

## **CSE 87 Errors and Failures**

We are surrounded by bad information, faulty thinking, outright lying, innocent mistakes, propaganda, and tragic failure. Our lives are increasingly dominated by computer systems in which simple errors can have consequences that affect the lives of millions of people. In this seminar we will discuss the nature of error. The goal is to be better equipped to avoid error when possible and to spot it when it occurs.

The course will include experiments and multimedia presentations. Each topic is covered in more depth in a small book associated with the seminar. The chapters of the book corresponds to the topics and will be supplied as pdf files at each class meeting. The seminar topics, one per week, are listed below.

### **Jumping to Conclusions and the Apple Store**

This kind of error can be both embarrassing and dangerous. What lies at the root and how can it be avoided? We will carry out a simple class experiment.

### **Collections, Procedures and the B-17 Checklist**

Even though we have repeated a task many times, we may still forget some step. When does this occur and what can we do to avoid it?

### **Slips, Lapses and the Second Narrows Bridge**

Some of the worst engineering disasters can be traced back to a slip or a lapse. There are also simple every-day examples. Powerful engineering methods to avoid these errors will be discussed.

### **Mental Workspace and the Zune Bug**

The mind has a "limited bandwidth." We will do some simple experiments and consider how to compensate. We will look at a related famous Microsoft software error.

### **Interfaces and the Ariane 5**

Interfaces are where things "fall through the cracks." They can occur between people and people, people and systems, and systems and systems. What can we do about it?

### **Bad Logic and the Expert Witness**

Formal reasoning can be used to avoid errors but there are ways to fake it. The study of this is as old as Aristotle. Some famous examples will be discussed.

### **Shady Logic and the Presidential Debates**

You can turn on a news channel and feel that what is being said is designed to fool you. This is the subject of informal fallacies. Video clips of past presidential debates will be used illustrate some common examples.

### **Probabilities and the OJ Trial**

Much of life is neither true nor false, but more or less likely. Probability is the related mathematical model. It is very easy to get it wrong. Several famous court cases will be discussed in which the misunderstanding of simple probability contributed to a bad outcome.

### **Models, Maps and the Holocaust**

“The map is not the domain” was made famous in General Semantics. The failure to understand this can lead to both personal and social madness. How does this occur?

### **Hindsight and Ivan Ilyich**

We can use hindsight to learn from our errors but this does not always work. We will do a simple experiment that illustrates a common way in which hindsight fails. Understanding of both this and other hindsight problems is critical to successful accident analysis.