Curriculum Vitae

Mohammad Javad Shafiee

Research Assistant Professor
University of Waterloo

Waterloo, ON, Canada, N2L 3G1
Email: mjshafiee@uwaterloo.ca

December, 2021

EDUCATION

- **University of Waterloo, Waterloo, Canada**   *Sept.2013– Feb.2017*
  PhD in Machine Learning & Computer Vision
  Thesis: "Randomly-connected Non-Local Conditional Random Fields"
  Supervisors: Prof. Alexander Wong, Prof. Paul Fieguth

- **Shiraz University, Shiraz, Iran**   *Sept.2008– Aug.2011*
  M.A.Sc. in Artificial Intelligent
  Thesis: "A Novel Conditional Random Field Framework For Object Tracking"
  Supervisor: Prof. Zohreh Azimifar

- **Shiraz University, Shiraz, Iran**   *Sept.2004– Aug.2008*
  B.A.Sc. Honours in Computer Science
  Project: "Vehicle Make and Model Recognition"
  Supervisor: Prof. Zohreh Azimifar

ACADEMIC AND INDUSTRIAL WORK EXPERIENCE

- **University of Waterloo, Waterloo, ON, Canada.**   *2017–Present*
  Research Assistant Professor, Dept. of Systems Design Engineering.

- **DarwinAI, Waterloo, ON, Canada.**
  Co-founder and Vice President Research   *2017–Present*

- **University of Waterloo, Waterloo, ON, Canada.**
  Postdoctoral Research Fellow, Dept. of Systems Design Engineering.

  1. Deep Intelligence for Driving Intelligence and Advanced Driving Assistance Systems (ADAS) [*Continental, Germany*].   *2017–2017*

  2. Embedded and Real-Time Car Detection Systems For Traffic Monitoring Applications. [*Miovision, Canada*]   *2017–2017*

- **University of Waterloo, Waterloo, ON, Canada.**
  Research Lead – Research Internship

  1. High-speed, Computerized Human Pose Estimation From Pressure Imaging Sensors In Clinical and Healthcare Environments. [*Xsensor, Canada*]   *2016–2016*

  2. Intelligent Patient Monitoring System. [*Hill-Rom Inc., USA*]   *2016–2016*

  3. Automatic Background Initialization In The Presence of Foreground Clutter For Video Surveillance of Crowded Environments. [*Aimetis Corp., Canada*]   *2015–2016*

  4. Intelligent Team Member Training System. [*Toyota Motor Manufacturing, Canada*]   *2014–2015*

- **Shiraz University, Shiraz, Iran.**
  Project Manager – Research Lead

  1. Video-based Traffic Flow Estimation System. [*ITS Center, Shiraz, Iran*]   *2011–2012*

  2. Video-based Red Light Camera Intrusion System. [*ITS Center, Shiraz, Iran*]   *2012–2013*

3. Vehicle Make & Model Recognition System. [*National Traffic Research Center, Iran*] *2011–2013*

4. Video-based Speed Estimation System. [*ITS Center, Shiraz, Iran*] *2010–2013*

5. On-line License Plate Recognition. [*ITS Center, Shiraz, Iran*] *2010–2011*

RESEARCH INTERESTS

- **AutoML and generative approaches for machine learning design**
  - Generative approach toward automatic deep neural network design.
  - Bayesian learning and Bayesian optimization in machine learning.

- **Explaining machine learning decision-making**
  - Study the behaviour of machine learning models and how they perform decision-making.
  - Analyze the effect of input data in the model's decision making.
  - Analyze the machine learning models and provide better understanding on how the model projects the data in the embedding space.

- **Adversarial attacks and robustness in AI models**
  - Study the robustness of machine learning especially deep learning models.
  - Analyzing the behaviour of different adversarial attacks and machine learning models facing the attacks.
  - Effective approaches to increase the generalization and robustness of deep neural network.

- **Efficient and real-time artificial intelligence methods**
  - Evolutionary deep intelligence approaches to synthesize efficient deep architectures.
  - Embedded and IoT-based deep intelligence methods.
  - Probabilistic deep structure models to generate and synthesize efficient deep neural networks.

- **Life-Long learning and catastrophic forgetting**
  - Bayesian methods toward mitigating catastrophic forgetting in deep neural networks.
  - Dynamic network designs and ensemble approaches.

- **Efficient and effective graphical modeling**
  - Deep-structured fully connected conditional random fields for efficient and accurate structural inference.
  - Randomly connected random fields for long-range spatial modeling in structural inference.
  - Efficient inference approaches for Bayesian inference.

- **Statistical computer vision & machine learning**
  - Developing applications of video surveillance and monitoring.
  - Semantic image segmentation and object localization in image and video stream data.
  - Designing new feature extraction algorithms for object classification and object saliency detection applications.

