Topical Workshop on Electronics for Particle Physics
2-6 September, 2019 – Santiago de Compostela – Spain

WELCOME
Prof. Abraham Gallas IGFAE/USC
University of Santiago de Compostela (USC) was founded in 1495

Oldest University in Galicia and third in Spain

Location: Two cities Santiago, Lugo
History timeline

1495
Lope Gómez de Marzoa creates a Grammar Academy

1649
Creation of Law and Medicine Faculties

Half of the 19th Century
The faculties of Philosophy and Letters are created; Physics and Natural Sciences

1913
Women’s access to the University in Santiago

1990
Segregation University, creation of 3 Universities

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1526
Pope Clement VII signed the recognition Bull of the Santiago Alfeo School, authorizing it to obtain the degrees of university studies

1771
Carlos III grants the status “Regia”. The University seal is enriched with the Royal Crown

2009
State recognition o Campus International of Excellence to the Campus Life.

2016/2017
Among 100 the most innovative Universities in Europe
49 Grades, 62 Master’s Programs, 55 PhD Programs

31 Research Centres and Institutes

1 Veterinary Hospital  3 University Hospitals (1,200 beds)
1.492 Academic Permanent Staff (R3-R4). 42.6% Female
2.791 Research Staff (R1-R2). 53.4% Female
2.630 PhD Students. 53.5% Female
25,035 Students. 62.9% Female

Data for 2018
More than 300 research groups

5 main research areas (Experimental Science, Health Science, Social Sciences and Law, Technology and Humanities)

6 strategic multidisciplinary focus:
- Biomedicine & Biotechnology
- Physics
- Environmental Technologies
- Bioeconomy, territory and entrepreneurship
- Cultural heritage
- Land resources
**R&D**

**Total R+D Internal Expenditure**  63.366.000 € *

- **Institutional Actions** 14%
- **International Actions** 8%
- **National Actions** 14%
- **Regional Actions** 21%
- **R&D Human Resources Programme** 22%
- **Companies & KTT Actions** 18%
- **Other Actions** 3%

**11,60 M€ R&D Companies and KTT Actions**

**42,70 M€ R&D Competitive Incomes**

*Data for 2018*
Scientific Production Knowledge Generation

1.653 * Published JCR/year
42% International Collaboration
49.1 % Q1 docs**
421 Average Score Cites
429 Disserted PhD Thesis

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<td><strong>NATIONAL</strong></td>
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<td>10º Production</td>
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<td>5º Thesis</td>
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<td>6º Patents</td>
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<td>5º ERC Grants</td>
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<td>General Position 501-600***</td>
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<td>Field Pos. 101-150 in Science</td>
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<td>Subject Pos. 201-300 in Physics</td>
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<td>178 articles in Highly cited papers</td>
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*In Journals, Q1 denotes the top 25% of the Impact Factor (IF) distribution. Data for 2016
** Data for 2017 – CYD Foundation 2017
*** ARWU Shangai International Ranking 2018

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EXCELENCIA MARÍA DE MAEZTU
07/2017-07/2021
Invention Disclosures in 2018 per Area

- Social and Humanity Sciences: 49%
- Biotechnology and health: 26%
- Chemistry, Pharmacy and Pharmaceutical technology: 20%
- Physics, Engineering and ITC: 5%

47 Transfer Agreements signed with companies 2018

- Material Transfer Agreements: 9
- Non-disclosure Agreements: 29
- First Option Agreements: 2

56 PATENTS APPLICATIONS
29 PRIORITY PATENTS APPLICATIONS
23 GRANTED PATENTS
Joint research center of the University of Santiago de Compostela and Xunta de Galicia - created in 1999
Scientific Advisory Board

