

computer Engineering

Subdivided into the 3 main areas:

- Software presented by Prof. Bagchi
- Architecture presented by Prof. Thottethodi
- Intelligent Systems presented by Prof. Givan

Computer Area includes some 18 primary area faculty members

Presentation available at:

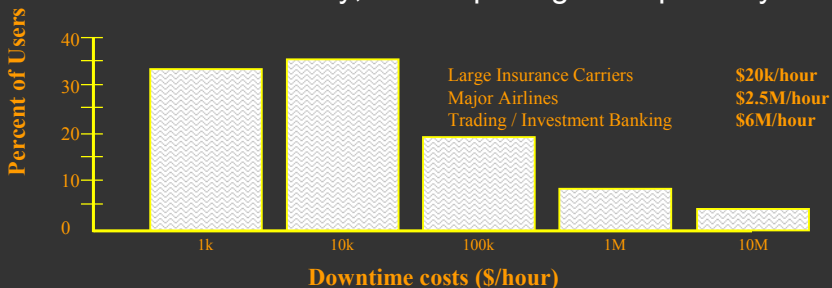
http://www.ece.purdue.edu/~sbagchi/Presentations/OpenHouse_040403.pdf

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Dependable Computing Systems Research

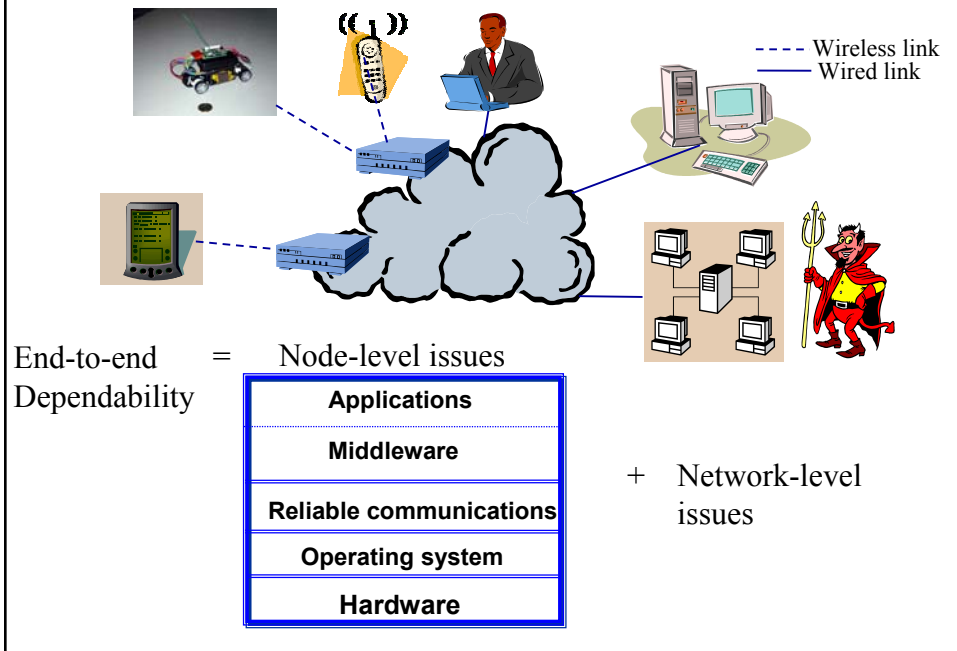
- Faculty Member: Saurabh Bagchi (sbagchi@purdue.edu)
- We need computer systems that we can depend on in the face of
 - Naturally occurring faults – hardware malfunction, software bugs
 - Malicious intrusions – insider attack or external hackers
- Downtime costs money, loss of prestige and possibly life



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System Perspective on Design of Dependable Systems



Research in Dependable Computing Systems Lab

- Framework for distributed disruption tolerant system
 - How to build an adaptive infrastructure for detecting, diagnosing and recovering from errors and attacks in a distributed platform?
- Self-checking network protocols
 - How to design network protocol components to be fail-silent?
- Dependable ad-hoc and sensor networks
 - How to build dependable network out of inherently unreliable components with resource constraints?
- Computation, communication and mobility scheduling in sensor networks
 - How to maximize goodput per unit power?
- Hardware architecture support for enhancing software reliability
 - How to check for software defects without crippling performance losses?

Selected Compiler Projects

- ❑ Faculty member: Sam Midkiff
- ❑ URL: www.ece.purdue.edu/~smidkiff/research.htm

- ❑ Compilation for more efficient, easier, safer programming
 - Optimization of programs to safely run as untrusted applications
 - Optimization of programs with high level user-specified parallelism
 - Compiler instrumentation of programs to detect and characterize errors
- ❑ Compilation for high performance
 - Hybrid compile-time/run-time analysis and optimization methods
 - Optimization of code for multithreaded processors
 - Optimization of code for reduced power consumption

I'm interested in smart, creative students with good programming skills.

Peer-to-Peer Computing: A new foundation for distributed applications

- ❑ Faculty member: Charlie Hu

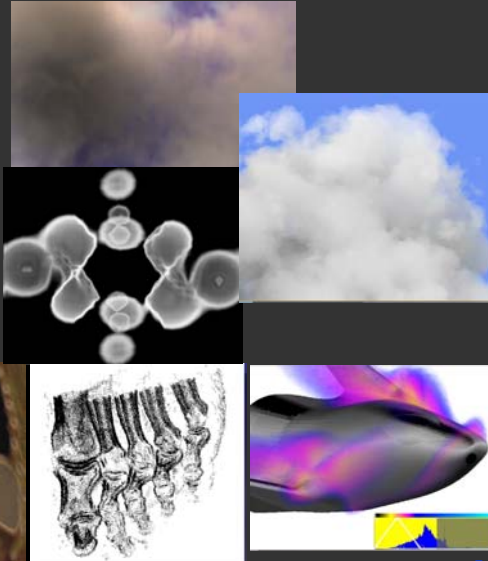
- ❑ Pioneers: Napster, Gnutella, FreeNet (1st generation)
- ❑ 2nd-generation p2p (CAN, Chord, Pastry, Tapestry)
 - fully decentralized
 - Self-organizing
 - efficient routing

- ❑ We are building 2nd-generation P2P systems
 - The routing substrate
 - P2p applications
 - » P2p-based file systems (Poster 1: Hoard)
 - » Scalable application-level multicast (Poster 2: Borg)
 - Synergy with other research areas:
 - » Grid computing: p2p-based resource management
 - » Mobile Ad Hoc Networks: (Poster 3: DPSR)
- ❑ Caching in p2p overlay networks (Poster 4: transparent p2p caching)

Computer Graphics & Visualization Research

Professor David S. Ebert (ebertd@purdue.edu)

- ❑ Procedural Models of Natural Phenomena
- ❑ Real-time Photorealistic Rendering
- ❑ Computer Animation
- ❑ Volume Visualization
- ❑ Minimally-immersive Visualization



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Data Mining, Computer Security

- ❑ Faculty Member: Carla Brodley (brodley@purdue.edu)
- ❑ Research Interests
 - Computer Security
 - » intrusion detection
 - » threat analysis
 - » user modeling
 - Data Mining
 - » unsupervised learning
 - » anomaly detection
- ❑ Courses Taught: - Computer Security (EE495), Machine Learning and Data Mining (EE632), Upcoming new grad course on Security in Spring 04
- ❑ Background Needed to be an RA with Prof. Brodley - Computer Security: Compilers, O.S., Networking, Programming Languages - Data Mining: AI, Pattern Recognition, Statistics

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