International Centre for
NUMERICAL METHODS IN ENGINEERING

CIMNE[R]

ANNUAL REPORT
2018

Since 1987
GENERATING KNOWLEDGE AND SOLUTIONS

CIMNE [R]

GENERATING KNOWLEDGE
AND SOLUTIONS
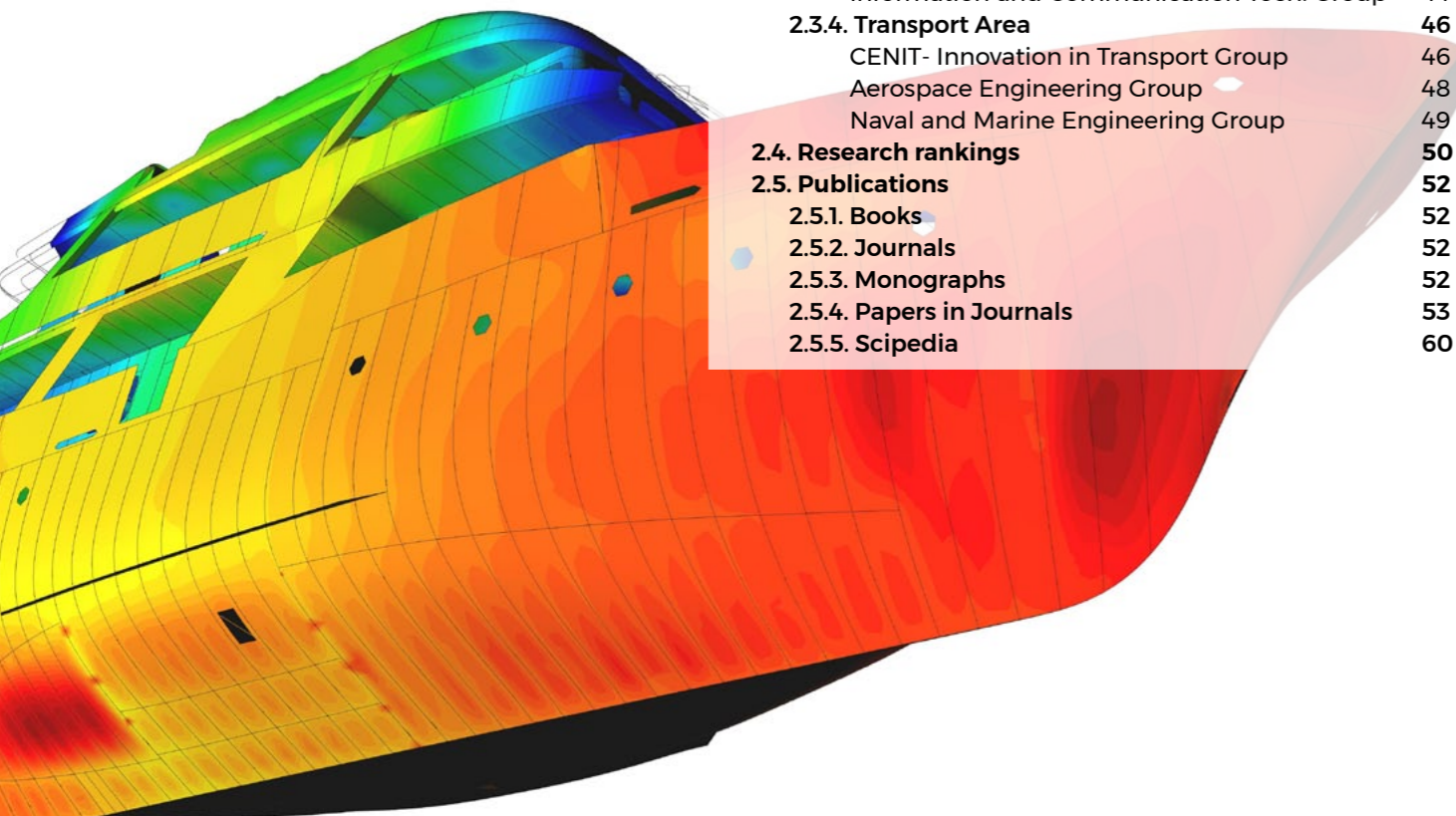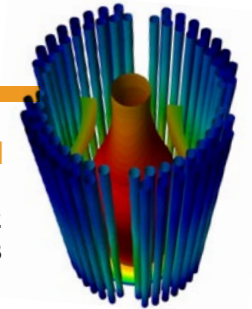Since 1987

Annual
Report 2018

CIMNE ANNUAL REPORT

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About CIMNE

Director's letter

Eugenio Oñate (onate@cimne.upc.edu)
Executive Vicepresident and Director of CIMNE

The International Centre for Numerical Methods in Engineering (CIMNE) was created in April 1987.

CIMNE's mission is the development and dissemination of original research in the field of Numerical Methods in Engineering (NME), the education of researchers and the transfer of the research outputs to industry.

CIMNE is a leader as an international centre of excellence in the field of NME through four main action vectors:

1. Excellence in research on NME for multidisciplinary engineering applications, in terms of scientific outputs and software-based tools.
2. International dimension.
3. Active participation and management in scientific societies.
4. Commitment with technology transfer to industry.

Research at CIMNE focuses on the development of NME of interest to the following scientific fields: structural mechanics, geomechanics, fluid dynamics, material sciences, optimization, biomechanics coupled multi-physics processes and high performance computing. Applications include problems in civil, mechanical, aeronautics, naval/marine, biomedical and environmental engineering, energy efficiency and fusion technology, among others.

Since 1987 CIMNE has evolved to become a prestigious international research centre on NME. Its research staff (90% of whom are engineers) includes (by April 2019) 18 Full Research Professors, 13 Associate Research Professors, 18 Assistant Research Professors, 16 Postdocs, 35 PhD Students, 6 Staff Scientists, 53 Research Engineers, 18 Visiting Researchers and 36 Administration Staff from 23 countries.

Several researchers of CIMNE (most of them in the two upper research categories) are faculty members of the Technical University of Catalonia (UPC) and develop their research duties in CIMNE. These distinguished affiliated researchers play an important role as liaison between researchers at different groups of UPC and CIMNE.

RESEARCH PRIORITIES AND APPLICATIONS

The priorities of CIMNE for research excellence target new NM and software codes to help engineers to better predict, design and optimize systems affecting our lives, including our environment, our security and safety, and the products we use and export. Indeed these goals can only be attempted from a multidisciplinary perspective.

Some relevant problems where the NMs developed at CIMNE are applied include: structural analysis of constructions and vehicles; safety of structures to natural hazards; geotechnical engineering and ground water flow; oil and gas engineering; thermal-mechanical analysis of structures and mechanical systems; metal forming processes (sheet forming, casting, welding, additive manufacturing, machining, etc.); shape and material optimization; aerodynamics of aircrafts, sail boats and road vehicles; blast, crashworthiness and impact problems; ship hydrodynamics; analysis of coastal and offshore structures; flow of granular materials in the mining, construction, food and pharmaceutical industries and fusion technology, among other applications.

NEW FOCUS OF CIMNE ON TERRITORY AND SUSTAINABILITY

Since December 2017 CIMNE is under the auspices of the Department of Territory and Sustainability (DTES) of the Catalonian Government. This has strengthen the research activities of CIMNE of interest to the civil and environmental engineering sector with a focus on applications to predictive territory management, smart infrastructures, water resources, energy efficiency, transport and mobility and environmental quality.

ORGANIZATION OF RESEARCH

Research in CIMNE is structured in research lines (RLs) covering several challenging topics applicable to different engineering disciplines. See current CIMNE RLs at the *"Research" section of this report*.

Researchers at CIMNE carry out their activity within Research and Technical Development (RTD) Groups managed by a Group Leader. The research activities are coordinated by one or more Principal Investigators (PIs). RTD Groups are gathered in RTD Areas that target fields such as Civil & Mechanical engineering, Transport (naval, aeronautics and land transport), Energy & Environment and Information and Communication Technologies.

INTERNATIONAL PRESENCE

CIMNE has established 2 legal international branches: CIMNE Latin America (Santa Fe, Argentina); and CIMNE USA (Washington DC, USA) and has also set up an international network of Joint Labs (the Aulas CIMNE) with 31 members: 6 in Spain and 25 in Latin America; *aulas.cimne.com*.

The International Association of the Aulas CIMNE (AIAC), created by CIMNE in 2015, aims to coordinating and fostering the activities of the Aulas CIMNE network. More information of AIAC can be found on *Alliances Section of this report.*

The International Association of the Aulas CIMNE (AIAC), created by CIMNE in 2015, aims to coordinating and fostering the activities of the Aulas CIMNE network.

RESEARCH OUTPUTS

All together, since 1987 CIMNE researchers have published some 2,600 JCR journal papers, 48 text books, 82 edited books, 258 monographs, 415 RTD reports, 643 technical reports and organized 214 international scientific conferences. CIMNE has 6 patents.

CIMNE scientists are chief editors or associated editors of 6 international JCR journals and members of the editorial board of 15 JCR journals.

Since 1987 CIMNE researchers have taken part in 1,720 RTD projects (including 10 research projects funded by the European Research Council).

In 2018 CIMNE researches have taken part in 23 RTD projects funded by international and national organizations which have meant a funding of 4 M€ for CIMNE. In the same period CIMNE had 92 RTD contracts with companies and private organizations amounting some 3,68 M€, managed 2 international MSc courses, 2 PhD programs and organized an average of 2 short courses and 20 seminars annually. Its research staff has supervised 171 PhDs and some 720 MSc students. Research at CIMNE has lead to many software codes that are useful for solving specific problems in each of the engineering areas addressed. The *"CIMNE Products" section* of this report lists the main software codes developed at CIMNE in 1987-2018.

CITATION RECORDS

By June, 2019, CIMNE scientists had an h index of 117 and 64,244 citations (h=75 and some 28,740 citations since 2014); Source: Google Scholar. Scopus records 525 JCR papers and 4,451 citations for the period 2014-18. Several CIMNE researchers are ranked in the first positions of the ranking for Mathematics & Interdisciplinary Applications and others of engineering created by Group for the Dissemination of the h Index (further information *cimne.com/research-rankings*).

By February 2019 the Ranking Web of World Research Centres (*research.webometrics.info*) reports that 123 CIMNE researchers the 60.460 most cited scientists of Spain best scientists in Spain in terms of citations (*webometrics.info/en/GoogleScholar/Spain*).

MANAGEMENT OF SCIENTIFIC ORGANIZATIONS

CIMNE is the permanent Secretariat of the following scientific organizations:
· International Association for Computational Mechanics (*iacm.info*, 1994-2016)
· European Community on Computational Methods in Applied Sciences (*eccomas.org*)
· Spanish Association for Numerical methods in Engineering (*semni.org*)
· Pilot Centre of the European Research Community in Flow, Turbulence and Combustion (*ercoftac.org*)
· Unesco Chair on Numerical Methods in Engineering of UPC (*cimne.com/unesco*). This is the first UNESCO Chair in the world, created in 1989.

TECHNOLOGY TRANSFER

CIMNE has a vocation for technology transfer. Since 2001 it has launched 20 spin-off companies (16 companies in 2012-18). These companies market a number of products emanating from CIMNE technology. Details of the companies are given in Section 3.2 and in *cimne.com/spin-offs*.

AWARDS TO CIMNE AND ITS SCIENTISTS

Since 1987 CIMNE and its scientists have received some 70 awards by national and international organizations. The list of CIMNE Awards can be seen in page 88 and in *cimne.com/awards*.

ORGANIZATION OF SCIENTIFIC CONFERENCES

The organization of international scientific conferences and workshops is a relevant activity of its research strategy. The CIMNE Conference Bureau Dpt., acts as a professional organizer of international events of scientific and technical interest to CIMNE.

Since 1987 CIMNE has organized some 200 international events. In 2018 CIMNE organized 4 international conferences on different topics related to NME.

Some 17 events are planned for 2019-2020. Further details of future and past events can be found in Section 5.2 of this report and in *congress.cimne.com*.

RTD ALLIANCES

CIMNE is a founding partner of the FLUMEN Institute in River Dynamics and Hydraulic Engineering (*www.flumen.es*).

On July 2017 CENIT (Centre for Innovation in Transport, cenit.es) merged its current structure into that of CIMNE, thus broadening the scope of the research activities of CIMNE in the field of transport engineering.

CIMNE has established research alliances with numerous prestigious institutions around the world.

A compilation of the most outstanding collaborations can be found in the *"Alliances" section of this report*.

DISSEMINATION AND COMMUNICATION STRATEGY

Dissemination and communication tasks in CIMNE involve various activities to bring the research outcomes to the attention of as many relevant people as possible. The Publications Dpt. (*cimne.com/publications*) of CIMNE publishes research and technical reports, monographs, text and edited books and software codes. The Aulas CIMNE network is also used for dissemination actions.

SCIPEDIA: CIMNE STRATEGY TOWARDS THE HOLISTIC 4.0 OPEN-ACCESS SCIENCE

In March 2016 CIMNE, via its spin-off company Scipedia SL, launched the innovative web platform Scipedia. Scipedia (*scipedia.com*) provides free publishing and Open Access services to disseminate the results of scientific and technical work.

CIMNE has implemented an (almost) self-sustainable financial model with limited annual public funding.

A SELF-SUSTAINED ORGANIZATION

CIMNE has implemented an (almost) self-sustainable financial model with limited annual public funding. This has been possible by combining public seed funding (mainly from the Generalitat de Catalunya) with income from RTD projects (sponsored by public and private organizations), dissemination activities, revenues from its spin-off companies and an efficient management structure. Since 1987 the self-obtained income obtained each year by CIMNE has amounted (in average) to 95% of its total annual budget.

I thank CIMNE staff and its many partners and friends in universities, research centres and industry worldwide for their cooperation that contributes in making of CIMNE a centre of reference in its field.
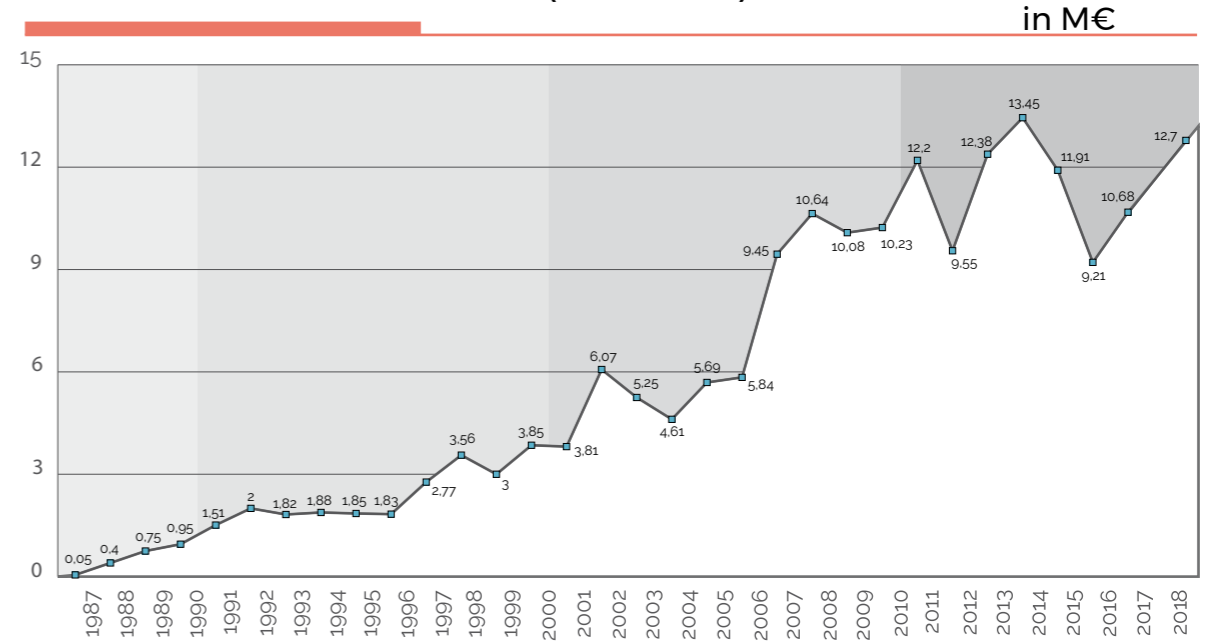
Eugenio Oñate
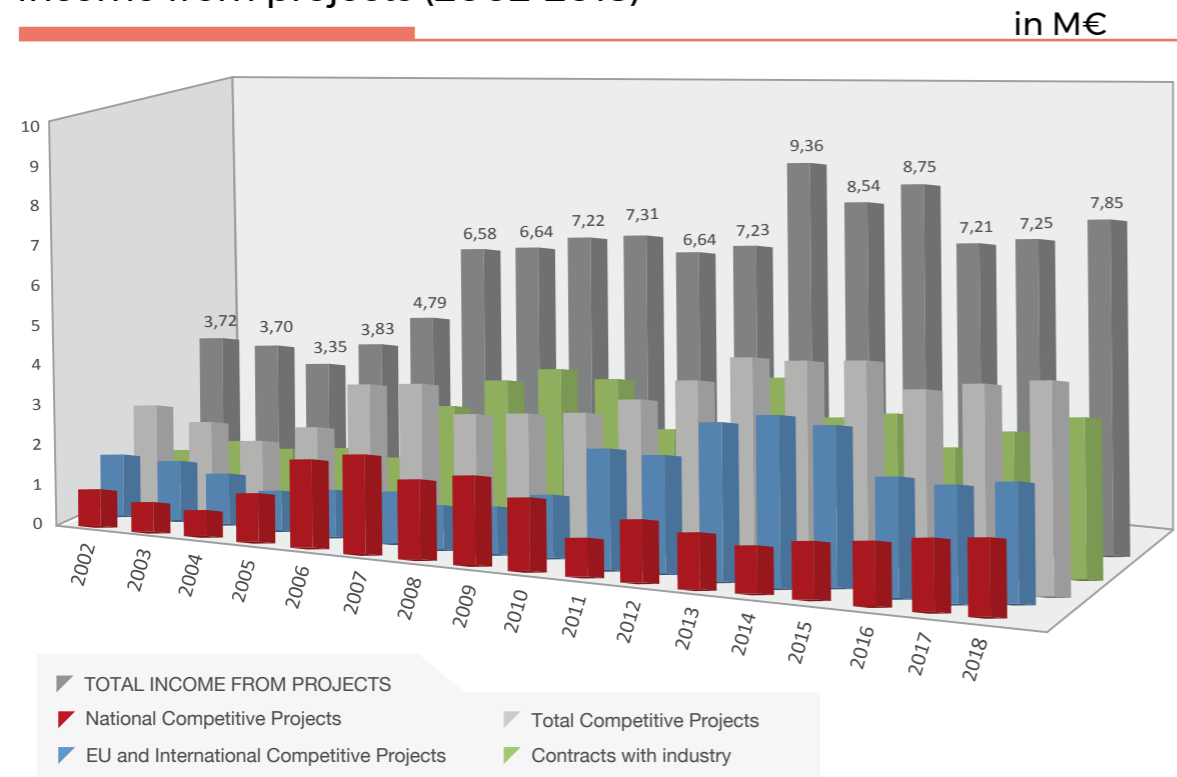Vicepresident and Director of CIMNE

CIMNE in numbers

ACTIVITIES	2018
Postgraduate Studies	4
Conferences	4
Seminars	11
Courses	8
Coffee Talks	15
Publications	110
Books	2
Monographs	8
Research Reports	0
Papers in Journals	100
Spin-off Companies	16
Aulas CIMNE	31
Patents	0 (5)
Contracts with Industry	92 (143)
Competitive Projects	23 (80)
National Projects	16 (47)
International Projects	7 (33)

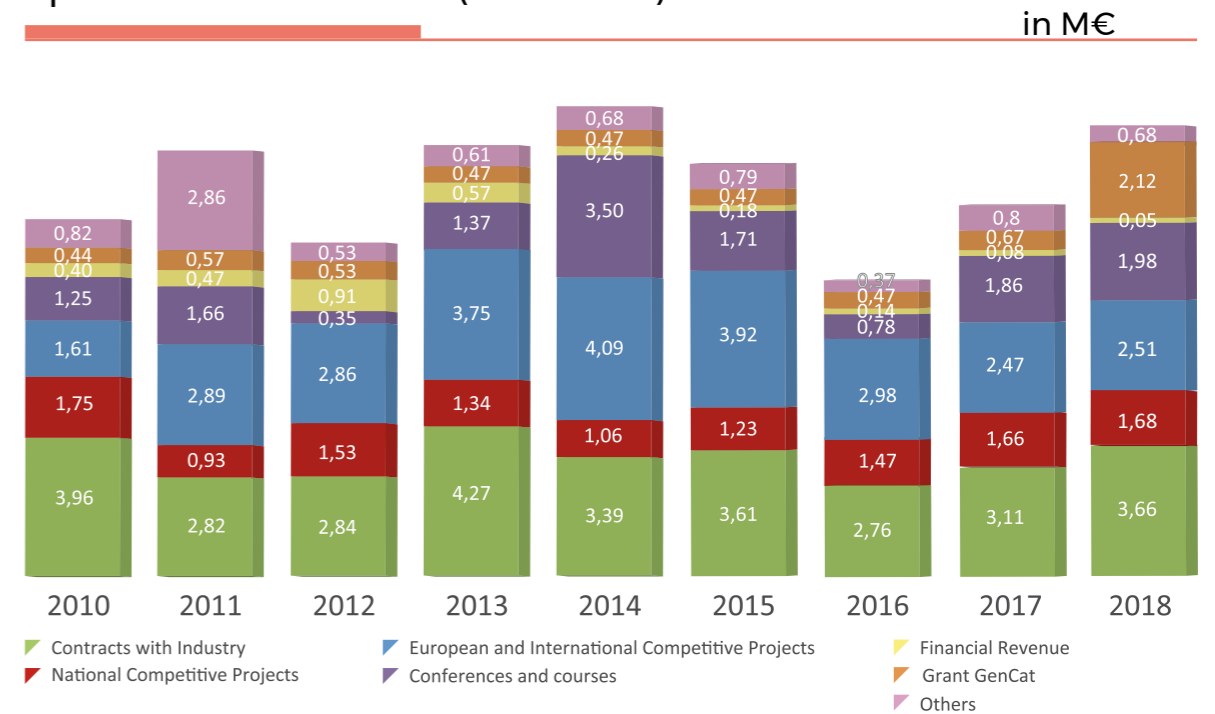In brackets, the total number of on-going contracts and RTD projects.

