French-American Workshop 2015
Invitation

GIANT INNOVATION CAMPUS

Grenoble, Maison MINATEC
June 15-16

FRENCH AMERICAN WORKSHOP

A BRIEF OVERVIEW OF THE SCOPE AND ACTIONS OF:

THE NANOSCIENCES FOUNDATION & THE LABEX LANEF

nano SCIENCES FONDATION

lanef Laboratoire d'Alliances Nanosciences-Energies du futur

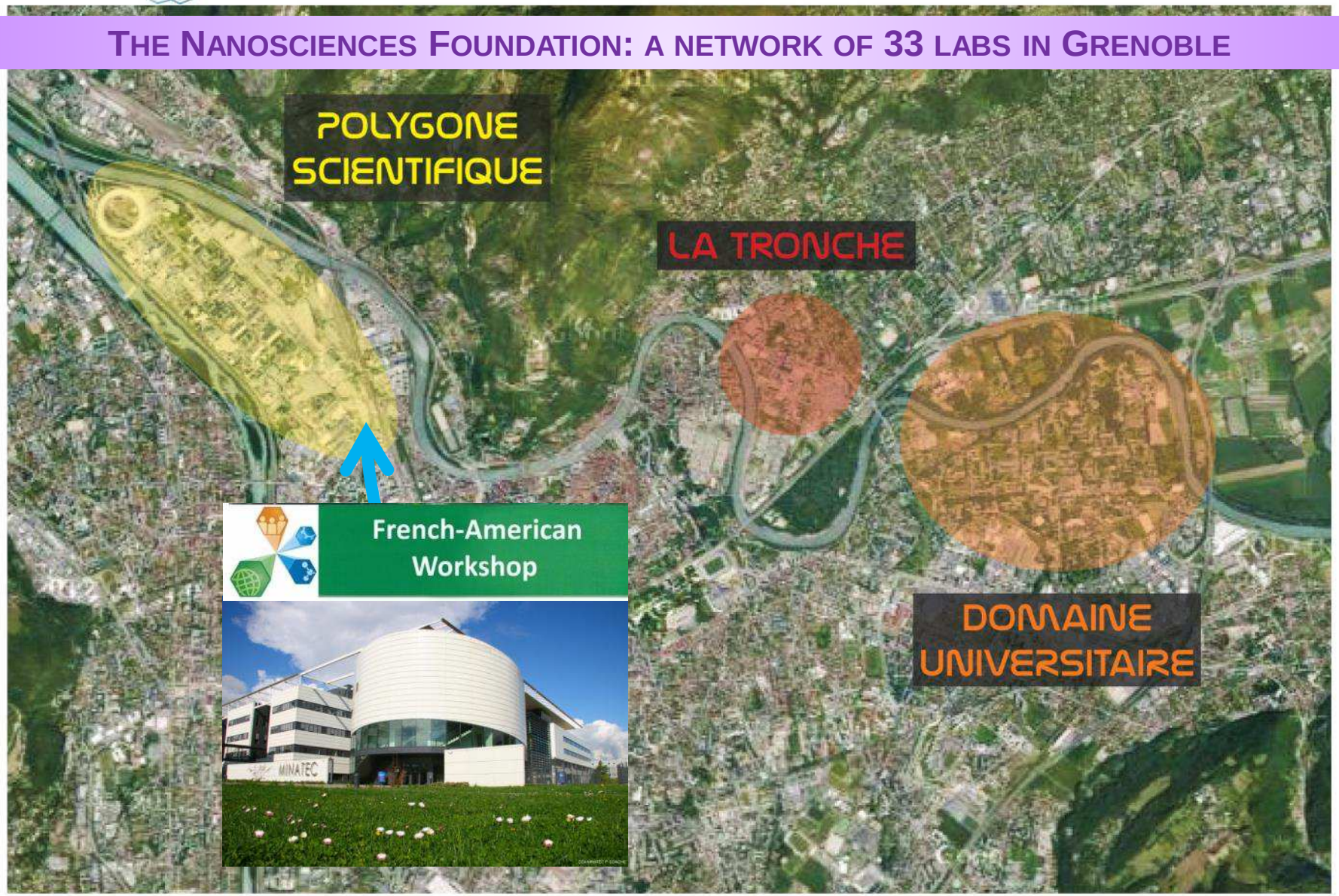
By Stéphanie MONFRONT
Head of Development & Communication

RESEARCH FUNDING AGENCIES……

MARIE CURIE **ACTIONS**

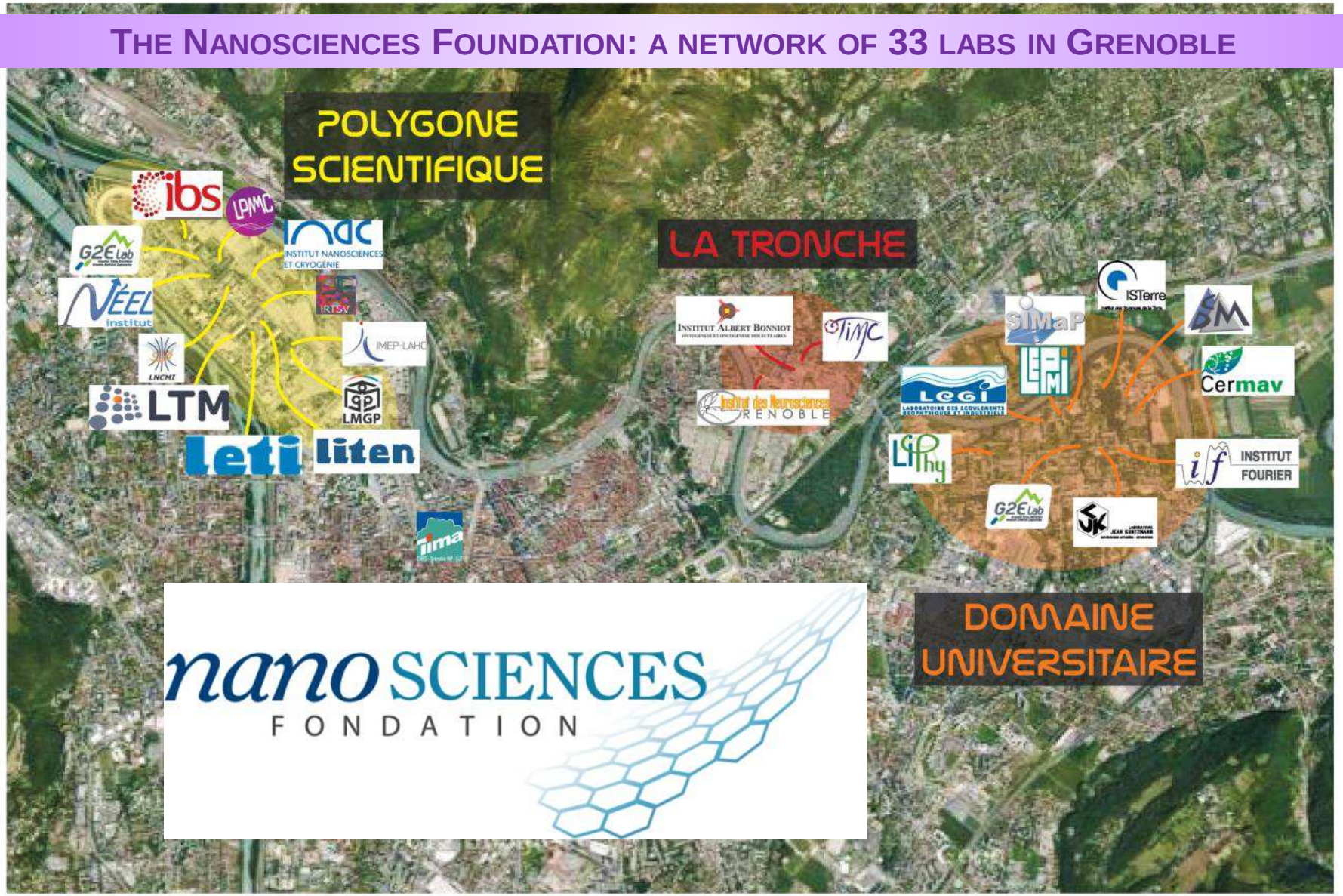
Opening new horizons

THE NANOSCIENCES FOUNDATION: A NETWORK OF 33 LABS IN GRENOBLE



RESEARCH FUNDING AGENCIES……

THE NANOSCIENCES FOUNDATION: A NETWORK OF 33 LABS IN GRENOBLE



RESEARCH FUNDING AGENCIES……

LABEX LANEF : A NETWORK OF 5 LABS IN GRENOBLE

RESEARCH FUNDING AGENCIES……

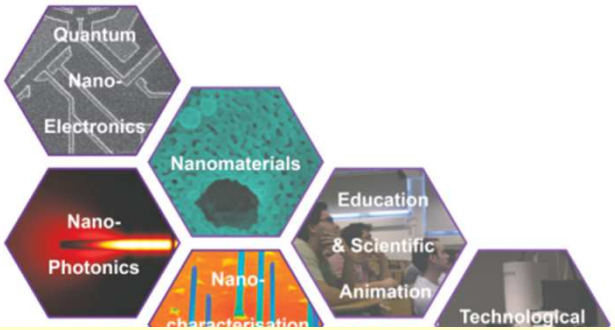
nano SCIENCES FONDATION	lanef Laboratoire d'Alliances Nanosciences-Energies du futur
2007	2011
33 labs	5 labs
Nanosciences	Nanosciences & Energies
10 thematics workgroups	9 alliances