- **Medical image processing**
  - Developing quantitative and stochastic features for characterization and modeling of tissue physiology.
  - Synthesizing new medical images (multi-parametric magnetic resonance imaging, MP-MRI) based on analytical algorithms.
  - Cancers (Prostate, Lung, Skin) analysis and detection and grading via MP-MRI and computed tomography (CT) and multi-spectral imaging

HONORS AND AWARDS

1. **Best Paper Award** — 2021
   CVPR Workshop on Adversarial Machine Learning in Real-World Computer Vision Systems and Online Challenges.

2. **Best Paper Award** — 2021
   Annual Conference on Vision and Intelligent Systems.

3. **North America Best Tech Startup Award** — Nov. 2021
   Awarded as Co-founder of DarwinAI.

4. **IMPACT 50** — Jan. 2019
   InsideBIGDATA, for being one of industries top 50 most impactful companies, Awarded as Co-founder of DarwinAI.

5. **AI Leader of the Year (Nominated)** — Nov. 2018
   4th Annual Canadian FinTech AI Awards, Awarded as Co-founder of DarwinAI.

6. **Top Ten Startups Award** — Nov. 2018
   AutoMobility LA, Awarded as Co-founder of DarwinAI.

7. **Toronto Best Tech Startup Award (Runner-up)** — Oct. 2018
   Tech in Motion Awards, Awarded as Co-founder of DarwinAI.

8. **Best Paper Award** — 2016
   NIPS Workshop on Efficient Methods for Deep Neural Networks, Spain.

9. **Magna Cum Laude Paper Awards** — 2016
   Annual Meeting of the Imaging Network of Ontario, Canada.
   Awarded a Magna Cum Laude Paper Award for paper on radiomics-driven clinical decision support.

10. **Cum Laude Paper Award** — 2016
    Annual Meeting of the Imaging Network of Ontario, Canada.
    Awarded a Cum Laude Paper Award for paper on lung cancer analysis.

11. **Conference Travel Grant** — 2015
    NIPS Workshop on Machine Learning For Health-care, Canada.

12. **Conference Travel Grant** — 2010
    International Conference on Image Processing, Hong Kong.

13. **Best Paper Award** — 2007
    Iranian Student Conference on Electrical and Computer Engineering, Iran.

PUBLICATIONS

Publication Summary:
Journal papers: 32 † Conference papers: 69 † Patent: 7

Journals (32)

J1 H. Aboutalebi, M. Pavlova, H. Gunraj, **M. Shafiee**, A. Sabri, A. Alaref, A. Wong, "MEDUSA: Multi-scale Encoder-Decoder Self-Attention Deep Neural Network Architecture for Medical Image Analysis", *Frontiers in Medicine, section Translational Medicine*(in-press).

J2 S. Abbasi, M. Famouri, **M. J. Shafiee**, and . Wong, "OutlierNets: Highly Compact Deep Autoencoder Network Architectures for On-Device Acoustic Anomaly Detection", *Special Issue on Embedded Artificial Intelligence for Smart Sensing and IoT Applications, Sensors*(in-press).

J3 H. Aboutalebi, M. Pavlova, **M. Shafiee**, A. Sabri, A. Alaref, A. Wong, "OVID-Net CXR-S: Deep Convolutional Neural Network for Severity Assessment of COVID-19 Cases from Chest X-ray Images", *Special Issue Machine Learning Applications for COVID-19 and Its Complications: Screening, Diagnosis, Treatment, and Prognosis, MDPI, 2021*.

J4 **M. Shafiee**, A. Jeddi, A. Nazemi, P. Fieguth, A. Wong, "Deep Neural Networks and Robust Autonomous Driving Systems", *IEEE Signal Processing Magazine, 2020*.

J5 A. Wong, **M. Shafiee**, B. Chwyl, and F. Li, "GenSynth: A generative synthesis approach to learning generative machines to generate efficient neural networks", *IET Electronics Letters, 2019*.

J6   A. Nazemi, Z. Azimifar, **M. J. Shafiee**, and A. Wong, "Real-time Vehicle Make and Model Recognition Using Unsupervised Feature Learning", *IEEE Transaction on Intelligent Transportation Systems, 2019.*.

J7   **M. J. Shafiee**, B. Chwyl, F. Li, R. Chen, M. Karg, C. Scharfenberger, and A. Wong, "StressedNets: Efficient Feature Representations via Stress-induced Evolutionary Synthesis of Deep Neural Networks", *Neurocomputing, Elsevier, 2018.*

J8   A. Wong, **M. J. Shafiee**, M. S. Jules, "MicronNet: A Highly Compact Deep Convolutional Neural Network Architecture for Real-Time Embedded Traffic Sign Classification", *IEEE Access, 2018.*

J9   F. Khalvati; J. Zhang; A. Chung, **M. J. Shafiee**, A. Wong and M. Haider, "MPCaD: A Multi-Scale Radiomics-Driven Framework for Automated Prostate Cancer Localization and Detection", *BMC Medical Imaging, Springer Nature, 2018.*