STAFF / POSITION TITLE	2018
Management Staff	3
Administration Staff	36
Research Staff	71
Full Research Professors	18
Associate Research Professors	13
Assistant Research Professors	18
Staff Scientists	6
Post Docs	16
Research Engineers	53
Research Students	56
PhD Students	35
Master Students	15
Undergraduate Students	6
TOTAL Staff	219

Evolution of Annual income (1987-2018)

in M€

Income from projects (2002-2018)

in M€

- TOTAL INCOME FROM PROJECTS
- National Competitive Projects
- EU and International Competitive Projects
- Total Competitive Projects
- Contracts with industry

Split of Annual income (2010-2018)

in M€

- Contracts with Industry
- National Competitive Projects
- European and International Competitive Projects
- Conferences and courses
- Financial Revenue
- Grant GenCat
- Others

Governing bodies

Governing council

President
Mr. Damià Calvet
President Departament de Territori i Sostenibilitat
(Generalitat de Catalunya)

Representing Catalan Government
Ms. María Matilde Villarroya
Directora General d'Indústria
(Generalitat de Catalunya)

Mr. Isidre Gavín
Secretari d'Infrastructures i Mobilitat
(Generalitat de Catalunya)

Dr. Joan Gómez Pallarès
Director General de Recerca
(Generalitat de Catalunya)

Vice-President
Dr. Eugenio Oñate
Catedràtic (UPC · BarcelonaTech)

Representing UPC · BarcelonaTech
Dr. Francesc Torres
Rector (UPC · BarcelonaTech)

Dr. Gabriel Bugeda
Vicerector of Scientific Policy (UPC · BarcelonaTech)

Dr. Pedro Díez
Catedràtic (UPC · BarcelonaTech)

Representing UNESCO
Dr. Lluís Ramallo
President of the Spanish Commission of UNESCO

Executive council

President
Dr. Eugenio Oñate
Catedràtic (UPC · BarcelonaTech)

Members
Mr. Xavier Baulies
Departament de Territori i Sostenibilitat, Generalitat de Catalunya

Dr. Jordi Berenguer
UPC · BarcelonaTech

Dr. Esteve Codina
UPC · BarcelonaTech

Ms. Cecilia Soriano
UNESCO

Dr. Antonio Gens
UPC · BarcelonaTech

Dr. Alejandro Josa
UPC · BarcelonaTech

Dr. Juan Miquel
UPC · BarcelonaTech

Dr. Juan Jesús Pérez
UPC · BarcelonaTech

Dr. Estanislau Roca
UPC · BarcelonaTech

Dr. Lluís Rovira
Institució Centres de Recerca de Catalunya

Ms. Ana Simon
ACCIÓ, Generalitat de Catalunya

Scientific Advisory Council (Meeting SAC in November 8th, 2017)
From left to right - Sitting down: Dr.-Ing. D. Knörzer (former EC Officer in Aeronautics), Prof. D.R.J. Owen (Swansea Univ., UK), Prof. J. Bonet (Univ. of Greenwich) and Prof. G. von Voigt (Leibniz Univ., Germany). Standing up: Prof. E. Oñate (CIMNE, Spain), Prof. M.Turró (Technical Univ. of Catalonia, Spain), Prof. B. Schrefler (Univ. of Padova, Italy), Prof. M. Kleiber (Polish Academy of Sciences, Poland), Prof. H. A. Mang (Technische Universität Wien, Austria), Prof. Ekkehard Ramm (Univ. of Stuttgart, Germany), Prof. M. Papadrakakis (National Technical Univ. of Athens, Greece), Prof. M. Casteleiro (Univ. of La Coruña, Spain).

Scientific Advisory Council

Chairman
Dr. Roger Owen
Swansea University, UK

Members
Prof. Javier Bonet
University of Greenwich, UK

Prof. Manuel Casteleiro
Universidade da Coruña, Spain

Prof. Michael Kleiber
Polish Academy of Sciences, Poland

Dr.-Ing. Dietrich Knörzer
Former EC Officer

Prof. Bernd Kröplin (†)
University of Stuttgart, Germany

Prof. Rainald Löhner
George Mason University, USA

Prof. Herbert A. Mang
Technische Universität Wien, Austria

Prof. Xavier Oliver
Technical University of Catalonia, Spain

Prof. Manolis Papadrakakis
National Technical University of Athens, Greece

Prof. Ekkehard Ramm
University of Stuttgart, Germany

Prof. Bernhard Schrefler
University of Padova, Italy

Prof. Mateu Turró
Technical University of Catalonia, Spain

Prof. Gabriele von Voigt
Leibniz University, Germany

Prof. Peter Wriggers
Leibniz University, Germany

(†) **Professor Bernd Kröplin passed away on January 1st, 2019.** He was a recognized scientist in the field of computational mechanics. In the period 1988-2010 Prof. Kröplin was director of the prestigious Institute for Static and Dynamics of Aerospace Structures (ISD) of the University of Stuttgart. The research contributions of Prof. Kröplin to new numerical methods for structural mechanics applications, and in particular, for stability analysis of structures, are recognized internationally.
Prof. Kröplin maintained a close cooperation with CIMNE in the last 32 years. He was a member of the Advisory Scientific Committee of CIMNE. CIMNE, ISD and TAO have participated in many research projects with funding from the European Commission.
Together with Prof. Eugenio Oñate (director of CIMNE), he was founder and co-organizer of the series of international conferences on Textile Membranes and Inflatable Structures (STRUCTURAL MEMBRANES).
The death of Prof. Kroplin is a very sad loss for CIMNE and the computational mechanics community in general. From CIMNE we would like to express our sincere condolences to the family, colleagues and friends of Prof. Kröplin.

Governing Council
Chair: D. Calvet

Executive Council
Chair: E. Oñate

Scientific Advisory Council
Chair: R. Owen

Director
E. Oñate

Scientific Director
P. Díez

General Manager
A. Font

Research and Tech Development

RTD Areas and Groups

CIVIL AND MECHANICAL ENGINEERING AREA

Fluid Mechanics Group
Leader - R. Codina

Geomechanics Group
Leaders - A. Gens

Industrial Processes Group
Leader - M. Chiumenti and M. Cervera

Structural Mechanics Group
Leader - E. Oñate

TRANSPORT AREA

Aerospace Engineering Group
Leader - J. Pons

CENIT - Innovation in Transport Group
Leader - S. Saurí

Naval and Marine Engineering Group
Leader - J. García

COMPUTATIONAL AND INFORMATION TECH. AREA

Information and Technology Group
Leader - J. Jiménez

Large-Scale Scientific Computing Group
Leader - S. Badia

Pre and Post-Processing Group
Leader - A. Coll

ENERGY AND ENVIRONMENT AREA

Building, Energy and Environment Group
Leader - J. Cipriano

Risk Assessment Group
Leader - L.Carreño

Administration

ACCOUNTANCY AND FINANCES
Leader - M.C. Linares

COMMUNICATION
Leader - L. Bermúdez

CONGRESS BUREAU
Leader - C. Vizcaya

HUMAN RESOURCES
Leader - I. Latorre

POST-GRADUATE TRAINING
Leader - L. Zielonka

PROJECT MANAGEMENT
Leader - S. Pérez

PUBLICATIONS
Leader - M.J. Samper

SYSTEMS
Leader - M. Alonso

CIMNE Staff

This is the list of all persons who collaborate with CIMNE at December 31st 2018

Research and Technology Development

FULL RESEARCH PROFESSORS
Carmen Andrade
Marcos Arroyo
Carlos Agelet de Saracibar
Eduardo Alonso
Irene Arias
Marino Arroyo
Santiago Badia
Álex H. Barbat
Gabriel Bugeda
José Antonio Canas
Juan Ramón Casas
Miguel Cervera
Michele Chiumenti
Ramón Codina
Pedro Díez
Julio García
Antonio Gens
Antonio Huerta
Sergio Idelsohn
Antonio Lloret
Juan Miquel
José Javier Muñoz
Xavier Oliver
Sebastián Olivella
Sergio Oller
Eugenio Oñate
Javier Príncipe
Enrique Romero
Riccardo Rossi
Xavier Sánchez
Jean Vaunat

ASSOCIATE RESEARCH PROFESSORS
Juan Carlos Cante
Josep M. Carbonell
Liliana Carreño
Daniel Di Capua
Lucila Candela

Pooyan Dadvand
Roberto M. Flores
Jerrad Davis Hampton
Alejandro Josa
Antonia Larese
Alberto Ledesma
Xavier Martínez
Núria Pinyol
Pavel Ryzhakov
Mateu Turró
Francisco Zárate

ASSISTANT RESEARCH PROFESSORS
Pedro Arnau
Joan Baiges
Ernest Bladé
Jordi Cipriano
Jordi Corominas
Josep Dolz
José M. González
Joaquín A. Hernández
Alberto Ledesma
Oriol Lloberas
Jaime E. Martí
Julio M. Martí
Alberto F. Martín
Enrique Ortega
Jordi Pons
Fernando Salazar
Borja Serván

POST DOCS
Mauricio Alvarado
Lucía Barbu
Jordi Cotela
Ignasi de Pouplana
Narges Dialami
Àlex Ferrer
Alessandro Franci
Eloi Gabaldón
Laura González

Jesús A. Güemes
Joaquín Irazábal
Bàrbara Llacay
Luis Monforte
Anna Ramón
Marcelo Raschi
Roger Ruiz
Emilio Salsi
Javier San Mauro
Eduardo Soudah
Erdem Toprak
Francesc Verdugo
David J. Vicente

STAFF SCIENTISTS
Abel Coll
Stoyan Danov
Alessandra Di Mariano
Javier Mora
Fernando Rastellini
Cecilia Soriano

RESEARCH ENGINEERS
Clara Alvarado
Alina Avellaneda
Marc Busquets
Jesús Carbajosa
Miguel Ángel Celigueta
Alexis Cid
Jaime Clapés
Martí Coma
André Conde
Josbel Cordero
Fernando Cortés
Xavier Cubillas
Englantina Dani
Germán De Melo
Gaia Di Carluccio
Enrique Escolano
Alberto Férriz
Óscar Fruitós
Javi Gárate

Javier Garrido
Francesc Gasparín
Vicente Gibert
Raúl Giménez
Jose Manuel González
Jordi Jiménez
Francesc Jordana
Mercè Lopez
Adrià Melendo
Anna Monros
Gerard Mor
Pau Morales
Rafael Morán
Marc Núñez
Gonzalo J. Olivares
José Luis Oñate
Ferran Parera
Miguel Pasenau
Gilbert Peffer
Domingo Peñalver
Daniel Pérez
Juan Pomares
Aleix Pons
Ángel Diego Priegue
Ivan Puig
Sara Puignau
Anaïs Ramos
Ester Raventós
Jaume Roca
Alfonso Rodríguez
Alberto Rovira
Verónica Royano
Ane Elixabete Ripoll
Francisco Rodero
Carlos A. Roig
José Santos
Marcos Sanz
Sergi Saurí
Mercedes Sondon
Jorge Suit
Andreu Tarracó
Alberto Tena

Research and Technology Development

RESEARCH ENGINEERS
(Cont.)
Jose Ignacio Torres
Javier Tous
Luis Ubalde
Sergio Valero
Ignacio Valero
Ahmad Zareidarmiyan
Claudio Zinggerling

RESEARCH STUDENTS

PhD Students
Matías Alonso
Ferran Arrufat
Ramón Barboza
Jesús Bonilla
Martí Burcet
Jordi Carbonell
Fabiola Cavaliere
Javier Cipriano
Jonathan Colom
Alejandro Cornejo
Agustín Cuadrado
Alessandro Fraccica
Rodrigo Gómez
Benedetto Grillone
Sergio Jiménez
Joel Jurado
Pavlina Karagianni
Alexandros Karkoulias
Peiman Khadivipanah
Miguel Ángel Manica
Miguel Masó
Vicente Mataix
Arisleidy Mesa
Arash Moaven
Laura Moreno
Christina Nasika
Alejandro Núñez

Marc Olm
Jaume Palmer
Arnau Pont
Albert Puigferrat
David Roca
Daniel Ruiz
Roger Ruiz
Núria Sau
Deniz Cagri Tanyldiz
Daniel Tarragó
Riccardo Tosi
Saeed Tourchi
Claudia Villarraga
María Teresa Yubero
Ningning Zhang

Master Students
Claudia Álvarez
Oriol Argelaguet
Pere Arrom
Pradeep Bal
Miriam Benítez
José Raúl Bravo
Javier Casanova
Inocencio Castañar
Jesús Conde
Nikhil Dave
Irene De Cubas
Ion Garaicoechea
Joaquín González
Umit Gul
Miquel Iranzo
Miquel Jofra
Oriol Jou
Sanath Keshav
Sumit Maharjan
Luan Malikoski
Babak Mammadov
Pere Antoni Martorell
Chiluba Nsofu

Moisés Ortega
Rafael Pacheco
Samuel Parada
Carlos Pérez
Shushu Qin
Zahra Rajestari
Felipe Robles
Juan Pedro Roldán
Francesc X. Sánchez
Ahmed Sherif
Pablo Leonel Sierra
Daniel Yago
Boyi Ye

Undergraduate Students
Pol Baladas
Oscar Cuatrecasas
Oriol García
Óscar Daniel Ledesma
Ramón Mercè
Hernani Jose Silva
Francesc Turón

VISITING SCIENTISTS
CIMNE promotes the visits of academics and researchers from around the world. Visiting Scientists at CIMNE in 2018:

Visiting Scientists

Keshmiri Amir
(University of Manchester, UK)

Michael Ghosn
(The City Collage, USA)

Axel Larreteguy
(Universidad Argentina de Empresa, Argentina)

Roman Lenner
(Stellenbosch University, South Africa)

Rainald Löhner
(Inst. for Computational Sciences and Informatics Science and Technology, USA)

Mario Storti
(Universidad Nacional del Litoral, Argentina)
VISITING SCIENTISTS

Visiting Students
J. Marcos Bosi Mendonça
Bodhinanda Chandra
Marc Chung-to-Sang
Karol Djanashvili
Hesam Farhangfar
Nicola Germano
Elisa Magliozzi
Christina Nasika
Francesco Pellegrino
Analice Turski Silva
Liang Wang
Xue Zhang

Administration

DIRECTOR
Eugenio Oñate

GENERAL MANAGER
Anna Font

SCIENTIFIC DIRECTOR
Pedro Díez

Administration staff in CIMNE is formed by highly qualified professionals who address the increasing needs of researchers and scientific personnel in the centre.

ACCOUNTANCY AND FINANCES
Mª Carmen Linares
(Head of Unit)
Valentín Catalán
Nuria Holgado
Elisabet Laya
Cristina Luque
Carolina Obando
Paula Oliva

COMMUNICATION
Laura Bermúdez

CONGRESS BUREAU
Cristina Vizcaya
(Head of Unit)
Sami Amin
Laia Aranda
Alessio Bazzanella
Mónica Camanforte
Marcela Silhankova

DIRECTOR SECRETARY
Mercè Alberich

HUMAN RESOURCES
Irene Latorre
(Head of Unit)
Merce Linares
Irene Martínez

PROJECT MANAGEMENT
Sandra Pérez
(Head of Unit)
Daniel Cuadrat
Marina de la Cruz
Francisco de la Rosa
Jon Rodríguez
Mahavir Singh

POSTGRADUATE TRAINING
Lelia Zielonka
(Head of Unit)
Cristina Pérez

PUBLICATIONS
MªJesús Samper
(Head of Unit)
Jesús Sánchez

SECRETARY
Teresa Penalba

SYSTEMS
Miguel Alonso
(Head of Unit)
Alberto Burgos
Aitor Lázaro

TECHNOLOGY TRANSFER
Javier Marcipar

Where we are

Photos: C1 Building at Campus Nord UPC Barcelona

Headquarters

Main premises at UPC

CIMNE's main premises are located at the heart of the North Campus of Universitat Politècnica de Catalunya · BarcelonaTech.

The offices are situated at the C1 Building, adjacent to the Civil Engineering School of UPC and occupy some 1,000 m² of modern office facilities and state of the art equipment with last generation computers linked via a fast intranet and a multicore cluster for parallel computing.

This space, created in 1987, hosts around 90 CIMNE researchers and the main administration offices.

CIMNE-BARCELONA
Campus Nord UPC, C1 Building
C/ Gran Capità, S/N, 08034 Barcelona, Spain
+34 93 401 74 95

B0 Building

In September 2014 CIMNE started the construction of a new building of some 2,000 m² in the North Campus of the Universitat Politècnica de Catalunya · BarcelonaTech.

The new B0 building, that also hosts the Flumen Institute, was completed by the end of 2015. Several CIMNE researchers moved to the new facilities during the first months of 2016. This new building is equipped with modern experimental facilities for model scale testing of river dynamic and hydraulic problems and it also provides work areas for researchers at the graduate level (master, doctoral and postdocs) and for senior researchers from CIMNE and UPC · BarcelonaTech.

CIMNE-B0
Campus Nord UPC, B0 Building
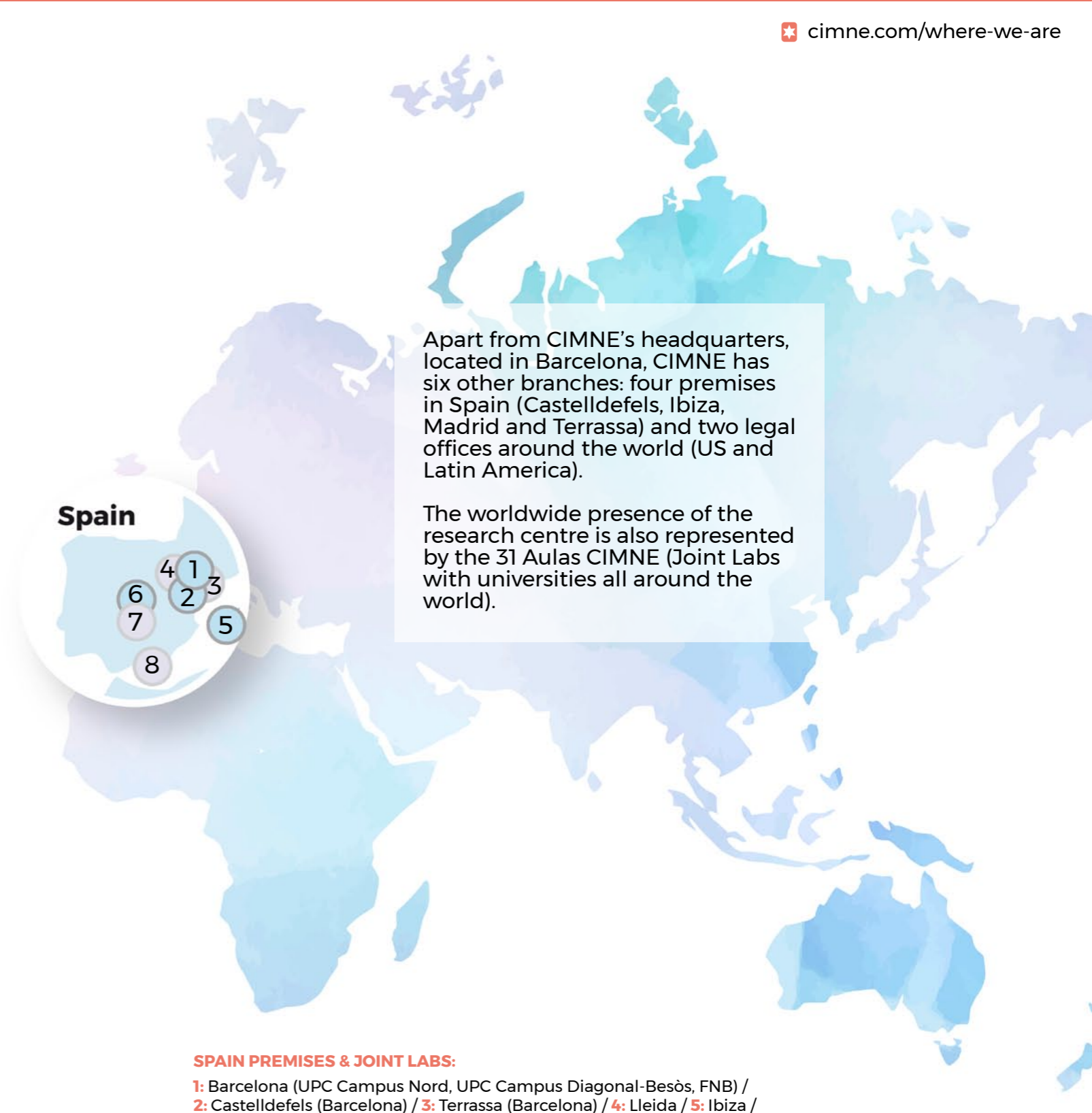C/ Gran Capità, S/N, 08034 Barcelona, Spain
+34 93 401 09 50

B0 Building at Campus Nord UPC Barcelona

CIMNE premises

Washington

México

Cuba

Guatemala
El Salvador

Venezuela

Colombia

Brasil

Perú

Argentina

Santa Fe (Argentina)

Chile

Aulas CIMNE

CIMNE Offices

Spain

Apart from CIMNE's headquarters, located in Barcelona, CIMNE has six other branches: four premises in Spain (Castelldefels, Ibiza, Madrid and Terrassa) and two legal offices around the world (US and Latin America).

The worldwide presence of the research centre is also represented by the 31 Aulas CIMNE (Joint Labs with universities all around the world).

SPAIN PREMISES & JOINT LABS:
1: Barcelona (UPC Campus Nord, UPC Campus Diagonal-Besòs, FNB) /
2: Castelldefels (Barcelona) / **3:** Terrassa (Barcelona) / **4:** Lleida / **5:** Ibiza /
6&7: Madrid / **8:** Cartagena

Premises in Spain

CIMNE - Terrassa

CIMNE offices in Terrassa (Barcelona, Spain) opened in 2001. The premises cover an area of 150m² and house part of the department of Building Energy and Environment Group (BeeGroup).
Director: J. Cipriano

CIMNE - TERRASSA
Campus de Terrassa UPC
Edifici GAIA (TR14)
C/ Rambla Sant Nebridi, 22
08222 Terrassa (Barcelona), Spain
+34 93 789 91 69

CIMNE - Castelldefels

CIMNE's headquarters in the city of Castelldefels (Barcelona, Spain) were inaugurated on October 15th 2008. The facilities are located in the building CIMNE-C3 of the Mediterranean Technology Park of the UPC, and occupy 1,500m² in a new building constructed in collaboration with the UPC. The premises are shared with the Technical School of Castelldefels.
Director: J. Mora

CIMNE - CASTELLDEFELS
Campus del Baix Llobregat UPC
CIMNE Building C3
C/Esteve Terradas, 5
08860 Castelldefels, Barcelona, Spain
+34 93 413 41 86

CIMNE - MADRID

CIMNE - MADRID started its activities in September 2007 and on May 2008 CIMNE opened its premises located in the centre of the city (150m²). The main goal of CIMNE Madrid is to build a strong research team in Madrid and foster the links between CIMNE, the Central Government of Spain, the Technical University of Madrid (UPM) and partner companies and research centres based in Madrid.
Director: F. Salazar

CIMNE - MADRID
Paseo General Martínez Campos, 41, 9°
28010 Madrid, Spain
Tel. +34 91 319 13 59

CIMNE - IBIZA

CIMNE inaugurated the CIMNE - IBIZA branch in 2009. It has 80m² and is located in the city of Ibiza.
CIMNE Ibiza activities focus on the delevopment and application of numerical methods and decision support systems to problems of interest to the environment and the sustainability of island communities.
Director: G. Molina

CIMNE - IBIZA
C/Bisbe Azara, 4, 3° 2ª
07800 Ibiza, Spain
Tel. +34 97 193 11 94

International branches

CIMNE-USA (Washington DC, USA)

CIMNE-USA is an educational and scientific research organization, affiliated with the International Centre for Numerical Methods in Engineering (CIMNE).

The objective of CIMNE-USA is leading scientific research and development projects supported by government, foundations and industry sources.

The branch also carries out educational activities related to advanced numerical methods. It participates in national and international conferences and symposia and works jointly with Aulas CIMNE, in cooperation with US and international universities. CIMNE-USA also supports visiting scientists.

Dr. David Cranmer (on the left side photo), CIMNE US Acting Executive Director, is a senior scientist at the National Institute of Standards and Technology (NIST) and advisor of many US companies. Mr. Varadaraju (Raju) Gandikota (on the right side photo) is CIMNE USA Scientific Director. Ms. Francisca García-Sicilia has coordinated the USA activities until 2018.

Selected RTD Projects

MUD MOTORS: Agreement between Mind Mesh LTD and CIMNE for the development of a software package for the computer simulation of Mud Motors.
Mind Mesh — 01/11/2016 - 01/05/2018

ALTAIR/KRATOS: Kratos App for Casting.
Altair — 22/10/2015 - 22/07/2018
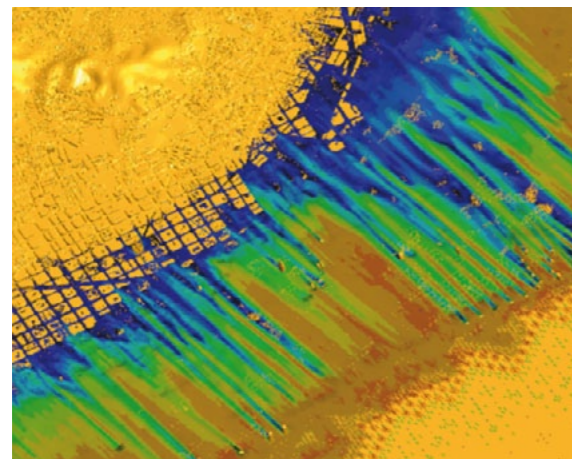
CIMNE-Latin America (Santa Fe, Argentina)

CIMNE is represented in Latin America by the CIMNE Latin American Foundation (FCL).

