

A success history in planning and preparing an MSCA individual fellowship: MENAWIR Project

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December 2019 – December 2023

Outline

- Who are we?
- The MENAWIR project
- Motivation
- First steps
- Writing the proposal
- Success!! Evaluation summary
- Signing the grant agreement
- Starting the work

Who are we?

Dr. Carlos Ruestes – Researcher:

- Aeronautics Engineer – U.N. de La Plata – Argentina (2005)
- Doctor in Engineering Sciences – Instituto Balseiro – Argentina (2015)
- Associate Researcher at CONICET – Argentina (on leave) (2016 – 2022)
- Professor at Universidad Nacional de Cuyo – Argentina (on leave) (2015 – 2022)
- MSCA Postdoctoral Fellow at IMDEA Materials (2022 – 2024)



Who are we?

Prof. Javier Segurado – Supervisor

- PhD in Materials Engineering, UPM in 2004
- Professor (Catedrático) at Departamento de Ciencia de Materiales, UPM from 2020
- Researcher at IMDEA-Materials Institute, leader of Multiscale Materials Modeling group from 2008
- Expertise in:
 - Multiscale modeling
 - Micromechanics and homogenization
 - Plasticity, damage and fracture
 - FFT and FEM



Who are we?



science



transfer



talent



820

Researchers

40

Nationalities

1500

R&D projects

3

**Seal of Excellence
Severo Ochoa & María
de Maeztu**



The IMDEA Materials Institute, one of the seven Madrid Institutes for Advanced Studies (IMDEA), is a public research centre (**non-profit research organisation**) founded in 2007 by Madrid's regional government.

The **Mission** of the Institute is to do research of excellence at the forefront of Materials Science and Engineering, contributing to tackle the challenges of society and fostering the sustainable development of the region of Madrid.



science



excellence
in materials **science**
and engineering
research



transfer



technology transfer to
industry to increase
competitiveness and
maintain technological
leadership



