Software Systems Research – Portfolio Review

Dr. Nelson R. Manohar Alers

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Outline of the Talk

- Background [10%]
- Computer-Supported Collaboration [25%]
- Dynamically Customized Web Touring [25%]
- Multimedia Computing Networking [35%]
- Wrap-Up [5%]

Educational Background

- **B.S. in Computer Engineering**
  - **The University of Puerto Rico at Mayaguez**
- **M.S. in Computer Engineering**
  - **The University of Wisconsin at Madison**
  - Computer Architecture and Organization (Advisor Dr. Yu Hen Hu)
- **M.S.E. in Industrial Engineering**
  - **The University of Michigan at Ann Arbor**
  - Statistical Quality Control/Information Systems (Advisor Dr. Dan Teichroew)
  - From January 1991 to December 1992*
- **Ph.D. in Computer Science and Engineering**
  - **The University of Michigan at Ann Arbor**
  - Software Systems Research (Advisor: Dr. Atul Prakash)
  - From January 1991* to May 1997

Work Experience

- **Senior Technical Associate**
  - **@ AT&T Bell Laboratories, Naperville, Illinois**
  - From June 1986 to August 1986
- **Member of the Technical Staff I**
  - **@ AT&T Bell Laboratories, Naperville (Indian Hill), Illinois**
  - From June 1987 to March 1991*
- **Member of the Technical Staff I**
  - **@ AT&T Bell Labs field work at La Telefonica's Spain AIN**
  - From September 1990* to December 1990*
- **Member of the Technical Staff**
  - **@ Bell Communications Research, Piscataway, New Jersey**
  - From June 1992 to August 1992
- **Research Staff Member**
  - **@ IBM Thomas J. Watson Research Center**
  - From May 1997 to December 2001*

Research Traversal

- Computer Architecture
  - University of Wisconsin - Madison (87-88)
- Advanced Intelligent Networks
  - AT&T Bell Labs (S'86, S'87, 88-91)
- Statistical Process Control & Systems Engineering
  - University of Michigan IOE Department (91-92)
- Distributed Computing & Distributed Systems
  - Bellcore (S'92);
  - University of Michigan EECS Department (92-93)
- Collaborative Systems
  - University of Michigan EECS Department (93-94)
- Collaborative Multimedia Systems
  - University of Michigan EECS Department (94-97)
- Multimedia Computing Networking
  - IBM T. J. Watson Research Center (97-01)

Selected Publications

- **"Applying Statistical Process Control to the Adaptive Rate Control Problem",**
  - Manohar, Nelson R.; Willebeek-Lemair, Marc H.; Prakash, Atul, in Proceedings of Multimedia Computing and Networking Conference, pp. 45-60, San Jose, CA, January 1998.
- **"Dealing with Synchronization and Timing Variability in the Playback of Interactive Session Recordings",**
  - Nelson R. Manohar and Atul Prakash, in Proceedings of the Third ACM Int'l Multimedia Conference, pp. 45-56. San Francisco, CA, November 1995.
- **"The Session Capture and Replay Paradigm for Asynchronous Collaboration",**
  - Nelson R. Manohar and Atul Prakash, in Proceedings of the Fourth ECSCW Conference, pp. 149-164. Stockholm, Sweden, September 1995.
- **"A Framework for Programmable Multimedia Overlay Networks",**
  - N. R. Manohar, A. Mehra, M. H. Willebeek-LeMair and M. Naghshineh, in IBM Journal of Research and Development, Special Issue on Digital Video, 43(4), July/August 1999.
- **"A Flexible Architecture for Heterogeneous Replayable Workspaces",**
  - Nelson R. Manohar and Atul Prakash, in Proceedings of the Third IEEE Int'l Conference on Multimedia Computing and Systems, pp. 274-278, Hiroshima,

