

GIANT

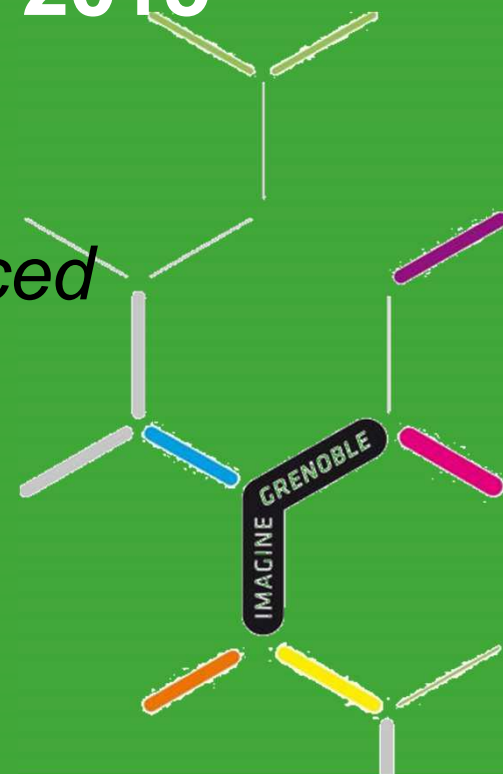
INNOVATION CAMPUS



Kick-Off Symposium
December 7, 2015

The GIANT Alliance
Grenoble Innovation for Advanced
New Technologies

F. Papillon
Head of GIANT Executive Team,
CEA, Grenoble



Outline



- Members and partners of GIANT, objectives, key numbers
- Centres of excellence
- Urban development
- GIANT 2.0
- GIANT International Internship Programme
- GIANT/REACT partners

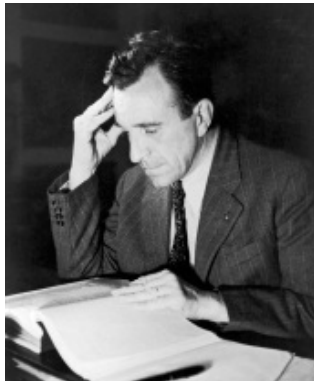
Grenoble in the Alps

- Grenoble is the largest research center in France after Paris with 22,800 jobs (11,800 in public research, 7,500 in private research and 3,500 PhD students)
- 66,000 students, 50% in science



A long tradition of strong cooperation between research / education / industry

- Two scientists and an industrialist anticipated and prepared the future



Louis Néel

Nobel prize in Physics
Founder of the CEA Grenoble



Louis Weil

Former Dean of the Grenoble University



Louis Merlin

Industrial
Founder of Merlin-Gérin
(Schneider Electric)

Grenoble has been transformed by science and technology



1956 CEA (CENG)



1962 CNRS

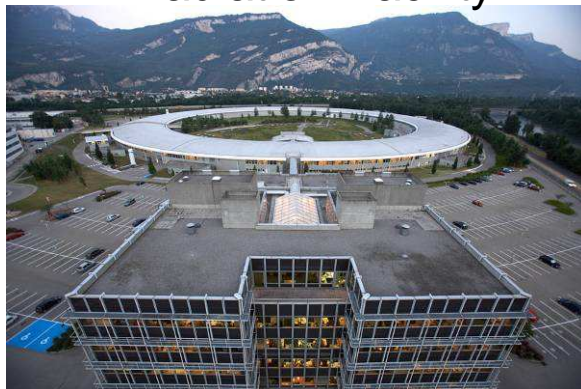


1967 ILL



and *Université Joseph Fourier, Grenoble Institut Polytechnique, Grenoble Ecole de Management ...*

1988 ESRF
European Synchrotron
Radiation Facility



2005 MINATEC
Micro and Nano-electronics



2009 GIANT
Innovation Partnership



Grenoble: a high tech industrial area

GIANT
CAMPUS

Lyon

Geneva

PHOTOWATT

SOITEC

METIS

SOFILETA

RADIALL

THALES

BIOMERIEUX

ST MICROELECTRONICS

YAHOO!

