Search for a Spanish Partner for a Bilateral R&D Project

Organization	
Date of Request:	16 January 2026
Company name:	American University in Dubai (AUD)
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SECTION 1: Entity launching the partner search	
(Please give brief / to the point explanations. For more explanation on any point below, you may add a short paragraph as an annexure, with this document.)	
Sector	Education
Entity mission or core functions	The Mission of the American University in Dubai is to serve as a culturally diverse learning community committed to the pursuit of knowledge through excellence in teaching and scholarly and creative endeavor, leading to students' academic, personal and professional success, as well as the advancement of society.
Date of establishment	1995
Ownership (if public and traded, add stock exchange and ticker symbol)	Private institute
Total number of employees	+600
Number of employees in R&D	+110 full time faculty members
Key products sold or services provided	AUD is officially licensed and its programs are accredited by the UAE Ministry of Higher Education and Scientific Research (MOHESR), permitted by the Knowledge and Human Development Authority (KHDA), and accredited by the Southern Association of Colleges and Schools Commission on

	Colleges (SACSCOC), the Association to Advance Collegiate Schools of Business (AACSB International), the Engineering Accreditation Commission of ABET, the International Advertising Association (IAA), the Accrediting Council on Education in Journalism and Mass Communications (ACEJMC), the National Architectural Accrediting Board (NAAB), the Council for Interior Design Accreditation (CIDA), and the National Association of Schools of Art and Design (NASAD).
Entity core technical competences	Education, Research
Key R&D programs and activities	- Thermo-fluid systems and multiphase flows - Fluid–solid interaction (FSI) - Surface engineering and thermal spray technologies - Energy systems, sustainable propulsion, and thermal management - Physics-informed and AI-assisted modeling of complex systems - Integrating physics-based modeling, advanced experimentation, and graph neural networks
Examples of accomplishments	https://dubairdi.ae/physics-and-ai-driven-additive-manufacturing-of-cool-materials-for-cognitive-cities/
Company strategic orientation	- Sustainable energy and climate resilience - Advanced manufacturing and materials engineering - AI-enabled engineering systems - Industry-academia knowledge transfer

SECTION 2: Spanish Company Profile	
(Please provide a brief summary of the prospective partner company or organization. This summary may address some or all of the points below)	
Profile of ideal technology partner	We are seeking an industrial or applied-research Spanish company with demonstrated experience in advanced materials, surface engineering, thermal or cold spray technologies, or functional coatings. The ideal partner should have a strong R&D orientation and interest in scaling laboratory innovations toward pilot or pre-commercial deployment,

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	particularly for applications in urban infrastructure, energy efficiency, and climate-resilient construction.
Core technological competencies and expertise	The prospective Spanish partner should possess expertise in one or more of the following areas: - Thermal spray, cold spray, or related additive manufacturing techniques - Development of ceramic, nanocomposite, or functional coatings (e.g., high solar reflectance, radiative cooling, corrosion-resistant coatings) - Materials formulation, powder engineering, or surface functionalization - Experimental validation, durability testing, or performance characterization under harsh environmental conditions - Industrial process optimization and scale-up - Experience integrating digital tools, data-driven optimization, or AI-assisted process control is considered a strong advantage.
Other essential qualifications (e.g.: ownership, track records etc.)	- Proven track record in collaborative R&D projects (national or international) - Ability to lead or contribute to CDTI-funded industrial R&D activities - Clear IP management capability and experience working under consortium agreements - Financial and organizational capacity to execute multi-year R&D tasks - Ownership structure is flexible; both SMEs and larger industrial firms are welcome, provided they meet CDTI eligibility criteria.
If you have a list of companies with whom you are in contact or interested in contacting, please provide contact details	At this stage, no specific Spanish company has been pre-selected. This partner search is open, and all interested and qualified Spanish entities identified through the CDTI database are encouraged to express interest.
If you are interested in collaboration: please specify details and other important information you want to share with a potential company	The Emirati partner (American University in Dubai) will collaborate scientifically and technically but will not bear any financial cost related to the Spanish partner's R&D activities. The collaboration will be aligned with an ongoing Dubai government–funded

	research project focused on "Physics and AI-Driven Additive Manufacturing of Cool Materials for Cognitive Cities."
Interested areas of collaboration	- Joint development of cool material formulations suitable for hot and arid climates - Advanced spray-based deposition strategies for complex or curved surfaces - Validation of coating performance (thermal, mechanical, durability) - Data generation to support physics-informed and AI-enabled optimization models - Pathways toward industrial demonstration or pilot-scale deployment
Specific R&D contribution you are seeking/offering	- Industrial R&D activities related to materials development, processing, testing, or scale-up - Experimental datasets and performance validation relevant to spray-deposited cool materials - Access to AI-driven modeling frameworks, numerical simulations, and process optimization tools - Integration of results into a broader Dubai-based smart and sustainable infrastructure research program

Signature   Mason Marzbali
Name: Dr. Mason Marzbali
Date: 16/01/2026

Summary

Hot-arid cities such as Dubai experience strong urban heat island effects driven by dense urban morphology, heat-absorbing surfaces, and anthropogenic heat. Passive cool materials—engineered for high solar reflectance and high mid-IR emissivity—offer a scalable pathway to lower surface and near-surface air temperatures, reduce cooling loads, and cut peak electricity demand. Current solutions span high-albedo paints (TiO_2/$BaSO_4$), retroreflective finishes, and radiative-cooling ceramics that scatter sunlight while emitting strongly in the 8–13 μm atmospheric window. Building-energy studies report substantial reductions in cooling energy, while hierarchically porous ceramics (e.g., alumina) have reached near-unity solar reflectance and high emissivity, with promising roof-scale demonstrations. Scalable manufacturing routes—including thermal spray and airless spray—bridge lab materials to large-area deployment for high performance durable coatings. In parallel, machine learning has progressed from physical and mechanical properties prediction to surrogate modeling and inverse design, and digital twins with robotic deposition are emerging to make application repeatable and adaptive. The main challenges remain: long-term durability and reproducible ceramic porosity/roughness on complex geometries. The AUD team has developed physics-based multiphase and heat-transfer models for particle impact and solidification. In addition, they built GNN surrogates to accelerate simulations of the thermal-spray process and generative artificial neural networks (GAN) pipelines to map spray conditions to coating microstructure, paving the way—within this project—for inverse design of spray "recipes" that target high reflectance and emissivity under durability constraints. Recently, they also developed a model for conjugate heat transfer in urban flows, which could help with actionable planning metrics for buildings coverage and material selection.