ECE 697J – Advanced Topics in Computer Networking

September 5th, 2002

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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/
  - All reading material online
- **Instructor:**
  - Tilman Wolf
  - Office: Knowles 211C,
  - Email: wolf@ecs.umass.edu

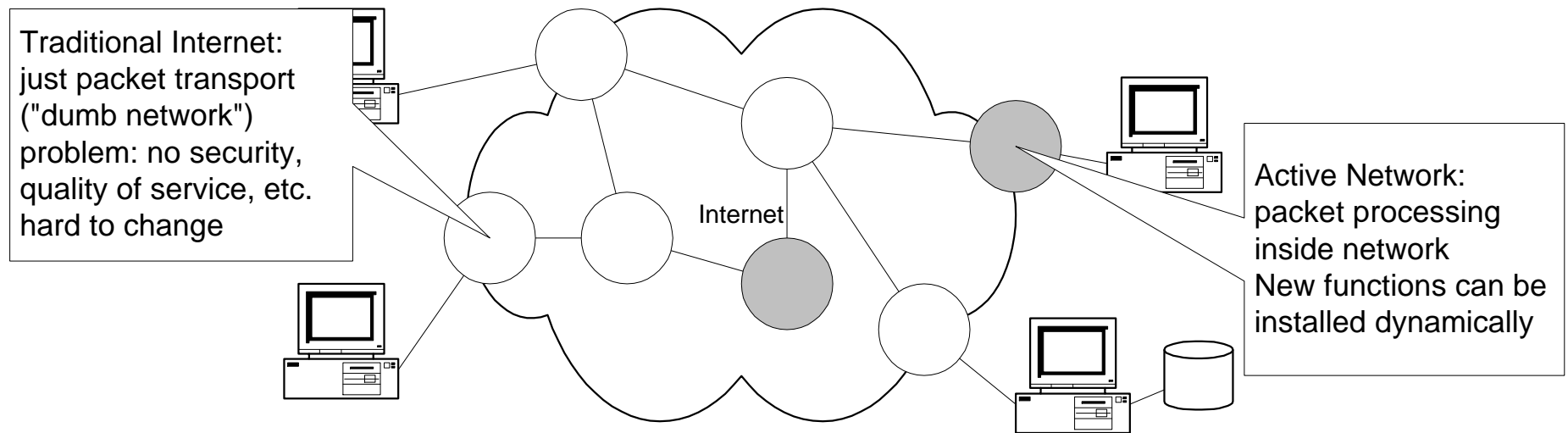University of Massachusetts Amherst

Who am I?

- Tilman Wolf
- New faculty member in ECE department
- Ph.D. at Washington University in St. Louis, MO
    - Thesis: "Design and Performance of Scalable High-Performance Programmable Routers"
- Undergrad studies at Universität Stuttgart, Germany
- Research interests
    - Computer networks
    - Computer architecture
- Previous teaching
    - Introduction to Computer Networks

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What is this course about?

- ## Active Networks (= Programmable Networks)
  - Data is not only transported from on 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

Internet

Active Network: packet processing inside network New functions can be installed dynamically

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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.

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This course does not cover

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

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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

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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

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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

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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

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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%)**

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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

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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

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Other Issues

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

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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

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Paper Assignments

- List of papers in your handout
- Please select two preferences

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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.

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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…

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