Gardanne

CMP Georges Charpak

Nice

SCHNEIDER

ST MICROELECTRONICS

ST

Crolles

Innovallée

CAP GEMINI

SUN

BD

BD

Chambéry

INES

TRONIC'S

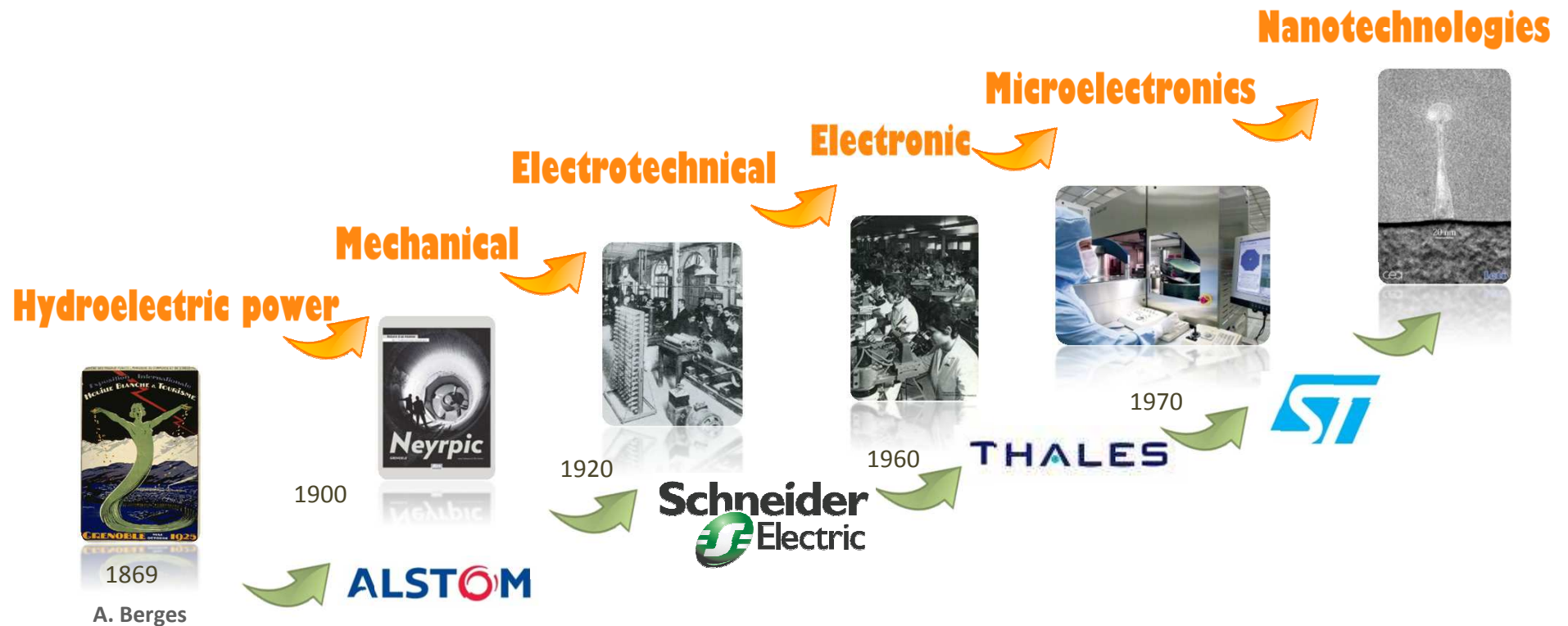
XEROX

FT R&D

MGE UPS

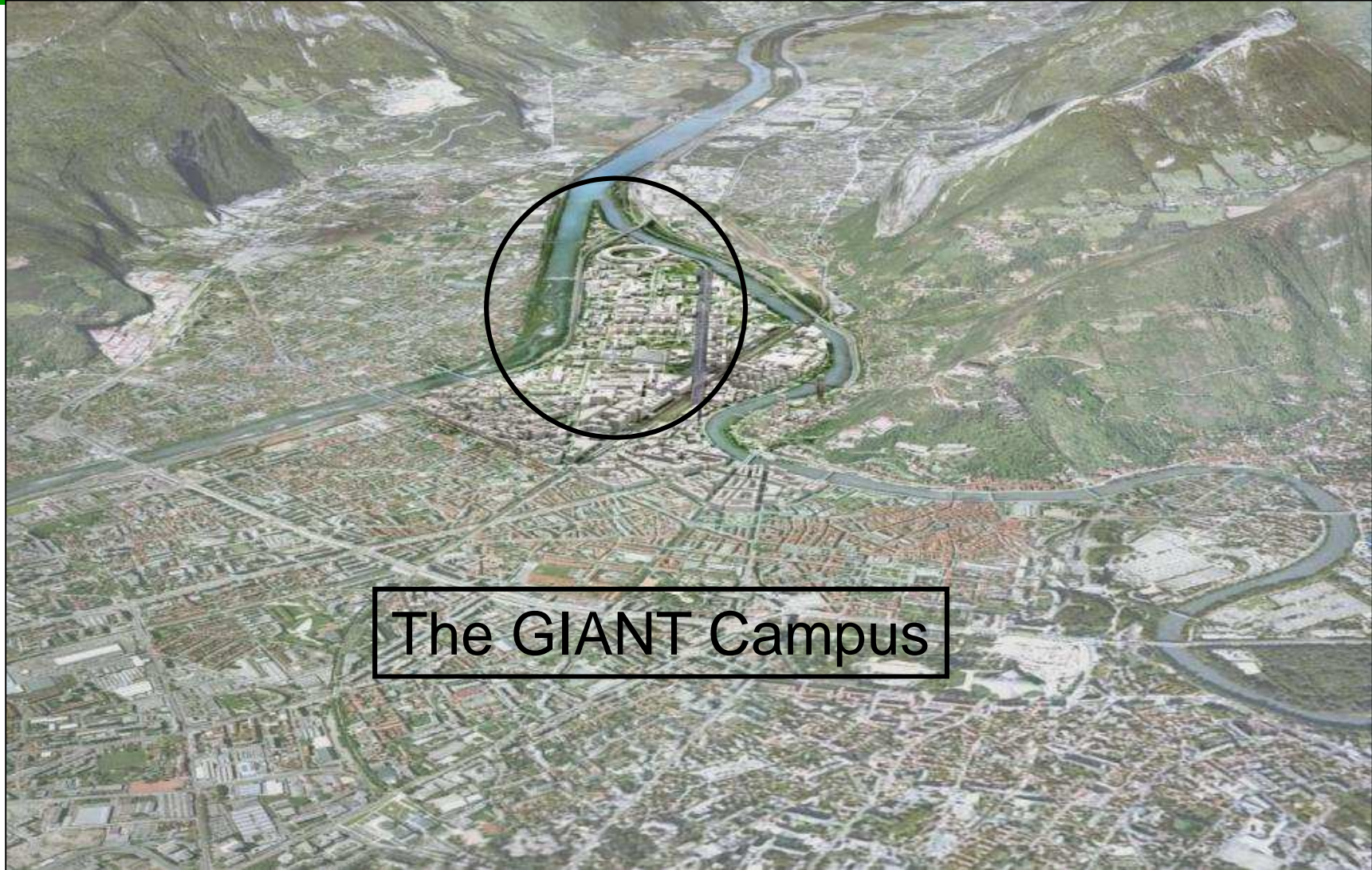
A history of success

- A continuing renewal of electric and electronics industries



Grenoble: the GIANT campus

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INNOVATION CAMPUS



The GIANT Campus

GIANT: Founding Members

Academic Members

- ✓ Grenoble Ecole de Management (GEM)
- ✓ Institut Polytechnique de Grenoble (G-INP)
- ✓ Université Joseph Fourier (UJF)



National Research Organizations

- ✓ Centre national de la recherche scientifique (CNRS)
- ✓ Commissariat à l'énergie atomique et aux énergies alternatives (CEA)



European Large-scale Research Facilities

- ✓ European Molecular Biology Laboratory (EMBL)
- ✓ European Synchrotron Radiation Facility (ESRF)
- ✓ Institut Laue Langevin (ILL)



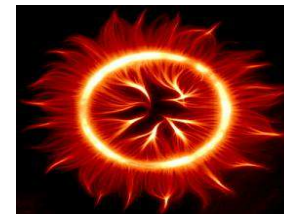
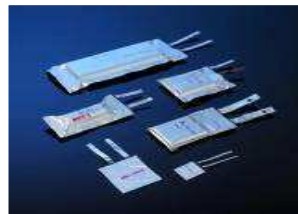
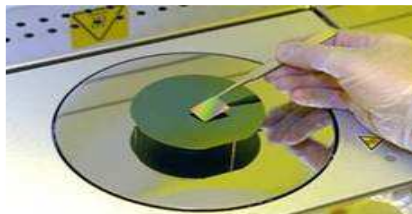
Supported by local/regional/national/international authorities



GIANT: Organization



- Members are independent legal entities
- Supply alliance, simple to organize
- Steering Committee (*Conseil*)
- GIANT Executive Team (GIANT Roadmap and budget)
- GIANT team and project Coordinators (scientific activities, economic activities, campus life ...)