J10   **M. J. Shafiee**, A. Mishra, and A. Wong, "Deep Learning with Darwin: Evolutionary Synthesis of Deep Neural Networks", *Neural Processing Letters, Springer Nature, 2017.*

J11   **M. J. Shafiee**, A. G. Chung, F. Khalvati, M. A. Haider, and A. Wong, "Discovery Radiomics via Evolutionary Deep Radiomic Sequencer Discovery for Pathologically-Proven Lung Cancer Detection", *Journal of Medical Imaging, SPIE, 2017.*

J12   I. Ben Daya, A. Chen, **M. J. Shafiee**, A. Wong, and J. Yeow, "Compensated Row-Column Ultrasound Imaging System Using Multilayered Edge Guided Stochastically Fully Connected Random Fields", *Nature Scientific Reports, 2017.*

J13   **M. J. Shafiee**, P. Siva, P. Fieguth, and A. Wong, "Real-Time Embedded Motion Detection via Neural Response Mixture Modeling", *Journal of Signal Processing Systems, 2017.*

J14   **M. J. Shafiee**, A. Wong, and P. Fieguth, "Deep Randomly-connected Conditional Random Fields For Image Segmentation", *IEEE Access Journal, 2016.*

J15   **M. J. Shafiee**, P. Siva, C. Scharfenberger, P. Fieguth, and A. Wong, "NeRD: a Neural Response Divergence Approach to Visual saliency detection", *IEEE Signal Processing Letters, 2016.*

J16   **M. J. Shafiee**, P. Fieguth, A. Wong, "Stochasticnet in Stochasticnet", *Journal of Computational Vision and Imaging Systems, 2016.*

J17   E. Li, **M. J. Shafiee**, F. Kazemzadeh, and A. Wong, "Sparse Reconstruction of Compressive Sensing Multi-spectral Data using an Inter-Spectral Multi-layered Conditional Random Field Model", *IEEE Access Journal, 2016.*

J18   E. Li, F. Khalvati, **M. J. Shafiee**, M. Haider, and A. Wong, "Sparse Reconstruction of Compressive Sensing MRI using Cross-Domain Stochastically Fully Connected Conditional Random Fields", *BMC Medical Imaging, Springer Nature, 2016.*

J19   A. Broomand, **M. J. Shafiee**, F. Khalvati, A. Wong, and M. Haider, "Noise-Compensated, Bias-Corrected Diffusion Weighted Endorectal Magnetic Resonance Imaging via a Stochastically Fully-Connected Joint Conditional Random Field Model", *IEEE Transactions on Medical Imaging, 2016* .

J20   **M. J. Shafiee**, P. Siva and A. Wong, "StochasticNet: Forming Deep Neural Networks via Stochastic Connectivity", *IEEE Access Journal, 2016.*

J21   L. Xu, **M. J. Shafiee**, A. Wong and D. Clausi, "Fully Connected Continuous Conditional Random Field With Stochastic Cliques for Dark-Spot Detection In SAR Imagery", *IEEE Journal of Selected Topics on Applied Earth Observation and Remote Sensing, 2016.*

J22   A. G. Chung, F. Khalvati, **M. J. Shafiee**, M. A. Haider, and A. Wong, "Prostate Cancer Detection via a Quantitative Radiomics-Driven Conditional Random Field Framework", *IEEE Access Journal, 2015* .

J23   T. Beltrame, R. Amelard, R. Villar, **M. J. Shafiee**, A. Wong, and R. Hughson, "Estimating oxygen uptake and energy expenditure during treadmill walking by neural network analysis of easy-to-obtain inputs", *Journal of Applied Physiology, 2016.*

J24   S.A. Haider, A. Cameron, P. Siva , D. Lui, **M. J. Shafiee**, A. Boroomand, A. Wong and N. Haider, "Temporal noise reduction of fluorescence microscopy image sequences using a stochastically-connected random field model", *Nature Scientific Reports, 2016.*

J25   I. Ben Daya, A. Chen, **M. J. Shafiee**, A. Wong, J. Yeow, "Compensated Row-Column Ultrasound Imaging System Using Fisher Tippett Multilayered Conditional Random Field Model", *PLoS ONE, 2016.*

J26   E. Ahmadi, Z. Azimifar, M. Shams, M. Famouri and **M. J. Shafiee**, "Document image binarization using a discriminative structural classifier", *Pattern Recognition Letter, 2015.*

J27   A. Wong, **M. J. Shafiee**, P. Siva and XY. Wang, "A Deep-Structured Fully-Connected Random Field Model For Structured Inference", *IEEE Access Journal, 2015.*

J28   **M. J. Shafiee**, Z. Azimifar and A. Wong, "A Deep-structured Conditional Random Field Model for Object Silhouette Tracking", *PLoS ONE, 2015.*

J29   **M. J. Shafiee**, S. Haider, A. Wong, D. Lui, A. Cameron, A. Modhafar, P. Fieguth and M. Haider, "Apparent Ultra-High b-value Diffusion-Weighted Image Reconstruction via Hidden Conditional Random Fields", *IEEE Transactions on Medical Imaging, 2014* .

