ECE 697J – Advanced Topics in Computer Networking

September 5th, 2002
Welcome!

- **Research course:**
  - Active and Programmable Networks
  - Network processor design
- **Classes:**
  - Tuesday & Thursday 2:30 – 3:45, Marston 220
- **Course homepage:**
  - [http://www.ecs.umass.edu/ece/wolf/courses/ECE697J/](http://www.ecs.umass.edu/ece/wolf/courses/ECE697J/)
  - All reading material online
- **Instructor:**
  - Tilman Wolf
  - Office: Knowles 211C,
  - Email: wolf@ecs.umass.edu
Who am I?

- Tilman Wolf
- New faculty member in ECE department
- Ph.D. at Washington University in St. Louis, MO
- Undergrad studies at Universität Stuttgart, Germany
- Research interests
  - Computer networks
  - Computer architecture
- Previous teaching
  - Introduction to Computer Networks
What is this course about?

- **Active Networks (= Programmable Networks)**
  - Data is not only transported from one point to another
  - Data is also processed inside the network

Traditional Internet: just packet transport ("dumb network")
- problem: no security, quality of service, etc.
- hard to change

Active Network: packet processing inside network
- New functions can be installed dynamically
What is this course about?

• Processing of network traffic requires infrastructure
  – Processors (= Network Processors)
    • Many processor cycles
    • Designs that differ from traditional workstation processors
  – Operating Systems
    • Dynamic deployment of new “functionality”
    • Safe and secure operation
• We will explore, understand, evaluate, and improve
  – Read, present, and discuss journal papers
  – Implement our ideas in group project
• Goal: learn material and learn how to make use of it.
This course does not cover

- Introduction to computer networks
- Introduction to computer architecture
- How to use PowerPoint
- Programming in any programming language
The Process

- Most papers have been selected
  - Two parts: Active networks and network processor design
- Everybody reads the paper for each class
- One selected student gives 45 minute presentation
  - Overview & background context
  - Details of goals, methods, implementations, etc.
- Discussion of paper with entire class
  - Understand aspects that might be unclear
  - What did we learn?
- Homework
  - Read papers & do background research
- Exams, project, and a few quizzes
Presentations

• Why presentations?
  – Presentations take preparation and effort
  – Teach for real life 😊
  – Teach presentation and language skills
  – Reduces workload for everyone
  – More intense exposure to a paper

• Use PowerPoint
  – Presentations will be put on course web page
Discussion

- Important part of the learning experience
- Discuss research ideas
  - Relevance and novelty
  - Technical accuracy
- Understand methods used
  - How were results obtained
  - What assumptions were made
- Evaluate quality of paper
  - Value of contribution
  - Presentation
- Teaches process of critical evaluation
  - Will help you for selecting your own research ideas
Course Resources

• Course material available on course web page:
  – http://www.ecs.umass.edu/ece/wolf/courses/ECE697J

• Papers are online
  – All papers that will be presented
  – Some related work (not available yet)

• Presentations online
  – PowerPoint files

• Discussions summaries online
  – One student gets to write a summary paragraph
    (once or twice in the semester)

• Questions and Answers online
Grading

- Presentation (25%)
  - Your understanding of material
    - Paper
    - Background
  - Quality of presentation
  - Ability to answer questions
- Discussion (10%)
  - Quality of understanding and contribution
- Project (30%)
- Exams (15% + 15%)
- Quizzes (5%)
Class Project

• Open topic – You have to come up with something
  – Related to programmable networks and/or network processors
• Process:
  – Definition of project by end of October
  – Review of proposal
  – Final presentation/report
• I will be available for defining project and making sure its possible/relevant
• Preferably, work in teams of two
How can you have impact?

• Active participation in class
  – Read papers
  – Participate in discussion
  – Ask questions

• Give feedback
  – Suggest topics that interest you
  – Fill out questionnaires

• Be effective
  – Understand concepts
  – Know some detail
  – Don’t try to understand everything 😊, but most of it

• Come up with exciting project
Other Issues

• Conflict with 697I
  – Who would like to take both courses?
  – Is there any other time we can meet?
Research Papers

• Selection criteria
  – Cover important topics in programmable networks and network processor design
  – Broad spectrum of research groups
  – Broad spectrum of methods (simulation, analysis, measurement, etc.)
  – By no means complete coverage of all topics
  – If you have any suggestions, please let me know!

• May require background reading
Paper Assignments

- List of papers in your handout
- Please select two preferences
Homework #1

• Due next class.
• Think about what questions should be answered when discussing a paper. Distinguish between questions about technical content and presentation. Write down 5-10 questions that are important to you.
Final Comments

• Course is supposed to be fun
  – No stress environment for presentations
  – Friendly discussions
  – We are trying to learn – not only technical things

• Your participation will make the difference!

• Please fill out background questionnaire…