The CIMNE-Latin American Foundation (FCL) is located in the city of Santa Fe (Argentina), the place where the first CIMNE Classroom in the Latin American region was created in cooperation with University of Litoral.

Since its creation, the CIMNE-Latin American Foundation has developed a wide range of activities in Latin America related to training, research and dissemination of advances in numerical methods.

Many of these projects are developed with the support of CIMNE, Aulas CIMNE, universities and public organizations.
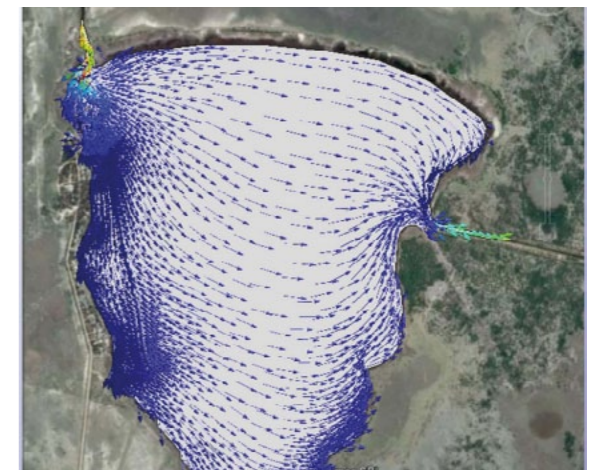The projects in which FCL participates can be classified into the following research areas:

- Engineering and Environment
- Industrial Processes
- Numerical Methods

FCL also takes part and organises courses, seminars, workshops, among others.
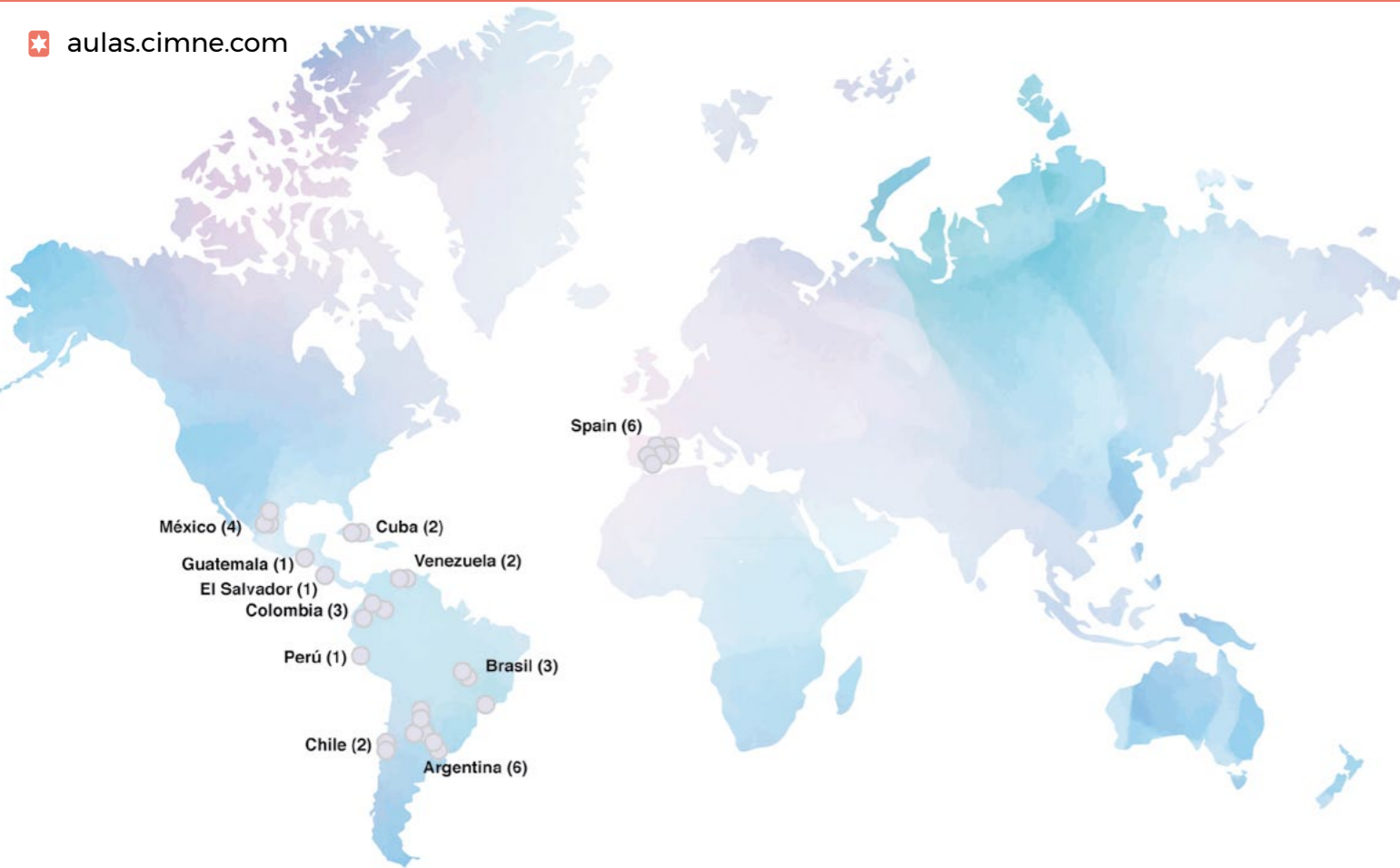
Activities

Development of advanced tools for computational design of engineering materials. CIMNE-Latin America also carries out also actions of representation and dissemination of numerical methods in engineering of the centre in the area.

Project Laguna Paiva
Hydrodynamic study

Spain (6)

México (4)
Cuba (2)
Guatemala (1)
Venezuela (2)
El Salvador (1)
Colombia (3)
Perú (1)
Brasil (3)
Chile (2)
Argentina (6)

TOTAL: 31 AULAS CIMNE

Argentina ○○○○○○
Brazil ○○○
Chile ○○
Colombia ○○○
Cuba ○○
El Salvador ○
Guatemala ○
Mexico ○○○○
Peru ○
Spain ○○○○○○
Venezuela ○○

Aulas CIMNE

Aulas CIMNE are physical spaces (Joint Labs) for cooperation in education, research and technological development (RTD) activities created jointly by CIMNE and one or several universities.

The 31 Aulas CIMNE promote educational and training activities at graduate and postgraduate level and development of RTD projects in cooperation with companies around the world.

AULA FICH – CIMNE (Argentina)

Universidad Nacional del Litoral
Director: Gerardo Franck
Created on: October 2002
Activity: Applications of numerical methods to problems related to water resources, mechanical and computer engineering.

AULA ITBA – CIMNE (Argentina)

Instituto Tecnológico de Buenos Aires
Director: Sebastián d'Hers
Created on: April 2015
Activity: Application development of numerical methods in the field of mechanical, naval, petroleum, chemical, electronics, electrical, industrial engineering and bioengineering.

AULA IUA – CIMNE (Argentina)

Instituto Universitario Aeronáutico
Director: Carlos Sacco
Created on: September 2002
Activity: Applications of numerical methods to problems related to fluid mechanics, structures, heat transfer, etc.

AULA UNER – CIMNE (Argentina)

Universidad Nacional de Entre Ríos
Director: José Di Paolo
Created on: March 2013
Activity: Applications of numerical methods to problems related to Bioengineering.

AULA UNSA – CIMNE (Argentina)

Universidad Nacional de Salta
Director: Liz Nallim
Created on: April 2008
Activity: Development of computer models for application in civil engineering.

AULA UNT – CIMNE (Argentina)

Universidad Nacional de Tucumán
Director: Guillermo Etse
Created on: November 2002
Activity: Development of computational models of bridges (degradation and repair mechanisms).

AULA FEMEC – CIMNE (Brazil)

Universidad Federal de Uberlândia
Director: Sonia Goulart
Created on: April 2004
Activity: Forming process applications, structural design and biomechanics.

AULA IFSP – CIMNE (Brazil)

Instituto Federal de Educaçao, Ciência e Tecnologia de Sao Paulo
Director: Écio Naves
Created on: July 2009
Activity: Applications of numerical methods in engineering problems in forming processes, solid mechanics and biomechanics.

AULA ISF – CIMNE (Brazil)

Instituto Federal de Educaçao, Ciência e Tecnologia de Goiás
Director: Écio Naves
Created on: October 2018
Activity: Applications of numerical methods in engineering problems.

AULA DIMEC – CIMNE (Chile)

Universidad Técnica Federico Santa María
Director: Franco Perazzo
Created on: March 2004
Activity: Numerical methods in mechanical engineering. Development of numerical methods without mesh. Applications in Engineering.

AULA PUCV

Pontificia Universidad Católica de Valparaíso
Director: Juan Carlos Vielma
Created on: October 2017
Activity: Numerical Methods for the evaluation of seismic vulnerability of structures, dynamic response of non-linear structures and pre-seismic reinforcement techniques.

AULA UNC – CIMNE (Colombia)

Universidad Nacional de Colombia
Director: Jairo Andrés Paredes
Created on: June 2005
Activity: Numerical methods applied to civil engineering.

AULA UNIMAR – CIMNE (Colombia)

Universidad Mariana de Colombia
Director: Jorge Hernan López Melo
Created on: May 2018
Activity: Structural analysis.

AULA UNIANDES – CIMNE (Colombia)

Universidad de los Andes
Director: René Meziat
Created on: January 2003
Activity: Teaching and research in numerical methods, optimization, variational principles and computational mechanics.

AULA UCI – CIMNE (Cuba)

Universidad de las Ciencias Informáticas
Director: Jorge Gulín
Created on: October 2015
Activity: Development of computational models and tools with application in high performance computation.

AULA UCLV – CIMNE (Cuba)

Centro de Investigación de métodos computacionales y numéricos en la ingeniería. Universidad Central de las Villas
Director: Carlos Recarey
Created on: July 2003
Activity: Modelling and analysis of structures and grounds to the application of numerical methods.

AULA UCA – CIMNE (El Salvador)

Universidad Centroamericana "José Simeón Cañas" UCA
Director: Mauricio Pohl
Created on: February 2010
Activity: Civil eng. applications and multi objective optimization and applications.

AULA UMG – CIMNE (Guatemala)

Universidad Mariano Gálvez
Director: Rolando Torres
Created on: February 2011
Activity: Development of computer models for application in civil engineering.

AULA CIMAT – CIMNE (Mexico)

Centro de Investigaciones en Matemáticas
Director: Salvador Botello
Created on: June 2006
Activity: Applied mathematics, numerical methods, engineering and statistical analysis.

AULA UGTO – CIMNE (Mexico)

Universidad de Guanajuato
Director: Mabel Mendoza
Created on: January 2002
Activity: Civil engineering applications and multi objective optimization and applications.

AULA MORELIA – CIMNE (Mexico)

Universidad Michoacana de San Nicolás de Hidalgo
Director: Francisco Domínguez
Created on: October 2015
Activity: Civil, mechanic and electric engineering.

AULA ITESM – CIMNE (Mexico)

Inst. Tecnológico de Estudios Superiores de Monterrey
Director: Sergio Gallegos
Created on: May 2009
Activity: Applications of numerical methods in civil engineering.

AULA PUCP – CIMNE (Peru)

Universidad Católica de Perú
Director: Rosendo Franco
Created on: April 2009
Activity: Modelling and analysis of structures and grounds to the application of numerical methods.

AULA ESEIAAT – CIMNE (Spain)

UPC · BarcelonaTech Terrassa
Directors: Roberto Flores; Óscar Fruitós
Created on: April 2007
Activity: Industrial and aeronautical engineering

AULA EEBE – CIMNE (Spain)

Escuela Técnica de Ingeniería Industrial
Director: Daniel Di Capua
Created on: July 2001
Activity: Development of numerical methods in industrial and civil engineering.

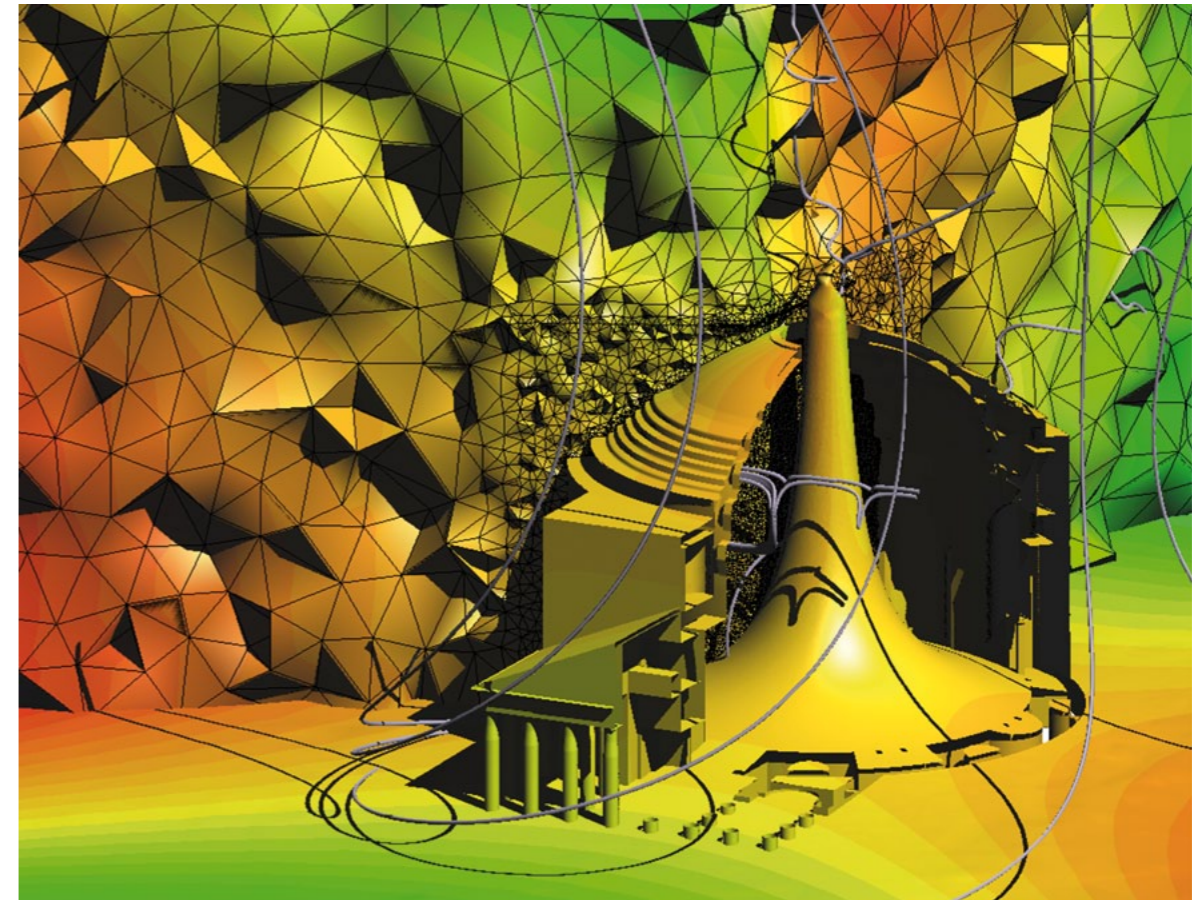## AULA ETSINO – CIMNE (Spain)

Universidad Politécnica De Cartagena
Director: José Gutiérrez
Created on: May 2018
Activity: Development of numerical naval engineering.

AULA FNB – CIMNE (Spain)

Facultad de Náutica de Barcelona
Director: Julio García
Created on: March 2002
Activity: Applications of numerical methods to problems related to marine engineering.

AULA UDL – CIMNE (Spain)

Universidad de Lleida
Director: Jordi Cipriano
Created on: July 2004
Activity: Numerical methods applied to the physics of buildings and renewable energy.

AULA UPM – CIMNE (Spain)

Universidad Politécnica de Madrid
Director: Rafael Morán; Miguel Ángel Toledo
Created on: May 2010
Activity: Applications of numerical methods in civil engineering.

AULA UC – CIMNE (Venezuela)

Universidad de Carabobo
Director: David Ojeda
Created on: April 2009
Activity: Applications of numerical methods in optimization and inverse problems in engineering failure analysis.

AULA UCLA – CIMNE (Venezuela)

Universidad Centrooccidental "Lisandro Alvaro" (UCLA)
Director: Juan Carlos Vielma
Created on: October 2008
Activity: Applications of numerical methods to civil engineering problems.

Activities in Asia Pacific

China

For over 10 years, CIMNE has been collaborating with research organizations, universities and companies in the People's Republic of China in a number of fruitful cooperation agreements, RTD projects and some educational activities.

CIMNE has strong links with the most renowned scientific institutions in China, such as Peking University, Tsinghua University and several research centres of the Chinese Academy of Sciences or the Chinese Aeronautics Establishment.

Supported by the 6th and 7th Framework Programme and the Horizon 2020 of the European Union, CIMNE has carried out the coordination on the European side of a series of projects aimed at promoting joint EU-China research in aeronautics. CIMNE also participates in research projects in areas of risk assessment of natural disasters.

The most relevant activities with China in 2018 have been:

» IMAGE: Innovative Methodologies and technologies for reducing Aircraft noise Generation and Emission.
H2020-MG-2015
Coordinated by Chalmers
01/04/2016 - 31/03/2019

» ECO-COMPASS: Ecological and Multifunctional Composites for Application in Aircraft Interior and Secondary Structures
H2020-MG-2015
Coordinated by DLR
01/04/2016 - 31/03/2019
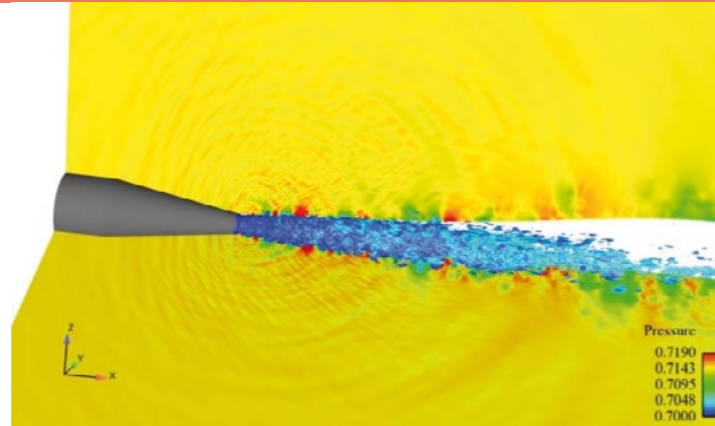
Singapore

CIMNE has collaborated for many years with Singaporean research organizations and companies in the field of biomedicine, energy and marine engineering.

The most outstanding example of research collaboration with Singaporean institutions is the study carried out in cooperation with the Tan Tock Seng Hospital and NTU on mechanistic and pathology of the genesis, growth, and rupture of abdominal aortic aneurysms.
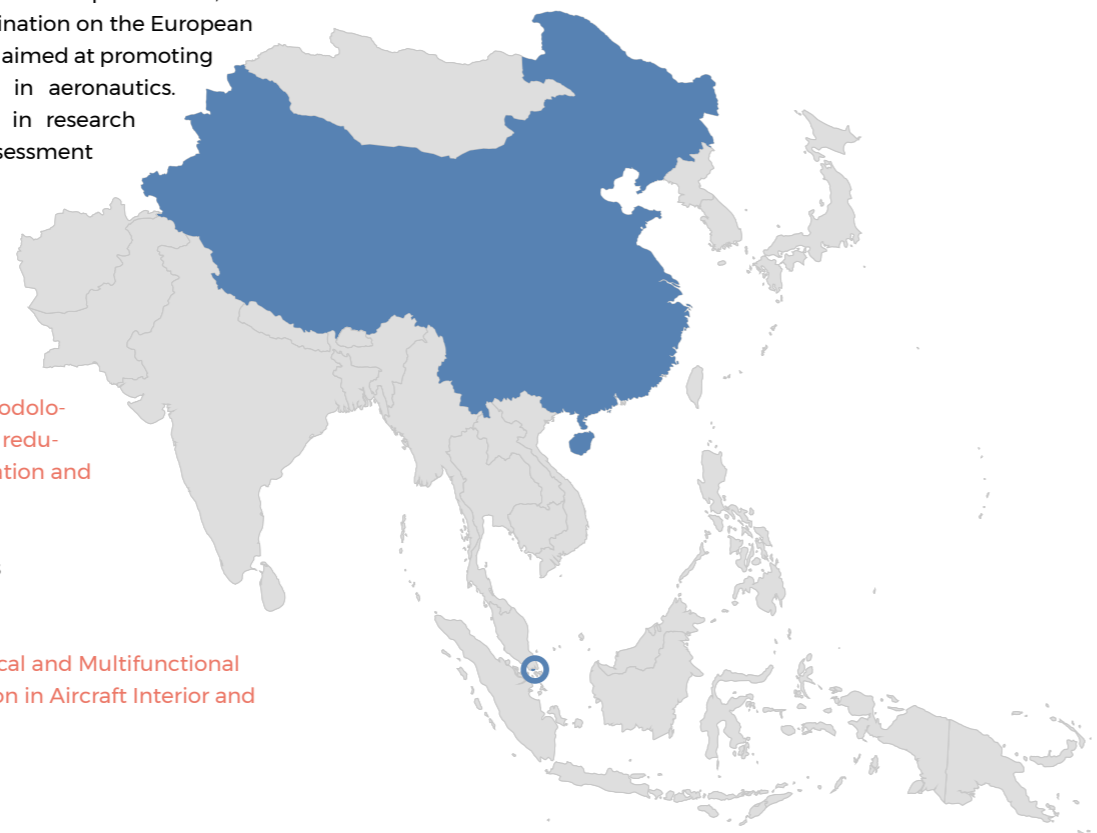
Research

RTD Activities

CIMNE has an important scientific structure splitted into different Research and Technological Development (RTD) Areas and Groups that cover a wide spectrum of research fields.

We list below the research lines at CIMNE and the Research and Technological Development (RTD) Areas and Groups. Principal investigators (PI) leading the research lines of each group are also shown. Researchers are appointed to research groups which are related to relevant engineering areas. In 2018, CIMNE had twelve research groups organized in four different research areas: **Civil and Mechanical Engineering, Energy and Environment, Computational and Information Technologies** and **Transport**.
Research lines often cover basic aspects applicable to different engineering areas. It is common that researchers from different RTD groups contribute to the same research line.

RESEARCH LINES

1. Algorithms for Multiphysics Problems

2. Computational Fluid Dynamics

3. Computational Geomechanics

4. Mathematical and Computational Modelling

5. Computational Modelling of Engineering Materials

6. Computational Solid and Structural Mechanics

7. Optimization

8. Computation and Information Technologies

9. Numerical Methods and Technologies for Energy and Environment

10. Transport System Analysis

RTD AREAS AND GROUPS

Civil and Mechanical Engineering Area

FLUID MECHANICS GROUP
PI's: R. Codina, S. Idelsohn, E. Oñate, R. Rossi and J. Baiges | RL's: 1 and 2.

GEOMECHANICS GROUP
PI's: E. E. Alonso, E. Gens, S. Olivella, X. Sánchez-Vila | RL: 3.

INDUSTRIAL PROCESSES GROUP
PI's: M. Chiumenti and C. Agelet de Saracibar | RL's: 1 and 7.

STRUCTURAL MECHANICS GROUP
PI's: E. Oñate, M. Chiumenti, M. Cervera, X. Oliver and S. Oller
RL's: 1, 5 and 6.

Energy and Environment Area

BUILDING, ENERGY AND ENVIRONMENT GROUP
PI: J. Cipriano | RL: 9.

RISK ASSESSMENT GROUP
PI: A. Barbat | RL: 6 and 9.

Computational and Information Technologies Area

INFORMATION AND COMMUNICATION TECHNOLOGY GROUP
PI: J. Jiménez | RL: 8.

LARGE-SCALE SCIENTIFIC COMPUTING GROUP
PI: S. Badia | RL: 1 and 4.

PRE AND POST-PROCESSING
PI: A. Coll | RL: 8.

