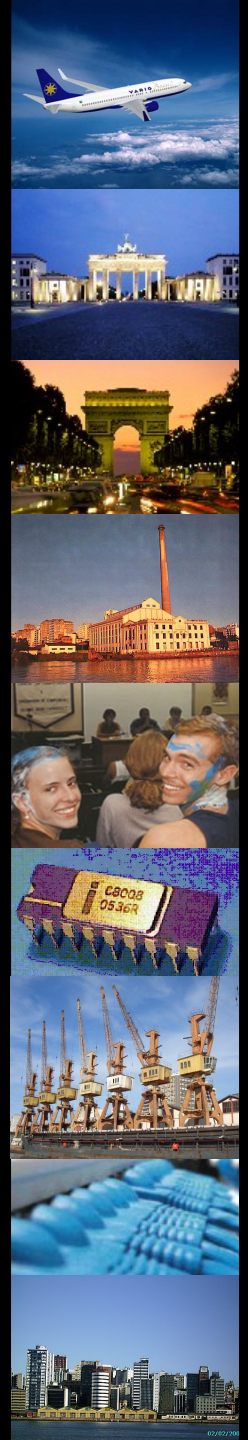


Internacionalização e seus Impactos na Pós-Graduação em CC

**Frum Coordenadores Computação
Brasília
26 de março de 2014**

Philippe Navaux

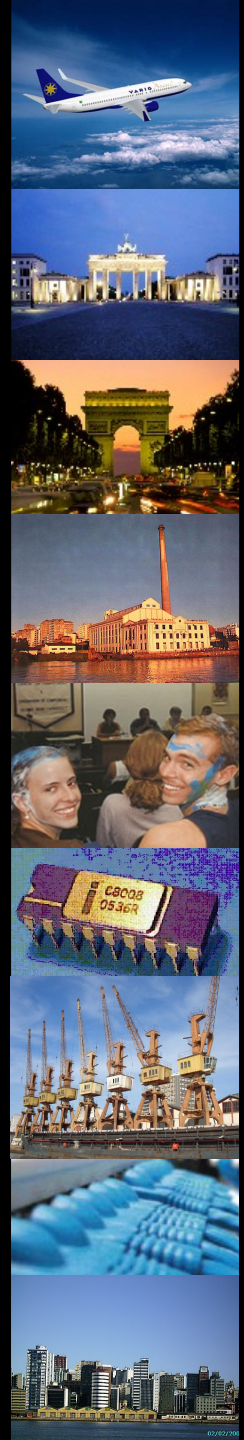


Internacionalização

No atual avanço da Pós-graduação brasileira, crescendo para ser de classe mundial, é essencial a cooperação com outras universidades internacionais.

Razões da Internacionalização

- A ciência não tem fronteiras,
- A importância do intercâmbio do conhecimento,
- Evitar endogenia,
- A Internacionalização deve ser nos dois sentidos,
- Pesquisa e Desenvolvimento são base do desenvolvimento social e econômico dos países.

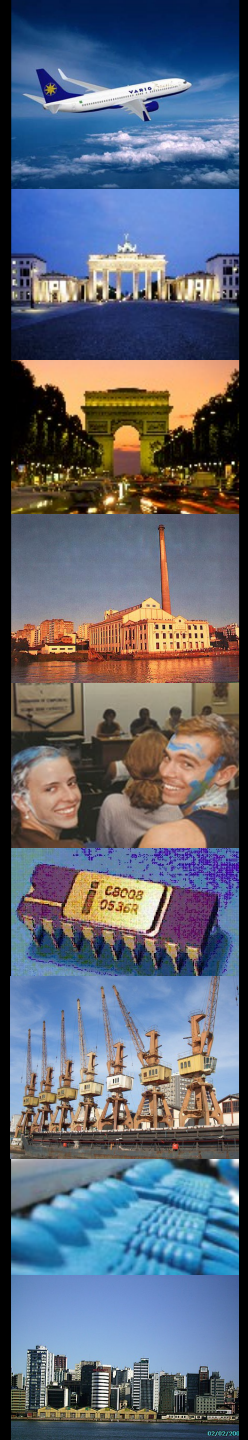




Tipos de Internacionalização

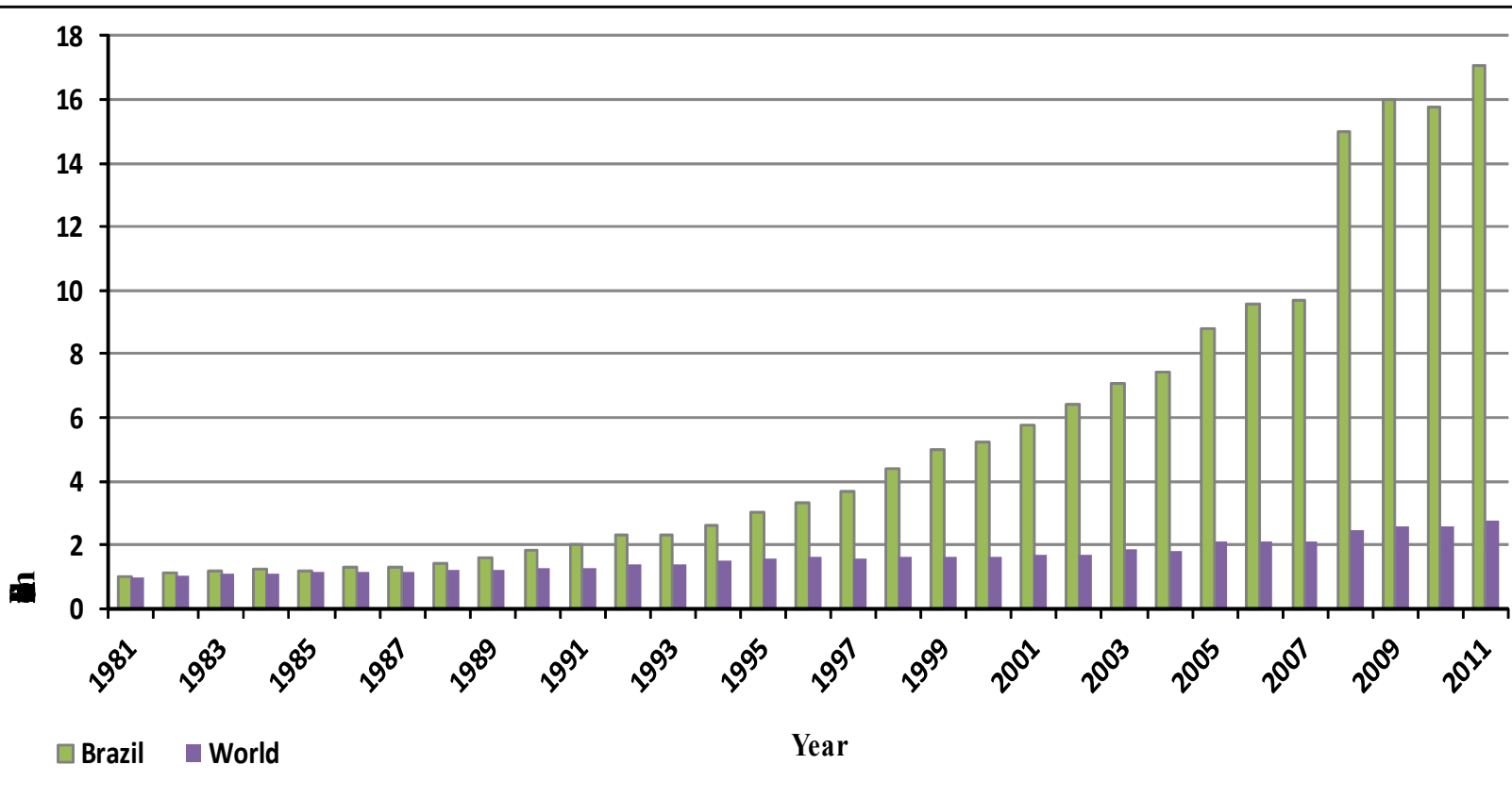
- Intercâmbio na Graduação,
 - Duplo Diploma
- Intercâmbio na Pós-graduação,
 - Co-tutela
- Intercâmbio de Pesquisadores
 - Pos Doc
 - Estágio Senior
 - Pesquisador Visitante
- Pesquisas entre grupos,
 - Laboratórios Associados
 - Workshops Conjuntos

