

## FOREWORD

# Campus Diagonal-Besòs

## Impact Factor 10 (and Counting)

One more edition of the *Campus Diagonal-Besòs Research Newsletter*, and this time with candles... This issue marks **Newsletter #10**, a nicely rounded number that feels like a small milestone and a good excuse to pause, smile, and celebrate how far we have come. Ten issues of research highlights, questions, and projects that keep growing, issue after issue.

outstanding people doing outstanding science, officially acknowledged.



But that's not the only reason to celebrate: the **Barcelona Research Center in Multiscale Science and Engineering** has been recognized as a **María de Maeztu Unit of Excellence** (Page 7), a prestigious seal that highlights scientific leadership, impact, and truly cutting-edge research. In other words:

So yes, this issue comes with a bit of extra sparkle. A round number, a major recognition, and the same scientific curiosity and enthusiasm that drive our research every day.

Thanks for being part of the journey. And here's to the next ten issues (at least!).

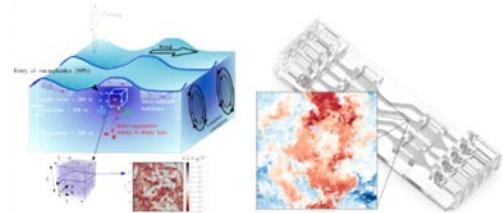
**Welcome to the Campus Diagonal-Besòs, where future's science and technology is being forged.**

# CAMPUS DIAGONAL -BESÒS

## Research Newsletter

Winter 2025

## IN THIS ISSUE



## Research Bites

A selection of high-impact articles, among those published by CDB researchers during the **second semester of 2023**, in areas such as *astrophysics, optics, materials science, electrical engineering, environmental science, and chemistry*, is displayed on Pages 2-3. An overview of one of the CDB research groups, **GAA**, is presented on Page 4. These snapshots show the rich and diverse research landscape that characterize the Campus.



## News &amp; Events

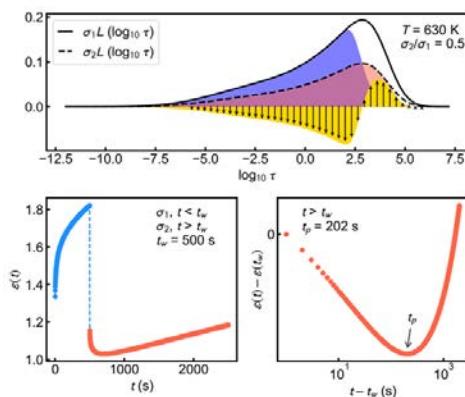
Funding opportunities, new research facilities and grants, past and future events, and research awards given to CDB researchers, can be found on Pages 8-9.

# Research Highlights

## ON MEMORY EFFECTS IN GLASSES

Y. Tong, L. Song, Y. Gao, L. Fan, F. Li, Y. Yang, G. Mo, Y. Liu, X. Shui, Y. Zhang, M. Gao, J. Huo, J. Qiao, E. Pineda & J.-Q. Wang, "Strain-driven Kovacs-like memory effect in glasses", *Nature Communications* 14, 8407 (2023) [Q1, 27/1333 in Physics and Astronomy; IF=14.7]

Glasses are solids with the molecular-scale structure of liquids. One of the consequences of the disordered structure of glasses is the presence of a broad temporal spectrum of molecular dynamics, comprising several orders of magnitude in time and generating a highly non-exponential relaxation. A consequence of such non-exponentiality is the memory effect, by which the properties of glasses evolve with time in a complex way.



This work, performed by research groups from China (the Ningbo Institute of Materials Technology and Engineering, and the Northwestern Polytechnical University in Xi'an), and the PTP-GlaDyM UPC group (Phase transitions, polymorphism, glasses and dynamics of the metastability), focused on the Kovacs-like memory effect in metallic glasses, manifested by non-monotonic stress relaxation during two-step high-to-low strains stimulations.

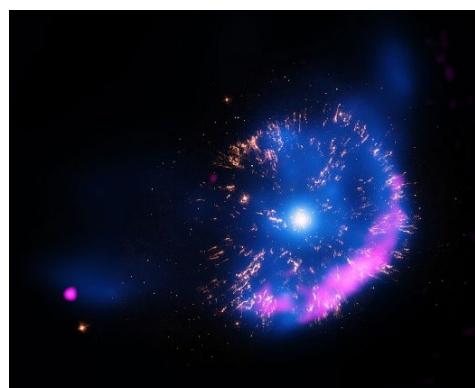
## ON SODIUM-22 PRODUCTION IN NOVA EXPLOSIONS

C. Fougères, C. F. de Oliveira Santos, J. José, C. Michelagnoli, E. Clément [+ 57 coauthors], "Search for  $^{22}\text{Na}$  in novae supported by a novel method for measuring femtosecond nuclear lifetimes", *Nature Communications* 14, 4536 (2023) [Q1, 27/1333 in Physics and Astronomy; IF=14.7]

Novae are thermonuclear explosions that occur on the surface of a white dwarf star, revitalized by mass transfer from a



companion star in a binary system. They are the second most frequent type of stellar thermonuclear explosion in our Galaxy, after X-ray bursts. During a nova explosion, mass is ejected from the white dwarf star at thousands of km/s. Hydrodynamic simulations of the explosion predict the presence of radioactive nuclei in the ejecta, such as  $^{22}\text{Na}$ , whose decay produces 1.275 MeV gamma rays that are potentially detectable. Unfortunately, production of  $^{22}\text{Na}$  strongly depends on some unknown properties of an energy state in  $^{23}\text{Mg}$ . To date, there have been significant discrepancies regarding the lifetime of this state, with proposed values ranging between 1 and 12 fs. Measuring nuclear processes of such short duration represents a true challenge.

