Gustavo **Vargas Hakim**

Machine Learning Researcher | Computer Vision | Multimodal AI

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PROFESSIONAL OVERVIEW

PhD researcher and applied ML engineer with a strong track record in scalable computer vision and multimodal learning. Author of 4+ publications in top-tier conferences (CVPR, ICCV, WACV) focused on test-time adaptation, CLIP-based models, and efficient model deployment. Experienced in prototyping and optimizing deep learning systems for real-world applications. Passionate about turning cutting-edge research into production-ready solutions.

SKILLS

Machine Learning: Deep learning, computer vision, test-time adaptation, vision-language models (CLIP), anomaly detection

Tools & frameworks: PyTorch, NumPy, Pandas, SciPy, Scikit-learn, Matplotlib, Anomalib

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

ML Infrastructure: HPC environments, scalable pipelines

Other: Scientific communication, cross-functional collaboration, enterprise software, public speaking, group management, conflict resolution, graphic design, algorithm design

Languages: Spanish (Native), English (fluent), French (fluent)

WORK EXPERIENCE

Computer Vision Research Intern 01/2022 - Present
Zebra Technologies *Montreal, Canada*

- Designed and deployed deep learning models for **real-time anomaly detection** in industrial systems
- Collaborated with cross-functional teams to scale models from **prototype to production**
- Led optimization of the inference pipeline, improving CPU performance by 2.6×

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

- Developed and evaluated **test-time adaptation** methods for domain-agnostic computer vision models
- Published 4+ peer-reviewed papers at **CVPR**, **ICCV**, **WACV**, including CLIP-based adaptation
- Designed and evaluated models using **HPC clusters** and large-scale visual datasets
- Collaborated on 6+ research projects, driving innovation from ideation to benchmarking

EDUCATION

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

- Thesis: Test-Time Adaptation of Computer Vision models
- Interned at **Sorbonne Université** under Prof. Nicolas Thome

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

· Thesis: Neuroevolution of Convolutional Neural Networks

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

· Exchange: Oklahoma State University (Stillwater, US)

PUBLICATIONS

CLIPArTT: Adaptation of CLIP to New Domains at Test-Time
WACV 2025 | ***Vargas Hakim, G. A.****, Osowiechi, D.*, et al. (*Equal contributions)
Domain adaptation for CLIP via transductive pseudo-labeling at test time

NC-TTT: A Noise Constrastive Approach for Test-Time Training
CVPR 2024 | Osowiechi, D.*, ***Vargas Hakim, G. A.****, et al. (*Equal contributions)
Unsupervised Test-time Training with Noise Contrastive Estimation to adapt models to new domains

ClusT3: Information Invariant Test-Time Training
ICCV 2023 | ***Vargas Hakim, G. A.****, Osowiechi, D.*, et al. (*Equal contributions)
Mutual Information-based clustering to adapt deep models to new domains at test-time

TTTFlow: Unsupervised Test-Time Training With Normalizing Flow
WACV 2023 | Osowiechi, D.*, ***Vargas Hakim, G. A.****, et al. (*Equal contributions)
Using Normalizing Flows to detect domain shifts at test-time and adapt deep models

Hybrid encodings for neuroevolution of convolutional neural networks: a case study
GECCO 2021 | ***Vargas Hakim, G. A.***, Mezura-Montes, E., Acosta-Mesa, H.-G.
Automatic design of CNNs for classification in medical imaging with genetic algorithms

TEACHING & OUTREACH

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

· Taught semi-supervised medical image segmentation

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

· Delivered courses in linear algebra, control theory, and electromechanical systems