ECSE-4740
Applied Parallel Computing for Engineers

Mon & Thurs 12:20–1:40, online

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This engineering course is aimed at seniors and grad students who wish to use current parallel hardware, and to obtain knowledge and hands-on experience in developing parallel applications software. We will use the ECSE parallel computing server, which contains two parallel architectures: dual 14-core Intel Xeon, and Nvidia Quadro RTX 8000 graphics card with 4608 CUDA cores.

Software tools will include CUDA and OpenACC on the Nvidia, and OpenMP on the Xeons. Programming paradigms will include multithreaded algorithms using massive (256GB) shared main memory on the Xeons, and single instruction multiple data streams on the Nvidia. Effectively programming these processors also requires in-depth knowledge about parallel programming principles, as well as the parallelism models, communication models, and resource limitations of these processors.

We will see that supercomputers are no longer required for many parallel tasks, and any lab can afford parallel computation.

ECSE-4740 will minimally overlap other RPI parallel programming courses, so that students can profitably take all. Students from outside ECSE are welcome.

Prereq: ECSE-2660 CANOS or equivalent, basic C++; or permission.