
1. PERSONAL DATA



Name: Pagona Maravelaki
Place of birth: Chalkida, Evoia, Greece
Date of birth: 3 December 1960
Nationality: Hellenic
Family status: Married with two children
Profession: **Full Professor**, School of Architectural Engineering, Director & Founder of the Lab “Materials for Cultural Heritage and Modern Building” (MaCHMoB), Technical University of Crete
Work address: Akrotiri University Campus
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2. EDUCATION

1988-1992: Ph.D. Chemical Science, Department of Environmental Science, Ca Foscari University of Venice, Consortium Ferrara-Venezia-Trieste, Italia, 1992.
Thesis Title: Chemical effect of the environment on exposed stone materials and methods for their conservation.
Part of the thesis was carried out in the Ecole Polytechnique Fédérale de Lausanne (EPFL), Département des Matériaux, Laboratoire de Conservation de la Pierre, Lausanne, Suisse, (15/4/91-5/8/91).
1978-1983: B.Sc. Department of Chemistry, National and Kapodistrian University of Athens.

3. ACADEMIC SCHOLARSHIPS & AWARDS

- 1987-1988: Research Scholarship from the Italian Government to EU citizens. Awarded for postgraduate research studies in the “Centro di studio sulle Cause di Deperimento e sui Metodi di Conservazione delle Opere d'Arte-Consiglio Nazionale delle Ricerche (CNR)”, Florence, Italy.
- 1988-1989: Research Scholarship from the Syremont s.p.a. for postgraduate research studies in the “Centro di studio sulle Cause di Deperimento e sui Metodi di Conservazione delle Opere d'Arte-Consiglio Nazionale delle Ricerche (CNR)”, Florence, Italy.
- 1989-1992: Research Scholarship from the State Scholarships Foundation-IKY. Awarded for doctoral studies in the Department of Environmental Science, Ca Foscari University of Venice.
- 1996-1997: Fellowship of the American School of Classical Studies, Athens, Greece. Awarded for postdoctoral studies on the effects of laser cleaning on marble, in the "Institute of Electronic Structure & Laser", Foundation for Research and Technology - Hellas (FO. R. T. H.), Heraklion, Crete, Greece.
- August 2013: 1st Prize -"Encouraging and Supporting Academic and Research Institutes for Research and Development (R & D) Industrial/R&D Industry, (MED 2007-13)", 2nd Best Researcher Awards Contest, “Ecological nanomaterials for the protection of buildings”, P. Maravelaki, Associate Professor, School of Architectural Engineering, Lab of Materials for Cultural Heritage and Modern Building, Technical University of Crete.

4. RESEARCH & TEACHING INTERESTS

Research interests focus on:

- Study of built heritage, more specifically the weathering mechanisms and stone decay forms;
- Technology of historic mortars, pigments and ceramics;
- Cleaning techniques of deteriorated stone surfaces ranging from conventional chemical cleaning to laser cleaning and nanogels;
- Assessment of cleaning with micro-destructive and nondestructive analytical techniques;
- Application and assessment of nondestructive spectroscopic techniques for the study of historic building materials;
- Development of eco-friendly and energy efficient plasters and paints for building envelope;
- Development and characterization of novel self-cleaning nanocomposites for the conservation and protection of historic monuments;
- Development of innovative multi-functional materials (mortars, hydrophobic coatings, strengthening) for building and monument protection
- Development of antimicrobial coatings for buildings
- Development of anticorrosive materials for concrete protection

Teaching interests include:

- Influence of the environment on monuments and buildings
- Decay and conservation of building materials of monuments and architectural surfaces
- Protection and Enhancement of Archaeological Monuments and Sites
- Restoration of Existing Envelopes
- Technology of materials used in buildings
- Principles of Chemistry
- Invited lecturer at the Postgraduate Program of the National Technical University entitled "Protection of Monuments"
- Environmental effect on monuments: mechanisms, restoration methods and assessment, Postgraduate Program TUC.

5. CAREER HISTORY

- 2019-Present: **Full Professor**, School of Architectural Engineering, Technical University of Crete.
- 2013-2019: Associate Professor, School of Architectural Engineering, Technical University of Crete.
- 2012-2008: Assistant Professor, Department of Sciences, Technical University of Crete.
- 1997-2008: Employee of the Ministry of Culture, 1st Department of Prehistoric and Classical Antiquities", Athens, Greece, (1997) and "25th Department of Prehistoric and Classical Antiquities", Chania, Crete, Greece (1998-2008).
- 1996-1995: Research Associate with the "Institute of Electronic Structure & Laser", Foundation for Research and Technology - Hellas (FO. R. T. H.), Heraklion, Crete, Greece.
- 1995-1993: Research Associate with the Department "Mineral Resources Engineering", Technical University of Crete, Chania, Crete, Greece.
- 1992: Research Associate with "Laboratoire de Conservation de la Pierre", Ecole Polytechnique Federale de Lausanne (EPFL), Lausanne, Switzerland, 1/4/92–31/7/92.
- 1987-1989: Research Associate with "Centro di Studio sulle Cause di Degrado e sui Metodi di Conservazione delle Opere d'Arte", Consiglio Nazionale delle Ricerche, Florence, Italy.
- 1983-1986: Teacher of chemistry to candidates of University in Private Schools, Athens.

6. PUBLICATIONS

6.1 PhD Thesis

P. V. Maravelaki, “Chemical effect of the environment on exposed stone materials and methods for their conservation” (“Effetto Chimico dell'Ambiente su Superfici Lapidee Esposte ed Indagini per un loro Recupero”), Tesi di Dottorato di Ricerca in Scienze Chimiche, IV ciclo, 1992, Università di Venezia, pages 150 (<http://phdtheses.ekt.gr/eadd/handle/10442/4199>).

6.2 BOOKS

Francesca Gherardi, Pagona Noni Maravelaki, **Conserving Stone Heritage**, Springer International Publishing, January 2022, DOI 10.1007/978-3-030-82942-1, ISBN 978-3-03-082941-4, 978-3-03-082942-1

Noni-Pagona Maravelaki and Federica Fernandez, "Nanomaterials for Historic Buildings", special issue of Buildings (ISSN 2075-5309), section "Building Materials, and Repair & Renovation", MDPI, 2019.

Noni-Pagona Maravelaki and Elisa Franzoni "Coatings for Building Applications", special issue of Coatings (ISSN 2079-6412), MDPI, 2020.