J30   **M. J. Shafiee**, Z. Azimifar and P. Fieguth, "How Conditional Random Fields Learn Dynamics: An Example-Based Study", *Computer Communication & Collaboration, 2013* .

J31   A. Wong, **M. J. Shafiee** and Z. Azimifar, "Statistical Conditional Sampling for Variable-Resolution Video Compression", *PLoS ONE, 2012.*

J32   M. H. Setayesh, M. Kazemnejhad and **M. J. Shafiee**, "Genetic Algorithms in Determining Optimal Capital Structure of Firms Accepted in Tehran Stock Exchange", *The Iranian Accounting and Auditing Review, 2009 [In Persian]* .

Conferences (69)

C1 **M. J. Shafiee**, M. Famouri, G. Bathla, F. Li, A. Wong, "TinyDefectNet: Highly Compact Deep Neural Network Architecture for High-Throughput Manufacturing Visual Quality Inspection", *Annual Conference on Vision and Intelligent Systems*, 2021. (**Best Paper Award**).

C2 S. Abbasi, A. Wong, **M. J. Shafiee**, "MAPLE: Microprocessor A Priori for Latency Estimation", *NewInML Workshop NeurIPS*, 2021.

C3 A. Jeddi, **M. J. Shafiee**, A. Wong, "A Simple Fine-tuning Is All You Need: Towards Robust Deep Learning Via Adversarial Fine-tuning", *CVPR Workshop on Adversarial Machine Learning in Real-World Computer Vision Systems and Online Challenges*, 2021. (**Best Paper Award**).

C4 S. Abbasi, **M. J. Shafiee**, E. Chan and A. Wong, "Does Form Follow Function? An Empirical Exploration of the Impact of Deep Neural Network Architecture Design on Hardware-Specific Acceleration, *TinyML Research Symposium*, 2021.

C5 J. Tang, **M.J. Shafiee**, P. Fieguth, "Incremental Generative Replay Embedding Toward an Effective Continual Learning Framework", *CVPR Workshop on Continual Learning*, 2021.

C6 H. Aboutalebi, **M. J. Shafiee**, M. Karg, C. Scharfenberger, A. Wong, "Residual Error: a New Performance Measure for Adversarial Robustness", *CVPR Workshop on Adversarial Machine Learning in Real-World Computer Vision Systems and Online Challenges*, 2021.

C7 H. Aboutalebi, **M. J. Shafiee**, M. Karg, C. Scharfenberger, A. Wong, "Adversarial Variance Attacks: Deeper Insights into Adversarial MachineLearning through the Eyes of Bias-Variance Impact", *CVPR Workshop on Adversarial Machine Learning in Real-World Computer Vision Systems and Online Challenges*, 2021.

C8 S. Abbasi, M. Famouri, **M. J. Shafiee**, and A . Wong, "OutlierNets: Highly Compact Deep Autoencoder Network Architectures for On-Device Acoustic Anomaly Detection", *Embedded Vision Workshop*, 2021.

C9 H. Aboutalebi, S. Abbasi, **M. J. Shafiee** and A Wong, "COVID-Net CT-S: 3D Convolutional Neural Network Architectures for COVID-19 Severity Assessment using Chest CT Images, *ICLR Workshop: Machine Learning for Preventing and Combating Pandemics*, 2021.

C10 H. Aboutalebi, M. Pavlova, **M. J. Shafiee**, A. Sabri, A. Alaref and A. Wong, "COVID-Net CXR-S: Deep Convolutional Neural Network for Severity Assessment of COVID-19 Cases from Chest X-ray Images, *CVPR Workshop on Women in Computer Vision*, 2021.

C11 A. Jeddi, **M. J. Shafiee**, M. Karg, C. Scharfenberger, A. Wong, "Learn2Perturb: An End-to-end Feature Perturbation Learning to Improve Adversarial Robustness", Computer Vision Pattern Recognition(CVPR), 2020.

C12 H. Aboutalebi, **M. J. Shafiee**, M. Karg, C. Scharfenberger, A. Wong, "Vulnerability Under Adversarial Machine Learning:Bias or Variance?", *NewInML Workshop NeurIPS*, 2020.

C13 A. Wong, M. Famouri, **M. J. Shafiee**, "AttendNets: Tiny Deep Image Recognition Neural Networks for the Edge via Visual Attention Condensers", NeurIPS Workshop, 2020.

C14 H. Aboutalebi, **M. J. Shafiee**, M. Karg, C. Scharfenberger, A. Wong, "Vulnerability Under Adversarial Machine Learning: Bias or Variance?", NeurIPS Workshop, 2020.