Calls for projects / Evaluation by steering committee for research based in Grenoble

nano SCIENCES
FONDATION

Alain FONTAINE, Director

THREE LEADING COMMITMENTS TO DRIVE THE FOUNDATION



→ **NETWORKING: Human resources**

- **international recruitment**
  chairs of excellence: top level scientists
  outstanding PhD students & post-doctoral fellows

→ **NETWORKING: investment**

- **upgrading** experimental facilities to the current international level,
- **full sharing** by the Grenoble scientific community

→ **NETWORKING: a challenge, for all the laboratories:**

dedicated to basic research as well as those dedicated to R&D

- to achieve a local **better integration**
- to **boost the ecosystem** in Grenoble

nano SCIENCES FONDATION

The Foundation focuses its action on:

8 Fields of Excellence

- → *Quantum Nanoelectronics*
- → *Nanomagnetism and spin electronics*
- → *Nanophotonics*
- → *Molecular Electronics*
- → *Nanomaterials & nanostructuration*
- → *Nanocharacterization and metrology*
- → *Nano approaches to life sciences*
- → *Nanomodeling and simulation*

Transfer & innovation to

- **Nanoelectronics**
- **Biology and Healthcare**
- **Energy & Environment**

Intellectual property

10 Working Groups

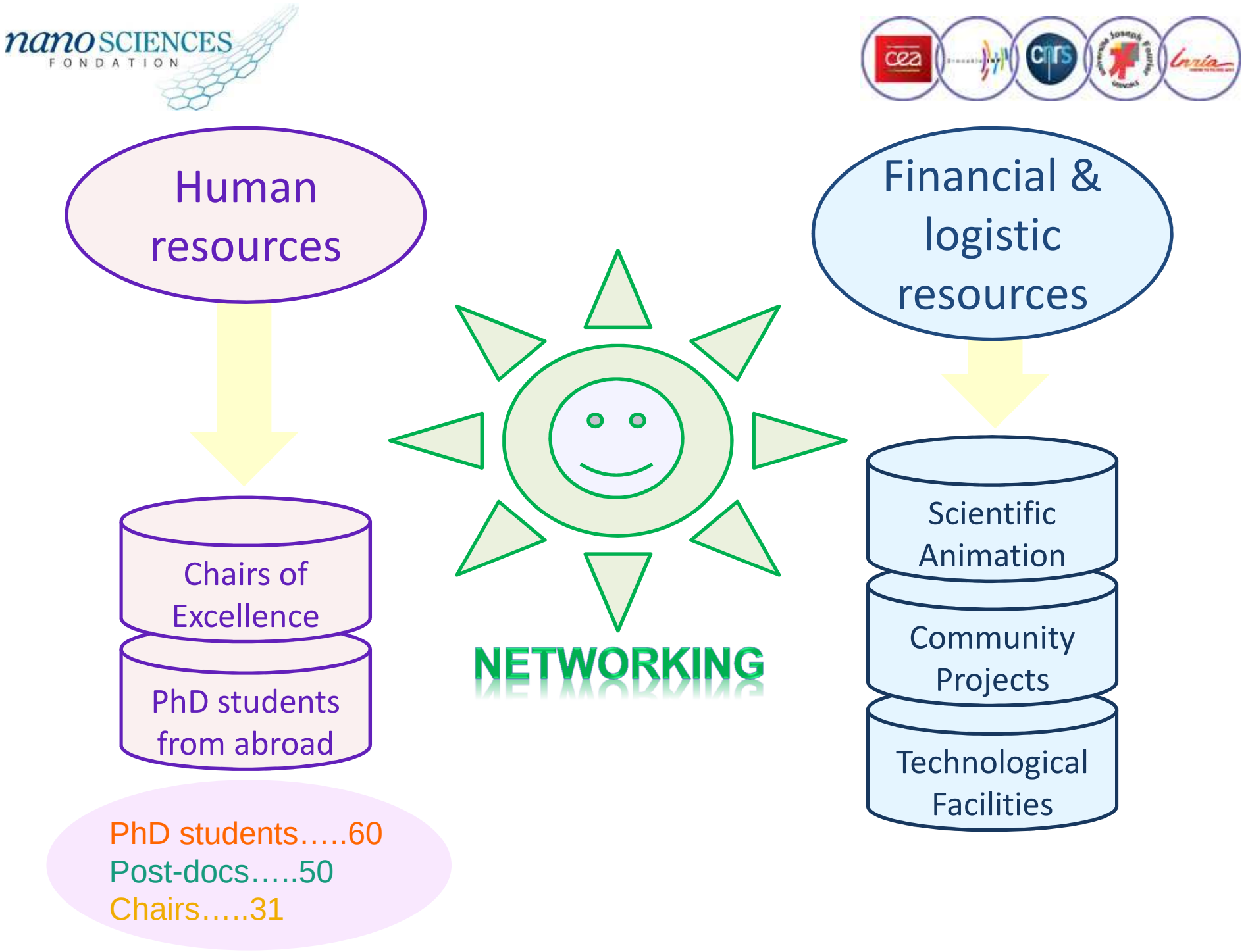
Steering Committee

Technological Platforms : shared-use facilities

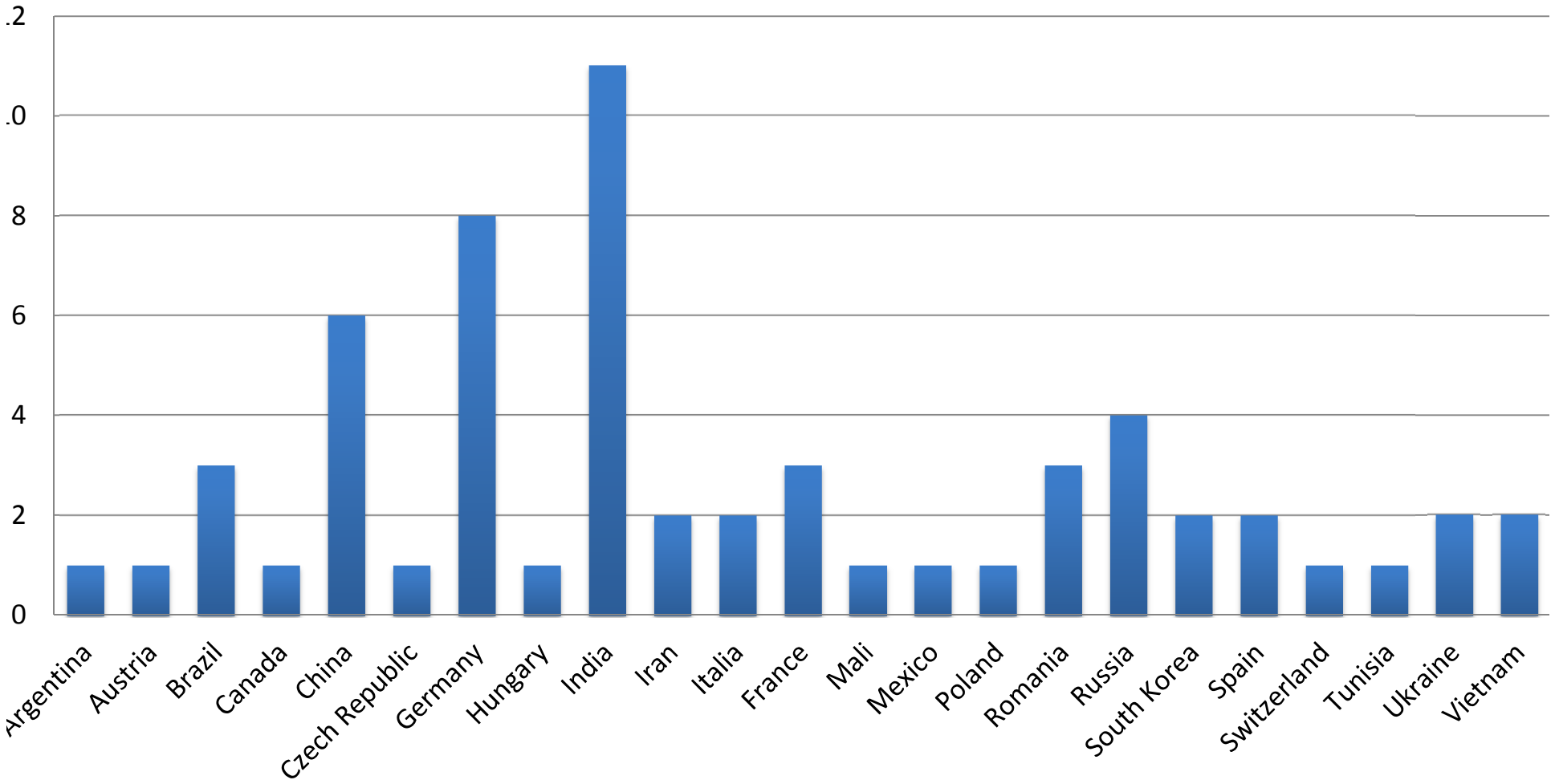
- → *Nanoscale fabrication*
- → *Nanocharacterization*
- → *Theory and simulation*

