French Institute for Research in Information and Communication Science and Technologies (ICST)

Hélène Kirchner
Director of International Relations

Missions and key figures

RESEARCH	TECHNOLOGY DEVELOPMENT AND EXPERIMENTATION	EDUCATION AND TRAINING	TRANSFER AND INNOVATION

4,300 People
(60 % paid by Inria)

8 Research Centers in France

180 Project teams

270 Active patents
(in total)

3,400 Scientists
1,200 PhD
250 Post-Doct
300 R&D engineers

110 Spin-offs

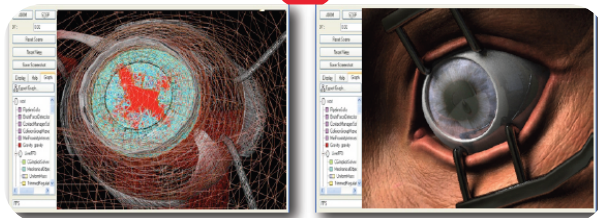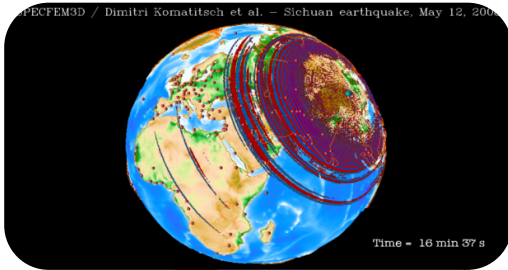**4,850** Scientific
publications

A BUDGET OF

€ 250M

Of which more than 25% from external resources

5 Main research topics

1 Applied Mathematics, Computation and Simulation

Numerical analysis, stochastic methods, optimisation and learning, control theory

2 Algorithmics, Programming, Software and Architecture

Cryptography, semantics, proofs, verification, embedded systems, compilation

3 Networks, Systems and Services, Distributed Computing

Networks and telecoms, distributed services, HPC

4 Perception, Cognition, Interaction

Knowledge representation, natural language, robotics

5 Computational Sciences for Biology, Medicine and Environment

Observation and modelisation, bio-maths, bio-info, neurosciences

Inria's Research Centres

Inria PARIS - Rocquencourt
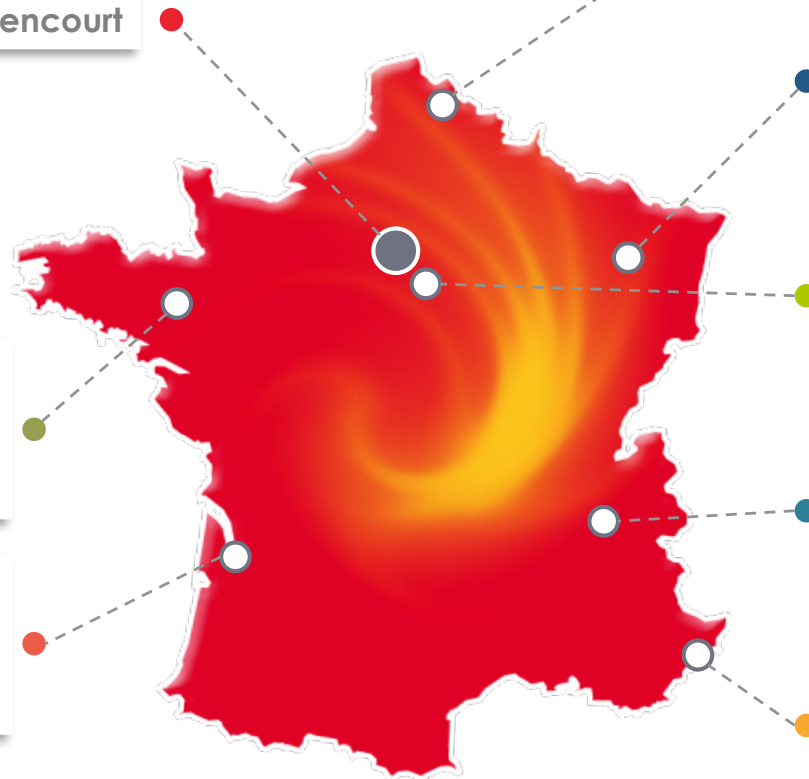
Inria LILLE
Nord Europe