C15 **M. J. Shafiee**, A. Hryniowski, F. Li, Z. Lin, A. Wong, "State of Compact Architecture Search for Deep Neural Networks", Workshop on Edge Intelligence, 2020.

C16 Z. Lin, **M. J. Shafiee**, S. Bochkarev, M. S. Jules, X. Wang, A. Wong, "Do Explanations Reflect Decisions? A Machine-centric Strategy to Quantify the Performance of Explainability Algorithms", NeurIPS Workshop, 2019.

C17 A. Wong, M. Famuori, **M. J. Shafiee**, F. Li, B.n Chwyl, J. Chung, "YOLO Nano: a Highly Compact You Only Look Once Convolutional Neural Network for Object Detection", NeurIPS Workshop, 2019.

C18 A. Jeddi, **M. J. Shafiee**, M. Karg, C. Scharfenberger, A. Wong, "Learn2Perturb: Improving Adversarial Robustness on Deep Neural Networks through End-to-end Feature Perturbation Learning", NeurIPS Workshop, 2019.

C19 I. Ben-Daya, **M. J. Shafiee**, M. Karg, C. Scharfenberger, A. Wong, "SANER: Efficient Stochastically Activated Network Ensembles for Adversarial Robustness Through Randomized Assembly", NeurIPS Workshop, 2019.

C20 M. S. Shafiee, **M. J. Shafiee**, and A. Wong, "Dynamic Representations Toward Efficient Inference on Deep Neural Networks by Decision Gates", *Computer Vision & Pattern Recognition Workshop (CVPR), 2019.*.

C21 I. Ben Daya, **M. J. Shafiee**, M. Karg, C. Scharfenberger, and A. Wong, "SANE: Towards Improved Prediction Robustness via Stochastically Activated Network Ensembles", *Computer Vision & Pattern Recognition Workshop (CVPR), 2019.*.

C22 A. Boroomand, B. Tan, **M. J. Shafiee**, K. Bizheva and A. Wong, "A Random Field Computational Adaptive Optics Framework for Optical Coherence Microscopy", *ICAIR, 2019.*.

C23 M. S. Shafiee, **M. J. Shafiee**, and A. Wong, "Efficient Inference on Deep Neural Networks by Dynamic Representations and Decision Gates", *Neural Information Processing Systems Workshop (NeurIPS), 2018.*.

C24 A. Wong, **M. J. Shafiee**, B. Chwyl, and F. Li, "FermiNets: Learning generative machines to generate efficient neural networks via generative synthesis", *Neural Information Processing Systems Workshop (NeurIPS), 2018.*.

C25 I. B. Daya, **M. J. Shaifee**, M. Karg, C. Scharfenderger, A. Wong, "On Robustness of Deep Neural Networks: A Comprehensive Study on the Effect of Architecture and Weight Initialization to Susceptibility and Transferability of Adversarial Attacks", *CVIS, 2018.*.

C26 AH Karimi, **M. J. Shaifee**, A Ghodsi, and A Wong, "Ensembles of random projections for nonlinear dimensionality reduction", *CVIS, 2017.*.

C27 I. B. Daya, A. Chen, **M. J. Shafiee** , J. Yeow, and A Wong, "Compensated Row-Column Ultrasound Imaging System Using Edge-Guided Three Dimensional Random Fields", *CVIS, 2017.*.

C28 K Kasiri, **M. J. Shafiee**, F Li, A Wong, and J Eichel, "Efficient Deep Network Architecture for Vision-Based Vehicle Detection", *CVIS, 2017.*.

C29 **M. J. Shafiee**, F. Li, B. Chwyl, and A. Wong, "SquishedNets: Squishing SqueezeNet further for edge device scenarios via deep evolutionary synthesis", *Neural Information Processing Systems Workshops (NIPS), 2017.*.

C30 **M. J. Shafiee**, B. Chwyl, F. Li, and A. Wong, "Fast YOLO: Better, Even Faster, Stronger for Real-time Embedded Object Detection", *Conference on Vision and Imaging Systems (CVIS), 2017.*.

C31 **M. J. Shafiee**, E. Barshan, F. Li, B. Chwyl, M. Karg, C. Scharfenberger, and A. Wong, "Learning Efficient Deep Feature Representations via Transgenerational Genetic Transmission of Environmental Information during Evolutionary Synthesis of Deep Neural Networks", *International Conference on Computer Vision Workshop (ICCV-W), 2017.*

C32 A. G. Chung, **M. J. Shafiee**, A. Wong and P. Fieguth, "The Mating Rituals of Deep Neural Networks: Learning Compact Feature Representations through Sexual Evolutionary Synthesis", *International Conference on Computer Vision Workshop (ICCV-W), 2017.*

C33 **M. J. Shafiee**, F. Li, A. Wong, "Exploring the Imposition of Synaptic Precision Restrictions For Evolutionary Synthesis of Deep Neural Networks", *Conference on Cognitive Computational Neuroscience, 2017.*

C34 **M. J. Shafiee**, A. Wong and P. Fieguth, "Forming A Random Field via Stochastic Cliques: From Random Graphs to Fully Connected Random Fields", *Future Technology Conference, 2017.*

C35 **M. J. Shafiee**, E. Barshan, A. Wong, "Evolution in Groups: A Deeper Look at Synaptic Cluster Driven Evolution of Deep Neural Networks", *Future Technology Conference, 2017.*

C36 B. Chwyl, A. Chung. **M. J. Shafiee**, Y. Fu, A. Wong, "A Deep Predictive Intelligence Platform for Patient Monitoring", *Engineering in Medicine and Biology Society (EMBC), 2017*, Accepted.

