



MINISTERIO
DE ECONOMÍA
Y COMPETITIVIDAD

AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2013

SECRETARÍA DE ESTADO
DE INVESTIGACIÓN
DESARROLLO E INNOVACIÓN

SECRETARÍA GENERAL
DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN

DIRECCIÓN GENERAL
DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA

SUBDIRECCIÓN GENERAL
DE RECURSOS HUMANOS
PARA LA INVESTIGACIÓN

Nombre: ARIAS MONTENEGRO, FRANCISCO JAVIER
Referencia: RYC-2013-13459
Área Científica: Ingeniería Mecánica, Naval y Aeronáutica
Correo Electrónico: frariasm7@fis.ub.edu

Título:

Energy Engineering- Thermal Energy

Resumen de la Memoria:

My research work has been focused in several aspects related with thermal energy. Since the beginning I have been interested all the aspect related with the thermal energy technology. My background as physicist and material engineer, and my PhD y heat transfer are allowed me to work In the design of advance concepts in the field.

My PhD (2010) fundamentally was dealing with thermohydraulic and hydrodynamics safety aspects in thermal reactors working with water or heavy liquid metal as coolants. Immediately finished my PhD, In 2010, thanks to a MEC/Fulbright postdoctoral fellowship form the Spain government, I had the opportunity to work at USA (2010-2012) at University of California at Berkeley (CAL) and the Massachusetts Institute of Technology (MIT) in the entire design of a novel nuclear core concept which enveloped both thermohydraulics and neutronics aspects . The project was sponsored by the Department of Energy of USA (DOE) with the participation among others: University of Michigan, Idaho National Laboratory, Brookhaven National laboratory, University of Ben Gurion (Israel).

After my first postdoc at USA, I was awarded with a competitive grant at the Belgian Nuclear research Centre (SCK-CEN) (November 2012) in a project related with the European Accelerator-Driven Reactor, My task was the establishment of the phenomenology and behavior of the corium in heavy liquid metal, the task was mostly in application to thermo physical process. Most recently (2013), I received a postdoctoral contract

at University of Cambridge for 1 year as principal Investigator to work in the UK plutonium problem. I was selected for this job because my research background during my stay at USA in thermodynamics-neutronics fit very well with the task, where the impact on the void coefficient of different fuel cycles and different fuel layouts within a PRISM reactor proposed by Hitachi is being investigated. This task implies a strong background in thermodynamics/neutronics as well as material engineering.

My immediate development is profiling in application of solar-thermal energy, taken advantage of skills gained in my previous postdocs and my degree background. Additionally with my appointment to University of Cambridge (UK), the university of Tasmania in Australia has offered working as associated researcher in a project related with the development of a solar reactor (50 MW) for thermochemical water splitting.

Resumen del Currículum Vitae:

Name : FRANCISCO JAVIER
Surname : ARIAS MONTENEGRO

Current professional position

Organism: University of Cambridge
Faculty : Department of Engineering
Dept./Secc Unit.Estr: Department of Engineering, Division of Energy,
Fluid Mechanics and Turbomachinery.

Post address: Trumpington Street Cambridge, CB2 1PZ

Phone: +44 (0) 1223 332629

Fax : +44 (0) 1223 765311

email: fja30@cam.ac.uk

Specialization:(UNESCO codes): Energy technology (See 2106.01, 3320.04, 3320.05, 3320.01),
Thermodynamics, Heat transfer (See 2213.02)

Professional status/ startup: Research scientist - 01/07/2013-today.

1.1 ACADEMIC EDUCATION

Titulacion Superior	Center	Data
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**AYUDAS RAMÓN Y CAJAL
CONVOCATORIA 2013**

- LICENCIATURA		
♢ Physics	University of Barcelona	2002-2006
_ INGENIERIA		
♢ Material Engineer	Technical University of Catalonia	2007-2009
_ MASTERS		
♢ Energy Engineering	Technical University of Catalonia	2008-2009
♢ Astrophysics	University of Barcelona	2008-2009
_ PhD		
♢ Thermal Engineering	Technical University of Catalonia	2007-2010

_ POSTDOCS		
Position	Center	Data
Research scientist(contract)	University of Cambridge	15/08/2013-today
Research scientist(Fulbright)	Massachusetts Institute of Technology	
	University of California at Berkeley	15/10/2010-15/10/2012
Research scientist(contract)	SCK_CEN-	
	elgian Nuclear Research Centre	01/11/2012-1/07/2013

Languages (Regular, Sufficient, Good)

LANGUAGE	SPEAK	READ	WRITE
Spanish	Good	Good	Good
Catalan	Good	Good	Regular
English	Good	Good	Good
German	Sufficient	Sufficient	Sufficient

1.2 PROFESSIONAL EXPERIENCE AND SCIENTIST ACTIVITY

PROJECT: Advanced Concept Self-sustaining thorium boiling water reactor for Nuclear waste Transmutation, RBWR-TH
SPONSOR INSTITUTIONS: Department of Energy-DOE, USA,



