

# Advanced Computer Systems Architecture

## Chip-Multiprocessors: Applications and Architectures

CSE 526M

Prof. Patrick Crowley

## Plan for Today

- Introduction
- Preliminaries
- Course Goals, Topics and Structure
- The next several weeks
- Assignment

## Administrivia

- Office location: Bryan 522-D
- Office hours:
  - TBD
- Newsgroup:
  - `wu.cs.class.526`
  - Post commentaries here

## Course Goals

1. Cultivate first-hand experience in using a chip-multiprocessor to solve problems
2. Place classic and recent research literature in parallel computer systems in appropriate modern context
3. Prepare students for cutting-edge research and development

## Course Topics (in approx. order of appearance)

- Multiprocessors, Multicomputers and the Intel IXP
- Programming the IXP (I/O oriented tutorial)
- Modeling and Performance Optimization
- Programming the IXP (New apps, exploiting het resources)
- Projects
- Classic Machines and Projects
- (On-chip) Interconnects
- Memory: hierarchies, heterogeneity and technology
- Synchronization and data sharing
- Contemporary Machines and Project

## Course Structure

- 50% lecture and discussion
- 30% design meetings
- 20% presentations

## The Next Several Weeks

- Introduction
  - CMPs in the context of multiprocessors and multicomputers
  - Intro paper for Thursday
- IXP Architecture and Programming Model
- Receiving, Processing and Transmitting Packets with the IXP2400/2800
  - Tutorial
  - Programming experience
- *Other* problems

## Potential Project Topics

- Numerics/scientific
  - transportation problem
  - decision trees
  - floating-point library
  - fixed-point library
  - dynamic programming
  - simplex algorithm
- Networking
  - Packet scheduling
  - Content search
- String processing
- Search/sort

## Assignment

- HW #0, due this week
- Readings
  - **Commentary:** MPOC: A Chip Multiprocessor for Embedded Systems