BENOIT MARTEAU

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LinkedIn | GitHub | Portfolio

SUMMARY

XR + AI researcher with **IEEE ICIR 2022 Best Paper Award** and 20+ peer-reviewed publications (7 first/co-first author). Expert in building **AI-powered immersive systems** that integrate deep learning, computer vision, and real-time 3D visualization**. Developed XR-AI applications**, **multimodal data fusion**, and intelligent scene understanding. Experience with CNNs, GANs, diffusion models, and deploying ML inference pipelines on edge devices. **Seeking XR + AI research internship.**

EDUCATION

Georgia Institute of Technology – Atlanta, GA

Ph.D. Student, Electrical & Computer Engineering _____ *Expected Fall 2026*

- Focus: Extended Reality, AI/ML, Computer Vision, Healthcare Digital Twins | GPA: 4.0/4.0
- **IEEE ICIR 2022 Best Paper Award** – Interactive Digital Twin in Virtual Reality
- IEEE BHI 2025 Young Professional Co-Chair

M.S. Electrical & Computer Engineering _____ *2018-2019*

Arts et Métiers ParisTech – France

M.S. Engineering | Dassault UAV Challenge Team Lead (2017-2018) _____ *2015-2020*

RESEARCH EXPERIENCE

Graduate Research Assistant & Lab Manager **January 2022 – Present**
Bio-MIBLab, Georgia Institute of Technology *Atlanta, GA*

- **EXR – AI-Powered EHR Visualization (IEEE ICIR 2025, Co-First Author):** Built immersive XR system integrating **deep learning medical image segmentation** with real-time 3D visualization; Unity 6 + Meta Quest 3 frontend with AI inference pipeline for automated spine analysis; fused FHIR clinical data with neural network outputs for multimodal patient representation
- **IDTVR – Best Paper IEEE ICIR 2022 (Co-First Author):** Designed cloud-based Digital Twin framework with **real-time ML inference** for rehabilitation; integrated Azure IoT Hub sensor streaming with Function App for edge ML processing; built photogrammetry pipeline (Meshroom + Blender) with **computer vision** for environment reconstruction
- **Brain-DTXR (IEEE ICIR 2024, Co-First Author):** Developed Unity XR application with **neural activity visualization powered by eLORETA source localization**; designed Azure ML pipeline integrating FreeSurfer cortical reconstruction for 3D brain models; implemented Meta SDK for VR interaction with real-time EEG-to-brain mapping
- **Synthetic Pathology AI (NeurIPS DGM4H 2023, Second Author):** Investigated training dynamics of **GANs and diffusion models** for whole-slide pathology image synthesis; applied data cartography to analyze synthetic data quality; contributed to deep generative modeling research for medical imaging
- **AI Implementation Science (IEEE BHI 2025, First Author):** Led modernization of multi-site pediatric research data warehouse to OMOP CDM v5.4 at Shriners Children's; developed Python-based data quality assessment tool (converted from R/Java OHDSI implementation for MS Fabric compatibility); integrated METRIC framework for Trustworthy AI evaluation in clinical settings
- **Cloud-XR + AI Infrastructure:** Architected secure healthcare data pipelines using Azure Blob Storage with ML model deployment; implemented real-time sensor streaming via MQTT to ESP32 with edge inference; deployed XR applications with WebGL fallback and **embedded neural network inference**
- **Lab Management:** Manage Azure cloud infrastructure and GPU compute resources for 50-person research lab; directly mentor 12+ students on XR + AI projects; co-organize STAR-AI symposium on Safe, Trustworthy, Actionable, Responsible AI

TECHNICAL SKILLS

XR Development: Unity 6 (C#), Meta SDK, XR Interaction Toolkit, Meta Quest 2/3/Pro, HP Reverb G2

AI/ML: PyTorch, TensorFlow | CNNs, GANs, Diffusion Models, Foundational Models | Medical Image Segmentation | Real-time Inference | Computer Vision | Trustworthy AI

3D/Visualization: Blender, Meshroom (Photogrammetry), FreeSurfer, MRI/EEG visualization, OBJ/FBX mesh pipelines

Cloud & Data: Microsoft Azure (IoT Hub, Function App, Blob Storage, ML), FHIR, REST APIs, MQTT, Edge ML deployment

Languages: Python, C#, C++

SELECTED PUBLICATIONS

- **Marteau B***, Chen M* et al. "EXR: An Interactive Immersive EHR Visualization in Extended Reality." *IEEE-ICIR 2025*
- **Marteau B** et al. "An AI Implementation Science Study to Improve Trustworthy Data in a Large Healthcare System." *IEEE-BHI 2025*
- Zhong Y*, **Marteau B*** et al. "IDTVR: A Novel Cloud Framework for an Interactive Digital Twin in Virtual Reality *IEEE-ICIR 2022* **– BEST PAPER**
- **Marteau B***, Vashista S* et al. "Brain Digital Twin Combining Artificial Intelligence and Extended Reality." *IEEE-ICIR 2024*
- Shi W, **Marteau B** et al. "Mapping and Diagnosing Augmented Whole Slide Image Datasets with Training Dynamics" *NeurIPS DGM4H 2023*

Full list: 20+ papers (7 first/co-first) – Google Scholar