Inria NANCY
Grand Est

Inria SACLAY
Ile-de-France

Inria RENNES
Bretagne
Atlantique

Inria BORDEAUX
Sud-Ouest

Inria GRENOBLE
Rhône-Alpes

Inria SOPHIA ANTIPOLIS
Méditerranée

In Europe

Key player in the European Research Area

• Involved in more than 150 European projects in the 7th Framework Programme

• Host of more than 20 grants of the European Research Council (ERC)

A driving force of EIT ICT Labs,
the European "cluster" for the development of the Future Information Society in Europe

Founding member and driving force within ERCIM
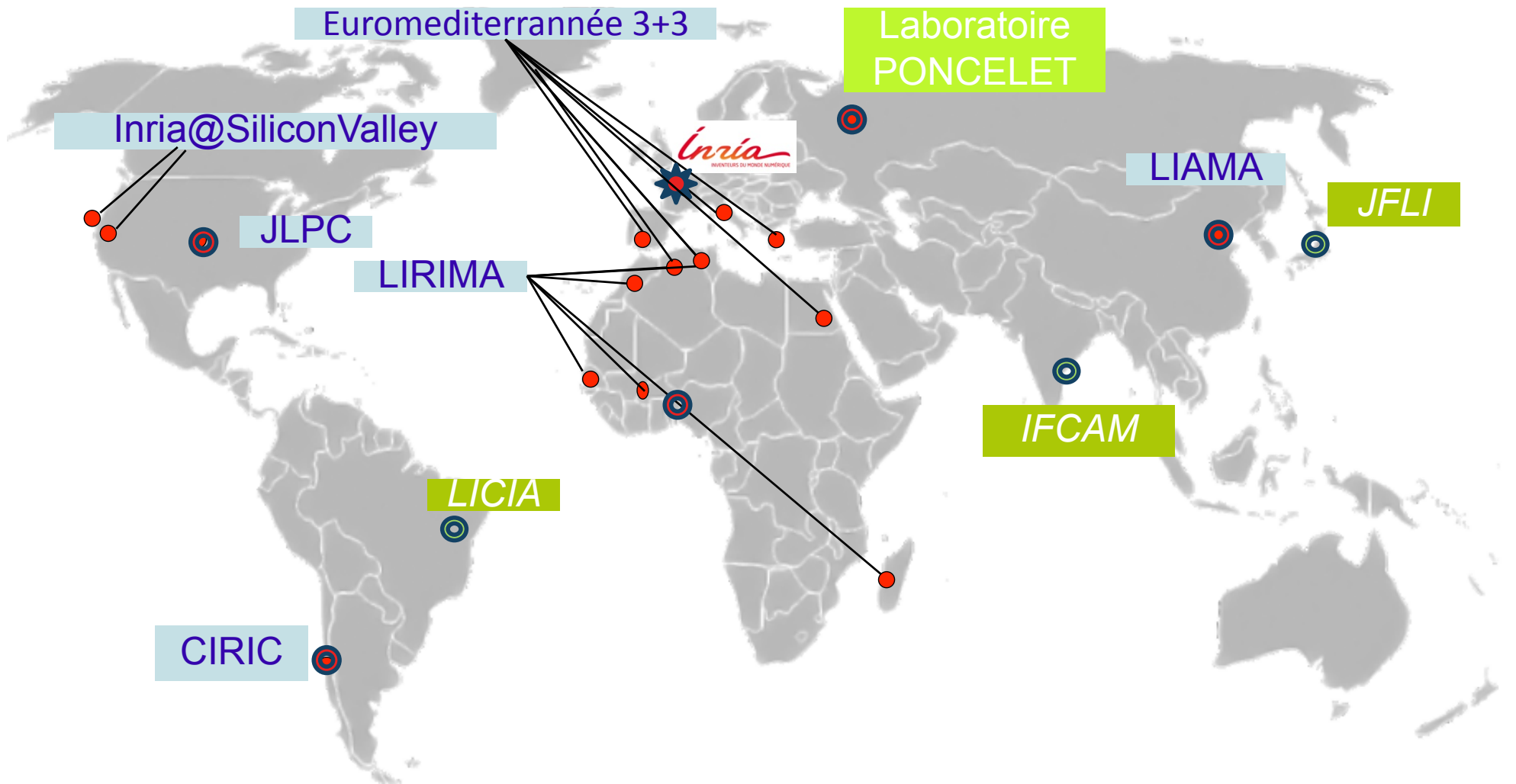European Research Consortium for Informatics and Mathematics

