

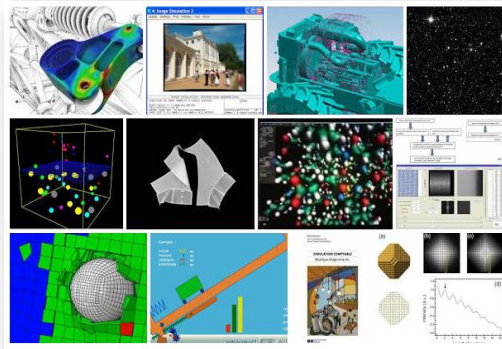
## ZZ2-F2 ISIMA “Simulation”

Subject :

- Introduction to Stochastic Discrete Event Simulation
- From MC simulation to simple multi-agent simulators

Staff:

- Instructor: David Hill
- ISIMA/LIMOS  
UMR CNRS 6158
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Web Page:

- <http://www.isima.fr/~hill/Simu-ZZ2/>

# Today



## Introduction

## Administrative stuff

## Why A simulation project?

## Overview of the course

## Start of the course



## About your teacher

David HILL (R.C.)  
(Aka "Benny")

"Relatively old" faculty  
Started teaching in 1989...

Ph.D 1993, Blaise Pascal Univ.

ISIMA UCA & CNRS  
(50/50) Teaching & Research

Teaching :

I am still learning...

Aim : learn useful cool things and transmit what we have learned  
(both you and me!)

Research

High Performance Computing & Simulation

Bioinformatics, Nuclear Medicine, Reproducible Numerical Computing,  
Philosophy and Ethics and recently : security

Admin : IIA - ISIMA Deputy director,

Past VP – Blaise Pascal University, Past Director CRRRI Comp. Center



## Course Outline

### Part I: Introduction to simulation and modelling

- Notions of models, time and system
- Discrete and continuous simulations...
- Monte Carlo simulations...

### Part II: Randomness

- Random numbers generators
- Bad & good news

### Part III: Bio-inspired simulations

- The first life simulation model
- 2D Cellular automata
- Population growth

### Part IV: Multi-Agents Simulations

- Different kinds of MAS (demo)
- Design of your own spatialized MAS
- Development of your design



Sign up for your lab participation from time to time

## Course Organization

### Integrated Course

### PPT, Formal training & Labs

#### Grade & Assessment requirements:

1. Lab participation (25%)
  - Writing codes, sending codes at the end of Labs (sometimes),
  - Pace of your development
  - Discover coding & comment styles
2. Class Participation (25%) – Being there enables :
  - Asking questions and have debugging & explanations
  - Debate and propose ideas, web sites or videos, etc.
  - Attending labs is a way to show you are involved.
  - Quizz (sometimes)
3. A final written Lab reports (50%) – Final Exam
  - Analysis, Specifications, Design and development
  - Printed report & email of the PDF & source code (no zip)



## Class Participation

Keep a "Laboratory book" :

Take notes of your understandings, design and coding progress (always a good idea and it saves your time for the writing of reports!).

The format is up to you. At least, you need to have:

- Summary of key points
- A few Interesting insights, "aha moments", keen observations, etc.
- Weaknesses of approach. Unanswered questions. Areas of further investigation, improvements.

Share your thoughts in the lab & code writings and in class if you think it's worth.

## What will you learn...

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- The functioning of pseudo-random number generators
  - How to reproduce stochastic phenomena
  - How to build Monte Carlo models
  - How to estimate confidence intervals
  - Understand the principles of discrete event simulation
  - Understand the problems linked to the management of a huge number of objects
- >
- *Study the basics of multi-agents systems*
  - *Development of a simple Multi-agent System*
  - *Understand problems linked to simultaneous events*
  - *Study some software engineering tools*

*Credits : D. Hill + Roger Crawfis, Fred Annexstain & Wikipedia<sup>9</sup>*