

Nanoscience & Nanotechnology Research in São Paulo

Marcelo Knobel

Instituto de Física Gleb Wataghin (IFGW)
Universidade Estadual de Campinas (UNICAMP)

E-Mail: knobel@ifi.unicamp.br
<http://sites.ifi.unicamp.br/knobel>



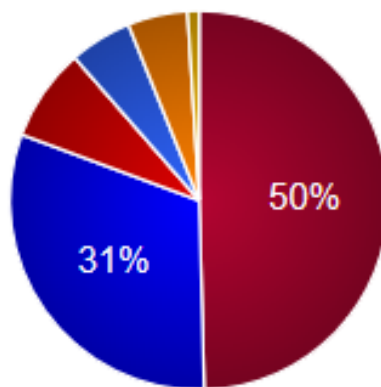
UNICAMP



Nano @ FAPESP: some numbers

Apoio FAPESP em números

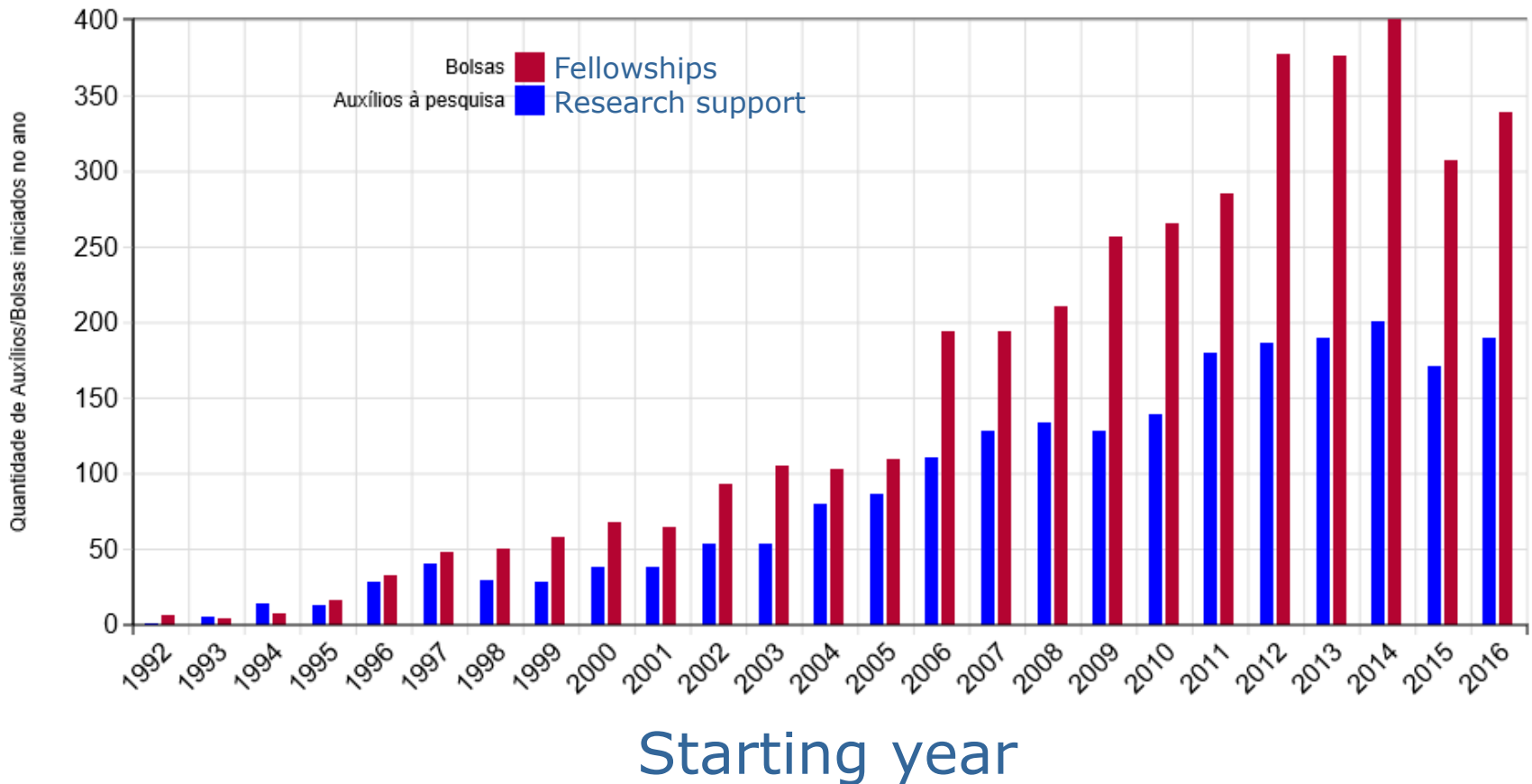
| | |
|--------------|-----------------------------------|
| 334 | Auxílios à pesquisa em andamento |
| 1.949 | Auxílios à pesquisa concluídos |
| 497 | Bolsas no país em andamento |
| 3.111 | Bolsas no país concluídas |
| 62 | Bolsas no exterior em andamento |
| 321 | Bolsas no exterior concluídas |
| 6.274 | Todos os Auxílios e Bolsas |