C37 D. Kumar, A. G. Chung, **M. J. Shafiee**, F. Khalvati, M. A. Haider and A. Wong, "Discovery Radiomics for Pathologically-Proven Computed Tomography Lung Cancer Prediction", *Machine Learning for Medical Image Computing Workshop, ICIAR, 2017.*

C38 A. Karimi, A. Chung, **M. J. Shafiee**, F. Khalvati, M. Haider, A. Ghodsi, and Alexander Wong, "Discovery Radiomics via a Mixture of Deep ConvNet Sequencers for Multi-Parametric MRI Prostate Cancer Classification", *Machine Learning for Medical Image Computing Workshop, ICIAR, 2017.*

C39 I. Ben Daya, A. Chen, **M. J. Shafiee**, A. Wong and J. Yeow, "Compensated Row-Column Ultrasound Imaging System Using Conditional Random Fields", *Proc. Annual Meeting of the Imaging Network of Ontario (IMNO), 2017.*

C40 **M. J. Shafiee** and A. Wong, "Evolutionary Synthesis of Deep Neural Networks via Synaptic Cluster-driven Genetic Encoding", *Neural Information Processing Systems Workshops (NIPS), 2016.* (**Best Paper Award**).

C41 **M. J. Shafiee**, P. Sive, P. Fieguth and A. Wong, "Embedded Motion Detection via Neural Response Mixture Background Modeling", *Computer Vision and Pattern Recognition Workshops (CVPRW), 2016.*

C42 **M. J. Shafiee**, P. Sive, P. Fieguth and A. Wong, "Efficient Deep Feature Learning and Extraction via StochasticNets", *Computer Vision and Pattern Recognition Workshops (CVPRW), 2016.*

C43 P. Sive, **M. J. Shafiee**, M. Jamieson and A. Wong, "Real-time, Embedded Scene Invariant Crowd Counting Using Scale-Normalized Histogram of Moving Gradients (HoMG)", *Computer Vision and Pattern Recognition Workshops (CVPRW), 2016.*

C44 A. Boroomand, E. Li, **M. J. Shafiee**, M. Haider, F. Khalvati and A. Wong, "Bayesian-based Compensated Magnetic Resonance Imaging", *Engineering in Medicine and Biology Society (EMBC), 2016.*

C45 A. Chung, **M. J. Shafiee**, D. Kumar, F. Khalvati, M.A. Haider, and A. Wong, "Discovery Radiomics via Layered Random Projection (LaRP) Sequencers for Prostate Cancer Classification, *Proc. Annual Meeting of the Imaging Network of Ontario (IMNO), 2016.* (**Magna Cum Laude Paper Award**).

C46 S. Haider, A. Chung, **M. J. Shafiee**, H. Grewal, F. Khalvati, A. Oikonomou, M.A. Haider, and A. Wong, "Single-Click Lung Nodule Contouring Method Using a Hierarchical Conditional Random Field (HCRF), *Proc. Annual Meeting of the Imaging Network of Ontario (IMNO), 2016.* (**Cum Laude Paper Award**).

C47 A. Karimi, **M. J. Shafiee**, C. Scharfenberger, I. BenDaya, S. Haider, N. Talukdar, D. Clausi and A. Wong, "Spatio-Temporal Saliency Detection Using Abstracted Fully-Connected Graphical Models", *IEEE International Conference on Image Processing (ICIP), 2016.*

C48 A. G. Chung, **M. J. Shafiee** and A. Wong, "Random Feature MAPS Via A Layered Random Projection (LARP) Framework For Object Classification", *IEEE International Conference on Image Processing (ICIP), 2016.*

C49 A. G. Chung, **M. J. Shafiee** and A. Wong, "Image Restoration via Deep-Structured Stochastically Fully-Connected Conditional Random Fields (DSFCRFs) for Very Low-Light Conditions", *Conference on Computer and Robot Vision (CRV), 2016.*

C50 **M. J. Shafiee**, A. Chung, D. Kumar, A. Wong, F. Khalvati, M.A. Haider, "Discovery Radiomics for Cancer Detection", *Neural Information Processing Systems Workshops (NIPS), 2015.*