Contacts with major European industrial groups

International Relations

Develop strong partnerships in priority places:

- *Joint research laboratories*
  In USA, China, Africa, Chile

- *Joint research programs*
  around Méditerrannée, in SiliconValley

- *Jointly with CNRS*
  in Brazil, Japan, India and Russia

- *Associate Teams*
  62 active Associate Teams in 2012 (156 since 2002)

Euromediterrannée 3+3

Laboratoire PONCELET

Inria@SiliconValley
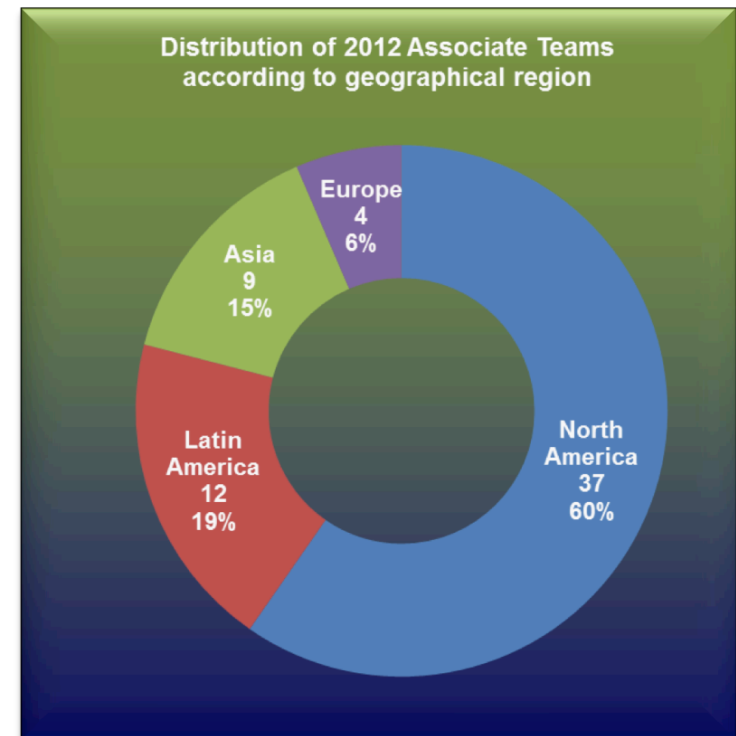
LIAMA

JFLI

JLPC

LIRIMA

IFCAM

LICIA

CIRIC

International Relations
Develop partnerships worldwide

Inria Associate Teams Program

- **Joint research project** between one Inria project-team and one excellent research team abroad

- Supports **scientific exchanges for 3 years**

- 30 to 50.000 Euros funding per project

Distribution of 2012 Associate Teams according to geographical region

Europe 4 6%

Asia 9 15%

North America 37 60%

Latin America 12 19%

International Relations
Incentives for mobility

- Inria Internships Program

▪ training-through-research opportunities for international students during their Masters or PhD