*Quantidades atualizadas em 26/11/2016

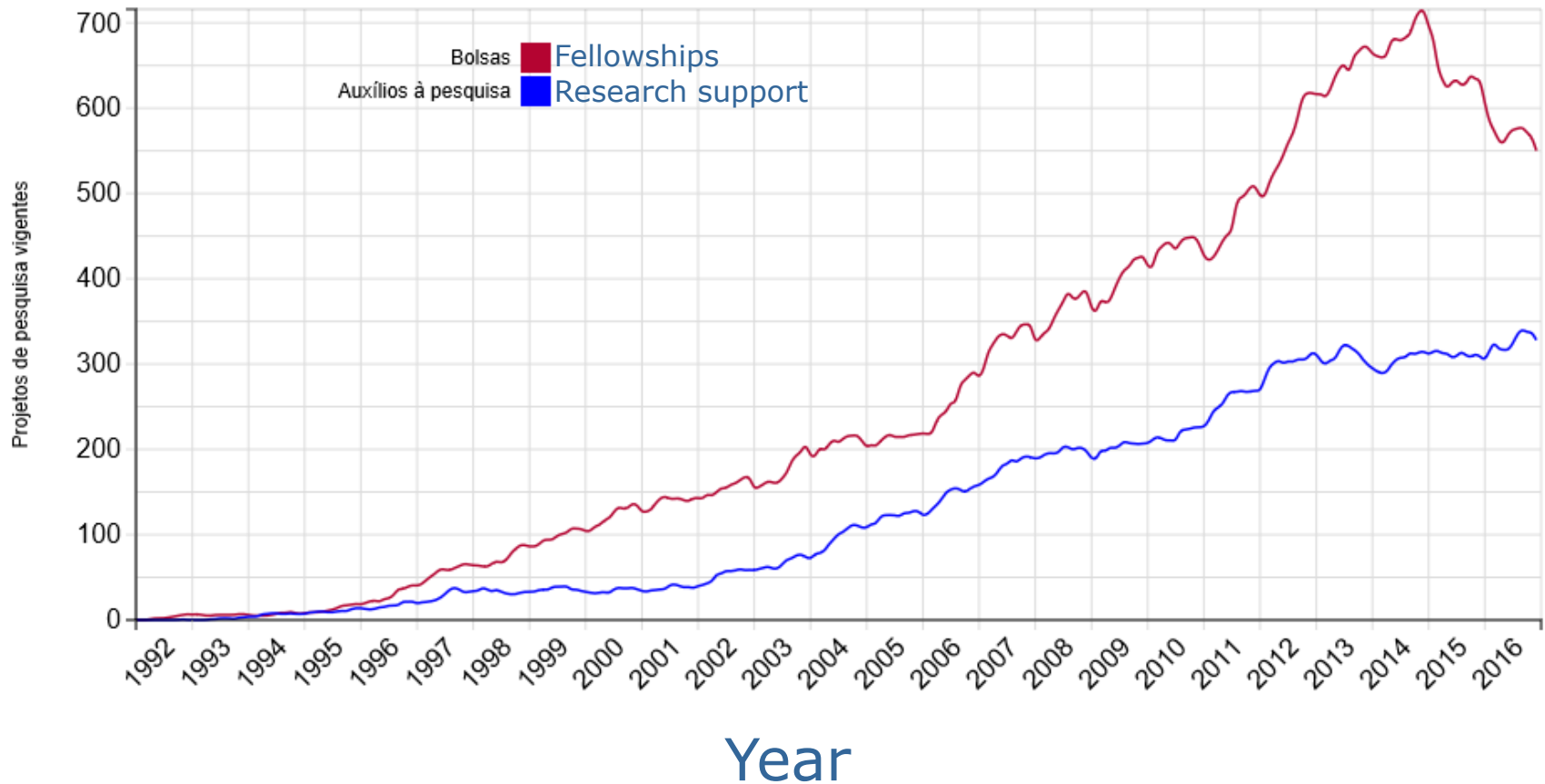
Nano @ FAPESP: some numbers

Histórico do fomento, por ano de início



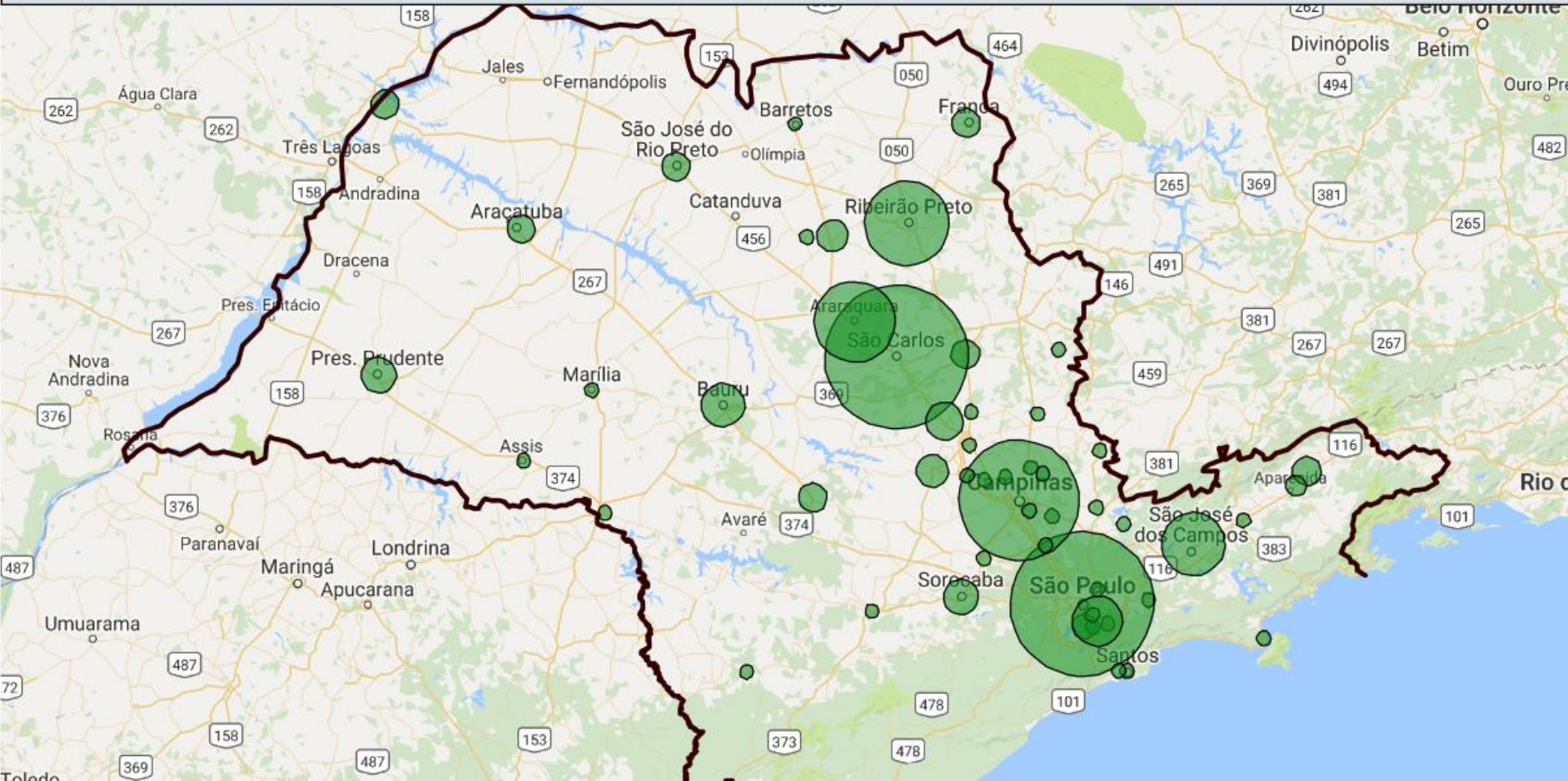
Nano @ FAPESP: some numbers

Projetos de pesquisa vigentes por ano




Nano @ FAPESP: geographical distribution

▲ Mapa da distribuição do fomento por município do Estado de São Paulo



Nano @ FAPESP: geographical distribution

| Município | Grants | Fellowships | Patents |
|---------------------|----------------|--|---------|
| | Nº de Auxílios | Nº de Bolsas | |
| São Carlos | 428 | 916  | 25 |
| São Paulo | 566 | 760  | 41 |
| Campinas | 376 | 572  | 36 |
| Ribeirão Preto | 116 | 355  | 15 |
| Araraquara | 125 | 308  | 8 |
| São José dos Campos | 113 | 152  | |
| Santo André | 78 | 85  | |