GIANT: Organization



Presidents, directors ...

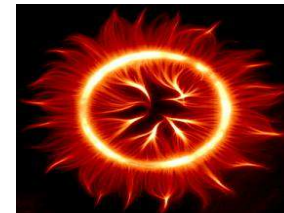
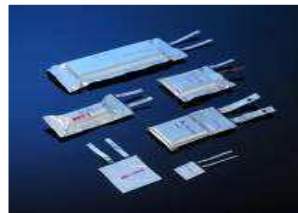
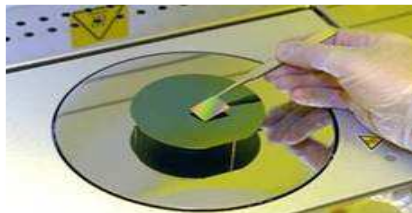


CEA J Therme
CNRS J Vitre
EMBL S Cusack
ESRF F Sette

GEM L Roche
G-INP B Plateau
ILL W. Stirling
UJF P Levy

GIANT: Objectives

- to respond to major societal challenges; information, energy and health
- to remove barriers to create centers of excellence by bringing together research and technological platforms, higher education and industry
- to achieve a major urban transformation by harmonizing urban and scientific development



GIANT: Key numbers



GIANT today

6 000 researchers
5 000 industrial jobs
5 000 students
300 inhabitants

GIANT tomorrow

10 000 researchers
10 000 industrial jobs
10 000 students
10 000 inhabitants

100 000 visitors annually

5 000 publications annually

500 patents filed annually

1.8 B€ invested between 2010 and 2015 including

€ 600 million on research and education

€ 600 million on infrastructure

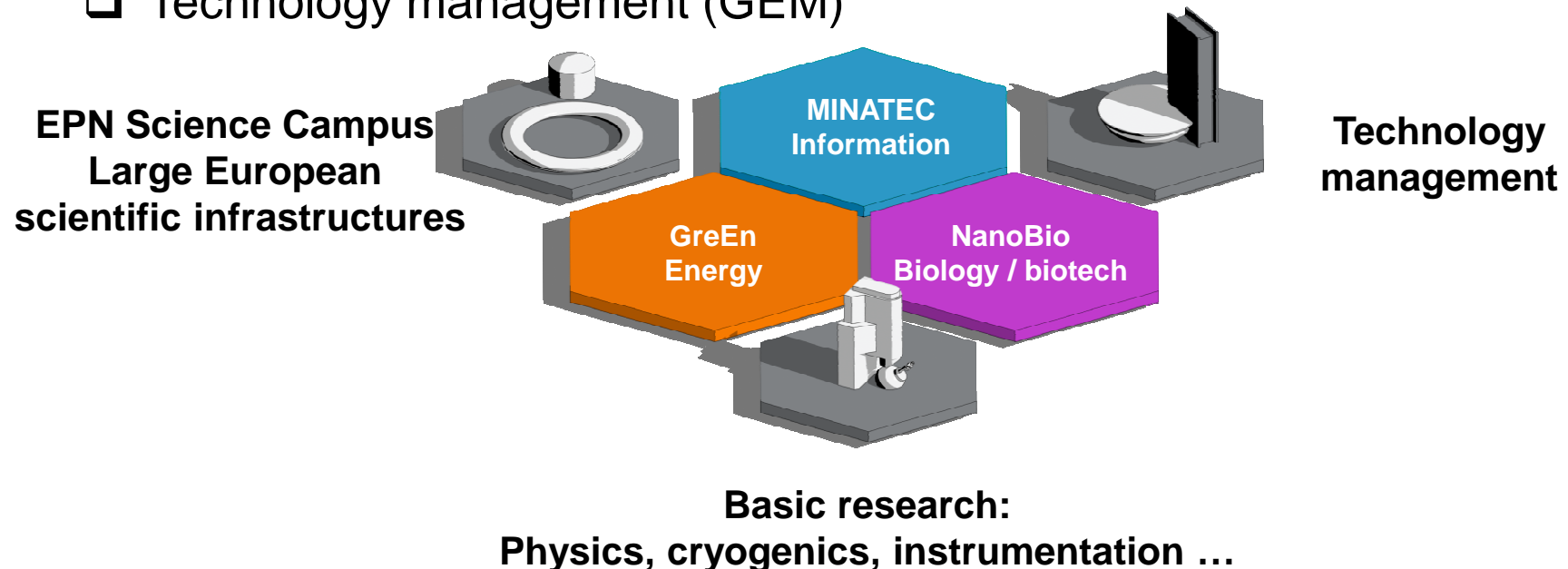
€ 600 million on public transport, accommodation ...

€4 billion annual economic impact

GIANT: Removing barriers to create centres of excellence



- Three technological centres: MINATEC, GreEn, NanoBio
- Three transverse centres:
 - ❑ EPN Science Campus (EMBL, ESRF, ILL, IBS)
 - ❑ Fundamental research (CNRS, CEA, G-INP, UJF ...)
 - ❑ Technology management (GEM)



MINATEC: the model



- Micro and nanoscience, and technology
- Research and development, prototyping/demonstrators, higher education, industrial partnerships ...