C51 **M. J. Shafiee**, A. Chung, A. Wong, and P. Fieguth, "Improved Fine Structure Modeling via Guided Stochastic Clique Formation in Fully Connected Conditional Random Fields", *IEEE International Conference on Image Processing (ICIP), 2015.*

C52 E. Li, **M. J. Shafiee**, F. Kazemzadeha, and A. Wong, "Sparse Reconstruction of Compressed Sensing Multi-spectral Data using Cross-Spectral Multi-layered Conditional Random Field Model", *SPIE Optical Engineering+ Applications, 2015.*

C53 J. Deglint, F. Kazemzadeh, **M. J. Shafiee**, E. Li, I. Khodadad, S. Saini, A. Wong, and D. Clausi, "Virtual Spectral Multiplexing for Applications in In-situ Imaging Microscopy of Transient Phenomena", *SPIE Optical Engineering+ Applications, 2015.*

C54 F. Y. Li, **M. J. Shafiee**, A. Chung, B. Chwyl, F. Kazemzadeh, A. Wong and J. Zelek, "High Dynamic Range Map Estimation via Fully Connected Random Fields with Stochastic Cliques", *IEEE International Conference on Image Processing (ICIP), 2015.*

C55 P. Siva, **M. J. Shafiee**, F. Y. Li and A. Wong, "PIRM: Fast Background Subtraction Under Sudden, Local Illumination Changes Via Probabilistic Illumination Range Modeling", *IEEE International Conference on Image Processing (ICIP), 2015.*

C56 L. Xu, **M. J. Shafiee**, A. Wong, F. Li, L. Wang and D. Clausi, "Oil Spill Candidate Detection from SAR Imagery Using a Thresholding-Guided Stochastic Fully-Connected Conditional Random Field Model", *Computer Vision and Pattern Recognition Workshops (CVPRW), 2015.*

C57 F. Y. Li, E. Li, **M. J. Shafiee**, A. Wong, J. Zelek, "Dense Depth Map Reconstruction from Sparse Measurements Using a Multilayer Conditional Random Field Model", *Conference on Computer and Robot Vision (CRV), 2015.*

C58 S. A. Haider, **M. J. Shafiee**, A. Chung, F. Khalvati, A. Oikonomou, A. Wong and M. Haider, "Single-click, Semi-Automatic Lung Nodule Contouring Using Hierarchical Conditional Random Fields", *International Symposium on Biomedical Imaging (ISBI), 2015.*

C59 A. Boroomand, **M. J. Shafiee**, F. Khalvati, A. Wong and M. Haider, "Noise-compensated Bias Correction of MRI via a Stochastically Fully-Connected Conditional Random Field Model", *Proc. Annual Meeting and Exhibition of the International Society for Magnetic Resonance in Medicine (ISMRM), 2015.*

C60 E. Li, **M. J. Shafiee**, A. Chung, F. Khalvati , A. Wong and M. Haider, "Enhanced Reconstruction of Compressive Sensing MRI via Cross-Domain Stochastically Fully-Connected Random Field Model", *Proc. Annual Meeting and Exhibition of the International Society for Magnetic Resonance in Medicine (ISMRM), 2015.*

C61 A. Boroomand, **M. J. Shafiee**, A. Wong and K. Bizheva, "Lateral Resolution Enhancement via Imbricated Optical Coherence Tomography in a Maximum-A-Posterior Reconstruction Framework", *The proceedings of SPIE Photonics West, 2015.*

C62 **M. J. Shafiee**, A. Wong, P. Siva and P. Fieguth, "Efficient Bayesian Inference Using Fully Connected Conditional Random Fields With Stochastic Cliques", *IEEE International Conference on Image Processing, 2014.*

C63 F. Kazemzadeh, **M. J. Shafiee**, A. Wong and D. Clausi, "Reconstruction of Compressive Multispectral Sensing Data Using a Multilayered Conditional Random Field Approach", *SPIE Optical Engineering+ Applications, 2014.*

C64 A. Cameron, A. Modhafar, F. Khalvati, D. Lui, **M. J. Shafiee**, A. Wong and M. Haider, "Multiparametric MRI Prostate Cancer Analysis via a Hybrid Morphological-Textural Model", *Engineering in Medicine and Biology Society (EMBC), 2014.*

C65 A. Nazemi, **M. J. Shafiee** and Z. Azimifar, "On Road Vehicle Make and Model Recognition via Sparse Feature Coding", *Iranian Conference on Machine Vision and Image Processing (MVIP), 2013.*

C66 **M. J. Shafiee**, Z. Azimifar and A. Wong, "A Novel Hierarchical Model-Based Frame Rate Up-Conversion via Spatio-temporal Conditional Random Fields", *IEEE International Symposium of Multimedia, 2011.*

C67 **M. J. Shafiee**, Z. Azimifar and P. Fieguth, "Model-Based Tracking: Temporal Conditional Random Field", *IEEE International Conference on Image Processing (ICIP), 2010.*

C68 **M. J. Shafiee**, Z. Azimifar and P. Fieguth, "Temporal Conditional Random Fields: A Conditional State Space Predictor for Visual Tracking", *The Conference on Machine Vision and Image Processing (MVIP), IEEE, 2010.*

C69 **M. J. Shafiee**, H. Rahmatkhah and Z. Azimifar, "License Plate Recognition in Complex Scene Based on the Neural Networks", *The 10th Iranian Student Conference on Electrical and Computer Engineering, [CD-ROM], Isfahan, Iran, 2007 [In Persian]*(**Best Paper Award**).