6.3 REFEREED JOURNAL PUBLICATIONS

- J1. “Laser Induced Breakdown Spectroscopy as a diagnostic technique for the Laser cleaning of marble”, P. V. Maravelaki, V. Zafiropoulos, M. Kalaitzaki, V. Kilikoglou and C. Fotakis, *Spectrochimica Acta*, part B, 52, 1997, pp. 41-53.
- J2. “Origin, characteristics and morphology of weathering crusts on Istria stone in Venice”, P. Maravelaki-Kalaitzaki and G. Biscontin, *Atmospheric Environment*, 33(11), 1999, pp. 1699-1709.
- J3. “Excimer laser cleaning of encrustation on Pentelic marble: procedure and evaluation of the effects”, P. Maravelaki-Kalaitzaki, V. Zafiropoulos and C. Fotakis, *Applied Surface Science*, 148, 1999, pp. 92-104.
- J4. “Sorel’s cement mortars: Decay susceptibility and effect on Pentelic marble”, P. Maravelaki-Kalaitzaki and G. Moraitou, *Cement and Concrete Research*, 29(12), 1999, pp. 1929-1935.
- J5. “Investigations on cleaning of black crusted sandstone using different UV-pulsed lasers”, G. Marakis, P. Maravelaki, V. Zafiropoulos, S. Klein, J. Hildenhagen, K. Dickmann, *Journal of Cultural Heritage*, 1, 2000, pp. 61s-64s.
- J6. “Compositional characterization of encrustation on marble with laser induced breakdown spectroscopy”, P. Maravelaki-Kalaitzaki, D. Anglos, V. Kilikoglou, V. Zafiropoulos, *Spectrochimica Acta, part B*, 56(6), 2001, pp. 887-903.
- J7. “Evaluation of the Initial Weathering Rate of Istria Stone Exposed to Rain Action, in Venice, with X-ray Photoelectron Spectroscopy”, P. Maravelaki-Kalaitzaki, R. Bertoncello, G. Biscontin, *Journal of Cultural Heritage*, 3, 2002, pp. 273-282.
- J8. "Physico-chemical Study of Cretan Ancient Mortars", P. Maravelaki-Kalaitzaki, A. Bakolas, A. Moropoulou, *Cement and Concrete Research*, 33/5, 2003, pp. 651-661.
- J9. “Short Free Running Nd:YAG laser to clean different encrustation on Pentelic marble: procedure and evaluation of the effects”, P. Maravelaki-Kalaitzaki, V. Zafiropoulos, P. Pouli, D. Anglos, C. Balas, R. Salimbeni, S. Siano, R. Pini, *Journal of Cultural Heritage*, 4, S1, 2003, pp. 77-82.

- J10. "Comparative study on the application of the 1st and the 3rd harmonic of a Nd: YAG laser system to clean black encrustation on marble", G. Marakis, P. Pouli, V. Zafiropoulos, P. Maravelaki-Kalaitzaki, *Journal of Cultural Heritage*, 4, S1, 2003, pp. 83-91.
- J11. "Yellowing effect and discoloration of pigments: Experimental and Theoretical studies", V. Zafiropoulos, C. Balas, A. Manousaki, G. Marakis, P. Maravelaki-Kalaitzaki, K. Melesanaki, P. Pouli, T. Stratoudaki, S. Klein, J. Hildenhagen, K. Dickmann, B. S. Luk'yanchuk, C. Mujat, A. Dogariu, *Journal of Cultural Heritage*, 4, S1, 2003, pp. 249-256.
- J12. "Pigment and Terracotta Analyses of Hellenistic Figurines, in Crete", P. Maravelaki-Kalaitzaki, N. Kallithrakas-Kontos, *Analytica Chimica Acta*, 497, 2003, pp. 209-225.
- J13. "EDXRF as an analytical tool in art: case studies from pigment identification and treatment assessment", N. Kallithrakas-Kontos, P. Maravelaki-Kalaitzaki, *Journal of Radioanalytical and Nuclear Chemistry*, 262(3), 2004, pp. 713-719.
- J14. "Hydraulic lime mortars for the restoration of the historic masonry in Crete", P. Maravelaki-Kalaitzaki, I. Karatasios, A. Bakolas, V. Kilikoglou, *Cement and Concrete Research*, 35, 2005, pp. 1577-1586.
- J15. "Black crusts and patinas on Pentelic marble from the Parthenon and Erechtheum (Acropolis, Athens): characterization and origin, P. Maravelaki-Kalaitzaki, *Analytica Chimica Acta*, 532, 2005, pp. 187-198.
- J16. "Evaluation of silicon-based strengthening agents on porous limestones", P. Maravelaki-Kalaitzaki, N. Kallithrakas-Kontos, D. Korakaki, Z. Agioutantis, S. Maurigiannakis, *Progress in Organic Coatings*, 57, 2006, pp. 140-148.
- J17. "Optical inspection for quantification of decay on stone surfaces", P. Kapsalas, P. Maravelaki-Kalaitzaki, M. Zervakis, E.T. Delegou, A. Moropoulou, *NDT&E International*, 40, 2007, pp. 2-11.
- J18. "Hydraulic lime-mortars with siloxane for waterproofing historic masonry", P. Maravelaki-Kalaitzaki, *Cement and Concrete Research*, 37(2), 2007, pp. 283-290.
- J19. "Evaluation of Image Segmentation Approaches for Non-Destructive Detection and Quantification of Corrosion Damage on Stonework", P. Kapsalas, M. Zervakis and P. Maravelaki-Kalaitzaki, *Corrosion Science*, 49, 2007, pp. 4415-4442.
- J20. "A Morphological Fusion Algorithm for Optical Detection and Quantification of Decay Patterns on Stone Surfaces", P. Kapsalas, P. Maravelaki-Kalaitzaki, M. Zervakis, E.T. Delegou, A. Moropoulou, *Construction and Building Materials*, 22, 2008, pp. 228-238.
- J21. "Chemical characterization of Cretan clays for the design of restoration mortars", Meral Budak, Pagona Maravelaki-Kalaitzaki, Nikolaos Kallithrakas-Kontos, *Microchimica Acta*, 162, 2008, pp. 325-331.
- J22. "A comparative study of porous limestones treated with silicon-based strengthening agents", P. Maravelaki-Kalaitzaki, N. Kallithrakas-Kontos, Z. Agioutantis, S. Maurigiannakis, D. Korakaki, *Progress in Organic Coatings*, 62, 2008, pp. 49-60.
- J23. "Application of ¹H NMR in hydration and porosity studies of lime pozzolan mixtures", M. Tziotziou, E. Karakosta, I. Karatasios, G. Diamantopoulos, A. Sapalidis, M. Fardis, P. Maravelaki-Kalaitzaki, G. Papavassiliou, V. Kilikoglou, *Microporous & Mesoporous Materials*, Volume 139, Issue 1-3, 2011, pp 16-24.
- J24. "Physico-chemical characterization of mortars as a tool in studying specific hydraulic components: application to the study of ancient Naxos aqueduct", P. Maravelaki-

