Gustavo **Vargas Hakim**

RESEARCH SCIENTIST - COMPUTER VISION - MACHINE LEARNING

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PROFESSIONAL OVERVIEW

Trilingual Machine Learning Researcher specializing in **Computer Vision** and **Machine Learning**. My PhD research has led to several peer-reviewed publications at top venues, international collaborations, and industrial projects. As a research chair member, I collaborate with **Zebra Technologies** developing Deep Learning products for industry applications. I am also passionate for scientific communication, making complex concepts accessible to diverse audiences.

Machine Learning | Deep Learning | Computer Vision | Vision-language models | Test-time adaptation | Anomaly Detection | Evolutionary Computation | Applied research | Data modeling and analysis

WORK EXPERIENCE

Computer Vision research student   01/2022 - Present
Zebra Technologies   *Montreal, Canada*

· Implementing and testing Deep Learning models from the state-of-the-art
· Collaborating with a cross-functional team for designing solutions in industrial anomaly detection
· Led the optimization of current product to improve CPU speed by up to x2.6

PhD researcher in Machine Learning   09/2021 - Present
ÉTS Montréal   *Montreal, Canada*

· Implement and train Deep Learning models from research articles
· Fast Prototyping of new Deep Learning and Computer Vision methods; from mathematical modeling to deployment in high-performance computing servers
· Collaborate with different teams in 6+ research projects

EDUCATION

PhD in Machine Learning   09/2021 - 07/2025
École de Technologie Supérieure (ETS)   *Montreal, Canada*

· Topic: Test-Time Adaptation of Computer Vision models
· Supervisors: Ismail Ben Ayed & Christian Desrosiers
· Research intern: **Sorbonne Université** under Prof. Nicolas Thome

Master's degree in Artificial Intelligence   08/2019 - 07/2021
University of Veracruz   *Xalapa, Mexico*

· Topic: Neuroevolution of Convolutional Neural Networks

Bachelor's degree in Mechatronics Engineering   08/2013 - 01/2019
UPAEP   *Puebla, Mexico*

· Exchange program: Oklahoma State University (Stillwater, US)

RELEVANT PUBLICATIONS

CLIPArTT: Adaptation of CLIP to New Domains at Test-Time

Vargas Hakim, G. A.*, Osowiechi, D.*, Noori, M., Cheraghalikhani, M., Bahri, A., Yazdanpanah, M., Ben Ayed, I., Desrosiers, C.

IEEE Winter Conference on Applications of Computer Vision (WACV), 2025, *Equal contributions

NC-TTT: A Noise Constrastive Approach for Test-Time Training

Osowiechi, D.*, ***Vargas Hakim, G. A.****, Noori, M., Cheraghalikhani, M., Bahri, A., Yazdanpanah, M., Ben Ayed, I., Desrosiers, C.

IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2024, *Equal contributions

ClusT3: Information Invariant Test-Time Training

Vargas Hakim, G. A.*, Osowiechi, D.*, Noori, M., Cheraghalikhani, M., Bahri, A., Ben Ayed, I., Desrosiers, C.

IEEE International Conference on Computer Vision (ICCV), 2023, *Equal contributions

TTTFlow: Unsupervised Test-Time Training With Normalizing Flow

Osowiechi, D.*, ***Vargas Hakim, G. A.****, Noori, M., Cheraghalikhani, M., Bahri, A., Ben Ayed, I., Desrosiers, C.

IEEE Winter Conference on Applications of Computer Vision (WACV), 2023, *Equal contributions

Hybrid encodings for neuroevolution of convolutional neural networks: a case study

Vargas Hakim, G. A., Mezura-Montes, E., Acosta-Mesa, H.-G.

Genetic and Evolutionary Computation Conference Companion (GECCO), 2021

PROFESSIONAL SKILLS

Programming: Python (advanced), MATLAB (intermediate), C/C++ (basic)

Libraries: PyTorch, NumPy, Pandas, SciPy, Scikit-learn, Matplotlib

Technical skills: Implementation and training of Deep Learning models for computer vision, Machine Learning algorithms, probabilistic modelling, vision-language models (VLMs), information theory, statistics

Environments: Linux, High-Performance Computing

Software: Graphic design (CorelDraw), Audio editing (Audacity, Reaper)

Other skills: scientific communication, presentation skills, public speaking, teaching, graphic design, group management

TEACHING

Tutorial lecturer	07/2022
Summer School on Deep Learning and Medical Imaging	*Montreal, Canada*

· Lecturing on semi-supervised medical image segmentation

Lecturer	02/2019 - 06/2019
Universidad Euro Hispanoamericana	*Xalapa, Mexico*

· Lectured linear algebra, control theory, measurements, and electromechanical systems

Private tutor	01/2019 - 07/2021

· Tutoring elementary, secondary and high school students in mathematics and sciences

LANGUAGES

Spanish Native / **English** Fluent / **French** Fluent /