Sergio Bertolucci
Università Bologna
CERN Scientific Director 2009-2015

Barbara Erazmus
SUBATECH Nantes
President EPS-HEP Board

Paolo Giubelino
INFN Torino
Scientific Director
GSI/FAIR

Gabriela González
Louisiana State University
Spokesperson LIGO 2011-2017

Francis Halzen
Univers. Wisconsin
Spokesperson IceCube

Larry McLerran
Director - Institute for Nuclear Theory
Seattle

Giulia Zanderighi
CERN & Max Planck München

Advise and evaluation
This figure **does not include** the contribution from university for salaries, premises, electricity, common services, etc **nor** competitive grants for PhD students or postdocs.
Retreat 2019

- 34 Academic Permanent Staff (R3-R4). 8.8% Female
- 22 Research Staff (R1-R2). 18.1% Female
- 45 PhD Students. 11.1% Female
- 13 Administrative/ Technical Staff. 46.1% Female
- 114 Members
Strategic Research Areas

SRA1: The Standard Model to the limits

SRA2: Cosmic Particles and fundamental Physics

SRA3: Nuclear Physics from the lab to improve people’s heath
The Standard Model to the Limits

Beyond the SM searches with LHCb

Participation in LHCb
Large group with important contributions to analysis, instrumentation, computing and phenomenology

Hot and dense QCD in the LHC era and beyond

TH and pheno
Jet quenching, quarkonia, nPDFs, CGC - small systems
Regge and string models
Improved Skyrme models

String theory and related fields

Mostly AdS/CFT - related
Applications of AdS/CFT
Integrability in AdS/CFT
GR to Quantum Gravity
Cosmic Particles and Fundamental Physics

Extremely energetic cosmic rays and neutrinos

**Participation in Pierre Auger**
- UHE cosmic rays and neutrinos
- Radiodetection
- Multimessenger

Dark Matter and the nature of neutrinos

**Participation in NEXT**
- Neutrino-less double beta decay
- R&D for next gen experiments

Gravitational Wave detection

**Participation in LIGO**
- Search for coalescence of compact binary systems
- Astrophysics
- Multimessenger
Structure of the nuclear many-body systems, astrophysical implications

Participation in R3B - FAIR
Analysis and instrumentation
(Dolores Cortina is spokesperson)
Experiments at low-energy facilities
Experiments at n-ToF facility

Exploitation of the Laser Laboratory of Acceleration and Applications

Local infrastructure for laser-induced plasma acceleration
Use laser-induced plasma acceleration to produce short lifetime isotopes for medical use
Other applications, e.g. X-rays
**Publications**

- **83% in Q1**
  - (min 75% for MdM)
- **63% in top 10%**

10% of the scientific production of the University of Santiago de Compostela

**Citations per year**

- **Total Publications**
- **Q1**
- **Top 10%**

**IGFAE - Instituto Galego de Física de Altas Enerxías**

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IGFAE involvement in experimental collaborations

LIGO GW Observatory

The Pierre Auger Observatory

CERN: LHCb experiment

Laser Laboratory for Acceleration and Applications

Next experiment at LSC

R3B experiment at FAIR

Silicon Tracker  Run 1,2

VELO pixel detector Run 3

Contact Information:

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● **Sensors:**
  ○ R&D, prototype construction
  ○ Radiation resistance certification

● **Front-end electronics qualification (VeloPix ASIC):**
  ○ Design and construction ASIC carrier, Probe Card
  ○ High Speed Data Transmission lines
  ○ Radiation hardness:
    • SEE
    • TID certification
  ○ Testing and quality assurance

○ **Back-end electronics and firmware development**
Thanks for your attention!
Back-up slides
Main Research Institutes

**Science**
- Center for Biological Chemistry and Molecular Materials (CIQUS)
- Institute of Aquaculture (IA)
- Institute of Food Analysis and Research (IIAA)
- Institute of Agrarian Biodiversity and Rural Development (IBADER)
- Galician Institute of High Energy Physics (IGFAE)
- Technological Institute for Industrial Mathematics (ITMATI)
- Mathematics Institute (IMAT)

