

1. ECE/CS 560: Foundations of Fine-Grain Parallelism
2. 4 credits: 2-75 minute lecture sessions/week, weekly lab time assigned
3. Louis-Noel Pouchet
4. None
5. Course Information
 - a. Programming novel architectures; performance tuning; automatic parallelization; program transformation; polyhedral model; equational programming
 - b. Prerequisites: CS475
 - c. Selected Elective: Computer Engineering; Electrical Engineering
6. Goals for the Course
 - a. Course Learning Objectives
 - i. Compute- and data-intensive loops and/or equations
 - ii. analyze above loops and equations to determine sequential or parallel schedules and storage mappings
 - iii. Transform them using these schedules and storage mappings, and (iv) derive/generate sequential or parallel "codes"
 - b. Student Outcomes
 1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
 2. An ability to apply the engineering design process to produce solutions that meet specified needs with consideration for public health and safety, and welfare, as well as global, cultural, social, environmental, and economic factors
 3. An ability to communicate effectively with a range of audiences
 4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
 5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
7. Topics Covered
 - Polyhedral model
 - GPUs (Graphics Processing Units)
 - FPGAs
 - Systematically derive programs