Dados da Internacionalização do Brasil



Qualitative and quantitative expansion of the SNPG

Comparative growth rate of scientific production Brazil vs World
(1981 to 2011)

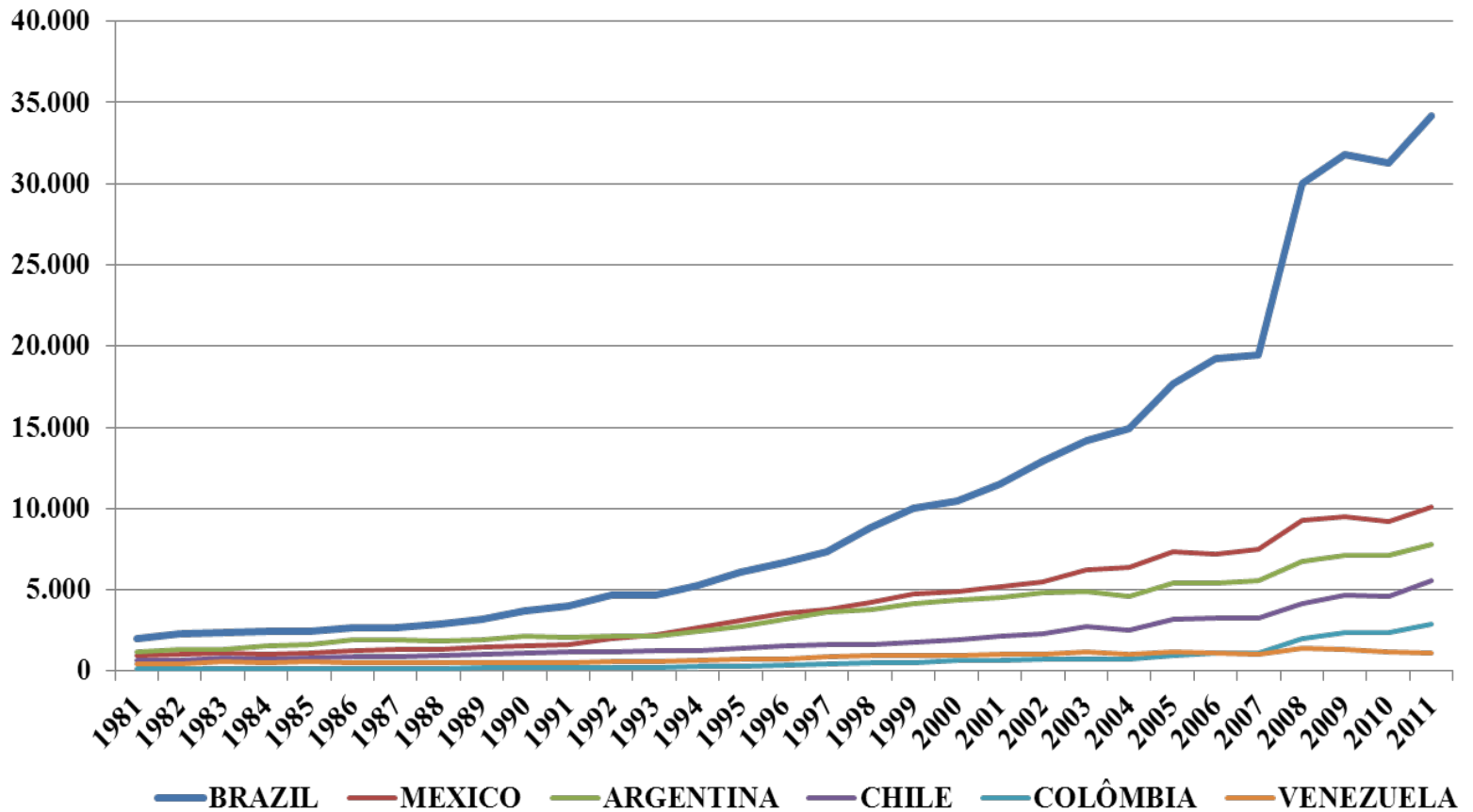


Source: Thomson Reuters. InCITIES.
2011.

Navaux

Qualitative and quantitative expansion of the SNPG

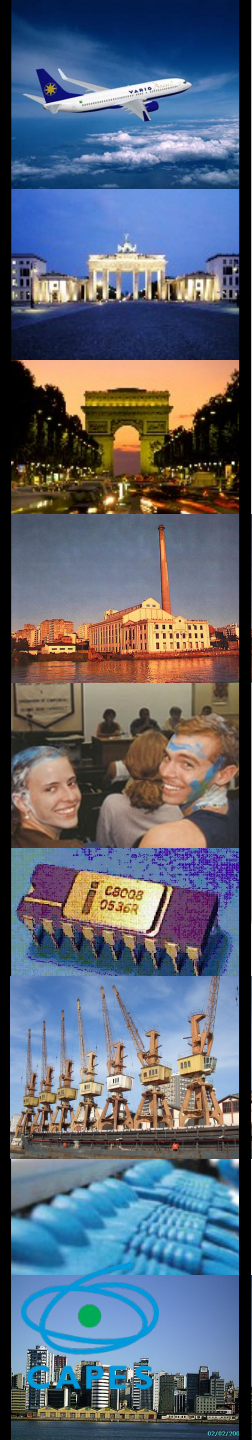
Brazil vs Latin America Countries (1981 to 2011)



Source: Thomson Reuters. InCITIES.
2011.