**Health Science**
- Health Research Institute of Santiago de Compostela (IDIS)
- Center for Molecular Medicine and Chronic Diseases (CIMUS)
- Institute of Forensic Sciences (INCIFOR)

**Technology**
- Center for Research in Information Technologies (CITIUS)
- Institute of Technological Research (IIT)
- Institute of Ceramics

**Social Sciences and Law**
- Institute of Galician Studies and Economic Development
- Institute of Criminology
- Institute of Education Sciences (ICE)

**Humanities**
- Institute of Galician Language (ILGA)
Network of Joint Infrastructures for Research support

- Magnetic Resonance and arqueometry
- X Ray
- Electronic and Confocal Microscopy
- Mass Spectrometry and Proteomics
- IR-Raman Spectroscopy
- Animal Experimentation
- Instrumental analysis
- Cryogenesis
- Blown glass-scientific quartz
- Magnetosusceptibility

Other Centers and Research Services

- Hydrobiology Station “Encoro do Con”
- Marine Biology Station “A Graña”
- Courel Scientific Station
- Astronomy Observatory
- Natural History Museum
- University Historical Archive
- University Library

Technological Platforms

- National Genotyping Center
- Drug Screening Platform
- Radiation Physics Laboratory
- Land Information Systems (SIT)
- Structural Wood Engineering (PEMADE)
ICE* focused on LIFE SCIENCES, integrated by a dynamic biocluster that brings together the main regional agents of the biosanitary & biotechnology sector.

ICE* focused on the MARITIME – FISHING issues, integrated by the three Galician universities.

New ICE focused on AGRARIAN and FORESTRY production, LIVESTOCK production and welfare, BIODIVERSITY management, FOOD security and RURAL development.

New ICE focused on HUMAN RIGHTS, INCLUSION, CULTURAL HERITAGE and CITIZENS. *The strategic plan is in progress.*

* International Campus of Excellence Program from the Spanish Government under the “2005 Strategy for universities”
# SINGULAR CENTERS AND INSTITUTES

- Center for Research in Molecular Medicine and Chronic Diseases (CIMUS)
- Center for Research in Biological Chemistry and Molecular Materials (CIQUS)
- Center for Research in Information Technologies (CITIUS)
- Center for Biomedical Research in Galicia (CEBEGA)
- Health Research Institute of Santiago de Compostela (IDIS)
- Institute of Forensic Sciences
- Institute of Technological Research
- Institute of Industrial Mathematics
- Galician Institute of High Energy Physics (IGFAE)
- Institute of Galician Studies and Development (IDEGA)

**Other Facilities:** National Genotyping Center (CeGen); Drug discovery screening platform; Nanoparticle platform for drug delivery; Biostatistics/bioinformatics platform; Metabolic phenotyping platform; Clinic University Hospital of Santiago de Compostela (CHUS); Laser laboratory for acceleration and applications.
Regional funds
Xunta de Galicia

National funds
Agencia Estatal de Investigacion (AEI)

European funds

Private foundations

**Context-funding**

- **Structural and people-based (but competitive calls)**
  - Structural groups funding - some 400 KEuros/yr for IGFAE groups
  - **Predoctoral** contracts / **postdoctoral** contracts (being revised)
  - Funding of specific actions - e.g. Tier2 for LIGO in coming weeks
  - **Oportunius** program for ERC grantees
  - Centers - **expected to be included in 2019** - up to 800KEuro/yr

- **Project-based funding** - main Spanish source of funding for projects
  - **Predoctoral** contracts / **postdoctoral** contracts (Juan de la Cierva)
  - **Ramon y Cajal** contracts - “tenure-track”
  - Infrastructures (with FEDER co-funding)
  - Excellence Centers (Severo Ochoa) and units (**Maria de Maeztu**)

- **Project-based funding** - most of our funding from excellent science
  - Marie Skłodowska-Curie, ERC, Research Infrastructures,…

- **People-based funding**
  - La Caixa fellowships - **new** since Maria de Maeztu