| Bauru | 37 | 92  | |
| Rio Claro | 58 | 43  | |
| Sorocaba | 34 | 55  | |
| Presidente Prudente | 17 | 65  | |
| Piracicaba | 17 | 60  | |
| Jaboticabal | 16 | 56  | |
| Botucatu | 20 | 46  | |
| Pirassununga | 21 | 45  | |
| Araçatuba | 15 | 47  | |

Nano @ FAPESP: some numbers

- Regular grants(281)
- Thematic Grants (58)
- CNPq - Pronex (4)
- CNPq - Institutos Nacionais de Ciência e Tecnologia (INCTs) (3)
- São Paulo Excellence Chair (SPEC) (1)
- PIPE Grants(17)
- Young Researchers (JP) (25)
- CEPID (5)
- Multiuser Equipments (25)

CEPIDs

- CEPOF - Centro de Pesquisa em Óptica e Fotônica
- CDMF - Centro de Desenvolvimento de Materiais Funcionais
- FoRC - Centro de Pesquisa em Alimentos
- CECC - Centro de Engenharia e Ciências Computacionais
- CEPIV - Centro de Ensino, Pesquisa e Inovação em Vidros

SPEC

- **Grafeno: fotônica e opto-eletrônica: colaboração UPM-NUS - Antonio Helio de Castro Neto – MACGRAPHE**

MackGraphe is the Graphene and Nanomaterials Research Center at Mackenzie Presbyterian University. We initiated our activities in 2013 with a start-up fund of approximately US\$ 20,000,000.00, including the construction of a new building (**opened on March 2nd, 2016 with the presence of Prof. Sir Andre Geim, [Nobel prize in Physics in 2010](#)**) with 7 floors plus two underground floors and a class 1000 clean room with an approximate area of 200 m². MackGraphe is a "brother" center of the [Centre for Advanced 2D Materials \(CA2DM\)](#), at the National University of Singapore, working in a complementary manner.