MINATEC Platforms



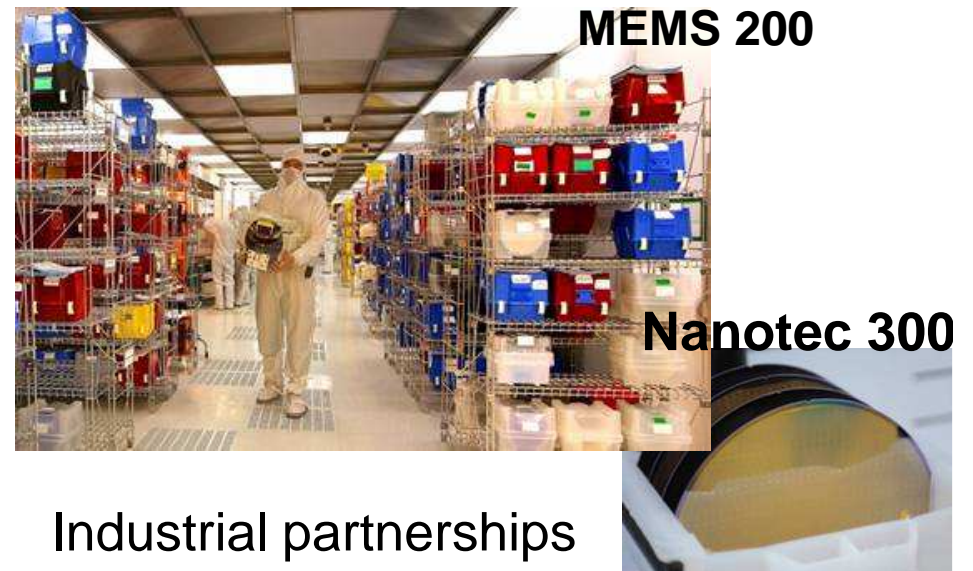
Education and Training



Upstream platforms



Nanocharacterisation platform



Industrial partnerships

Energy storage



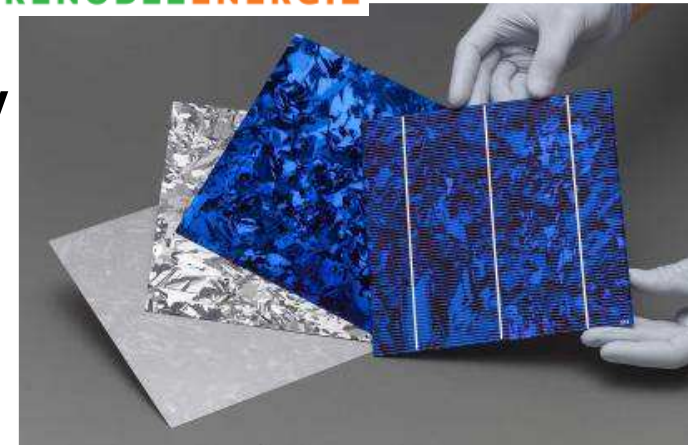
Fuel Cell
Platform



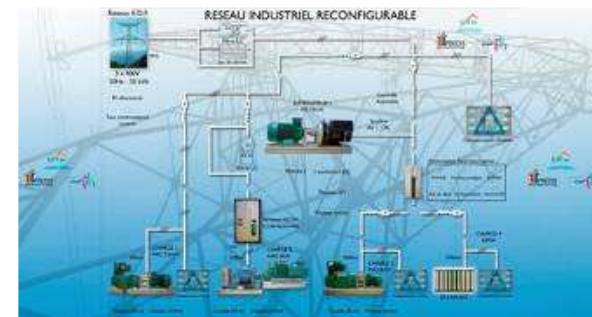
Battery
Platform



Production of renewable energy PV, biomass, wind, hydro-



Energy management / network management / energy efficiency

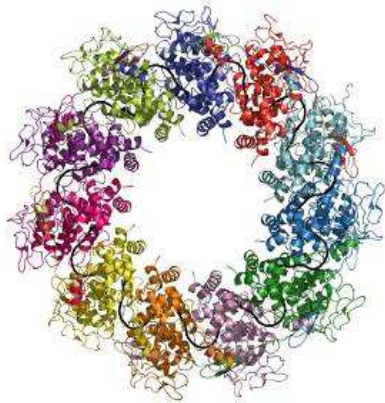
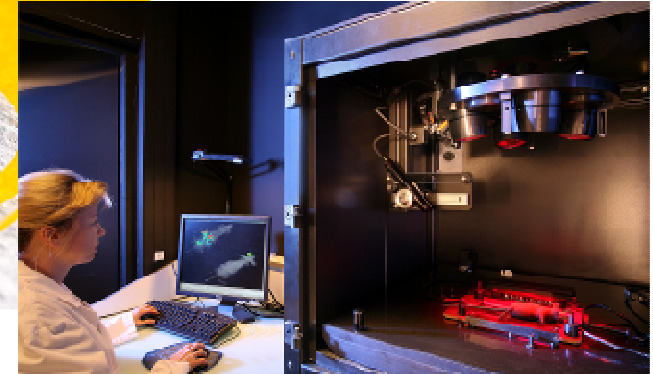
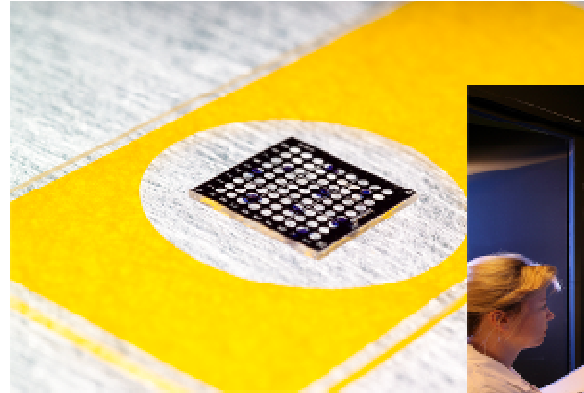


NanoBio biotechnologies and health

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Nanomaterials/nanostructures
to interface "nano-living"
Molecular analysis and imaging



Structural biology at the European level
Partnership for Structural Biology (PSB)
Institut de Biologie Structurale, EMBL, ESRF, ILL

Clinatec

Neuroprosthesis, neurostimulation systems
Systems for localised drug delivery



EPN Science Campus



Institut Laue-Langevin (ILL) operates the most intense (reactor) neutron source in the world, feeding a suite of 40 high-performance instruments

European Synchrotron Radiation Facility (ESRF) is a world-leading synchrotron radiation source hosting 41 cutting-edge experimental stations

European Molecular Biology Laboratory (EMBL Grenoble) is an outstation of the EMBL organisation (HQ in Heidelberg), specialising in research in structural biology

The Institut de Biologie Structurale (IBS) is a research centre in structural biology. The IBS possesses cutting edge facilities and is a partnership between CEA, CNRS and UJF



Fundamental research

Major institutes in Grenoble:

- Institut Néel - National Center for Scientific Research (CNRS)
- Institute for Nanoscience and Cryogenics (INAC)
- Institut de Recherches en Technologies et Sciences pour le Vivant (iRTSV)

And laboratories integrated in the universities and research centres: UJF, G-INP, LPSC, EMBL, ESRF, ILL...