▪ 3 to 9 months stay within an Inria team

**2011 Internships
by area of home institutions**
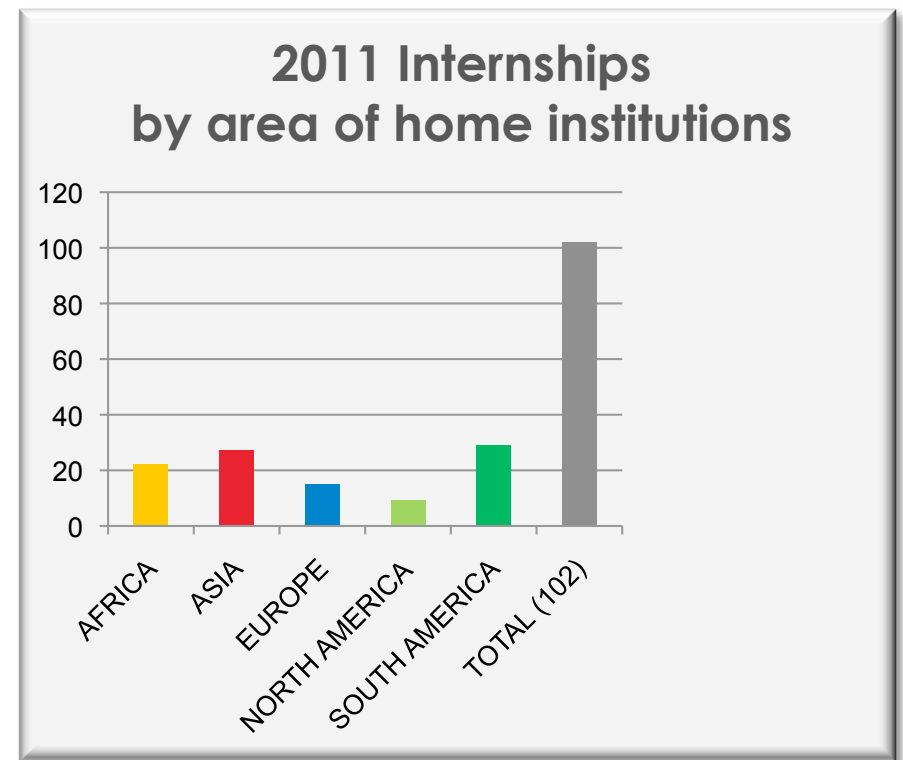
COLLABORATIONS INRIA-BRAZIL

A sustained Brazil-Inria relation

Through different programs since 2003 :

Associate Teams Programs : 5 teams since 2005

STIC & MATH AmSud: annual call since 2006
 2 joint projects including Brazil (via CAPES and FAPESP).
Main partner institutions: UFPE, UFRGS, IMPA, …

Inria-CNPq bilateral agreement :
  2 calls (2005 and 2008). Main partner institutions: UFRJ, UFRN, …

New initiatives

➢ **HOSCAR Call with CNPq:** 4-year projects on *High performance computing and data management driven by high demanding applications*.

➢ **Inria – FAP - CNRS** calls : in 2010-2011, with 18 FAPs : 15 joint active projects with 18 FAPs : FACEPE, FAPEAM, FAPEG, FAPEMA, FAPEMAT, FAPEMIG, FAPERGS, FAPERJ, FAPERN, FAPES, FAPESB, FAPESC, FAPESP, FAPESPA, FAPITEC, FUNCAP and Fundação Araucaria, FUNDECT

➢ Participation to **Joint CNRS Laboratory: LICIA** (UFRGS; CNRS, Inria, 3 French universities)

➢ Participation to **European Marie Curie Action – IRSES** on *High performance computing for geophysics applications* (Brazil, France, Mexico, Spain)

Inria

Brazilian researchers at Inria

In 2011 :

22 paid by Inria : 8 engineers, 1 researcher, 11 Phd, 2 Post-docs

26 in Inria teams : 1 researcher, 1 professor, 22 Phd, 2 Post-docs

33 brazilian Phd doctorants on a total of 1282 (3%.)

A great opportunity to support joint projects :

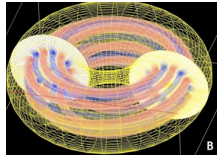*the program Ciências sem Fronteiras*

through Phds and Postdocs

Inria is a hosting french institution
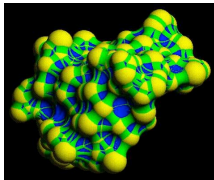
Inria
&
High Performance Computing

HPC research at Inria
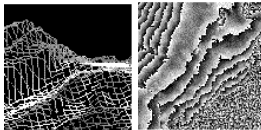# From Computer Arithmetic to Scientific Platforms

Scientific Visualization
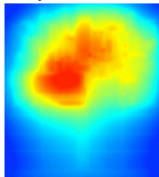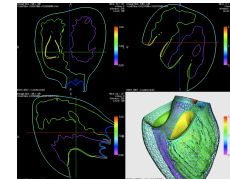(e.g. Plasma Physic)

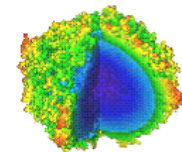Modeling molecules

Earth reconstruction
(inverse problems)