Education and Scientific Animation

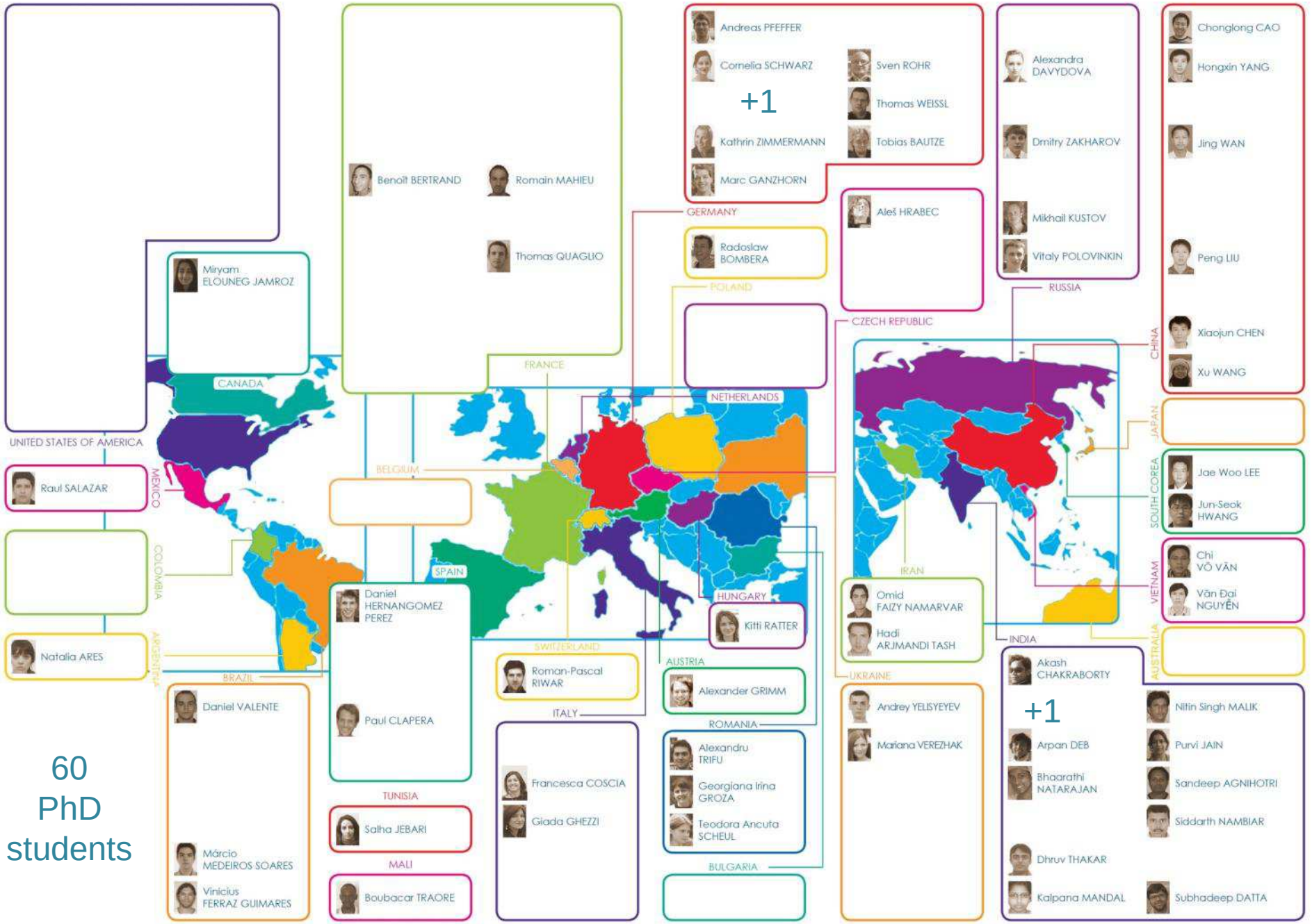
- → Doctoral schools / Summer schools (ESONN, HERCULES)
- → Workshops, seminars, conferences


nano SCIENCES
FONDATION
Human resources
Financial & logistic resources
Chairs of Excellence
PhD students from abroad
NETWORKING
Scientific Animation
Community Projects
Technological Facilities
PhD students…..60
Post-docs…..50
Chairs…..31