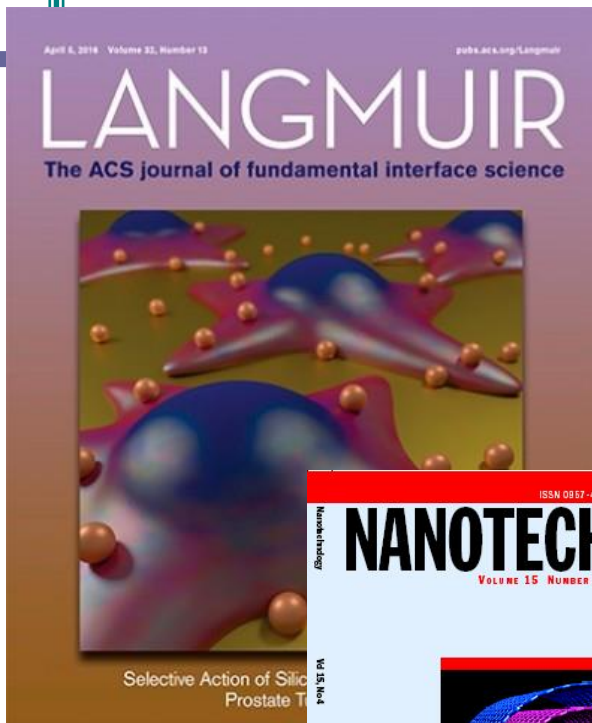
MackGraphe



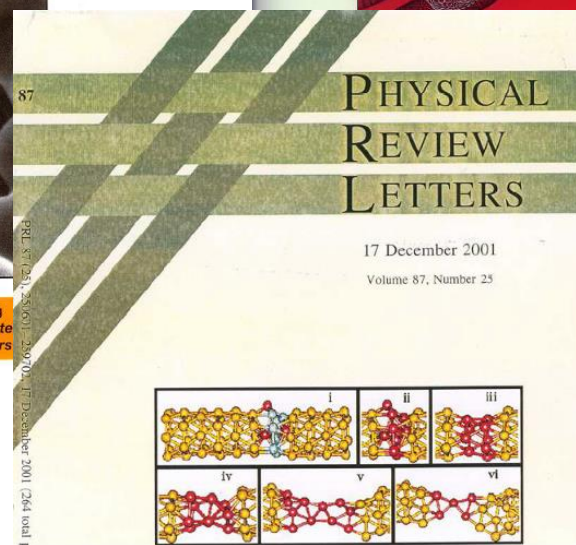
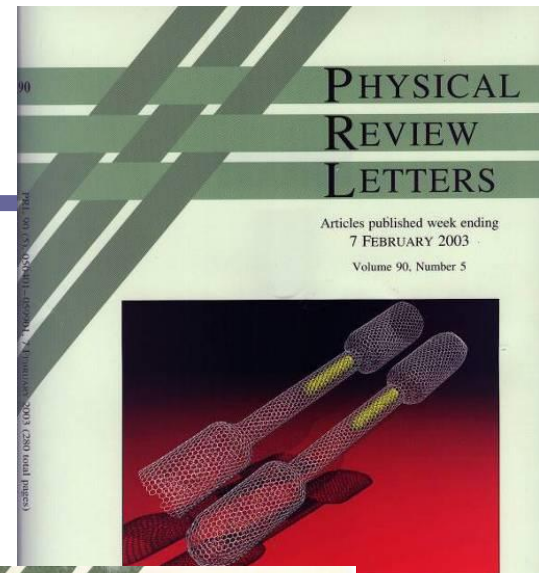
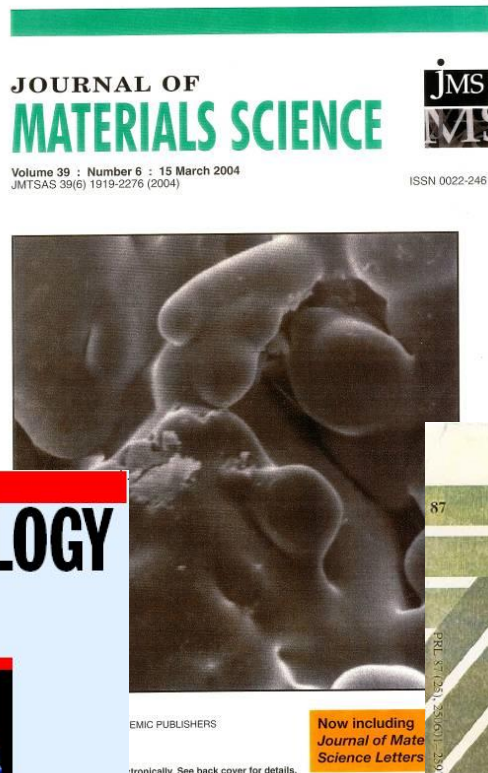
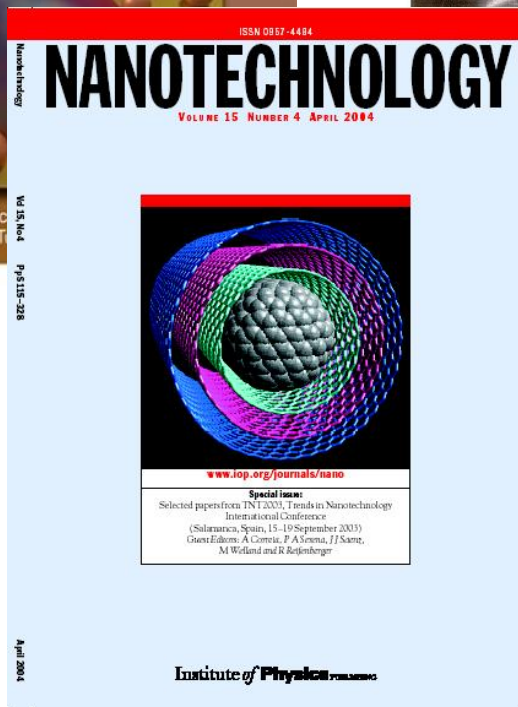
Young Professors

- Some examples @IFGW-Unicamp:
- Gustavo: <http://www.bv.fapesp.br/pt/auxilios/56524/nanofotonica-em-semicondutores-do-grupo-iv-e-iii-v/>
- Thiago: <http://www.bv.fapesp.br/pt/auxilios/56525/optomecanica-em-cristais-fonicos-e-fononicos/>
- Paulo: <http://www.bv.fapesp.br/pt/auxilios/83939/processos-de-espalhamento-de-luz-em-microestruturas-fonicas/>
- Lázaro: <http://www.bv.fapesp.br/pt/auxilios/86579/espectroscopia-avancada-em-novos-nanomateriais/>

Research Quality



ACS Publications
Most Trusted. Most Cited. Most Read.