talent

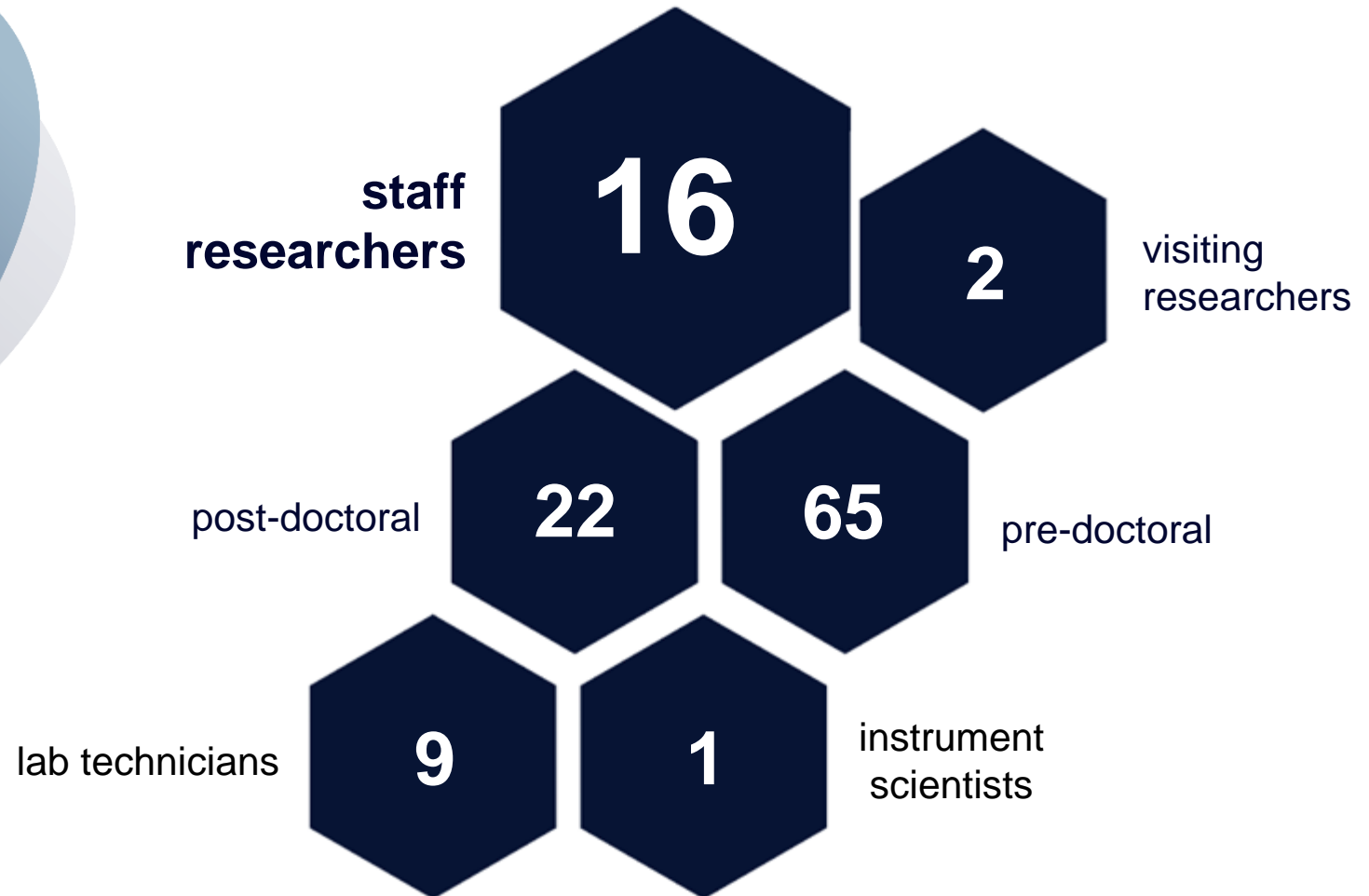


attraction of talented
researchers from all over
the world to work in Madrid
in an international and
interdisciplinary
environment



**~115 researchers
from 26 countries**

Transparent selection