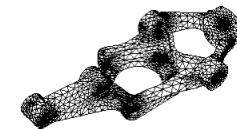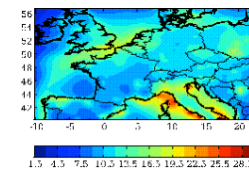Modeling microprocessor
temperature

Cardiac imaging
and simulation

Modeling Tissue Growth

Automatic Mesh
Generation

Modeling Air quality

| Scientific software platform (Scilab) |
| :---: |
| Scientific visualization; Visual analytics |
| Mathematical Methods |
| Computing Models |
| Mesh generation |
| Batch Schedulers |
| Runtime environments |
| Computing & Communication Libraries |
| Single System Image |
| Compilation for processors, Multi-core & GPU |
| Microprocessor design |
| Computer Arithmetic |
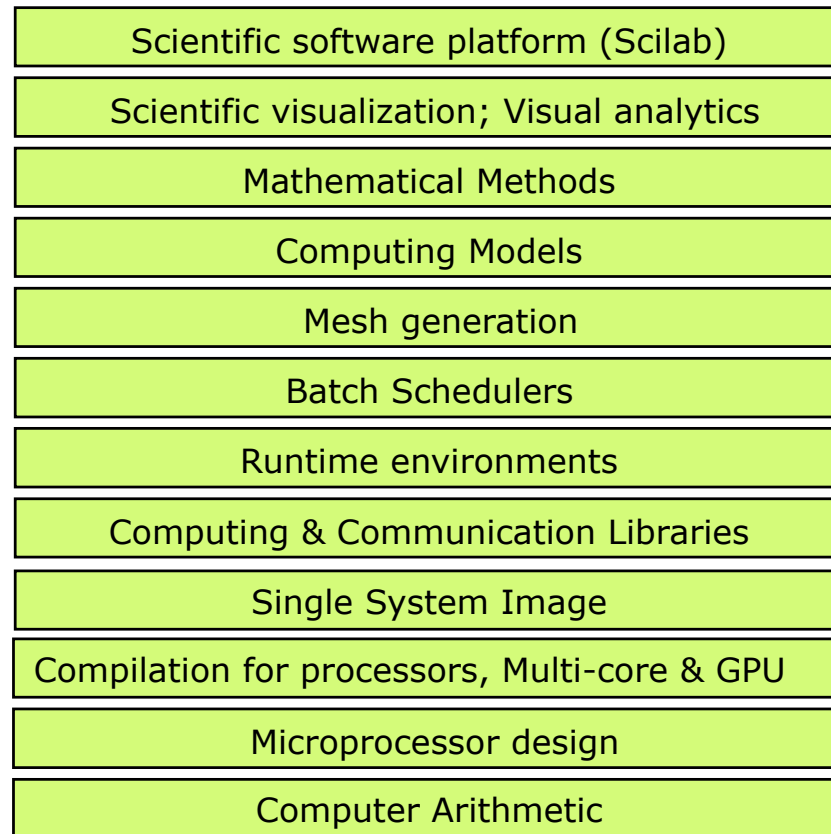
Platform for
numerical
computation

MUMPS Parallel
sparse
direct Solver
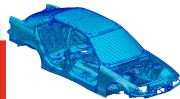
general
purpose
library

SUPERLU

PM2 Runtime
Environment

Kerrighed
Single
System Image

Fault tolerant
MPI

MPICH-V
MPI Implementation for Volatile resources

Batch
Scheduler

Middleware for
Cyber infrastructures

Inria Strategic Activities in HPC

A 4-years Large-Scale Initiative at Inria
Very High Performance Computing for Computational Science

Collaborations around HPC

- Joint laboratory with UIUC-NCSA (Design of Petascale computer)

- Joint laboratory with CERFACS (Numerical algorithms and libraries for Peta/Exascale computing)

- Strategic Partnership with Bull on supercomputer design and parallelism , with EDF on simulation and with TOTAL on waves and geophysics

- Collaboration with ANDRA on nuclear waste management

- Collaboration with CEA on key system software (Kadeploy) for supercomputers

- Collaboration with CEA and academic labs on plasma simulation for ITER

- Collaboration with ONERA on aeroacoustics, numerical methods, CFD...

Best wishes to HOSCAR!

Department of International Relations

www.inria.fr

INVENTORS FOR THE DIGITAL WORLD