Moein Heidari

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Google Scholar: Publications
Github: Link
Website: Link

Education

- **The University of British Columbia (UBC)** — Vancouver, British Columbia, Canada
  Ph.D - Biomedical Engineering — *January 2024 - 2028*
  Thesis: AI for Point-of-Care Ultrasound: Addressing Data, Deployment, and Domain Shift Challenges
  Supervisor: Dr. Ilker Hacihaliloglu

- **Iran University of Science and Technology (IUST)** — Tehran, Iran
  M.Sc. - Communication Systems ; GPA: 4, (18.48/20) — *Oct 2021 - Nov 2023*
  *Thesis: Fully Transformer-based End-to-End Communication System (Mark: **Very Good**)*
  Supervisor: Dr. Shahrokh Farahmand

- **Iran University of Science and Technology (IUST)** — Tehran, Iran
  B.Sc. - Electrical Engineering - Communications Engineering ; GPA: 3.6, (17.11/20) — *Sep 2017 - Sep 2021*
  Thesis: Deep Learning Based End-to-End Wireless Communication System With Conditional GAN as Unknown Channel (Mark: 19.5/20)
  Supervisor: Dr. Shahrokh Farahmand

Publications

- **Reza Azad, Moein Heidari, Yuli Wu, Dorit Merhof ("Contextual Attention Network: Transformer Meets U-Net")**: Accepted for publication in the MICCAI 2022, arixv, Github
- **Reza Azad, Moein Heidari, Julien Cohen-Adad, Ehsan Adeli, Dorit Merhof ("Intervertebral Disc Labeling With Learning Shape Information, A Look Once Approach")**: Accepted for publication in the MICCAI 2022, arixv, Github
- **Moein Heidari, Amirhossein Kazerouni, Milad Soltany, Reza Azad, Ehsan Khodapanah Aghdam, Julien Cohen-Adad, Dorit Merhof ("HiFormer: Hierarchical Multi-scale Representations Using Transformers for Medical Image Segmentation")**: Accepted for publication in the WACV 2023, arixv, Github
- **Reza Azad, Moein Heidari, Moein Shariatnia, Ehsan Khodapanah Aghdam, Sanaz Karimijafarbigloo, Ehsan Adeli, Dorit Merhof ("TransDeepLab: Convolution-Free Transformer-based DeepLab v3+ for Medical Image Segmentation")**: Accepted for publication in the MICCAI 2022, arixv, Github
- **Reza Azad, Mohammad T. AL-Antary, Moein Heidari, Dorit Merhof ("TransNorm: Transformer Provides a Strong Spatial Normalization Mechanism for a Deep Segmentation Model")**: Accepted for publication in the IEEE Access journal, arixv, Github
- **Amirhossein Kazerouni, Ehsan Khodapanah Aghdam, Moein Heidari, Reza Azad, Mohsen Fayyaz, Ilker Hacihaliloglu, Dorit Merhof ("Diffusion Models for Medical Image Analysis: A Comprehensive Survey")**: Accepted for publication in Medical Image Analysis journal, arixv, Github
- **Reza Azad, Amirhossein Kazerouni, Moein Heidari, Ehsan Khodapanah Aghdam, Amirali Molaei, Yiwei Jia, Abin Jose, Rijo Roy, Dorit Merhof ("Medical Image Analysis with Transformers: A Review")**: Accepted for publication in Medical Image Analysis journal, arixv, Github
- **Mustansar Fiaz, Moein Heidari, Rao Muhammad Anwer, Hisham Cholakkal ("SA2-Net: Scale-aware Attention Network for Cell Segmentation and Beyond")**: Accepted for **oral** publication in the 2023 British Machine Vision Conference (BMVC),arixv, Github
- **Moein Heidari, Alireza Morsali, Samin Heydarian, Tohid Abedini ("DiffGANPaint: Fast Inpainting Using Denoising Diffusion GANs")**: Invite to archive in ICLR 2023 TinyPapers, Paper
- **Alireza Morsali, Moein Heidari, Samin Heydarian, Tohid Abedini ("MLP-Attention: Improving Transformer Architecture with MLP Attention Weights")**: Invite to archive in ICLR 2023 TinyPapers, Paper, Github
- **Reza Azad, Moein Heidari, Kadir Yilmaz, Michael Hüttemann, Sanaz Karimijafarbigloo, Yuli Wu, Anke Schmeink, Dorit Merhof ("Loss Functions in the Era of Semantic Segmentation: A Survey and Outlook")**: Published on arXiv, arixv, Github
- **Moein Heidari, Reza Azad, Sina Ghorbani Kolahi, René Arimond, Leon Niggemeier, Alaa Sulaiman, Afshin Bozorgpour, Ehsan Khodapanah Aghdam, Amirhossein Kazerouni, Ilker Hacihaliloglu, Dorit Merhof ("Enhancing Efficiency in Vision Transformer Networks: Design Techniques and Insights")**: Published on arXiv, arixv, Github
- **Pooria Ashrafian, Milad Yazdani, Moein Heidari, Dena Shahriari, Ilker Hacihaliloglu ("Vision-Language Synthetic Data Enhances Echocardiography Downstream Tasks")**: Published on arXiv, arixv, Github
- **Moein Heidari, Sina Ghorbani Kolahi, Sanaz Karimijafarbigloo, Bobby Azad, Afshin Bozorgpour, Soheila Hatami, Reza Azad, Ali Diba, Ulas Bagci, Dorit Merhof ("Computation-Efficient Era: A Comprehensive Survey of State Space Models in Medical Image Analysis")**: Submitted to the Medical Image Analysis journal, arXiv, GitHub