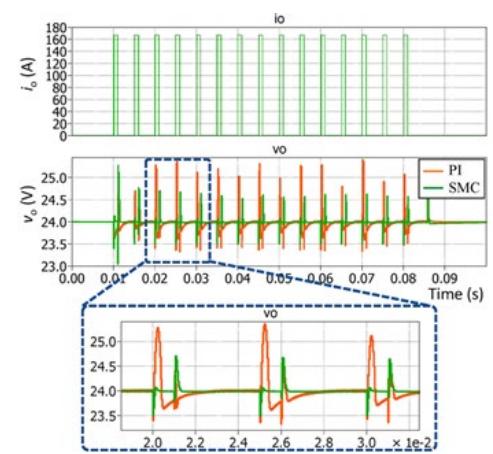


This work, that involved the participation of a GAA (Astronomy & Astrophysics Group) researcher, presents the results of a new approach that combines novel particle-correlation analysis techniques and velocity-difference measurements to determine the lifetime of this state, obtaining a new value of 11 fs, and consequently, a more reliable prediction of the amount of  $^{22}\text{Na}$  produced in a nova explosion.

## A NEW SLIDING MODE CONTROL STRATEGY FOR DC/DC CONVERTERS

L. Xu, J. Matas, B. Wei, Y. Yu, Y. Luo, J.C. Vasquez & J. Guerrero, "Sliding mode control for pulsed load power supply converters in DC shipboard microgrids", *International Journal of Electrical Power & Energy Systems* 151, 109118 (2023) [Q1, 233/3747 in Engineering; IF=5.0]

This work, which included participation of a research from EPIC (Energy Processing and Integrated Circuits), proposes a sliding mode control (SMC) strategy for DC/DC converters feeding pulsed power loads (PPLs) in shipboard microgrids, where conventional PI controllers often fail to meet fast dynamic demands.



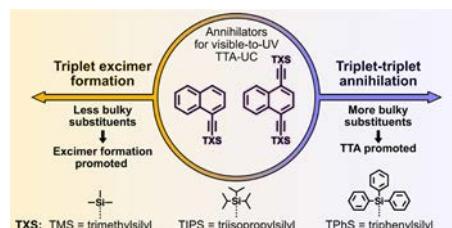
The SMC approach enhances system robustness, reduces voltage overshoot, and improves transient response under abrupt load changes. Simulation and experimental results validate the controller's effectiveness, showing superior performance in voltage regulation and stability. The work

contributes to advancing reliable, efficient power conversion in naval electrical systems facing high-impact transient conditions.

### ON THE MECHANISMS OF NAPHTHALENE-DERIVATIVES FORMATION

A. Olesund, S. Ghasemi, K. Moth-Poulsen & B. Albinsson, "Bulky Substituents Promote Triplet-Triplet Annihilation Over Triplet Excimer Formation in Naphthalene Derivatives", *Journal of the American Chemical Society* 145, 22168 (2023) [Q1, 12/1073 in Chemistry; IF=14.4]

The work, with participation of a researcher from **MOMA (Molecular Materials Group)**, reveals how molecular design can steer excited-state pathways in organic chromophores. The study demonstrates that introducing bulky substituents into naphthalene derivatives suppresses triplet excimer formation and instead promotes efficient triplet-triplet annihilation (TTA). By controlling intermolecular interactions through steric hindrance, the authors show that close  $\pi$ - $\pi$  stacking—often responsible for excimer formation—can be minimized, allowing triplet excitons to interact productively. This shift has important consequences for photophysical performance, as TTA is a key mechanism behind photon upconversion and energy harvesting applications.



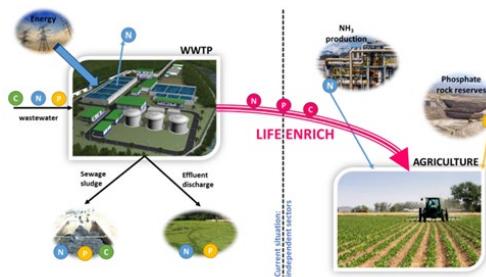
The findings provide clear structure–property relationships and practical design rules for tailoring triplet dynamics in aromatic systems. More broadly, the work highlights how subtle chemical modifications can decisively influence excited-state behavior, opening new opportunities for the rational design of advanced optoelectronic materials.