■ Mission

- providing skills and knowledge in pedagogical innovation and applied research
- promoting responsible business practices through expertise in technology and innovation management



**GRENOBLE
ECOLE DE
MANAGEMENT**
TECHNOLOGY & INNOVATION

■ Accreditations

- AACSB International (Association to Advance Collegiate Schools of Business)
- EQUIS (European Quality Improvement System)
- AMBA (Association of MBAs) for its MBA et MIB programs



GIANT from above

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Research -Industry partnerships

➤ GIANT, instigator of synergies between research and industry

Encouraging and facilitating technology transfer from research to industry:

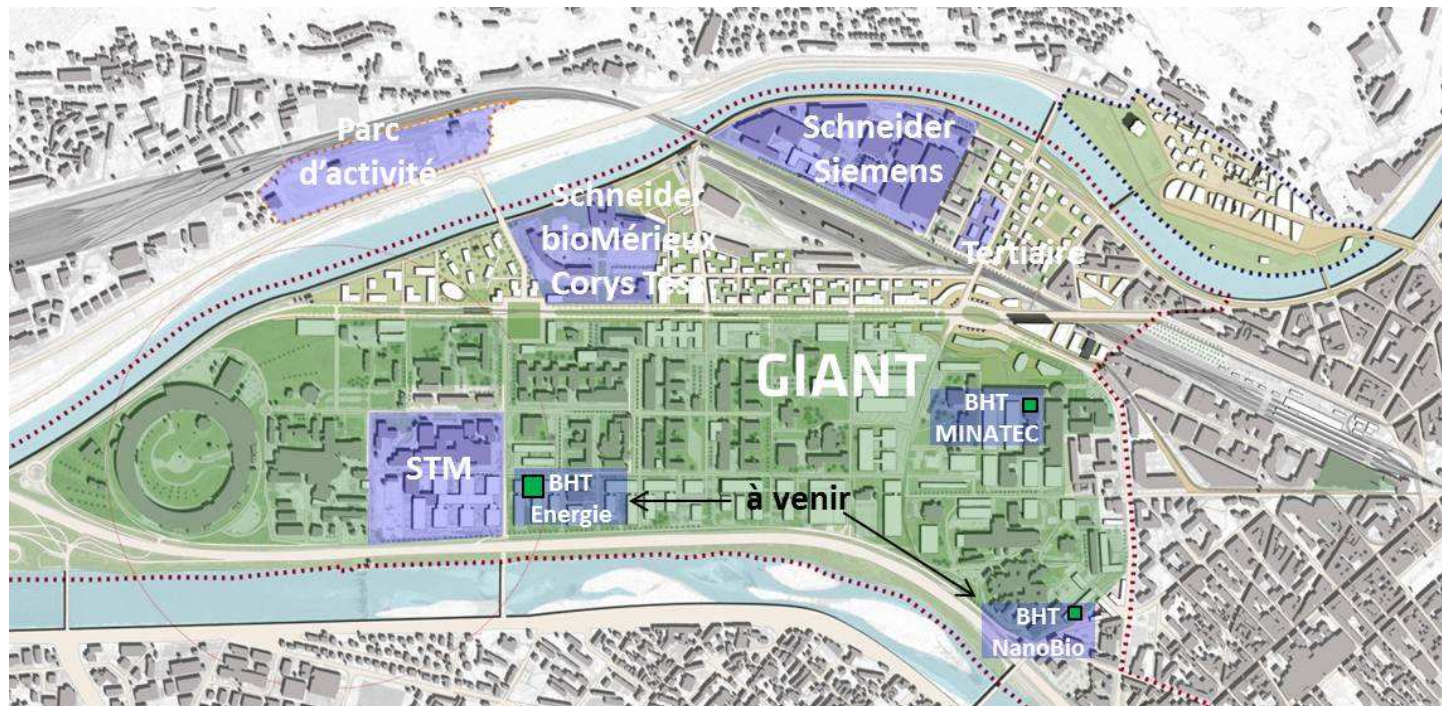
- Technology platforms: covering nanotechnology, biotechnology, and new energy technologies, and hosting cross-disciplinary projects
- A fertile environment for start-ups: support system
56 start-ups launched over the last decade
- Access to maturation funding (Gate1) and business angel networks
- Partnerships with companies (inc. EASYTECH)
- Clusters: MINALOGIC, LyonBioPôle, TENERRDIS, Carnot



Research - Industry partnerships

➤ Industry: a dense concentration

Today, 40 companies representing more than 5,000 industrial jobs are present on the site. Some examples:



Objective : 10,000 industrial jobs

- More than 100 collaborations with start-ups, SMEs and large companies
- Technology platforms

Major urban transformation



- Housing, shops, leisure facilities and transport infrastructures
- A total capacity of over 800 000 m² to be built in the next decades: one of the 3 biggest urban development operations in France



