

Abraham Sánchez Romero.

Aerospace Engineer | PhD Researcher | Advanced Manufacturing & Materials

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Professional Summary

Aerospace Engineer and PhD Researcher developing sustainable manufacturing routes for metallic materials for extreme operating environments. My work combines additive manufacturing, powder-based technologies and innovative thermal processing to enable the production of high-temperature alloys, functionally graded materials and lunar regolith-based components for future aerospace and space systems. Through international R&D projects, I translate emerging manufacturing concepts into experimentally validated engineering solutions with the potential for industrial implementation.

Core competencies

- **Advanced Manufacturing:** Additive Manufacturing (MEX-PDS, PBF), Powder Metallurgy, Reactive Sintering, Concentrated Solar Energy, Induction Heating
- **Materials Systems:** Titanium Alloys (Ti-6Al-4V), Titanium Aluminides (TiAl), Nickel Superalloys (Inconel 718), Aluminum Alloys, Copper Alloys (GRCop-42), Lunar Regolith Simulants
- **Characterization:** SEM/EDS, Optical Microscopy, XRD, Metallography, Mechanical Testing, Density Measurement, Thermal & Electrical Characterization, High-Temperature Oxidation & Corrosion Testing
- **Engineering:** Process Development, Design of Experiments, Process–Microstructure–Property Relationships, Sustainable Manufacturing

Professional Experience

R&D Engineer – Advanced Manufacturing & Materials

University of Castilla-La Mancha (UCLM) – Institute for Applied Research to the Aeronautical Industry (INAIA)

Toledo, Spain | Oct 2024 – Present

Developing sustainable manufacturing technologies for high-performance metallic components through competitive regional, national and European R&D projects focused on aerospace, space, and energy applications.

- Developed sustainable manufacturing routes for monolithic, multimaterial, and functionally graded metallic components by integrating Additive Manufacturing, Powder Metallurgy, Reactive Sintering, and Concentrated Solar Energy.
- Designed, optimized, and validated advanced manufacturing processes including Material Extrusion (MEX-PDS), Powder Bed Fusion (PBF), induction heating, and solar-assisted thermal processing to improve densification, microstructure, and functional performance.
- Processed high-performance metallic materials including titanium alloys (Ti-6Al-4V), titanium aluminides (TiAl), nickel superalloys (Inconel 718), aluminum alloys (Al 6061), copper alloys (GRCop-42), and lunar regolith simulants for aerospace, space, and In-Situ Resource Utilization (ISRU) applications.

- Established process–microstructure–property relationships through comprehensive microstructural, mechanical, thermal, and electrical characterization, including SEM/EDS, XRD, optical microscopy, metallography, density and hardness measurements, mechanical testing, thermal conductivity evaluation, and high-temperature oxidation and corrosion evaluation.
- Collaborated in European R&D projects (SOL-AM and SOL3D_MULTIMETAL) with leading international research institutions including PROMES-CNRS (France), BAM (Germany), and CENIM-CSIC (Spain), contributing to the development of sustainable manufacturing technologies for advanced engineering applications.
- Disseminated research through international and national conferences, including EUROMAT, BACSI, and CNMAT, receiving the **Best Oral Presentation Award** and **Best Scientific Poster Award** for contributions to advanced manufacturing and materials engineering.

Teaching Fellow

Universidad Carlos III de Madrid - Department of Materials Science and Engineering and Chemical Engineering
Madrid, Spain | Dec 2023 - Oct 2024

Competitive Master's Fellowship supporting laboratory teaching and practical training in Materials Science and Engineering.

- Delivered laboratory classes and supervised practical sessions in Spanish and English for undergraduate engineering programmes, including Aerospace, Energy, Mechanical, Electrical, and Industrial Electronics Engineering.
- Guided students in materials processing, characterization, and engineering laboratory techniques while preparing teaching materials and evaluating practical performance.
- Combined teaching responsibilities with master's research focused on advanced ceramic coatings for concentrated solar power thermal energy storage systems.

Engineering Intern

Tecnove Fiberglass S.L.
Herencia, Spain | Jul 2022 - Sep 2022

- Supported the design and manufacturing of insulated composite structures for refrigerated transport vehicles.
- Produced engineering drawings, manufacturing documentation, and technical specifications for composite and structural components.
- Participated in material selection, production planning, and shop-floor supervision to ensure manufacturing quality and compliance with engineering requirements.
- Gained hands-on experience in composite materials, industrial manufacturing processes, technical documentation, and production engineering.