60 PhD students recruited over 23 countries: 2007-2015

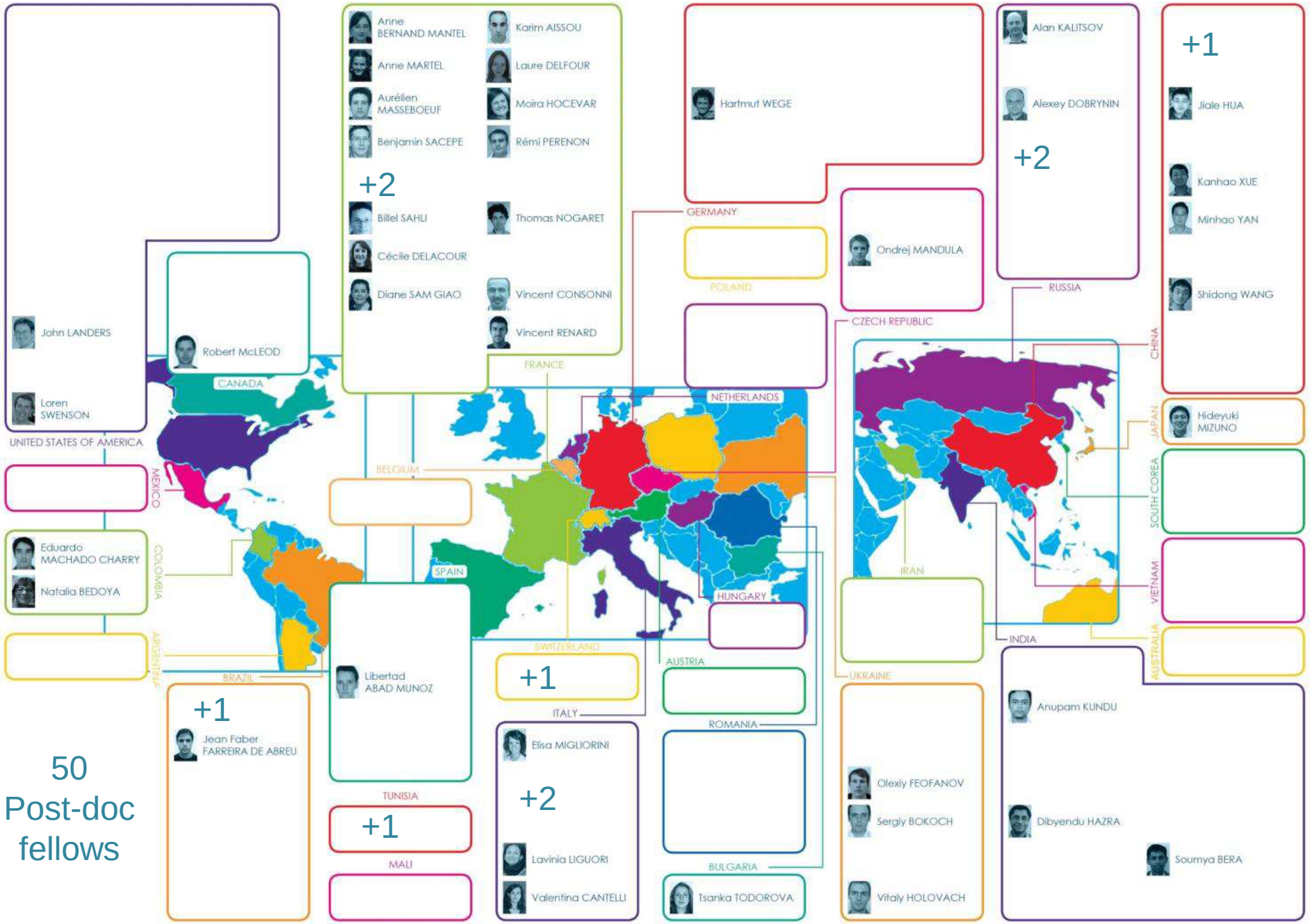


nano SCIENCES



60
PhD
students

nano SCIENCES



50
Post-doc
fellows

nano SCIENCES

Jukka P. PEKOLA

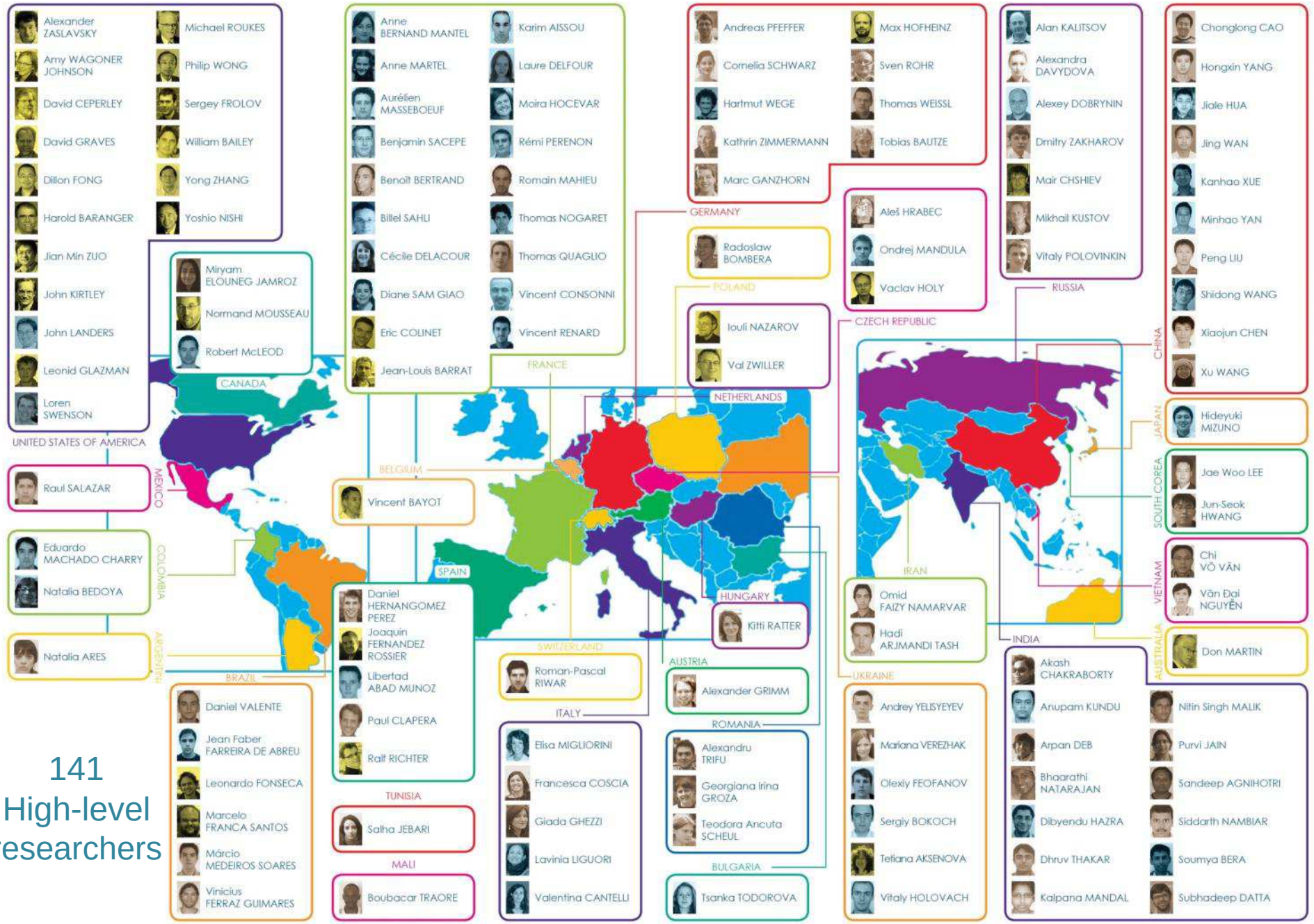
Finnish, 56 years old

Academy Professor,
Academy of Finland

Aalto University
School of Science

31
Chairs
Of
Excellence

nano SCIENCES



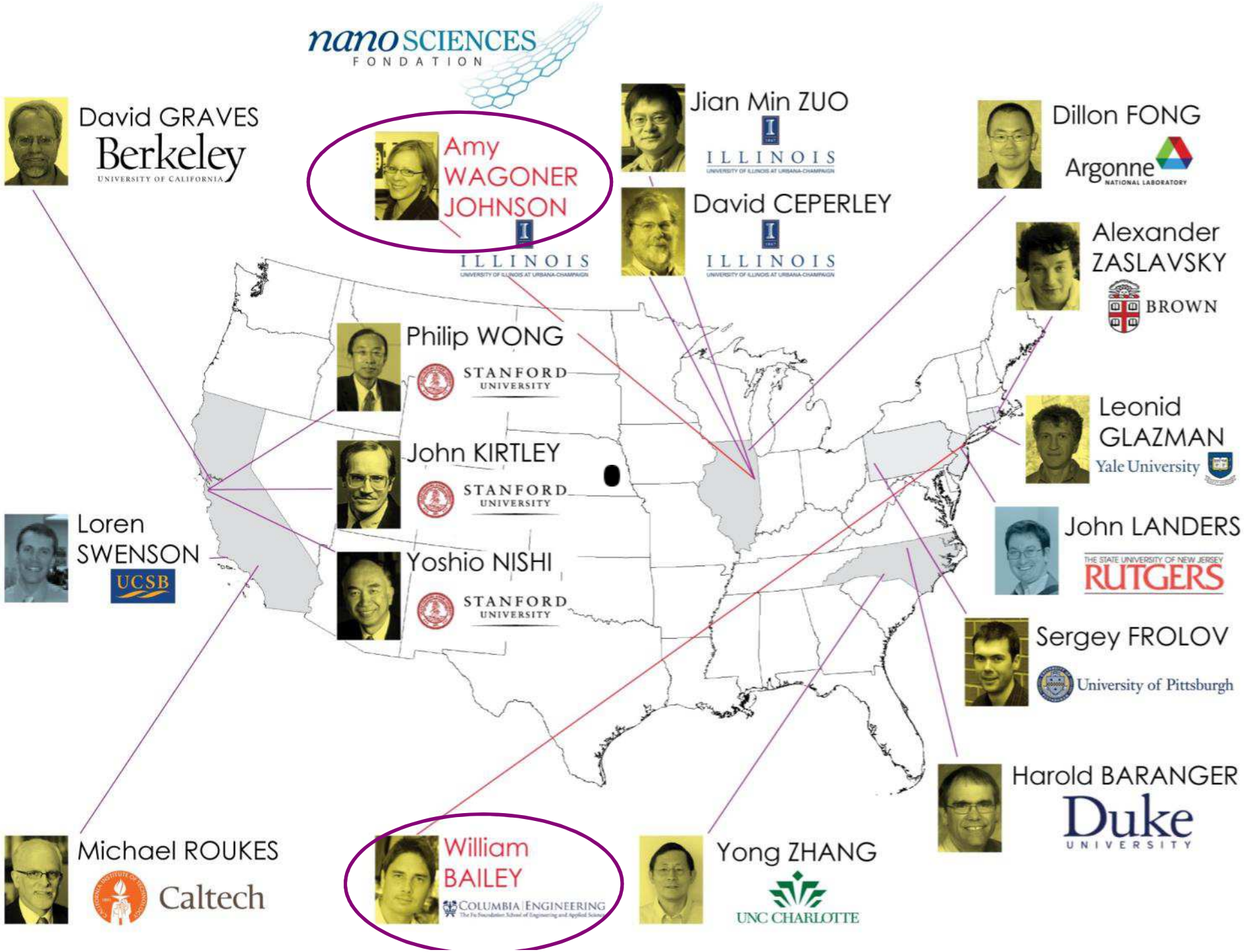
141
High-level
researchers

CROCUS Technology
Blossoming future

nano SCIENCES
FONDATION

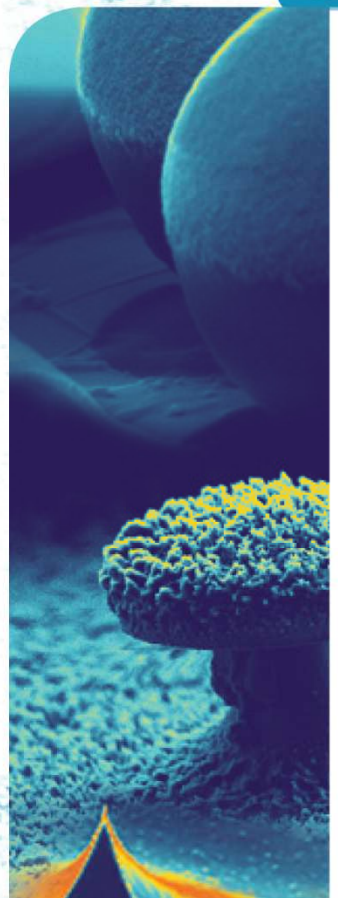
NETWORKING BOOSTED BY THE FOUNDATION'S **31 CHAIRS OF EXCELLENCE** LAUREATES.

- LPMMC
- IBS
- FMNT = IMEP + LMGP + LTM + SPINTEC
- East Campus = CERMAV + DCMI + SIMaP + TIMA
- Health Campus= IAB + TIMC-IMAG
- LÉTI
- INAC
- Institut Néel


nano SCIENCES
FONDATION
David GRAVES
Berkeley
UNIVERSITY OF CALIFORNIA
Amy
WAGONER
JOHNSON
ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
Jian Min ZUO
ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
David CEPERLEY
ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
Dillon FONG
Argonne
NATIONAL LABORATORY
Alexander
ZASLAVSKY
BROWN
Philip WONG
STANFORD
UNIVERSITY
John KIRTLEY
STANFORD
UNIVERSITY
Yoshio NISHI
STANFORD
UNIVERSITY
Leonid
GLAZMAN
Yale University
Loren
SWENSON
UCSB
John LANDERS
THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS
Sergey FROLOV
University of Pittsburgh
Harold BARANGER
Duke
UNIVERSITY
Michael ROUKES
Caltech
William
BAILEY
COLUMBIA | ENGINEERING
Yong ZHANG
UNC CHARLOTTE

2015 PhD. Program
Call for application

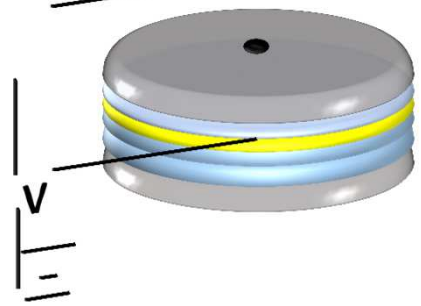
nano SCIENCES FONDATION



And the winners are…

Optimization of Parameters for realizing a Voltage Tunable Magnetic Sensor

An approach to tune the range and sensitivity of sensors



Titiksha SRIVASTAVA

Supervisor: Claire BARADUC, Hélène BEA at Spintec CEA
Co-Supervisor: Anne BERNAND-MANTEL at Institute Néel