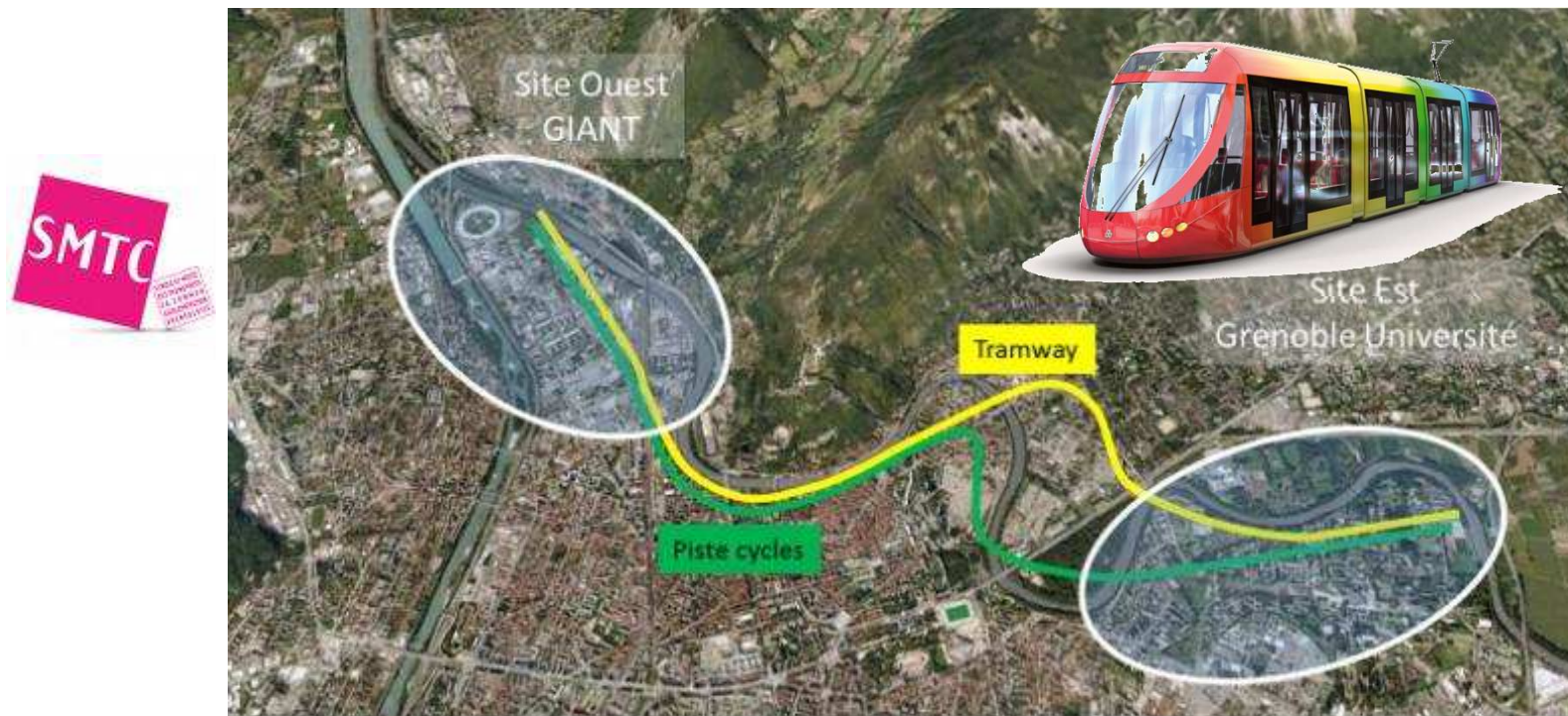
WORK IN PROGRESS

A urban Project

GRENOBLE
PRESQU'ÎLE

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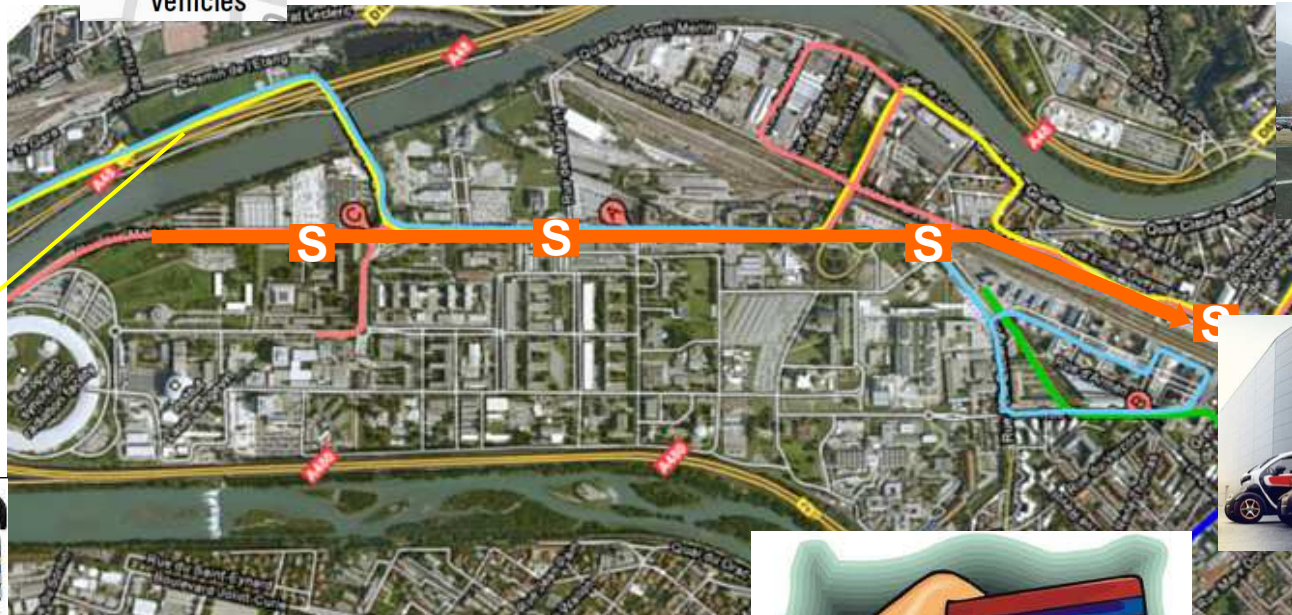
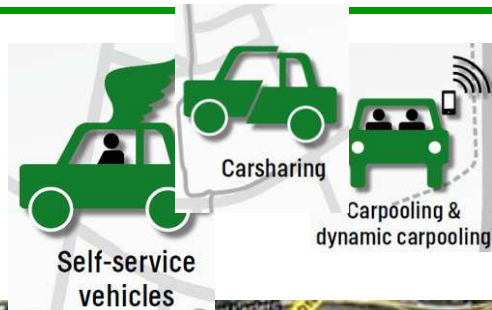
Extension of tram line B - *"La ligne du savoir"*



Environmentally sensitive transport, eco-friendly buildings ...

GIANT: integrated environmentally friendly mobility

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métro vélo



- with a common card

Open Innovation Centre - a gateway to GIANT



“an out of the box environment for collaborative, cross-technologies design, with the best fast prototyping facilities”



Participation of citizens, cultural development, exchange of ideas and information, open laboratories, ...

GIANT 2.0 : 2015-2020

Impact on education, research and innovation, industry, jobs ...

- Open Innovation Center :
Participation of citizens, cultural development
exchange of ideas and information, open laboratories, ...



- Welcome new inhabitants and students

GRENOBLE
PRESQU'ÎLE



Green-ER



PHELMA2

- Continuation of educational and societal projects

GIANT Educational and societal projects



GIANT involvement with school, university students, researchers, industrials

- Training for European Research Council (ERC) candidates
- Researcher Network, Student Network (welcome day, visits, sports ...)
- Industry Connection, GIANT Science and Technology Review
- Nano@school, Synchrotron@School ...
- Junior Scientist & Industry Annual Meeting (JSIAM)
- *100 anniversary of crystallography* (international), *Fête de la Science* (national)
- ...



GIANT International Internship Programme



***Grenoble: a top destination for high level research
and life experience!***

➤ Why an internship programme ?

