

Curriculum vitae of Professor Georgios Exadaktylos



DATE: July 2015

Brief Summary: Professor Georgios Exadaktylos was born on 20th of December 1961. He has obtained his diploma of Mining & Metallurgical Engineering at the National Technical University of Athens in 1985. Next, in 1988 he has obtained a Master of Science Diploma in Mineral Resources Engineering from the Virginia Polytechnic Institute and State University (VPI&SU), USA. In the next year 1989, he has acquired the degree of Doctor of Philosophy in Mining Engineering at the National Technical University of Athens. Then for a period of three years he has worked as mining engineer in marble quarries in Greece (Dionysos-Pendelikon, Naxos, Tinos, Drama) and he has contributed to the design of the underground marble quarrying for the first time in the Greek Marble Sector on 1992, that successfully continues to date. From 2010 on, he contributes to the partial transformation and hence sustainability of surface into underground exploitation of marble quarries in Greece and abroad. On 1993 he was appointed faculty member (Assistant Professor) at the Mineral Resources Engineering Department of the Technical University of Crete. He has done consulting for a number of mineral extraction companies (bauxite, mixed sulphides, gold, copper, marble, limestone, lignite, chromite, talc etc) and for Geotechnical companies. Currently he is Professor of Rock Mechanics & Mining Engineering at the Technical University of Crete (since 2004) and Director of two distinct Laboratories namely the Mining Engineering Design Laboratory (since 1999) and the Rock Mechanics Laboratory (since 2014) and accomplished successfully under his supervision four (4) PhD theses on the topics of Rock Mechanics and Tunnelling and Mining Engineering. He is a member of more than ten professional bodies and member of the Editorial Board of four scientific journals. His expertise acquired from diverse studies and practical experience refers to *Mineral resources exploration and evaluation, Geostatistics, Surface and Underground Mining Engineering, Excavation Engineering, Tunnelling, Rock and Soil Mechanics, Geological & Geotechnical Engineering, Recovery-Storage of Energy-Natural Resources, Continuum Mechanics & Micromechanics, Fracture Mechanics, Damage Mechanics, and Computational Mechanics*. He has published more than one hundred papers in Greek & International scientific Journals, refereed national and international conferences, and book chapters. He is also the editor together with I. Vardoulakis of a book entitled *Bifurcation, Instabilities and Degradation in Geomechanics*, Springer. Apart from conducting applied research in a number of national projects funded by the private quarrying and mining sectors, he was also scientific and administrative responsible in ten competitive collaborative RTD European Projects of Framework Programmes (FP's) 4th to 7th. He has also been Project Coordinator in two European Commission collaborative RTD Projects in the areas of Rock and Fracture Mechanics, Mechanics of Structures and Rock characterization related to Protection of Cultural Heritage, and Work-Package leader referring to “*Tunneling Design and Ground Characterization*” in the largest European Commission IP-FP6 Project in Tunneling ever (<http://www.ifb.tugraz.at/tunconstruct/>). In the frame of 5-years of TUNCONSTRUCT he has closely cooperated with Bouygues Travaux Publics, Sandvik, Herrenknecht, Hochtief, Amberg, TUGraz, RU Bochum, Leoben etc. In the year 2010 he has been also nominated as an Expert of INSPIRE EC-Directive in the Technical Committee of “Natural Risk Zones” <http://inspire.ec.europa.eu/index.cfm/pageid/2/list/30>. In the period 2011÷2012 he has been appointed by European Commission as an Expert Reviewer of proposals referring to large scale CO₂ storage.

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1. Personal Data

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Date of birth: 20.December.1961
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Web: <http://minelab.mred.tuc.gr>
Languages: Greek (fluently), English (fluently), German (elementary)

2. Education (1980÷1989)

1980 ÷ 1985: *Diploma of Mining Engineering & Metallurgy Engineering*, National Technical University of Athens (Grade: Very Good, 7.2/10).
1987 ÷ 1988: *Master of Science (M.Sc.) in Mineral Resources Engineering*, Virginia Polytechnic Institute and State University VPI & SU (Grade: 3,94/4,00 excellent, among top 5% of the graduate students in Virginia Tech for the year 1988). Topic: Numerical simulation of Bench Blasting procedures.
1985 ÷ 1989: *Doctor of Philosophy (PhD) in Mining Engineering*, National Technical University of Athens, Mining & Metallurgy Engineering Department (with Honors). Full-scale investigation of the influence of discontinuities on rock fragmentation in tunnel blasting.

