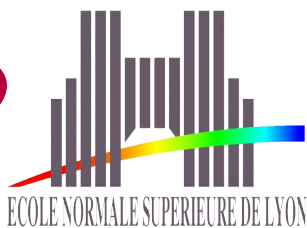


# MC2 Team – Modèles de Calcul et Complexité

Scientific leader : Pascal Koiran

- General presentation (Eric Thierry) ~ 20 min
- Scientific talk (Eric Rémila) ~ 25 min
- Discussion (Pascal Koiran, Toronto) ~ 45 min



## Main research topics

- Models of computation, Complexity theory
- Discrete and algebraic algorithms
- Combinatorics
- Discrete models for complex systems

## MC2 Team History

- Team created between 1995 and 1997 by merging team *Connexionisme* (Head: H. Paugam-Moisy) and team *Automates Cellulaires et Pavages* (Head: J. Mazoyer)
- Located in the Complex Systems Institute IXXI from 2006 (Founder: M. Morvan)
- Scientific leaders:
  - Jacques Mazoyer (until Sept 2007)
  - Pascal Koiran (from Sept 2007)

# Current Team Composition (Dec 2009)

## Researchers (4+2)

KOIRAN	Pascal	PR ENS Lyon
PORTIER	Natacha	MC ENS Lyon
REMILA	Eric	MC IUT Roanne
THIERRY	Eric	MC ENS Lyon
ARRIGHI	Pablo	MC délég CNRS
GRATTAGE	Jonathan	ATER ENS Lyon

## Doctoral students (5)

BRIQUEL	Irénée	ENS Lyon
GRENET	Bruno	ENS Lyon
JOUHET	Laurent	ENS Lyon
NOUAL	Mathilde	ENS Lyon
ROBERT	Julien	ENS Lyon

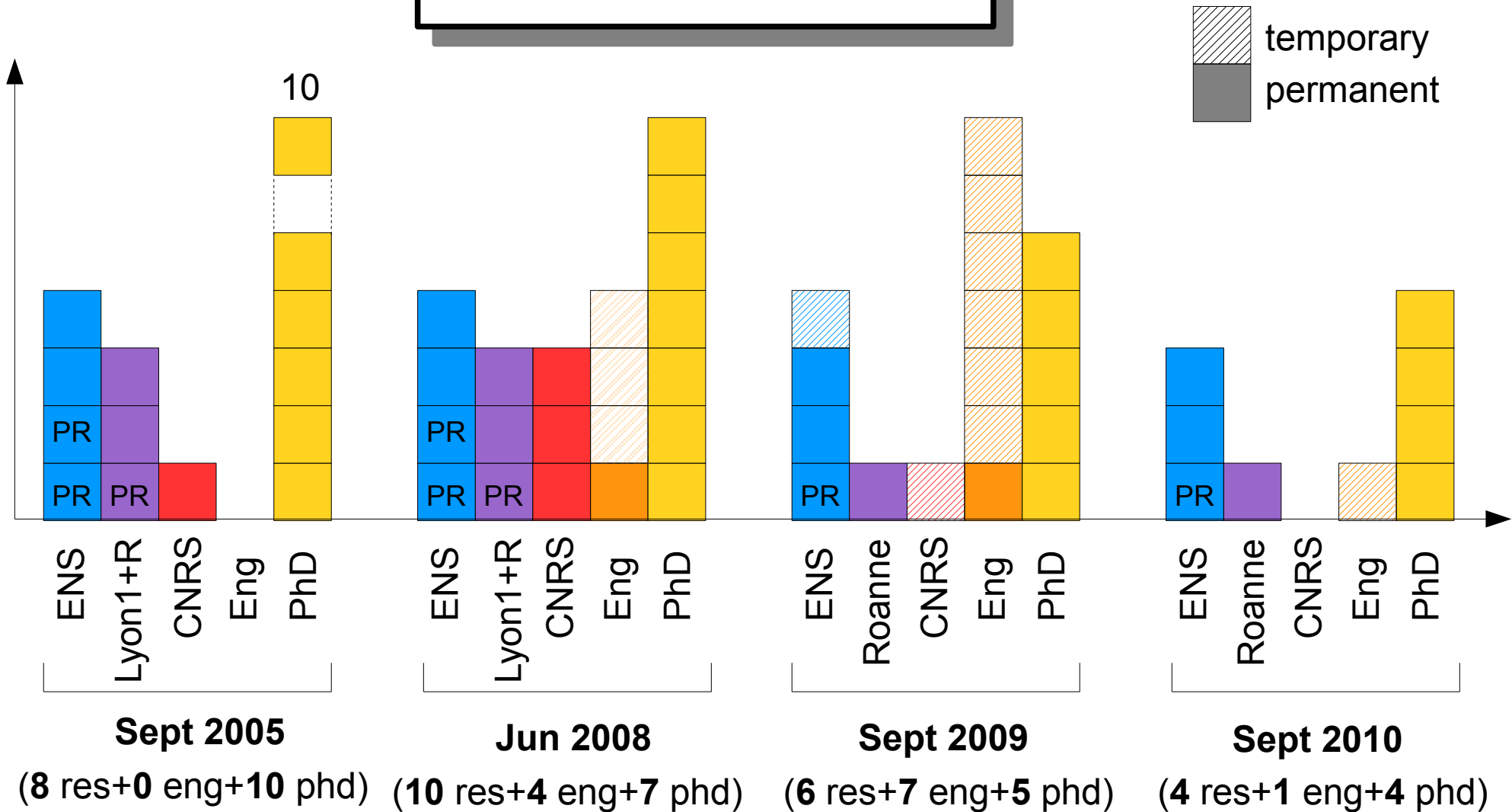
## Engineers (1+6)