- To increase the number of international student research experiences at the undergraduate and grad level
- To develop new international collaborations and cooperative projects with top universities

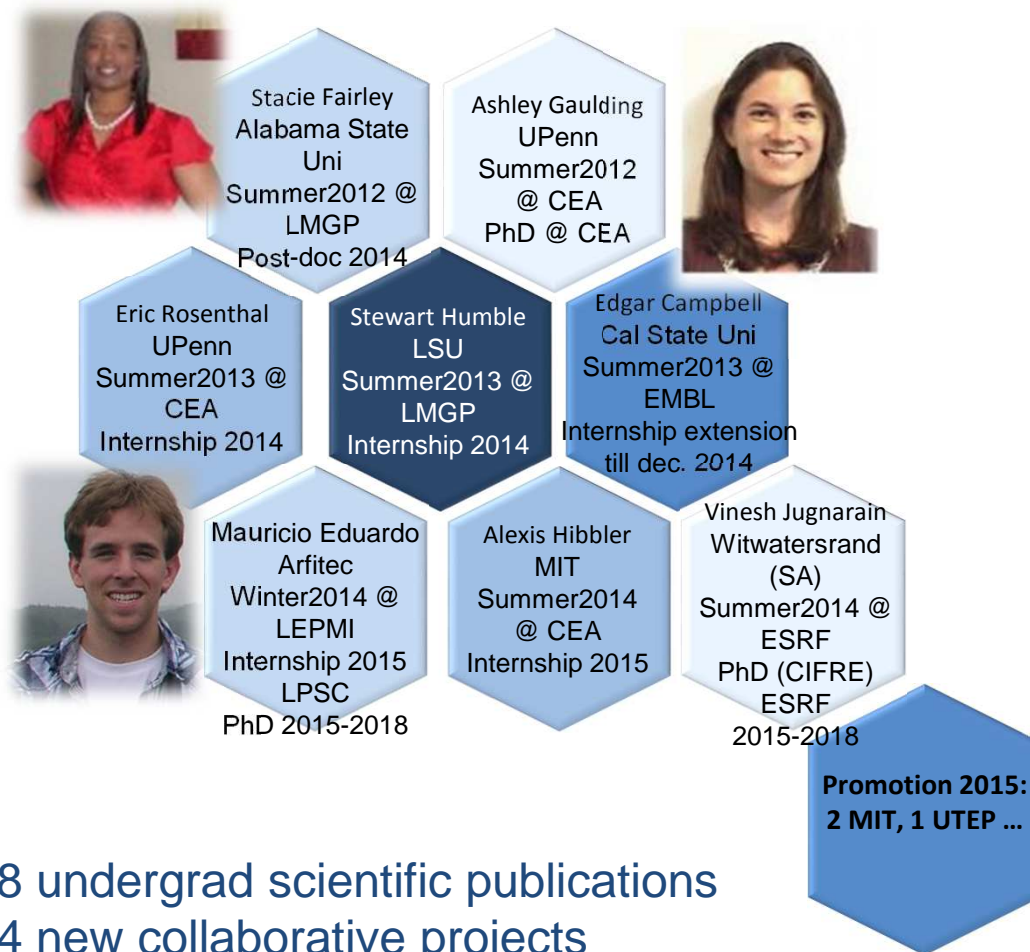
➤ GIIP programme ?

- 10-week research experience / summer and fall sessions
- Scientific seminars, site visits, oral presentations, ...
- French American Workshop (poster presentation)



GIIP : a programme in expansion

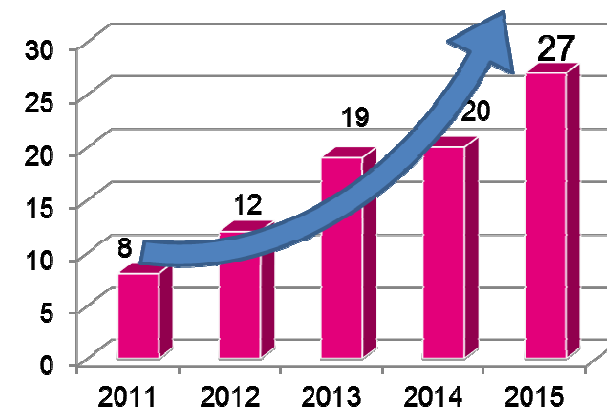
They came back ...



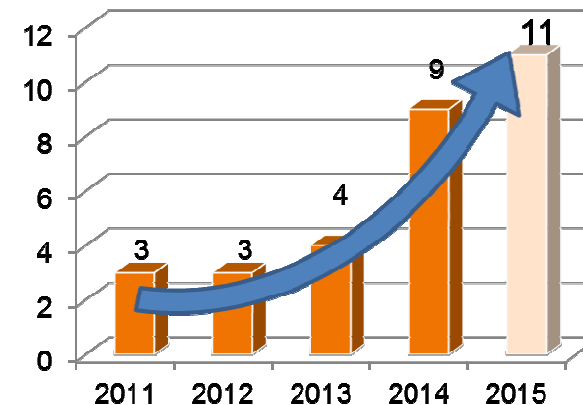
8 undergrad scientific publications
4 new collaborative projects
4 conference presentation – 1 prize

116 students since 2011 !

Summer Session



Fall Session



A special collaboration with UPENN...

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Rhône-Alpes Région 

*nano*SCIENCES
FONDATION 

lanef 
Laboratoire
d'Alliances
Nanosciences-Energies
du futur



... we are looking forward to welcoming you
for the next FAW, June 14-15, 2016 !



<http://www.internships.giant-grenoble.org/>
giip-committee@giant-grenoble.org
<https://www.facebook.com/GIANTIIP>

reAct



ACT1 @ GIANT: HIERARCHICAL STRUCTURES FOR WATER MANAGERMENTS



ACT1's GIANT leader



Remi Dreyfus (CNRS)

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Michel Langlet (CNRS)

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Celine Ternon (G-INP)

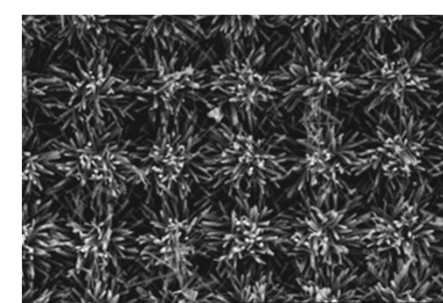
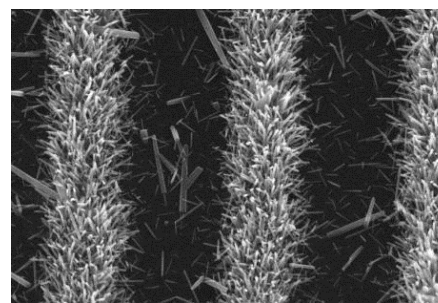
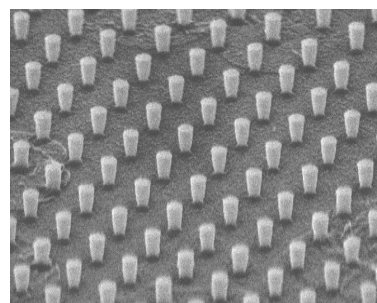
celine.ternon@grenoble-inp.fr

