

# Workshops

27/11/2014

A molecular interactions? Roadmap to 2D functional nanostructures.

Dr. Magali Lingenfelder

Max Planck-EPFL Laboratory for Molecular Nanoscience EPFL, Lausanne, Switzerland

04/12/2014

Physics of a few magnetic atoms adsorbed on a surface.

Fernando Delgado

CFM, Donostia-San Sebastián, Spain

05/12/2014

Are polarization and Magnetization Really Bulk Properties?

Prof. Raffaele Resta

Università di Trieste, Trieste, Italy

16/12/2014

Spin-orbitronics, a new direction for spintronics: magnetic skyrmions, spin-orbit effects in 2D electron gas at surfaces and interfaces.

Prof. Albert Fert

Unité Mixte de Physique CNRS/Thales, France

## 5th International Workshop on Photoluminescence in Rare Earths (PRE'14): Photonic Materials and Devices

May 13-16, 2014

Palacio Miramar, Donostia-San Sebastián, Spain

ORGANIZERS

Joaquin Fernandez (UPV/EHU, Spain)

Rolindes Balda (UPV/EHU, Spain)

This series of workshops started in 2005. It provides a forum for material scientists, chemists and physicists to discuss state of the art photonic materials based on rare earth ions. Both fundamental photoluminescence properties and application oriented material investigations are considered. Our main topics are:

Fundamental photoluminescence properties and spectroscopic measurements

Modelling, first-principles calculations, etc.

Photonic devices exploiting rare-earths characteristics

Rare-earth-doped crystalline materials

Transparent ceramics and glass-ceramic materials

Rare-earth optical amplifiers for telecommunication

Fiber lasers and micro-chip lasers

Phosphor materials for Solid-state Lighting

Downconvertors for photovoltaic applications

Rare-earth-doped materials for biological applications

*cont.*

## CONTRIBUTIONS

Takunori Taira (Institute for Molecular Science, Japan)  
RE3+ Ceramic Lasers for Energy: from Engine to Fusion Ignitions

John Ballato (Clemson University, USA)  
Novel Rare-earth Doped Optical Fibers with Intrinsically Low Brillouin and Raman Gain

Patrice Camy (University of Caen, France)  
Fluoride crystals for short pulse lasers and amplifiers

Luis Carlos (University of Aveiro, Portugal)  
Nanoscale Thermometry with Rare Earths

Alicia Durán (Instituto de Cerámica y Vidrio, CSIC, Spain)  
Transparent nano-glass ceramics doped with RE

Yasufumi Fujiwara (Osaka University, Japan)  
Effects of impurity codoping on luminescence properties in Eu-doped GaN

Malgorzata Guzik (University of Wroclaw, Poland)  
Rare earth-doped tungstates-based optical materials of cubic structure

Dariusz Hreniak (Polish academy of Sciences, Wroclaw, Poland)  
Spectroscopic properties of Eu-doped pentaphosphate nanoceramics for white light-emitting devices

Daniel Jaque (Universidad Autónoma de Madrid, Spain)  
Rare earth doped nanoparticles for infrared in vivo imaging and therapy

Tony Kenyon (University College London, United Kingdom)  
Perspectives on Nanoclusters sensitization of erbium luminescence

Jorge Méndez Ramos (Universidad de La Laguna, Spain)  
Rare-earth doped up-conversion materials for enhancing photocatalytic activity of water-splitting semiconductor electrodes

Markus Pollnau (University of Twente, Netherlands)  
Rare-earth-ion-doped dielectric waveguides: Fabrication, spectroscopy, amplification, and lasing

Edwin Pun (City University of Hong Kong, Hong Kong China)  
Rare earth doped superbroadband glass materials

Lothar Wondraczek (Otto-Schott-Institute, University of Jena, Germany)  
Phosphors for light conversion in photosynthetic and photochemical energy harvesting

Ka-Leung Wong (Hong Kong Baptist University, Hong Kong China)  
Luminescence lanthanide materials for imaging of key cell cycle regulators and inhibition of cancer cells

## Trends in (Nano)Photonics 2014

July 24-24, 2014  
Donostia International Physics Center, Donostia-San Sebastián, Spain

### ORGANIZERS

Javier Aizpurua (CFM, CSIC-UPV/EHU, Spain)  
Rubén Esteban (DIPC, Spain)

A one-day workshop devoted to the latest trends and findings by experts in Photonics and Nanophotonics from all over the world and collaborators in Donostia.