Navaux

Qualitative and quantitative expansion of the SNPG

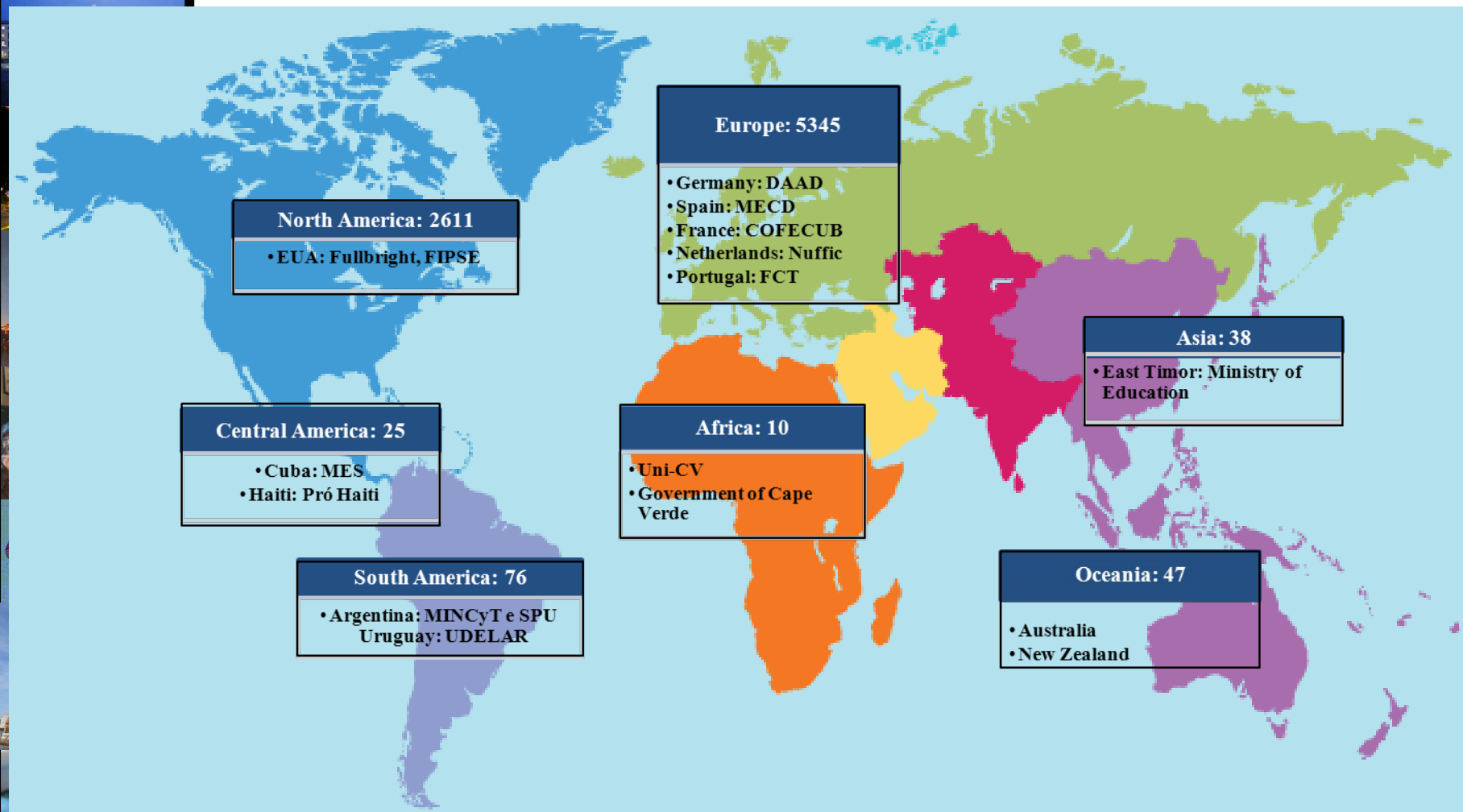


Ranking of Scientific Production of 2011

Rank	Country	N° Articles	Participation % compared to the world
1	United States of America	354.486	28,1
2	China	146.662	11,6
3	Germany	93.541	7,4
4	England	84.178	6,7
5	Japan	76.099	6,0
6	France	66.283	5,3
7	Canada	57.263	4,5
8	Italy	53.476	4,2
9	Spain	49.095	3,9
10	India	45.485	3,6
11	Corea	44.718	3,5
12	Australia	43.441	3,4
13	Brazil	34.210	2,7
14	Netherlands	32.975	2,6
15	Russia	28.281	2,2
16	Taiwan	26.648	2,1
17	Switzerland	24.152	1,9
18	Turkey	23.294	1,8
19	Sweden	20.700	1,6
20	Polond	20.617	1,6



Scholarships Abroad- 2012



More than 11,000 scholarships and 900 cooperation projects.