Nombre: FARIA LOPES, CLAUDIO SAUL
Referencia: RYC-2013-14271
Área Científica: Ingeniería Mecánica, Naval y Aeronáutica
Correo Electrónico: claudiosaul.lopes@imdea.org

Título:

Design and Simulation of Composite Structures

Resumen de la Memoria:

Dr. Lopes research line is on Design and Simulation of Composite Structures, which he initiated with his PhD in 2005, continued with is post-doc in 2009, his research assignment at INEGI and his current research position at IMDEA Materials. Two interconnected branches characterize the research developed by Dr. Lopes:

1. Multiscale modelling and simulation of composite materials: Micromechanical, mesomechanical and mechanical models are three approaches being developed by Dr. Lopes to predict the elastic and inelastic response of composite materials. Micromechanical models are based on representative volume elements where the several constituents are discretely represented. Mesomodels, more appropriate for large scale computations, treat the composite plies as homogeneous materials and are based on appropriate constitutive models for the individual plies and interfaces between them. Computational mechanics allows the practical structural simulation of large composite components. In this approach, the composite material structure is further homogenized to the laminate level whose mechanical behaviour until fracture is dictated by Continuum Damage Mechanics. Using homogenization laws, the multiscale models developed by Dr. Lopes define relations between the structural scale, the mesoscale, and the microscale.

2. Design and optimization of new generation of composite structures: The use of composite materials by the aerospace industry in the past decades increased substantially but their widespread use as alternatives to metallic materials (e.g. aluminium), has been hampered by the limitations of the traditional manufacturing processes and an insufficient practical knowledge about their structural behaviour which dictated a limited flexibility in laminate design. This picture is rapidly changing, enabled by automated systems capable of rapidly manufacturing large and high quality composite parts (e.g. Boeing 787 and Airbus 350). Automated fibre placement machines offer the possibility to expand the design envelope of composite laminates at no extra cost. Exploitation of such possibilities will allow the development of composite designs with improved structural performances. The associated reductions in the weight of aeronautical composite structures will directly translate in higher flight efficiencies, hence lower fuel consumptions and carbon emissions. Such composite configurations are being proposed by Dr. Lopes who is conducting extensive structural analysis regarding buckling, strength, impact damage resistance and damage tolerance and optimizing these composites of a new generation. To his end, he is using the multiscale numerical tools developed in parallel and explained above.

Resumen del Currículum Vitae:

Dr. Cláudio S. Lopes was born in Portugal (1977) and developed a strong international academic, professional and research career. He graduated in Aerospace Engineering at the Lisbon University of Technology (2000), and holds M.Sc. (2002) and Ph.D. (2009) degrees in Aerospace Engineering from the Delft University of Technology (The Netherlands). His Ph.D. programme, on the subject of ♦damage and failure of non-conventional composite laminates♦, was followed in collaboration with the University of Porto (Portugal). In complement of his academic career, Dr. Lopes acquired experience in the aerospace industry before starting his Ph.D. programme.

After a short post-doctoral position, In 2009 he became a research coordinator at the Institute of Mechanical Engineering and Industrial Management (Porto, Portugal) leading a team of research assistants. He is currently appointed researcher and head of the group ♦Design and Simulation of Composite Structures♦ at IMDEA Materials Institute (Madrid, Spain). He has been supervising 7 PhD students thesis (1 completed), 7 MSc students and 2 post-doctoral researches.

Dr. Lopes research develops along the lines of ♦multiscale modelling and simulation of composite materials♦ and ♦design and optimization of new generation of composite structures♦. He is the author of 20 scientific papers in ISI-indexed peer-reviewed journals (h-index of 10) these fields. He participates or has participated in 29 national and international research projects and industrial contracts of R&D and technology transfer nature, 15 of them as Principal Investigator, and is expert reviewer for the European Research Programmes FP7 and Horizon2020.

Dr. Lopes maintains international collaboration with the Delft University of Technology (The Netherlands), INEGI (where he is visiting researcher) and the University of Porto (Portugal), and the University of Girona (Spain) amongst others.



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Nombre: CABRERA CRESPO, ALEJANDRO JACOBO

Referencia: RYC-2013-12617

Área Científica: Ingeniería Mecánica, Naval y Aeronáutica

Correo Electrónico: alexbexe@uvigo.es

Título:

Computational Fluid Dynamics and its Application to Coastal Engineering and Renewable Energy

Resumen de la Memoria:

My research activity is mainly focused on computational fluid dynamics and its application to coastal engineering. I work on the development of a novel meshless particle method (Smoothed Particle Hydrodynamics - SPH) to study free-surface problems with real-life applications.

I was awarded with a doctoral grant of Xunta de Galicia from 2005 to 2008. In 2007, I visited Johns Hopkins University and I collaborated with Prof. Robert A. Dalrymple in Hopkins University (U.S.A.). I obtained my PhD Degree in June 2008 after four years and under the supervision of Full Professor M. Gómez Gesteira. This work was awarded by the University of Vigo with **Premio Extraordinario de Doctorado**.