### ON NUTRIENT RECOVERY FROM WASTEWATER TREATMENT PLANTS FOR AGRICULTURAL APPLICATION

A. Mayor, S. Vinardell, K. Ganeshan, C. Bacardí, J.L. Cortina & C. Valderrama, "Life-cycle assessment and techno-economic evaluation of the value chain in nutrient recovery from wastewater treatment plants for agricultural application", *Science of the Total Environment* 892, 164452 (2023) [Q1, 92/1949 in Environmental Science; IF=8.2]

Recovering nutrients from wastewater helps turn treatment plants into resource-producing facilities. In this study, performed by researchers of the **Resource Recovery and Environmental Management** group (R2EM), a pilot system captured nitrogen and phosphorus and turned them into fertilisers for agriculture. The environmental assessment showed that using these recovered fertilisers can reduce pollution and greenhouse gas emissions compared with conventional fertilisers.

Although the process is not yet economically profitable due to the cost of chemicals, it could become viable if fertiliser prices increase and the technology is optimised. Overall, the work demonstrates that transforming wastewater into valuable agricultural products can support sustainability and promote a more circular use of resources.

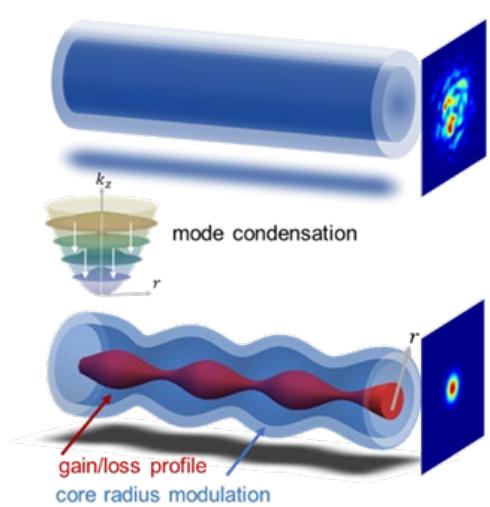


### ALL-OPTICAL-MODE CLEANING FOR MULTIMODE FIBERS

M.N. Akhter, S.B. Ivars, S. B., **M. Botey**, R. Herrero & K. Staliunas, "Non-hermitian mode cleaning in periodically modulated multimode fibers", *Physical Review Letters* 131, 043604 (2023) [Q1, 47/1333 in Physics and Astronomy; IF=8.1]

This study, which involved a researcher from the **DONLL group (Nonlinear Dynamics, Nonlinear Optics and Lasers)**, proposes an all-optical mode-cleaning scheme using Non-Hermitian physics. Multimode fibers produce speckle patterns due to light modes propagating at different speeds, and interfering randomly. By simultaneously modulating the fiber's refractive index (via core radius) and its gain/loss profile it is possible to induce a unidirectional coupling among modes. This asymmetry allows the "condensation" of initially turbulent beams into a Gaussian-like output, over roughly one meter of fiber.

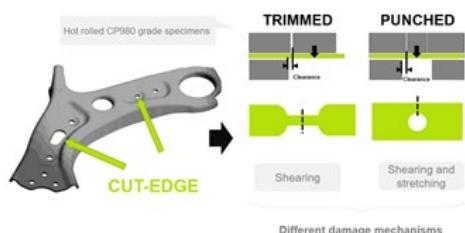
The proposal was semi-analytical predicted and numerically confirmed, also further extended to antisymmetric fibers, and nonlinear amplifiers.



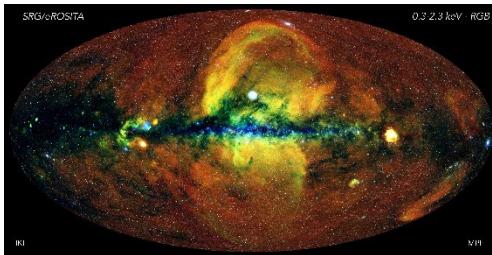
### NEW SIMULATIONS OF METAL PUNCHING AND TRIMMING

D. Gustafsson, S. Parareda, L. Ortiz-Membrado, A. Mateo, E. Jimenez & E. Olsson, "Simulation of metal punching and trimming using minimal experimental characterization", *Journal of Materials Processing Technology* 321, 118148 (2023) [Q1, 9/357 in Modeling and simulation; IF=6.7]

Understanding how metal parts fail requires looking at them on a very small scale. Accurate simulations of metal cutting processes are essential for designing reliable industrial components, but these simulations require robust validation. This study, performed by researchers from **CIEFMA (Center for Research in Structural Integrity, Reliability and Micromechanics of Materials)**, combines simulations with micromechanical tests to investigate the area around the cut edge, where damage is concentrated in critical areas. Two key techniques are employed: focused ion beam with digital image correlation to measure local residual stresses, and high-speed nanoindentation to create micrometer-scale maps of mechanical properties such as hardness near the cut edge. Together, they reveal how cutting affects the material exactly where damage initiates. By linking micromechanical measurements with simulations, this study demonstrates that complex cutting behavior can be predicted using an efficient, targeted experimental strategy.



## RESEARCH GROUPS



## GAA in a nutshell

GAA is a Generalitat de Catalunya's Consolidated Research Group of the UPC. The group boasts a rich history focused on the exploration of the final stages of stellar evolution. Specifically, the group has made significant contributions to the study of the physics of white dwarfs and neutron stars, whether in isolation or as components of close binary systems. The explosive fate of these celestial bodies, manifesting as classical and recurrent novae, type Ia supernovae, and X-ray bursts, has been a central theme of the GAA's intense research efforts. This dedication has yielded a robust publication record, numerous advised PhD theses, and a broad and well-established network of international collaborators. In recent years, the GAA has expanded its scientific interests to encompass the physics of black holes. Currently, the group consists of 14 senior researchers and 8 PhD students, with a subset established at the Castelldefels Campus.

