Fabian Boemer

858-522-9220   fabiboemer@gmail.com

fabianboemer.com

WORK EXPERIENCE

Intel Corporation

Staff Machine Learning Engineer / Technical Lead — *Apr 2021 - present*
Research Scientist — *Oct 2018 - Apr 2021*

- Lead team of developers working on Intel HEXL, a **C++ homomorphic encryption** acceleration library using AVX512
- Lead developer of nGraph-HE, a **C++** DL compiler backend for private inference using **homomorphic encryption**
- Developing Intel HE Toolkit
- Open-source contributor to SEAL and PALISADE homomorphic encryption libraries
- Directed $100k research grant with Barcelona Supercomputing Center; collaboration with UCSD, TU Darmstadt

Tesla Motors — *Summer 2017*

Software Development Intern, Firmware: Maps & Navigation

- Wrote vehicle firmware code (**C++**, Qt) to report navigation telemetry on company-wide website
- Implemented **Python** solution processing Apache Kafka stream of 150,000 trips daily
- Deployed solution with Kubernetes on AWS and Grafana for real-time visualization

Lyrical Labs — *Summer 2016*

Research and Development Intern

- Developed 4K image segmentation algorithm using SLIC Superpixels and Extreme Learning Machines

Badgeville Inc. — *Summer 2015*

Software Development Intern

- Predicted user churn and clustered users by behavior using Apache Spark, mongoDB, Hadoop, Scala

EDUCATION

Stanford University, 4.0 GPA — *2017 - 2018*

M.S. Computational and Mathematical Engineering, Data Science Track

- Placed 2nd/180 in class competition to optimize Bayesian network

California Institute of Technology, 3.8 GPA — *2013 - 2017*

B.S. Computer Science, B.S. Applied and Computational Mathematics

- TA'd 5 CS classes: graded 1100 problem sets, rated 4.7/5.0 by students
- NCAA DIII athlete: cross-country, soccer, track & field

SELECT PUBLICATIONS

Intel HEXL: Accelerating Homomorphic Encryption with Intel AVX512-IFMA52. WAHC 2021.

Enabling Homomorphically Encrypted Inference for Large DNN Models. IEEE Transactions on Computers 2021.

MP2ML: a Mixed-Protocol Machine Learning Framework for Private Inference. ARES 2020. Poster presentation at NeurIPS 2020 PPML. CCS 2020 PPMLP Workshop. Contributed talk at Crypto 2020 PPML.

nGraph-HE: A Graph Compiler for Deep Learning on Homomorphically Encrypted Data. CF 2019.

nGraph-HE2: A High-Throughput Framework for Neural Network Inference on Encrypted Data. WAHC 2019.

Parameter-free image segmentation with SLIC. Neurocomputing 277. 2018.

6 patents pending

Additional information on Google Scholar

SKILLS

Software: C++, CMake, Python, TensorFlow
Expertise: homomorphic encryption, privacy-preserving machine learning, deep learning, graph compilers

PROFESSIONAL ACTIVITIES

Program Committee / Reviewer: WAHC (2019, 2020, 2021), ICML (2021), Journal of Cryptographic Engineering (2021)