

# **Session 1: Basics and Challenges**

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# Basics & Challenges

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## ❖ Lessons from Computer Games (Dan Siewiorek)

- ◆ High motivation for dependability
  - ✦ Undependable (esp. interface) => lose loads of \$€£¥
  - ✦ DoS => DoP
- ◆ Inter-disciplinary R&D => 9 tips for making dependable games
  - ✦ can't choose users (so, user-centered design by necessity)
  - ✦ can fool them (some of the time)
  - ✦ but should focus on educating/empowering/enthralling them

## ❖ Aspects of Human Error (Michael Harrison)

- ◆ new technology => new problems
  - ✦ change tasks and add new tasks ("can speed type")
  - ✦ invites new forms of human error (mode confusion)
  - ✦ novel ways of system breakdown (wrestling with automation)
- ◆ breakdowns due to **cascade** of miscommunication and mis-assessment

# Human errors & their causes

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## ❖ Behavioral accounts of human error

- ◆ possible deviations from actions required to complete task:
  - ✦ omission, commission, qualitative, timing, sequence
- ◆ Hollnagel's error phenotypes:
  - ✦ repetition, reversal, omission, delay, premature action, replacement, insertion, intrusion

but need to look at cognitive processes to understand error

## ❖ Norman's and Rasmussen's models

- ◆ actions may be skill-based, rule-based, knowledge-based
- ◆ distinction: slips/lapses (in execution) vs mistakes (in intention)
- ◆ error causes, e.g., at knowledge level: confirmation bias, availability bias, selectivity
- ◆ different implications for design and assessment

# Dependability thru' Diversity

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## ❖ Dependability, Diversity, Disaster... (Tom Anderson)

### ◆ dependability — of a *well-delineated* system

- ✦ mostly does(n't do) what it's (not) supposed to do
- ✦ achievement requires holistic approach
  - attributes, fault types, **means**, inter-system threats, cultural divides
  - **means**: design/build with care, incorporate defenses, find and fix mistakes, measure and evaluate

### ◆ defense thru' diversity

- ✦ by necessity, users are tolerant of design deficiencies
- ✦ should design systems to be tolerant of user error (undo...)

## ❖ Dependability of Computer-based Systems (Brian Randell)

### ◆ UK interdisciplinary research collaboration in dependability of computer-**based** systems

### ◆ interdisciplinarity

- ✦ hard: words vs numbers; observe vs change
- ✦ fruitful: yet another interest of diversity