- Kalaitzaki, A. Galanos, I. Doganis, N. Kallithrakas-Kontos, *Applied Physics A: Materials Science & Processing*, Volume 104, Issue 1, 2011, pp. 335-348.
- J25. "Development and analysis of mineral based coatings for buildings and urban structures", Kolokotsa, D., Maravelaki-Kalaitzaki, P., Papantoniou, S., Vangeloglou, E., Saliari, M., Karlessi, T., & Santamouris, M., *Solar Energy*, Volume 86, Issue 5, 2012, pp. 1648–1659.
- J26. "TiO₂–SiO₂–PDMS nano-composite hydrophobic coating with self-cleaning properties for marble protection", Kapridaki, C., & Maravelaki-Kalaitzaki, P., *Progress in Organic Coatings*, Volume 76, Issue 2-3, 2013, pp. 400–410.
- J27. "Physico-chemical and Mechanical Characterization of Hydraulic Mortars Containing Nano-Titania for Restoration Applications", Maravelaki-Kalaitzaki, P., Agioutantis, Z., Lionakis, E., Stavroulaki, M., & Perdikatsis, V., *Cement and Concrete Composites*, Volume 36, Issue 1, 2013, pp. 33-41.
- J28. "Producing photoactive, transparent and hydrophobic SiO₂/crystalline TiO₂ nanocomposites at ambient conditions with application as self-cleaning coatings", C Kapridaki, L Pinho, MJ Mosquera, P Maravelaki-Kalaitzaki, *Applied Catalysis B: Environmental* 156, 2014, pp. 416-427.
- J29. "A biomimetic approach to strengthen and protect construction materials with a novel calcium-oxalate–silica nanocomposite", A Verganelaki, V Kilikoglou, I Karatasios, P Maravelaki-Kalaitzaki, *Construction and Building Materials* 62, 2014, pp. 8-17.
- J30. "Study of the stability of siloxane stone strengthening agents", Elena Tesser, Fabrizio Antonelli, Laura Sperti, Renzo Ganzerla, Noni-Pagona Maravelaki, *Polymer Degradation and Stability*, Volume 110, 2014, pp. 232-240.
- J31. "Development and analysis of advanced inorganic coatings for buildings and urban structures", K. Gobakis D. Kolokotsa, N. Maravelaki-Kalaitzaki, V. Perdikatsis, M. Santamouris, *Energy and Buildings*, Volume 89, 2015, pp. 196–205.
- J32. "Modified tetraethoxysilane with nano-calcium oxalate in one-pot synthesis for protection of building materials", Anastasia Verganelaki, Chrysi Kapridaki and Pagona Maravelaki-Kalaitzaki, *Ind. Eng. Chem. Res.*, 54 (29), (2015), p. 7195-7206. 2015 American Chemical Society.
- J33. "Chrysotile asbestos detoxification with a combined treatment of oxalic acid and silicates producing amorphous silica and biomaterial", Aikaterini Valouma, Anastasia Verganelaki, Pagona Maravelaki-Kalaitzaki, Evangelos Gidaracos, *Journal of Hazardous Materials*, 305, (2016), 164-170.
- J34. "Amelioration of crushed brick-lime composites using nano-additives", M. Theodoridou, E. Charalambous, P. Maravelaki-Kalaitzaki, I. Ioannou, *Cement and Concrete Composites* 68, 2016, pp. 77-87.
- J35. "Monitoring of self-healing phenomena towards enhanced sustainability of historic mortars", M. Amenta, I. Karatasios, P. Maravelaki, V. Kilikoglou, *Applied Physics A* 122 (5), 2016, pp. 1-8.
- J36. M Amenta, I Karatasios, P Maravelaki-Kalaitzaki, V Kilikoglou, "The role of aggregate characteristics on the performance optimization of high hydraulicity restoration mortars", *Construction and Building Materials*, 153, 2017, pp. 527-534.
- J37. A Valouma, A Verganelaki, I Tectoros, P Maravelaki-Kalaitzaki, Evangelos Gidaracos, "Magnesium oxide production from chrysotile asbestos detoxification with oxalic acid treatment", *Journal of Hazardous Materials*, 336, 2017, pp. 93-100.