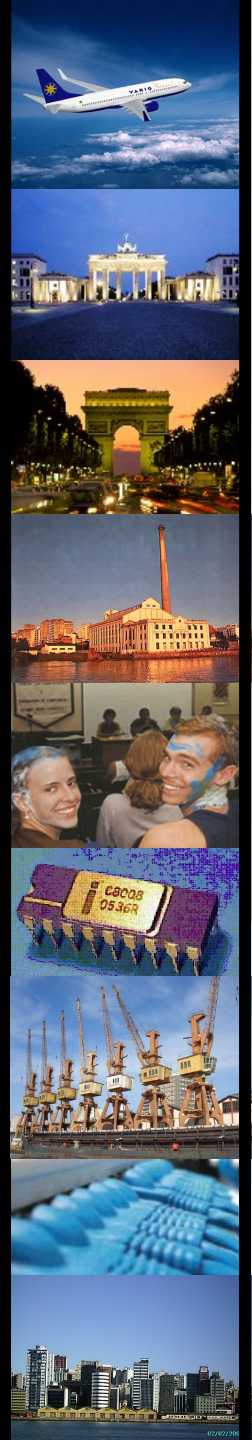


Types of scholarships and goals granted by the Federal Government

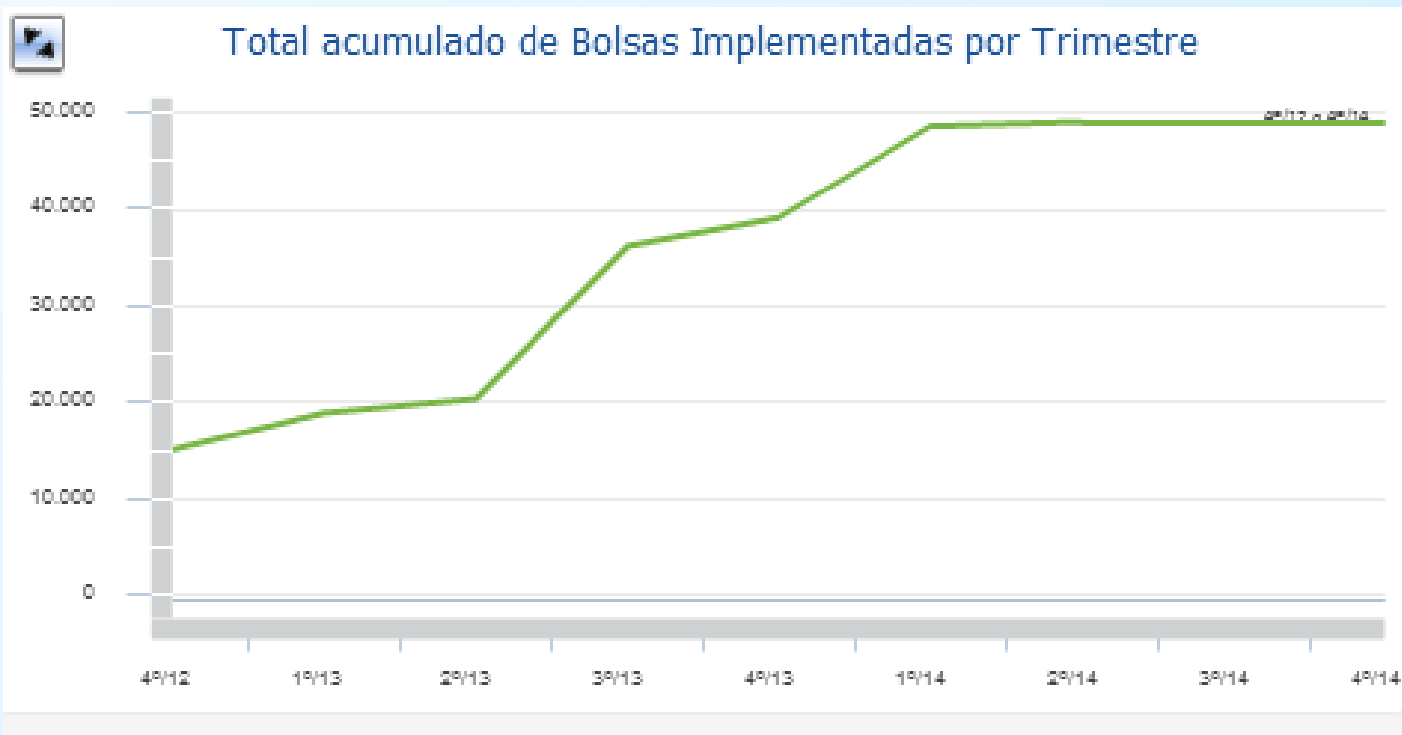
CAPES/CNPq

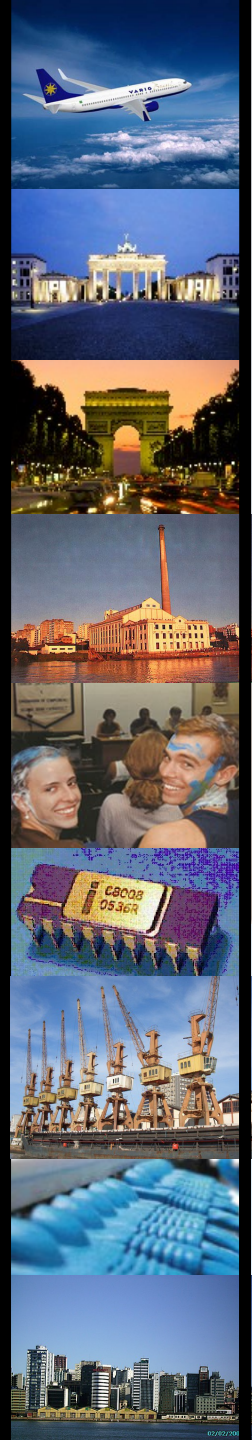
Undergraduate Sandwich (one year of study abroad)	27.500
Doctorate Sandwich (one year of study abroad)	24.700
Full Doctorate	9.940
Postdoctorate	10.910
Training Specialists Abroad	700
Young Scientists (for expatriates and foreigners)	860
Visiting Scientists (for expatriates and foreigners)	390
Total	75.000