Challenges

1st year

Optimization of Structure
- Anisotropy of free layer
- Barrier thickness with defined resistance

Making the structure more sensitive to electric field
- Separate Spin transfer torque effect

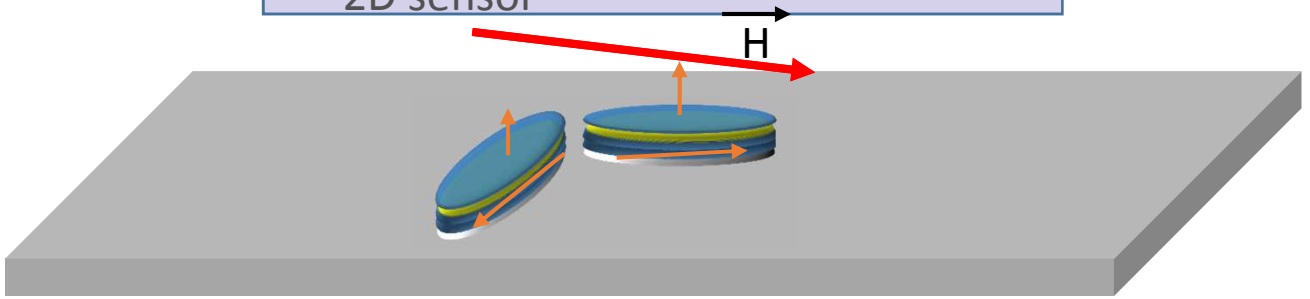
2nd year

Effect of temperature
- Ensure working temperature range (-20 – 40°C)

Influence of domain walls
- To study its influence on the working of the device

3rd year

Final Optimization
- Tuning the device size
- Measurement of sensitivity and detectable field range
- 2D sensor



Scanning single electron transistor microscopy on two dimensional electron systems

Jorge P. Nacenta Mendivil

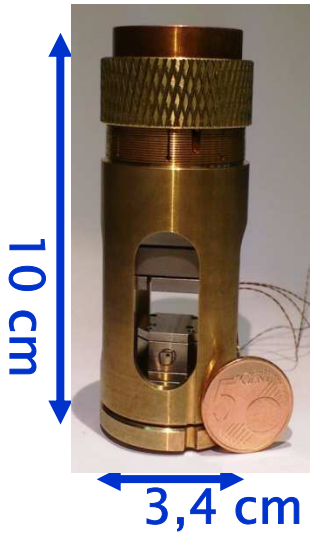
Under Supervision of:

Roman Kramer

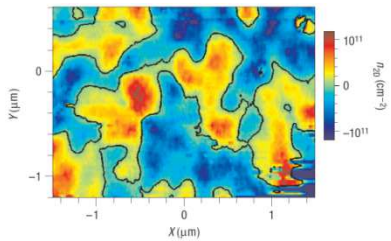
Laurent Lévy

Institut Neel (CNRS)

Quantum Coherence Team



➔ Pioneer in Europe,
2nd in World (Yacoby, Harvard)



SET, Yacoby ,Havard
Work on GaAs and graphene

Electron–hole puddles, Nat. Phys. (2008)
Fractional quantum Hall states, Science (2012)
Electron– hole asymmetric integer and fractional quantum Hall effect, Science (2014)

Why this project?

- **Microscope unique en Europe**

- **New materials: Topological Insulator**

- **Multi disciplinar**
  - **Probe microscopy**
  - **Nano fabrication**
  - **Cryogenics**
  - **Nanoelectronics**
  - **Superconductivity**
  - **Magnetism**

Why me?

- **Ready from the beginning**
  - **Charge detection EFM**
  - **Tuning fork**
  - **Electronics**
  - **Nano fabrication**

Why here?

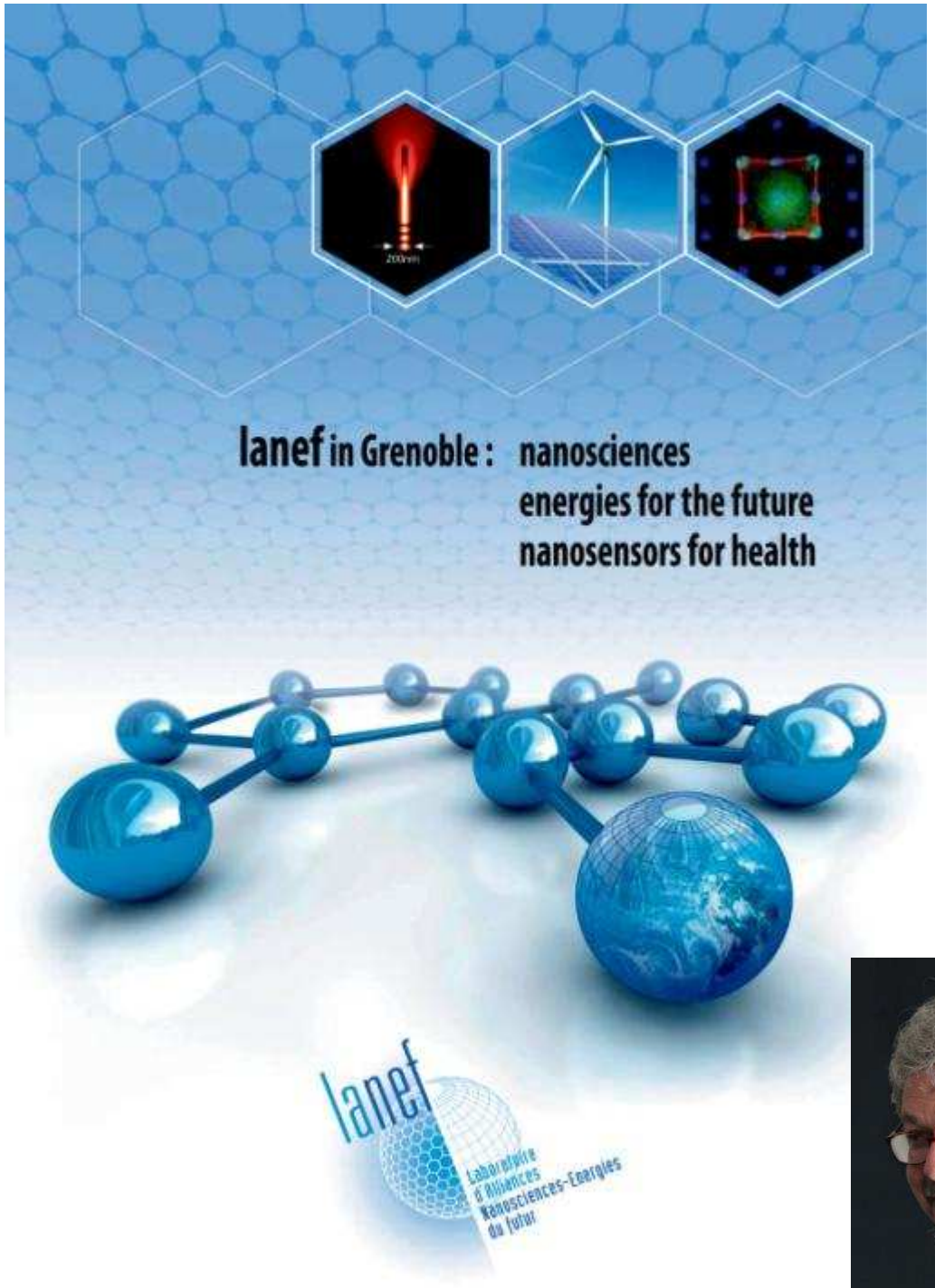
Totally dedicated Lab
- **Low temperature**
- **High magnetic field**
- **Accesible Nanofab clean room**
- **Expertise**
- **Ready samples**

- **Why you?**

Nanosciences Foundation is the perfect environment for the instrument

Applications in several working groups:
- **Topological insulators** Ph. Ballet CEA LETI
- **Metal/Insulator transistion** B. Sacépé NEEL,C. Chapelier INAC
- **Gate dielectrics** M. Kogelschatz LTM