### CONTRIBUTIONS

Francisco J. García Vidal (University Autónoma of Madrid, Spain)  
Plasmonanoquanta: Transformation optics, quantum and non-linear phenomena in plasmonics

Otto Muskens (University of Southampton, United Kingdom)  
Ultrafast nano-optics with plasmonic nanoantennas and silicon waveguides

Luis Liz-Marzán (biomaGUNE, Donostia-San Sebastián, Spain)  
Metal nanoparticles with unusual morphologies

Paolo Vavassori (nanoGUNE, Donostia-San Sebastián, Spain)  
Magnetoplasmonic nanoantenna metasurfaces for sensing and active control of light polarization

Juan José Sáenz (University Autónoma of Madrid and DIPC, Donostia-San Sebastián, Spain)  
Intensity fluctuations produced by fluorescent emitters in complex media

Rainer Hillenbrand (nanoGUNE, Donostia-San Sebastián, Spain)  
Infrared nanoimaging and nanospectroscopy

Yury Rakovich (CFM and UPV/EHU, Donostia-San Sebastián, Spain)  
Optical effects in hybrid system of J-aggregates and plasmonic nanostructures

Andrey Borissov (Institute of molecular Sciences in Orsay, France)  
Plasmon resonances in bimetallic nanoshells: quest for quantum effects

Scott Carney (University of Urbana, Illinois, USA)  
Synthetic optical holography for probe microscopy

Stefan Maier (Imperial College London, United Kingdom)  
Plasmonics for novel imaging, ultrafast lasing and compact directional emission

## Light in a hole: Workshop on confining light and molecules

August 18-19, 2014

Donostia International Physics Center, Donostia-San Sebastián, Spain

### ORGANIZERS

Javier Aizpurua (CFM, CSIC-UPV/EHU, Spain)

In this workshop, four groups meet at DIPC to discuss ongoing collaborations in the field of optoelectronic networks formed by organometallic nanostructures as a platform to develop enhanced and selective SERS, catalysis, active optical control of modal response, and analyse particle on a mirror configurations, among others. The workshop is a unique opportunity to define the priorities and the roadmap of the recently awarded joint project led from Cambridge aiming at controlling and using the confinement of light and molecules in the presence of active and gain media.

### PARTICIPANTS

Prof. Jeremy Baumberg (University of Cambridge, United Kingdom) with 6 participants

Prof. Oren Scherman (University of Cambridge, United Kingdom) with 3 participants

Prof. Ortwin Hess (Imperial College London, United Kingdom) with 1 participant

Prof. Javier Aizpurua (DIPC, Donostia-San Sebastián, Spain) with 3 participants

## Fuerzas y Túnel 2014

August 27-29, 2014

Palacio Miramar, Donostia-San Sebastián, Spain

### ORGANIZERS

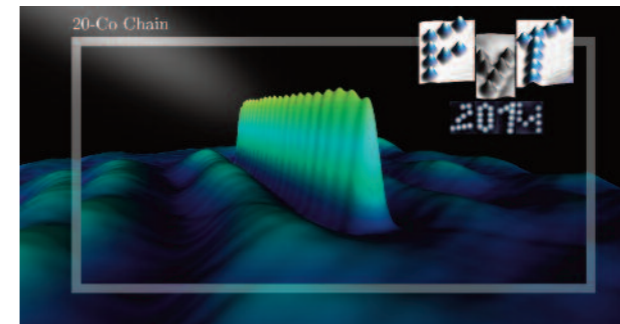
Celia Rogero Blanco (Centro de Física de Materiales (CSIC-UPV/EHU), Materials Physics Center (CFM), Donostia-San Sebastián, Spain)

Fernando Moreno-Herrero (Centro Nacional de Biotecnología (CNB-CSIC), Madrid, Spain)

Every two years the Spanish community working on scanning probe techniques meet for Fuerzas y Túnel (FyT). These biennial conferences began in Barcelona in 1998 and continued in Santiago de Compostela (2000), Zamora (2002), Vic (2004), Murcia (2006), Segovia (2008), Tarragona (2010), San Lorenzo de El Escorial (2012) and now in Donostia-San Sebastián. It brings together scientists who share an interest in applications, use, development and theoretical description of technology based in scanning probes. Sessions are dedicated to atomic force microscopy, scanning tunneling microscopy and theory of local probes techniques covering a wide range of applications from soft matter physics and biophysics to surface science in vacuum.

