Saman Motamed

PhD Candidate in Computer Science
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Research Interests

Computer Vision, Deep Learning, Generative Models, Representation Learning, Image and Video Synthesis & Editing, Physics-based Understanding

Education

- **ELLIS PhD Candidate in Computer Science**
  INSAIT, Sofia University - Oxford, United Kingdom
  Expected Graduation: 2027
  Main Advisor: Prof. Luc Van Gool, ELLIS Advisors: Prof. Andrea Vedaldi and Dr. Iro Laina

- **Master of Science in Computer Science**
  University of Toronto, Toronto, Canada
  Graduated with a 4/4 GPA, 2019 - 2021
  Thesis: A Semi-Supervised Pipeline for Anomaly Detection in Medical Image"

- **Honours Bachelor of Science in Computer Science**
  University of Toronto, Toronto, Canada
  Graduated with High Distinction, 2014 - 2019

Work Experience

- **Student Researcher**
  ***Google DeepMind**, April 2024 - November 2024* Toronto, Canada
  At GDM Toronto, I worked on evaluating the capabilities of Video Diffusion Models in understanding physics and created the Physics-IQ benchmark.

- **Visiting Researcher**
  ***Carnegie Mellon University**, Sep 2021 - April 2023* Pittsburgh, USA
  Advised by Prof. Fernando De la Torre
  At CMU's Human Sensing Lab, I worked on multiple projects that led to publications in NeurIPS 22, ICCV 23 and WACV 24, including personalized face inpainting models, a framework for making data generation using latent-based generative models more fair and a multi domain active learning method. I also had the pleasure of supervising two Masters student thesis that led to a publication at WACV.

- **Visiting Researcher**
  ***KAUST Computer Vision grou**p, Sep 2022 - Dec 2022* Saudi Arabia
  Worked on text-guided editing of NeRF scenes.

- **Research Intern**
  ***Vector Institute** - May 2021 - Aug 2021* Toronto, Canada
  Worked on a project around NeurIPS 2021 Billion-Scale Approximate Nearest Neighbor Search

Publications

- **Do generative video models learn physical principles?**
  S. Motamed**, L. Culp, K. Swersky, P. Jaini, R. Geirhos - **arXiv 2025

- **InTraGen: Trajectory-controlled Video Generation for Object Interactions**
  *Z. Liu, A. Yanev, A. Mahmood, I. Nikolov, **S. Motamed**, W. Zheng, X. Wang, L. Van Gool, D. Paudel - **arXiv 2024***

- **Lego: Learning to Disentangle and Invert Concepts Beyond Object Appearance in Text-to-Image Diffusion Models**
  S. Motamed**, D. Paudel, L. Van Gool - **ECCV 2024

- **Investigating the Effectiveness of Cross-Attention to Unlock Zero-Shot Editing of Text-to-Video Diffusion Models**
  S. Motamed**, W. Van Gasnbeke, L. Van Gool - **CVPR Workshop, 2024

- **A Unified and Interpretable Emotion Representation and Expression Generation**
  *R. Paskaleva, M. Holubakha, A. Ilic, **S. Motamed**, L. Van Gool, D. Paudel - **CVPR, 2024***

- **D3GU: Multi-target Active Domain Adaptation via Enhancing Domain Alignment**
  *L. Zhang, L. Xu, **S. Motamed**, S. Chakraborty, F. De la Torre - **WACV, 2024***

- **Personalized Face Inpainting with Diffusion Models by Parallel Visual Attention**
  *J. Xu, **S. Motamed**, P. Vaddamanu, C. H. Wu, C. Häne, J.-C. Bazin, F. De la Torre - **WACV, 2024***

- **PATMAT: Person Aware Tuning of Mask-Aware Transformer for Face Inpainting**
  S. Motamed**, J. Xu, C. H. Wu, C. Häne, J.-C. Bazin, F. De la Torre - **ICCV, 2023

- **GVP: Unifying Distributional Control of Pre-trained Generative Models**
  *C.H. Wu, **S. Motamed**, S. Srivastava, F.D. De la Torre - **NeurIPS, 2022***

- **Inception-GAN for Semi-supervised Detection of Pneumonia in Chest X-rays**
  ***S. Motamed**, F. Khalvati - In Proceedings of the 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (**EMBC**), 2021*

- **Multi-class Generative Adversarial Networks: Improving One-class Classification of Pneumonia Using Limited Labeled Data**
  ***S. Motamed**, F. Khalvati - In Proceedings of the 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (**EMBC**), 2021*

- **RANDGAN: Randomized Generative Adversarial Network for Detection of COVID-19 in Chest X-ray**
  S. Motamed**, P. Rogalla, F. Khalvati - **Nature Scientific Reports, 2021

- **Data Augmentation using Generative Adversarial Networks (GANs) for GAN-based Detection of Pneumonia and COVID-19 in Chest X-ray Images**
  ***S. Motamed**, P. Rogalla, F. Khalvati - **Informatics in Medicine Unlocked**, Volume 27, 2021*

- **Vanishing Twin GAN: How training a weak Generative Adversarial Network can improve semi-supervised image classification**
  S. Motamed**, F. Khalvati - **arXiv, 2021

- **A Transfer Learning Approach for Automated Segmentation of Prostate Whole Gland and Transition Zone in Diffusion Weighted MRI**
  S. Motamed**, I. Gujrathi, D. Deniffel, A. Oentoro, M.Haider, F. Khalvati - **arXiv - 2019

Teaching

- **University of Toronto**

  CSC420: Introduction to Image Understanding - Fall 2019
  A final year undergraduate course designed to introduce students to fundamentals of Computer Vision before and after Deep Learning. Duties included designing assignments on feature matching and transfer learning, holding office hours and grading assignments and exams.

  CSC384 : Introduction to Artificial Intelligence - Winter 2019 , Summer 2020

Created assignments on constraint satisfaction and heuristic search and held office hours.

ESC180 : An introductory course to programming concepts in Python - Fall 2020
A course designed for first year Engineering Science students to get started with Object Oriented Programming in Python. Duties included designing midterm questions and holding weekly lab hours for students.

Honours and Awards

- ELSA Mobility Grant (€3,000) - 2025
- Nominated for Best Thesis Award, University of Toronto - 2022
- Institute of Medical Science U of T Open Fellowship Award ($5,000) - 2021.
- Canada Graduate Scholarships – NSERC ($17,500) - 2020.
- Mergelas Family Scholarship in Medical Imaging ($5,000 - $3,000) - 2019 , 2020
- Dean's List Scholar (Summer 2015, Winter 2019, Summer 2019).

Services

- **organizer**
  ICCV 2025 physics-IQ challenge organizer at the 3rd Perception Test Challenge
- **Reviewer**
  NeurIPS (22-23-24-25), ICLR (24-25) ICCV(23), CVPR(23-24-25), WACV(23-24-25), MICCAI(2021)
- **Student Volunteer**
  ICCV 2023, Paris