

CS 851: FORENSIC SOFTWARE ENGINEERING

FALL 2002

John C. Knight with Kimberly S. Hanks
Department of Computer Science

This seminar is intended as an introductory reading and discussion course on forensic software engineering. Incidents and accidents that can be attributed to software failure often result in tragedies and other losses. The need to learn from these events grows more critical as software systems become more complex and the ways they can fail become less intuitive. Clear access to retrospective information about the complex and systemic causes of incidents and accidents is not provided by existing software development methods (Johnson), and forensic software engineering refers to the body of work aimed at addressing this deficiency. In this seminar, we will review the literature basic to this area and give specific attention to a number of topics.

Topics to be addressed will include:

- The systems perspective for software development
- Human error and the limits of what it can account for
- Investigation and reporting methods
- The form and role of guidelines
- Reports and data analysis
- Software process feedback: closing the loop
- Accident case studies

Readings:

Selected chapters from the following books:

- *Normal Accidents*, Charles Perrow
- *Human Error*, James Reason
- *Design Paradigms: Case Histories of Error and Judgment in Engineering*, Henry Petroski
- *Learning from Accidents*, Trevor Kletz
- *Safeware*, Nancy Leveson
- *Fatal Defect: Chasing Killer Computer Bugs*, Ivars Peterson

As well as the following papers and other materials:

- *Forensic Software Engineering*, Chris Johnson
- *Normal Accidents-Yesterday and Today*, Barry Strauch
- *Software Aspects of Strategic Defense Systems*, David Parnas
- *A Quick Introduction to Why-Because Analysis*, Peter Ladkin
- RISKS newsgroup, in search of relevant stories
- others as assigned

Assignments:

All reading will be required of all students, but students will be also assigned specific chapters or papers for presentation and leading of discussion on a rotating basis. Short writing assignments (3-5 pages) will focus on software-related incidents or accidents reported in the news or on RISKS, with the goal of closer examination, follow-up, and discussion, or reflection and discussion of issues raised in class. A semester project will consist of either an in-depth extension of one of these writing assignments or original work on an approved topic appropriate for submission to IRIA 2003.

Pre-requisites: graduate standing, or CS340 and permission of instructor