical Image Computing and Computer-Assisted Intervention (MICCAI). Springer, 2015. 363-371. [AR 30%]

**O. Oktay**, et al. “Biomechanically Driven Registration of Pre- to Intra- operative 3D Images for Laparoscopic Surgery”. Medical Image Computing and Computer-Assisted Intervention (MICCAI). Springer, 2013. 1-9. [AR 32%] [Best Paper Award]

**O. Oktay**, et al. “Probabilistic Edge Map (PEM) for 3D Ultrasound Image Registration and Multi-atlas Left Ventricle Segmentation”. Functional Imaging and Modeling of the Heart (FIMH). Springer, 2015. 223-230. [Best Paper Award]

AWARDS &  
ACHIEVEMENTS

**Imperial College London (ICL) / Computing Department**

- Tech City UK Tier-1 Exceptional Talent Status  
Every year it is awarded to 150-200 candidates across the U.K. 2018
- Association of British and Turkish Academics (ABTA) - Doctoral Researcher Awards - Honourable Mention, 2016.
- Medical Image Computing and Computer Assisted Intervention Conference (MICCAI) - Student Travel Award, 2015.
- International Conference on Functional Imaging and Modelling of the Heart (FIMH) - Best Paper Award, 2015.
- Workshop on Sparsity Techniques in Medical Imaging (STMI) - Best Paper, 2014.

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All manuscripts consist of full-length, 8+ page papers that undergo double-blinded peer-review by 3-7 experts in the field, with highly competitive acceptance rates (AR), which are stated, where available. Top Conferences, such as MICCAI, have lower acceptance rates than many top journals.

## **Ecole Polytechnique Federale de Lausanne (EPFL)**

- MICCAI Young Scientist Award - Runner-up, 2013.
- Excellence Scholarship, 2010–2012.
- Merit Based Grant, 2011–2012.

## **Middle East Technical University (METU)**

- Dean’s Distinguished University Fellowship, 2006–2010.
- Graduated in 2<sup>nd</sup> place among the entire graduating class of 2010.
- Dean’s High Honor List - 8 semesters.

### **PATENTS**

“Cardiac MR Segmentation from Undersampled k-space using Deep Latent Representation Learning” (GB1814649.8) Intellectual Property Office U.K. September 2018.

“System and method for registering pre-operative and intra-operative images using biomechanical model simulations” (US Patent US9761014 B2) Sept 2017.

“Blood vessel obstruction diagnosis method, apparatus and system” (GB1703575.9) Intellectual Property Office U.K. Publication Date April 2017.

### **PROFESSIONAL SERVICES**

Reviewer, Bioinformatics Journal

Reviewer, Medical Image Analysis Journal (MedIA)

Reviewer, IEEE Transactions on Medical Imaging (TMI)

Area Chair, International Conf on Medical Imaging with Deep Learning (MIDL), 2019

Program Committee, Medical Imaging Meets NIPS (MED-NEURIPS), 2018

Organising Committee, 3<sup>rd</sup> International MICCAI Workshop on Reconstruction and Analysis of Moving Body Organs, 2018

### **INVITED TALKS**

#### **International Conferences**

- Deep Learning for Medical Imaging School, Lyon, 2019
- Cognitive Health: Cognitive Technologies for the Digital Health Revolution, 2018
- NVIDIA - GPU Technology Conference (GTC), Silicon Valley, March 2018
- Medical Image Computing and Computer Assisted Intervention (MICCAI), 2016
- Functional Imaging and Modeling of the Heart (FIMH), June 2015
- Medical Image Computing and Computer Assisted Intervention (MICCAI), 2013

### **TECHNICAL SKILLS**

#### **Programming Languages**

- C/C++ (Working Knowledge), Python (Working Knowledge), R (Knowledgeable), JavaScript (Knowledgeable), HTML (Knowledgeable)

#### **Libraries**

- CUDA, OpenGL, OpenCV, OpenMP, Boost, ITK, VTK, Matlab, LaTeX
- Scikit-learn, PyTorch, TensorFlow, Sonnet, Theano, Lasagne, LibSVM