Other Publications

- **"Streaming and Synchronization of Re-executable Content",**
  - N. Manohar and A. Prakash, *unpublished*, 1998.
- **"Design Issues on the Support of Tools and Media on Replayable Workspaces",**
  - N. Manohar and A. Prakash, CSE-TR-304-96, Dept. of EECS, Univ. of Michigan, September 1996.
- **"Design Considerations in Building a Distributed Collaboratory",**
  - A. Prakash, F. Jahanian, R. Hall, N. Manohar, A. Mathur, C. Rasmussen, H. Shim, T. Weymouth, G. Wu, D. Atkins, R. Clauer, and G. Olson, School of Information, Univ. of Michigan, Feb. 1995.
- **"Statistical Quality Control and Software Productivity."**
  - N. Manohar, Quals Report, (research work under Dr. Daniel Teichroew), Dept. of IOE, Univ. of Michigan, May 1992.
- **"The DCIS6 Finite State Machine Tables",**
  - Nelson R. Manohar-Alers, AT&T Bell Laboratories, Int'l 5ESS Features Development Department, Internal Memorandum, August 1989.
- **"The Computer Architecture of VLSI Digital Signal Processors",**
  - MSEE Thesis/Report, Nelson R. Manohar-Alers, Department of ECE, Graduate Engineering Library, University of Wisconsin-Madison, August 1988.

Intellectual Property (IP) Activity

- **IP Training:**
  - Trained with **IBM Master Inventors** Mr. Leon Lumelsky and Dr. Philip S. Yu

- **IP Performance**:
  - **Principal inventor** (and principal inventor-in-training) on seven patents.
  - **Eight USPTO patent filings**, **seven** successfully granted.
  - **Two IBM Invention Plateaus** achieved.