Non-Refereed Presentations & Posters

N1 S. Haider, A. Chung, E. Li, **M.J. Shafiee**, and A. Wong, "Computational Diffusion Imaging Modalities For Prostate Cancer", Abstract and Poster presentation. *CIHR Team Grant and OICR Smarter Imaging Program (SIP) Prostate Workshop: Imaging Applications in Prostate Cancer, London, ON, November 21, 2014.*

N2 A. Chung, E. Li, **M. J. Shafiee**, and A. Wong, "Computer-Aided MRI Reconstruction and Analysis", Poster presentation. *WeInnovate Symposium, Waterloo, ON, November 19, 2014.*

PATENTS

P1 A. Hryniowski, **M. J. Shafiee**, A. Wong, "System and Method for Selecting Unlabeled Data for Building Learning Machines", US Patent App. 63/075,811, 2020.

P2 M. Famouri, **M. J. Shafiee**, A. Wong, "System and Method for Selecting Components in Designing Machine Learning Models", US Patent, 2020.

P3 A. Wong and **M. J. Shafiee**, F. Li, "System and Method For Automatic Building Of Learning Machines Using Learning Machines" , US Patent App. 15/982,478, 2019.

P4 A. Wong and **M. J. Shafiee**, "System and Method for Building Artificial Neural Network Architectures", US Patent Application 62/362,834, 2018.

P5 A. Wong, Y. Fu, B. J. Chwyl, A .G. Chung, **M. J. Shafiee**, "Method and apparatus for automatic event prediction", US Patent App. 15/883,754, 2018.

P6 Y. Fu, I. Soreefan, A. Wong, **M. J. Shafiee**, B. J. Chwyl, A. G. Chung , "Bed exit monitoring system", US Patent App. 15/866,972, 2018.

P7 A. Wong and **M. J. Shafiee**, "System and Method for Building Artificial Neural Networks Using Data", US Patent Application 62/529,474, 2017.

TEACHING EXPERIENCES

- **Teaching, University of Waterloo**

  1. ***Pattern Recognition***   Winter, 2020
     Covering the main topics of pattern recognition, supervised, unsupervised and feature extraction/detection.

  2. ***Pattern Recognition***   Winter, 2019

  3. ***Advance Topics in Pattern Recognition***   Winter, 2018
     Focusing on a set of conventional machine learning algorithms (e.g., Bayesian and ensemble methods) and new deep learning approaches and compare them side by side.

RESEARCH PROJECTS FUNDING
Total Funding: $1,640,702 in cash, $259,100 in-kind

PROFESSIONAL ACTIVITIES

Scientific Journal & Conference Review

1. Transactions on Neural Networks and Learning Systems (IEEE)
2. Transactions on Intelligent (IEEE) Transportation Systems
3. Nature Scientific Report
4. ACCESS (IEEE)
5. Computer Vision Journal (IET)
6. BMC Medical Imaging (IEEE)
7. Journal of Signal Processing Systems (Springer)
8. Journal on Emerging and Selected Topics in Circuits and Systems (IEEE)
9. Electronics Letters (Wiley)
10. Transactions on Cognitive Communications and Networking (IEEE)

Memberships

1. Standard Council of Canada (AI) — 2021–Present
2. Member of Vision & Image Processing Research group (VIP), University of Waterloo — 2013–Present
3. Kitchener-Waterloo Vision and Imaging Society (KW-VIS) — 2013–Present
4. Waterloo Institute for Sustainable Aeronautics (UW WISA) — 2021–Present
5. Member of the Institute of Electrical and Electronics Engineering (IEEE) — 2010–Present
6. Member of Computer Vision and Pattern Recognition group (CVPR), Shiraz University — 2006–2013

Selected MEDIA COVERAGE

1. "TinyML Could Democratize AI Programming for IoT", IoT World Today, Nov. 2020.

2. "Artificial intelligence may not need networks at all", NetworkWorld, Dec. 2017.

3. "Researchers edge out leading institutions to win AI award", Waterloo Engineering Research Media Release, Dec. 2016.

4. "The Best of the Physics arXiv (week ending June 25, 2016)", MIT Technology Review, June, 2016. (Proposing a new evolutionary deep intelligence approach to synthesize efficient deep neural network architectures.)

5. "Researchers honoured for advances in identifying cancer through imaging", Waterloo Engineering Research Media Release, Mar. 2016.