

Igor Krawczuk

PH.D., ML AND OPTIMIZATION RESEARCHER

✉ contact@krawczuk.eu | 🌐 https://krawczuk.eu | 📧 igor-krawczuk | 📄 igorkrawczuk | 🎓 Igor Krawczuk

"Learning is Living"

Summary

ML & Optimization researcher & practitioner with experience across the full ML stack - from systems programming to large-scale ML/RL training. Over more than a decade I have contributed to academic research and industrial innovation, co-founded startups, managed IT infrastructure at scale, and mentored numerous students and interns.

My aim is to build trustworthy AI and human systems that serve and create value for their stakeholders. For this, I draw on my experience working with and leading teams, my theoretical expertise and practical experience from working as a software engineer both freelance and in innovative companies. I excel at transferring bleeding edge research to real world applications.

Technical Skills

ML Research & Engineering	Experience building and training ML/RL models (PyTorch, Jax, TensorFlow), distributed training with AWS, GCP, Lambda and HPC/Slurm; communication via LaTeX/Typst
ML-Ops	Dataset curation, cluster administration (local/cloud), experiment tracking (Ray, DVC, W&B, MLflow)
DevOps	AWS, GCP, modal.com, Docker, Kubernetes, GitHub/GitLab CI, MinIO, Slurm, Terraform/OpenTofu, Ansible
Backend/Systems/SWE	Rust, Python, C/C++ (expert); Java, NodeJS/TypeScript (professional); Go, Julia, VHDL/Verilog (familiar); CUDA/Triton (basic); profiling and optimizing performance critical systems, architecting maintainable systems
Front-end/Full stack	Hugo, HTML5/CSS, LESS, SASS, TypeScript, Rust-web, Elm
Project & Business	Agile/Scrum, PRINCE2, Diátaxis, Human-Centered Design, basic legal/accounting (GDPR, regulatory compliance)
Languages	German (Native), English (Fluent), French (Working), Polish (Basic), Norwegian (Basic)

Work Experience

Adaptiv Bio

Lausanne, Vaud, Switzerland

LEAD ML & OPTIMIZATION ENGINEER

Mar 2024 - Sep 2026

- Developed and implemented digital strategy, bridging software, data, and ML capabilities
- Built the Adaptiv Bio API and its internal and external MCP servers, exposing platform capabilities for programmatic and AI-agent access
- Led migration from ad-hoc systems to a proper database (data engineering for migration) and various codebase restructurings as we scaled the system
- Led the setup of the observability pipeline (Grafana, Sentry) with distributed tracing
- Helped to develop and run Adaptiv Bio 2024 EGFR competitions
- Served concurrently as a guest associated researcher supervising students at EPFL/LIONS

Self Employed / Freelancer

Globally remote

ML/AI PROTOTYPING CONSULTANCY

Aug 2014 - Present

- Proof-of-concept work in automation and ML, and teaching
- From embedded system firmware (C) to custom ETL/classification (Python) and NLP lead tracking
- Developed custom C++/ROCM ML framework for AMD GPUs pre-official TF support
- Prototyped CV algorithms for aquaculture health monitoring
- Other Projects: predictive maintenance (time series anomaly detection), automated asset monitoring (crawler+NLP), introductory OWASP courses, Due diligence and geospatial analyses for insurance brokerages

LSM and LIONS labs @ EPFL

Lausanne, Switzerland

RESEARCHER & PHD CANDIDATE

Sep 2017 - Feb 2024

- 7 top venue publications, collaborated with over a dozen industry partners
- Supervised ~24 students (semester/BSc/MSc) and 2 interns
- Contributed to grant writing (~200'000 CHF funding)
- Lab-side sysadmin for a 30-machine cluster, managed ~250'000 CHF in procurement
- Deployed centralized monitoring (Grafana, InfluxDB) to track cluster usage

Samsung Korea

VISITING RESEARCHER

- High-dimensional multi-objective optimization with Gaussian Processes + evolutionary algorithms for semiconductor development
- Gathered requirements, surveyed literature, delivered proof-of-concept, enabled knowledge transfer

