Introduction to Parallel Programming (And Parallel Systems)

Universidad Industrial de Santander
CONSTRUIMOS FUTURO
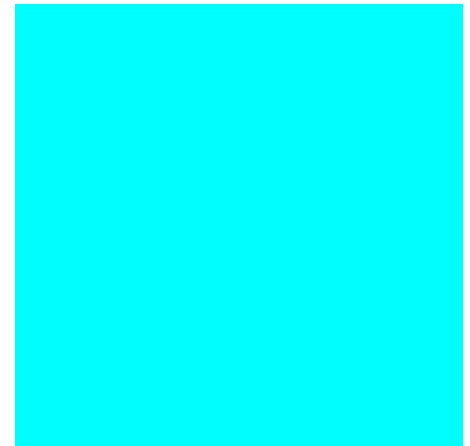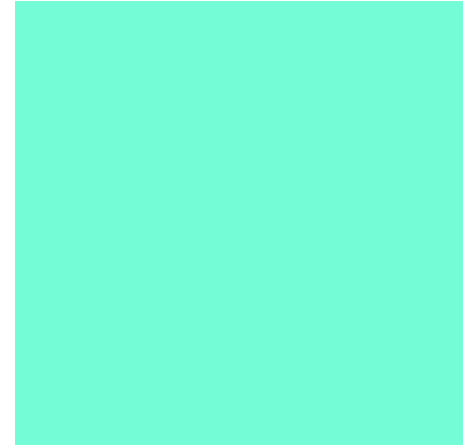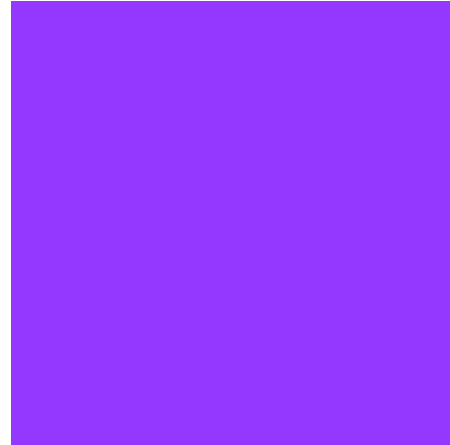
Super Computacion y
Calculo Cientifico UIS

Carlos Jaime Barrios Hernandez, PhD.

Systems and Informatics Engineering School

Bucaramanga, 2011

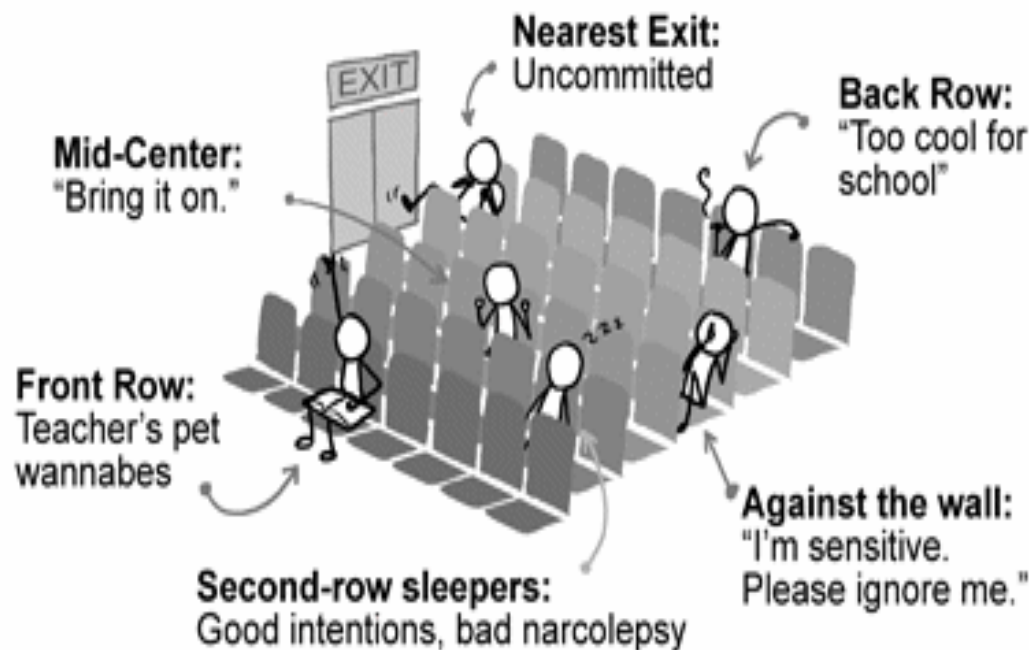# What is your interest in this course?
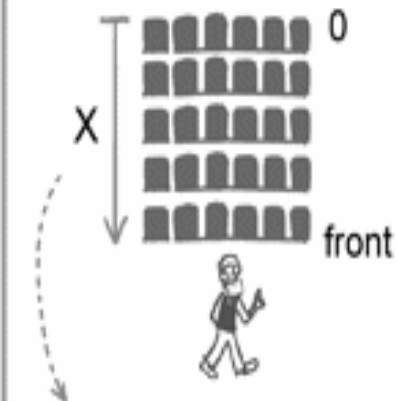
+ About Me …

