ResiliNets: Survivable and Resilient Networking
James P.G. Sterbenz and David Hutchison – www.ittc.ku.edu/resilinets

**Survivable Resilient Nets**
• Maintain service in the face of:
  – design, configuration, & operational errors
  – large-scale natural disasters
  – attacks (crackers, terrorist, war)
  – environmental challenges: mobile wireless
  – unexpected legitimate traffic (flash crowd)
• Strategy and lines of defense
  – resistance: architecture maximises defense
  – detection: problem & attack self-diagnosis
  – remediation: automatically react and repair
  – recovery: self-organising and autonomic

**Multilevel**
• Do the best possible at every level
  – foundation for the next level up or out
• Bottom-up
  – phys → link → network → transport → app
• All planes
  – data → control → management planes
• Inside-out
  – components → entire network
• Cross-layer knobs and dials
  – knobs instrument up; dials influence down

**Model**
- Architecture maximises defense
- Detection: problem & attack self-diagnosis
- Remediation: automatically react and repair
- Recovery: self-organising and autonomic

**Research Thrusts**
• Architectural diversity
  – technologies, topology, and routing
  – autonomic and dynamically programmable
  – service and communication adaptation
  – infrastructure independence
• New communication paradigms
  – communicate even when no stable E2E path
  – resilience and survivability as a QoS property
• New protocol architectures
  – cross-layer and cross-plane optimisation
  – composable, adaptive, and evolvable