- **Sina Ghorbani Kolahi, Seyed Kamal Chaharsooghi, Toktam Khatibi, Afshin Bozorgpour, Reza Azad, Moein Heidari, Ilker Hacihaliloglu, Dorit Merhof ("MSA^{2}Net: Multi-scale Adaptive Attention-guided Network for Medical Image Segmentation")**: Published in the British Machine Vision Conference (BMVC) 2024, arXiv, GitHub
- **Moein Heidari, Reza Rezaeian, Reza Azad, Dorit Merhof, Hamid Soltanian-Zadeh, Ilker Hacihaliloglu ("SL^{2}A-INR: Single-Layer Learnable Activation for Implicit Neural Representation")** : Accepted to ICCV 2025, arXiv, GitHub
- **Ali Mehrabian, Parsa Mojarad Adi, Moein Heidari, Ilker Hacihaliloglu ("Implicit Neural Representations with Fourier Kolmogorov-Arnold Networks")**: Accepted for publication in the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2025, arXiv, GitHub
- **Yasamin Medghalchi, Moein Heidari, Clayton Allard, Leonid Sigal, Ilker Hacihaliloglu ("Prompt2Perturb (P2P): Text-Guided Diffusion-Based Adversarial Attacks on Breast Ultrasound Images")**: Accepted to CVPR 2025, arXiv, GitHub
- **Moein Heidari, Afshin Bozorgpour, AmirHossein Zarif-Fakharnia, Dorit Merhof, Ilker Hacihaliloglu ("Echo-E^{3}Net: Efficient Endo-Epi Spatio-Temporal Network for Ejection Fraction Estimation ")**: Submitted to MICCAI 2025, arXiv, GitHub
- **Moein Heidari, Ehsan Khodapanah Aghdam, Alexander Manzella, Daniel Hsu, Rebecca Scalabrino, Wenjin Chen, David J Foran, Ilker Hacihaliloglu ("A Study on the Performance of U-Net Modifications in Retroperitoneal Tumor Segmentation")**: Accepted to SPIE 2025, arXiv, GitHub

Research Interests

- Artificial Intelligence
- Computer Vision
- Deep Learning
- GANs
- Machine Learning
- 3D Vision
- Medical Images
- Object Recognition

Skills Summary

- **Languages**: Python, MATLAB, C/C++, SQL, Julia
- **Frameworks**: PyTorch, TensorFlow, Keras, Flux, OpenCV, NPM (NumPy - Pandas - Matplotlib), etc.
- **Tools**: Linux, Latex, Git, MySQL
- **Soft Skills**: Leadership, Event Management, Writing, Public Speaking, Time Management

Research Experience

- **Mohamed bin Zayed University of Artificial Intelligence** — Remote
  Research Assistant (Under supervision of Dr. Hisham Cholakkal — *Jan 2023 - May 2023*
  - **Attention Mechanisms:**: My research was focused on attention mechanisms for microscopic medical image segmentation which resulted in 1 conference publication
- **RWTH Aachen University** — Remote
  Research Assistant (Under supervision of Prof. Dorit Merhof and Reza Azad — *Oct 2021 - Dec 2023*
  - **Transformer Models:**: My research was focused on Transformer models which resulted in 4 conference and 3 Journal papers.
  - **Intervertebral Disc Labeling**: I also worked on the segmentation of intervertebral discs from medical images which resulted in 1 conference publication.
- **Iran University of Science and Technology (Dept. of CS)** — Tehran, Iran
  Research Assistant (Under supervision of Dr. Mohammad Reza Mohammadi — *April 2021 - July 2021*
  - **Self-Supervised Object Detection**: I worked on different methods for object detection with low supervision. Specifically, we aimed to train the RetinaNet architecture with various self-supervised pretraining methods such as MOCO, PIRL and others.
- **DGSculptor, Montreal, Canada** — Remote
  Machine Learning and Computer Vision Researcher — *Dec 2021 - Dec 2023*
  - **Generative Flow Networks**: At DGSculptor, I am working on various generative models and their statistical perspective which resulted in 2 conference publication.