Suwon, Gyeonggi-do, Korea

Apr 2018 - Jun 2018

SCI-STI-MM@EPFL

RESEARCH INTERN

- Researched ML applications in Dataflow Programming
- Developed a decision-tree based scheduler for dataflow programs

Lausanne, Switzerland

Mar 2017 - Aug 2017

Blik

RESIDENT CONSULTANT/TECH LEAD

- Developed first product iteration of an integrated intra-logistics localization and tracking system

Munich, Germany

Nov 2016 - Feb 2017

EPFL

TA & LABORATORY ASSISTANT

- Characterized Metal-Oxide Memristors using Agilent ATP
- Guided and supported students through VHDL implementations of Multi-Core CPUs

Lausanne, Switzerland

Nov 2014 - May 2015

K&K Prime

FREELANCE CONSULTANT

- Embedded software development in C/C++, interface development in C#

Apr 2014 - Aug 2015

Publications

Note: The * indicates equal contribution

RESEARCH

Building-Diffusion: Graph Discrete Diffusion Model For Architectural Volumetric Design Generation

CVPR Workshops

MOHAMMED EL AMINE SEHABA, **IGOR KRAWCZUK**, SERGE MIGUET, XAVIER MARSALT

2026

Deep-Learning-Assisted SICM for Enhanced Real-Time Imaging of Nanoscale Biological Dynamics

Small Methods

ZAHRA AYAR, MARCOS PENEDO, BARNEY DRAKE, JIALIN SHI, SAMUEL MENDES LEITAO, **IGOR KRAWCZUK**, HELENA MILJKOVIC, ALEKSANDRA RADENOVIC, JELENA BAN, VOLKAN CEVHER, GEORG ERNEST FANTNER

2025

Toward Resisting AI-Enabled Authoritarianism

Oxford Martin AI Governance Initiative

FAZL BAREZ, ISAAC FRIEND, KEIR REID, **IGOR KRAWCZUK**, VINCENT WANG, JAKOB MÖKANDER, PHILIP TORR, JULIA MORSE, ROBERT TRAGER

2025

Open Challenges in Multi-Agent Security: Towards Secure Systems of Interacting AI Agents

arXiv preprint

CHRISTIAN SCHROEDER DE WITT, KLAUDIA KRAWIECKA, **IGOR KRAWCZUK**, AND 21 OTHERS

2025

Why Risk Matters for Protein Binder Design

ICLR 2025 GEM Workshop

TUDOR-STEFAN COTET, **IGOR KRAWCZUK**

2025

Crowdsourced Protein Design: Lessons From the Adaptyv EGFR Binder Competition

bioRxiv preprint

TUDOR-STEFAN COTET, **IGOR KRAWCZUK**, FILIPPO STOCO, NOELIA FERRUZ, ANTHONY GITTER, AND 22 OTHERS

2025

Multi-Agent Risks from Advanced AI

Cooperative AI Foundation Technical Report #1, arXiv preprint

LEWIS HAMMOND, ALAN CHAN, JESSE CLIFTON, JASON HOELSCHER-OBERMAIER, AKBIR KHAN, EUAN MCLEAN, (...19 OTHERS...), **IGOR KRAWCZUK**, (...18 OTHERS...)

2025

Going beyond Compositions, DDPMs Can Produce Zero-Shot Interpolations

ICML 2024

*JUSTIN DESCHENAUX, ***IGOR KRAWCZUK**, GRIGORIOS CHRYSOS, VOLKAN CEVHER

2024

Graph Generative Deep Learning Models with an Application to Circuit Topologies

IGOR KRAWCZUK

PhD Thesis, EPFL

2024

Multi-Resolution Graph Diffusion

MAHDI KARAMI, *IGOR KRAWCZUK, VOLKAN CEVHER

ICLR 2024 Workshop on Machine Learning for Genomics Explorations

2024

MEDITRON-70B: Scaling Medical Pretraining for Large Language Models

ZEMING CHEN, ALEJANDRO HERNÁNDEZ CANO, ANGELIKA ROMANOU, ANTOINE BONNET, KYLE MATOBA, FRANCESCO SALVI, MATTEO PAGLIARDINI, SIMIN FAN, ANDREAS KÖPF, AMIRKEIVAN MOHTASHAMI, ALEXANDRE SALLINEN, ALIREZA SAKHAEIRAD, VINITRA SWAMY, IGOR KRAWCZUK, ET AL.