BOIX	Eric	IR CNRS
BELTRAN	Jorge	IR expert
CHIQUILLO	Gina	IR expert
GRIGNARD	Arnaud	IR expert
LA ROTA	Camilo	IR expert
MALATERRE	Mathieu	IR expert
URIBE	Ricardo	IR expert

## Administrative assistant (1)

LECOT	Laetitia	ENS Lyon
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# Team evolution



## Research activities: Sept 2005 – Sept 2009

- Algebraic complexity
- Quantum computing
- Kolmogorov complexity
- Fault-tolerant computation
- Algebraic algorithms
- $(\min, +)$  algorithms for Network Calculus
- Blind scheduling and data broadcast
- Tilings and self-assembly
- Network of asynchronous automata
- Modelling, simulation, analysis of gene regulatory networks
- Simulation platform for complex systems

## Research activities: Sept 2005 – Sept 2009

- Algebraic complexity
- Quantum computing
- Kolmogorov complexity
- Fault-tolerant computation
- Algebraic algorithms
- $(\min, +)$  algorithms for Network Calculus
- Blind scheduling and data broadcast
- **Tilings and self-assembly (Eric Rémila, today)**
- Network of asynchronous automata
- Modelling, simulation, analysis of gene regulatory networks
- **Simulation platform for complex systems (Eric Boix, tuesday)**

## Production & Support: Sept 2005 – Sept 2009

- Publications: 33 peer-reviewed journal articles, 53 peer-reviewed conference articles
- External contracts and grants: 7 ANR, 2 ATIP CNRS, 1 ARC INRIA, 1 IXXI, 1 IUF, several EU grants and projects
- Spin-off start-up from the simulation platform for complex systems: CoSMo (jan-fev 2010, with E. Boix and M. Morvan)



## Perspectives: Scientific project

- MC2 achievements in complex systems:
  - Strong MC2 support in the creation of IXXI
  - Theoretical results on discrete models
  - Leader in some modelling / simulation / mathematical analysis projects, in particular with biologists
- Creation of the startup CoSMo
- Position for the future:  
modelling / simulation / mathematical analysis

## Perspectives: Scientific project

- Reinforce our core topics :
  - Models of computation, Complexity theory
  - Discrete and Algebraic algorithms, Combinatorics
  - Analysis of discrete models for complex systems
- Highlighted incoming research topics :
  - Algebraic complexity, Quantum computing
  - Probabilistic Cellular Automata, Self-assembly tilings, Gene networks
  - Algorithmics of discrete event systems, Game theory

## Perspectives: Position / LIP, ENS Lyon, and other supporting institutions

- Foster interactions with other LIP teams
- Carry on the strong MC2 involvement in the Computer Science Education Department in ENS Lyon
- Regain a critical mass thanks to recruitments from our supporting institutions