After my PhD, I spent several months at the University of Aveiro (Portugal) working on coastal protection using SPH models. I stayed during 2009 at **School of Mechanical, Aerospace and Civil Engineering** of The University of Manchester (U.K.) working with Dr Benedict Rogers) and Prof. Peter Stansby on the development and application of the SPHysics model to free-surface hydrodynamics and working on GPU computing for SPH models. In 2010, I also visited the **Laboratori D'Enginyeria Marítima** in the **Universitat Politècnica de Catalunya** and I was funded by the program ICTS/CIEM accesses of Ministerio de Ciencia e Innovación.

I was awarded with a Postdoctoral Grant of Xunta de Galicia named Isabel Barreto for 2010 and 2011 to work on development and application of SPH models to real-engineering problems.

In the last two years (2012-2013) I have been working as Postdoctoral fellow funded by the program Juan de la Cierva of Ministerio de Ciencia e Innovación.

I collaborate with research centres in Spain, Italy, United Kingdom, Belgium, and Portugal involving numerous and varied research projects and collaborations with these world-leading institutions to study real-life engineering problems.

Starting from my postdoctoral period and thanks to the hardware acceleration the numerical code has been applied to simulate real-life engineering problems such as:

- the simulation of Pelton turbines for their optimization and future design as prototypes
- the assessment of the wave run-up and wave overtopping of existing armour block sea breakwaters
- the computation of forces exerted by large waves on the urban furniture of a promenade
- the study of the sediment transport induced by ship propellers inside harbours
- the simulation of areas with potential risk of floods or landslides

I have been internationally recognised as an expert on numerical modelling of fluid dynamics and I am a member of different international scientific committees that promote meshless methods such as the European **Smoothed Particle Hydrodynamics European Research Interest Community (SPHERIC)**, an international organisation that promotes the development and use of SPH. And finally, I have given several courses and three invited talks in international conferences.

At present, I am the advisor of two PhD whose theses will be defended this year. Several peer-reviewed papers have been published related to the results under my supervision.

During this period, I have participated in several research projects and collaborations covering these different research lines:

NUMERICAL MODELING IN COMPUTATIONAL FLUID DYNAMICS
MODEL COASTAL DEFENSES
DESIGN OF NEW RENEWABLE ENERGY DEVICES

Resumen del Currículum Vitae:

Publications:

- H-index = 10 (Scopus), 9 (Web of Science), 13 (Google Scholar)
- 23 papers in international journals in Science Citation Index (5 as first author, 7 as second author)
- 4 chapters of books
- Editor of the book SPHERIC. SPH EUROPEAN RESEARCH INTEREST COMMUNITY in 2007
- Editor of the special issue SPH for free-surface flows published in Journal of Hydraulic Research in 2010
- Editor of The Scientific World Journal since 2013



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Participation in research projects:

Since the end of my degree in 2003 until the present day, I have participated in a total of 15 research projects supported by ♦European Project FP6-MOBILITY♦, ♦Ministerio de Educacion y Ciencia♦, ♦Ministerio de Ciencia y Tecnologia♦, ♦Ministerio de Economía y Competitividad♦, ♦Xunta de Galicia♦ and ♦University of Vigo♦. I also was the PI in the project INOU12-03. In addition, I am the PI in the project with the private company SENER S.A.

Presentations in congresses:

Since the end of my degree in 2003 until the present day, I have participated in a large number of congresses presenting the different results obtained from the research projects:

- National congresses: 3 oral communications, 1 as Invited Speaker and 5 participations as co-author
- International congresses: 27 presentations (19 oral communications, 5 poster and 3 Lectures as Invited Keynote Speaker) and 18 participations as co-author

Participation in the organization of research activities:

Member of the Organising Committee of several International congresses:

- X International Symposium on Oceanography of the Bay of Biscay, April 2006 in Vigo
- Second SPHERIC International Workshop, May 2007 in Madrid
- 6th ERCOFTAC Iberian West Pilot Centre, Partners♦ Meeting and Workshop on Turbulence and Transition, October 2011 in Vigo
- Chair of the Organising Committee for the Iberian Workshop Advances on Smoothed Particle Hydrodynamics, December 2013 in Ourense

Supervision of dissertations and/or final projects:

- 5 final projects of Master♦s degree in Climate Sciences
- 1 Bachelor thesis
- 2 PhD dissertations (A. Barreiro and J.M. Dominguez) whose theses will be defended this year

Teaching Activities:

Several subjects given in Physics Degree in Universidade de Vigo (since 2006)

Several subjects given in PhD courses Universidade de Vigo (since 2008)

Several subjects given in Master♦s degree in Climate Sciences Universidade de Vigo being also the coordinator of some of them (since 2009)

Several subjects given in International European Master in Coastal and Engineering and Management in UPC (in 2011)

Several subjects given in Environmental Science Degree Universidade de Vigo being also the coordinator of some of them (since 2012)

In 2013, I obtained the Accreditation of PROFESOR TITULAR UNIVERSIDAD by Agencia Nacional de Evaluación de la Calidad y Acreditación (ANECA)