

Task:

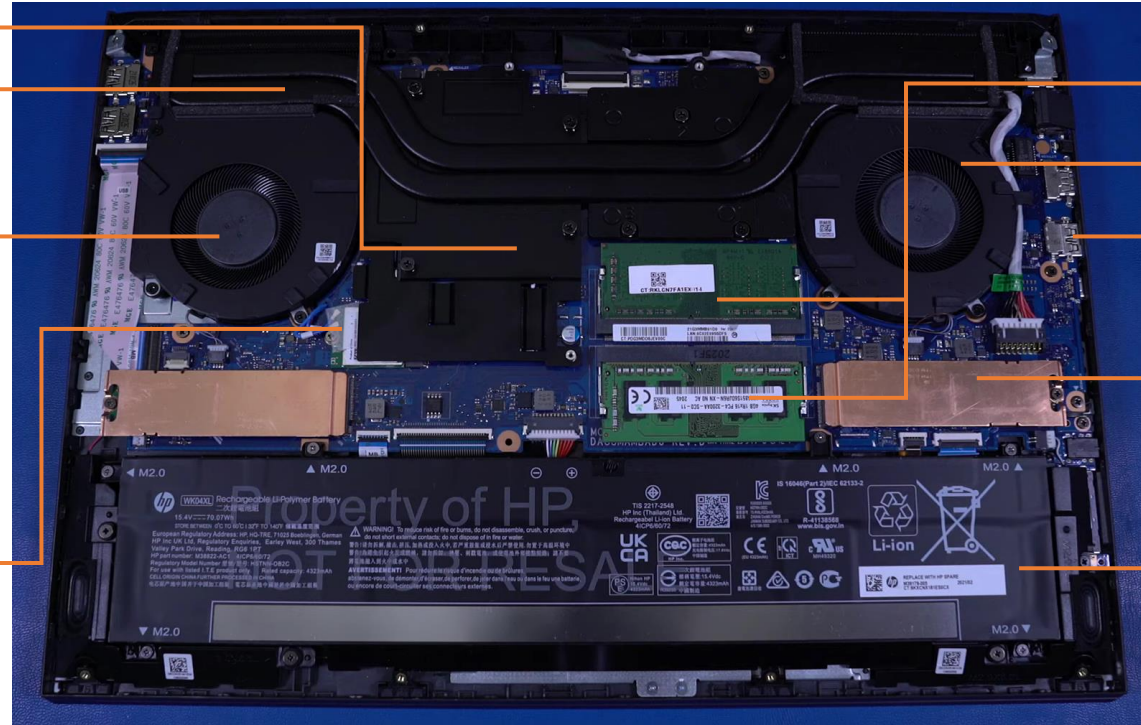
My laptop is **HP VICTUS**, Processor: **AMD Ryzen 7 6000H**, 8 Cores, 16 Logical Processors, **NVIDIA GeForce RTX 3060**

Heat Spreader,
underneath which
is the CPU and
GPU

Heat Sink

GPU Cooling Fan

Wireless LAN
Module



Memory Module,
8GB(x2)

CPU Cooling Fan

USB Port

Solid State
Drive (512GB)

70 WH Lithium
Battery

Task:

Gavranovic, S., Hartmann, D. and Wever, U., 2019. **Topology optimization using gpgpu**. *Advances in Evolutionary and Deterministic Methods for Design, Optimization and Control in Engineering and Sciences*, pp.553-566.

A graphics processing units (GPUs) accelerated adjoint-based optimization platform is proposed in this paper. The reason I was interested in this was because I had previously worked on topology optimization, specifically on computational fluid dynamics with regards to a heat exchanger as a research project. The main issue we faced was the large number of simultaneous equations being computed by the solver. Using GPUs will surely help get desired results in a less computationally expensive way. In the above paper, a two-dimensional adjoint Euler solver is extended to incorporate GPU acceleration using CUDA kernels and named ADjoint-GARfield (ADGAR). The adjoint optimization platform, ADGAR, is verified to a high accuracy of 14 significant digits. Significant speedup of around 16x is observed using ADGAR for computations on a single GPU over a single CPU core.