## GAA's RECENT RESEARCH HIGHLIGHT

Lai, E.V., De Marco, B., Cavecchi, Y., El Mellah, I., Cinus, M., Diez, C.M., Grinberg, V., Zdziarski, A.A., Uttley, P., Bachetti, M., José, J., Sala, G., Różańska, A., & Wilms, J. (2024), "Characterisation of the stellar wind in Cyg X-1 via modelling of colour-colour diagrams", *Astronomy & Astrophysics* 691, A78 (15 pp)

## GAA's RESEARCH FAST FACTS

Source: <https://futur.upc.edu/GAA>

## RESEARCH OUTPUTS

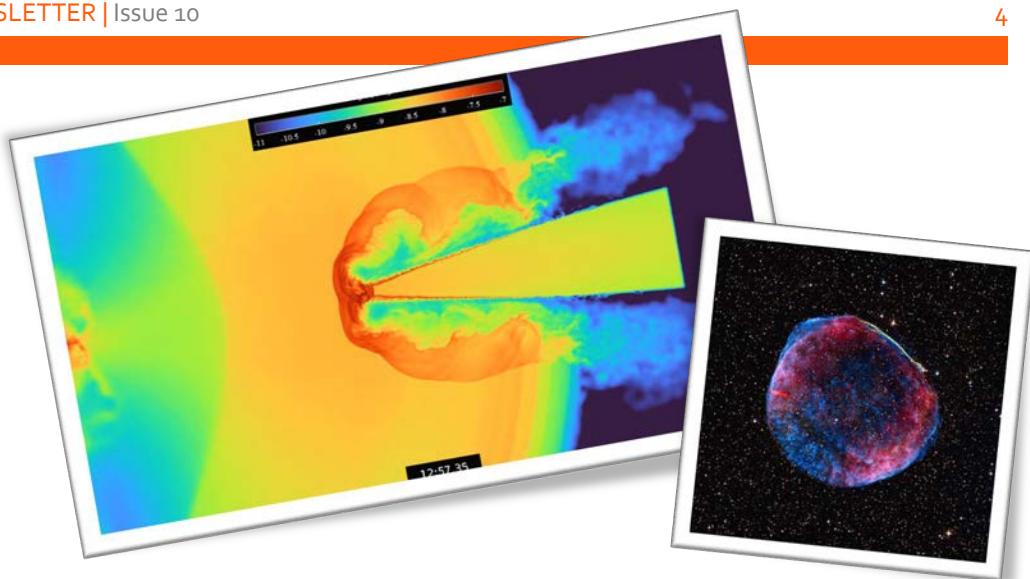
- 732 Research Papers in indexed journals
- 538 contributions to Conference Proceedings
- 221 Scientific Documents
- 76 Research and Text Books and Book Chapters
- 32 PhD Theses
- 1 Patent

## FUNDING &amp; AWARDS

- 87 R&D&I international & national competitive projects
- 8 awards

## FOR MORE INFORMATION

Prof. Jordi José,  
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## RESEARCH GROUPS @ CDB

# Astronomy & Astrophysics Group (GAA)



At present time, the main GAA research interests at CDB include:

- Stellar evolution
- Physics of white dwarfs, neutron stars, and black holes
- Type Ia supernovae: multidimensional models and nucleosynthesis
- Classical novae: multidimensional models and nucleosynthesis; observations
- Type I X-ray bursts: models and nucleosynthesis; observations; mass and radius constraints, recurrence times
- Stellar mergers and collisions
- Cosmochemistry: presolar meteoritic grains
- Intergalactic/circumgalactic medium
- Cosmology: observations
- Nuclear Astrophysics: re-evaluation of nuclear reaction rates; experimental nuclear physics
- Space missions: ground segment and payload
- Laboratory Astrophysics



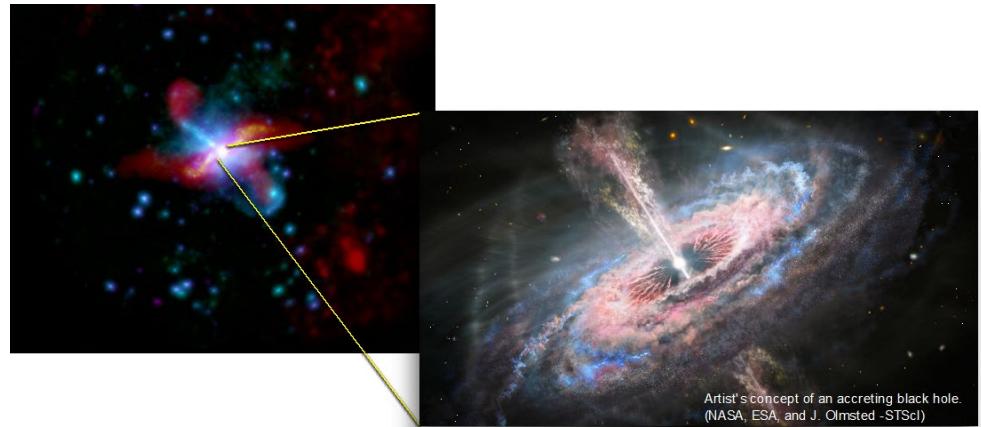
WHAT/WHICH/HOW

# WHAT are Black Holes?

By Prof. Barbara de Marco (GAA, Dept. Physics, EEBE-CDB)