Transport Area

AEROSPACE ENGINEERING GROUP
PI's: J. Pons, E.Ortega and G. Bugeda | RL: 2 and 7.

CENIT - INNOVATION IN TRANSPORT GROUP
PI's: S. Saurí | RL: 10 and 7.

NAVAL AND MARINE ENGINEERING GROUP
PI: J. Garcia | RL: 2 and 7.

Research lines of CIMNE

All the research carried out at CIMNE is developed around 10 research lines, which cover several challenging topics:

1. ALGORITHMS FOR MULTIPHYSICS PROBLEMS. Numerical methods for complex coupled problems such as fluid-soil-structure interaction, aero-acoustics, electromagnetics, magneto-hydrodynamics and atmospheric/thermal flows, etc.

2. COMPUTATIONAL FLUID DYNAMICS. Numerical methods for incompressible and compressible flows. Applications to internal and external flows, free-surface flows, multifluids, flow in porous media, aerodynamics and acoustics.

3. COMPUTATIONAL GEOMECHANICS. FEM and particle methods for dry, saturated and partially saturated soils and rocks. Applications to geotechnical engineering: foundations, underground structures, tunnels, dams and slopes.

4. MATHEMATICAL AND COMPUTATIONAL MODELLING. Mathematical models and algorithms for error estimation, mesh adaption and quality of the numerical solution. Reduced order models for (quasi) real time solution of complex engineering systems.

5. COMPUTATIONAL MODELLING OF ENGINEERING MATERIALS. Methods for multiscale analysis of materials and structures. Applications to the design of new smart structural materials.

6. COMPUTATIONAL SOLID AND STRUCTURAL MECHANICS. FEM and particle-based procedures for linear and nonlinear analysis of solids and structures. Applications to most engineering fields.

7. OPTIMIZATION. Robust optimization procedures for shape and material design and process optimization in civil, mechanical, aerospace and naval engineering.

8. COMPUTATION AND INFORMATION TECHNOLOGIES. Methods for mesh generation and visualization of huge sets of numerical results in parallel computers using data mining and cloud storage techniques. Integration of decision support systems in engineering.

9. NUMERICAL METHODS AND TECHNOLOGIES FOR ENERGY AND ENVIRONMENT. Holistic risk prediction and risk management of constructions and landscape under hazards. Methods for producing fresh water via evaporation techniques. Energy management and reduction in buildings.

10. TRANSPORT SYSTEM ANALYSIS. Urban mobility. Port logistics and maritime transport. Transport infrastructure management.
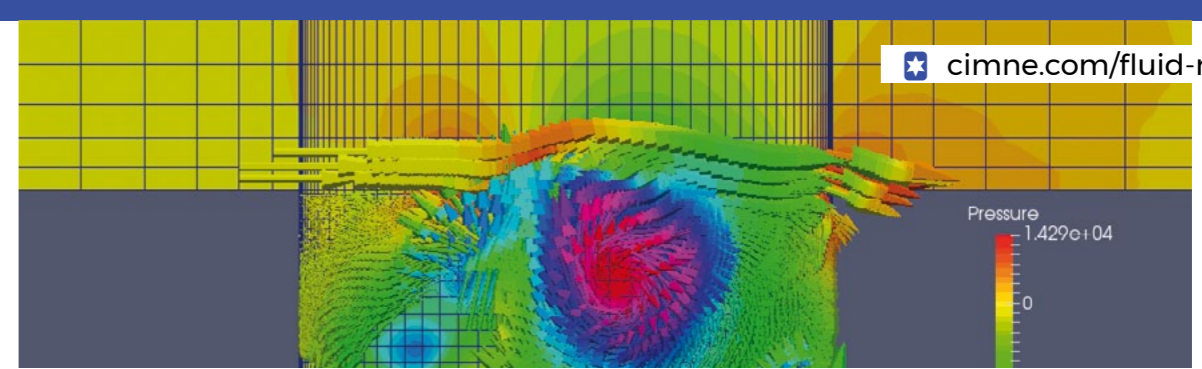
Fluid Mechanics Group

The Fluid Mechanics Group focuses on the development of mathematical models and numerical methods for the solution of a wide range of problems in engineering and other applied sciences involving external and internal flows.

Applications include, among others, high speed compressible flows, turbulent flows, shallow water flows, flow in porous media, bio-flows and many multidisciplinary coupled problems involving fluids, such as magneto-hydro-dynamics, fluid-structure interaction and thermal flows.

Research topics

1. COMPUTATIONAL FLUID DYNAMICS (CFD)
- Stabilized finite element methods for problems involving waves, viscoelastic flows, compressible flows, shallow water flows, magneto-hydro-dynamics and approximation of eigenvalues. **PI:** R. Codina.

- Fractional step schemes for incompressible flows. **PI:** R. Codina.

- Weak imposition of boundary conditions. **PI:** R. Codina.

- Meshless methods in CFD. **PIs:** S. Idelsohn and E. Oñate.

- FEM and particle methods for multifluids, flow in porous media and free surface flows. **PI:** R. Codina, S. Idelsohn and R. Rossi.

- FEM and particle methods for blood flow and air flow in lungs. **PIs:** R. Rossi and E. Soudah.

- Multiscale modelling of turbulence. **PI:** S. Idelsohn.

2. ALGORITHMS FOR MULTIPHYSICS PROBLEMS
- **Aeroacoustics:** Acoustic analogies in incompressible flows, direct numerical simulation of sound, aeroacoustics in time dependent domains, application to human voice simulation. **PIs:** R. Codina and J. Baiges.

- **Optical quality of observation sites:** Numerical simulation of turbulence, estimation of optical parameters of turbulent atmospheres, application to telescope visibility. **PI:** R. Codina.

- **Reduced order models (ROM):** Domain decomposition, fluid-structure interaction, thermally coupled flows. **PIs:** R. Codina and S. Idelsohn.

On-going RTD Projects

ELASTIC-FLOW - Aumento de la eficacia en procesos de mezcla y transmisión de calor utilizando fluidos viscoelásticos en régimen laminar y turbulento
MINECO - Retos Investigación: Proyectos de I+D+i
Coordinator: CIMNE - 01/01/2016 - 31/12/2018

Staff

Ramon Codina (Leader)	Laura Moreno
Sergio Idelsohn (Leader)	Arnau Pont
Joan Baiges	Riccardo Rossi
Jordi Cotela	Eduardo Soudah

Geomechanics Group

The research achievements of the Geomechanics Group focus on the contribution to fundamental understanding and modelling of soil and rock behavior, the development of advanced computational tools and testing techniques at laboratory scale and the participation in applied engineering projects.

Achieving a proper balance among these aspects has been a permanent objective of the group over the years. The research of the group and the software developed are a reference in the analysis of coupled thermal, hydraulic, mechanical and chemical processes in porous media applied to the analysis and design of underground structures (tunnels, foundations, geo-reservoirs, etc), earth and rockfill dams and fluid-soil-structure interaction problems.

Research topics

1. COMPUTATIONAL GEOMECHANICS

• Constitutive models and numerical methods for analysis of unsaturated soils and rocks. **PI:** E. Alonso
  » Particle Methods in Geomechanics
  » Unsaturated Soil Mechanics
  » Landslides

• FEM for coupled problems in geotechnical engineering. Particle-based and discrete element methods for geomechanical problems. **PIs:** A. Gens and S. Olivella

• Bio-geo-chemical processes in artificial recharge practices. **PI:** X. Sánchez-Vila

• Reactive transport, emerging contaminants (ECs) and associated risk. **PI:** X. Sanchez-Vila

• Computational methods for environmental technologies and geohazards. **PI:** X. Sánchez-Vila

Ongoing projects

TERRE - Training Engineers and Researchers to Rethink geotechnical Engineering for a low carbon future - H2020 (2014-2020) - EC
Coordinator: University of Strathclyde
01/11/2015 - 31/10/2019

LOOK - Extracción masiva y no destructiva de información en pruebas experimentales
Proyectos Explora Ciencia y Explora Tecnología - MCIU
Coordinator: CIMNE - 01/11/2018 - 30/10/2019

Staff

Eduardo E. Alonso (Leader)	Luis Monforte
Antonio Gens (Leader)	Ferrran Parera
Núria M. Pinyol (Leader)	Ivan Puig
Matías Alonso	Enrique E. Romero
Mauricio Alvarado	Anna Ramón
Ramón Barboza	Daniel Ruiz
Oriol Bertran	Roger Ruiz
Jose A.Canas	Xavier Sánchez
Gaia Di Carluccio	Núria Sau
Jordi Corominas	Fernando A. Sossa
María S. De la Fuente	Daniel Tarragó
Alessandra Di Mariano	Erdem Toprak
Rodrigo A. Gómez	Saeed Tourchi
Laura González	Claudia J. Villarraga
Alejandro Josa	M. Teresa Yubero
Peiman Khadivipanah	Cristina Valhondo
Arisleidy Mesa	Ningning Zhang
Alberto Ledesma	

Industrial Processes Group

The Industrial Processes Group specializes in the field of metal forming processes, elastomers, composites and environmental impact.

The group performs applied research. There is an important collaboration in R&D with universities, research centres and companies to make them available their expertise on the following topics:
  · Studies of improved manufacturing processes
  · Treatment and recovery of wastes
  · Development of pre/post processing interfaces for specific industrial applications, including adaptations for users with disabilities.

The activities of this group are included in the context of the Help Center Network for Technology Innovation of Catalonia Regional Government and national railway sector and industry cluster RAILGRUP (www.railgrup.net).

Research topics

1. ALGORITHMS FOR MULTIPHYSICS PROBLEMS

FEM for analysis of industrial forming processes (casting, mold filling, sheet metal stamping, 3D printing, friction stir welding, etc.).
PIs: M. Chiumenti and C. Agelet de Saracibar

Particle methods for industrial forming processes.
PI: J.M. Carbonell

Numerical methods for coupled thermal-mechanical problems for constructions and mechanical components. **PIs:** M. Chiumenti and M. Cervera

2. OPTIMIZATION

Numerical methods for optimization of industrial forming processes. **PI:** M. Chiumenti

3. COMPUTATIONAL SOLID AND STRUCTURAL MECHANICS

Structural analysis of mechanical components.
PI: M. Cervera

Pre/Postprocessing interfaces for industrial forming processes. **PI:** O. Fruitós

On-going RTD Projects

ADaMANT - Marco Computacional para la Fabricación Aditiva de Componentes de Aleaciones de Titanio
MCIU - Proyectos de I+D (Excelencia)
Coordinator: CIMNE - *01/01/2018 - 31/12/2020*

AVINT - Estratègies de mecanitzat i predicció de la rugositat per a una integritat superficial òptima (RIS-3CAT Industries del Futur)
ACCIÓ - Projectes col·laboratius recerca industrial i/o innovació
Coordinator: CTM - *01/01/2018 - 31/12/2020*

CAxMan - Computer Aided Technologies for Additive Manufacturing - EC - H2020 (2014-2020)
Coordinator: SINTEF - 01/09/2015 - 31/08/2018

TRANSPORT - Ecosistema d'R+D+i per la implementació i adopció de la Fabricació Additiva/Impressió 3D a la indústria del transport (RIS3CAT Llavor3D)
ACCIÓ - Projectes col·laboratius recerca industrial i/o innovació
Coordinator: CIMNE - *01/01/2018 - 31/12/2020*

Staff

Michele Chiumenti (Leader)	Jesús Conde
	Alberto Férriz
Josep M. Carbonell	Oscar Fruitós
Miguel Cervera	Emilio Salsi

Structural Mechanics Group

The Structural Mechanics Group specializes in the development of next-generation numerical methods and software for the accurate and efficient solution of large scale multidisciplinary engineering problems in structural mechanics.

The research activities of the Structural Mechanics Group have spread over a range of multidisciplinary fields to which it has contributed relevant theories and methods of practical relevance.

The research achievements of the Structural Mechanics Group can be found in the field of numerical methods for the analysis and design of structures, new materials, fluid-structure interaction problems and industrial manufacturing processes are internationally recognised.

Research topics

1. ALGORITHMS FOR MULTIPHYSICS PROBLEMS
· FEM and particle-based methods for fluid-soil-structure interaction. NM for the oil and gas industry. **PI:** E. Oñate

2. COMPUTATIONAL MODELLING OF ENGINEERING MATERIALS
· Constitutive models for metallic and frictional materials (concrete, rocks, soil, ceramics, etc). Multiscale FEM analysis of materials. Optimum material design. **PI:** X. Oliver

· Material models for discrete element methods (DEM). **PI:** E. Oñate

3. COMPUTATIONAL SOLID AND STRUCTURAL MECHANICS
FEM for non-linear analysis of solids and structures. Fracture analysis in solids. **PIs:** M. Cervera and X. Oliver

Rotation-free shell elements. Meshless and particle-based methods in solid mechanics. Multifracture analysis of solids with the DEM and coupled DEM-FEM procedures. **PI:** E. Oñate

Staff

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Deniz Cagri Tanyildiz
Ignacio Valero
David J. Vicente
Francisco Zárate

On-going RTD Projects

AVINT - Estratègies de mecanitzat i predicció de la rugositat per a una integritat superficial òptima
ACCIÓ - Comunitat RIS3CAT Industries del Futur
Coordinator: CTM – *01/01/2018 - 31/12/2020*

ACOMBO - Código de cálculo para el análisis termo-tenso-deformacional complejo de las presas bóveda
MINECO - Retos Colaboración: Proyectos I+D
Coordinator: JGICSA – *01/09/2015 - 31/12/2018*

ACASIAS - Advanced Concepts for Aero-Structures with Integrated Antennas and Sensors – EC - H2020
Coordinator: NLR – *01/06/2017 - 31/05/2020*

ADaMANT - Marco Computacional para la Fabricación Aditiva de Componentes de Aleaciones de Titanio
MCIU - Proyectos de I+D (Excelencia)
Coordinator: CIMNE – *01/01/2018 - 31/12/2020*

BIMIoTICa - Digitalización de los Procesos de Prevención de Riesgos Laborales en el Sector de la Construcción
Coordinator: MCIU - Retos Colaboración: Proyectos I+D
01/07/2018 - 31/12/2020

CALA - Seguridad hidrológica e incremento de la capacidad de embalse de presas de fábrica mediante la implementación de CAnales LAterales – MEIC - Retos Colaboración: Proyectos I+D
Coordinator: CITECHSA – *01/09/2016 - 31/08/2019*

CATALOG - Computational catalog of multiscale materials: a plug-in library for industrial FE codes – EC - H2020 (2014-2020)
Coordinator: CIMNE – *01/01/2018 - 30/06/2019*

CAxMan - Computer Aided Technologies for Additive Manufacturing – EC - H2020
Coordinator: SINTEF – *01/09/2015 - 31/08/2018*

COFRE - COmpuerta Fusible REcuperable para la mejora de la Seguridad Hidrológica de las Presas
MCIU - Retos Colaboración: Proyectos I+D
Coordinator: Ventilación, estructuras y montaje metálicos, SL – *01/07/2018 - 30/06/2021*

COMETAD - Desarrollo de técnicas computacionales y experimentales para el análisis y el diseño de polímeros retardantes al fuego
MINECO - Retos Investigación: Proyectos de I+D+i
Coordinator: CIMNE – *01/01/2015 - 30/06/2018*

DRAGY - Drag Reduction in Turbulent Boundary Layer via Flow Control – EC - H2020 (2014-2020)
Coordinator: CIMNE – *01/04/2016 - 31/03/2019*

DSS4RA - Desarrollo de un Sistema de Apoyo a las Decisiones basado en Técnicas de IA para el manejo rutinario de la Artritis Reumatoide
ISCIII - Acción Estratégica en Salud
Coordinator: Hospital de la Princesa
01/01/2015 - 31/12/2018

ECO-COMPASS - Ecological and Multifunctional Composites for Application in Aircraft Interior and Secondary Structures – EC - H2020 (2014-2020)
Coordinator: DLR – *01/04/2016 - 31/03/2019*

ELASTIC-FLOW - Aumento de la eficacia en procesos de mezcla y transmisión de calor utilizando fluidos viscoelásticos en régimen laminar y turbulento
MINECO - Retos Investigación: Proyectos de I+D+i
Coordinator: CIMNE – *01/01/2016 - 31/12/2018*

EMUSIC - Efficient Manufacturing for Aerospace Components USing Additive Manufacturing, Net Shape HIP and Investment Casting - EC - H2020 (2014-2020)
Coordinator: Univ. Birmingham – *01/04/2016 - 31/03/2019*

FIBRESHIP - Engineering, production and life-cycle management for massive application of FIBRE-based materials in large-length SHIPs
EC - H2020 (2014-2020)
Coordinator: TSI – *01/06/2017 - 31/05/2020*

HIRMA - Desarrollo y validación de una aplicación para la determinación del hidrograma de rotura de presas de materiales sueltos
MEIC - Retos Colaboración: Proyectos I+D
Coordinator: INCLAM – *01/09/2016 - 31/08/2019*

IMPRESIÓN - Desarrollo de una herramienta para el tratamiento de imágenes de presas tomadas mediante drones y su integración en el sistema de auscultación de la presa – MEIC - Retos Colaboración: Proyectos I+D
Coordinator: TECOPY - *01/10/2016 - 31/12/2018*

IMAGE - Innovative Methodologies and technologies for reducing Aircraft noise Generation and Emission
EC - H2020 – Coordinator: CHALMERS – *01/04/2016 - 30/06/2019*

METAMAT - Computational design of acoustic and mechanical metamaterials - MCIU - Proyectos de I+D
Coordinator: CIMNE – 01/01/2018 - 31/12/2020

MONICAB - Desarrollo de herramientas para la modelación numérica del efecto de la contaminación del balasto con arena en líneas de alta velocidad
MINECO - Proyectos de I+D: Retos de la Sociedad 2015
Coordinator: CIMNE – *01/01/2016 - 31/12/2018*

MOVASE - Desarrollo de nuevos métodos y herramientas para la optimización del proceso de fabricación de envases de vidrio
MEIC - Retos Colaboración: Proyectos I+D
Coordinator: COMPASS ING. Y SISTEMAS, S.A. *01/07/2016 - 31/12/2018*

NICE-SHIP - Development of new Lagrangian computational methods for ice-ship interaction problems
ONR- NICOP
Coordinator: CIMNE – *30/09/2016 - 01/10/2019*

NUMA - Desarrollo de una plataforma para la integración de modelos NUméricos de base física y Modelos basados en datos en la gestión de la Auscultación de presas - MEIC - Retos Colaboración: Proyectos I+D
Coordinator: DACARTEC – *01/06/2016 - 31/12/2018*

PABLO - Prototipo de Aliviadero de BLOques en forma de cuña
MCIU - Retos Colaboración: Proyectos I+D
Coordinator: PREHORQUI – *01/07/2018- 30/06/2021*

PRO2 - Ecosistema d'R+D+i per la implementació i adopció de la Fabricació Additiva /Impressió 3D a fabricació de productes indistrials i als processos industrials de producció
ACCIÓ - Comunitat RIS3CAT Llavor3D
Coordinator: LEITAT – *01/01/2018 - 31/12/2020*

PS BRIDGE - Desarrollo de un puente liviano, modular y portable con vigas Tensairity
MCIU - Retos Colaboración: Proyectos I+D
Coordinator: PSTEC - *01/07/2018 - 30/06/2020*

ResCiclo - Evaluación de la resistencia residual de estructuras de hormigón armado sometidas a eventos sísmicos
MINECO - Retos Investigación: Proyectos de I+D+i
Coordinator: CIMNE – *01/01/2016 - 31/12/2018*

TRANSPORT - Ecosistema d'R+D+i per la implementació i adopció de la Fabricació Additiva/Impressió 3D a la indústria del transport
ACCIÓ - Comunitat RIS3CAT Llavor3D
Coordinator: CIMNE – *01/01/2018 - 31/12/2020*

SCAVE - Espacio inmersivo, interactivo e itinerante para la gestión colaborativa de proyectos constructivos
MEIC - Retos Colaboración: Proyectos I+D
Coordinator: PMS – *01/10/2016 - 31/03/2019*

SIMSOLIDAM - Simulation of metal Solidification in Additive Manufacturing processes
EC - H2020 (2014-2020)
Coordinator: CIMNE – *15/03/2017 - 14/03/2019*

SMILER -Desarrollo de un Sistema basado en MachIne Learning para la Reducción de pérdidas en redes de distribución de agua
MCIU - Retos Colaboración: Proyectos I+D
Coordinator: INCLAM – *01/07/2018 - 31/12/2020*

StampackXXI - Desarrollo de un nuevo código para simulación de procesos de conformado de piezas laminares – MEIC- Retos Colaboración: Proyectos I+D
Coordinator: QUANTECH - 01/10/2016 - 31/03/2019

Building, Energy and Environment Group

The Building, Energy and Environment Group (BEE Group) focus on the development of numerical methods in energy saving, at building and consumer levels, and the environment.

The Building Energy and Environment Group (BEE Group) is an autonomous research unit of CIMNE centre involving over 20 researchers (Physics, Engineering,   ICT, Environmental Science and Statistics specialists). It was founded in 2001 and has two main offices, one in the GAIA building of the UPC Campus in Terrassa and the other in the EUROTRADE building (C/Pere de Cabrera,16,2˚ G, 25002, Lleida).

BEE Group meets the challenge of employing our knowledge and experience to help users to get the best possible use out of the energy that they consume.

Staff

Jordi Cipriano (Leader)
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Jaime E. Martí
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José Santos López
Jaume Palmer
Daniel Pérez

Research topics

1. COMPUTATION AND INFORMATION TECHNOLOGIES
• Development of data driven models to get insights of the energy performance of huge amounts of buildings in real operation conditions.

2. NUMERICAL METHODS AND TECHNOLOGIES FOR ENERGY AND ENVIRONMENT
• A comprehensive work about design, implementation and installation of domestic and industrial bio-digesters, adapting to simple technologies in cold climates. More than 2000 bio digesters have been installed in Latin America.

• Working actively to raise the awareness of the trend towards near zero and energy positive buildings; towards the time in the near future when buildings will produce as much or more energy than they consume.

3. OPTIMIZATION
• Developing technologies to maximize the flexibility of the electricity network while optimizing the use of Renewable Energy Sources in urban environments.

• Help energy users to save energy by positively manage their energy consumption with new developments to understand their behavior and performance.

On-going RTD Projects

EDI-Net - The Energy Data Innovation Network
EC - H2020 (2014-2020)
Coordinator: DMU
01/03/2016 - 01/03/2019

FCU - Fortalecimiento de la cooperación universitaria
AECID
Coordinator: ISF
01/09/2017 - 30/03/2019

FLEXCoop - Democratizing energy markets through the introduction of innovative flexibility-based demand response tools and novel business and market models for energy cooperatives
EC - H2020 (2014-2020)
Coordinator: Fraunhofer
01/10/2017 - 30/09/2020

REFER - Reducció Energètica i Flexibilitat en Edificis en Rehabilitació
ACC1Ó - Projectes col·laboratius recerca industrial i/o innovació
Coordinator: COMSA EMTE, S.L.
01/06/2016 - 31/05/2019

SHERPA - Shared knowledge for Energy renovation in buildings by Public Administrations
EC - MED Programme 2014-2020
Coordinator: GENCAT
27/09/2016 - 31/10/2019

Sim4Blocks - Simulation Supported Real Time Energy Management in Building Blocks
EC - H2020 (2014-2020)
Coordinator: ZAFH
01/04/2016 - 31/03/2020

SIE3 - Sistema de Información Energética de Edificios en Ecuador
AECID – Coordinator: CIMNE
01/04/2017 - 31/03/2019

Technology transfer

The BEE Group collaborates with national and international companies and institutions since 2001, a long journey with more than 41 national and international RTD projects that has carried on a trade to emerge two new business "Start-ups": Inergy (created in 2012) and Beedata Analytics (created in 2017).