arXiv preprint

2023

Expanded version published as “MEDITRON: Open Medical Foundation Models Adapted for Clinical Practice,” Research Square, 2024

EPFL-LLM Megatron-LLM

Open-source software

ALEJANDRO HERNÁNDEZ CANO, MATTEO PAGLIARDINI, ANDREAS KÖPF, KYLE MATOBA, AMIRKEIVAN MOHTASHAMI, XINGYAO WANG, OLIVIA SIMIN FAN, AXEL MARMET, DENIZ BAYAZIT, IGOR KRAWCZUK

2023

Adversarial Training Descends Without Descent: Finding Actual Descent Directions Based on Danskin’s Theorem

ICLR 2023

*FABIAN LATORRE, *IGOR KRAWCZUK, *LEELLO TADESSE DADI, THOMAS PETHICK, VOLKAN CEVHER

2023

Distributed Extra-gradient with Optimal Complexity and Communication Guarantees

ICLR 2023

*ALI RAMEZANI-KEBRYA, *KIMON ANTONAKOPOULOS, *IGOR KRAWCZUK, JUSTIN DESCHENAU, VOLKAN CEVHER

2023

DiGress: Discrete Denoising diffusion for graph generation

ICLR 2023

*CLEMENT VIGNAC, *IGOR KRAWCZUK, ANTOINE SIRAUDIN, BOHAN WANG, VOLKAN CEVHER, PASCAL FROSSARD

2023

Proximal Point Imitation Learning

NeurIPS 2022

LUCA VIANO, ANGELIKI KAMOUTSI, GERGELY NEU, IGOR KRAWCZUK, VOLKAN CEVHER

2022

A Computational Turn in Policy Process Studies: Coevolving Network Dynamics of Policy Change

Complexity

MAXIME STAUFFER, ISAAK MENGESHA, KONRAD SEIFERT, IGOR KRAWCZUK, JENS FISCHER, GIOVANNA DI MARZO SERUGENDO

2022

Method for Interfacing with Hardware Accelerators

US Patent 11,250,107

CHRISTOPHE PIVETEAU, NIKOLAS IOANNOU, IGOR KRAWCZUK, MANUEL LE GALLO-BOURDEAU, ABU SEBASTIAN, EVANGELOS STAVROS ELEFThERIOU

2022

Filling gaps in trustworthy development of AI

Science

SHAHAR AVIN, HAYDN BELFIELD, MILES BRUNDAGE, GRETCHEN KRUEGER, JASMINE WANG, ADRIAN WELLER, MARKUS ANDERLJUNG, IGOR KRAWCZUK, DAVID KRUEGER, JONATHAN LEBENSOLD, TEGAN MAHARAJ, NOA ZILBERMAN

2021

Toward Trustworthy AI Development: Mechanisms for Supporting Verifiable Claims

arXiv preprint

MILES BRUNDAGE, SHAHAR AVIN, JASMINE WANG, HAYDN BELFIELD, GRETCHEN KRUEGER, GILLIAN HADFIELD, (...23 OTHERS...), IGOR KRAWCZUK, (...29 OTHERS...)