- J38. KN Kaklis, SP Maurigiannakis, ZG Agioutantis, P Maravelaki-Kalaitzaki, "Characterization of pozzolanic lime mortars used as filling material in shaped grooves for restoring member connections in ancient monuments", *International Journal of Architectural Heritage*, 12 (1), 2018, pp. 75-90.
- J39. C Kapridaki, A Verganelaki, P Dimitriadou, P Maravelaki-Kalaitzaki, "Conservation of Monuments by a Three-Layered Compatible Treatment of TEOS-Nano-Calcium Oxalate Consolidant and TEOS-PDMS-TiO₂ Hydrophobic/Photoactive Hybrid Nanomaterials", *Materials*, 2018, 11(5), 684; <https://doi.org/10.3390/ma11050684>.
- J40. K. Kaklis Z. Agioutantis S. Mavrigiannakis P. Maravelaki-Kalaitzaki, "On the experimental investigation of pozzolanic lime mortar stress-strain behavior and deformation characteristics when subjected to unloading-reloading cycles", *Procedia Structural Integrity*, Volume 10, 2018, pp. 129-134.
- J41. F Gherardi, C Kapridaki, M Roveri, D Gulotta, PN Maravelaki, L Toniolo, "The deterioration of Apuan white marble in contemporary architectural context", *Journal of Cultural Heritage*, 2018, 10 pages, in press, F. Gherardi, <https://doi.org/10.1016/j.culher.2018.06.008>.
- J42. A. Michalopoulou, E.P. Favvas, A.C. Mitropoulos, P. Maravelaki, V. Kilikoglou, I. Karatasios, A comparative evaluation of bottom-up and break-down methodologies for the synthesis of calcium hydroxide nanoparticles for the consolidation of architectural monuments, ScienceDirect, *Materials Today: Proceedings* 5 (2018) 27425–27433.
- J43. Kapridaki, C., Xynidis, N., Vazgiouraki, E., Kallithrakas-Kontos, N., Maravelaki-Kalaitzaki, P., Characterization of photoactive Fe-TiO₂ lime coatings for building protection: The role of Iron content, 2019 *Materials* 12(11),1847.
- J44. Kaklis, K., Agioutantis, Z., Mavrigiannakis, S., Maravelaki-Kalaitzaki, P., A simplified damage evolution relationship and deformation characteristics of a pozzolanic lime mortar when subjected to unloading-reloading cycles in the pre-peak region, 2019 *Frattura ed Integrita Strutturale*, 13(50), pp. 395-406.
- J45. Maravelaki, P.-N., Toniolo, L., Gheraldi, F., Kapridaki, C., Arabatzis, I., The Oslo Opera House – Condition analysis and proposal for cleaning, protection and maintenance of exterior marble, 2019 *Communications in Computer and Information Science*, 962, pp. 104-116.
- J46. P. N. Maravelaki, F. Mallouchou-Tufano, M. Ashrafi, I. Doganis & A. Galanos (2019) Materials and Strategies for Conservation Interventions on Monuments of the Sassanid Period in Fars, Iran, *Conservation and Management of Archaeological Sites*, 21:4, 215-229, DOI: [10.1080/13505033.2020.1772561](https://doi.org/10.1080/13505033.2020.1772561)
- J47. Kapetanaki, K.; Kapridaki, C.; Maravelaki, P.-N. Nano-TiO₂ in Hydraulic Lime–Metakaolin Mortars for Restoration Projects: Physicochemical and Mechanical Assessment. *Buildings* 2019, 9, 236. <https://doi.org/10.3390/buildings9110236>
- J48. Fotiou, A.; Oiry, C.; Kapetanaki, K.; Perdikatsis, V.; Kallithrakas-Kontos, N.; Maravelaki, P.-N. Ecological Restoration Plasters and Mineral Pigments Designed with Raw Material from the Island of Gavdos. *Infrastructures* 2020, 5, 110. <https://doi.org/10.3390/infrastructures5120110>
- J49. Michalopoulou A., Maravelaki Pagona Noni, Nikolaos-Alexios Stefanis, Panagiotis Theoulakis, Stelios Andreou, Vassilis Kilikoglou, Ioannis Karatasios, Evaluation of nanolime dispersions for the protection of archaeological clay-based building materials, *Mediterranean Archaeology and Archaeometry*, Vol. 20, No 3, (2020), pp. 221-242, DOI: 10.5281/zenodo.3960201.

- J50. Fernandez, F.; Germinario, S.; Basile, R.; Montagno, R.; Kapetanaki, K.; Gobakis, K.; Kolokotsa, D.; Lagou, A.M.; Dania, P.; Enna, M.T.; Mangiapane, M.; Maravelaki, P.-N. Development of Eco-Friendly and Self-Cleaning Lime-Pozzolan Plasters for Bio-Construction and Cultural Heritage. *Buildings* 2020, 10, 172. <https://doi.org/10.3390/buildings10100172>
- J51. Anastasia Michalopoulou, Elisavet Michailidi, Evangelos Favvas, Noni-Pagona Maravelaki, Vassilis Kilikoglou & Ioannis Karatasios (2020) Comparative Evaluation of the Morphological Characteristics of Nanolime Dispersions for the Consolidation of Architectural Monuments, *International Journal of Architectural Heritage*, 14:7, 994-1007, DOI: [10.1080/15583058.2020.1745323](https://doi.org/10.1080/15583058.2020.1745323)
- J52. Anastasia Michalopoulou, Pagona-Noni Maravelaki, Vassilis Kilikoglou, Ioannis Karatasios, Morphological characterization of water-based nanolime dispersions, *Journal of Cultural Heritage*, Volume 46, 2020, Pages 11-20, ISSN 1296-2074, <https://doi.org/10.1016/j.culher.2020.06.005>.
- J53. M. Amenta, I. Karatasios, V. Psycharis, P. Maravelaki, V. Kilikoglou, The leaching mechanism of hydraulic mortars as part of autogenic self-healing process, *Journal of Cultural Heritage*, Volume 46, 2020, Pages 1-10, ISSN 1296-2074, <https://doi.org/10.1016/j.culher.2020.06.012>.
- J54. Maravelaki, P.-N.; Theologitis, A.; Budak Unaler, M.; Kapridaki, C.; Kapetanaki, K.; Wright, J. Characterization of Ancient Mortars from Minoan City of Kommos in Crete. *Heritage* 2021, 4, 3908-3918. <https://doi.org/10.3390/heritage4040214>
- J55. Theologitis, A., Kapridaki, C., Kallithrakas-Kontos, N., Maravelaki-Kalaitzaki, P., & Fotiou, A. (2020). Mortar and plaster analysis as a directive to the design of compatible restoration materials in Frangokastello (Crete), *Mediterranean Archaeology and Archaeometry*, Vol. 21, No 1, (2021), pp. 109-120.
- J56. Maravelaki, P.-N.; Kapetanaki, K.; Stefanakis, D. TEOS-PDMS-Calcium Oxalate Hydrophobic Nanocomposite for Protection and Stone Consolidation. *Heritage* 2021, 4, 4068-4075. <https://doi.org/10.3390/heritage4040224>
- J57. Stefanakis, D.; Krasoudaki, T.; Kaditis, A.-I.; Bakolas, A.; Maravelaki, P.-N. Design of Novel Photocatalytic Films for the Protection of Architectural Surfaces via the Incorporation of Green Photocatalysts. *Coatings* 2021, 11, 934. <https://doi.org/10.3390/coatings11080934>
- J58. Alvarez, J.I., Veiga, R., Martínez-Ramírez, S. et al. RILEM TC 277-LHS report: a review on the mechanisms of setting and hardening of lime-based binding systems. *Mater Struct* 54, 63 (2021). <https://doi.org/10.1617/s11527-021-01648-3>

6.4 REFEREED CHAPTERS IN BOOKS (15)

- B1 “What is the state of our knowledge of the mechanisms of deterioration and how are our estimates of rates of deterioration?”, H.A. Viles, D. Camuffo, S. Fitz, B. Fitzner, O. Lindqvist, R.A. Livingston, P.V. Maravelaki, C. Sabbioni, T. Warscheid, In: *Saving Our Architectural Heritage: The Conservation of Historic Stone Structures*, edited by Baer, N. S. and R. Snethlage, Wiley, 1997, pp. 95-112.
- B2 “Innovative techniques for the characterization of encrustation on Pentelic marble from the Parthenon”. P. Maravelaki-Kalaitzaki, In: *Cultural Heritage Conservation and Environmental Impact Assessment by Non-Destructive Testing and Micro-Analysis*,