Further information at "Spin-off Companies" section at page 68.
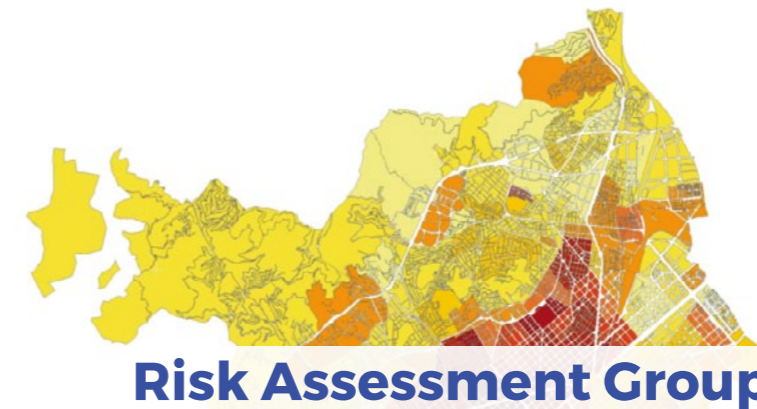
Risk Assessment Group

The Risk Assessment Group has made important contributions to seismic vulnerability and risk studies in Spain, Europe and Latin America. This group has developed numerous natural hazards and risk modelling studies for several countries in the Latin America and Caribbean Region, Europe, South-East Asia and Indic Ocean.

These studies have been developed for different resolution levels and with different objectives; thus, their results have been used for risk reduction, land use planning, financial risk transfer, insurance and re-insurance, and for integrated disaster risk management.

The developments performed on the vulnerability and risk evaluation and on the holistic risk approach, as well as on the development and use of risk indicators and the development of urban risk scenarios, are well known in the scientific community.

More recently, contributions have been made in the fields of probabilistic modelling of hazard and risk, economic evaluations for risk transfer and financial protection. In 2018, for example, the group has collaborated with the Inter-American Development Bank to create risk profiles for the Northern Region of Central America and Uruguay.

Staff

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M. Liliana Carreño (Leader)
Lucía G. Barbu
Ignasi de Pouplana
Bàrbara Llacay
Julio M. Martí
Cecilia Soriano

Research topics

1. COMPUTATIONAL SOLID AND STRUCTURAL MECHANICS

Seismic vulnerability assessment of structures using computational models. Risk evaluation using deterministic and probabilistic approaches at several spatial scales for different natural hazards such as earthquakes, tsunamis, floods, drought, tropical cyclones, volcanic eruptions, among others.

2. NUMERICAL METHODS AND TECHNOLOGIES FOR ENERGY AND ENVIRONMENT

Holistic evaluation of disaster risk at different levels. Risk evaluation from a comprehensive approach taking into account socio-economic fragilities and lack of resilience of the community. Development of tools for effective and integral disaster risk management. This involves the use of the risk evaluation results in risk reduction, disaster management, and the performance evaluation of disaster risk management.

On-going RTD Projects

E-ZUANA - Evaluación de la vulnerabilidad y el riesgo de Zonas Urbanas expuestas a Amenazas Naturales y Antrópicas
MINECO - Retos Investigación: Proyectos de I+D+i
Coordinator: CIMNE
30/12/2016 - 29/12/2019
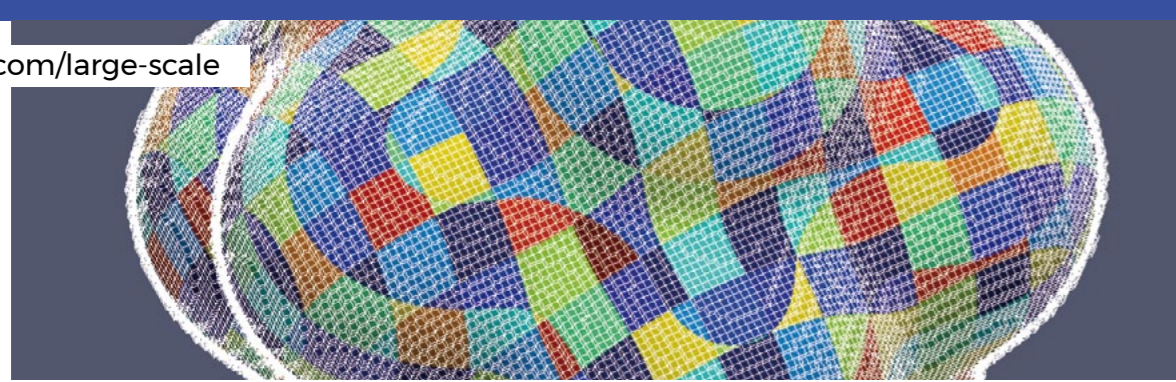
Large-scale Scientific Computing Group

The large scale scientific computing group develops advanced numerical methods for the simulation of problems governed by PDES, e.g., solid and fluid mechanics and electromagnetics, together with the design and implementation of scalable solvers for the arising linear systems.

Research topics

PI: S. Badia

1. MATHEMATICAL AND COMPUTATIONAL MODELLING

· Weakly scalable algorithms for finite element problems
· Unfitted finite element methods
· hp-adaptive finite elements
· Space-time formulations and solvers
· Optimization at large scales
· Uncertainty and quantification at large scales

2. ALGORITHMS FOR MULTIPHYSICS PROBLEMS

· Preconditioners for multiphysics problems
· Interface problems with unfitted finite elements
· Large scale multiphysics simulations
· Coupling of electromagnetical, thermal, and solid and fluid mechanics problems

On-going RTD Projects

EFES - Algoritmos de elementos finitos para exaescala y su implementación en código libre
PLAN ESTATAL (2013-16) - MINECO
Coordinator: CIMNE
01/01/2015 - 31/12/2018

EUROFUSION
EC - H2020 (2014-2020)
Coordinator: EURATOM
01/01/2014 - 31/12/2018

NuWaSim - On a Nuclear Waste Deep Repository Simulator
EC - ERC-2016-PoC
Coordinator: CIMNE
01/11/2016 - 30/04/2018

Staff

Santiago Badia (Leader)
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Víctor Sande
Francesc Verdugo
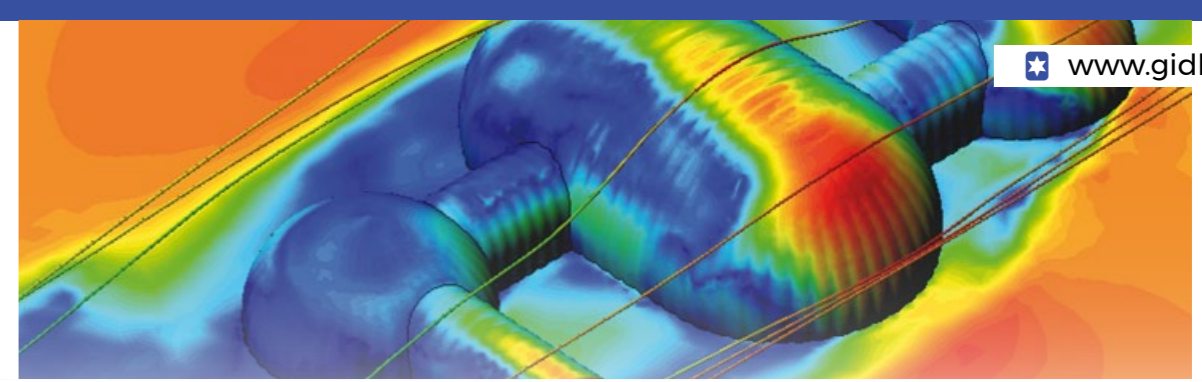
Pre and Post-Processing Group

The Pre and Postprocessing Group works on the development of advanced methods for efficient generation of data for numerical simulations and visualization of computational results.

Research and development activities include:

· Geometry creation, importation and edition (CAD).
· Mesh generation.
· Interfacing between preprocessor, solvers and postprocessor.
· Visualization of huge amount of data in a 3D environment.
· Advanced visualization techniques for stereoscopic and realistic visualization.

Technology transfer

The main commercial product of the group is the software GiD, which is a universal pre and postprocessor (www.gidhome.com) able to be connected with several numerical simulation codes and provide them with several advanced tools in the geometry creation and edition, mesh generation, assignation of data to the geometry or mesh, advanced visualization tools, and results visualization.
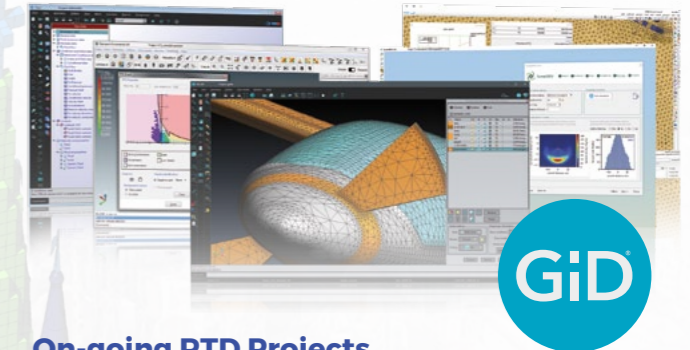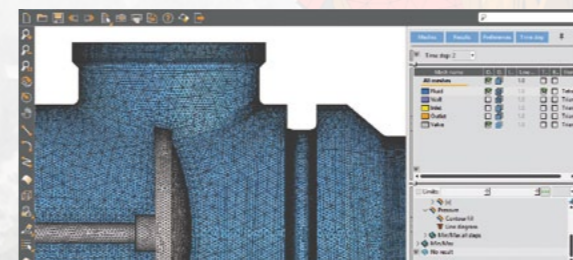
On-going RTD Projects

ACASIAS - Advanced Concepts for Aero-Structures with Integrated Antennas and Sensors
EC - H2020 (2014-2020)
Coordinator: NLR
01/06/2017 - 31/05/2020

Staff

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CORRIDOR INFORMATION FLOW THROUGH TO THE CMP

GOODS SUPPLIER

HINTERLAND AT ORIGIN → PORT OF ORIGIN → SEA CARRIER → PORT OF DESTINATION → HINTERLAND AT DESTINATION

CUSTOMER

GOODS FLOW THROUGH TO THE CORRIDOR INFRASTRUCTURES

WiderMoS project. Interoperability & multimodality. Door 2 Door Logistics.
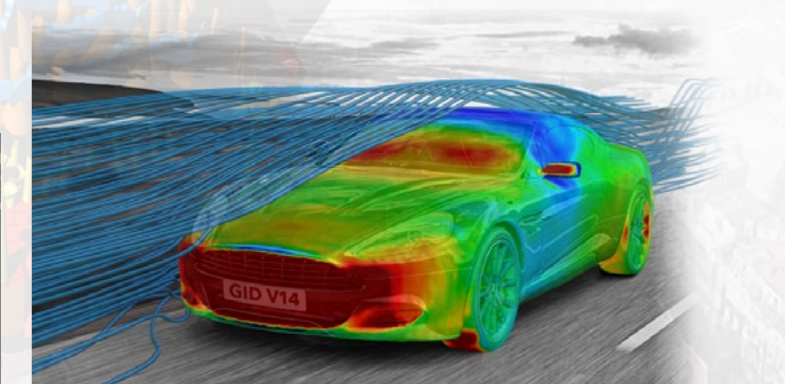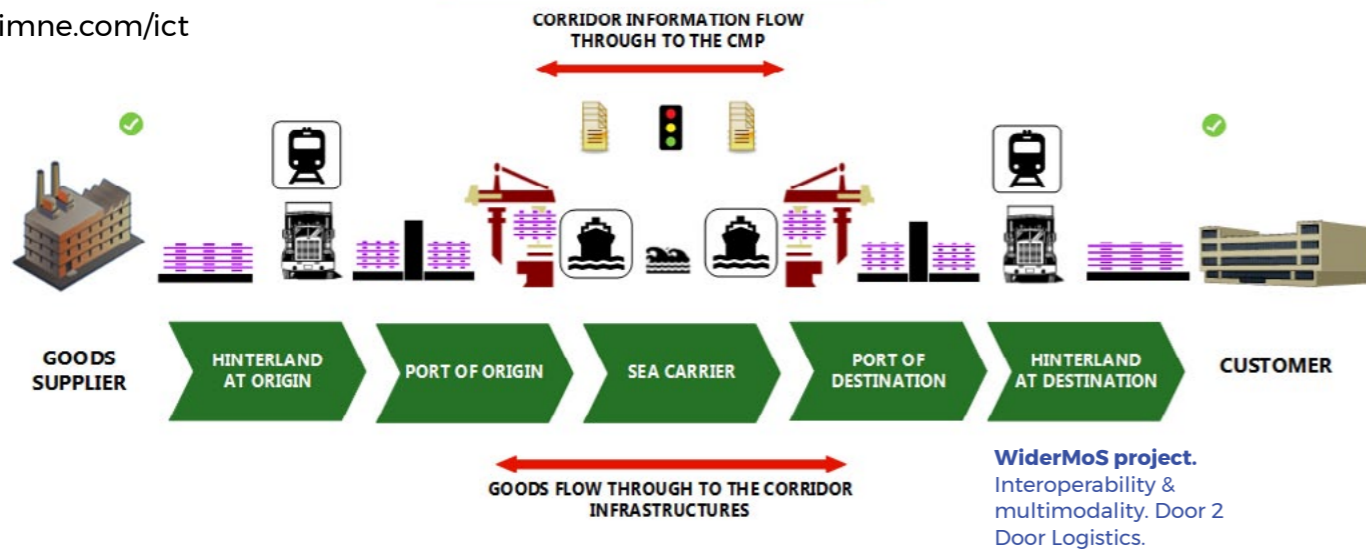
Information and Communication Technology (ICT) Group

The Information and Communication Technology Group of CIMNE specializes in research, development and innovation of new and disruptive tecnologies, applicable to multiple engineering areas.

The group activities aim to improving simulation tools, smart embedded systems, Artificial Intelligence (AI) and GIS in order to develop Decision Support Systems (DSS) and prediction systems for advancing knowledge and technology in engineering and applied sciences.

Research topics

1. COMPUTATION AND INFORMATION TECHNOLOGIES (PI: J. Jiménez)

- Decision Support Systems
- Smart Management Systems
- Internet of Things
- App Technology
- Embedded ICT Systems
- Internet Tools
- GIS (2D/3D)
- WSN Deployments
- BOT Technology
- Blockchain
- Machine Learning
- Virtual and Augmented Reality
- Data Science and Artificial Intelligence

Staff

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Pavlina Karagianni
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Javier Mora
José Luis Oñate

Gilbert Peffer
Ángel Diego Priegue
Andreu Tarracó
Alberto Tena
Javier Tous
Sergio Valero
Claudio M. Zinggerling

On-going RTD Projects

BIMIoTICa - Digitalización de los Procesos de Prevención de Riesgos Laborales en el Sector de la Construcción
MCIU - Retos Colaboración: Proyectos I+D
Coordinator: COMSA – 01/07/2018 - 31/12/2020

COFRE - Diseño Industrial de una COmpuerta Fusible REcuperable para la mejora de la Seguridad Hidrológica de las Presas
MCIU - Retos Colaboración: Proyectos I+D
Coordinator: Ventilación, Estructuras y montajes metálicos, SL – 01/07/2018 - 30/06/2021

EnerNETMob - Mediterranean Interregional Electromobility Networks for intermodal and interurban low carbon transport systems
EC - MED Programme 2014-2020
Coordinator: REGPEL – 01/02/2018 - 31/01/2022

GNLBlockchain - Implementación de un prototipo pre-industrial de ultracongelación utilizando GNL y desarrollo de herramientas de trazabilidad mediante el concepto Blockchain
MCIU - Retos Colaboración: Proyectos I+D
Coordinator: E4EFFICIENCY – 01/07/2018 - 30/06/2021

IMPRESIÓN: Desarrollo de una herramienta para el tratamiento de imágenes de presas tomadas mediante drones y su integración en el sistema de auscultación de la presa
MEIC - Retos Colaboración: Proy. I+D
Coordinator: TECOPY - 01/10/2016 - 31/12/2018

LASH FIRE - Legislation Assessment addressing Safety Hazards of Fire and Innovations in Ro-ro ship Environments – EC - H2020 (2014-2020)
Coordinator: RISE - 01/05/2019 - 30/04/2023

PABLO - Prototipo de Aliviadero de BLOques en forma de cuña – MCIU - Retos Colaboración: Proyectos I+D
Coordinator: PREHORQUI - 01/07/2018 - 30/06/2021

PAVIRE - Plataforma TIC para la Gestión del Estado del Pavimento y su influencia en el consumo con información cruzada del tipo de conducción
MCIU - Retos Colaboración: Proyectos I+D
Coordinator: COMSA – 01/07/2018 - 31/12/2020

PS BRIDGE - Puente liviano, modular y portable con vigas Tensairity – MCIU - Retos Colaboración: Proyectos I+D
Coordinator: PSTEC – 01/07/2018 - 30/06/2020

PICASSO - Preventing Incident and Accident by Safer Ships on the Oceans
EC - INEA - CEF Programme 2014-2020
Coordinator: Sasemar – 01/05/2016 - 30/06/2018

SCAVE - Espacio inmersivo, interactivo e itinerante para la gestión colaborativa de proyectos constructivos
MINECO - Retos Colaboración: Proyectos I+D
Coordinator: PMS - 01/10/2016 - 31/03/2019

SciShops.eu - Enhancing the Responsible and Sustainable Expansion of the Science Shops Ecosystem in Europe – H2020 (2014-2020) - EC
Coordinator: SYNYO – 01/09/2017 - 29/02/2020

SMILER - Sistema basado en MachIne Learning para la Reducción de pérdidas en redes de distribución de agua – MCIU - Retos Colaboración: Proyectos I+D
Coordinator: INCLAM – 01/07/2018 - 31/12/2020

STM Validation Project
EC - CEF Programme 2014-2020
Coordinator: Swedish Maritime Administration
01/01/2015 - 30/06/2019

TERRE - Training Engineers and Researchers to Rethink geotechnical Engineering for a low carbon future – H2020 (2014-2020) - EC
Coordinator: University of Strathclyde
01/11/2015 - 31/10/2019

CENIT - Innovation in Transport Group

With the integration of CENIT in CIMNE in 2017, synergies in research, development and technology transfer on the transport field have been enhanced.

The Centre for Innovation in Transport (CENIT) was incorporated in CIMNE as a new research group in the area of transport. This has contributed to provide solutions on the transport and mobility area of interest to society from a cross-cutting point of view.

Research topics

1. TRANSPORT SYSTEM ANALYSIS (PI: S.Saurí)

URBAN MOBILITY
- Public Transport
- Travel Behavior
- Transport Economics
- Urban Freight Distribution
- Electromobility and Traffic Modelling

PORT LOGISTICS AND MARITIME TRANSPORT
- Demand Analysis
- Transport Economics
- Operational Research at Terminals Port Management
- Port Management

TRANSPORT INFRASTRUCTURE MANAGEMENT
- Transport Economics Public
- Private partnership

2. OPTIMIZATION
- Assessment of transport investments and policies, improvement of public transport networks, optimization of operations, application of technology to transportation, demand modeling and urban mobility. PI: S. Saurí

Staff

Sergi Saurí (Leader)
Pere Arrom
Eglantina Dani
Irene de Cubas
Julia García
Javier Garrido
Francesc Gasparín
Umit Gul
Miquel Jofra
Genis Majoral

Pau Morales
Moisés Ortega
Domingo Peñalver
Francisco Rodero
Kristi Ann Shalla
Ane Elixabete Ripoll-Zarraga
Jose Ignacio Torres
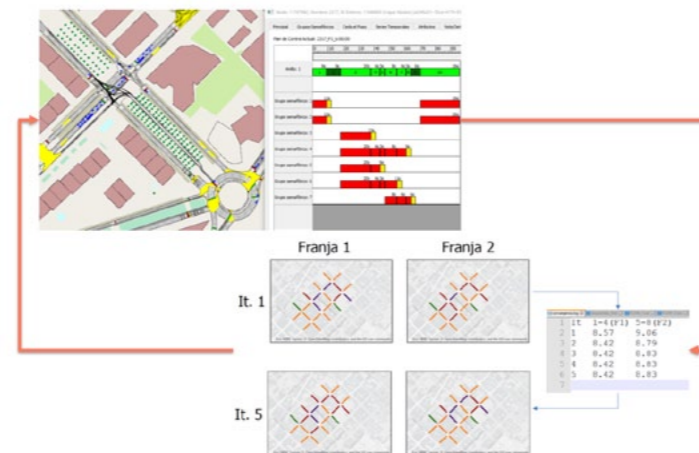
Photo: Optimization traffic regulation of 22 @ District

On-going RTD Projects

EnerNETMob - Mediterranean Interregional Electromobility Networks for intermodal and interurban low carbon transport systems
EC - MED Programme 2014-2020
Coordinator: REGPEL – *01/02/2018 - 31/01/2022*

INTERMODEL - Simulation using Building Information Modeling Methodology of Multimodal, Multipurpose and Multiproduct Freight Railway Terminals Infrastructures (TRA.16P042)
EC - H2020 (2014-2020)
Coordinator: IDP Ingeniería y Arquitectura Iberia SL
01/09/2016 - 31/08/2019

LASH FIRE - Legislation Assessment addressing Safety Hazards of Fire and Innovations in Ro-ro ship Environments – EC - H2020 (2014-2020)
Coordinator: RISE – *01/05/2019 - 30/04/2023*

NOVELOG - New cooperative business models and guidance for sustainable city logisticsInfrastructures (TRA.15P027)
EC - H2020 (2014-2020)
Coordinator: CERTH
01/06/2015 - 31/05/2018

ELIPTIC - Electrification of public transport in cities
EC - H2020 (2014-2020)
Coordinator: FHB – *01/06/2015 - 31/05/2018*

GrowSmarter - Transforming cities for a smart, sustainable Europe (TRA.14P024) - EC - H2020 (2014-2020)
Coordinator: STOCKHOLMS STAD
01/01/2015 - 31/12/2019

REG4SSEA - Estrategias regulatorias para fomentar el transporte sostenible a través del Short Sea Shipping (TRA.169053)
MINECO - Retos Investigación: Proyectos de I+D+i
Coordinator: CENIT – *30/12/2016 - 29/12/2019*

Aerospace Engineering Group

The Aerospace Engineering Group develops innovative research in the fields of aeronautics and space, optimization and data modelling, as well as fuel cells.

The group deals with research in fluid dynamics, optimization, and fuel cells technology and also collaborates with other CIMNE groups in composites materials analysis and IT technology applied to sensoring and data management.

Research topics

1. COMPUTATIONAL FLUID DYNAMICS (CFD)
· FEM and meshless methods for aerodynamics analysis and drag reduction in aeronautics. **PIs:** J. Pons-Prats and E. Ortega

2. OPTIMIZATION
· Optimization algorithms for robust optimal design, shape optimization and material design in aeronautics. **PI:** G. Bugeda and J. Pons-Prats

Staff

Jordi Pons-Prats (Leader)
Gabriel Bugeda
Martí Coma
Roberto M. Flores
Oriol Frigola
Jacques Périaux
Enrique Ortega

On-going RTD Projects

AVINT - Estratègies de mecanitzat i predicció de la rugositat per a una integritat superficial òptima
ACCIÓ - RIS3CAT – Coordinator: CTM
01/07/2017 - 30/06/2020

DRAGY - Drag Reduction in Turbulent Boundary Layer via Flow Control
EC - H2020 (2014-2020) – Coordinator: CIMNE
01/04/2016 - 31/03/2019

ExaQUte - EXAscale Quantification of Uncertainties for Technology and Science Simulation
EC - H2020 (2014-2020) – Coordinator: CIMNE
01/06/2018 - 31/03/2019

ECO-COMPASS - Ecological and Multifunctional Composites for Application in Aircraft Interior and Secondary Structures
EC - H2020 (2014-2020) – Coordinator: DLR
01/04/2016 - 31/03/2019

FIBRESHIP - Engineering, production and life-cycle management for massive application of FIBRE-based materials in large-length SHIPs
EC - H2020 (2014-2020)
Coordinator: TSI – *01/06/2017 - 31/05/2020*

ICARE – International Cooperation in Aviation Research - EC-H2020 (2014-2020)
Coordinator: ERDYN – *01/10/2017 - 31/3/2020*

IMAGE - Innovative Methodologies and technologies for reducing Aircraft noise Generation and Emission
EC - H2020 (2014-2020) – Coordinator: Chalmers
01/04/2016 - 31/03/2019
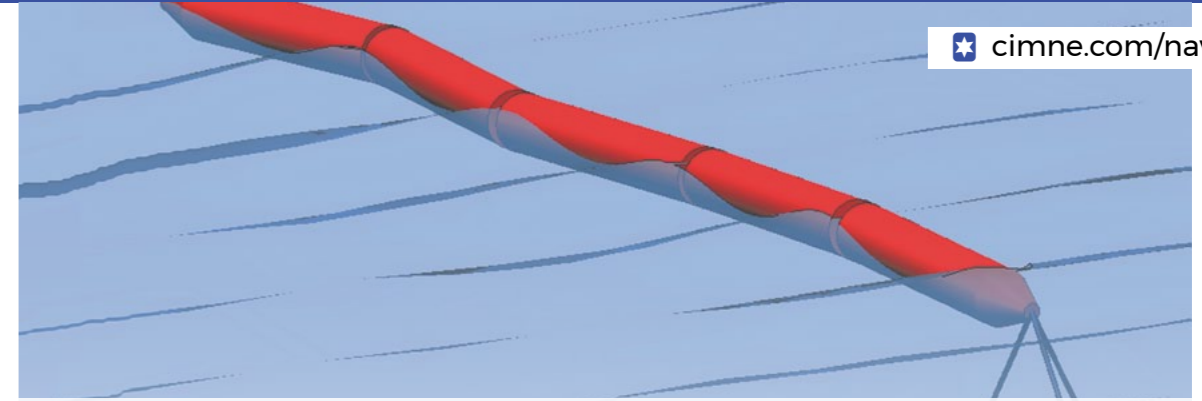
Naval and Marine Engineering Group

CIMNE has a large experience in conducting RTD projects in naval and marine engineering.