3. Present position

1980 ÷ 1985: Full Professor of Rock Mechanics & Mining Engineering, School of Mineral Resources Engineering, Technical University of Crete.
1999 ÷ on: Director of Mining Engineering Design Laboratory in the same School.
2014 ÷ on: Director of Rock Mechanics Laboratory in the same School.

4. Professional experience (full and part-time positions)

| Date from - Date to | Location | Company | Position | Description |
|---------------------|---------------------------------------|--|---|--|
| 1985-1987 | Amfissa, Fthiotida Perfection, Greece | Delphi-Distomo Bauxite Mines | Practising Mining Engineer (full time) | Geological engineering and blast design in access drives and in underground bauxite mines |
| 1987-1989 | Blacksburg, Virginia (USA) | Virginia Tech | Research Assistant (full time) | Department of Mineral Resources Engineering (supervising graduate students, preparation of lab training, administrative work, research) |
| 1989 | Athens, Greece | PMS & ERGO Construction Company | Supervising Mining Engineer (full time) | Blasting Engineer |
| 1990-1992 | Athens, Greece | DIONYSSOMARBLE Co. S.A. | Mining Engineer (full time) | Exploration-Design-Production engineer in four quarries: Dionysos open pit and underground marble quarries, Volakas Northern Greece dolomitic marble quarry, and chief engineer at Tinos marble quarry (Verdi di Tino), and at Naxos white marble quarry (Naxos white “crystalline”) |
| 1992-1994 | Athens, Greece | National Technical University of Athens | Senior Researcher (part-time) | Rock engineering analysis of underground bauxite mines mined with the room and pillar method |
| 1997-1999 | Athens | AIGIS Ltd Consulting company for TVX Hellas AE | Consultant (part-time) | Feasibility study of the investment referring to underground mining of gold / mixed sulphides ore deposits at Skouries and Olympias mines. |
| 1997-date | Athens, Greece | DIONYSSOMARBLE Co. S.A. | Consultant (part-time) | Marble ore reserve estimation and quarry design of four (4) marble quarries owned by the company (Dionysos, Drama, Thasos and Naxos marble quarries) |

| | | | | |
|-----------|----------------|-------------------------------|--|--|
| 1993-1997 | Chania, Greece | Technical University of Crete | Assistant Professor (full time) | <p>Teaching and Research in Mining Engineering and Rock Mechanics.</p> <p>Undergraduate Courses: (1) Stability of Underground & Surface Excavations , (2) Underground Mining Engineering Methods and Tunneling Design/Construction, (3) Theory of Elasticity & Fracture Mechanics, (4) Design of Open Pit Quarries & Mines</p> <p>Post-graduate courses: (1) Stability analysis of geotechnical constructions, (2) Continuum Mechanics and Numerical Methods in Geotechnical Engineering</p> |
| 1997-2003 | Chania, Greece | Technical University of Crete | Associate Professor (full time) | <p>Teaching and Research in Mining Engineering and Rock Mechanics</p> <p>Undergraduate Courses: (1) Stability of Underground & Surface Excavations , (2) Underground Mining Engineering Methods and Tunneling Design/Construction, (3) Theory of Elasticity & Fracture Mechanics, (4) Surface excavations and surface mining</p> <p>Post-graduate courses: (1) Stability analysis of geotechnical constructions, (2) Continuum Mechanics and Numerical Methods in Geotechnical Engineering</p> |
| 1997-2001 | Athens, Greece | EDRASIS C. PSALLIDAS S.A. | Consultant Geotechnical Engineer (part-time) | Consulting on Special geotechnical constructions such as tunneling, shaft sinking, excavation technologies, reinforcement of rocks/soils, foundations etc |
| 1999-date | Chania, Greece | Technical University of Crete | Director of Mining Engineering Design Laboratory (full time) | <p>Organization of the lab, funding from various EU Research projects and National Organizations as well as from the private sector.</p> <p>Organization of laboratory exercises for CAD design of surface and underground excavations and tunnelling, rock & fracture mechanics testing, analogue tests on the formation of faults (fault mechanics) and tunnel failures, drilling testing of rocks, design and construction of Rock Mech Testing machine, and a lot of numerical modelling based on commercial and home-made software.</p> |