Most importantly, in this 9th edition, we honor Prof. Arturo M. Baró who will retire on 2014. Prof. Baró is one of the pioneers of SPM in Spain and one of our most renowned AFM/STM specialist abroad.

The Conference is included in the program of the XXXIII edition of "Cursos de Verano" of the University of Basque Country.



2014 FyT SPM Image Contest Winner: 20-Co Chain

Created by: Maria Moro (Instituto de Nanociencia de Aragón, Zaragoza, Spain)

STM image of a chain made by twenty Co atoms on a Ag(111) surface. The atomic chain was assembled along the [1-1 0] closed packed direction of the surface, by means of lateral manipulation technique. The distance between the Co atoms forming the chain is  $d=0.578$  nm, two atomic distances of the Ag(111) lattice parameter,  $a=0.289$  nm. The Fuerzas y Túnel 2014 logo was built by fifty seven Co atoms arranged with the STM tip by means of lateral manipulation technique on a Ag(111) surface. In this case, the distance between the Co atoms is three atomic distances,  $d=0.867$  nm.

For PhD students and postdocs presenting posters, there were two additional prizes sponsored by Bihurcrystal.

### SCIENTIFIC COMMITTEE

Andrés Arnau (UPV/EHU)

Agustina Asenjo (ICMM)

Jaime Colchero (UM)

Jordi Fraxedas (CIN2)

José Miguel García (IMM)

Ricardo García (ICMM)

Julio Gómez (UAM)

José María Gómez-Rodríguez (UAM)

Amadeo López de Parga (UAM)

José Angel Martín-Gago (ICMM)

Javier Méndez (ICMM)

Aitor Mugarza (ICN)

Pedro J. de Pablo(UAM)

Jose Ignacio Pascual (CIC-Nanogune)

Rubén Pérez (UAM)

Roberto Otero (UAM)

Juan José Saenz (UAM)

## 3rd Baskrete Industry Open Days

September 16-17, 2014

CEI Euskampus, UPV/EHU, DIPC, Tecnalía, CFM, CIC nanoGUNE, Donostia-San Sebastián, Spain

### ORGANIZERS

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The BASKRETE initiative is a collaborative project within the Campus of International Excellence (Euskampus) carried out between the University of the Basque Country (UPV/EHU), Materials Physics Center (CFM), Donostia International Physics Center (DIPC) and TECNALIA with a twofold mission: On one hand, BASKRETE coordinates actions which are currently underway in the Basque Country in the field of nanoscience and nanotechnology for cementitious materials and on the other hand, BASKRETE helps trigger the transfer of high technology knowledge to companies through the establishment of a cooperative program with the industrial agents.

## GDRi 2014

September 28 - October 1, 2014

Donostia International Physics Center, Donostia-San Sebastián, Spain

### ORGANIZERS

Roland Pellenq (MIT, CNRS)

Emanuela Delgado (ETH Zurich)

Pierre Levitz (CNRS)

Jorge Sanchez-Dolado (TECNALIA)

Andres Ayuela (DIPC, CFM-CSIC)

Hegoi Manzano (UPV/EHU)

Sivina Cerveny (CFM-CSIC)

Workshop on Multiscale Porous Materials:

- Materials cover cements, clays, soils, porous glasses, porous ceramics including nuclear fuels...
- Models bridge time and length scales including texture measurement/simulation at different scales, mechanics (including fracture) at different scales, transport properties at different scales, long term behavior such as creep at different scales,...

The idea of setting-up the Groupement de Recherche International Multi-scale Materials Under the Nanoscope (GDRi, M2UN), is structuring the Physics, Chemistry, Mechanics and Materials Science communities on a common ground for developing an integrated approach (combining both simulation and experiments) for the prediction of texture properties from angstroms to micron and their evolution in time from nanoseconds to years of complex multi-scale materials such as clays (soil), cement, nuclear solid fuels, steels and ceramics. The M2UN GDRi is an initiative organized under the auspices of CNRS ([www.cnrs.fr](http://www.cnrs.fr)). This international research organization aims at promoting:

- Scientific exchanges through recurrent meetings collaborations between the different teams involved including visits of PhD students, post-doctoral associates and faculty.
- Educational activities and the spread of knowledge through the organizations of a thematic school, the Marseille Winter School on Multiscale Porous Materials for Energy and Environment (2nd Edition, Jan 16-22, 2014, Aix-Marseille Polytech-ESIL, Luminy campus, Marseille).
- A platform from which participants can design grant proposals toward the US-NSF, the ESF and others funding agencies the emergence of a new field of research at the frontier between Science and Engineering.