The main activities of the Naval and Marine Eng. Group are related to the development and application of computational methods and computer aided design and verification tools on the following topics:
· Hydrodynamic and seakeeping analysis of vessels and marine structures
· Hydro-elasticity and fatigue analysis in large marine structures
· Navigation in ice (ice-structure interaction)
· Environmental problems in marine and ocean engineering
· Near-time simulation (operational) tools for ocean wave converters
· Design and assessment of offshore wind turbines and ocean energy converters
· Optimization and design support systems in naval architecture and ocean engineering

Research topics

1. COMPUTATIONAL FLUID DYNAMICS (CFD)
Semi-Lagrangian methods for hydrodynamic analysis of ships and marine structures. PI: B. Serván and J. García

2. OPTIMIZATION
Optimal design of ship hulls, wind energy structures and offshore structures. PI: J. García

Staff

Julio García (Leader)
Daniel Di Capua
Jesús Carbajosa
Jonathan Colom
Rafael Pacheco
Borja Serván

On-going RTD Projects

FIBRESHIP - Engineering, production and life-cycle management for massive application of FIBRE-based materials in large-length SHIPs
EC - H2020 (2014-2020)
Coordinator: TSI – *01/06/2017 - 31/05/2020*

STM Validation Project
EC - CEF Programme 2014-2020 - MAP
Coordinator: Swedish Maritime Administration
01/01/2015 - 31/12/2018

NICE-SHIP - Development of new Lagrangian computational methods for ice-ship interaction problems
ONR - NICOP
Coordinator: CIMNE – *30/09/2016 - 01/10/2019*

MOVASE - Desarrollo de nuevos métodos y herramientas para la optimización del proceso de fabricación de envases de vidrio
MEIC - Retos Colaboración: Proyectos I+D
Coordinator: COMPASS Ing. y Sistemas, S.A.
01/07/2016 - 31/12/2018

Research Rankings

Webometrics Ranking

Recently, it has been published the **twelfth edition of Webometrics Ranking of Spanish researchers** and researchers working in Spanish Institutions (Spain) according to their Google Scholar Citations public profiles (http://www.webometrics.info).

This edition data was collected during the last week of February 2019. The list includes the top **65.000 profiles ranked by h-index** in decreasing order and then by the total number of citations.

Eugenio Oñate, professor of the School of Civil Engineering of UPC, is in the position 261th of the ranking with a h-index of h=69 and 20.053 citations.

There are **123 CIMNE researchers listed in Webometrics, four of them among the 1.000 first positions:**

· Prof. Eugenio Oñate (261th position)
· Prof. Antonio Gens (400th position)
· Prof. Eduardo Alonso (724th position)
· Prof. Antonio Huerta (908th position)

This list ranks Prof. Eugenio Oñate, director of CIMNE, as the highest cited researcher of Universitat Politècnica de Catalunya · BarcelonaTech (UPC).

Webcindario Ranking

Another reference website in research ranking is Webcindario (https://indice-h.webcindario.com). In March 2019, it has updated its yearly list about prizes, women researchers and its ranking list by provinces.

The following list is a summary of the CIMNE researchers that appear in the one made by DIH Group / Webcindario:

Researcher Name (h (ISI/DIH) index); Knowledge area:

· Oñate, Eugenio (1,5); Mathematics, Interdisciplinary Applications (Ranked Nº1 in this field)
· Gens, Antonio (1,33); Engineering, Geological
· Huerta, Antonio (1,11); Mathematics, Interdisciplinary Applications
· Alonso, Eduardo (1,03); Engineering, Geological
· Idelsohn, Sergio (1,07); Mathematics, Interdisciplinary Applications
· Oller, Sergio (1,01); Mathematics, Interdisciplinary Applications; Mechanics; Engineering, Multidisciplinary
· Barbat, Alex H. (,92); Engineering, Civil
· Arroyo, Marino (,91); Mathematics, Interdisciplinary Applications; Mechanics
· Agelet de Saracibar, Carlos (,8); Engineering, Multidisciplinary

RANKING OF CIMNE SCIENTISTS IN SPAIN (WEBOMETRICS.INFO)

RANK	NAME	H-INDEX	CITATIONS
261	Eugenio Oñate	69	20053
400	Antonio Gens	62	17006
724	Eduardo Alonso	54	14419
908	Antonio Huerta	51	9511
1103	Ramón Codina	48	8568
1254	Javier Oliver	46	10779
1363	Sergio Idelsohn	45	8790
1509	Miguel Cervera	44	5928
1582	Alex H Barbat	43	6429
2232	Sergio Oller	38	6994
3095	Marino Arroyo	34	4032
3531	Sebastià Olivella	32	4829
3534	Enrique Romero	32	4801
4010	Alfredo Huespe	31	3066
5136	Santiago Badia	28	2681
6437	Michele Chiumenti	25	2412
6591	Carlos Agelet de Saracibar	25	1965
6819	Melba Navarro	24	3080
7736	Pedro Díez	23	1811
8308	Riccardo Rossi	22	1859
8604	Miguel Cerrolaza	22	1408
8810	Antonio Rodríguez Ferran	21	2446
8936	Julio García Espinosa	21	1930
10190	José Sarrate	20	1245
12031	Javier Principe	18	1083
12035	Xavier Martínez	18	1081
12510	Martha Liliana Carreño	17	1712
12853	Gabriel Bugeda Castelltort	17	1166
13862	Luca Pelà	16	1179
13862	Núria Pinyol	16	829
15673	M. Cristina Marulanda	15	793
16798	Juan Carlos Cante	14	820
17440	Jaime Martí Herrero	14	602
18494	Cecilia Soriano	13	670
18732	Joan Baiges	13	603
19955	Francisco Zarate	12	679
20590	Narges Dialami	12	494
20906	Josep María Carbonell	12	438
21231	Alberto F. Martín	12	346
22689	Pavel Ryzhakov	11	390
23609	Marcelo Raschi	10	592
23872	Julio Marti	10	481
24200	Fernando Salazar	10	411
24976	Rafael Morán	10	314
25394	Xue Zhang	10	262
25834	Pedro Arnau	9	564
26235	Daniel Di Capua	9	382
26282	Antonia Larese	9	374
26625	Javier Mora	9	320
28146	Miguel Ángel Celigueta	8	564
28173	Oriol Lloberas Valls	8	521
28715	Omar Salomon	8	306
2877	Borja Serván Camas	8	297
29502	Enrique Ortega	8	230
29923	Jordi Cipriano	8	203
30227	Roubin Emmanuel	8	186
30336	Francesc Verdugo	8	178
31100	Pooyan Dadvand	7	363
31103	Jerrad Hampton	7	362

RANK	NAME	H-INDEX	CITATIONS
31345	Fernando Rastellini	7	280
31787	Mario A Salgado Gálvez	7	219
32509	Eduardo Soudah	7	174
32584	Antonio R Marí	7	171
32908	Alessandro Franci	7	155
33349	Ernesto Castillo	7	134
33731	Roberto Flores	7	114
34638	Manuel A. Caicedo	6	195
36311	Prashanth Nadukandi	6	109
37077	Lucia Gratiela Barbu	6	84
37100	Alessandra di Mariano	6	83
37177	Jordi Pons Prats	6	79
37278	Jackson Tellez Álvarez	6	72
37290	Hieu Nguyen	6	71
37707	Enrique Escolano	5	202
38162	Fermín Otero	5	136
38433	Stoyan Viktorov Danov	5	119
38643	Héctor Espinoza	5	111
39098	Jordi Cotela Dalmau	5	96
39908	Pau Morales Fusco	5	77
40485	Kazem Kamran	5	65
41105	David Roca	5	48
41770	Pablo A Becker	4	110
41937	Salvador Latorre	4	96
41978	Oriol Colomés	4	93
42128	Lorenzo Benedetti	4	85
42705	David J Vicente	4	67
42899	Alex Ferrer	4	63
42949	Joaquín Irazábal	4	62
43443	Miguel A Pasenau	4	54
43667	Javier San Mauro Saiz	4	51
44031	Arnau Pont	4	46
44105	Alex Jarauta	4	45
44964	Marina Arbat Bofill	4	34
45023	Ester Comellas	4	33
45505	Abel Coll	3	147
45819	José Manuel González	3	75
45928	Jordi Carbonell	3	68
46012	Miquel Santasusana	3	64
46328	Alba Hierro	3	51
46842	Nelson Lafontaine	3	41
47107	Claudio Zinggerling	3	37
47696	Emilio Salsi	3	31
49418	Bàrbara Llacay	3	18
49418	Ilaria Iaconeta	3	18
50340	Guillermo Casas	2	49
50473	Ehsan Hajiesmaili	2	40
50509	Adrià Melendo	2	38
50683	Jesús Bonilla	2	32
51839	Marc Olm	2	17
52370	Ignasi de Pouplana	2	14
52572	André Conde Vazquez	2	13
53060	Javier Marcipar	2	11
55366	Eric Neiva	1	19
56102	Alejandro Cornejo	1	7
56616	Daniel Pérez	1	5
57036	Domingo Penyalver	1	4
57595	Arnab Samaddar	1	3

Publications

CIMNE publishes books, journals, monographs, scientific reports and educational software on the theory and applications of numerical methods in engineering and applied science.
The publications of CIMNE can be visited and ordered via Internet on the website cimne.com. Most publications can be freely downloaded from the web. We list below the publications of CIMNE in 2018.

NUMBER OF CIMNE PUBLICATIONS (1987-2018)	
Edited books	84
Text books	46
Research reports	417
Technical reports	643
Monographs	266
Papers in journals (since 2009)	774

Books

Grases J. Ingeniería sísmica forense. Antecedentes y casuística, *CIMNE*, L146, 127pp, 2018.

Chiumenti, M. Momentos de Inercia: Problemas Resueltos, *CIMNE*, L147, 144pp, 2018.

Journals

Archives of Computational Methods in Engineering. **Editors:** Kleiber M., Oñate E. Springer, 2018. Journal Impact Factor (2017): 6.605; 5 Year Impact Factor (2017): 6.915

Revista Internacional de Métodos Numéricos para Cálculo y Diseño en Ingeniería. Editors: Oñate E., Idelsohn S.R., Scipedia, 2018. Journal Impact Factor (2017): 0.369; 5 Year Impact Factor (2017): 0.436

Monographs

In 2018 CIMNE researchers have published **8 monographs:**

Bonilla S. M., Soudah E. *Uso de analogías eléctricas para entender patologías cardiovasculares.* M182. CIMNE, 2018.

De Pouplana I., Oñate E. *Development of new computational methods for fluid-structure interaction analysis of multi-fractured media.* M177. CIMNE, 2018.

Jiménez S., Barbu L.G., Oller S.H. *Analysis of Post-Tensioned Structures by Means of a Constitutive Serial-Parallel Rule of Mixtures.* M178. CIMNE, 2018.

Jou O., Oñate E., Celigueta M.A. *Theoretical study about sea ice behaviour, analysis of floe-ice fractures and discrete element modelling for ship-ice interactions.* M179. CIMNE, 2018.

Casas G., Oñate E., Rossi R. *Numerical analysis of particulate flows with the finite element method.* M181. CIMNE, 2018.

San Mauro J., Toledo M.A. *Diseño de aliviaderos de bloques en forma de cuña.* M180. CIMNE, 2018.

Prior O, Soudah E., De Coss O, Valero I., Pavía J. *On the usage of augmented reality in hepatic oncosurgery.* M183. CIMNE, 2018.

Vielma J.C., Mulder M.M. *Factores de prestaciones sísmicas de edificios con irregularidad en planta.* MIS76. CIMNE, 2018.

Papers in Journals

In 2018 CIMNE researchers have published **100 papers in JCR Journals:**

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Badia S., Martín A.F., Principe J. FEMPAR: An Object-Oriented Parallel Finite Element Framework, *Archives of Computational Methods in Engineering*, vol.25, issue:2, 195 - 271, 2018.

Badia S., Martín A.F., Verdugo F. Mixed aggregated finite element methods for the unfitted discretization of the stokes problem, *SIAM Journal on Scientific Computing*, vol.40, issue:6, B1541 - B1576, 2018.

Badia S., Olm M. Nonlinear parallel-in-time Schur complement solvers for ordinary differential equations, *Journal of Computational and Applied Mathematics*, vol.344, 794 - 806, 2018.

Badia S., Verdugo F. Robust and scalable domain decomposition solvers for unfitted finite element methods, *Journal of Computational and Applied Mathematics*, vol.344, 740 - 759, 2018.

Badia S., Verdugo F., Martín A.F. The aggregated unfitted finite element method for elliptic problems, *Computer Methods in Applied Mechanics and Engineering*, vol.336, 533 - 553, 2018.

Barbat G.B., Cervera M., Chiumenti M. Appraisement of planar, bending and twisting cracks in 3D with isotropic and orthotropic damage models, *International Journal of Fracture*, vol.210, issue:43497, 45 - 79, 2018.

Barros-Rodríguez J., Fernández Fructuoso J.M., Flores Le Roux R., Sánchez Prieto S., Rodríguez Polo O. Unveiling modal parameters with forced response using SVD and QR during flutter flight testing, *Proceedings of the Institution of Mechanical Engineers*, Part G: Journal of Aerospace Engineering, vol.232, issue:1, 68 - 76, 2018.

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Bayona C., Baiges J., Codina R. Variational multiscale approximation of the one-dimensional forced Burgers equation: The role of orthogonal subgrid scales in turbulence modeling, *International Journal for Numerical Methods in Fluids*, vol.86, issue:5, 313 - 328, 2018.

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Bitrián V., Príncipe J. Driving mechanisms and streamwise homogeneity in molecular dynamics simulations of nanochannel flows, *Physical Review Fluids*, vol.3, issue:1, 2018.

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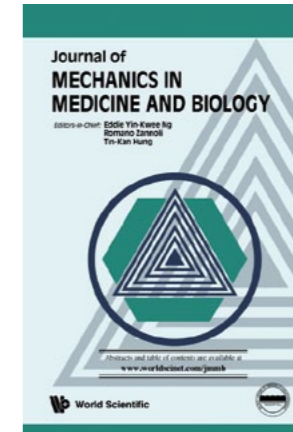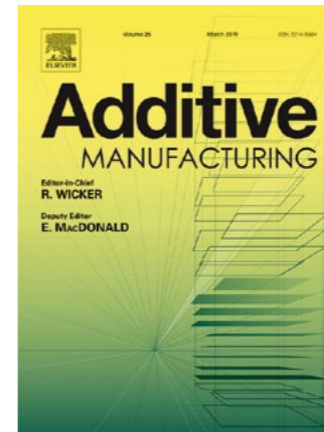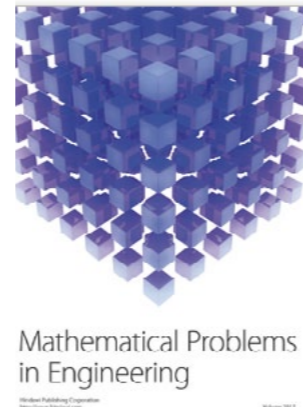
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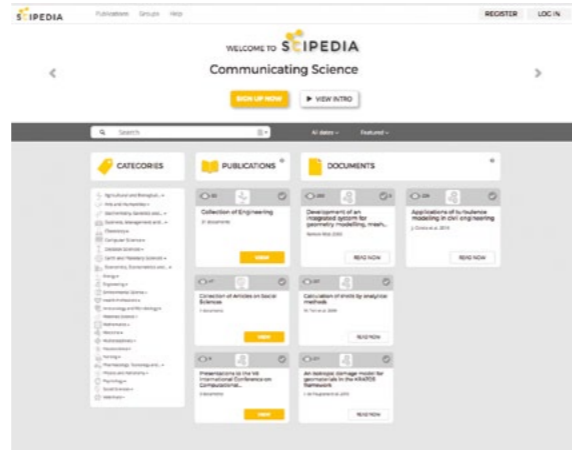
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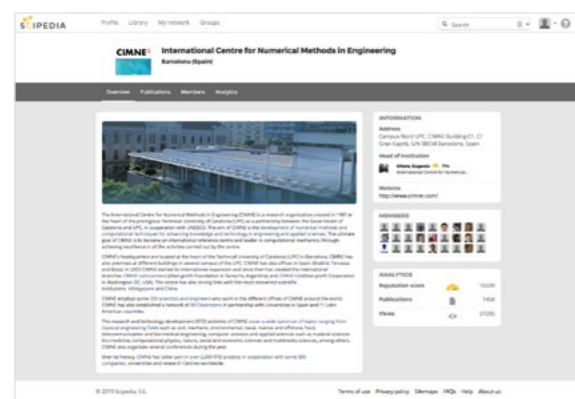
CIMNE has its own institutional profile in Scipedia that consists of four sections: Overview, Publications, Members and Analytics.

This space is a repository of papers, monographs, technical reports and conference lectures given by CIMNE researchers, as well as we can find here the magazine "Revista Internacional de Métodos Numéricos en Ingeniería", edited by CIMNE. To sum up, a confortable site where is possible find all the scientific production of CIMNE and interact with its members.

Innovation and technology transfer

CIMNE RTD activities are based on a holistic approach.

CIMNE aims at providing comprehensive solutions for solving problems that affect human beings, through the integration of existing knowledge in a particular field with quantitative information emanating for prediction methods, such as computational-based techniques, and experimental measurements.

These four concepts: the problem to be solved, computational methods, experimental methods and existing knowledge can be represented by the tetrahedron shown in the figure above. Each of the nodes is connected to the other three by lines that represent information transfer pipelines.

The holistic approach for solving problems at CIMNE:

Products / Problems

Measurements
Laboratory experiments
On-Site monitoring, etc.

Computations
Numerical Methods
Software
Pre and Postprocessors
Interfaces, etc.

Knowledge
Data Bases
Knowledge management tools, etc.
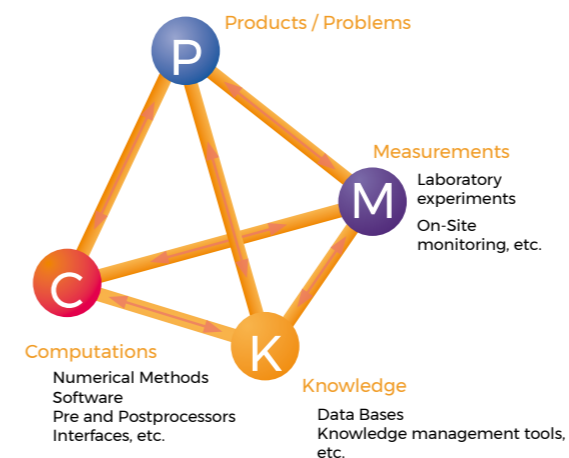
The mission and activity of CIMNE can be explained through the so called Cycle of Ideas:
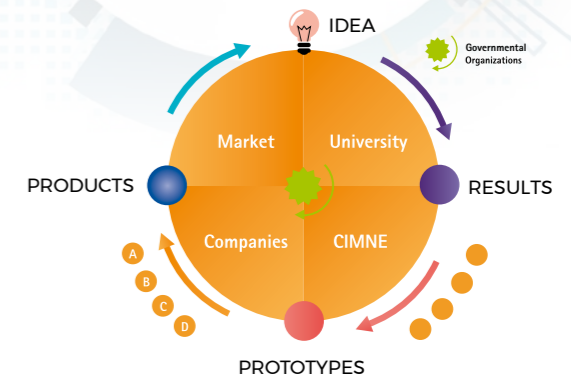
Ideas (scientific advances) usually originate in university environments, where many professionals study, investigate and discover new areas of knowledge. The idea matures until it produces tangible results (thesis, papers, computer programs, physical devices, etc.) that have to be filed and protected. **Results** evolve until they reach the level of a prototype (a software code, a system, a device, etc.). The transit of a result to a prototype demands an organization, efficient and capable staff and resources. What it is desirable is that the idea follows its route on specialized institutions, adjacent to the university, such as CIMNE, with the mission of transforming knowledge into tangible things (prototypes). The **prototype** develops into a product within a company. The cycle follows with the marketing of the **product** and ends up with the reinvestment of part of the revenues in the development of new ideas.

CIMNE Products

PRE AND POST PROCESSING SOFTWARE

GID

A universal and adaptive pre and postprocessor for computer simulation in engineering and applied science.
Developed & marketed by CIMNE since 1998. **www.gidhome.com**

DIPPO
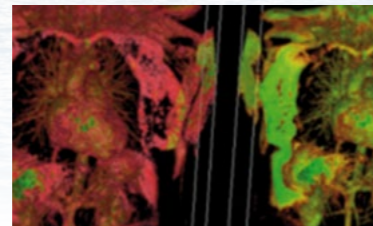
Versatile platform for digital image processing combined with numerical modelling and simulations. Developed and marketed by CIMNE since 2011.

ENGINEERING SYSTEMS AND HARDWARE

INFATABLE STRUCTURES

Inflatable pavilions, shelters and bridges for applications in engineering and architecture. Developed by Buildair and CIMNE. Marketed by Buildair since 2002. **buildair.com**

OKO

Interactive frame for displaying images and videos.
Developed by CIMNE.
Marketed by Tecnologías Avanzadas para el Ocio (TAOC), SL since 2016. **okoproject.com**

WATER-PS

Fresh water production system.
Developed by CIMNE and Fresh Water Nature, Ltd.
Marketed by Fresh Water Nature, Ltd. since 2016. **freshwaternature.com**

COLLABORATIVE WORK PLATFORMS

MI COLEGIO EN RED

Communications system and integrated services designed specifically for schools via the Internet. Developed and marketed by CIMNE since 2000. **cimne.com/mcr**

FRAKTALIS

Fully customizable web application that creates virtual communities where users can communicate and share. Developed and marketed by CIMNE since 2009. **fraktalis.com**

LHINGS

Cloud platform to provide access and links to all kind of things and let users management, share and interaction with them. Developed and marketed by Lyncos SL and CIMNE. **lhings.com**

SIGPRO
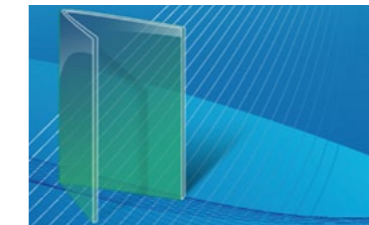
Integrated software platform for the management of the research and financial activities and reports in RTD projects. Developed by CIMNE. **cimne.com/sigpro**

SCIPEDIA
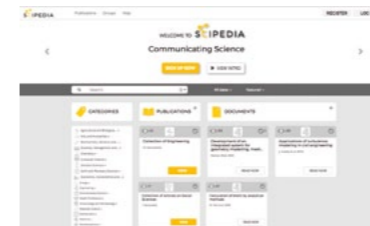
Web platform for free publishing and open access of scientific publications.Developed by Scipedia, S.L. in cooperation with CIMNE. Marketed by Scipedia, S.L. since 2016. **scipedia.com**

EDUCATIONAL SOFTWARE

Educational software for interactive learning about structural design and finite element method. Developed and marketed by CIMNE. **cimne.com/educational**

MAT-FEM
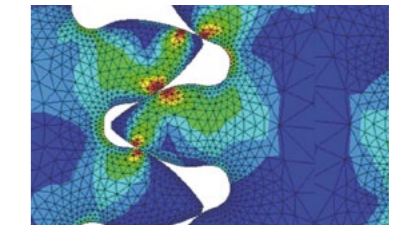
Educational program in MATLAB for introduction to the finite element method for analysis of structures and field problems. Developed by CIMNE. **cimne.com/mat-fem**

DECISION SUPPORT SYSTEMS

BEACHING

Information system for management of tourism activities in beach areas. Developed by CIMNE and marketed by TAOC SA since 2011. **beaching.com**

RMOP

Integrated platform for robust multiobjective optimization in engineering.
Developed by CIMNE. **tts.cimne.com/RMOP**

DECISION SUPPORT SYSTEMS

GIS+
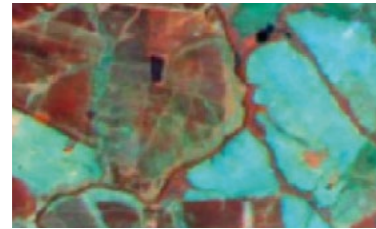
Web-based interactive Geographic Information System.
Developed by CIMNE.