**Black holes** are the most compact objects in the universe, with masses from a few to billions of Suns packed inside the **event horizon**—a region whose radius ranges from kilometers to Solar System scales. Their gravity is so strong that beyond this boundary nothing, not even light, can escape. A supermassive black hole is thought to lie at the center of almost every galaxy.

Matter falling onto a black hole forms a hot **accretion disc** that emits huge amounts of radiation, making the system bright at all wavelengths, especially in X-rays, and producing **rapid variability**. The regions close to a black hole are natural laboratories for **testing general relativity**. Black holes not only consume matter but can also launch powerful **jets and winds of plasma**.



In the **Astronomy & Astrophysics group** (GAA, EEBE), we study black hole systems by analyzing their rich and complex phenomenology. To do so, we use advanced **spectroscopic, timing, spectral-timing, and polarimetric techniques**, extracting physical information from the data collected by major X-ray observatories such as XMM-Newton, NICER, NuSTAR, and IXPE. These methods allow us to probe the geometry, dynamics, and evolution of the accretion flow around a black hole, to study phenomena in the strong-gravity regime, and to explore how

black holes interact with their environment through winds and jets.

## FURTHER READING ON BLACK HOLES

**De Marco, B., Motta, S., & Belloni, T.M.,** "Probing Black-Hole Accretion Through Time Variability", in ***Handbook of X-ray and Gamma-ray Astrophysics***, id. 58 (2022), C. Bambi and A. Santangelo (eds.), Springer Living Reference Work, ISBN: 978-981-16-4544-0.

## SCIENCE & CINEMA

The 9<sup>th</sup> edition of the **Science & Cinema** series took place at the CDB in September 2023, continuing this initiative that explores the scientific foundations, along with the inaccuracies, depicted in popular films and television series.

In this edition, researchers **Ángeles Carmona, Andrés M. Encinas** and **María José Jiménez** (MAPTHE), engaged the audience with an insightful and dynamic talk entitled ***Math Saves 'The Last of Us'***. Using the acclaimed series as a starting point, the speakers examined how mathematical models help us understand the spread of epidemics, predict complex biological and social phenomena, and support decision-making in critical situations. Their presentation highlighted the fundamental role of mathematics as a powerful tool for interpreting reality, demonstrating how mathematical thinking allows us to better understand the world around us—even in scenarios that seem straight out of fiction.



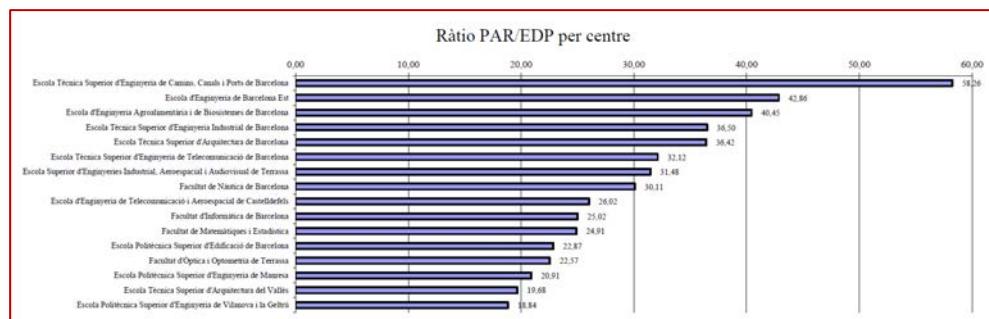
# THE EEBE @ THE UPC RESEARCH RANKINGS

The 2022 research report endorsed by the Vice-Rectorate for Science Policy of the Universitat Politècnica de Catalunya (UPC),

[http://drac.upc.edu/info/ca/lavaluaciodel-curriculum-vitae/upc-punts-par/informe/copy\\_of\\_informe-any-2021](http://drac.upc.edu/info/ca/lavaluaciodel-curriculum-vitae/upc-punts-par/informe/copy_of_informe-any-2021)

places the *Barcelona East School of Engineering* (EEBE) second among UPC's 16 schools and faculties, with a total of 8699.76 PAR. This marks a 21.5% decrease in research productivity compared to 2021.

In terms of normalized ratios, EEBE ranks second, achieving an impressive average of 42.86 research points per researcher (PAR/EDP).