Education

Ph.D. in Materials Science and Engineering (Expected 2027)

University of Castilla-La Mancha (UCLM) | Toledo, Spain

Research focused on sustainable manufacturing technologies for high-performance metallic materials using Additive Manufacturing, Powder Metallurgy, and Concentrated Solar Energy for aerospace, space, and energy applications.

M.Sc. in Materials Science and Engineering

Universidad Carlos III de Madrid (UC3M) | Madrid, Spain | 2024

Master's Thesis: Performance of Glass-Ceramic Coatings Applied to Conventional and Alternative Mortars for Thermal Energy Storage Applications. Competitive Master's Teaching Fellowship.

B.Sc. in Aerospace Engineering

University of Castilla-La Mancha (UCLM) | Toledo, Spain | 2023

Honors and Awards

- **Best Oral Presentation Award**, XVIII National Congress on Materials (CNMAT) | 2026
Awarded for the presentation "Synthesis of Ti-Al Functionally Graded Materials by Solar Reactive Sintering", recognizing outstanding research in advanced manufacturing and materials processing.
- **Best Scientific Poster Award**, XVIII National Congress on Materials (CNMAT) | 2026
Awarded for excellence in scientific communication and innovation in advanced manufacturing research presented at the XVIII National Congress on Materials.
- **Airbus Best Bachelor's Thesis Award**, University of Castilla-La Mancha & Airbus | 2023
Awarded in recognition of the outstanding quality and industrial relevance of the Bachelor's Thesis "Processing and Characterization of Lightweight Carbon Fiber/Nomex Sandwich Structures".

Selected Projects

SOL3D_MULTIMETAL - Development of sustainable processes for the synthesis and manufacturing of advanced metallic multi-materials for energy applications

PROMES-CNRS (France) | European RIS-Energy Project | Visiting Researcher | 2026

Developed sustainable manufacturing routes for advanced metallic multi-materials using Concentrated Solar Energy, including the processing of titanium alloys, titanium aluminides, and lunar regolith simulants for aerospace, energy, and In-Situ Resource Utilization (ISRU) applications.

Sustainable Processing of Functional Metallic Components through Additive Manufacturing Techniques Using Concentrated Solar Energy

University of Castilla-La Mancha | Regional R&D Project | Research Engineer | 2024–2027

Development of sustainable manufacturing technologies combining Material Extrusion (MEX-PDS), Powder Metallurgy, Reactive Sintering, and Concentrated Solar Energy for high-performance metallic components intended for aerospace, space, and energy applications.

SOL-AM - Use of Concentrated Solar Energy in Additive Manufacturing and Post-Treatment of Metal Components for Energy Applications

PROMES-CNRS (France) | European RIS-Energy Project | Visiting Researcher | 2025–2026

Investigated the use of Concentrated Solar Energy for additive manufacturing and post-processing of metallic materials, contributing to the development of energy-efficient thermal processing technologies through experimental research at the PROMES-CNRS solar furnace.

Selected Publications

- Sánchez Romero, A.; Romero Gutiérrez, A.; Horta Muñoz, S.
Processing and Characterization of Lightweight Sandwich Structures (CFRP–Nomex).
Material-ES, Vol. 9, No. 1, 2024.
- Sánchez Romero, A.; Romero Gutiérrez, A.; Sierra Palacio, D. I.; Cañadilla Sánchez, A.
Atrévete a encontrar: Materiales en vuelo.
Material-ES, Vol. 3, No. 10, 2026.

Engineering & Scientific Software

- MATLAB
- SolidWorks
- AutoCAD
- LaTeX
- Microsoft Office

Languages

- **Spanish:** Native
- **English:** Professional Working Proficiency

Career Highlights

- Participation in 4 competitive research projects (regional, national and European).
- 3 international research stays at PROMES-CNRS (France).
- Development and optimization of 4 advanced manufacturing technologies: Material Extrusion (MEX-PDS), Powder Bed Fusion (PBF), Induction Reactive Sintering and Concentrated Solar Energy processing.
- Processing and characterization of 5+ advanced metallic material systems, including Ti-6Al-4V, TiAl intermetallics, Inconel 718, Al 6061 and lunar regolith simulants.
- Research results disseminated through 4+ national and international scientific conferences and peer-reviewed journal publications..
- Recipient of 2 national awards for scientific excellence (Best Oral Presentation and Best Scientific Poster, CNMAT 2026).