The ambition of such a GDRi is formulating a conceptual tool named as the "nanoscope" that combines most advanced statistical Physics numerical simulations (such as accelerated Molecular Dynamics) and experiments (such as X-Ray tomography and microscopy...). This "nanoscope" tools aims at elucidating the 3D texture of those multi-scale (and most of the time porous) materials from the scale of atoms to microns focusing in particular of mechanical and transport properties. The coupling between numerical simulation and experiments is a major theme of the GDRi and is one of the most challenging issues in Material Science, Mechanics and condensed matter Physics. From a computational point of view, two ways are usually put

forward: a utopian one that aims at developing "the ultimate simulation code" and a more pragmatic one that considers associating different scales by passing the "right" piece of information to the scale above and create an interface, for instance between atomistic description and finite element methods that are operational at the scale of microns and above. We have obviously chosen this second approach. We aim at spanning not only length by also time scales and address phenomena such visco-elastic deformations and creep that cover many length and time scale. To achieve this, important experimental developments are needed to observe and understand materials texture and transport properties at different scales; these range from X-ray microscopy and tomography, electron microscopy, nano-indentation, dispersive wave spectroscopy, NMR-relaxometry. The scientific project of the GDRi M2UN is both fundamental and applied as it merges Science and Engineering in a single research field: as physicists or Material scientists are driven by engineering challenges and engineers move into the fundamentals of physics, a shift of paradigm is taking place that enables progress at the interface of physics and engineering for a large variety of critical problems that are at the core of many society, environmental and economy concerns in connection with durability and sustainability issues in construction, transportation, energy and waste management.

### CONTRIBUTIONS

#### Session 1: Textures and Mechanics

Chair: Pierre Levitz

Enrico Masoero

**C-S-H at the Mesoscale: Structure and Water Sorption**

Franz-Joseph Ulm

**Fracture Toughness of Multi-scale Materials.**

Emanuela Del Gado

**Early stages of cement hydration and meso-scale texture of C-S-H**

Rainer Hillebrand

**Nano-FTIR in minerals**

Henri Van Damme

**Urban Physics, City Texture Matters**

Benoit Coasne

**Multi-Scale Modeling of Molecular Transport in Shales**

#### Session 2: Experimental Characterization of Confinement

Chairs: Emanuela Del Gado, Silvina Cerveny

Jean-Pierre Korb, Benjamin Nicot, Aline Louis-Joseph, Salvatore Bubici, Gianni Ferrante  
**Dynamics and Wettability of Oil and Water in Oil Shales**

Jan Swenson

**What can we learn about bulk water from dielectric relaxation studies of confined water and aqueous solutions?**

Heloisa N. Bordallo  
Neutron scattering, a powerful tool to study water in confinement

Michael Vogel  
NMR study of the dynamics of confined water

### **Session 3: Nano-Micro Mechanics**

Chair: Franz J. Ulm

Guillaume Galliero, Hai Hoang  
Fluids confined in slit nanopores: from local transport properties to shear induced swelling

Gilles Pijaudier-Cabot, Laurent Perrier, David Grégoire  
Enhanced poromechanics for the modeling of swelling in microporous materials:  
Coupled effects, size effects and upscaling issues

Jeremy Berthonneau, Christian Hoover, Olivier Grauby, Alain Baronnet, Roland Pellenq, Franz-Joseph Ulm  
Experimental nano-chemo-mechanical testing on minerals: from elasticity to fracture

David N. Espinoza, Matthieu Vandamme, Jean-Michel Pereira, Patrick Dangla, Sandrine Vidal-Gilbert  
Experimental characterization, modeling, and impact on permeability, of adsorption-deformation  
couplings in coal samples in presence of CO<sub>2</sub>