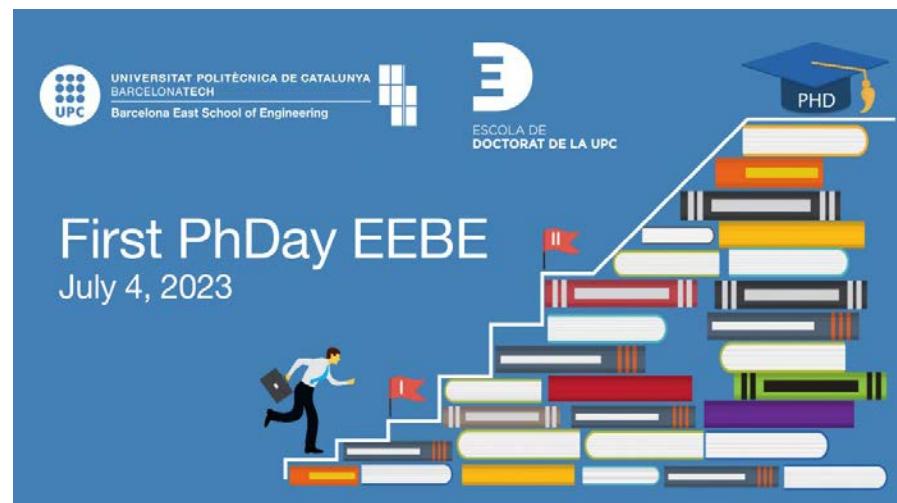


Among the research groups based at EEBE, **ENCORE** (Energy, Catalysis, Process and Reaction Engineering), **CIEFMA-PROCOMAME** (Microstructural Design and Advanced Manufacturing of Materials), **GAA** (Astronomy and Astrophysics Group), and

**R2EM** (Resource Recovery and Environmental Management) lead the ranking, with more than 80 PAR/EDP (a metric reflecting normalized productivity per researcher) in 2022, highlighting their significant research contributions.

## PhDAY @ EEBE

On July 4, PhD, Master's, and (brave) advanced undergraduate students came together for the (very) **First PhDay at EEBE**, a brand-new initiative designed to answer *everything you ever wanted to know about doing a PhD*. During the event, PhD students and postdoctoral fellows at different stages of their academic journey generously shared their experiences, wisdom, and survival tips with younger colleagues. The program featured a number of highly motivating talks, including one on funding opportunities for future PhDs and postdocs by the Vice-Director of the UPC Doctorate School (yes, enthusiasm is wonderful, but funding is also essential). In addition, a former UPC PhD student, now working in the R&D Department at Braun Surgical, offered valuable insights into the importance (and real-world impact) of holding a PhD in the industrial sector.



A round table entitled *A Stranger in a Strange Land* explored the experiences of several international PhD students upon arriving at EEBE-UPC, sharing first impressions, cultural surprises, and the small (and not-so-small)

challenges of starting a PhD far from home. The day also included a lively poster session conducted by current PhD students and postdocs at EEBE, proving that research can be both rigorous and visually appealing.

## RESEARCH INITIATION GRANTS

The **Second Call for Research Initiation Grants** at EEBE was launched on Summer 2023. This program provides selected students with the opportunity to carry out their Final Degree Projects (Bachelor's or Master's theses) within established research groups, or to gain their first research experience through summer placements.



The initiative is designed to connect academic training with practical experience by engaging students in active research settings, allowing them to participate directly in ongoing scientific work.

7 students were funded in this new edition of the *Research Initiation Grants*.

# María de Maeztu Unit of Excellence accreditation

**The *Barcelona Research Center in Multiscale Science and Engineering* has been awarded as a “María de Maeztu Unit of Excellence”, acknowledging its leadership and cutting-edge research**

Materials science has become a key driver for global competitiveness. The European Commission has published the groundwork for the design of the second Strategic Plan of the Horizon Europe program 2025-2027. This plan includes, with regard to the development of advanced materials, an investment that seeks to position the European continent as a leader in innovation in this sector. At the Spanish level, the government approved in 2024 the X State Plan for Scientific, Technical and Innovation Research 2024-2027, and foresees investments in priority areas such as health, energy and the environment, all of them directly related to materials science.

In this context, the ***Barcelona Research Center in Multiscale Science and Engineering (CCEM)***, dedicated to materials science and located in the Diagonal-Besòs Campus, has demonstrated in recent years a rigorous and constant research trajectory, which has resulted in a high-impact scientific production and the development of innovative projects with great potential for technological transfer. In this sense, obtaining the ***María de Maeztu Unit of Excellence*** accreditation, granted by the Spanish Ministry of Science, Innovation and Universities, has been an endorsement of this successful journey. The ***María de Maeztu Unit of Excellence*** accreditation is a seal of quality that distinguishes those research centers that demonstrate a significant impact in their field, remarkable scientific excellence, and a capacity to attract and retain top-level research talent.

The CCEM is characterized by a multidisciplinary approach covering different areas such as physics, chemistry, biology and engineering. This comprehensive approach allows complex problems to be addressed from different perspectives, generating innovative and disruptive solutions. The eight research groups that make up the center work on three fundamental pillars: health, energy and the environment, and are committed to the search for solutions to the global challenges facing these fields, with

projects on biomaterials for the tissue regeneration and functional repair; on the behavior of metastable and nanocrystalline materials, and their multiple applications in the field of sustainability or drug development; on new micro and nano-structured polymeric materials, or focused on the study of the resistance of materials; projects on the development of catalysts applied to the energy world, or of thin-film and crystalline silicon solar cells that can improve the field of renewable energies; projects on waste recovery and elimination, and on the applicability of polymers in the dosing of drugs, among many others.