and evaluation by an
independent
Scientific Council



48%

**foreign nationals
researchers**

58%

**PhD granted by
foreign universities**

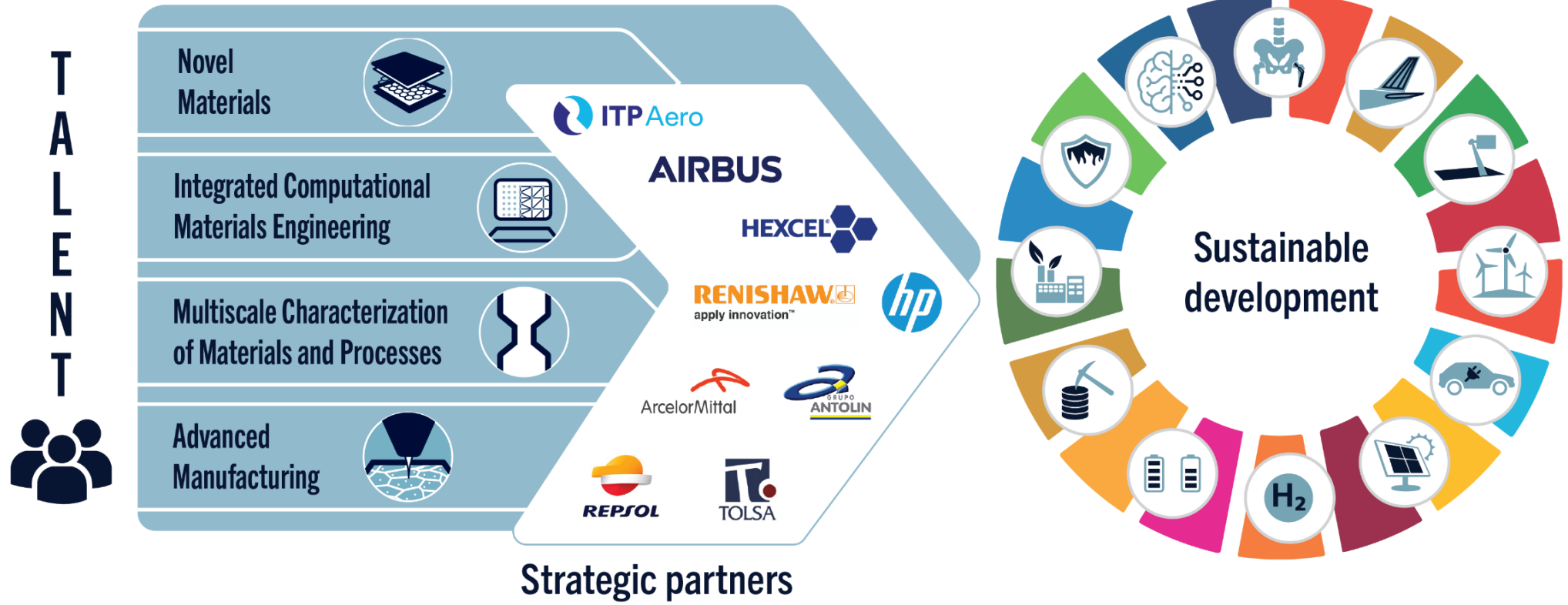
**Who arrived in IMDEA Materials from
prestigious universities around the world**

