

**EE/CpE 423**

**Senior Design**

**Fall 2003**

# Course Introduction

- Logistics:
  - Course coordinator: Bruce McNair
    - Office: Burchard 206
    - Phone: 201-216-5549
    - email: [bmcnair@stevens-tech.edu](mailto:bmcnair@stevens-tech.edu)
    - Web site: <http://koala.ece.stevens-tech.edu/~bmcnair>
    - Office hours: Tuesday ~9:30 - ~11 (other hours, TBD)
  - TA: Dominik Hepp '03: [dhepp@stevens-tech.edu](mailto:dhepp@stevens-tech.edu)
- Class schedule:
  - Generally, 1 hour Tuesday sometime between 3 – 5:50 pm, as needed
  - **LET ME KNOW ABOUT TIME CONFLICTS ON TUESDAY – I'LL SCHEDULE CLASS TIME TO MINIMIZE THEM. Class time will be 4pm for now.**
  - Fall group presentations may require full class schedule time and Thursday meetings
- Class web site:

Access thru WebCT is being set up. Site will also be mirrored on a site that is externally accessible. You will also be able to access via my web site

All of last year's senior design groups' sites are archived.

# A personal perspective

- My perspective on senior design
  - As a '71 student
  - As an AT&T/Bell Labs technical recruiter from 1982-1996
  - As a faculty member

# Your three tasks

1. Figure out what your job (project) is
2. Tell people about it
3. Do it

# Senior Design course flow

1. Project identification
  - Is it interesting?
  - Is it doable?
  - Is it meaningful?
  - Can you find a sponsor?
  
2. Group formation/selection of Group Leader
  - ~4-5 students/group
  - Equal share in outcome of project \*\*\*\*
  - Group leader keeps project on target (time and direction) and is responsible for reporting
  
3. Find a Faculty Advisor
  - **Must** be a member of ECE, CS, or Physics Departments' faculty
  - Evaluates written reports
  - Determines 80% of group grade

# Senior Design course flow (continued)

4. Submit Project/Advisor Form – due by 9/16/03
  - Completed after project and advisor are selected.
  - Faculty advisor signs, group submits to course coordinator (me)
  - I assign a group number that is used in all future reports
- Weekly Status Reports - first report due the Monday after group number assigned
  - From group leader to course coordinator (me): an electronic one page summary of project status, progress for the week. CC: advisor and TA
  - Due before Noon Monday via email. Send .pdf or .doc file
  - Format/template on web site – don't deviate
  - “Hours spent on project” are for CURRENT week, report person-hours
- Advisor-Group Meetings/Oral and Written Progress Reports
  - Meet with advisor at least once every two weeks
  - Advisor provides technical guidance, advice to group
  - All students must attend advisor-group meetings
  - Advisor signs written reports

# Senior Design course flow (continued)

- Logs
  - Every student must maintain an up-to-date laboratory notebook, recording time spent on project, observations, directions, dead-ends, etc..
  - Must be made available on request to advisor, coordinator, other faculty
- Documentation required (in order)
  - Project/Advisor form – early in first semester
  - Project Proposal – middle of first semester
  - Individual project web site (I'm looking for consistency)
  - Final Design report – end of first semester
  - Project Oral Presentation – end of first semester
  - Interim Progress report – middle of second semester
  - Poster/Project demonstration – end of second semester
  - Final Report – end of second semester

# Senior Design course flow (continued)

- Class Meetings
- Grades
  - 80% assigned by advisor
  - 20% assigned by course coordinator
- Awards
- Materials & Supplies
- Facilities

# New this year

- Ongoing group assessment of members/group effectiveness
- Option for individualized grades
- Seminars on selected topics
- Opportunities for interdisciplinary projects with Technology Management (contact Dean Laucirica)