The CCEM began 2025 with excellent prospects. It could celebrate the granting of two new ICREA Acadèmia recognitions and three new grants for transfer projects from the Indústria del Coneixement Program, awarded by the Generalitat de Catalunya, which demonstrate the attractiveness of the CCEM for the business sector. These new recognitions are added to the four ERC projects achieved in recent years, and to the prestigious ICREA, Marie Curie, Ramón y Cajal or Juan de la Cierva accreditations, among others, of its researchers, which endorse the talent of the center. A talent that is actively promoted, since the CCEM is part of five European networks of innovative training, which aim to train a new generation of researchers capable of converting knowledge into products and services with economic and social benefit.



In recent years, the CCEM, which has state-of-the-art laboratories and research facilities, has experienced great growth and has consolidated itself as an international reference in its field. The publication, during the period 2020-2024, of more than 1.000 scientific articles in the most prestigious journals is proof of the high level of research carried out at the center, as well as the attraction of 31,5 million euros in competitive funds during the same period, without forgetting the 3,3 million euros in transfer agreements with companies. Currently, the CCEM has a portfolio of 19 European projects in progress, a fact that further emphasizes the mentioned international dimension of the center.

Obtaining the ***María de Maeztu*** accreditation opens a new chapter that will allow the center to consolidate its position as an international benchmark in research, a recognition of the effort and dedication of all members of the center. Today, the CCEM is in the best position to continue contributing to the advancement of knowledge and the development of innovative solutions for the crucial challenges of the 21<sup>st</sup> century.



UNIVERSITAT POLITÈCNICA DE CATALUNYA  
BARCELONATECH

Centre de Recerca en Ciència i Enginyeria  
Multiescala de Barcelona



EXCELENCIA  
MARÍA  
DE MAEZTU  
04/2024 - 03/2030

María de Maeztu CEX 2023-001300-M/AEV/10.13039/501100011033  
Project funded by Spanish State Research Agency



# AWARDS, GRANTS, & EVENTS

## PhD Theses Defended

**Georgina Company** (Advisor: Lexa Nescolarde/Ramon Bragos, IEB), "Temporal and frequency differentiation of healthy and pathological lung tissue through minimally invasive electrical impedance spectroscopy" (Jul/2023)

**Lisbeth A. Torres** (Advisor: José Antonio Travieso/Nuria Cuadrado/Jordi Llumà, TECNOFAB), "Tool-part tribological interaction assessment for continuous deformation processes" (Jul/2023)

**Karina V.A. Torres** (Advisor: Antonio Florido/Vicenç Martí, R2EM), "Nano-enabled screen-printed electrodes for the determination of trace elements in aqueous environmental samples" (Jul/2023)

**Xavier Solé** (Advisor: Cristina Canal/Maria-Pau Ginebra, BBT), "Effects of cold atmospheric plasmas on biomaterials: hydrogels and composites with calcium phosphates" (Jul/2023)

**Alexandre Alonso** (Advisor: Jordi de la Hoz/Maria Helena Martin, SEPIC), "Contribution to Optimal Microgrid Design and Management in Uncertain and Regulated Environments" (Jul/2023)

**Alfonso D. Loaeza** (Advisor: Orlando Santana/Maria Lluïsa Maspoch, e-PLASCOM), "Polymer blends based on post-consumer waste of opaque poly(ethylene terephthalate) and polypropylene" (Jul/2023)

**Pascale Vacca** (Advisor: Eulàlia Planas/Elsa Pastor, CERTEC), "Fire risk analysis framework at the wildland-urban interface" (Jul/2023)

**Eric Velázquez** (Advisor: Jordi Llumà/Ramon Jerez, TECNOFAB/Vincent Wagner), "Application of the vibration-assisted ball burnishing process on rotational symmetric parts to improve their fatigue strength and wear properties" (Sep/2023)

**Itzel Lorente** (Advisor: José Antonio Calero/Luis Llanes, CIEFMA/Nuria Salán), "Desarrollo de sistemas de dispersión coloidal y granulación de partículas metálicas finas" (Sep/2023)

**Vahid Foroughi** (Advisor: Joaquim Casal/Elsa Pastor, CIEFMA), "Risk analysis of jet fires thermal effects" (Sep/2023)

**Carlos Sáez** (Luis del Valle/Jordi Puiggalí, PSEP), "Obtaining micro- and nanotextured functional surfaces on thermoplastics via injection moulding techniques using laser textured metallic inserts and NIL (nano-imprint lithography)-textured polymeric films" (Oct/2023)

**Jersson X. Leon-Medina** (Advisor: Francesc Pozo, CoDALab/Diego A. Tibaduiza), "Intelligent condition monitoring of structures through data-driven process and machine learning methods" (Oct/2023)

**Jing Liang** (Advisor: Emilio Jiménez, CIEFMA), "Micromechanics of quaternary AlCrSiN coatings on hard substrates" (Oct/2023)

**Shiva Fazlakeshteli** (Advisor: Jordi Llorca, ENCORE/Xavier Vendrell), "Partial oxidation of methane into syngas at low temperature" (Oct/2023)