- Cambridge University
- Max Planck for Iron Research
- Delft University of Technology
- University of Leoben
- Dublin Institute of Technology
- Universität Erlangen-Nürnberg
- University of California Berkeley
- Mines ParisTech
- University of Queensland

- Catholic University of Louvain
- State University of Campinas
- Korea Advanced Institute of Science and Technology
- Chinese Academy of Sciences
- China Central South University
- Sichuan University
- University of Science and Technology of China
- ...

Research programmes: fundamental and applied

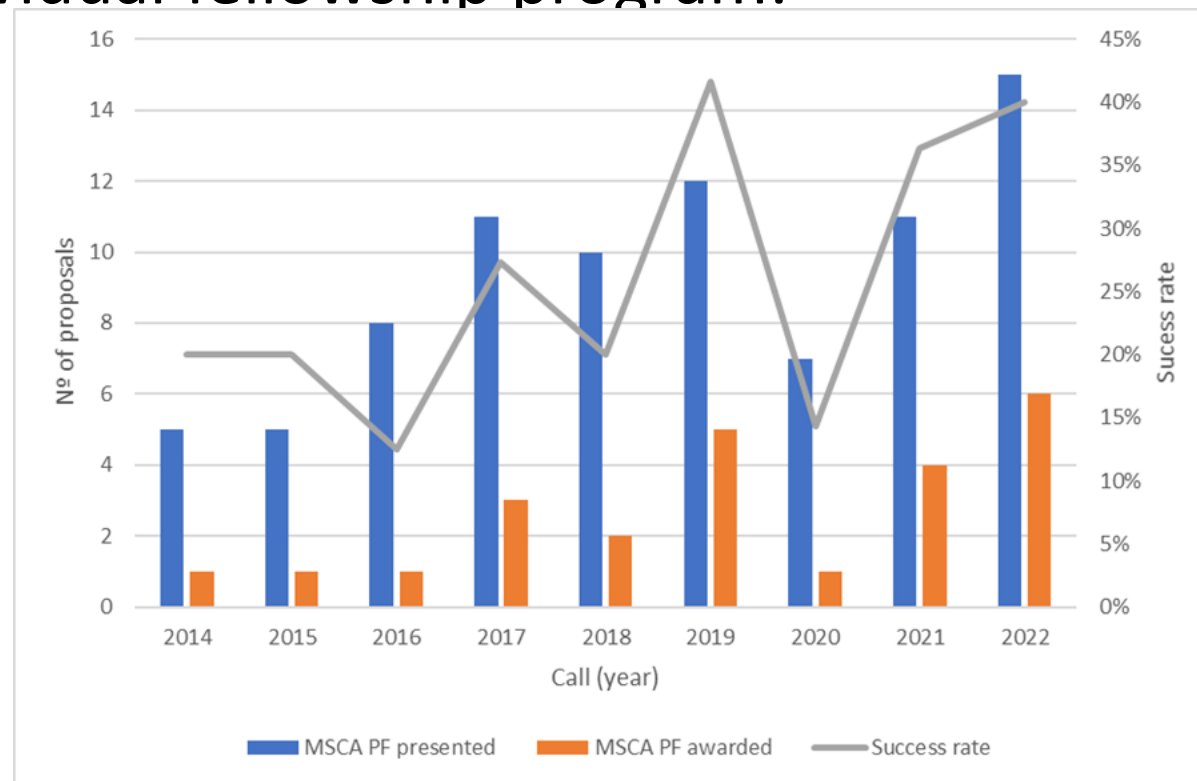
Global challenges



Who are we?

IMDEA experience in MSCA-individual fellowship program:

- Average success rate over the years of 26% w.r. to 17% rate in Engineering,
- Some years more than 40% some years. In 2022, absolute 3rd position in Spain having only around 100 researchers
- Very high number of proposals per IP



AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	31
UNIVERSIDAD AUTONOMA DE BARCELONA	7
UNIVERSIDAD DE GRANADA	7
UNIVERSIDAD DEL PAIS VASCO/ EUSKAL HERRIKO UNIBERTSITATEA	7
FUNDACIO PRIVADA INSTITUT CATALA D'INVESTIGACIO QUIMICA	6
FUNDACION IMDEA MATERIALES	6
UNIVERSIDAD POMPEU FABRA	6
UNIVERSITAT DE BARCELONA	6
UNIVERSIDAD DE SANTIAGO DE COMPOSTELA	5

