



Sahar Elahi, PhD

PATENT AGENT

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Dr. Sahar Elahi assists Choate's life sciences clients by utilizing her background in biomedical engineering to help with the preparation and prosecution of patent applications, as well as freedom-to-operate and patentability analyses.

Dr. Sahar Elahi received her PhD in biomedical engineering from the University of Texas at Austin. She focused her dissertation and research on the objective to characterize and correct artifacts that arise when imaging stents in coronary arteries with IVOCT. Through this research, high resolution Micro-CT images of the stents deployed within phantom vessels were recorded as a gold standard. Through the utilization of optical simulations of light/stent interaction along with IVOCT images of the phantom vessels, this research was able to characterize the underlying mechanism of these imaging artifacts. The results of Sahar's studies formed a basis to develop algorithms to remove stent artifacts in clinical IVOCT images. Following her PhD, Sahar worked as an assistant research scientist for the Nathan Kline Institute. Here, she improved the algorithms used to perform automatic image processing of MRI images of the brain. Additionally, she was a postdoctoral research fellow at Case Western Reserve University, where she built a high-speed optical coherence tomography (OCT) system to measure hemodynamics in the early developing embryonic hearts. She applied a new method of measuring Doppler shifts, Complex regression Doppler to extend the dynamic range of Doppler OCT. Additionally, Sahar developed a new approach to estimate shear stress that does not rely on recording 4D image sets and extensive post processing.

Sahar received her master's degree in biomedical engineering at Brunel University in London. Her thesis focused on Image Processing and 3D Reconstruction of carotid arteries bifurcation with atherosclerosis plaque. Through this research, image processing in MATLAB was performed on MRI images based on which arterial geometries were constructed in SolidWorks to study the morphological differences and their possible relationship with the plaque development. Sahar received her bachelor's degree in biomedical engineering from AmirKabir University in Tehran, Iran. She performed research where an arm was modeled in MSC.ADAMS using LifeMOD plug-in and was linked to a neural network controller that was designed in Simulink.

Focus Areas

Intellectual Property

IP Counseling

Publications and Presentations

- "Semi-automated shear stress measurements in developing embryonic hearts," first author, *Biomedical Optics Express*, August 2020
- "Complex regression Doppler optical coherence tomography," first author, *Journal of Biomedical Optics*, April 2018

- “Semi-automated measurement of absolute blood velocity and shear stress in developing embryonic hearts using a MHz FDML swept laser source,” presenter, *SPIE BiOS*, March 2018
- “Automated assessment of blood flow in developing embryonic hearts by extending dynamic range of Doppler OCT using a MHz FDML swept laser source,” presenter, *SPIE BiOS*
- “Extended dynamic range of Doppler OCT by application of a new method to high density B-scans using a MHz FDML swept laser source,” presenter, *SPIE BiOS*
- “Corpus Callosum Atrophy Rate in Mild Cognitive Impairment and Prodromal Alzheimer’s Disease,” first author, *Journal of Alzheimer’s Disease*
- “Evaluation of IVOCT imaging of coronary artery metallic stents with neointimal coverage,” first author, *International Journal of Cardiovascular Imaging*
- “Intravascular optical coherence tomography light scattering artifacts: merry-go-rounding, blooming, and ghost struts,” co-author, *Journal of Biomedical Optics*
- “Flare spots in intravascular optical coherence tomography images of bioabsorbable stents,” first author, *JACC Cardiovascular Imaging*
- “Intravascular optical coherence tomography measurement of size and apposition of metallic stents,” first author, *Biomedical Optics Express*
- “Effect of catheter eccentricity on appearance of stent struts in IV-OCT images in presence of thick neointimas,” first author, *SPIE Conference Proceedings*
- “Evaluation of IV-OCT in detection and measurement of neointimal coverage of coronary artery stents,” presenter, *Annual Meeting of the ASLMS*
- “Effect of stent surface-scattering properties on IV-OCT images,” first author, *SPIE Conference Proceedings*
- “Sunflower artifact in OCT,” first author, *JACC Cardiovascular Imaging*

Education & Credentials

- University of Texas at Austin, PhD (2013) Biomedical Engineering
- Brunel University, MSc (2008) Biomedical Engineering
- AmirKabir University, BSc (2007) Biomedical Engineering

Admissions

- U.S. Patent & Trademark Office