More 26.000 places granted by private initiative



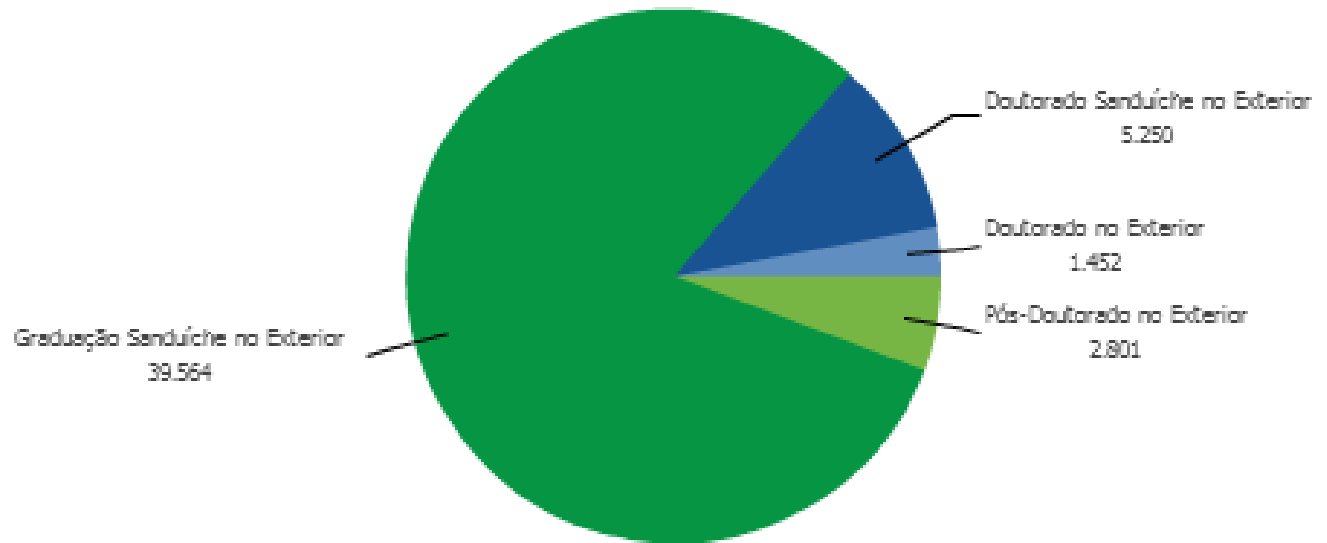
Dados CsF final 2013





Dados do CsF

Distribuição das Bolsas Implementadas por Modalidade





Intercâmbio de Alunos

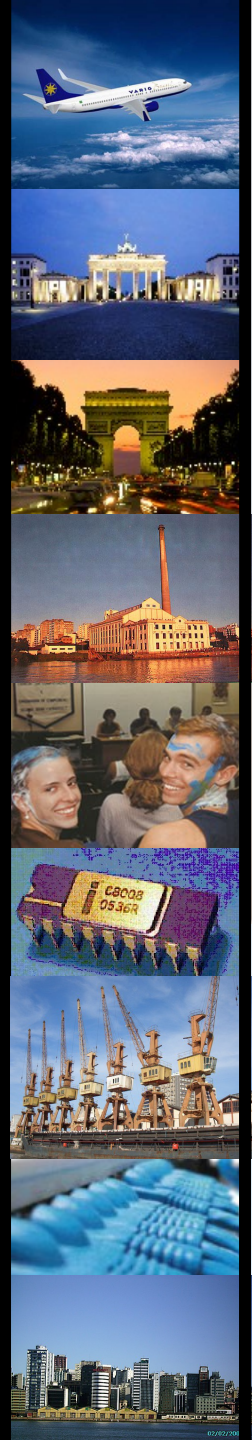
Acordo de Bolonha

Bologna Agreement

European Dimension

The European Dimension

- 1998 Sorbonne – 4 Countries
- 1999 Bologna – 29 Countries
- 2001 Prague – 31 Countries
- 2003 Berlin – 33 Countries
- 2005 Bergen – 45 Countries
- 2007 London
- 2009 Netherlands
- 2010 Paris





THE BOLOGNA PROCESS

Action Lines (Bologna)

EHEA

European Higher Education Area

1. Easily readable and comparable degrees
2. Bachelor-Master system
3. Credit system (transfer and accumulation)
4. Mobility
5. European cooperation in quality assessment
6. Integrated study programmes and joint degrees (revision of national legislation)



THE BOLOGNA PROCESS

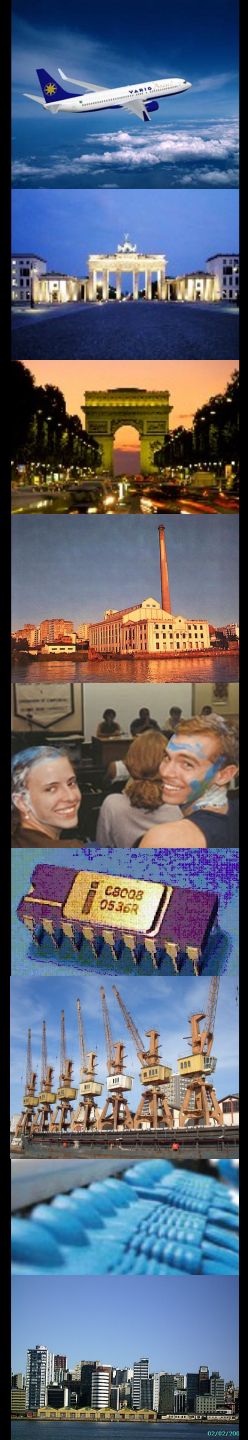
Action Lines (Prague)

7. Lifelong Learning
8. The Involvement of Universities and students in the process of the EHEA
9. Enhancing the attractiveness of the EHEA to international students.

THE BOLOGNA PROCESS

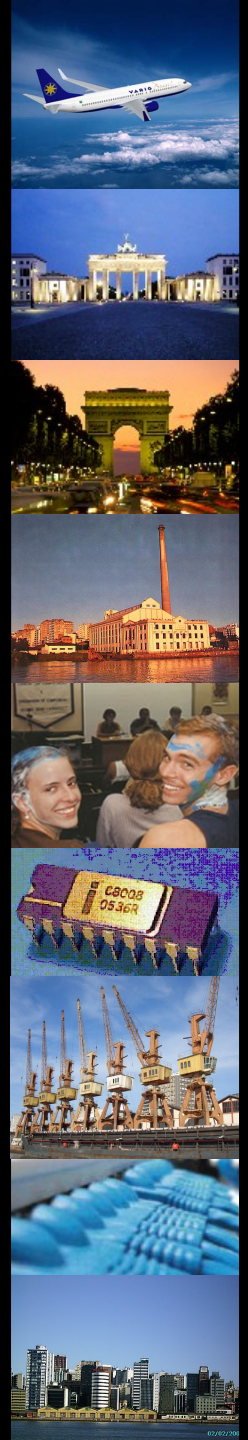
Action Lines (Berlin and Bergen)

11. Include the doctoral level as the third cycle
12. Prepare an external dimensions strategy



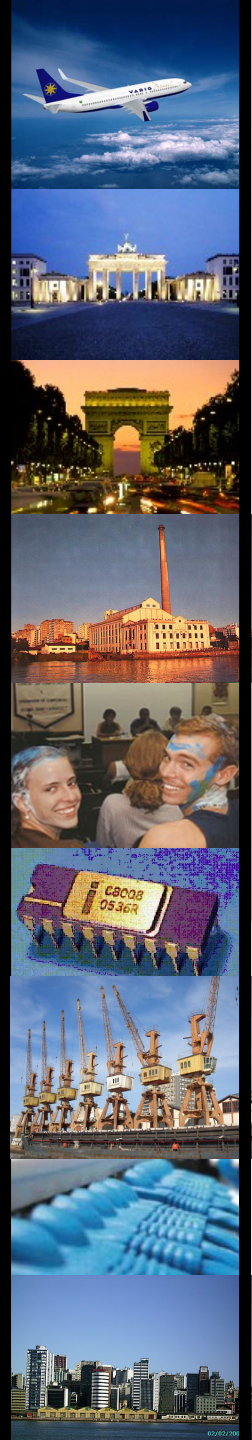
Calculation of „Workload“ acc. to ECTS

- **ECTS: European Credit Transfer System**
- **Credits estimate the real work load of an average student**
- **1 ECTS credit point = 30 h work**
- **Workload per year: max. 1800 hours:**
 - 45 weeks with 40 hours
- **Equivalent to 60 ECTS**
- **per semester: 30 ECTS**
- **Example:**
 - 2 hours weekly lecture
 - 2 presence hours * 15 weeks = 30 hours
 - Pre- and postpreparation: 15 hours (1h/week)
 - Exam preparation: 15 hours total
 - Total: 60 hours workload = 2 ECTS

