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

| Organization | |
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| **Date of Request:** | September 3rd 2026 |
| **Company name:** | American University in Cairo |
| **Contact person and title/ designation:** | Ahmed Faheem<br>Associate Professor |
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| **SECTION 1: Entity launching the partner search**<br>*(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.)* | |
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| Sector | Roadway pavement |
| Entity mission or core functions | Scientific |
| Date of establishment | 1919 |
| Ownership (if public and traded, add stock exchange and ticker symbol) | Not for profit university |
| Total number of employees | Approx. 3,000 faculty and staff (including ~450 full-time faculty) |
| Number of employees in R&D | ~450 full-time faculty engaged in research, supported by graduate and undergraduate research assistants; dedicated construction materials and pavement laboratories |
| Key products sold or services provided | Higher education (undergraduate and graduate degrees); scientific research; construction materials testing and consulting services through departmental laboratories |
| Entity core technical competences | Academic |
| Key R&D programs and activities | Pavement materials characterization; development of the Micro-Indentation and Relaxation (MIR) method — a simplified screening test for asphalt binder quality assurance validated against the Dynamic Shear Rheometer (DSR); asphalt binder aging and polymer- |

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| | modified binder rheology; viscoelastic modeling (Hertzian contact mechanics, Prony series interconversion) |
| Examples of accomplishments | MIR method proof-of-concept published with ASCE (Airfield and Highway Pavements 2017); internally funded 2-year MIR validation research program covering 4 binder grades and 4 aging states with full DSR cross-validation; established track record of peer-reviewed publications in asphalt materials and pavement engineering |
| Company strategic orientation | Translating the validated MIR method into a deployable, low-cost screening instrument and standardized test protocol for routine asphalt binder QA/QC, positioned as a first-line screening tool with the DSR retained as referee method; technology transfer to industry and standardization (AASHTO-format draft specification) |

| **SECTION 2: Spanish Company Profile**<br>*(Please provide a brief summary of the prospective partner company or organization. This summary may address some or all of the points below)* | |
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| Profile of ideal technology partner | A Spanish company active in (a) materials testing equipment / instrumentation manufacturing, or (b) road construction, asphalt production, or pavement engineering with in-house QA laboratories. Ideally an SME or large company with an interest in developing a simplified binder screening instrument and test protocol. |
| Core technological competencies and expertise | Precision mechanical testing equipment design (load frames, displacement control, force sensing); embedded software and data acquisition; instrument industrialization and CE certification; and/or asphalt binder and mixture testing practice, QA/QC laboratory operations, and access to binder supply chains for field validation. |
| Other essential qualifications (e.g.: ownership, track records etc.) | Eligible for CDTI funding under the International Technological Cooperation Projects (PCTIs) conditions; demonstrable track record in construction materials, testing equipment, or road infrastructure; capacity to conduct Spanish-side validation testing and to carry the product to market. |
| If you have a list of companies with whom you are in contact or interested in contacting, please provide contact details | No specific companies identified yet — open to introductions through CDTI and STDF nodal representatives. |
| If you are interested in collaboration: please specify details and other important information you want to share with a potential company | AUC has developed and is validating the MIR (Micro-Indentation and Relaxation) method: a spherical indenter on a basic load frame pressed into a cast asphalt binder disk yields a force-relaxation curve that captures the binder's viscoelastic fingerprint. The method is dramatically simpler and cheaper than the |

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| | Dynamic Shear Rheometer used in routine QA today. AUC offers the validated test protocol, the Hertzian analysis and DSR-interconversion software, and a 16-cell validation dataset (4 binder grades x 4 aging states). We seek a partner, perform Spanish-side validation on European binders, and commercialize the instrument and protocol for QA laboratories, contractors, and binder suppliers. |
| Interested areas of collaboration | Construction thematic area — Advanced construction technology and materials; advanced construction management and methods (quality assurance of asphalt paving materials). |
| Specific R&D contribution you are seeking/offering | Seeking: European binder samples and Spanish-side laboratory validation. Offering: the validated MIR test method and protocol; Hertzian contact analysis and Prony-series/Fourier interconversion pipeline; comprehensive binder-aging validation dataset; scientific supervision, joint publications, and AASHTO/CEN-format draft specification development. |

**Signature**
**Name: Dr. Ahmed Faheem**
**Date: September 3rd , 2026**

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MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES
CDTI INNOVACIÓN

## Summary:

Routine asphalt binder quality assurance is dominated by the Dynamic Shear Rheometer (DSR) — a sophisticated, expensive, and operationally demanding instrument requiring specialized training, precise environmental control, and delicate specimen handling. The Micro-Indentation and Relaxation (MIR) method offers a radically simpler alternative: a spherical tip on a basic load frame, pressed into a binder disk, records a force-relaxation curve that encodes the binder's complete viscoelastic fingerprint via Hertzian contact mechanics. This proposal develops and validates MIR as a screening and pre-qualification tool for routine binder QA/QC — with the DSR retained as the referee method — across four performance grades and four aging states, using both rigorous mathematical equivalence (Prony series / Fourier interconversion) and practical empirical correlation as the dual validation framework.