MENAWIR Project proposal

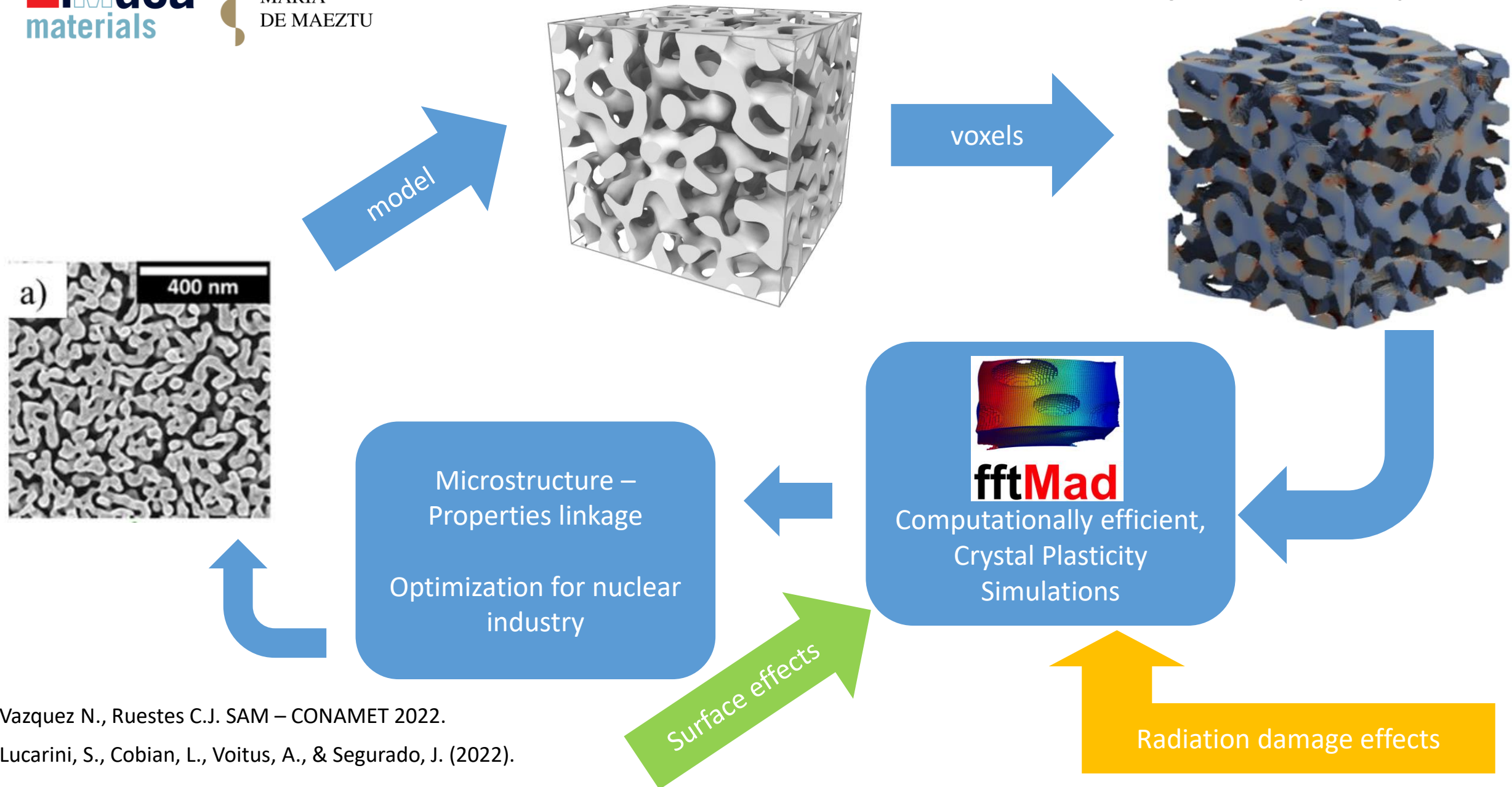
- **Summary:** Fusion reactors demand materials capable of withstanding unprecedented extreme conditions. Refractory-based nanoporous metals offer a combination of mechanical and radiation performance that makes them ideal potential candidates for nuclear applications. Modelling and simulation is a valuable tool, allowing to replace many of experimental tests by simulations, especially useful for extreme conditions as in fusion.

The MeNaWir project aims at shedding light into elusive aspects of the mechanical behaviour of nanoporous refractory metals and could lastingly impact innovation on materials for fusion.

- Mechanical behaviour of nanoporous refractory metals, focusing on nanoporous tungsten (np-W) and the effect of radiation damage on its mechanical properties.
- Multiscale computational approach
- Coupling Crystal Plasticity - Fast Fourier Transform (CP-FFT) simulations, radiation damage models and plasticity at the nanoscale.
- A framework for the computational assessment of nanoporous materials for the nuclear industry
- To provide a window of optimal np-microstructures to guide the fabrication of np-W parts.

Project Kick-off: September 2022

MENAWIR Project proposal



Vazquez N., Ruestes C.J. SAM – CONAMET 2022.

Lucarini, S., Cobian, L., Voitus, A., & Segurado, J. (2022).

Motivation

Carlos:

- New techniques (Leave comfort zone)
- New international experience
- Extend network of collaborators
- Work at top-notch institution
- Test myself on a more competitive environment
- Family needs

Javier:

- Expand my approaches to materials under irradiation and nuclear applications
- Learn new techniques
- Extending the network
- Provision of funds for working with very strong researchers as Carlos

First steps

- Call for expressions of interest in EURAXESS (Javier – *Early July 2021*)
- Contact (Carlos – *Early July 2021*)
- Online meetings to discuss and mature the idea (*July – August*)

Beginning: Nano-porous (basic science)→

Move focus to application: hot topics and high win-high risk→

Include societal impact: UN SDG7: Ensure access to affordable, reliable, sustainable and modern energy→

Nanoporous W for fusion applications

- Writing of the proposal (*August – September*)
- Submission (*Early October*)