- edited by R. Van Grieken & K. Janssens, *A.A Balkema* publishers, 2005 Talylor & Francis Group, London, pp. 135-148.
- B3 "Machine Vision Schemes Towards Detecting & Estimating The State Of Corrosion", P.Kapsalas, M. Zervakis, P. Maravelaki-Kalaitzaki, E.T. Delegou, A. Moropoulou, Chapter 4 in Book "Pattern Recognition and Signal Processing in Archaeometry: Mathematical and Computational Solutions for Archaeology", Author(s)/Editor(s): Constantin Papaodysseus (National Technical University of Athens, Greece), Published in the United States of America by Information Science Reference (an imprint of IGI Global), 2012, DOI: 10.4018/978-1-60960-786-9, pp. 148-167.
- B4 "Application of ^1H NMR to the hydration monitoring of lime-pozzolan mortars", M. Tziotziou, E. Karakosta, I. Karatasios, M. Fardis, P. Maravelaki-Kalaitzaki, G. Papavassiliou, V. Kilikoglou, in: J. Válek et al. (eds.), *Historic Mortars: Characterisation, Assessment and Repair, Part IV: Assessment and Testing*, RILEM Bookseries 7, DOI 10.1007/978-94-007-4635-0_34, © RILEM 2012, pp. 435-442.
- B5 "Appendix: Non-destructive qualitative and quantitative analyses of a Minoan ring by a portable EDXRF", N. Kallithrakas-Kontos and P. Maravelaki-Kalaitzaki, in E. Papadopoulou, "Gifts to the Goddess: A Gold Ring from Myopotamos, Rethymnon", *Athenische Abteilung, Mitteilungen des Deutschen Archäologischen Instituts, Athenische Abteilung (AM)*, Band 126 - 2011, Gebr. Mann Verlag, 2014, pp. 21-22.
- B6 "Improvement of properties of hydraulic mortars with addition of nano-titania", N. Maravelaki, C. Kapridaki, E. Lionakis, A. Verganelaki, In *Adhesives: Mechanical Properties, Technologies and Economic Importance*, Chapter 4, Editor Dario Croccolo, Nova Science Publishers, Inc., 2014, pp. 79-93.
- B7 "Characterization of a newly synthesized calcium oxalate-silica nanocomposite and evaluation of its consolidation effect on limestones", A. Verganelaki, N. Maravelaki, V. Kilikoglou, I. Karatasios, I. Arampatzis, K. Siamos, *Built Heritage. Monitoring Conservation Management*, Editor(s): M. Boriani, G. Guidi, L. Toniolo, Springer, 2015, pp. 391-402.
- B8 "Mix Design Parameters of Restoration Mortars: The Effect of Aggregate Characteristics", M Amenta, I Karatasios, A Kalagri, P Maravelaki-Kalaitzaki, V Kilikoglou, *Engineering Geology for Society and Territory - Volume 5: Urban Geology, Sustainable Planning and Landscape Exploitation*, 2015, pp. 85-88.
- B9 "Synthesis and Characterization of a Calcium Oxalate-Silica Nanocomposite for Stone Conservation", Pagona-Noni Maravelaki, Anastasia Verganelaki, Vassilis Kilikoglou and Ioannis Karatasios, *Engineering Geology for Society and Territory - Volume 8*, G. Lollino et al. (eds.) Springer International Publishing Switzerland, 2015, pp. 525-529.
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- CP63. Α. Μιχαλοπούλου, Ε.Π. Φάββας, Α.Χ. Μητρόπουλος, Π. Μαραβελάκη, Β. Κυλίκογλου, Ι. Καρατάσιος, «Συγκριτική αξιολόγηση επαγωγικών και απαγωγικών μεθόδων σύνθεσης νανοσωματιδίων υδροξειδίου του ασβεστίου για τη στερέωση των αρχιτεκτονικών Μνημείων», 11ο Πανελλήνιο Επιστημονικό Συνέδριο Χημικής Μηχανικής (11 ΠΕΣΧΜ), Θεσσαλονίκη, 25-27 Μαΐου, 2017.
- CP64. Nikos Skoutelis, Manoutsoglou Emmanouil, Vafeidis Antonios, Maravelaki Noni-Pagona, Stavroulaki Maria, Geological, Chemical and Structural Research Regarding the Rehabilitation of the Drystone Rainwater Cisterns of Epano Mirabello Region, Crete, Proceedings of the 4th Biennial of Architectural and Urban Restoration BRAU4 Proceedings © CICOP Italia ISBN: 978-88-909-1165-1, 15–30 April, 2018 Nicosia, Catania, Tunis, Athens and Piraeus, Rethymno, Alex-andria, pp. 435-444.
- CP65. Pagona-Noni Maravelaki, Lucia Toniolo, Francesca Gheraldi, Chrysi Kapridaki and Ioannis Arabatzis, The Oslo Opera House – Condition Analysis and Proposal for Cleaning, Protection and Maintenance of Exterior Marble, 1st International Conference TMM_CH Transdisciplinary Multispectral Modelling and Cooperation for the Preservation of Cultural Heritage, 10-13 October, 2018 Eugenides Foundation Athens, Greece.

- CP66. Fotiou, A., Oiry, C., Kapetanaki, K., Kallithrakas-Kontos, N., Maravelaki, N.-P., Ecological restoration mortars and plasters designed with raw material from the island of Gavdos, REHABEND, 2020, pp. 1482–1489.
- CP67. Papayianni, I.; Válek, J.; Alvarez, J.; Bokan Bosiljkov, V.; Faria, P.; Ferrara, L.; Groot, C.; Gulotta, D.; Toniolo, L.; Gunozu, H.; van Hees, R.; Hughes, J.; Ioannou, I.; Nunes, C. L.; Padovnik, A.; Maravelaki, N. P.; Pachta, V.; Pavia, S.; Peter, U.; Rani, D.; Secco, M.; Stefanidou, M.; Tedeschi, C.; Theodoridou, M.; Veiga, R.; Velosa, A.; Martínez Ramírez, S.; Ramesh, M.; Passian, C.; Torok, A.; Stukovnik, P., 2019, Testing properties governing the durability of lime-based repair mortars, Proceedings of the International Conference on Sustainable Materials, Systems and Structures (SMSS2019) Durability, Monitoring and Repair of Structures