Teaching Assistant Experience

- **CPSC 330 – Applied Machine Learning** — UBC, Canada
  Teaching Assistant — *Fall 2024 (2024W1)*
- **CPSC 340 – Machine Learning and Data Mining** — UBC, Canada
  Teaching Assistant — *Winter 2025 (2024W2)*
- **Signals and Systems Analysis** — IUST, Iran
  Teaching Assistant — *Spring 2021, Spring 2022, Spring 2023*
- **Fundamentals of Deep Learning** — IUST, Iran
  Teaching Assistant — *Spring 2022*

Working Experience

- **AI Engineer** Tehran, Iran
  FaraAI (https://faraai.ir/) *May 2022 – Dec 2022*
  - **Responsibilities:**: Designed and implemented computer vision pipelines for the automatic detection and dispatching system for roadside emergencies, including fires and traffic incidents along with other side projects.

Professional Services

MICCAI	Conference Reviewer for MICCAI 2024, 2025 *(Rank 1 conference in AI for medical imaging)*
CVPR	Conference Reviewer for CVPR 2025 *(Top-tier, Rank 1 in Computer Vision)*
ICCV	Conference Reviewer for ICCV 2025 *(Rank 2 in Computer Vision)*
ICLR	Conference Reviewer for ICLR 2024 *(Top-tier, Rank 1 in Machine Learning)*
BMVC	Conference Reviewer for BMVC 2025 *(Well-recognized European CV conference)*
IEEE TMI	Journal Reviewer for IEEE Transactions on Medical Imaging *(Top-tier journal in medical imaging)*
IEEE JBHI	Journal Reviewer for IEEE Journal of Biomedical and Health Informatics *(Top-ranked journal for biomedical AI)*
IEEE Access	Journal Reviewer for IEEE Access *(Broad-scope Q2 journal)*
IEEE Sys. J.	Journal Reviewer for IEEE Systems Journal *(Multidisciplinary systems-oriented journal)*
IEEE SPL	Journal Reviewer for IEEE Signal Processing Letters *(Concise letters in signal processing research)*

Relevant Course Grades

- Probability & Statistics: 19.25/20.0 (IUST)
- Digital Image Processing: 17.00/20.0 (IUST)
- Deep Learning: 20.0/20.0 (IUST)
- Advanced Data Mining: 20.0/20.0 (IUST)
- Cellular Communication: 19.25/20.0 (IUST)
- Engineering Mathematics: 20.0/20.0 (IUST)
- Reinforcement Learning: 20.0/20.0 (IUST)
- Random Processes: 19.25/20.0 (IUST)
- BMEG 591 - Topics in Biomedical Engineering: 92/100 (UBC)
- BMEG 581 - Professional and Academic Development: 100/100 (UBC)

Honors and Awards

- Ranked **3rd** among **25** students who chose Communications as a subfield, IUST, Iran - May, 2021
- Ranked **9th** among **127** Electrical Engineering students, IUST, Iran - May, 2021
- Ranked **1st** in the national Rahneshan competitions for detecting inappropriate content in images and videos, INEF, Feb 2021
- Ranked within the top 1% among approximately 148,000 participants in the National University Entrance Exam, Iran, Summer 2017
- Received honorary master's admission from Iran University of Science and Technology, Sep 2021
- Top Student for 5 Consecutive Semesters at the ILI (Iran Languages Institute), 2015-2016

Online Courses

- Convolutional Neural Networks, Coursera
- Structuring Machine Learning Projects, Coursera
- GANs Specialization, Coursera
- Neural Networks and Deep Learning, Coursera
- Sequence Models, Coursera
- Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization, Coursera

Languages

- IELTS (Academic): (Listening: 7.5, Reading:7, Speaking:7.5, Writing:6.5, **Overall:7**), **C1 Proficiency**
- *Persian* : Native

References

- **Dr. Ilker Hacihaliloglu**
  Assistant Professor at the University of British Columbia
  Email: ilker.hacihaliloglu@ubc.ca

- **Prof. David J. Foran**
  Professor of Pathology, Laboratory Medicine and Radiology at Rutgers Robert Wood Johnson Medical School
  Email: foran@cinj.rutgers.edu

- **Prof. Dorit Merhof**
  Professor, Faculty of Informatics and Computer Science, University of Regensburg
  Email: dorit.merhof@lfb.rwth-aachen.de