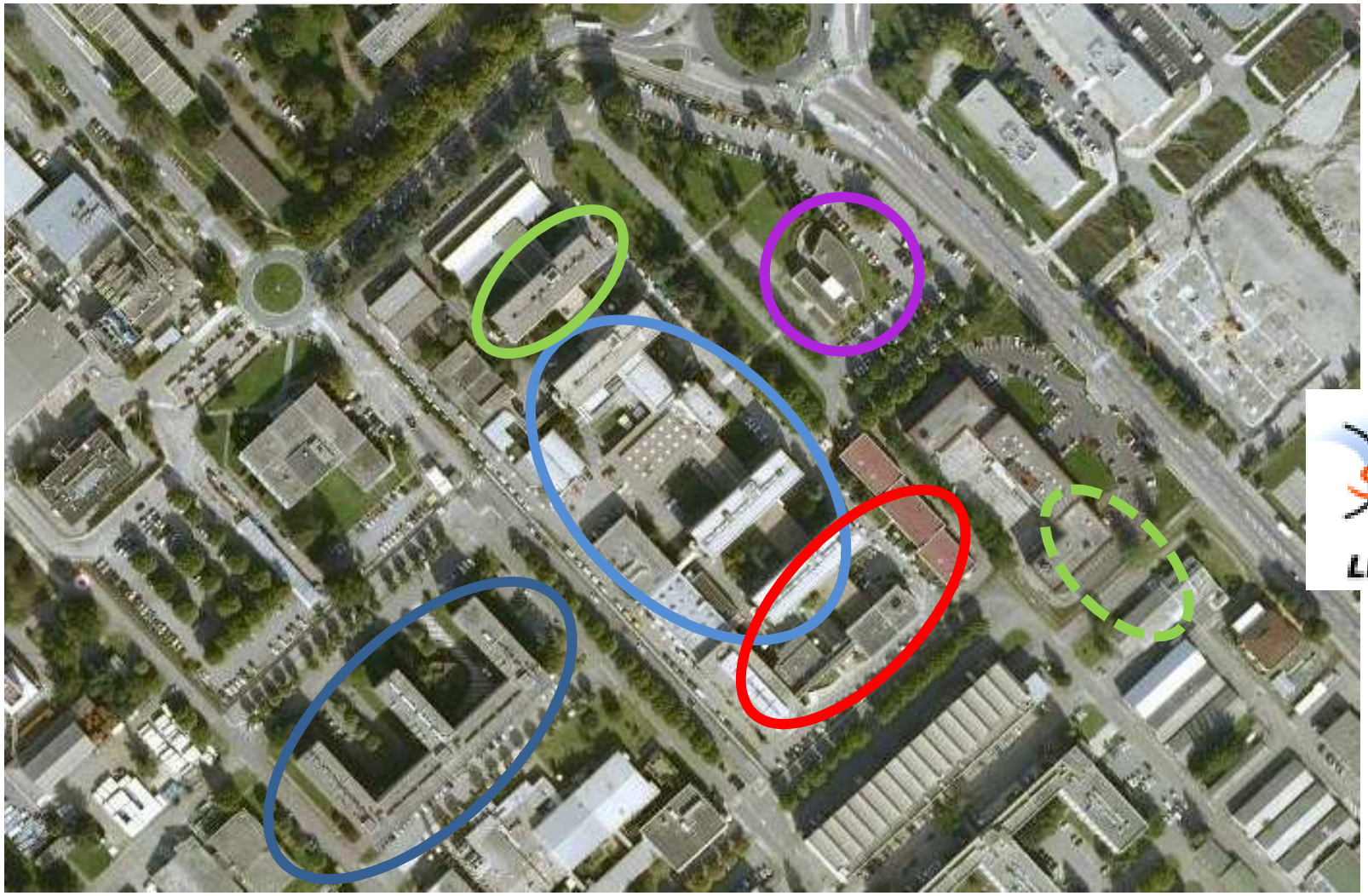
Future directions:
- **Superconductivity, magnetism**



PRES - Université de Grenoble

lanef
Laboratoire d'Alliances Nanosciences-Energies du futur

Joel CIBERT, Director



740 scientists, engineers, technicians
390 PhD students and postdocs

New facilities & premises for the LANEF labs

> The NEEL's new building dedicated to research in nanosciences , inaugurated in April 2013.

> A part of the "Plan Campus", the GreEn-ER building, in May 2015, is almost ready to host the G2ELab.

LANEF

Nanosciences & Information | **Energy** | **Health & biology**

Alliance 1	Alliance 2	Alliance 3	Alliance 4	Alliance 5	Alliance 6	Alliance 7
Photonics & Semi-Conductors	**Spintronics & Nano-Magnetism**	**Quantum Nano-Electronics**	**Breakthroughs for Electrical Energy**	**Advanced Super-Conductivity From basics to applications**	**New Frontiers In Cryogenics**	**Nanosensors & Nanomaterials For Healthcare & Biology**

Alliance transverse **Theoretical and computational physics**

Alliance transverse **Facilities**

INSTITUT NANOSCIENCES ET CRYOGÉNIE

LPMC laboratoire de physique et de modélisation des milieux condensés

NÉEL institut

LNCMI

G2Elab Grenoble Génie Electrique Grenoble Electrical Engineering

Alliances | Events | Calls | Jobs | Outcomes | Partners | Contact

lanef — Laboratoire d'Alliances Nanosciences-Energies du futur

INAC INSTITUT NANOSCIENCES ET CRYOGÉNIE — LPMC laboratoire de physique et de modélisation des milieux condensés — NÉEL institut — LNCMI — G2Elab

Calls

- Ongoing calls
  - LANEF Predoc Program
  - LANEF PhD Program
  - Chairs of Excellence
- Results of previous calls
  - PhD Program
  - Chair of Excellence

sfp.grenoble.cnrs.fr
Agenda 38 des sciences

20 / 06 / 2014 - 11h00
> LDA+DMFT APPROACH TO MAGNETOCRYSTALLINE ANISOTROPY OF STRONG MAGNETS
24 / 06 / 2014 - 15h00

Grant of 8000€. Application by Mid-March

Grant of 1450 €/month during 36 months.
Application by Mid-April *or* early October

Full time or part time position in Grenoble.
From 300k€ to 400k€.
Recruitment of PhD student &/or post-doc
Small equipment
Usual running costs (travels, conferences, etc…)

Predoc program 2015

successful students

Grant of 8000€: “To support excellent students who want to do the 2nd year of their Master degree (M2) at the University Joseph Fourier with the goal of pursuing a PhD thesis on a topic developed within one of the 5 LANEF laboratories.”

Ammar	CHAFI	Algeria	M2R : Energie Electrique (French)	Impact of distributed generation on the power system transient stability
Aurelian	JOHN HERPIN	France	Erasmus mundus of Nanosciences & Nanotechnologies Spec. Nanobiotechnologies	Development of electronic noses (gas sensing)
Barbora	LAVIČKOVÁ	Czech Republic	Erasmus mundus of Nanosciences & Nanotechnologies Spec. Nanobiotechnologies	Design and characterisation of an Electrochemical detection coupled to Magnetic immunoassays
José	SAYRITUPAC	Venezuela	Electrical Engineering for smart grids and buildings	A stochastic approach of the trial result of DREAM Project, considering the effectively of the control in the self-healing algorithm





SPRING 2012
FALL 2012






SPRING 2013
AUTUMN 2013

PhD program 2014
successful students

		Full Name	Alliance(s)	Thesis subject	Supervisor Name	Labs
SPRING 2014		Sarah DELSHADI	Alliance 2 Alliance 7	Fast point-of-care diagnostic immuno-assay exploiting magnetic nano-particles, structured μ-magnet arrays, and integrated electrochemical μ-detectors	Ophélie CUCAT	NEEL G2Elab
		Michael DING	Alliance 8	Dislocation Electronic Structure Modelling for Optical Properties Prediction in Photovoltaic Materials	Pascal POCHET	NEEL INAC
		Magatte GUEYE	Alliance 4	Printable and flexible thermoelectric generator for low temperature applications: material and process developments	Alexandre CARELLA	INAC
		Tobias SATTLER	Alliance 1	Ovoid ring optical resonators for microlasers and ultrafast all-optical switching	Jean-Michel GERARD	NEEL INAC
		Michel STANO	Alliance 2 Alliance 8 Alliance 9	Spin-Hall-effect-driven domain wall motion in ferromagnetic core-shell nanowires	Olivier FRUCHART	INAC NEEL
		Katharina ROJAN	Alliance 1 Alliance 8	Strongly correlated photons in cavity arrays	Anna MINGUZZI Maxime RICHARD	NEEL LPMMC
AUTUMN 2014		Daria BEZNASYUK	Alliance 1 Alliance 2 Alliance 8 Alliance 9	High-mismatch Si/InGaAs nanowire heterostructures for quantum optics	Moira HOCEVAR	NEEL INAC
		Lorenzo CAMOSI	Alliance 2 Alliance 8	Materials and physics of magnetic skyrmions in ultrathin structures with absence of inversion symmetry	Jan VOGEL	NEEL INAC
		Javier PUERTAS MARTÍNEZ	Alliance 3 Alliance 5	Quantum collective effects in superconducting circuits	Nicolas ROCH	NEEL INAC
		Mo Abdul Aziz SUZON	Alliance 1 Alliance 4	Bandgap engineering in kesterite thin-film solar cells	Henri MARIETTE	NEEL Lite

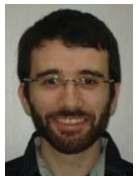
PhD program 2015 - Successful students

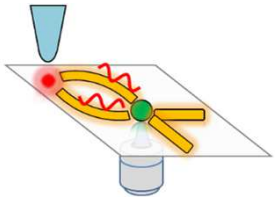
Integrated Forest of Structured Silicon Nanowires For Thermoelectrics

Dhruv SINGHAL, Indian
INAC/SP2M
Alliance 3

From SFG to SPDC in hybrid nonlinear plasmonics

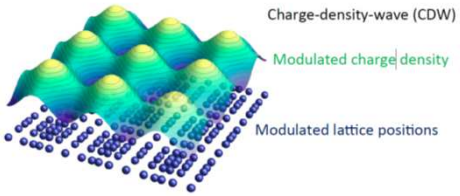
Nicolas CHAUVET, French
Institut Néel / Nano
Alliance 1





NMR study of charge ordering phenomena in high temperature superconductors

Igor VINOGRAD, German
LNCMI
Alliance 5



First steps towards the spatial cryorefrigerators miniaturization

Arkadii SOCHINSKI, Russian
INAC/SBT & LEGI
Alliance 6

Iontronics

2012

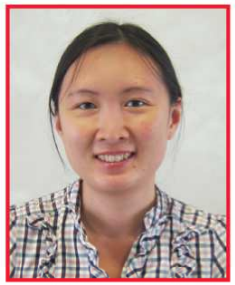

Principal investigators

Shimpei ONO (CRIEPI, Chair of Excellence), Johanna SEIDEMANN (PhD student), Benjamin SACÉPÉ (NEEL, Grenoble contact), Thierry KLEIN (NEEL, PhD supervisor), Etienne BUSTARRET (NEEL), Vincent BOUCHIAT (NEEL), Dominique GIVORD (NEEL), Laurent RANNO (NEEL), Anne BERNAND-MANTEI (NEEL), Xavier BLASE (NEEL), Christophe MARCENAT (INAC, PhD co-supervisor), Silvano DE FRANCESCHI (INAC), Bruno DAUDIN (INAC).