6.7 NON-REFEREED CONFERENCE PROCEEDINGS - FULL PAPERS OR ABSTRACTS) (14)

- CA1. **Maravelaki-Kalaitzaki P.**, "Environmental impact on stones & mortars from historic buildings: Case studies from Venice, Athens and Crete (2001) Workshop "Environmental Effects on Art-works", pp. 4-5.
- CA2. **Maravelaki-Kalaitzaki, N.**, & Kallithrakas-Kontos, N. (2003). Cinnabar find in Cretan Hellenistic tombs, preservative or cosmetic purposes-4th Symposium on Archaeometry. Hellenic Society for Archaeometry.
- CA3. Skoulikidis, Th., Vassiliou, P., Papakonstantinou, P., Moraitou, A., Zafiropulos, V., Kalaitzaki, M., Spetsidou, P., **Maravelaki, P.**, "Some remarks on Nd:YAG and excimer UV laser for cleaning soiled sulfated monument surfaces", 2004 LACONA I, 1st Int. Conference on La-sers in the Conservation of Artworks, 4.-6. October 1995, Heraklion, Crete, Greece.
- CA4. **N. Maravelaki**, A. Galanos, I. Doganis, N. Kallithrakas-Kontos, "Pigmented plasters at the Acropolis of ancient Karthaia", Greece, 5th Symposium of the Hellenic Society for Archaeometry, 8-10/10/2008, Athens, Book of Abstracts, O48.
- CA5. **N. Maravelaki** and N. Kallithrakas-Kontos, "EDXRF and FTIR combined studies of archaeological artworks in Crete", TECHNART 2009, Non-destructive and Microanalytical Techniques in Art and Cultural Heritage, Athens, 27-30 April 2009, Book of Abstracts, p. 65.
- CA6. L. Kalogerakis, A. Verganelaki, C. Kapridaki, A. Gotsis, **P. Maravelaki**, "Hybrid TEOS/colloidal silica/TiO₂/GPTMS composites for stone consolidation", P2-19, 7th International Conference – NN10 on Nanosciences & Nanotechnologies, 11-14 July 2010 Ouranoupolis, Halkidiki, Greece, p. 191.
- CA7. C. Kapridaki, **P. Maravelaki**, "Titania-silica sol-gel bactericide coatings on marble", P2-20, 7th International Conference – NN10 on Nanosciences & Nanotechnologies, 11-14 July 2010 Ouranoupolis, Halkidiki, Greece, p. 192.
- CA8. P. Kapsalas, M. Zervakis, **P. Maravelaki-Kalaitzaki**, E.T. Delegou, A. Moropoulou; "Automated Detection of Robust Morphology Regions to Quantify Corrosion Damage & Identify its Type, Application of Multivariate Analysis and Chemometry to Cultural

Heritage and Environment", CMA4CH Mediterraneum Meeting, 26-29 September 2010, Taormina, Italy.

- CA9. **P. Maravelaki**, L. Kalogerakis, A. Verganelaki, C. Kapridaki, A. Gotsis, "Evaluation of hybrid TEOS/colloidal silica/TiO₂/GPTMS composites as stone consolidants", EuroNanoForum 2011, 30th - 31st May, Budapest, 2011.
- CA10. **(invited) P. Maravelaki**, E. Lionakis, C. Kapridaki, A. Verganelaki, "Physico-chemical characterization of hydraulic mortars containing nano-titania for restoration applications", 8th International Conference on Nanosciences & Nanotechnologies – NN11 'Ioannis Vellidis' Congress Centre, 12-15 July 2011 Thessaloniki, Greece.
- CA11. **Maravelaki-Kalaitzaki P.** (et al.), 2012. "Hybrid TEOS/colloidal silica/TiO₂/GPTMS composites for stone consolidation", 4th International Symposium on Nanotechnology in Construction, Agios Nikolaos, Greece, May 20-22, 2012.
- CA12. "Hydraulic mortars with nano-titania for joining sandstone architectural members of the Acropolis Monuments", Study: **P. Maravelaki**, Z. Agioutantis, E. Lionakis, Ch. Kapridaki, A. Verganelaki, Technical University of Crete, Coordination-Implementation: E. Sioumbara, E. Aggelakopoulou, E. Fragiadaki, G. Frantzi, The Acropolis Restoration Service Athens, 6th International Meeting for the Restoration of the Acropolis Monuments, Athens, 4th - 5th October 2013
- CA13. **(invited) Pagona-Noni_Maravelaki**, C. Kapridaki, A. Verganelaki, Novel hybrid nanocomposites for building materials' strengthening and protection, 10th International Conference on Nanosciences & Nanotechnologies, 9 - 12 July 2013, Thessaloniki, Greece.
- CA14. **(invited) M. Theodoridou**, E. Charalambous, I. Ioannou, **P. Maravelaki**, "The use of nano-additives in composite construction materials", 10th International Conference on Nanosciences & Nanotechnologies, 9 - 12 July 2013, Thessaloniki, Greece.

6.8 Partent (1)

1. **Maravelaki P**, Verganelaki A, et al (2011) Method for the production of nano-oxalic silicon gel with application on building materials. Industrial Property Organization. No. 1007392. 54.

7. PROFESSIONAL & EDUCATIONAL SERVICE ACTIVITIES

7.1 REFEREE - INTERNATIONAL PEER REVIEW JOURNALS

1. Cement and Concrete Research
2. Water Air and Soil Pollution
3. Thermochemica Acta
4. Building and Environment

5. Surface and Interface Analysis
6. Progress in Organic Coatings
7. Analytica Chimica Acta
8. Applied Organometallic Chemistry
9. Construction and Building Materials
10. Cement and Concrete Composites
11. Materials Science and Engineering B
12. Environmental Science and Pollution Research

7.2 REFEREE - RESEARCH PROPOSALS

Cyprus Research Promotion Foundation: Involved in the review and evaluation of a research proposal in the field of characterization of monumental building materials.

