



FACULTY MENTOR

Yatish Turakhia

PROJECT TITLE

GPU Acceleration of Bioinformatics Algorithms

PROJECT DESCRIPTION

Biological datasets, such as genomic data, are among the fastest-growing data types on the planet and pose enormous computational challenges to analyze. In this project, the student(s) will work closely with the PI and other lab members to:

1. Design and implement algorithms for compute-intensive bioinformatic tasks, such as genome assembly, read alignment, and whole-genome alignments on GPUs to achieve massive speedups.
2. Compare and benchmark the performance against existing methods.
3. Co-author papers based on this work to be published in top-tier journals and conferences.

This project will be in person.

INTERNS NEEDED

2 Students

PREREQUISITES

- C++ and CUDA programming



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PROJECT TITLE

A Programmable Hardware Accelerator for Dynamic Programming Algorithms

PROJECT DESCRIPTION

Dynamic Programming algorithms are fundamental building blocks of numerous algorithms in bioinformatics. In this project, the student(s) will work closely with the PI and other lab members to:

1. RTL design and implementation of a flexible hardware accelerator that can be programmed for a wide range of dynamic programming algorithms in bioinformatics.
2. Prototype the accelerator on FPGA and perform ASIC analysis.
3. Compare and benchmark the performance against existing methods.
4. Co-author papers based on this work to be published in top-tier journals and conferences.

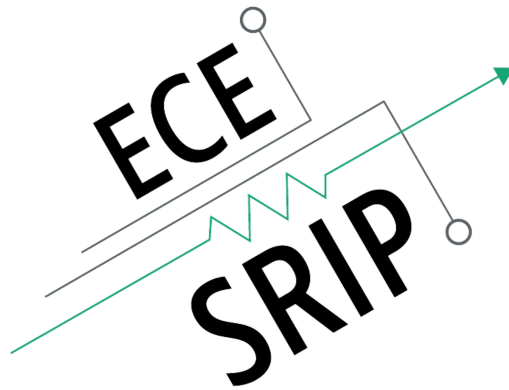
This project will be in person.

INTERNS NEEDED

2 Students

PREREQUISITES

- RTL Design in SystemVerilog
- Computer Architecture
- VLSI Design



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PROJECT TITLE

Algorithms for Pathogen Genomic Surveillance

PROJECT DESCRIPTION

Genomic surveillance is the process by which scientists monitor the genetic mutations occurring in a pathogen (such as HIV or the COVID-19 virus) and study the evolutionary and transmission dynamics of different variants. In this project, the student(s) will work closely with the PI and other lab members and collaborators to:

1. Design and implement new algorithms that enable pathogen genomic surveillance on a massive and global scale.
2. Compare and benchmark the performance against existing methods.
3. Co-author papers based on this work to be published in top-tier journals and conferences.

This project will be in person.

INTERNS NEEDED

2 Students

PREREQUISITES

- C++/Python programming