Eduardo Duque-Redondo, Hegoí Manzano, Nerea Epelde, Virginia Martínez-Martínez, Iñigo López-Arbeloa  
Input from Molecular Modelling for the Design of Hybrid Photoactive Materials

David Grégoire, Fadi Khaddour, Gilles Pijaudier-Cabot  
Upscaling Poiseuille's and Knudsen's flows to predict gas permeability in damaged porous media

Hegoí Manzano  
Hydration of Mineral Surfaces: new insight from reactive force field Molecular Dynamics

### **Session 4: Fluid under Confinement**

Chair: Jose S. Dolado

Carine Malheiro, Frédéric Plantier, Bruno Mendiboure, Christelle Miqueu  
Use of Density Functional Theory for the modeling of adsorption of methane, water and their binary  
mixture in slit micropores.

Qianqian Wang, Yanhua Guo, Xiaodong Shen, Feng Li, Hegoí Manzano, Iñigo López-Arbeloa  
Water adsorption and dissociation on the  $\beta$ -C<sub>2</sub>S (100) cement clinker surface from first-principles  
calculations

Houria Chemmi, Dominique Petit, Renaud Denoyel, Jean-Pierre Korb, Pierre Levitz  
Confinement impact on the dynamics of water in calibrated mesoporous silica

Mohammad.-Javad, Abdolhosseini Qomi, Roland Pellenq  
Nanoscale Dynamics of water in CSH

Jean-Mathieu Vanson  
Simulation of adsorption and transport in hierarchical porous materials using Lattice-Boltzmann model

P. Levitz, C. Bousige, B. Coasne  
Potentiality of the pore network topological graphs to analyze structure and dynamics of  
complex porous media: focus on cement paste and disordered carbon membranes

### **Session 5: Carbon Materials**

Chair: Andrés Ayuela

Roland Pellenq  
The Journal of Nano and Micromechanics, ASCE

Julio A. Alonso, Iván Cabria, María J. López  
Doped Nanoporous Carbons for Hydrogen Storage.

Matthieu Salanne, Clarisse Péan, Céline Merlet, Benjamin Rotenberg, Paul Madden, Barbara Daffos,  
Pierre-Louis Taberna, Patrice Simon, Yury Gogotsi  
Modeling Ion Adsorption and Dynamics in Nanoporous Carbon Electrodes

Julien Colell, Guillaume Galliero  
Molecular Simulation of Fluid Distribution and Transport Properties in Shales Organic Matter

Gyorgy Hantal, Laurent Brochard, Roland J.M. Pellenq, Franz J. Ulm, Benoit Coasne  
Mechanical behavior and failure of clay-organic composites: overall toughening upon interface  
weakening? Numerical simulations and theory

## XI International Ontology Congress

October 1-4, 2014

University of the Basque Country and Chillida Leku Museum, Donostia-San Sebastian, Spain

October 6-7, 2014

Universitat Autònoma de Barcelona, Spain

October 23, 2014

Fundación Paideia, A Coruña, Spain

Since its first conference in 1993, the aim of the International Ontology Congress has been to breathe new life into the great topics of Greek philosophy, examining them from a contemporary perspective, namely using the tools provided by contemporary science. These problems keep being brought up constantly, either because of the emergence of new scientific data or because of attempts of new philosophic perspectives. Most of the conferences of the Congress have been held under the auspices of UNESCO.

International Scientific Committee

A. Aspect (Paris); P. Aubenque (Paris) F.J. Ayala (California); J. Bouveresse (Paris); tE. Chillida (San Sebastián); A. Grünbaum (Pittsburgh); tW. Lamb (Arizona); T. Marco (Madrid); U. Moulines (München); tl. Prigogine (Brussels); H. Putnam (Boston). Coordinator: V. Gómez Pin (Barcelona)

Organizing Committee

Gotzon Arrizabalaga (UPV/EHU); José Ignacio Galparsoro (UPV/EHU); Juan Ramón Makuso; Gemma Cortel (UAB); Andreu Ballús (UAB). Coordinator: Víctor Gómez Pin (UAB).