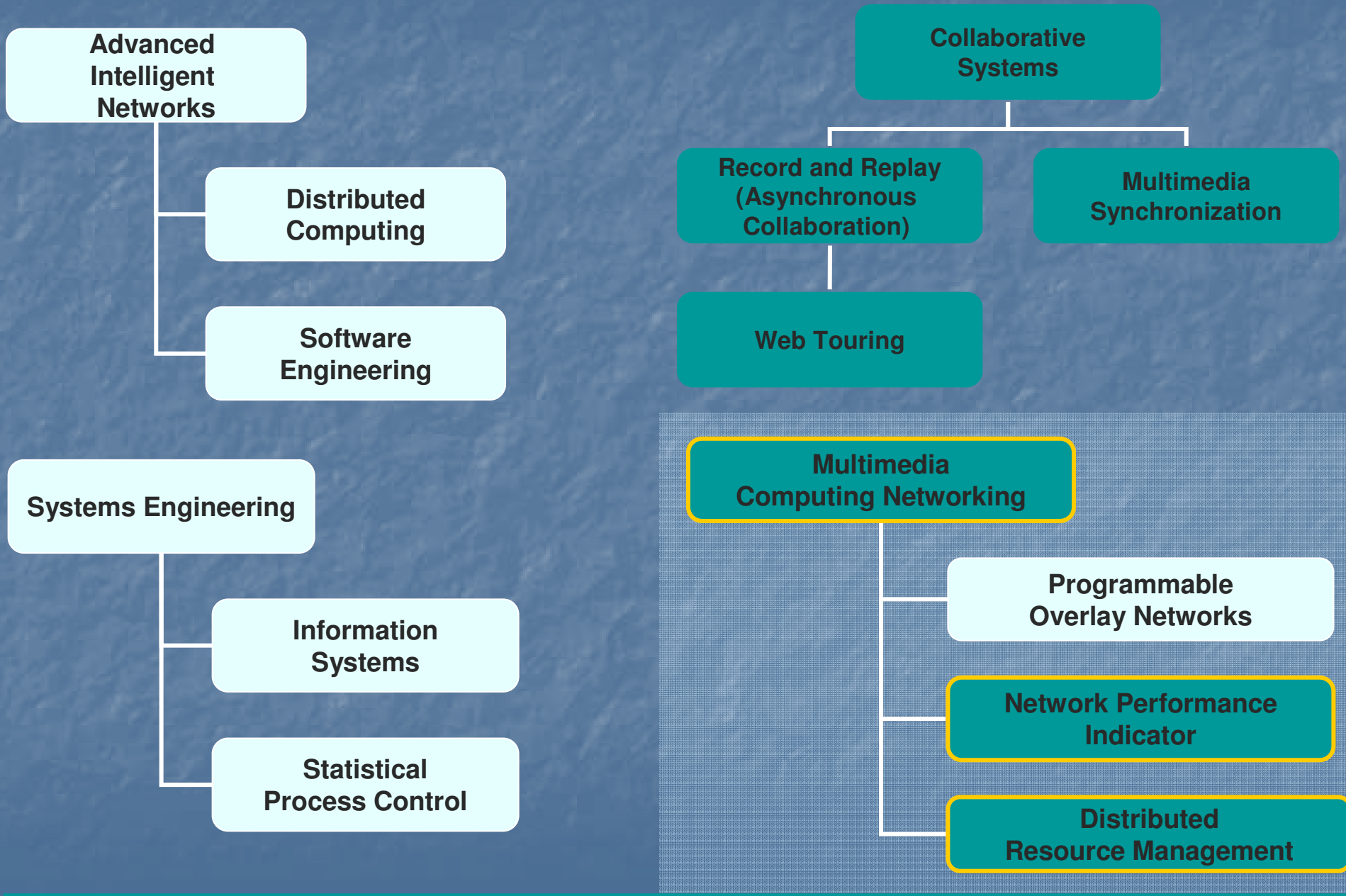
Selected Patents

- **6,572,662: dynamic customized web tours…**
  - related to: tour data mining, tour authoring, like-minded touring of multiple websites, token-based control of traversal projections over web-tours, touring clients,...
- **6,516,350: self-regulated resource management…**
  - related to: autonomous (self-regulated) distributed resource management integrating traditional demand-shaping and capacity-shaping mechanisms …
- **6,466,980: capacity shaping of distributed resources on an internet environment…**
  - related to: replication management, QoS, and capacity-shaping of a network's resources (e.g., capacity-follows-demand management distributed resource management policy), etc…
- **6,529,950: policy-based QoS negotiation…**
  - related to: brokering framework for distributed resource management, etc...

Complementary Patents

- **6,463,454: integrated load distribution and resource management …**
  - related to: replication and capacity policies for distributed resource management, etc…
- **6,460,082: service-oriented resource signatures…**
  - related to: low overhead resource management and measurements policy for distributed servers, resources, capacity, objects, etc...
- **6,377,996: seamless live streaming handoffs …**
  - related to: handoff of live multimedia streaming across servers, “virtual sockets”, migration transparency, etc...

Software Systems Research Map



Outline of the Talk – Revisited

- Background [10%]
- Computer-Supported Collaboration [25%]
- Dynamically Customized Web Touring [25%]
- Multimedia Computing Networking [35%]
  - Building Robust Network Performance Indicator
  - Distributed Resource Management for Multimedia
- Wrap-Up [5%]

Selected Research Contributions

- **Record And Replay (By Re-execution) Paradigm**
  - for asynchronous collaboration, capture of intra-task content
  - manipulation of computer sessions as first class objects
- **Multimedia Scheduling/Synchronization Protocols**
  - integrating fine-grained re-executable events and continuous media
- **Dynamically Customizable Web-touring**
  - touring content control through token-based projections
  - tokens visible and controllable also by user
- **Robust Online-SPC based Process State Indicator**
  - **robust statistical process state indicator (network probing)**
  - **process-performance guiding of adaptive rate control problems**
- **Distributed Resource Management**
  - **self-regulated capacity-shaping (time-variant number and placement of capacities)**

Proposed Focus Areas

- **CSCW/HCI/Groupware Applications**
  - groupware, collaborative intelligence, information management, distance learning, user interfaces, etc.
- **Intelligent Infrastructure**
  - multimedia computing networking, distributed resource management, etc.
  - utility computing, pervasive computing, sensor-based computing,
- **Software Systems Research**
  - applications and middleware systems for the above
  - formalization, theory, experimentation, simulation, etc.

Proposed Courses

- **Classes**
  - Introduction to Databases
  - Introduction to Software Engineering
- **Special Topics**
  - Special Topics: Collaborative Systems
  - Special Topics: Multimedia Computing Networking
- **Advanced Classes**
  - Special Topics: Software Systems Principles
  - Software Systems Research Seminar