7.3 INVITED PUBLIC PRESENTATIONS

13. Invited participation in the Workshop “Conservation of Historic Stone Structures, Working Group I on Mechanisms and Rates of Stone Damage”, Dahlem University, Dahlem, 3-8 March 1996.
14. Invited participation as external expert of the relevant G7 COST Action, Bucharest, 19-21 January 2001.
15. Invited presentation in the Workshop on “Environmental effects on artworks” COST G7 with title: “Environmental impact on stones and mortars from historic buildings: case studies from Venice, Athens and Crete”, Herakleion 18-21 October 2001, Book of abstracts, COST G7.
16. Invited presentation in the interdisciplinary meeting of the Committee for the Preservation of the Acropolis Monuments, with title: “Laser cleaning of marble: procedure and evaluation of the effects”, Athens, 2001.
17. Invited presentation in the interdisciplinary meeting of the IGME-ICOMOS, with title: “Encrustation on Pentelic marble: cleaning and evaluation with laser assisted techniques”, Athens, 2001.
18. Invited presentation in the Workshop on “New technologies for the preservation of cultural heritage”, with title: “Innovative technologies for characterization and cleaning of encrustation”, Fraunhofer-Institut für Silicatforschung, Bronnbach Branch, Bronnbach, 2001, Abstracts from the Greek Participants, General Secretariat for Research and Technology, BMBF-DLR, pp. 10-12.
19. Invited presentation, 7th International Conference on Non-Destructive Testing and Microanalysis for the Diagnostics and Conservation of Cultural and Environmental Heritage with title “Innovative techniques for the characterization of encrustation on Pentelic marble, from the Parthenon”, Antwerp, Belgium, 2-6 June 2002.
20. P. Maravelaki, "Novel consolidant, protective and cleaning agents based on nano-technology for monument conservation", pages 16, 2009, Tehran, 20/12/2009, Research Institute for the Iranian Cultural Heritage Handicrafts and Tourism Organization (ICHHTO), “Esfahan University of Art”, Esfahan, (14/12/09), and “Parsa Pasargadae Research Foundation” Pasargadae (19/12/09).

21. “Novel consolidant, protective and cleaning agents based on nano-technology for monument conservation”, University of Cyprus, Civil & Environmental Engineering Department, 14/3/2011, Nicosia, Cyprus.
22. "Remedial materials and techniques of past treatments: the case of the archaeological Museum of Kissamos", Università IUAV di Venezia, 28/4/2011, Lecture, Erasmus project.
23. "Innovative cleaning, consolidation and protection materials based on nanotechnology for the monument conservation", Università IUAV di Venezia, 28/4/2011, Lecture, Erasmus project.
24. Invited presentation “Hydraulic mortars with nano-titania for joining sandstone architectural members of the Acropolis Monuments”, Meeting No. 4, Committee for the Preservation of the Acropolis Monuments, Athens, 19-5-2011.
25. "Physico-chemical characterization of hydraulic mortars containing nano-titania for restoration applications", 8th International Conference on Nanosciences & Nanotechnologies – NN11 'Ioannis Vellidis' Congress Centre, 15 July 2011, Thessaloniki, Greece.
26. “Novel hybrid nanocomposites for building materials’ strengthening and protection”, 10th International Conference on Nanosciences & Nanotechnologies, 11 July 2013, Thessaloniki, Greece.
27. Milano, Defense Committee of the: PhD thesis of Dr. Francesca Gherardi with the Title "Nano-structured coatings for stone and paint surfaces of Cultural Heritage" February 22nd, 2016, Politecnico di Milano Dipartimento di Chimica, Materiali e Ingegneria Chimica "Giulio Natta.
28. Bologna, DICAM, Dipartimento di Ingegneria Civile, Chimica, Ambientale e dei Materiali Università di Bologna, DICAM Seminar 15 th December 2016 h. 10.00 - Room 5.4 (Viale Risorgimento 2), Seminar: “Nanomaterials for monument conservation: applications as additives in mortars, consolidants and self-cleaning protectives”, Pagona-Noni Maravelaki, 2016.
29. Dr. Noni-Pagona Maravelaki, Three-step cleaning methodology to remove the yellowing from Cararra marble, NANO-CATHEDRAL Open Conference in Oslo, Nano Technology Applications in a Northern Scandinavian Setting, Oslo Opera House, 7th June 2017, Oslo.
30. P. Maravelaki-Kalaitzaki (key note): Nanomaterials for monument conservation: applications as additives in mortars, consolidants and self-cleaning protectives, TechnoHeritage 2017, 21-24 May Cádiz, Spain.
31. 4th Workshop of the Joint Doctoral Program in Chemistry, “Nanomaterials for monument conservation: applications as consolidants and self-cleaning protectives”, Annual Workshop of the PhD in Chemistry, Università Ca’ Foscari di Venezia and Università degli Studi di Trieste, Trieste 28 July, 2018.
32. Cadiz El próximo jueves 26 de Julio de 2018 tendrá lugar a las 11:30, en la Sala de Grados 1 de la Facultad de Ciencias, la conferencia “Innovative materials for building conservation: Preliminary results in the European Project InnovaConcrete” impartida por la Profesora Noni-Pagona Maravelaki, School of Architecture Technical, University of Crete. <http://imeymat.uca.es/es/2018/07/20/conference-innovate-materials-for-building-conservation/>
33. 1st Innova Concrete Workshop: The work of Eduardo Torroja and the Modern Architecture, Eduardo Torroja Institute MADRID, SPAIN, October 23 & 24, 2018, με ομιλία «Materials for Preserving Historic Concrete: Impregnation Techniques vs. Coatings».

34. MaterialiAccademy, 4-7 June 2019, Sardegna, Parco scientifico tecnologico di Pula, “Beni culturali dell’edilizia storica e moderna. Nuove prospettive nel recupero e nella conservazione dei materiali“, corso internazionale indirizzato a dottorandi, ricercatori e professionisti (ingegneri e architetti), lecture entitled “Conservation of the 20th century concrete structures, InnovaConcrete H2020 project”.

7.4 COLLABORATIONS

1. Pursuant to the official invitation from the Research Institute for the Iranian Cultural Heritage Handicrafts and Tourism Organization (**ICHHTO**), the Professor Dr. Fani Mallouchou-Tufano and the Associate Professor Dr. Pagona-Noni Maravelaki visited Iran from 13/12/2009 up to 21/12/2009. During their visit they gave lectures at the “Isfahan University of Art” in Isfahan (14/12/2009), at the “Research Foundation Parsa Pasargadae” in Pasargadae, and at the “The Research Center for Conservation of Historical-Cultural Works and Objects” in Tehran, Iran, with topics relative to the restoration and conservation of monuments. In particular, case studies concerning the monument restoration of the Acropolis monuments, and other important monuments of Greece, such as the Sikion Theatre, the Olympia archaeological site, the new Museum of Chalkida, etc. Furthermore, the recent advances of the nanotechnology for specific applications in the conservation of materials were presented and discussed. The Iranian scientists expressed particular interest on the restoration and conservation of the Sassanid period (3rd century AC up to 7th century PC) monuments in the cities of Firuzabad and Bishapur, including rock reliefs, Temple, Palace and Castle.
2. University of Cyprus, Civil & Environmental Engineering Department, Assistant Professor I. Ioannou, 2011-, Nicosia, Cyprus, Erasmus Agreement, 2011-2014.
3. University Ca Foscari of Venice (IVENEZIA01), Prof. Guido Bisconti and Associate Prof Elisabetta Zendri, Dipartimento di Scienze Ambientali Sede: Polo scientifico via Torino - Informatica e laboratori di Scienze Santa Marta - Dorsoduro 2137 - 30123 (VE), Erasmus Agreement, 2011-2014.
4. Università IUAV di Venezia, Laboratorio di Analisi dei Materiali Antichi, Prof. L. Lazzarini, 2011-παρόν.
5. YSMA, The Acropolis Restoration Service, 2010-present.
6. Universidad de Cadiz, Spain, María Jesús Mosquera Díaz, Departamento de Química-Física, Facultad de Ciencias, Erasmus Agreement, 2013-2014.