Under the Honorary Presidency of Bas van Fraassen

### OLD QUESTIONS ON PHYSIS, CONTEMPORARY APPROACHES

I. The Problem of Realism: State of The Art (Under the patronage of DIPC)

1. San Sebastián
2. Barcelona - 50 Years of Bell's Theorem: Physics and Reality

II. THE RISE OF THE HUMAN ANIMAL (Under the Patronage of ATAPUERCA)

### CONTRIBUTIONS

David Albert (Columbia University, New York, USA)

Francisco J. Ayala (UC Irvine, California, USA)

Giovanni Boniolo (IFOM-IEO Campus, Milan, Italy)

Eudald Carbonell (Universitat Rovira i Virgili, Fundación Atapuerca, Tarragona, Spain)

Anjan Chakravartty (University of Notre Dame, Indiana, USA)

Alberto Cordero (City University of New York, USA)

Steven French (University of Leeds, United Kingdom)

Tim Maudlin (New York University, USA)

James Ladyman (University of Bristol, United Kingdom)

Andrés Moya (President of the SSBE)

Jean-Michel Raimond (École Normale Supérieure, Paris, France)

Simon Saunders (University of Oxford, United Kingdom)

Mauricio Suarez (Universidad Complutense de Madrid, Spain)

Bas Van Fraassen (Princeton University, New Jersey, USA)

## Mestizajes Workshop 2014 (II Encuentro sobre Literatura y Ciencia)

November 18-19, 2014

CFM, Donostia-San Sebastian, Spain

ORGANIZER

Gustavo Ariel Schwartz (CFM-CSIC and DIPC)

Mestizajes constituye un espacio alternativo para el encuentro de artistas, científicos y humanistas. Un lugar para el debate, para pensar diferente, para imaginar; un lugar para la búsqueda, para el encuentro y también para el desacuerdo; un lugar para la generación y la divulgación de nuevas formas de conocimiento. Mestizajes pretende abrir un camino que permita transitar la frontera entre arte y ciencia y crear allí un terreno fértil para la generación de nuevas ideas. Mediante workshops, conferencias, residencias y colaboraciones, Mestizajes pretende fomentar la participación activa y una mirada crítica de la realidad desde una perspectiva innovadora y vanguardista. La idea fundacional de Mestizajes es que se ha abierto una grieta en la muralla que separa arte y ciencia y que es posible transitar esa frontera e internarnos en un territorio emergente cargado de un enorme potencial humano e intelectual.

### Razón, Intuición e Imaginación

Los objetivos principales de Mestizajes son favorecer el diálogo entre ciencias, artes y humanidades; fomentar la diversidad intelectual y promover el mestizaje entre distintas formas de conocimiento; analizar el surgimiento simultáneo de ideas en diversos campos del conocimiento, como así también estimular la influencia recíproca, entre las ciencias, las artes y las humanidades. Mestizajes se propone como un espacio para romper con la hiper-especialización del conocimiento y desde donde promover el multilingüismo cognitivo. Mestizajes pretende contribuir a la construcción de un conocimiento más amplio donde arte, ciencia y humanidades se complementen y se enriquezcan mutuamente.

En esta ocasión, el tema de debate se centrará en torno a la Razón, la Intuición y la Imaginación en la Literatura y en la Ciencia. Nos proponemos explorar la intuición literaria y su relación con la neurociencia, la génesis metafórica de los conceptos científicos, la construcción del mundo desde la literatura y desde la ciencia y las relaciones entre razón e intuición.

Temas del encuentro: Matemática, intuición e imaginario colectivo, Intuición literaria y neurociencia, Razón, intuición e imaginación en ciencia y en literatura, La construcción del mundo desde la literatura y la ciencia

### PARTICIPANTES

Ricardo Díez Muiño (CSIC-CFM and DIPC, Donostia-San Sebastián)

#### Presentación

Gustavo A. Schwartz (CSIC-CFM and DIPC, Donostia-San Sebastián)

#### Apertura

Jorge Wagensberg (Facultad de Física – Universidad de Barcelona)

#### Sobre el talento y el talante interdisciplinario

Amelia Gamoneda (Facultad de Filología – Universidad de Salamanca)

#### ¿Cómo sabe una metáfora? Poética y ciencia

Moderador: Gustavo A. Schwartz (CSIC-CFM and DIPC, Donostia-San Sebastián)

#### Discusión – Mesa redonda Jorge Wagensberg / Amelia Gamoneda

Itziar Laka (Facultad de Letras, UPV/EHU, Vitoria)

#### Intuición, arte y lenguaje