A 3-month process, almost full time for the researcher

Writing the proposal

Continuous interaction between researcher (R) + Principal investigator (IP) + European Project Office (EPO)

PART B1 – Scientific proposal: all, on-line meetings and sending back and forth different versions until reaching a final one

1 Excellence:

Abstract, objectives, SOA, methodology R+IP

Gender dimension + open science practices: EPO+IP

Quality of the supervision: all

Experience of IP and R (in addition to a CV)

Two way transfer, very important ALL

2 Impact: R+IP with help of EPO

3 Implementation: (WPs, tasks, etc) R+IP

Part B2 – Researcher CV and Research center capabilities: R with help of EPO

All sections are equally
important !!!

Success!! Evaluation summary

TOTAL SCORE: 97%

1) Excellence 5/5

Strengths

- *A state of the art is very relevant with suitable reference to the research objectives.*
- *The proposal presents a **research topic** of timely interest with a good level of novelty.*
- *The research **objectives** are sufficiently measurable, verifiable and realistic.*
- *The research **methodology** is credible and suitable to the proposal objectives.*
- ***Interdisciplinary** aspects of the proposal are clearly articulated.*
- *The proposed **open science** measures are effective and appropriate for the proposed actions.*
- *The **supervisor's level of experience** in the field of research, international collaboration, and experience in supervising at the advanced level is very high.*
- *The **two-way of transfer knowledge** is logical and well planned.*
- *The **researcher's competencies and skills** are very good, and they are entirely in line with the research proposal.*

Success: Evaluation

TOTAL SCORE: 97%

2) Impact 4.5/5

Weaknesses

- The **strategy for management of the intellectual property** is not sufficiently described concerning software licensing.
- **Justifications of the impact beyond the immediate scope** of the proposal are not sufficiently outlined.
- The proposal vaguely presents **the quantified estimates of the expected outcomes** and their impacts.

Success: Evaluation

TOTAL SCORE: 97%

3) Implementation 5/5

Strengths

- ***The work plan*** is coherent and lists clear work package titles.
- ***Deliveries*** and ***milestones*** are well allocated and defined with....
- ***Risk management and contingency plans*** address well the main plausible risks.
- The ***schedule of tasks in the Gantt*** chart is credible, showing sequential development of the project.
- The host institution offers a ***suitable environment for the proper implementation*** and development of the research, ensuring coherent project implementation at a high level.
- The ***host institution's infrastructures, logistics, and facilities*** are sufficiently described and reasonably appropriate for the proposal.

Success: Evaluation

To **score high** you need a **delicate balance** of

- Novelty, innovative idea (risky but not impossible) with a wide open view -> impact across disciplines
- Complementary skills (researcher & supervisor) in a perfect setting (host institution)
- Measurable impact and results exploitation strategies (hard when you plan to push frontiers of disciplines)
- **Is not only research**, pay attention to the **non-scientific aspects** (dissemination strategy, intellectual property, open science) and organizative (Gantt charts, milestones, deliverables, and last but not least... *Risk management strategies*)

Signing the grant agreement

Calendar:

Proposal submission: early October 2021

Results: early March 2022

Grant agreement signed in May 2022

Incorporation to IMDEA: September 2022

- No changes in the proposal or Budget reduction was done for the grant
- Only point to discuss, the incorporation date. This must be included in the grant agreement
- Deliverables included: Career Development Plan & Data Management Plan

Starting the work

- Initial training by IP in models, techniques and codes related to the workplan
- Initial training by hosting center in the use of some machines and experimental techniques
- Seminar of the researcher to present his previous work to the institute
- Workshop by the researcher to train students at the institute
- Writing and submission of deliverables (DMP and CDP)

In addition to the scientific tasks of the Project:

- Dissemination article in “the conversation” with very high impact:

”fusión nuclear: ¿qué material puede contener una estrella en la Tierra?”

- Attendance to scientific conferences, courses (Nanoporous 2023, Complas 2023, CISM, Udine)
- Additional collaborations with other researchers and institutes