7.5 LANGUAGES

Greek (mother language), English (very well), Italian (very well), French (basic knowledge), Spain (basic knowledge).

8. FUNDED PROJECTS (Principal or Co-Principal Investigator and/or Coordinator)

- 2021: **Erasmus+**, Grant Agreement (GA) No: 101004049, European University in the field of Responsible Consumption and Production (RCP): EURECA-PRO, Responsible of the Light House 3 on the Sustainable Materials and Products.
- 2018: **Horizon 2020**, Grant Agreement (GA) No: 760858 Acronym: InnovaConcrete Title: Innovative materials and techniques for the conservation of 20th century concrete-based cultural heritage Call/Topic: Innovative solutions for the conservation of 20th century cultural heritage Type of action: Research and Innovation action Granted by: European Union Horizon 2020, 300,000€, 2018-2021.
Team Leader
- 2016: “Kommos Archaeological Site / General Condition Assessment”, Institute for Aegean Prehistory Study Center for East Crete INSTAP-SCEC S.A.”, €10,000.
Coordinator
- 2015: **First prize** at the **international contest** “The Oslo Opera House – Condition analysis and proposal for protection and maintenance of exterior marble”, organized by Statsbygg, Norway. The Oslo Opera House is a listed building of approximately 23 000 m² Carrara Marble that decorates the external facades and roof of the Opera. In this project, Betong Consult AS, NanoPhos SA, the Laboratory Materials and Methods for Cultural Heritage of the Politecnico di Milano and the Surfa Products Scandinavia AS, also collaborate. € 48,000, 2015-2016.
Coordinator
- 2015: Restoration of the Venetian Fortress, Chania, Crete: Study of the construction and repair materials and methods, Greek Ministry of Culture, (€4,000.00).
Coordinator
- 2014-2011: Bioinspired nanocomposites for the strengthening of construction materials, "European Territorial Cooperation", NSRF, Greek General Secretariat for Research and Technology (GRST), (€516,160.00).
Coordinator
- 2014-2011: Sustainability and Compatibility of advanced materials and technologies for the protection of cultural heritage monuments: Development of investigation criteria and methodologies – COMASUCH», [(€600,000.00), European Regional Development Fund and national resources, Thales Project.
Principal Investigator
- 2013-2010: Assessment of mortars with nano-additives for the re-adhesion of porous fragments from the Acropolis, Athens, monuments. The Akropolis Restoration Service, (€6,000.00).
Coordinator
- 2013-2009: Evaluation of chemical compatibility and improvement of stone consolidants with nano-technology. “HRAKLEITOS II”, the European Union-European Social Fund (ESF) & National Sources. (€45,000.00).
Coordinator

- 2012: Physico-chemical analysis of mortars from ancient city of Polyrrenia Chania, Crete, Greek Ministry of Culture, (€4,692.64).
Coordinator
- 2012-2011: Documentation, Principles and Materials Research for the Conservation and Restoration of the Ancient Monuments of Iran, Technical University of Crete, (€6,000.00).
Coordinator
- 2011-2009: Novel nanocomposites for stone consolidation, Technical University of Crete, (€15,000.00).
Coordinator
- 2010-2009: Restoration of the ancient Aptera Theatre, Conservation-Restoration of monuments, Regional Operational Program of Crete, (€14,995.00).
Coordinator
- 2006: Study of the effects of consolidation in the stones of the wall of the Aptera remains in Chania, Crete, Greece, EU-ARTECH, 2006, MOLAB Transnational Access Activities, EU-ARTECH (www-eu.artech.org), “Access Research and Technology for the Conservation of the European Cultural Heritage (FP6-506171)”,
Principal Investigator
- 2005: Integrated tool for in situ characterization of effectiveness and durability of conservation techniques in historical structures (DIAS), DIAS-EVK4-CT-2002-00080, Application to the Fortifications of Aptera, Chania, Crete, Technical University of Crete.
Principal Investigator
- 2004-2002: Early Metallurgy in Crete, P.E.N.E.D. Project, Ministry of Research and Technology of Greece-GSRT.
Principal Investigator
- 2002-2000: Design and application of compatible mortars for the restoration of the Firkas Fortress, Chania, Crete, Greece, project METAFORA: Mediterranean Towers and Fortresses: Oriented Revitalisation Actions, CULTURA 2000, EC projects.
Principal Investigator
- 1997-1995: Development of new materials for the structural and surface conservation of monuments, based upon studies of the original materials used for their construction, Ministry of Research and Technology of Greece-GSRT.
Principal Investigator
- 1997-1996: Assessment of the consolidation products for the conservation of porous stones from the Rhodes fortifications, National Technical University of Athens, Section of Materials and Engineering, Regional Operational Program of Rhodes.
Principal Investigator
- 1995-1994: Study of decay mechanisms and weathering products of the materials used in the Venetian Fortifications, at Chania, Crete, Greece, Technical University of Crete, RECITE Program, Region of Crete.
Principal Investigator
- 1995: Weathering problems of the materials used for the construction of the Venetian Fortifications, at Heraklion, Crete, Greece”, 1995, Department of Mineral

Resources Engineering of the Technical University of Crete, funded by the Ministry of Culture and the Municipality of Heraklion.

Principal Investigator

1992: Study on the provenance of yellow stains appeared on constructions of marble in Switzerland, Ecole Polytechnique Federale de Lausanne” (EPFL), Departement des Materiaux, Laboratoire de Conservation de la Pierre, 1992, funded by national foundation of Switzerland.

Principal Investigator

9. CITATIONS

Citations: 1915, h=22, Source: Scopus

Citations: 2912, h-index=25, i10-index=47, Source: Google Scholar,