

IOANNIS KARATASIOS, Researcher C

Ceramics and Composite Materials research group (CCM)

Institute of Nanoscience and Nanotechnology, National Centre for Scientific Research "Demokritos"

E: i.karatasios@inn.demokritos.gr T: +30 210 6503326 W: <https://inn.demokritos.gr/en/prosopiko/i.karatasios/>

 <https://orcid.org/0000-0002-3482-0424>

Current status and previous positions

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| 2017 - | • Researcher (grade C)- Institute of Nanoscience and Nanotechnology, NCSR Demokritos |
| 2007-2016 | • Research officer - Institute of Material Science, National Centre for Scientific Research "Demokritos" |
| 1998-2001 | • Directorate for the Conservation of Antiquities, Hellenic Ministry of Culture |

Studies

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| 2006 | PhD - Conservation Science
Leicester School of Architecture, De Montfort University, Leicester, U.K.
PhD Thesis: "The effect of barium hydroxide on the physicochemical properties of lime-based conservation mortars" [DOATAP: 12-369 (18/12/2006)] |
| 1998 | BSc - Architectural and Archaeological Conservation (Hons)
Dpt. Conservation of Antiquities and Works of Art,
University of West Attica (former Technological Educational Institute (TEI) of Athens) |

Teaching / Educational activities

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| 2015-today | Lecturer – MSc programme "Cultural Heritage Materials and Technologies" – University of Peloponnese (topic: Technological studies and development of archaeological and historical mortars) |
| 2008-today | Lecturer – MSc programme "Cultural Heritage Conservation", University of West Attica (topic: Nanotechnology in Cultural Heritage Conservation) |
| 2006-2012 | Lecturer - dpt of Conservation of Antiquities and Works of Art, Technological Educational Institute (TEI) of Athens (topic: Conservation of stone and architectural monuments) |

Research co-ordination/ Supervision activities (indicative projects)

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| 2018 – | Papaioannou S., (PhD candidate), "Development of encapsulated healing agents for the production of self-healing cements". Department of Materials Science and Engineering, University of Ioannina (Supervisor) |
| 2017 - 2020 | Amenta M., (Postdoctoral Fellow), "Development and evaluation of self-healing cement composites by incorporation of encapsulated inorganic admixtures and hydraulic phases". Stavros Niarchos Foundation Industrial fellowship grant. (Scientific mentor) |
| 2016 - 2019 | Michalopoulou A., (PhD), "Development of innovative, nano-composite Ca-bearing materials for the consolidation and protection of cultural heritage architectural monuments", Technical University of Crete. IKY granted project. (Advisor). |
| 2017/18 | Mantzana E., (MSc student, University of Peloponnese), "Reactivity and performance characteristics of lime-mixtures with different types of ceramic pozzolans", (Supervisor)

Moreover, Supervisor in five (5) MSc thesis, Advisor in two (2) PhD thesis completed in the Laboratory of Archaeological Materials and supervisor of four (4) diploma thesis. |

Research background and vision

Dr. Karatasios' research is focused on the building materials and technology of historic buildings and architectural monuments, along with the development of innovative materials for the Conservation of Cultural Heritage and modern buildings. He has participated in 8 EU and national projects as researcher and is currently participating in one (1) EU and two (2) national projects.

Dr. Karatasios has (co-)organized six (6) scientific conferences and is registered evaluator for the General Secretary for Research and Innovation, IKY and ELIDEK. Moreover, he acts as reviewer for several scientific journals and in normal basis for Construction & Building Materials, Journal of Cultural Heritage and Journal of Building Engineering. Ioannis Karatasios is the national representative and voting member in the European Committee for Standardization CEN TC346/ Conservation of Cultural Property, WG 2: Materials constituting cultural property». His current research activities in the field of innovative conservation/restoration mortars and building materials are in line with Green Deal and HE priorities for greener, more durable and sustainable materials, along with current research trends in the field of cement-composites.

Research Activities

Technology of archaeological mortars

The study of archaeological and historic mortars provides a wide range of information about production technologies, raw materials and mix proportions, mechanical properties and deterioration mechanisms. The above information contributes to the archaeological research and provides data for the development of new, compatible conservation mortars.

Climate Change impact on Cultural Heritage monuments

Key environmental factors, such as temperature and relative humidity fluctuations, combined with the presence of soluble salts, along with the diffusion and distribution of salts and the associated weathering patterns are measured and evaluated, to provide more effective remedial and preventive strategies.

Development of multifunctional conservation/restoration mortars

This research activity focuses on the design of innovative multifunctional mortars for Cultural Heritage and building applications. The modification of their composition with functional nano-materials (TiO₂, C-nanostructures, nano-silica) enhances their performance and attributes to mortars new features/functionality, such as reinforcement at the nano-scale and self-sensing properties.

Encapsulation additives for Self-healing cements/mortars

The exploitation of background knowledge on the autogenic self-healing mechanism in archaeological mortars lead to the development of innovative encapsulated self-healing additives at the macro-scale, for restoration mortars, cement and concrete.

Green cements

In collaboration with a major Hellenic cement company, the effect of the clinkering temperature and duration on the formation and evolution of Green, low energy BCSA clinker, using industrial raw materials and byproducts is studied.

Future Research Plans

- ✓ Expanding and utilizing existing knowledge for understand the evolution of mortars technology and the influence of societal, cultural, political and environmental parameters
- ✓ Innovative materials and technologies for adaptation and mitigation of climate change impacts on Cultural Heritage monuments, involving innovative IoT tools
- ✓ To expand IP portfolio and exploit self-healing achievements, with emphasis on the optimization of encapsulated process and healing agents for different types of mortars and concrete mixtures
- ✓ Development of self-sensing mortars and materials embedded sensors for remote and continuous monitoring of materials and Cultural Heritage monuments
- ✓ Extending collaborations for multi-scale modeling and LCA studies of self-healing mortars and cements, taking into account microstructure, presumed loads and damage assessment

Publications Overview (Scopus)

Patents (National)	= 1		
(EPO/PCT)	= 2 (pending)		
Papers in Journals	= 46	Citations= 585	h-index= 11
Inter./Nation. Confer. Proceedings (reviewed)	= 28 / 36		
Conference Presentations	= 90		
Invited Lectures	= 6		
Technical Reports	=65		