KEYWORDS, CORE COMPETENCES, RESEARCH LINES & APPROACHES

Biomimetism
Bioinspiration
Wet-chemistry
Functions @ Surfaces

Photochemistry
Sol-gel & Hydrothermal Synthesis
Wet (self)assembly of NWs/NPs
Nanosphere lithography

1D/2D/3D Nanoobjects Networks
ZnO nanowires (NWs)
Ag nanoparticles (NPs)
TiO₂ nanoparticles





ACT2 @ GIAN: PREVENTION OF INFECTION TRANSMISSION



ACT2's GIAN leader



Thomas Boudou (CNRS)
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Catherine Picart (G-INP)
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Marianne Weidenhaupt (G-INP)
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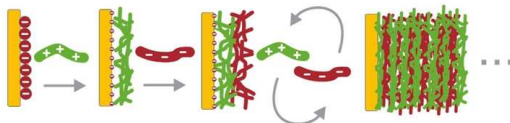


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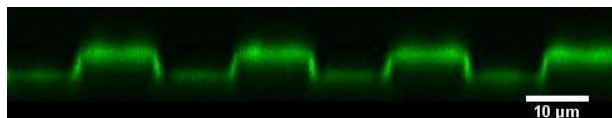
KEYWORDS, CORE COMPETENCES, RESEARCH LINES & APPROACHES

**Biomechanics
Biomaterials**

1. CYCLE n CYCLES LbL THIN FILM



**Layer-by-Layer Assemblies:
Polypeptides/Polysaccharides**

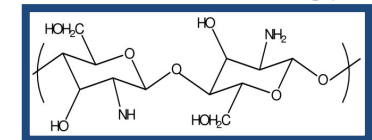
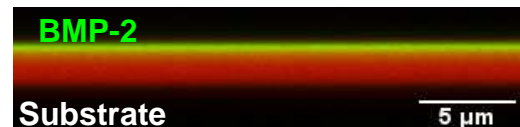


Incorporation of :
Small and Large Biomolecules
Nanoparticles

**Biophysics
Biomaterials**

**Molecular and
cellular biology**

**Molecular and
cellular biology**



**Characterization by physico-chemical and
biophysical techniques :**

AFM (imaging and nanoindentations)

FTIR (including ATR)

QCM-D

Fluorescence spectroscopy

Fluorescence/confocal microscopy

Electron microscopy

Part I: ENERGY GENERATION/HYBRID SOLAR CELLS



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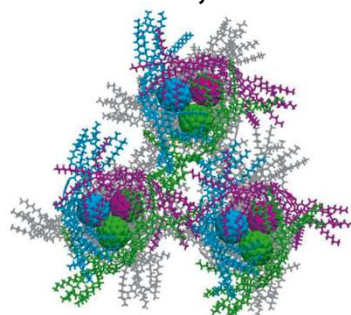
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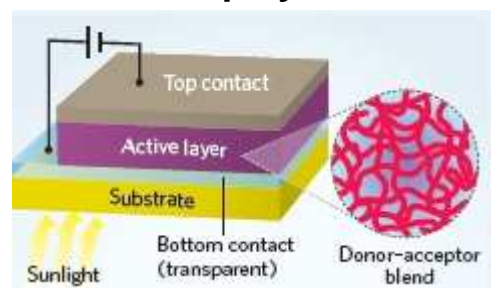


KEYWORDS, CORE COMPETENCES, RESEARCH LINES & APPROACHES

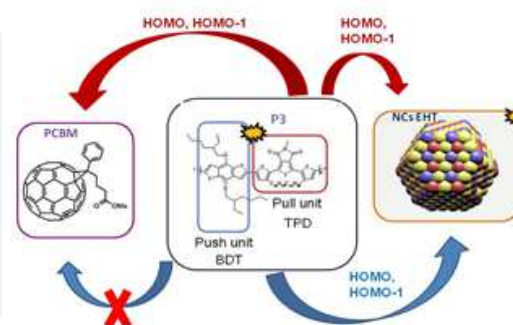
Molecular synthesis
Coordination & supramolecular chemistry
Liquid Crystals
Surfactants
Self-assembly
Fulleroids, Dendrimers



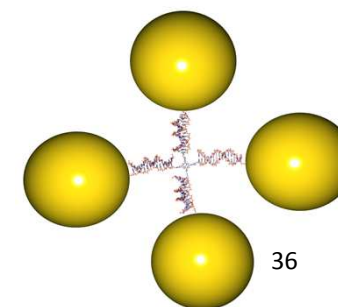
Functional soft matter
Electronic & Energy Transfers
Structure/Property correlations accross many length/time scales
Organic (semi)conductors
Block copolymers



Electronic properties
Electron Paramagnetic Resonance
Molecular architectures, EPR tracing, Spin trapping



Biorganic synthesis
DNA
DNA engineering
DNA self-assembly
DNA conjugaison
DNA-NPs nanohybrides



Part II: ENERGY STORAGE



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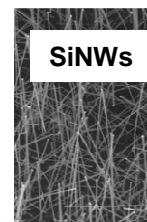
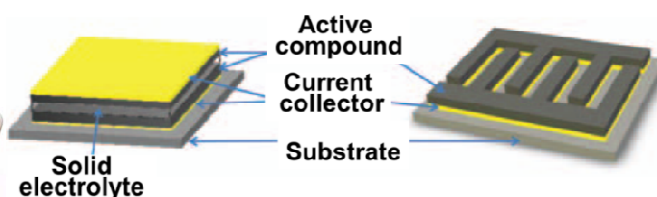
KEYWORDS, CORE COMPETENCES, RESEARCH LINES & APPROACHES

Bio/Soft matter
in situ
and/or
operando
multiscale characterizations
Neutron Scattering
X-Ray Scattering

Functional soft matter
Multiscale
ionic transport
in situ and/or operando
characterizations
Single-Ion
Block Copolymers

Electrochemistry (Macro)Molecular Engineering
Electronically and ionically
Conducting polymer
Electron transfers
Si NWs & Nanotrees
Supercapacitors
Battery

Ionically conducting
polymer
Controlled polymerization
Single-Ion
Block Copolymers
Battery



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Merci pour votre attention

Thank you for your attention