- https://sites.google.com/site/carlosjaimebh/

- http://www.researchgate.net/profile/ Carlos_Jaime_BARRIOS_HERNANDEZ/
  - Systems Engineer (UIS '02)
  - Master in Computer Science (UJF – Université de Grenoble, France '05)
  - Doctor in Computer Science(UNAS – Université de Nice-sophia Antipolis '09)
  - Postdoctoral Researcher (HIPCAL Project – I3S Laboratory)
  - UIS * High Performance and Scientific Computing Responsible (From 2010)
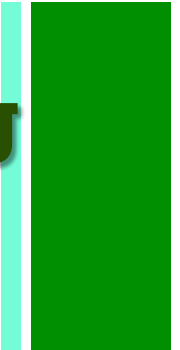 - Associated Professor/Teacher at UIS (From tomorrow)

Systems Development Process
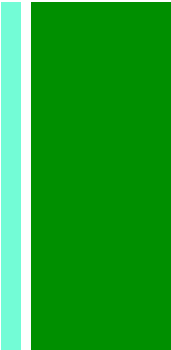
Why Parallel and Scalable Computing (Distributed Computing)?

- Parallel and Scalable Hardware are not all.
  - Big and expensive is not always better.

- Parallel Software solutions are not all.
  - Depending of the complexity of the problem
  - Depending of the Accuracy of the Algorithms.
  - However Portability of many applications… often parallel computing software is not portable.

- Parallel and Scalable Computing change computer science
  - Society Influence
  - Paradigms Rupture

Goals
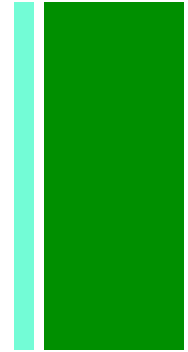
- PP Course aims to offer a overview to identify patterns and towards in parallel computing addressed to applications development from Engineering Point of View.
    - Independently of the programming language or libraries.
    - Independently of the platforms and resources (available or desires)
   - Looped to Systems Engineers… (however, to multidisciplinary interaction)

+ Plan

1. Introduction to Parallel Programming and Computing

2. Parallel Architectures and Systems

3. Algorithms (Concurrency and Parallelism)

4. Parallel Programming Models

5. Patterns for Parallel Programming

6. Towards and Hot Topics on Parallel Programming and Supercomputing.
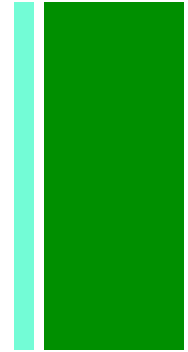
Why the slides are in English?
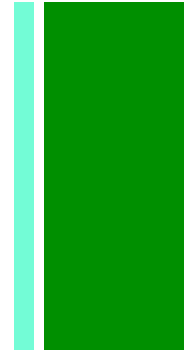
- Technical words are more easy to write in English (For certain terms are not possible to find a good translation in Spanish)

- General and Today bibliography are in English.

- (Also… for slides recycling ;-))
 - However, sometimes you can find slides in Spanish..

Methodology

- Theoretic- Practical Sessions (48 hours in Total)

- Lectures and Discussions about papers and sites (Most part in English)

- Analysis and Evaluation of Cases of Study

- Evaluations

- All Documents (for teacher side) will be staying in http://grid.uis.edu.co

- Ecological Thinking: No printing, Digital Politics (via email, wiki or portals)

+ And the Practice?
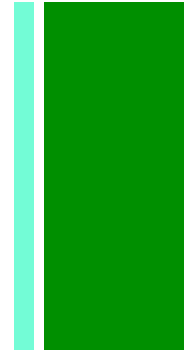
- Real Practice:
  - Pencil and paper (Diagrams, pseudo codes, schemas)
  - Discussion on the Board
  - Some Parallel Codes (In proposed languages and libraries)
- Suggestion to Implementations:
- You can use "any" programming environment with an associated language or libraries and test in "any" facility of the UIS platform.
 - Discussion "off- sessions"

+ Practices in GridUIS-2 Platform
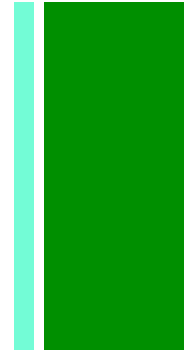
- Please see the site: http://grid.uis.edu.co

- Contact to Super-Administrator Sergio Orostegui via email (86nano@gmail.com) and demands your account as PP Student.
  - Your account will be activated soon after a verification process. Not forget to see and understand the "User Chart".
  - The account will be available during 6 months after the date of creation.
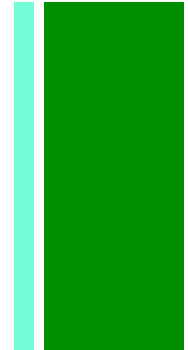
+ Evaluation
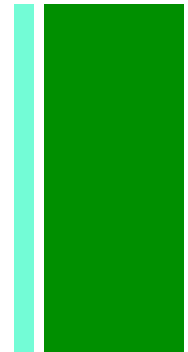
- A Final Examen (In the End of the Course)

- Final Project (Individual or Group of 2 peoples)
  - Demo or proposal
  - Speech
  - Document (6 pages)

+ Questions, More Information, Contact and Suggestions?

- carlosjaimebh@computer.org (Please use de Ticket [PP-EISI] in the subject)

- CENTIC 4th Floor or LP 226 (Supercomputing Space) (Rendez-vous previously, via email or by phone 1251 or 2855)
  - Please see my Time Employment in : https://sites.google.com/site/carlosjaimebh/

- http://grid.uis.edu.co (Exactly: http://grid.uis.edu.co/index.php/Cursos)