# Technical Advisors and their Research Areas

<p><b>Francis T. Boesch</b></p> <ul style="list-style-type: none"> <li>• Network Design</li> <li>• Network Reliability</li> <li>• Applications of Graph Theory</li> </ul>	<p><b>Rajarthanam Chandramouli</b></p> <ul style="list-style-type: none"> <li>• Networked Communications</li> <li>• <b>Wireless</b> Communications</li> <li>• <b>Multimedia</b> Computing and <b>Security</b></li> <li>• Energy Efficient Coding for <b>Wireless</b> Communications</li> </ul>	<p><b>Cristina Comaniciu</b></p> <ul style="list-style-type: none"> <li>• QoS for <b>wireless</b> networks</li> <li>• Cross-layer design for <b>wireless</b> networks</li> <li>• <b>Radio</b> resource management</li> <li>• Admission/access control for <b>multimedia</b></li> <li>• <b>Spread spectrum</b> communications</li> <li>• Multiuser detection &amp; multi-access protocols</li> </ul>
<p><b>Sumit Ghosh</b></p> <ul style="list-style-type: none"> <li>• Asynchronous Distributed Decision-Making Algorithms</li> <li>• Networking and Network <b>Security</b></li> <li>• Computer-Aided Design of Digital Systems</li> <li>• Modeling and Simulation of Complex Systems</li> <li>• Intelligent Transportation</li> </ul>	<p><b>Harry Heffes</b></p> <ul style="list-style-type: none"> <li>• Integrated Broadband Communications Networks</li> <li>• Overload Controls for Distributed Switching Systems</li> <li>• Queuing and Teletraffic Theory and Applications</li> <li>• Computer Performance Modeling and Analysis</li> <li>• Mobile Communications and Congestion Control for High Speed Networks</li> </ul>	<p><b>Gerald J. Herskowitz</b></p> <ul style="list-style-type: none"> <li>• Long-Distance High-Capacity Single-Mode Optical Fibre Communications Systems</li> <li>• Integrated Video, Data, Voice Networks</li> <li>• Optical Sensing Systems for Processing and Environmental Controls</li> </ul>
<p><b>Hongbin Li</b></p> <ul style="list-style-type: none"> <li>• Signal Processing for Communications</li> <li>• Channel Identification and Equalization</li> <li>• <b>Transmit/Receiver</b> Diversity</li> <li>• <b>CDMA</b> and <b>OFDM</b> Systems</li> <li>• Stochastic Signal Processing</li> <li>• Sensor Array Processing</li> <li>• Detection and Estimation</li> <li>• Spectral Analysis and System Identification</li> <li>• <b>Radar</b> and Medical Imaging</li> </ul>	<p><b>Hong Man</b></p> <ul style="list-style-type: none"> <li>• <b>Image</b> Compression</li> <li>• <b>Video</b> Compression</li> <li>• Error Resilient Data Compression</li> <li>• <b>Wireless</b> Data Communications</li> </ul>	<p><b>Bruce McNair</b></p> <ul style="list-style-type: none"> <li>• <b>Wireless</b> Communications</li> <li>• Computer and Network <b>Security</b></li> <li>• Signal Processing for Communications</li> <li>• Software-Defined <b>Radios</b></li> <li>• OFDM <b>Wireless</b> Systems</li> <li>• <b>Wireless</b> LANs</li> </ul>
<p><b>K.P Subbalakshmi</b></p> <ul style="list-style-type: none"> <li>• Joint Source-Channel Coding</li> <li>• <b>Image</b> and <b>Video</b> Coding</li> <li>• Error Resilient <b>Multimedia</b> Communications</li> <li>• <b>Multimedia</b> Networking</li> </ul>	<p><b>Stuart K. Tewksbury</b></p> <ul style="list-style-type: none"> <li>• VLSI and ULSI Digital Systems</li> <li>• System Interconnects &amp; Packaging</li> <li>• Communications for Concurrent Computing</li> <li>• Reconfigurable Computing Systems</li> <li>• Computation Science &amp; Engineering</li> </ul>	<p><b>Uf Tureli</b></p> <ul style="list-style-type: none"> <li>• CDMA-Based <b>Wireless</b> Systems</li> <li>• <b>Wireless</b> Testbeds</li> <li>• OFDM <b>Wireless</b> Systems</li> <li>• Signal Processing for Communications</li> </ul>
<p>EE/CpE423: Senior Design Fall 2003</p>	<p><b>Yu-Dong Yao</b></p> <ul style="list-style-type: none"> <li>• Microcellular <b>Wireless</b> Architectures</li> <li>• Equalization for Co-Channel Interference</li> <li>• <b>Spread Spectrum</b> for Indoor and Mobile <b>Wireless</b></li> <li>• Mobile <b>Satellite</b> Communications</li> </ul>	

# Last Year's Projects

Chaotic Spreading Spectrum System Development and Implementation using  
FPGA/VHDL for Secure Wireless Communications

Kalman Filter Library

**Autonomous Advertising Robot Interface**

Factory Deviation Monitor

Data Center Environmental Link

**MyStevens**

**Voice Over IP at Stevens**

**Missile Course Deviation**

**Motion Tracking Device**

Platform for Media Riche Lecture Delivery

**Redesign of the Stevens Campus Network**

**Youth Monitoring Device**

**eHousing**

Real-time Wireless Sensor Network – Signal Analysis for Security Applications

**Home Calling Center**

**Miniaturization of MP3 Player**

Cell Phone – Brew Based Cellphone Application Development

**Smart Appliances**

**“Universal” Credit Card**

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**Digital Fingerprint Scanner**

**Blue Force Tracing Geolocation Services**

**Self Tuning Guitar**

Wireless Cargo Tracking using 802.11a Technology

EZPARK

**Financial Management Software**

**Remote Camera Control**

**H-26L Video Coding Standard**

Autonomous Underwater Vehicle

**Secure Data Transfer System**

Web-based Information Tracker

**Real-time Multimedia Steaming System w/ advanced  
compression & steganography algorithms over wireless channels**

**Automobile Black Box**

**GPS tracking for RF transceivers**

**Digital Player Piano**

**LED Learners Guitar**

Modular LED Display

Digital Video Surveillance System

Media Pad

Electronic Caddy

# Senior Design Tasks – Fall '03

