

# Shazia Akbar

Toronto, ON, Canada

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## Professional Summary

Skilled researcher specializing in machine learning and artificial intelligence, with industry experience rolling out machine learning models to production. Experience working with international collaborators and developing bespoke applications which harness machine learning technology in medicine.

## Skills

- **Manage** a small team of ML engineers in a Toronto-based healthcare startup company
- Experience working in **multidisciplinary** field and strong foothold in A.I. community (local and international)
- **Problem solver** with experience working on challenging real-world problems which utilize state-of-the-art machine learning technology
- **Programming skills:** Python, C++, C, Java
- **Machine learning/Data analytics tools:** PyTorch, Theano, Docker, R

## Experience

### Altis Labs, Inc., Toronto, Canada

2019 -

#### Lead Machine Learning Engineer

- Design and develop machine learning models from research to production in a cloud-based environment
- Collaborate with clinical and industry partners, working closely to validate models on real medical data
- Ingest and process datasets for training models
- Public speaking and communicate findings to collaborators

### Sunnybrook Research Institute, Toronto, Canada

2016 - 2019

#### Medical Biophysics, University of Toronto, Toronto, Canada

#### Vector Institute Affiliate, Toronto, Canada

#### Postdoctoral Fellow

- Collaborated with pathologists, oncologists and graduate students in the Medical Biophysics program at the University of Toronto to develop bespoke deep learning algorithms to analyze medical images.
- Developed an automated pipeline to analyze a dataset of over 2TB of microscopic images of breast tissue.
- Organized a global image analysis challenge, BreastPathQ, in collaboration with NCI, AAPM and FDA.

### NYU School of Medicine, New York. U.S.

2015 - 2016

#### Postdoctoral Fellow

- Conducted independent research in 3D segmentation of the aorta in MRI scans using deep neural networks.
- Collaborated with radiologists to design and implement an MRI pulse sequence for pediatric patients.

### Toshiba Medical Visualization Systems, Edinburgh, U.K.

2014

#### Image Analysis Research Intern (3 months)

- International collaboration with Japan to build a pipeline for extracting texture features from CT scans for Big Data analysis.
- Harnessed a in-house C++ API and expanded it to include optimized computer vision algorithms.

## Education

<b>PhD: Tumour Localisation in Histopathology Images</b> <i>University of Dundee, Dundee, U.K.</i>	2011 - 2015
<b>BSc Applied Computing Hons (1st class)</b> <i>University of Dundee, Dundee, U.K.</i>	2008 - 2011

## Accomplishments

### Experimental Design

- Developed the “transition module” to prevent overfitting in deep neural networks.
- Designed 2 weakly-supervised learning frameworks to predict patient outcome from thousands of large-scale images.
- Planned and carried out a 3-year research project investigating novel context image descriptors.

### Leadership

- Co-organized a global image analysis challenge, BreastPathQ, in collaboration with Sunnybrook, NCI and AAPM.
- Organized an “AI in Health” workshop for 14 students at the Toronto Deep Learning and Reinforcement Learning summer school.
- Volunteered to organize a machine learning journal club, currently ongoing at Sunnybrook Research Institute, Toronto.

## Selected Publications

Full list of publications available at <http://www.shaziaakbar.co.uk/publications/>

N. Petrick, **S. Akbar**, K. Cha *et al.*, SPI-AAPM-NCI BreastPathQ challenge: an image analysis challenge for quantitative tumor cellularity assessment in breast cancer histology images following neoadjuvant treatment, *SPIE Medical Imaging*, vol. 8, 2021.

**S. Akbar**, and A. L. Martel, Cluster-based learning from weakly labeled bags in digital pathology, *Machine Learning for Health, NeurIPS 2018*, 2018.

**S. Akbar**, M. Peikari, S. Salama, S. Nofech-Mozes, and A. L. Martel, The transition module: A method for preventing overfitting in convolutional neural networks, *Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization*, 2018.

S. Manivannan, W. Li, **S. Akbar**, R. Wang, J. Zhang, and S. J. McKenna, An automated pattern recognition system for classifying indirect immunofluorescence images of HEP-2 cells and specimens, *Pattern Recognition*, vol. 51, pp. 12-26, 2016.

## Selected Presentations

“Explainable AI for Global Labels in 3D Medical Imaging,” Machine Learning in Healthcare Summit, Toronto, Canada	2021
“Integrating Deep Learning in Breast Pathology,” TMLS Micro Summit, Toronto, Canada	2019
“Multiple Instance Batch Learning as a Means for Dealing with Imprecise Labels,” IMAGING Network Ontario 2018, Toronto, Canada	2018
“Determining Tumor Cellularity in Digital Slides using ResNet,” SPIE Medical Imaging 2018, Houston, U.S.	2018
“Generalizing Deep Learning Models for Histology Data,” Pathology Informatics 2017, Pittsburgh, U.S.	2017
“Transitioning Between Convolutional and Fully Connected Layers in Neural Networks,” Deep Learning Medical Image Analysis Workshop, MICCAI 2017, Quebec City, Canada	2017