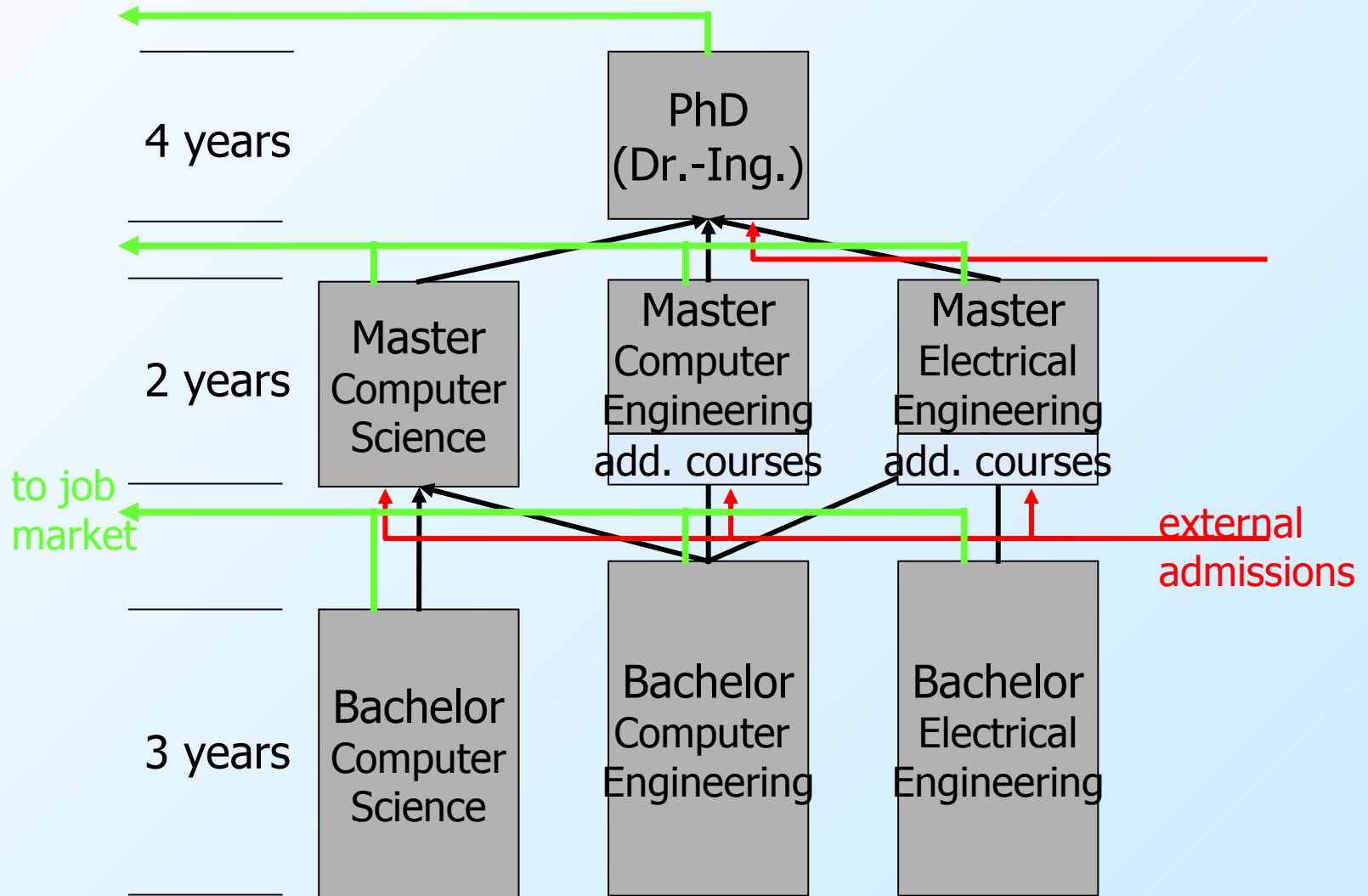


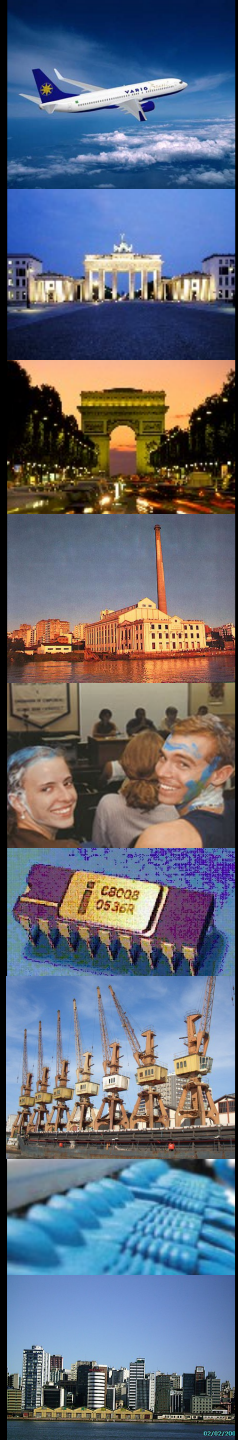
Alternatives in discussion

	I	II	III	IV
PhD				
<i>research</i>	PhD	PhD	PhD	PhD
MSc				
<i>depth</i>		Master	integr. Master	Master
BSc				
<i>breadth</i>	Diplom		Bach.	
VD				
<i>foundation</i>		Bach.	Found.	Bach.