SIE
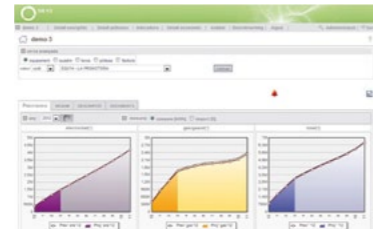
Information system for management of energy consumption in public buildings and municipalities. Developed by CIMNE. Marketed since 2005 by Gassó Auditores SL and CIMNE. **inergybcn.com**

ROEM

Information system for assessment of the environmental quality in reservoirs and lakes.
Developed by CIMNE.

E-TESTING

Web-based platform for e-management of experimental tests. Developed by CIMNE and Applus.

FLOOD
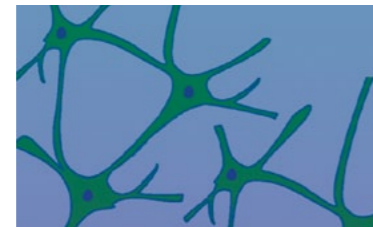
Artificial neuronal network package. Developed by CIMNE.
cimne.com/flood

RAMFLOOD
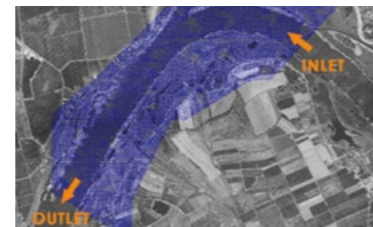
Decision support system for risk assessment and managing of floods. Developed by CIMNE and Flumen.
www2.cimne.com/ramflood

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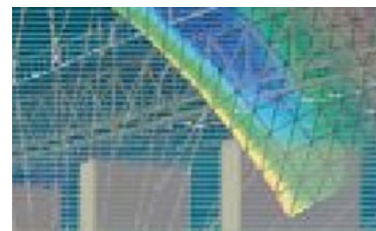
An integrated platform for e-monitoring using wireless sensor network technology. Developed by CIMNE.
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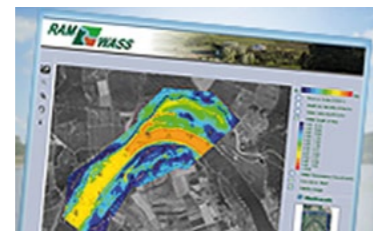
RAMWASS

Decision support tool for the risk assessment and management of environmental and human-induced hazards on the water/sediment/soil system in fluvial ecosystems. Developed by CIMNE.
www.cimne.com/ramwass

BEE DATA
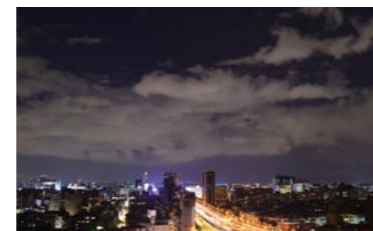
Open source BiG Data Analytics platform for deep analysis of massive data coming from smart metering infrastructure of utility companies. Developed by CIMNE and marketed by Inergy.
beedataanalytics.com

SIMULATION SOFTWARE FOR INDUSTRIAL PROCESSES

WELDPACK

Welding processes software.
Developed by CIMNE.

STAMPACK
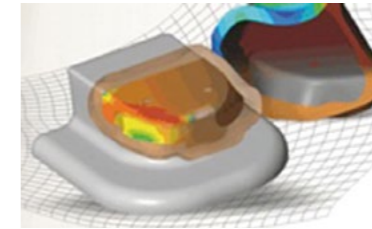
Software for sheet metal forming processes. Developed by Quantech ATZ, SA and CIMNE. Marketed by Quantech ATZ, SA since 1999.
stampack.com

CLICK2CAST
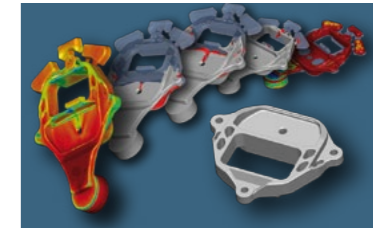
Software for fast simulation of casting processes. Developed by Quantech ATZ in cooperation with CIMNE. Marketed by Altair since 2015.

SCUT

Software able to simulate cutting processes for the metal manufacturing industry. Developed by CIMNE.

ADD2MAN

Additive manufacturing processes software. Developed by CIMNE in cooperation with Eurecat.

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Forging manufacturing processes software. Developed by CIMNE.

MACHPACK

Software able to simulate machining manufacturing processes. Developed by CIMNE.

SPREADDEM
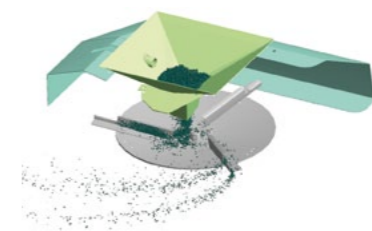
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SIMULATION SOFTWARE FOR MULTIPHYSICS

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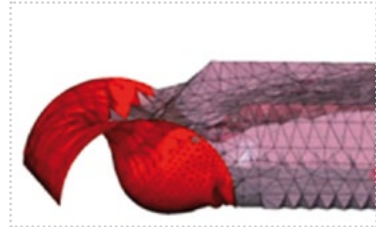
Object-oriented software platform for the development and application of finite element codes for multidisciplinary applications. Developed by CIMNE.

cimne.com/kratos

ERMES
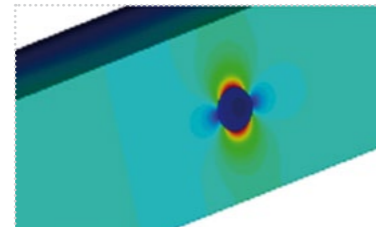
Computational electromagnetics using advanced finite element methods.
Developed by CIMNE.

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PFIRE

Analysis of propagation of fire and its effect on the burning and melting of objects.
Developed by CIMNE.

SIMULATION SOFTWARE FOR FLUID DYNAMICS

TDYN

Finite element code for analysis of a wide range of multi-physic problems in engineering and applied science. Developed by Compass Ingeniería y Sistemas, SA. and CIMNE. Marketed by Compass since 2003. compassis.com

SEAFEM
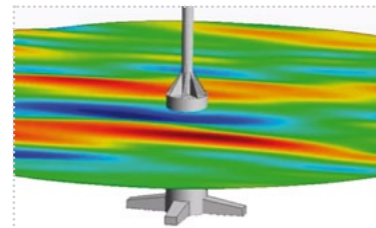
Hydrodynamics and seakeeping analysis of ships and marine structures. App for wind tower generators in the sea.Developed by Compass Ingeniería y Sistemas, SA. and CIMNE. Marketed by Compass since 2011. compassis.com

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Analysis of fluid dynamics and fluid-structure-soil-thermal interaction problems into the Particle Finite Element Method (PFEM). Developed by CIMNE.

cimne.com/pfem

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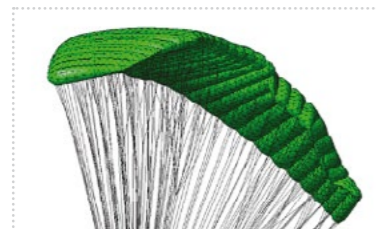
Computer program for the fast simulation of parachute-payload systems. Developed and marketed by CIMNE since 2016.

cimne.com/parachutes

SIMULATION SOFTWARE FOR STRUCTURAL ENGINEERING

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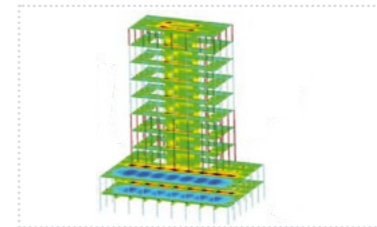
Finite element code for analysis of structures in engineering and architecture. Developed by Compass Ingeniería y Sistemas, SA. and CIMNE. Marketed by Compass since 2003.

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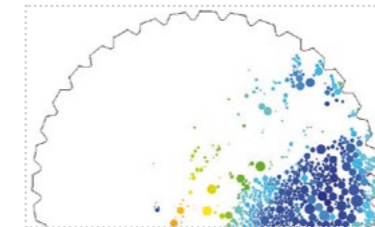
Analysis of granular systems and multifracturing problems in geomechanics and industrial processes using discrete and finite element methods. Developed by CIMNE.

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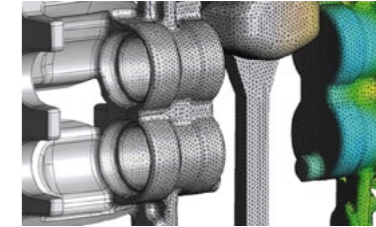
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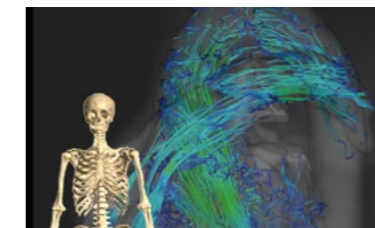
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Created in 2001
structuralia.com
Training and consulting activities in the civil engineering via Internet. It was sold in 2011 to KAPLAN (The Washington Post Group).

COMPASS INGENIERÍA Y SISTEMAS, SA
Created in 2002
compassis.com
It develops commercial activities related to numerical methods in engineering, with emphasis on civil, naval and maritime engineering. CIMNE owns 24% of COMPASS.

INGENIA AIE
Created in 2006
EIG formed by several companies and CIMNE. The objective is to promote the participation of its members in projects of aeronautics and the space field, in cooperation with the main international manufacturers in the sector.

QUANTECH ATZ
Created in 1996
quantech.es
Development and marketing of simulation software for production processes.

CIMNE TECNOLOGÍA, SA
Created in 2011

cimnetecnologia.com
Company 100% owned by CIMNE aiming to industrialize and market the products and technology developed at CIMNE. CIMNE Tecnología SA. is also an incubator and promoter of new companies.

BUILDAIR INGENIERÍA Y ARQUITECTURA, SA
Created in 2001
buildair.com
Inflatables structures for engineering and architecture applications. CIMNE Tecnología SA owns 2,51% of Buildair.

BEEDATA ANALYTICS, SL
Created in 2017
beedataanalytics.com
ICT services based on mass analytical data treatment to users and business intelligence for companies and institutions. CIMNE Tecnología owns 49,36% of Beedata Analytics, SL.

BIOMECHANIC DEVELOPMENTS, SL
Created in 2015
cimnetecnologia.com/links.aspx
Software solutions and services in biomedical field.
CIMNE Tecnología SA owns 43,67% of Biomechanics Developments.

COMPUTATIONAL AND INFORMATION TECHNOLOGIES, SA
Created in 2012
citechsa.com
Computational methods and information technology systems in engineering. 100% owned by CIMNE Tecnología SA.

FRESH WATER NATURE, SL
Created in 2013
freshwaternature.com
Solutions for obtaining fresh water from desalination and destillation of waste water.
The company is 92,99% owned by CIMNE Tecnología SA.

HEALTHAPP, SL
Created in 2013
bcnhealthapp.com
Software for treatments of eating disorders. It improves the links therapist / patient.
18,52% owned by CIMNE Tecnología SA.

RSM GASSÓ CIMNE ENERGY, SL
Created in 2012
inergybcn.com
Advanced engineering energy services. 50% owned by Servicios Energéticos Avanzados, SL, which is 100% owned by CIMNE Tecnología, SA.

INLOC ROBOTICS, SL
Created in 2014
inlocrobotics.com
Positioning and navigation solutions for mobile robots in buried environments. CIMNE Tecnología owns 7,73% of INLOC Robotics since October 2015.

LYNCOS TECHNOLOGIES, SL
Created in 2012
lhings.com
Software and systems for the Internet of Things.
CIMNE Tecnología SA owns 4,77% of Lyncos Technologies, SL.

PORTABLE MULTIMEDIA SOLUTIONS, SL
Created in 2013
portablemultimediasolutions.com
Mobile pavilions with multimedia technology for leisure, sport and events. 17,96% owned by CIMNE Tecnología SA.

PNEUMATIC STRUCTURES TECHNOLOGIES, SL
Created in 2015
ps-technologies.com
Pneumatic structures for a wide range of engineering problems. 10% owned by CIMNE Tecnología SA.

OKTICS ATZ, SL
Created in 2019
okobusiness.com
Digital Signance Technologies and products.
CIMNE Tecnología, SA owns the 24,5% of OKTICS ATZ SA.

SCIPEDIA, SL
Created in 2015
scipedia.com
Free publishing and open access for scientific publications. CIMNE Tecnología owns 16,67% of Scipedia, SL.

TECNOLOGÍAS AVANZADAS PARA EL OCIO, SL
Created in 2012
beaching.com
Information systems for leisure sectors (tourism, music...). 100% owned by CIMNE Tecnología SA.

VISIT
CIMNE COMPANIES AT
CIMNE.COM/ COMPANIES

Alliances

CIMNE, leader in research on computational engineering, has established relevant alliances with international institutions and companies since its creation in 1987.

CIMNE host of UNESCO Chair of Numerical Methods in Engineering Since 1989.

Prof. Olgierd Zienkiewicz was UNESCO Chair until his death (2009).

Secretariat of SEMNI Since 1989

Pilot Center of ERCOFTAC in Spain Since 1989

Secretariat of ECCOMAS Since 1992

Secretariat of IACM 1994 - 2016

Partner of FLUMEN Since 2012

Creation of AIAC Since 2015

Unesco Chair in Numerical Methods in Engineering

UNESCO and UPC · BarcelonaTech reached an agreement to create the first UNESCO chair in the world in 1989: the UNESCO Chair of Numerical Methods in Engineering.

Dr. Jacques Périaux

The main mission of the Chair is to promote the development, dissemination and application of numerical methods in engineering at an international level, through education, research and technology transfer, with the aim of contributing to the solution of complex problems in lower income countries.

Prof. O. C. Zienkiewicz held the UNESCO Chair since its creation in 1989 until his death on January 2nd, 2009. Since 2009 Dr. Jacques Périaux is the Chairholder of the Unesco Chair of Numerical Methods in Engineering. He is a recognized expert in the field of numerical methods applied to aerospace engineering.

Dr. Périaux contributions have resulted in a significant increase in the RTD activities of CIMNE in the aerospace sector, in particular with academic organizations and industry in China, the organization of numerous training courses, exchanges with leading scientists worldwide and several RTD projects at an international level.

It is important to note that computational methods are especially useful in resource-limited countries because they enhance the ability of people to predict outcomes and optimize solutions before committing resources to specific investments.

An important UNESCO Chair activity over the years has been the creation of a series of "Aulas CIMNE" (CIMNE Classrooms), physical spaces of collaboration with other research groups in universities and research centers located mainly in Latin America and Europe. All nodes in the network connected to each other are using, transforming and broadcasting knowledge generated in CIMNE over the last thirty years.

Both the people and the knowledge generated by the network members easily circulate within the network. "Aulas CIMNE" is now a growing network of centers of excellence in research and training in the field of numerical methods.

A priority in the network is the promotion of joint projects in research and training using international competitive funds and existing programs that target specific local needs. Links with scientific groups and other organizations established locally are also actively encouraged. The network is the seed for creating other expected nodes in countries of Africa and Asia.

Dr. Cecilia Soriano is the coordinator of the UNESCO Chair of Numerical Methods in Engineering.

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura

Cátedra UNESCO de Métodos Numéricos en Ingeniería. Universidad Politécnica de Cataluña. BarcelonaTech

FLUMEN Institute

In 2012, the Government of Catalunya created the FLUMEN Institute for River Dynamics and Hydrologic Engineering as a partnership between CIMNE and UPC · BarcelonaTech.

FLUMEN Institute is the outcome of merging the prestigious Flumen RTD group existing since 2005 at the School of Civil Engineering of UPC · BarcelonaTech and CIMNE, bringing together the numerical and experimental expertise of Flumen RTD group in hydraulics with the broad experience of CIMNE on numerical methods, computer simulation and integration of decision support systems.

The objectives of FLUMEN are the promotion of RTD and technology transfer activities in the field of river dynamics and hydrologic engineering. The Flumen Institute is directed by Prof. Ernest Bladé.

FLUMEN Premises

Flumen Institute is located at the B0 Building in the North Campus of UPC · BarcelonaTech since 2016. The building is equipped with modern experimental facilities for model scale testing of river dynamic and hydraulic problems. It also provides work areas for researchers at the graduate level (masters, doctoral and postdoc) and for senior researchers from CIMNE and UPC · BarcelonaTech.

Flumen is actively engaged in research activities, consulting, training and technology transference in relation to hydrology and river dynamics.

www.flumen.upc.edu

SEMNI
Sociedad Española de Métodos Numéricos en Ingeniería

Since 1989 CIMNE supports the activities of the Spanish Association for Numerical Methods in Engineering (SEMNI).

The basic aims of SEMNI are the organization and coordination of all activities related to numerical methods in engineering in Spain and being the Spanish representative in the International Association for Computational Mechanics (IACM).

SEMNI is linked to similar associations in other countries, such as the European Community on Computational Methods in Applied Sciences (ECCOMAS), the International Association for Computational Mechanics (IACM), the Groupe pour l'Avancement des Méthodes Numériques de l'Ingénieur in France, the United States Association for Computational Mechanics in the United States, and the Asociación Argentina de Mécanica Computacional, among others.

The headquarters and the secretariat of SEMNI are based in CIMNE. Currently, SEMNI has over 400 members worldwide. Some of the main activities of SEMNI include the organization of technical workshops and the organization of the Spanish Conference on Numerical Methods in Engineering, held every two years.

SEMNI will organize, jointly with the portuguese association APMTAC, the congress CMN 2019 (Congress on Numerical Methods in Engineering) on July 1-3, 2019. in the city of Guimarães (Portugal). During the event it will be awarded the Prize SEMNI Olgierd Zienkiewicz to Manuel Doblaré and the Prize SEMNI Juan Carlos Simó to Joan Baiges. The best theses of the year will be also been awarded.

ECCOMAS
European Community on Computational Methods in Applied Sciences

ECCOMAS is a scientific organization founded in 1992. It groups European associations with interests in the development and application of computational methods in applied sciences and technology. The ECCOMAS Secretariat is located at CIMNE.

The mission of ECCOMAS is to promote joint efforts of European universities, research institutes and industries which are active in the broad field of numerical methods and computer simulation in Engineering and Applied Sciences (i.e. Computational Solid and Structural Mechanics, Fluid Dynamics, Acoustics, Electromagnetics, Physics, Chemistry, Applied Mathematics, and Scientific Computing), to address critical societal and technological issues with particular emphasis on multidisciplinary applications and disseminate innovative research.

The three main scientific events that ECCOMAS organizes every four years are the ECCOMAS Congress, the ECCOMAS Conference on Computational Solid and Structural Mechanics (ECCM) and the ECCOMAS Conference on Computational Fluid Dynamics (ECFD). They attract approximately 5,000 participants in total.

The ECCOMAS Congress is addressed to scientists and engineers both in and outside Europe. Its main objective is to provide a forum for presentation and discussion of state-of-the-art in scientific computing applied to engineering, with emphasis on basic methodologies, scientific development and industrial applications. It also includes invited lectures, Special Technological Sessions (STS), contributed papers from Academy and Industry and organized Minisymposia. Proceedings of the ECCOMAS Congresses are widely disseminated in Europe.

The next ECCOMAS Congress will be jointly organized with the 14th World Congress on Computational Mechanics in Paris, France, on 19-24 July 2020.

These series of ECCOMAS global meetings are complemented with more focused thematic conferences on state-of-the-art topics in computational sciences and engineering.

IACM
International Association for Computational Mechanics

The International Association for Computational Mechanics (IACM) was founded in 1981 and, since then, it has been strongly connected to CIMNE.

The goal of IACM is the promotion of advances in computational mechanics in a wide sense. IACM defines computational mechanics as the development and application of numerical methods and digital computers to solve problems in engineering and applied sciences with the objectives of understanding and harnessing the resources of nature.

Computational Solid Mechanics (CSM) and Computational Fluid Dynamics (CFD) are at the core of IACM activity. Subjects such as thermodynamics, electromagnetics, rigid body mechanics, control systems and some aspects of particle physics fall naturally within the scope of the IACM. Indeed providing a common forum for discussion, education and research information transfer between the diverse disciplines represented is the main raison d'être of IACM.

From 22 to 27 July, 2018, the IACM and the United States Association for Computational Mechanics (USACM), in cooperation with the Columbia University and the University of Texas, organized jointly the 13th World Congress on Computational Mechanics (WCCM XIII) and 2nd Panamerican Congress on Computational Mechanics (PANACM II) in New York City (EEUU). During this event, Prof. Antonio Huerta was elected new President of the IACM. Full professor in civil engineering at the Technical University of Catalonia (UPC) and a regular collaborator of CIMNE, Prof. Huerta had been the General Secretary of the IACM in the period 2010-2018.

IACM publishes a periodic bulletin and supports Special Interest Conferences, IACM Symposia and courses in various fields of computational mechanics. The next World Congress of the IACM will take place in Paris, in 2020 (19-24 July).

Prof. Huerta, new IACM President at WCCM XIII

Conference during WWCM XIII

ERCOFTAC
European Research Community on Flow, Turbulence and Combustion

The ERCOFTAC network was founded in 1987. It is promoted by several European aerospace companies and it groups together more than 60 research centers and companies working primarily in the numerical simulation of fluid mechanics problems in engineering.

Since 1989, CIMNE is a Pilot Centre of ERCOFTAC in Spain.

CIMNE, acting as Pilot Centre, has organized a number of activities, including, among others, the 8th European Turbulence Workshop (Barcelona 2000), the Europe-Russia Workshop (Barcelona 2006), the 3rd Workshop on Research in Turbulence (Seville 2008), the 5th Workshop on Research in Turbulence (Tarragona 2010) and ERCOFTAC Spring Festival (Terrassa 2014).

CIMNE has coordinated the FP7 E-Caero projects 1 and 2 (E-CAERO: European Collaborative Dissemination of Aeronautical research and applications, 2009-2013 and 2014-2017). Both projects aim to promote joint activities of different scientific associations in the aeronautic field in Europe. ERCOFTAC is a partner in both projects.

AIAC
International Association of Aulas CIMNE

The International Association of Aulas CIMNE (AIAC) is a non-governmental non-profit civil organization with the objective of fostering the advances of numerical methods in a common academic space: the Aulas CIMNE (Joint Labs). Aulas CIMNE are the basis for cooperation in scientific, technological and training among its members, aiming to achieve social and economic improvements in society.

