



# VIRGINIA MOUNTAIN SECTION NEWSLETTER

IEEE Region 3, Council 09, Section 65

November 2007

Thursday, November 15, Holiday Inn Hotel Roanoke Airport

## *Transdisciplinary Science and Interaction Based Modeling of Very Large Complex System*

**Dr. Chris Barrett Director  
Network Dynamics and Simulation Science Laboratory  
Virginia Bio-Informatics Institute  
Virginia Tech**

### **Abstract**

Detailed models of population activities and movements on the scale of urbanized regions and nations is becoming possible. This capability leads to direct synthesis of very large dynamic social interaction networks. Interaction-based processes such as contagious disease epidemics, packet switched wireless networks, etc., can then be simulated in very different ways than previously possible, offering intriguing possibilities. For instance, the details of the interplay between the dynamics (e.g. disease spread, data and information dissemination) and underlying co-evolving social networks can be generated and represented using advanced computing systems.

Agent-oriented simulation is an example of an interaction based computational technique useful to socio-technical, biological and information systems. Scaling to large systems raises important computational and conceptual issues

such as the necessity of the particular approach as well as its feasibility.

This talk will address some of the common issues that come up in interaction-based approaches to large systems. We will illustrate some of these ideas by discussing the development of information-support environments for public health planning related to epidemics of infectious diseases and in wireless networks.

### **Speaker**

Chris Barrett is a Professor in the Computer Science Department and Director of the Network Dynamics and Simulation Science Laboratory in the Virginia Bio-Informatics Institute (VBI) at Virginia Tech. He received his Ph.D. in bio-information systems from the California Institute of Technology in 1985. Prior to joining VBI, he worked for 17 years at the Los Alamos National Laboratory (LANL). While at LANL, he

was leader of the Basic and Applied Simulation Science Group and built up a research group active in theoretical and applied research in intelligent systems, distributed systems, and advanced computer simulation. He has scientific experience in simulation, scientific computation, algorithm theory and development, system science and control, engineering science, bio-systems analysis, decision science, cognitive human factors, testing and training. His achievements include the development of large-scale, high performance simulation systems, and the development of a distributed computing approach for detailed simulation-based study of mobile packet-switched digital communications systems. Dr. Barrett has received Distinguished Service Awards from Los Alamos National Laboratory, the Alliance for Transportation Research, the Royal Institute of Technology in Stockholm, and Artificial Life and Robotics, Oita University, Japan.

**Date: Thursday November 15**  
**Social: 6:30 PM**  
**Dinner: 7:00 PM**  
**Talk: 8:00M**

**Dinner cost:**  
**Member or Guest \$ 20.00**  
**Student \$ 10.00**

**Advance reservations are required.**  
**Please reserve by**  
**5 PM Monday, Nov. 12 indicating**  
**number of attendees**

**Dr. Wilbur Dale (540) 464-7547**  
**e-mail: [dalewn@vmi.edu](mailto:dalewn@vmi.edu)**

**Directions to**  
**Holiday Inn Hotel Roanoke Airport**

2727 Ferndale Drive NW  
 1581 Exit 3 Hershberger Rd West  
 1st Rt. onto Ordway Drive,  
 ¼ mile, Rt. Into Parking Lot.

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**Carnegie Mellon wins DARPA's Urban Challenge.**

[CNET](http://www.cnet.com) (11/5, Olsen) reports, "Carnegie Mellon University won the \$2 million first place prize in DARPA's [Defense Advanced Research Projects Agency] urban robot race this weekend." The Urban Challenge involved "a six-hour test of driverless vehicles on the suburban roads of the former George Air Force Base in Oro Grande, Calif., where the robotic cars were required to complete three missions while obeying traffic laws and avoiding obstacles and collisions with other driverless vehicles." Race officials said this year's challenge "was the first ever to test robots driving among other robots." Stanford University and **Virginia Tech** came in second and third, winning \$1 million and \$500,000, respectively."

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