Laboratories: NEEL, INAC

Nanowire innovative solar cells

2013

Principal investigators

Nikos PELEKANOS (University of Crete, Heraklion, Chair of Excellence), Siew LI TAN (Post-doc, INAC), Henri MARIETTE (NEEL, Grenoble contact), Yann GENUIST (INAC).

Laboratories: NEEL, INAC, LITEN, LTM, LETI

This project aims at demonstrating a high efficiency nanowire solar cell, employing GaAs-based core-shell nanowires which are piezoelectrically-engineered and have optimal absorption. The former will occur by exploiting strain-induced piezoelectric fields, the latter by taking advantage of absorption-enhancing phenomena in NW arrays of specific dimensions. The project objectives can be summarized as follows:

- Development of piezoelectric engineering to optimize GaAs NWs for PV applications.
- Achievement of enhanced absorption GaAs NW arrays for PV applications.
- Demonstration of high efficiency (>10%) GaAs NW-based solar cells.

2014

QUANTUM PHASE TRANSITIONS & SUPERCONDUCTOR-INSULATOR TRANSITION IN 2D FILMS

Principal investigators

Aviad FRYDMAN (Bar Ilan University in Israel), Olivier BOURGEOIS (NEEL, Grenoble contact), Olivier PIOT (LNCMI)

Laboratories: NEEL, LNCMI

The problem of phase transitions in low dimensional systems is a very important yet still open subject. Particularly interesting are quantum phase transitions (QPT) that occur at zero temperature. A prototype of a QPT is the disorder driven superconductor-insulator transition (SIT) in 2D films. This transition has been widely treated theoretically

2014

NEXT GENERATION OF MESFET FOR DIAMOND POWER DEVICES

Principal investigators

Hitoshi UMEZAWA (AIST, Chair of Excellence), Etienne.GHEERAERT (NEEL, Grenoble contact), Nicolas ROUGER (G2ELab), Julien PERNOT (NEEL), David EON (NEEL)

Laboratories: NEEL, G2ELab

In this project, to realize normally-off type diamond switching devices, following experiments will be carried out in NEEL.

(1) Development of normally-off type MESFET

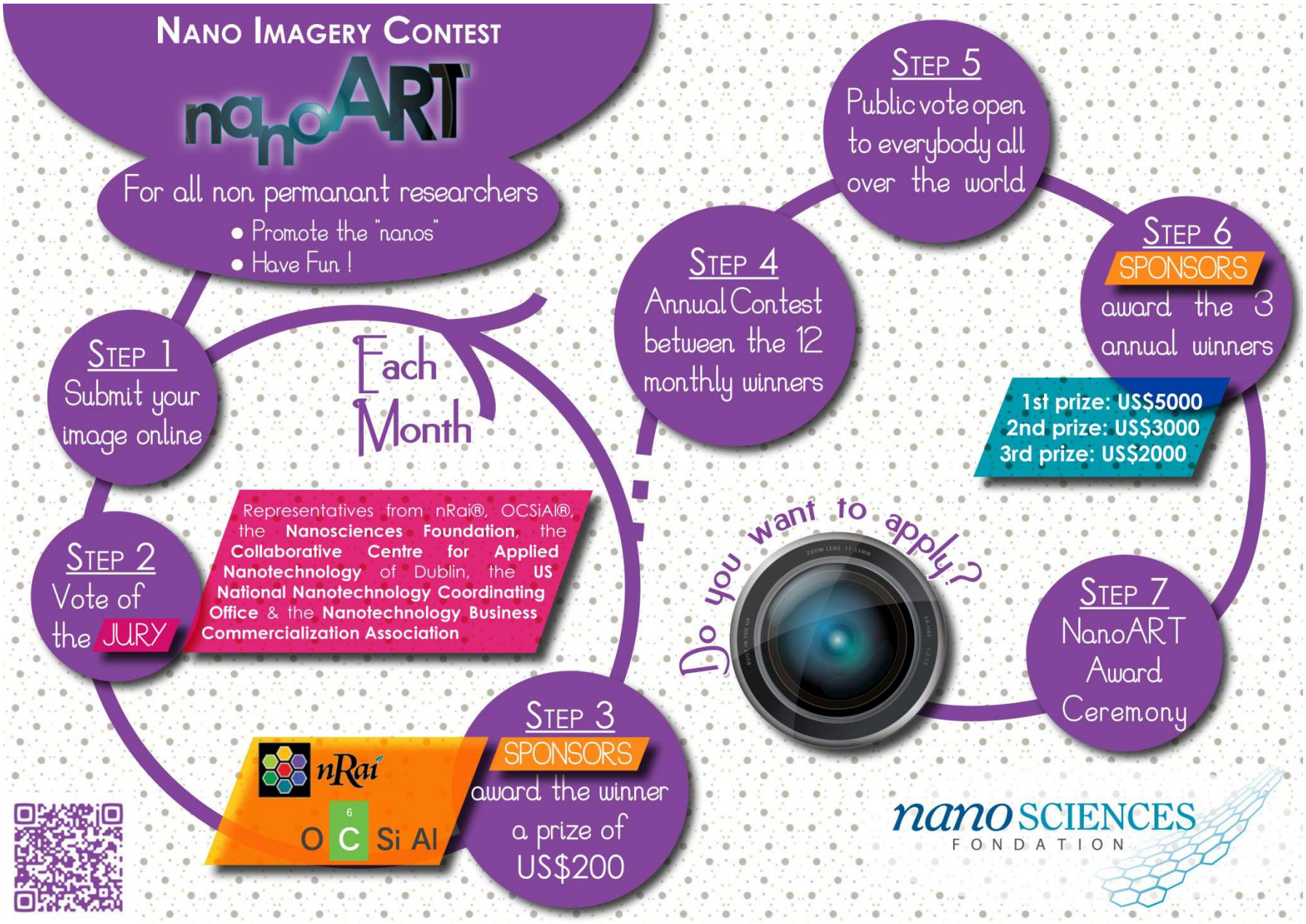
MESFET is one of the potential device structure for diamond power devices because of its simple fabrication process and high current capability. To realize normally-off type MESFET, precise control of doping concentration and thickness of epitaxial film is required to control the threshold voltage. In general, channel must be depleted at zero gate bias condition. In the project, two types of normallyoff type diamond MESFETs, such as lightly boron doped channel and recessed gate devices, will be fabricated based on the design and establishment of device

RESEARCH FUNDING AGENCIES……

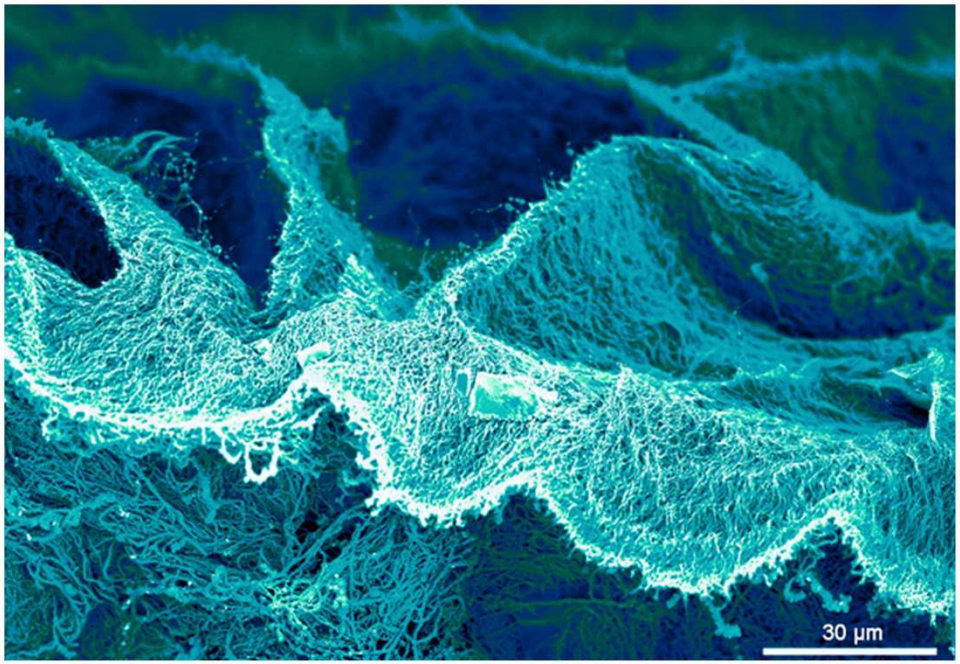
…… WORKING WITH (COMMON) CALLS FOR PROJECTS