Mission

To contribute to the development, strengthening and consolidation in:
· Training, by promoting and organizing courses of interest to its members.
· Scientific and technological research, including the processes of innovation, adaptation and technology transfer in strategic areas.
· The use of numerical methods in engineering as a tool to help developing countries.
  The interaction of the members of the Association with the society at large, by disseminating scientific and technological advances that drive progress.

AIAC members benefit from:

· Continuous education, enhancing the set of high-level human resources of Aulas CIMNE and the Network and by the competitive advantage of installed capacity in the regions.
· The development of multi- and inter-disciplinary activities in areas of basic research, applied research and experimental developments.
· Exchange programs for teachers, researchers, students and academic and innovation managers.
· Research and development programs in emerging knowledge areas, related to new professional profiles identified as strategic.

AIAC's vision

To promote a common project and create a network of experts from around the world, which results in the international benchmark in the field of numerical methods in engineering.

AIAC intends to encompass an international environment in which scientists, technical staff and engineers can benefit directly from CIMNE's tools (developed or in development), international collaborations, participation in projects, exchange of information and industry technology transfer, among others.

Dissemination

Knowledge transfer is of vital importance for CIMNE, which invests great efforts in training and education adressed to its research staff as well as to graduates and professionals from schools of engineering and universities in applied sciences.

CIMNE regularly organises seminars, coffee talks, courses and post-graduate studies related to the theory and application of numerical methods in engineering. It has also developed a web environment for distance learning education via Internet.

The research centre plays also an important role as event organizer in the fied of computational enginee-ring. In the following pages, a summary of the confe-rences organized by CIMNE Congress Bureau during 2017 can be found. The wide agenda of congresses and conferences that will take place during 2018-2019, it is also included.

Training

Post-graduate Studies

CIMNE supports the organization of the following postgraduate degrees awarded by the UPC · BarcelonaTech.

Master Degrees

Master on Numerical Methods in Engineering
Duration: 2 academic years, 120 ECTS
🔗 cimne.com/mumni

Master of Science on Computational Mechanics
Duration: 2 academic years, 120 ECTS
🔗 cimne.com/mcm

Doctoral Degrees

Simulation in Engineering and Entrepreneurship Development- SEED
Duration: PhD studies, 3-4 years period
🔗 cimne.com/emjd-seed

Courses

CIMNE is also been organizing courses and workshops related to its field of expertise:

9th GiD Convention
6-8 June, 2018, Barcelona

Presentation GID v14
ECCM-ECD 2018, 11-15 June, 2018, Glasgow (UK)

R+D+i Course to Domus Vi Foundation students
by Angel Priegue CTO (CIMNE ICT group) / OKO Case of study.
DomusVi, Barcelona, 14 and 21 November 2018

Ibercursos
Online courses held in 2018:
· Initiation (English/Spanish)
· Advanced courses (only in Spanish):
  · Dam breaks
  · Water quality
  · Hydraulic works
  · Sediment transport

CIMNE Seminars in 2018

Geotechnical and Environmental Coupled Models
Involving Unsaturated Soils and Rocks
Sebastià Olivella; UPC · BarcelonaTech, Barcelona
(Spain) – 31/01/2018

Computational models for safety in dam
engineering
Antonia Larese; UPC · BarcelonaTech/CIMNE,
Barcelona (Spain) – 09/05/2018

Nonlinear multi-scale analysis. Proposals for
an efficient calculation with which to simulate
structural components
Xavi Martínez, UPC · BarcelonaTech/CIMNE,
Barcelona (Spain) – 28/05/2018

A three dimensional FEM-DEM technique
for predicting the evolution of fracture in
geomaterials and concrete
Francisco Zárate, UPC · BarcelonaTech/CIMNE,
Barcelona (Spain) – 05/06/2018

How the Nuclear Engineering Inspires the New
Cardiovascular Devices through Novel Flow
Modelling
Amir Keshmiri, Univ. of Manchester/MACE,
Manchester (UK) – 18/06/2018

The shifted boundary method: An embedded
approach for computational mechanics
Guglielmo Scovazzi, Duke University, Durham
(USA) – 08/10/2018

Reactive transport: numerical issues and
challenges
Jesús Carrera, GHS UPC-CSIC, IDAEA, CSIC,
Barcelona (Spain) – 10/10/2018

Basic ideas on the coupling of virtual element and
boundary element methods
Gabriel N. Gatica, University of Concepción/CI2MA,
Concepción (Chile) – 29/10/2018

Validation and Application of Computational
Models for Fluid-Structure Interaction
in Coastal and Hydraulic Engineering
Chris Kees, Coastal and Hydraulics Laboratory US
Army Engineer Research & Development Center
(USA) – 05/11/2018

Soil crushing via DEM
Marcos Arroyo, UPC (Spain) – 14/11/2018

Hybrid optimization methods
Jordi Pons, CIMNE (Spain) – 05/12/2018

CIMNE Coffee Talks in 2018

BIM Methodology, problems and reflections for
the incorporation of simulations and emerging
ICT Technologies
Felipe Muñoz La Rivera, Pontificia Universidad
Católica de Valparaíso (Chile) – 24/01/2018

BIM at the construction site
Jeniffer Nogales and Gerardo Chavarri, UPC
(Spain) – 07/03/2018

Formfinding and Prestressed Membrane Analysis
Anna Rehr, CIMNE (Spain) – 21/03/2018

Implementation of a VMS Finite Element Solver
for compressible Navier-Stokes equations
Elisa Magliozzi, TUM (Spain) – 18/04/2018

Programming constitutive models in Kratos
framework
Josep Ma Carbonell, CIMNE/UPC (Spain) –
23/05/2018

Natural Disaster Simulation by Particle Methods
Bodhinanda Chandra, TU Munich (Germany) –
24/05/2018

Advances in Computational Modeling of Fluid-
Structure Interaction, Specially Rotordynamics
Mario Storti, CONICET/Universidad Nacional del
Litoral (Argentina) – 05/07/2018

Modeling shallow water flows with PFEM2
Miguel Masó, UPC (Spain) – 12/07/2018

Computational tools for acoustic metamaterials
design
David Roca, UPC/CIMNE (Spain) – 26/09/2018

Study of the containment building of a nuclear
power plant. An international benchmark
Sergio Jiménez, CIMNE (Spain) – 03/10/2018

Turbulent fluid flows: a different approach
Sergio Idelsohn, CIMNE (Spain) – 18/10/2018

Advances in Constitutive Laws in the Structural
Mechanics Application in Kratos
Alejandro Cornejo, CIMNE (Spain) – 31/10/2018

The Bonded DEM. Strength and weakness
Miguel Ángel Celigueta, CIMNE (Spain) – 21/11/2018

Urban Systems: Efficiency, Sustainability and
Resiliency
Tianzhen Hong, Deputy Head of the Building
Technology Department of Lawrence Berkeley
National Laboratory (USA) – 23/11/2018

Plastic damage constitutive model with variable
dilatancy for concrete
Mauro Poliotti École Nationale de Ponts et
Chaussees (France) – 28/11/2018

Conferences in 2018

Conferences organized by CIMNE in 2018

We list below the conferences organised by the CIMNE Congress Bureau in 2018.

*NP: Number of participants

ECCM - ECFD 2018
VI European Conference on Computational Mechanics & VII European Conference on Computational Fluid Dynamics
11-15 June, 2018, Glasgow, UK **# NP:** 1900

IAMU 2018
19th International General Assembly - AGA 2018
17-19 Oct., 2018, Barcelona, Spain **# NP:** 190
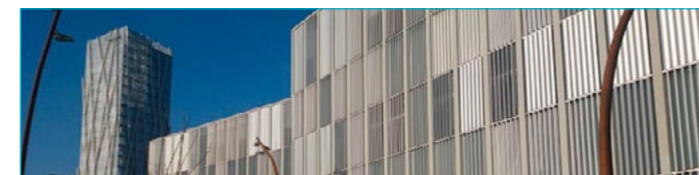
SAAEI 2018
25th Annual Seminar on Automation, Industrial Electronics and Instrumentation / 4-6 July, 2018, Barcelona, Spain **# NP:** 153

Nordic Association for Computational Mechanics - NSCM-31
25-26 October 2018, Umeå, Sweden **# NP:** 42

EUCEET 2018
4th International Conference on Civil Engineering Education: Challenges for the Third Millennium
5-8 Sept. 2018, Barcelona, Spain **# NP:** 59
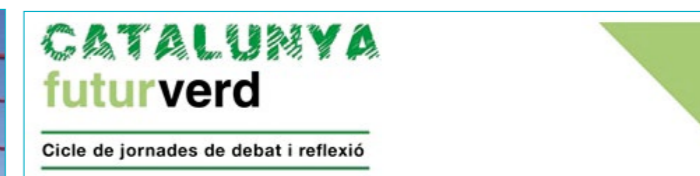
Book presentation: "Catalunya Futur Verd"
27 de November, 2018, La Pedrera, Barcelona **# NP:** 154

Upcoming conferences organized by CIMNE (2019-2020)

We list below the conferences that CIMNE will organise in 2019 and 2020.
For further details visit congress.cimne.com

MARINE 2019
VIII Conference on Computational Methods in Marine Engineering
13-15 May, 2019, Göteborg, Sweden

ADMOS 2019
International Conference on Adaptive Modeling and Simulation
27-29 May, 2019, El Campello, Spain

COUPLED 2019
VIII International Conference on Coupled Problems in Science and Engineering
3-5 June, 2019, Sitges, Spain

EMuS 2019
European Conference on Multifunctional Structures
11 - 12 June, 2019, Barcelona, Spain

CFRAC 2019
VI International Conference on Computational Modeling of Fracture and Failure of Materials and Structures
12-14 June, 2019, Braunschweig, Germany

SMART 2019
IX ECCOMAS Thematic Conference on Smart Structures and Materials
8 - 12 July 2019, Paris, France

COMPLAS 2019
XV International Conference on Computational Plasticity
3-5 Sept., 2019, Barcelona, Spain
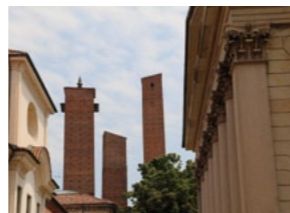
SIM-AM 2019
II International Conference on Simulation for Additive Manufacturing
11-13 September 2019, Pavia, Italy

IGA 2019
International Conference on Isogeometric Analysis
18-20 Sept., 2019, Munich, Germany

MUSLOC 2019
Multi-scale analysis of slopes under climate change. A cross-disciplinary workshop
19 - 20 September 2019, Barcelona, Spain

FORM AND FORCE 2019
IASS 60th Anniversary Symposium & 9th Int. Conference on Textile Composites and Inflatable Structures
7-10 Oct. 2019, Barcelona, Spain

PADRI 2019
Platform for Aircraft Drag Reduction Innovation
16 - 17 October 2019, Barcelona, Spain

PARTICLES 2019
VI International Conference on Particle-Based Methods
28-30 Oct., 2019, Barcelona, Spain

CM3
International workshop on Digital Technologies in Transport
11 - 12 November 2019, Barcelona, Spain

DBMC2020
15th International Conference on Durability of Building Materials and Components 2020
30 June - 3 July 2020, Barcelona, Spain

ECCOMAS CONGRESS 2020 & WCCM XIV
14th World Congress on Computational Mechanics and 8th European Congress on Computational Methods in Applied Sciences and Engineering
19 - 24 July 2020, Paris, France
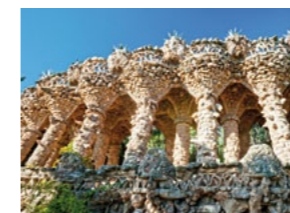
SAHC2020
12th International Conference On Structural Analysis of Historical Constructions
16 - 18 September 2020, Barcelona

85

Awards

Chronology of the prizes awarded to CIMNE

Below we briefly review some of the awards granted to the research centre along its history.

SPECIAL MENTION TO THE CIUTAT DE BARCELONA AWARD 1999

The city of Barcelona awarded CIMNE a Special Mention to the Ciutat de Barcelona Award 1999 in the category of Technological Research for the work carried out by Drs. P. Roca, M. Cervera and E. Oñate on the modelling and structural analysis of the Barcelona Cathedral.

NARCÍS DE MONTURIOL PLATE AWARD TO THE SCIENTIFIC AND TECHNOLOGICAL MERIT 1999

On November 3rd, 1999, the Generalitat de Catalunya granted to CIMNE the Narcís de Monturiol Plate Award for Scientific and Technological Merit:

· For its contribution to the development of new methods for analysis and design for products and processes in engineering.
· For fostering the cooperation between industry and university research groups.
· For the organization of training activities and the promotion of science and technology at an international level.

2002 IST PRIZE TO THE BEST PRODUCT OF THE INFORMATION SOCIETY TECHNOLOGIES, EUROPEAN COMMISSION (EC)

The EC granted the IST Award to the pre/post processor system GiD developed at CIMNE.

CIUTAT DE BARCELONA 2002 AWARD IN TECHNOLOGICAL RESEARCH

On February 11th, 2003, the Ciutat de Barcelona Award in Technological Research was awarded to the CIMNE research team formed by Eugenio Oñate, Ramon Ribó, Enrique Escolano, Miquel Pasenau and Jorge Suit Pérez. The prize recognized the development of the pre/postprocessor GID. This simulation software is an innovative and user-friendly graphic interface that allows the geometric modelling and visualization of the results of numerical simulations.

AWARD DURAN I FARRELL FOR RESEARCH AND TECHNOLOGY UNIVERSITAT POLITÈCNICA DE CATALUNYA, 2004

The Award was delivered to CIMNE scientists Dr. Oñate and Dr. García for their work entitled: "Development of a new finite element code for the hydrodynamic study of vessels. Aplications to the design of sailing ships for the America Cup race".

CUBAN NATIONAL PRIZE 2016 TO THE SCIENTIFIC RESEARCH RESULT BY THE CUBAN ACADEMY OF SCIENCES

This award is a recognition of the research work entitled "Development of advanced technologies for the generation and packaging of particles focused on the methods of discrete elements".

The research was carried out by the Central University "Las Villas" of Cuba (UCLV) and the CIMNE within the Aula UCLV-CIMNE. It also involved the collaboration of the universities of Leuven (KU Leuven, Belgium), and Brasilia (UnB, Brazil), as well as foreign and local institutions.

FIMA 'TECHNICAL NOVELTY' AWARD 2018

The Centrifugal Spreading Simulation Software, SpreadDEM, developed by CIMNE, has been awarded by the 40th International Fair of Agricultural Machinery (FIMA) with the "Technical Novelty" award in the category of "Agricultural Management Solution". With this award, the Fair recognizes the companies that present devices and systems with direct application in agriculture and rural areas, which bring remarkable innovation to the sector.

Awards and honours to CIMNE Scientists in 2018

1. JOAN BAIGES
Juan Carlos Simó Prize 2018, SEMNI, 2018.

2. RAMON CODINA
Ludwig Prandtl Medal for outstanding and sustained contributions in the field of Computational Fluid Dynamics, ECCOMAS, 2018.

3. JOAQUÍN IRAZÁBAL
TALGO Award to the Railway Innovation for the PhD Thesis entitled "Numerical analysis of railway ballast behaviour using the Discrete Element Method", by TALGO Foundation, 2018.

4&5. ORIOL LLOBERAS & XAVIER OLIVER
21st Teaching Initiative Award, Social Council of UPC, 2018.

6. EUGENIO OÑATE
Award for the contribution to the development of the Discrete Elements Method (DEM), Academy of Sciences of Cuba (Cuba), 2018.

7. NÚRIA PINYOL
Selected Speaker for the 2nd Hutchinson Conference, Hong Kong, 2018.

8. EDUARDO SOUDAH
Best paper award, EECSS'18 (Madrid, Spain), 2018.

CIMNE in the media 2018

BUILDAIR H75

ORIGINAL TITLES: "Buildair H75: el hangar hinchable más grande del mundo es español" / "Buildair H75, nuevo récord en hangares hinchables"

TITLES IN ENGLISH: Buildair H75: the largest inflatable hangar in the world is Spanish / Buildair H75, new record in inflatable hangars

SOURCE: *TICbeat NCYT*

PUBLICATION DATE: June-July 2018

CHIRAJARA BRIDGE

SUMMARY: CIMNE experts prepared a technical report on the collapse of the Chirajara bridge (Colombia) at the request of the Prosecutor's Office

SOURCE: *El espectador, RCN Radio, La FM, Eje 21*

PUBLICATION DATE: March-May 2018

AXA RESEARCH FUND

ORIGINAL TITLE: "AXA Research Fund destina 50 millones a proyectos de ciencia para los próximos 5 años y selecciona 5 proyectos en España"

TITLE IN ENGLISH: AXA Research Fund allocates 50 million to science projects for the next 5 years and selects 5 projects in Spain

SOURCE: *Bolsamanía*

PUBLICATION DATE: 29/06/2018

MARS: ESA/CIMNE

ORIGINAL TITLE: "Un'altra sonda e il drone su Marte, la missione guidata dalla Campania"

TITLE IN ENGLISH: Another probe and the drone on Mars, the mission led by Campania

SOURCE: *Il Matino*

PUBLICATION DATE: 08/06/2018

NAVAL ENGINEERING

ORIGINAL TITLE: "Ingeniería Naval: buena formación con amplias posibilidades laborales"

TITLE IN ENGLISH: Naval engineering: good training with wide job opportunities

SOURCE: *La opinión de Murcia*

PUBLICATION DATE: 13/06/2018

ENERGY EFFICIENCY ECUADOR

ORIGINAL TITLE: "INER, CIMNE, Inergy y BEE Group implantan el Sistema de Información Energética SIE en Edificios de Ecuador"

TITLE IN ENGLISH: INER, CIMNE, Inergy and BEE Group implement the SIE Energy Information System in Buildings of Ecuador

SOURCE: *Casadomo.com*

PUBLICATION DATE: 30/01/2018

EURECAT / CIMNE

ORIGINAL TITLE: "Música sense gravetat"

TITLE IN ENGLISH: Music without gravity

SOURCE: *Via empresa*

PUBLICATION DATE: 13/06/2018

DRON VICTORIA

ORIGINAL TITLE: "Ferri muestra su embarcación no tripulada Victoria"

TITLE IN ENGLISH: Ferri shows its unmanned vessel Victoria

SOURCE: *La defensa*

PUBLICATION DATE: 06/06/2018

FLEXICOOP

ORIGINAL TITLE: "El proyecto europeo Flexcoop promueve la gestión activa de la demanda entre prosumidores domésticos"

TITLE IN ENGLISH: The European project Flexcoop promotes the active management of demand among domestic prosumers

SOURCE: *Smartgridsinfo*

PUBLICATION DATE: 15/06/2018

ADD2MAN

ORIGINAL TITLE: "Tres nuevas tecnologías de impresión 3D en la feria IN(3D)USTRY"

TITLE IN ENGLISH: Three new printing 3D technologies in the IN(3D)USTRY fair

SOURCE: *TecnoNews*

PUBLICATION DATE: 16/10/2018

CIMNE CONSULTANCY

ORIGINAL TITLE: "Navarra adjudica a Geoconsult el estudio independiente de seguridad de Yesa por 222.537 €" "Adjudicado el estudio sobre la estabilidad de la ladera derecha del embalse de Yesa"

TITLE IN ENGLISH: Navarra awards Geoconsult Yesa's independent security study for € 222,537 /Awarded the study on the stability of the right slope of the Yesa reservoir

SOURCE: *Noticias de Navarra, EuropaPress*

PUBLICATION DATE: 10/2018

IAMU / CIMNE CONGRESS BUREAU

ORIGINAL TITLE: "Debaten sobre cómo hacer sostenible el transporte marítimo en el mundo"

TITLE IN ENGLISH: Debate about how to make maritime transport sustainable in the world

SOURCE: *ABC / La Vanguardia*

PUBLICATION DATE: 17/10/2018

AULA UCI CUBA

SUMMARY: Creation of the joint lab UCI Cuba.

SOURCE: *Juventud Rebelde, ACN, CubaSí*

PUBLICATION DATE: 09/2018

FIBRESHIP PROJECT

ORIGINAL TITLE: "Fibreship: el futuro de la construcción de barcos pasa por España"

TITLE IN ENGLISH: Fibreship: Spain, key in the future of shipbuilding

SOURCE: *InnovaSpain*

PUBLICATION DATE: 25/10/2018

PREDICTIVE MANUFACTURING

ORIGINAL TITLE: "Mecanizar piezas metálicas sin defectos mediante una nueva aplicación predictiva"

TITLE IN ENGLISH: Machining defective metal parts with a new predictive application

SOURCE: *Interempresas*

PUBLICATION DATE: 01/10/2018

CARMEN ANDRADE (CIMNE RESEARCHER)

ORIGINAL TITLE: "La responsabilidad ante las infraestructuras"

TITLE IN ENGLISH: The responsablity with regard to infrastructures

SOURCE: El País

PUBLICATION DATE: 04/09/2018

INERGY / CIMNE

ORIGINAL TITLE: "Telecomunicaciones es el sector de mayor consumo de electricidad en el país"

TITLE IN ENGLISH: Telecommunications is the sector with the highest electricity consumption in the country

SOURCE: El Telégrafo

PUBLICATION DATE: 23/11/2018

ICF / BUILDAIR

ORIGINAL TITLE: "El fondo Capital Expansió invierte un millón de euros en Buildair"

TITLE IN ENGLISH: The Capital Expansió fund invests one million euros in Buildair

SOURCE: El Periódico

PUBLICATION DATE: 03/12/2018

ICF / BUILDAIR

ORIGINAL TITLE: "El ICF toma el 25% de Buildair, que abrirá oficina en Arabia"

TITLE IN ENGLISH: The ICF takes 25% of Buildair, that will open office in Arabia

SOURCE: Expansión

PUBLICATION DATE: 04/12/2018

@2018 IN TWEETS / TOP TWEETS

CIMNE carries out an intensive activity through social media, with special attention to Twitter, where the centre has more than 1,000 followers. Below we highlight some of the 2018 tweets to explain CIMNE's activities through the networks.

JANUARY'18

CIMNE researchers have published 113 papers in 2017. Check the list on CIMNE website!

FEBRUARY'18

Seguim celebrant el #diamujeryciencia al @cimne amb la conferència "Trajectoria investigadora personal - pasado, presente y futuro" a càrrec de la Dra. Lucía Barbu

MARCH'18

*ENTREVISTA - @elcorreogallego - La investigadora del @cimne Carmen Andrade: "Aunque se sea autodidacta, el entorno humano es muy decisivo"

APRIL'18

CIMNE is participating in the @SciShops_eu that is a new @EU_H2020 project promoting the growth of community-based participatory research and science shops...

MAY'18

Prof. Theofanis Strouboulis from @TexasAMu visits @cimne

JUNE'18

En @cimne estamos de enhorabuena porque 2 de nuestros investigadores @RCodinaRovira y @JoaquinIrazabal han sido reconocidos con los @Ludwig_Prandtl y @FUNDACIONTALGO

JULY'18

The @cimne researcher Alessandro Franci has been awarded a fellowship by @AXAResearchFund. Congrats!

AUGUST'18

Visita al departament de @territoricat del Dr. Jaime Martí, investigador de @cimne en energies renovables per a comunitats indígenes a la selva amazònica.
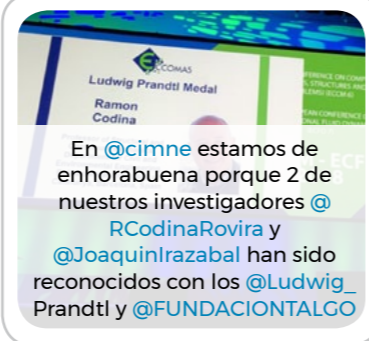
SEPTEMBER'18

.@okosmartframe supplies #ICT resources for the #CopaDelRey bit.ly/2LZfOPC

OCTOBER'18

A delegation of Government of Catalonia visits @cimne

NOVEMBER'18

NEWS* Successful Third Meeting of the Aulas CIMNE Mexico

DECEMBER'18

Javier Machi y Alex Masip, de @TYPSAGroup, visitaron ayer el @cimne #engineering #Consulting

CIMNE

ANNUAL REPORT 2018

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