

Alexandre Kirchmeyer

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EDUCATION

Carnegie Mellon University

Pittsburgh, PA

Master's degree in Machine Learning ([MSML](#)) | Current GPA: 4.06/4.0

Sep. 2022 – Dec. 2023

- Pursuing research under the supervision of [Pr. Deepak Pathak](#) in Computer Vision and Embodied AI.
- Relevant Coursework: *Multimodal ML, Visual Learning and Recognition, Deep Reinforcement Learning, Intermediate Statistics, Convex Optimization, Probabilistic Graphical Models, Advanced Introduction to ML, ML in Practice.*

École Polytechnique

Palaiseau, France

Engineer Program, Master's degree in Math and CS: [Image, Vision and ML Track](#) | GPA: 3.90/4.0

Aug. 2019 – Aug. 2022

- Relevant coursework: *Deep Learning, Computer Vision, Shape Analysis, Intro to NLP, Algorithm Analysis, Randomized Algorithms, Optimization and Control, Markov Chains and Martingales, Logic and Computing, Galois Theory*

EXPERIENCE

LEAP Lab, Carnegie Mellon University

Pittsburgh, PA

Research Assistant – Advisor: [Pr. Deepak Pathak](#), CMU Robotics Institute

Apr. 2023 – Present

- Learning RL catching policy in simulation and transferring to real-world via policy distillation / Rapid Motor Adaptation.
- Perception using 3D vision (SDF, pointcloud, depth), supervised by dexterous grasping (DexGraspNet losses, eigengrasps)

Independent Study - Advisor: [Pr. Deepak Pathak](#), CMU Robotics Institute [\[notes\]](#) [\[code\]](#)

Dec. 2022 – Mar. 2023

- Explored the use of diffusion models for single-view 3D reconstruction (à la DreamFusion / Zero123).
- Fine-tuned StableDiffusion for image-conditioned generation with LoRA/ControlNet/InstructPix2Pix frameworks.
- Generated multi-view synthetic data with MiDaS and different in-painting procedures to improve 3D geometry.

Princeton Vision and Learning Lab, Princeton University [\[paper\]](#) [\[poster\]](#) [\[code\]](#)

Princeton, NJ

Visiting Student Researcher – Advisor: [Pr. Jia Deng](#), Princeton Vision & Learning Lab

Mar. 2022 – Aug. 2022

- Explored the following question: Can we make ConvNets work without 2D?
- Researched the use of a novel *oriented 1D* convolution operator, to improve the long-range scaling of CNNs at linear cost.
- Implemented personalized CUDA kernels (from scratch) which are up to 50% faster than PyTorch.
- Trained fully 1D ConvNeXt models, demonstrating that our 1D approach can match 2D on image classification, semantic segmentation and object detection. 1st author publication at ICCV 2023.

HarfangLab Cybersecurity Startup

Paris, France

Research and Development Intern

Jun. 2021 – Sep. 2021

- Implemented a C/C++ Windows user-mode driver to detect malicious behavior through DLL injection and API hooking.

PROJECTS

Multi-Modal Concept Learning and Understanding [\[report\]](#) [\[poster\]](#) [\[code\]](#)

Pittsburgh, PA

Carnegie Mellon University, Multimodal Machine Learning Course Group Project

Sep. 2022 – Dec. 2022

- Examined whether multimodal models learn and understand concepts. Proposed to learn concepts with auxiliary learning, mine concepts using prefix tuning, and improve causal robustness with diffusion-based data augmentations.
- Selected as one of the two *Best Midterm Presentation* for the course out of 24 groups.

Non-Rigid Shape Correspondence [\[report\]](#) [\[code\]](#)

Palaiseau, France

Independent Study – Advisor: [Pr. Maks Ovsjanikov](#), GeoViC Group, INRIA & LIX

Sep. 2021 – Mar. 2022

- Examined the use of hyper-networks and deformed implicit fields for the task of non-rigid 3D shape correspondence.
- Re-implemented Microsoft DIF-Net on JAX and evaluated shape correspondence performance on KeypointNet dataset.
- Studied limitations of architecture, devised and tested hybrid correspondence approach based on analysis.

Electrically powered rocket project for vertical landing optimization [\[paper\]](#)

Palaiseau, France

École Polytechnique, Mechanics Department

Sep. 2020 – Sep. 2021

- Led a 5-student team to build an electrically powered rocket for vertical landing optimization, directed by a thrust vectoring system and controlled by an LQR algorithm.
- [Presented](#) work at the *International Astronautical Congress (IAC) Student Conference*, Dubai, U.A.E., Oct. 2021.

SKILLS

Programming: C/C++, Python, CUDA, JavaScript, Pytorch, JAX, OpenGL, Slurm, ArchLinux, ROS, Raspberry Pi, ReactJS

Languages: French (native), English (native), German (intermediate)

AWARDS

- [Ranked](#) 4th out of 107 at the ACM ICPC SWERC 2020-2021 European Algorithmics Contest Mar. 2021
- [Ranked](#) 3rd out of 12 at the ICPC Ecole Polytechnique Championship 2020 Jun. 2020
- [Ranked](#) 8th out of 62 at the French-Australian Regional Informatics Olympiad 2017 Mar. 2017
- [USACO Platinum](#) level Dec. 2016

PUBLICATIONS

- Alexandre Kirchmeyer, Jia Deng, *Convolutional Networks with Oriented 1D Kernels*, ICCV, 2023. [\[paper\]](#) [\[code\]](#)