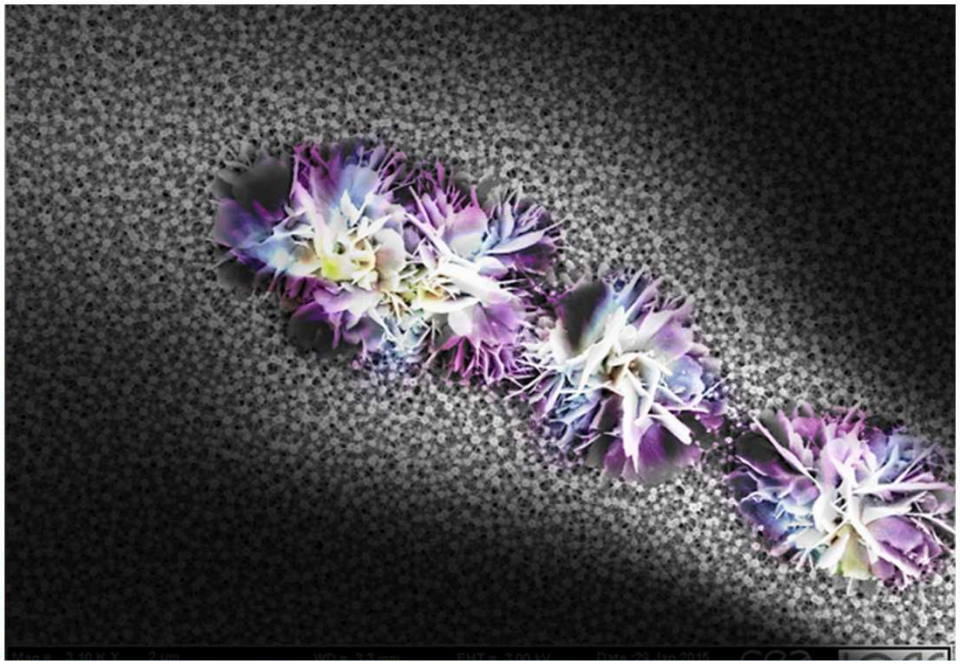
Programs	Scope	Deadlines	Network	PDF	More details online
Predoc program	For M1 students **Worldwide**	20/03/2015			http://grenoble-lanef.fr/spip.php?article59
PhD program	For M2 students **Worldwide**	01/04/2015			http://www.fondation-nanosciences.fr/RTRA/en/924/PhD.html
					http://grenoble-lanef.fr/spip.php?article66
Prix de Thèse	For PhD students who have already defended their thesis **in Grenoble**	14/06/2015			http://www.fondation-nanosciences.fr/RTRA/fr/943/PDT.html
Chairs of Excellence	For junior & senior researchers **Worldwide**	13/09/2015			http://grenoble-lanef.fr/spip.php?article69
PhD program	For M2 students **Worldwide**	04/10/2015			http://grenoble-lanef.fr/spip.php?article66
NanoART image contest	For non-permanent - academic or private - researchers **Worldwide**	Last Friday every month			http://www.fondation-nanosciences.fr/RTRA/en/903/NanoART.html

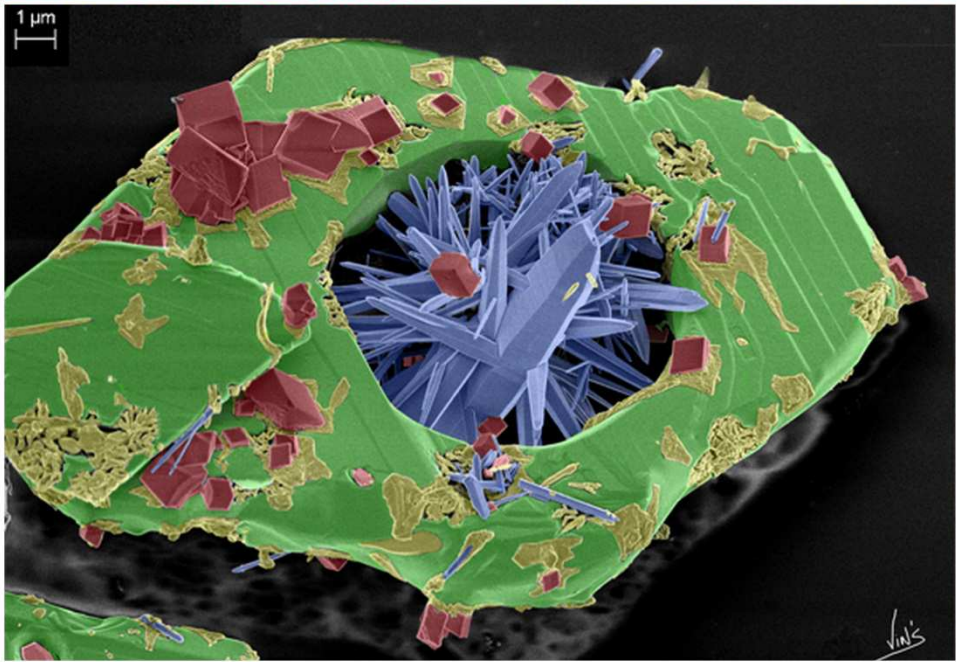
PROMOTING RESEARCH…… WITH A TOUCH OF FUN !



PROMOTING RESEARCH…… WITH A TOUCH OF FUN !



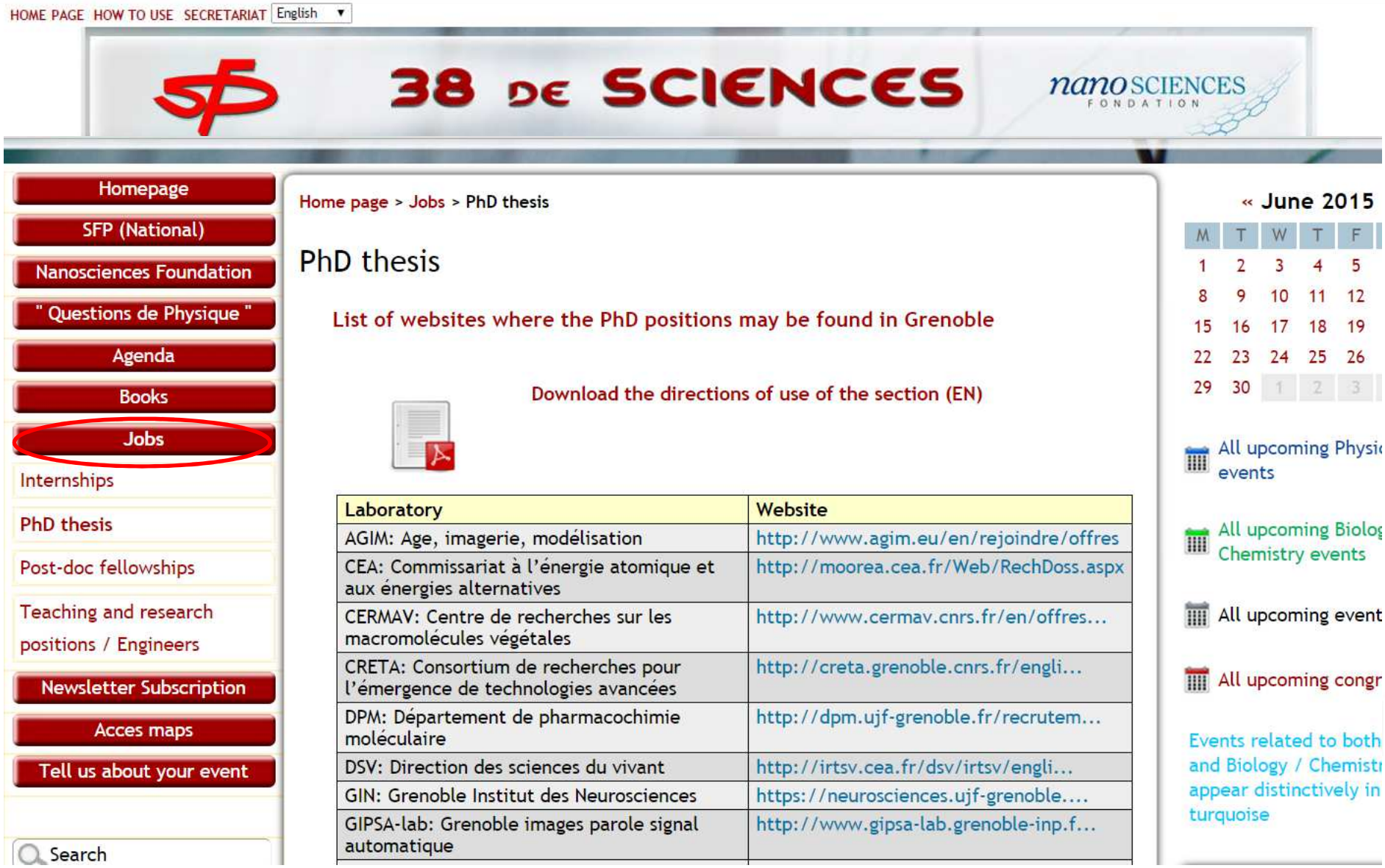




[Insert your picture here]

ONE LAST ADVICE !

ONE LAST ADVICE !



Welcome to Grenoble

400 000 people

2 campus, 4 universities - ALL in ONE

2 business schools

10 Museum

9 cinemas

12 theaters

10 ski resorts (<30 min)

...

THANKS FOR YOUR ATTENTION

+

ASK ME YOUR QUESTIONS

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Or

info@grenoble-lanef.fr

nano SCIENCES FONDATION

lanef Laboratoire d'Alliances Nanosciences-Energies du futur

Welcome to Grenoble