Transitions





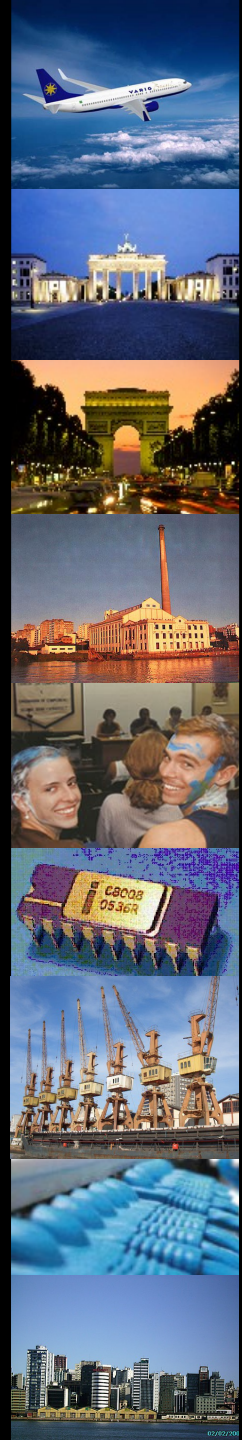
Sem.	CP	Bachelor Computer Science				
1	27	TechGI 1 Digital Systems 6 CP	MPGI 1 g. and Funct. Solution of Discrete Problems 9 CP		TheGI 1 Foundations & Algebra Structures 6 CP	Math 1 Linear Algebra f. Eng. 6 CP
2	29	TechGI 2 Computer Organisation (2V+2Ü) 6 CP	MPGI 2 Structures and Algorithms in Imperative 9 CP		TheGI 2 Logic Calculi 6 CP	Math 2 Calculus I f. Eng. 8 CP
3	32	TechGI 3 System Programming 6 CP	MPGI 4 Software Engineering (including project) 12 CP	MPGI 3 Practice of Program Development 6 CP	TheGI 3 Automata and Complexity 6 CP	Math 3 Calculus II f. Eng. 8 CP
4	30	TechGI 4 Distributed Systems 6 CP		MPGI 5 Database Systems 6 CP	TheGI 4 Specification und Semantics 6 CP	Math 4 Stochastics 6 CP
5	32	Computer Science Electives 12-14 CP	Computer Science Electives 12 CP		Management 6 CP	Minor studies 12-14 CP
6	30		Bachelor thesis 15 CP		Information Rules 6 CP	

Software technology

Databases and Information Systems
Software Engineering
Quality Assurance

Communication technology

Communication Networks
Open Communication Systems
Distributed Systems
Computer Security

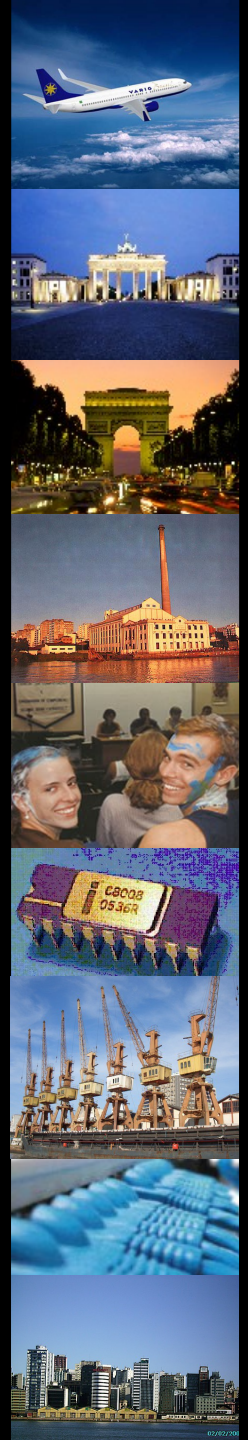


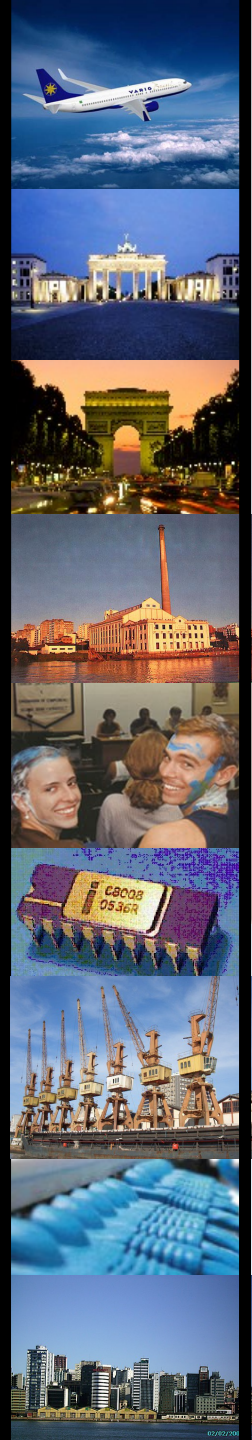
Master Computer Science					
1	30	Specialization-Module 1 12 CP		Elective-Module 12 CP	Minor Studies 12 CP
2	30	Specialization-Module 3 12 CP	Specialization-Module 2 6 CP		Minor Studies 12 CP
3	30	Elective Module 12 CP		General Studies 12 CP	
4	30	Master thesis 30 CP			

Specialization Topics

- **System Engineering** (Software Engineering, Programming Language Design, Compiler Construction, Computer Organization, Design Automation, Operating Systems, Information Systems, Computer&Law, Information Economy, System Analysis, Enterprise Architecture, Net Business Processing,...)
- **Dependable Systems** (Component-Based Modeling, Specification Tools, Semantics and Calculi, Security&Trust, Realtime Systems, Computer and Network Security, Correctness, Fault-tolerance,...)
- **Intelligent Systems** (Neural Information Processing, Bio-Informatics, Intelligent Data Analysis, Computer Graphics, Computer Vision, Image Analysis, Robotics, Artificial Intelligence, Agent Oriented Systems,...)
- **Communication-based Systems** (Communication Networks, Protocol Design, Performance Evaluation, Mobile Communication, Ubiquitous Communication & Ambient Intelligence, Next Generation Networks, (Open) Distributed Systems, Service Delivery Platforms...)