2020

Technical report, 950 citations as of 2026-07-01

GG-GAN: A Geometric Graph Generative Adversarial Network

OpenReview

IGOR KRAWCZUK, PEDRO ABRANCHES, ANDREAS LOUKAS, VOLKAN CEVHER

2020

MRI Adaptive Sampling: “Closed Loop Deep Bayesian Inversion: Uncertainty Driven Acquisition for Fast MRI”; “Uncertainty-Driven Adaptive Sampling via GANs” (NeurIPS 2020 Workshop)

OpenReview preprints

THOMAS SANCHEZ, IGOR KRAWCZUK, ZHAODONG SUN, VOLKAN CEVHER

2020

On the Benefits of Deep RL in Accelerated MRI Sampling

Preprint

*THOMAS SANCHEZ, *IGOR KRAWCZUK, VOLKAN CEVHER

2021

Multi-ReRAM synapses for artificial neural network training

IREM BOYBAT, CECILIA GIOVINAZZO, ELMIRA SHAHRABI, **IGOR KRAWCZUK**, IASON GIANNPOULOS, CHRISTOPHE PIVETEAU,
MANUEL LE GALLO, CARLO RICCIARDI, ABU SEBASTIAN, EVANGELOS ELEFThERIOU, YUSUF LEBLEBICI

2019 IEEE International Symposium
on Circuits and Systems (ISCAS)

2019

Effect of metal buffer layer and thermal annealing on HfO_x-based ReRAMs

JURY SANDRINI, BEHNOUSH ATTARIMASHALKOUBEH, ELMIRA SHAHRABI, **IGOR KRAWCZUK**, YUSUF LEBLEBICI

2016 IEEE International Conference
on the Science of Electrical
Engineering (ICSEE)

2016

OTHER CONTENT & APPEARANCES

muckrAlkers Podcast

CO-HOST, WITH JACOB HAIMES

Technology/AI podcast

2025-Present

Into AI Safety: “Scaling Democracy” (Episode 18)

GUEST

Podcast

2024

Machine Learning Street Talk (MLST): “X-Risk, Governance, Effective Altruism” (Episode 99)

GUEST, WITH CARLA CREMER

Podcast

2023

Protein Optimization 101: Insights from the Literature; Protein Optimization 102: Lessons from the Protein Design Competition

TUDOR-STEFAN COTET, **IGOR KRAWCZUK**

Company blog post, not peer-reviewed

Adaptiv Bio blog

2024

SRF: Themenabend “DataLand” - “Die digitale Revolution: Künstliche Intelligenz erobert unser Leben”

AI EXPERT, PANEL SEGMENT

Swiss Radio and Television (SRF 1),
national broadcast

2018

Education

EPFL (École Polytechnique Fédérale de Lausanne)

PHD IN ELECTRICAL ENGINEERING

- Thesis: Graph Generative Deep Learning Models with an Application to Circuit Topologies
- Part of the “Data Champion” project whose members offer their technical expertise to other EPFL members.
- Completed the PRINCE2 Foundation 6th Edition project management certificate as part of the doctorate

Lausanne, Switzerland

Sep 2017 - Feb 2024

TUM (Technical University of Munich)

M.SC. IN ELECTRICAL AND COMPUTER ENGINEERING

- Master thesis at EPFL as part of an ERASMUS exchange Aug. 2015 - Nov. 2016
- Student representative on the faculty council, IT responsible for the student union

TUM (Technical University of Munich)

B.SC. IN ELECTRICAL AND COMPUTER ENGINEERING

- Member of the student union, treasurer responsible for over 250'000 € yearly cash-flow

Munich, Germany

Mar 2014 - Feb 2017

Munich, Germany

Sep 2011 - Aug 2014

Honors & Awards

2015 **Deutschlandstipendium**, German federal scholarship for excellent students

2015 **Semi-Finalist (with BioCloud)**, OneStart Europe by Oxbridge Biotech and SR One

London, UK

2014 **Impact Hub Zürich, Climate KIC & Pro Juventute Social Impact Award**, HackZurich 2014

Zürich, Switzerland

Community service

2024 **Research lead**, AI safety camp (AISC)

Ongoing since
my PhD **Reviewer**: AAAI, AISTATS, ICLR, ICML, NeurIPS, TMLR

2020-2021 **Mentor**, CHERI existential risk summer program

Switzerland