Technology Trends and Implications
Larry Bernstein, Visiting Associate CSE/JUSC

State-of-the-Practice:

Each day more people come to depend on software without knowing how much, when, where, and who built it.

The more people depend on software, the more vulnerable they become to the consequences of software failures.

The economic security and safety of societies depend on the mastery of software development and application.

Billions of dollars are spent annually for software systems that are never delivered, are unreliable, unsafe and vulnerable to sabotage.

Government, industry and academia must unite to create a professional, ethical, and responsible software industry.

Because of its rapid technological development, R&D in software systems and tools must be maintained and supported.

Software R&D must contribute to the National Well Being.
Areas Needing USC Attention

1. **Trustworthy Software**
   - Software Fault Tolerance and Rejuvenation
   - Testing Technology
   - Design Constraints
   - Software Dynamics
   - Software Stability Theory

2. **Humanizing Systems**
   - Gesture Recognition
   - Ethical Responsibilities of Software Professionals

3. **Transparent Computing**
   - Super Clients
   - Super Servers
   - Name Managers
   - Super File Managers
   - Dynamic Program Binding
   - Dynamic System Binding

4. **Software Value**
   - Value Points
   - Economic Value Assessment Methodology
Software Fault Tolerance and Rejuvenation Activities:

- Lucent, Bell Laboratories- Leaders in the Field
  Chandra Kintala and his researchers
  Email: cmk@research.bell-labs.com

- Univ. of Illinois, Urbana-Champaign, Ill.
  Profs. Iyer, Sanders

- Carnegie Mellon Univ.
  Profs. Elnozahy, Johnson, Siewiorek

- Duke University, Durham, NC
  Prof. Trivedi - especially on Rejuvenation

- Purdue University
  Prof. Fuchs

- Univ. of Texas, Austin
  Prof. Abrams

- NYU and Cornell are peripherally interested
  PLinda Project

- JPL, mission to Jupiter
  L. Alkalaj especially on Rejuvenation

- Indian Inst. of Technology, Kanpur
  Prof. Jalote

- Humboldt Univ., Berlin, Germany
  Prof. Malek

- Univ. of New South Wales, Sydney, Australia
  Mr. Ouyang

- Univ. of Coimbra, Portugal
  Profs. Costa, Silva

- Universita di Catania, Italy
  Prof. Puliafito on Rejuvenation

- Tech. University of Budapest, Hungary
Prof. Telek on Rejuvenation