O Brasil no cenário da Ciência em Movimento

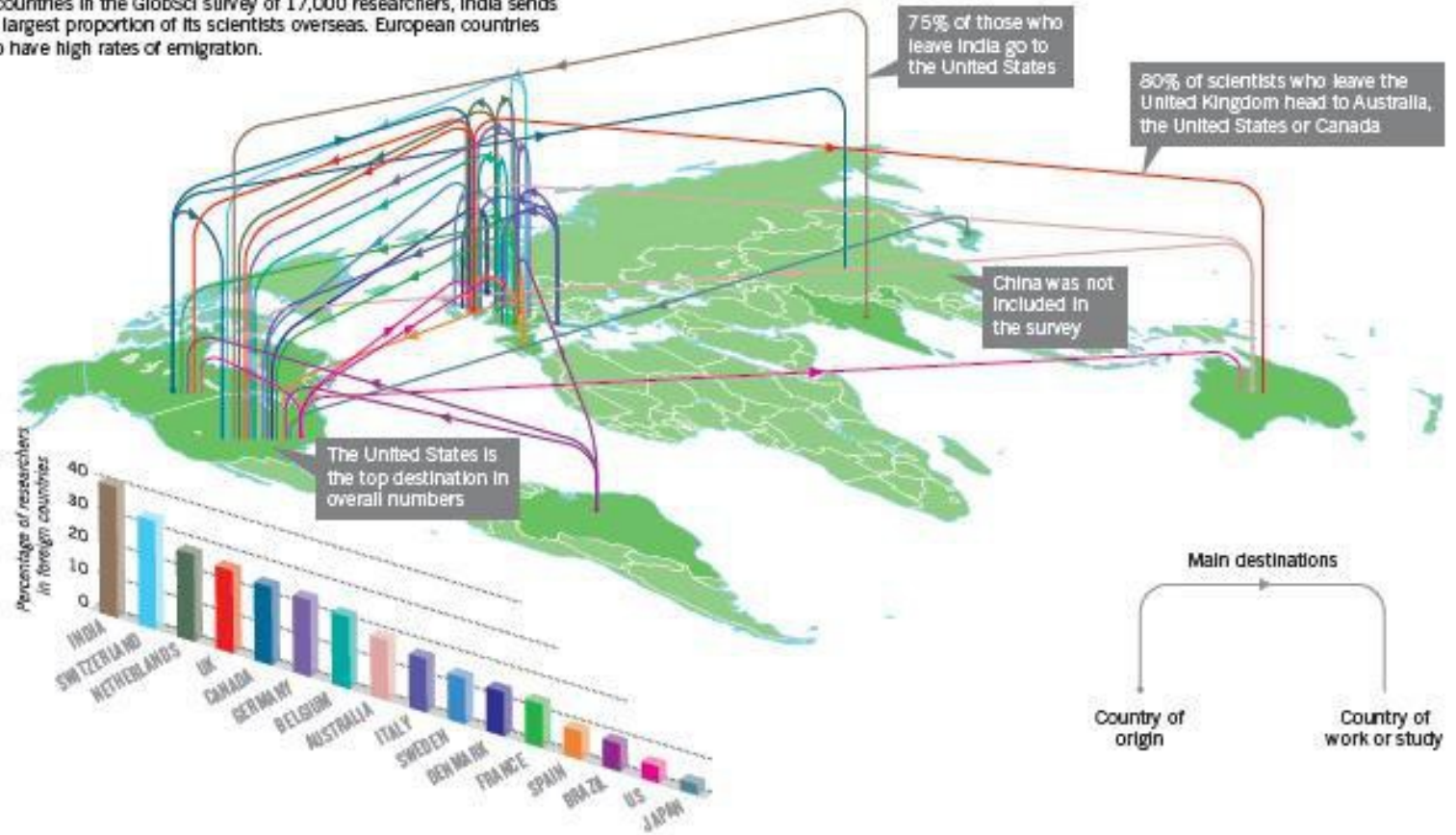




Global Diaspora

THE GLOBAL DIASPORA

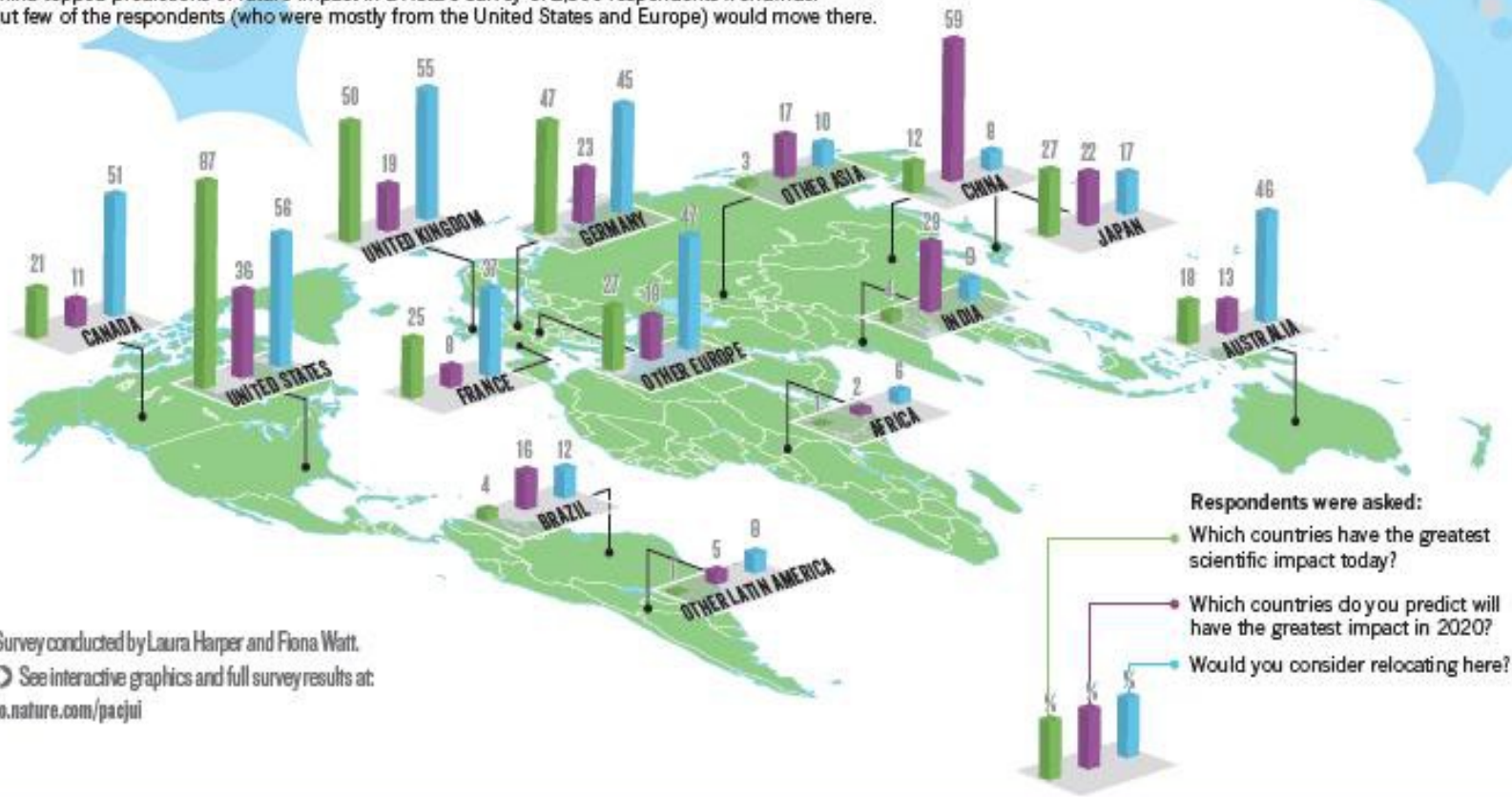
Of countries in the GlobSci survey of 17,000 researchers, India sends the largest proportion of its scientists overseas. European countries also have high rates of emigration.



Lands of Promise

LANDS OF PROMISE

China topped predictions of future impact in a *Nature* survey of 2,300 respondents worldwide. But few of the respondents (who were mostly from the United States and Europe) would move there.



Survey conducted by Laura Harper and Fiona Watt.
 See interactive graphics and full survey results at:
go.nature.com/pajui



Obrigado!