Member Subscription Copy
Library or Other Institutional Use Prohibited Until 2008

American Physical Society

Member Subscription Copy
Library or Other Institutional Use Prohibited Until 2006

APS
Published by The American Physical Society

CNPEM

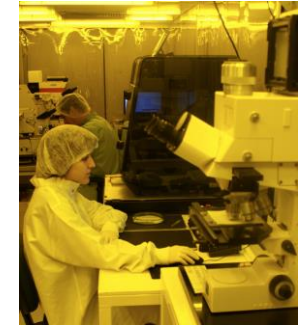
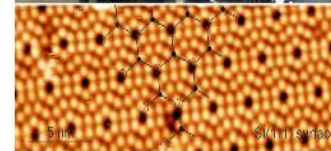
Laboratório Nacional de Nanotecnologia / LNNano LMLS & Sirius



LNNano: History

- Created in 2011
 - Electron microscopy;
 - Probe microscopy;
 - Microfabrication;
- New units and groups
 - Metal processing (2012);
 - Nanostructured materials (2012);
 - Sensors and devices (2014);
 - Criomicroscopy (2014);
 - Nanotoxicology (2014).

93 people (8 PIs, 33 staff,
24 internships and 28
students)



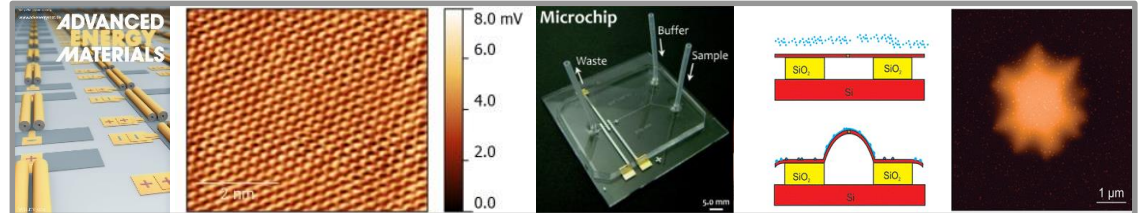
LNNano: Mission

To participate of the scientific, technological and innovation development, by means of the development and application of concepts and tools of nanotechnologies leading to economic and strategic impacts.

Axis 1 Open Laboratories



Axis 2 In-house research



Axis 3 Support to innovation



Axis 4 Education and training



93 People (41 Staff, 24 Interns and 28 students)

LNNano: Open Facilities

Electron Microscopies



- **Electronic Cryomicroscopy**- structural biology, colloidal systems, lipidic vesicles.
- **Corrected microscopy** – First in Latin America with double aberration correction. Subangstrom resolution.

LNNano: Open Facilities

Clean Room



Plasma corrosion
Oxford NPG80



ALD thin film deposition



Plasma cleaning system

- Open to users in January/2016.
- Allows users to build and characterize electronic devices, such as sensors and biosensors.
- International standards of microfabrication, offering a variety of equipments to process and integrate components.

LNNano: Open Facilities

Nanobiotech & Nanotoxicology

To be open in 2017.



Nanotoxicology:

- Antimicrobial activity of nanomaterials– *E. coli* and *B. subtilis*
- nanoecotoxicity essays– seeds, *C. elegans* and *D. rerio*
- Hemolytic essays – hemaceae

Nanobiointerfaces:

- Dispersion of nanomaterials in biological fluids of environmental and medical interest – aggregation and size
- Biomolecular essays – enzymatic activity; DNA damage and *protein corona* characterization.

IFGW - UNICAMP

■ My Research Group

■ LMBT

- 03 post-docs
- 03 PhD students
- 02 Master students

Former researchers:

- 10 post-docs
- 08 PhDs
- 10 master degrees
- 14 undergraduate

■ Granular Systems

- Magnetic properties
- Structure
- Magneto-transport properties: magnetoresistance and Giant Hall Effect

■ Soft Magnetic Materials

- Amorphous wires and ribbons; amorphous microwires, nanocrystalline systems
- Joule heating

■ Other

- Molecular magnets
- Magnetic semiconductors
- Nanowires

IFGW - UNICAMP

- Active collaborations with:
- Dora Altbir, Juliano C. Denardin (USACH)
- Patricio Vargas, Carlos Garcia (UTFSM)
- David Larose (Arica)

