

Onni Kosomaa

onni.kosomaa@gmail.com | +358 45 8965899 | Helsinki, Finland

<https://kosomon.github.io/> | <https://www.linkedin.com/in/onnikosomaa/>

ABOUT ME

I'm a driven and proactive engineer with over four years of professional experience. In recent years, I have applied my knowledge to conduct research on a deep learning method for 3D medical imaging reconstruction. I have a no-fuss approach to all my work, and I strive to solve problems from a practical standpoint while maintaining a solid theoretical foundation. In addition to my research work, I have experience in low-level development with rigorous testing and safety standards. I'm used to balancing performance, safety and code quality. My electrical engineering education has given me a strong background in signal processing, hardware knowledge, and low-level systems and embedded programming.

EXPERIENCE

Research Staff, Aalto University & NVIDIA

Feb 2021 –

- I developed a fully three-dimensional CT reconstruction algorithm using deep learning, based on the first principles of digital signal processing.
- My work led to two patent applications in July 2021.
- Publication in preparation for October 2022.
- I wrote all the software used.
- I developed differentiable alias-free versions of commonly used tomographic primitive operations.
- I developed a 3D CT volume renderer for visualizing the results, using CUDA and OpenGL.
- Technologies used were Python, CUDA, C++, PyTorch, DICOM.
- Extreme memory consumption of volumetric deep learning pipeline required adding several custom CUDA operations to the PyTorch implementation, and optimization of GPU memory bandwidth was crucial.

Research Scientist, NVIDIA

May 2020 – Jan 2021

- Research on using deep learning for CT reconstruction. My bachelor's thesis is based on this research.

System Software Engineer, NVIDIA

Sep 2019 – Apr 2020

- I worked on automotive ISO 26262 ASIL-B safety certification and development of a Linux user space GPU driver for the Tegra SoC, while also developing new features for upcoming chips.
- Additionally, I wrote design documents, refactored code to adhere to safety standards, and increased testing coverage.
- Codebase was C++17 run on SoCs, and Python for scripting. Coding standards MISRA and AUTOSAR C++.
- I received "Top Contributor" status, awarded amongst top 5% of engineers of matching seniority level.
- **Additionally, four internships within System Software Engineering at NVIDIA, totaling 14 months.**

PUBLICATIONS

Self-Supervised Deep Learning for Volumetric Helical CT Reconstruction

In review at IEEE Transactions on Medical Imaging as of November 2022. Pre-print at [project page](#).

Onni Kosomaa, Samuli Laine, Tero Karras, Miika Aittala, Jaakko Lehtinen.

End-to-end training for a three-dimensional tomography reconstruction pipeline

[Patent US17/365,574](#) - Filed Jul 1, 2021

Onni Kosomaa, Jaakko Lehtinen, Samuli Laine, Tero Karras, Miika Aittala.

Three-dimensional tomography reconstruction pipeline

[Patent US17/365,645](#) - Filed Jul 1, 2021

Onni Kosomaa, Jaakko Lehtinen, Samuli Laine, Tero Karras, Miika Aittala.

EDUCATION

Aalto University

Sep 2016 – Dec 2020

BSc with Honors, Electrical Engineering. Top one university in Finland.

- 4.6/5.0 GPA (EE Major: 4.7/5.0, CS Minor: 5.0/5.0)
- Absent for conscript service during Fall 2017 – Spring 2018

SKILLS & INTERESTS

- **Skills:**
 - C++, C, and Python.
 - CUDA, PyTorch, OpenGL, Linux, Git.
 - Native speaker of Finnish and Swedish, fluent in English.
- **Interests:** Woodworking, cooking, climbing, and restoring old furniture and electronics.