



International Council on Systems Engineering
Delaware Valley Chapter Meeting
(Non-members welcome to attend)

Speaker: Sarah A. Sheard, Principal, Third Millennium Systems (<http://www.3milsys.com>)

Topic: Complex Systems Sciences and Systems Engineering

For abstract and author's biographical summary, see next page.

Date: Tuesday January 23rd, 2007

Time: 6:00 p.m. \$10 for the buffet meal (students \$5)
6:30 p.m. Meeting begins

Place: L-3 Communications,
A&E Building, Auditorium
1 Federal Street, Camden, NJ

For directions to L-3 please visit the web site
http://www.l-3com.com/cs-east/ie_locmap.shtml
<http://www.l-3com.com/cs-east/gif/smallmap.gif>

Please contact Peter.Scott@L-3Com.com if you plan to attend this event. Please let him know if you are not a U.S. citizen so he can get the necessary approval.

For further information about the International Council on Systems Engineering please visit the INCOSE website at <http://www.incose.org/> and the Delaware Valley Chapter website at <http://www.incose.org/delvalley/>

Many systems engineers have heard terms similar to “chaos,” “fractal,” and “butterfly effect,” but most are not aware that these concepts have the potential to improve significantly how we engineer systems. Chaos science and its descendants, including topics such as nonlinear behavior, network dynamics, multi-agent systems, and evolutionary computation, are coming to dominate the research agenda in sciences close to systems engineering. To date, these sciences have informed true advances in other engineering fields such as electrical engineering, but have yet to make much of an impression on systems engineers.

This talk answers the following questions:

- What are the sciences of complex systems?
- Why should they have an effect on systems engineering? What is the state of systems engineering today, and why will an understanding complex systems help?
- What effects are these sciences having now?
- What effects do we want them to have and not to have?
- How can we make them have the effects we want?

Many engineers fear that this new set of sciences is too complicated and too divorced from what they do on a day-to-day basis. INCOSE Fellow Sarah Sheard is convinced this is not the case, and has put together this talk (as well as other products) specifically to help inform practicing systems engineers of some useful areas to pursue.

Sarah A. Sheard is the Principal at Third Millennium Systems LLC in Great Falls, Virginia as well as an adjunct professor at two universities. Ms. Sheard has worked in systems engineering and process improvement for over 25 years. She is a Fellow of the International Council on Systems Engineering (INCOSE), and has also earned INCOSE's Founder's Award (in 2002) for her contributions to systems engineering and INCOSE, including over 30 publications, chairing the Measurement technical committee and the Communications committee, and serving as program chair and director of the Washington Metropolitan Area chapter. Ms. Sheard is a certified systems engineering professional (CSEP) with degrees from the University of Rochester and the California Institute of Technology.

Ms. Sheard's career began with systems engineering of satellites including the communications payload and power subsystems areas, research and software specification areas, and proposals. Her 1992 NCOSE paper, which was given the “Best Paper” Award in the Process track, documented the effort she co-led to develop the company's first systems engineering process description. Ms. Sheard subsequently participated in engineering of complex software-intensive systems such as Air Traffic Control. She also spent ten years at the Software Productivity Consortium (now the Systems and Software Consortium) bringing systems engineering and process improvement to Consortium member companies, eventually serving as the Chief Technologist leading the systems engineering effort. Ms. Sheard is now the Principal at Third Millennium Systems, an independent systems engineering consultancy she founded, whose focus is on improving systems engineering to handle complex software-intensive systems as needed for the future.