**Sergi Rey** (Advisor: Miguel Angel Mateos/Elisabet Engel, IMEM-BRT), "Development of a resorbable and bioactive personalized 3D-printed implant for guided bone regeneration" (Nov/2023)

**Elma Sanz** (Advisor: Joaquin Blesa/Vicenç Puig, SAC), "AI-enhanced Cyber-Physical Systems in Automotive Industry. Integration of CPS and Application Artificial Intelligence Technologies in Automotive Paint Shop Process" (Nov/2023)

**Mingyue Yuan** (Advisor: Trinitat Pradell, PTP-GlaDyM), "Historical copper and iron coloured glazes and glasses" (Nov/2023)

**Violeta García** (Advisor: Orlando Santana/Maria Lluïsa Maspoch, e-PLASCOM), "Blends of modified PLA and biopolyamides for additive manufacturing" (Nov/2023)

**Agustina Giuliodori** (Advisor: Joaquin A. Hernandez/Eduardo Soudah, (MC)2-UPC), "Development of Multiscale reduced-order models for the Analysis of Medical Devices" (Nov/2023)

**Mahdi Sheikh** (Advisor: José Luis Cortina/César Valderrama, R2EM/Mashallah Rezakazemi), "Nitrogen Recovery from wastewater treatment effluents by liquid-liquid membrane contactor for fertilizers production" (Nov/2023)

**Enric Andreu** (Advisor: Rafael Pastor/Alberto García-Villoria, DOPS), "Multi-manned Assembly Line Balancing Problem con tiempos de proceso dependientes (MALBP-DTT)" (Dec/2023)

**Álvaro Mayor** (Advisor: José Luis Cortina/César Valderrama, R2EM/Núria Bassat), "Evaluation of nutrient recovery from urban wastewater for sustainable fertilizer production" (Dec/2023)

**Marina Martínez** (Advisor: Elena Martínez/Elisabet Engel, IMEM-BRT), "Promoting cardiac regeneration by biomimetic microenvironments" (Dec/2023)

**Xavier Marimon** (Advisor: Raul Benítez, BIOCOM-SC), "Caracterització multiescala de dades fisiològiques en la cardiologia translacional" (Dec/2023)

## New Research Grants

*Sistemas complejos espaciotemporales para el control no convencional de luz*, MICINN, PID2022-138321NB-C21 (2023-2027), UPC's PI: M. Botey/K. Staliunas (DONLL)

*Medium to long term thermal energy storage system with embedded heat pumping capability*, European Union, HE-EIC-PATHFINDER Challenge-101114987-MUSPELL (2023-2027), UPC's PI: P. Lloveras (PTP-GlaDyM)

*Massively parallel simulations of microplastics transport in turbulent marine environments*, Digital Research Alliance of Canada, RAC-2023 kfw-162-ab (2023-2025), PI: L. Jofre (GReCEF)/M. Rahmani

*Multifunctional hydrogelS for High precision targeting of urOlogic Tumors: boosting cold atmospheric plasma and Electric field technologies for combinatorial anticancer therapies*, MICINN, PID2022-141120OB-I00 (2023-2026), PI: C. Canal/J.M. García-Torres (BBT)

*Post-processing and mechanical integrity of additive manufactured ceramics, MICINN, PID2022-137274NB-C32 (2023-2026), UPC's PI: G. Fargas/L. Llanes (CIEFMA)*

*Additive manufacturing of salt chlorination cells from recycled Ti scrap, Generalitat de Catalunya, ACE099/23/000018 (2023-2025), UPC's PI: A. Mateo (CIEFMA)*

*Síntesis Automática del Sistema de Gestión de Energía para Microrredes Eléctricas, MICINN, PID2022-138631OB-100 (2023-2026), PI: H. Martínez (EPIC)*

*From 1D to 3D flexible hydroxyapatite ceramics for biomedical applications, MICINN, PID2022-142395OB-100 (2023-2026), PI: M. Español/M.-P. Ginebra (BBT)*

*Tecnologías de destilación y cristalización por membranas mejoradas para la recuperación de productos de amoníaco hacia vertido cero, MICINN, PID2022-138389-OB-C33 (2023-2026), PI: E. Guillén (R2EM)*

## Awards

**Prof. Maria-Pau Ginebra (BBT)** received the ICREA Academia 2023 distinction.



**Linh Johansson (BBT)** was awarded with the *Premis Impacte 2022 de Doctorats Industrials* (Societal Impact Category), for her work "3D printed personalized bone grafts - Combined benefits in terms of cost, patient, comfort and recovery" (October/2023).

**Nerea García de Albéniz and Patricia López (BBT)** got the *Jury Award* and a *Special Mention Public Award*, respectively, for the *Best Amazing Flash Presentations* at the Summer School of the Bio-TUNE project "Strategies to develop new generation of multifunctional scaffolds and implants with cell instructive and antibacterial properties", Jogjakarta (Indonesia; July/2023).

## International Events, Meetings & Conferences at CDB

*SIBB2023 - XLV Congreso de la Sociedad Ibérica de Biomecánica y Biomateriales, (November/2023; BBT)*



# CAMPUS DIAGONAL-BESOS

## Research Newsletter

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