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|-----------|------------------------------|---|---|--|
| 2004-date | Chania, Greece | Technical University of Crete | Professor & Director of Mining Engineering Design Laboratory (full time) | Teaching and Research in Mining Engineering and Rock Mechanics Undergraduate Courses: (1) Stability analysis of Underground & Surface Excavations , (2) Underground Mining Engineering Methods and Tunneling Design/Construction, (3) Theory of Elasticity & Fracture Mechanics, (4) Surface Mining and Quarrying and geotechnical constructions. Post-graduate courses: (1) Poromechanics, (2) Geomechanics |
| 2005 | Paris, France | l'Ecole Nationale des Ponts et Chaussées | Visiting Professor. Sabbatical leave (Spring Semester 2004-2005) | Six (6) months at Ecole de Pont ser Chaussées-LCPC (Paris) giving seminars on “Conventional and Mechanized Tunnelling”, “Geostatistics” as well as on “Thermoporomechanics of cracked porous solids” and collaborating in research proposals with the host staff. |
| 2005-2010 | Kamari, Attiki, Greece | TITAN Cement Co. | External consultant (part- time) | He carried out resource estimations, classifications and evaluations, he performed independent review of third party evaluations and provided input into technical reporting to international guidelines and standards. Also, limestone Reserves modeling/ Quarry Design/Production Scheduling. He supervised several exploration programmes and alternative quarry designs as well as production scenarios for the optimization of limestone surface quarry at Kamari, Attiki, Greece |
| 2007-date | Athens | Archirodon (http://www.archirodon.net) | Consultant (part-time) | Consulting on Mining of metallic ore deposits and decorative Stone quarrying. |
| 2014-date | Chania, Greece | Technical University of Crete | Director of Rock Mechanics Laboratory | Organizing of teaching and lab demonstrations and applied research on the following two undergraduate courses : 1) Rock Mechanics and Rock Engineering 2) Drilling-Blasting and mechanical boring of underground excavations |

5. Scientific expert positions

1. Member of European Committee CEN-TC 246: Mechanical properties of Natural Building Stones (1997-1999).
2. Technical Committee 34 (TC 34) of the ISSMGE (International Society of Soil Mechanics and Geomechanics) entitled 'Prediction and Simulation Methods in Geomechanics' (2005-on).
3. Member of the “JTC2 Committee for Representation of ISRM Suggested Methods in Electronic Form (RISMEF)” of ISRM (Prof. Zuyu Chen, China Institute of Water Resources and Hydropower Research, Beijing, China) (2008-on).
4. Expert in European Commission’s “Joint Technical Committee of Federation of International Geo-Engineering Societies (INSPIRE) Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)”, and specifically in the Thematic Working Group of “Natural Risk Zones” (nominated after evaluation of applicants on 26/3/2010) (2010-on).
5. Member of Global Environmental Standards (GES) (nominated on 17th Nov 2011) that is a non profit global standard setting organisation dedicated to providing and recognising leadership in the Sustainable Development challenges of the 21st Century (2011-on).
6. In the period 2011÷2012 he has been appointed by European Commission as an Expert Reviewer of proposals referring to large scale CO₂ storage.
7. Scientific expert for the evaluation of Proposals in the Polish Norwegian Research Programme published on the website of the National Center for Research and Development in accordance with the Annex 12 to the Regulation on implementation of the EEA and Norwegian Financial Mechanisms 2009-2014.
8. Scientific expert who participated in evaluation of Proposals related to mining, hydrocarbon extraction, environmental engineering projects for the National Centre for Research and Development in Poland (NCRD) (2014-2015).

6. Teaching (1993 – date)

His teaching activities of graduate and post-graduate courses in the past 21 years are focusing in Mining Engineering, Tunnelling, Rock Mechanics, Geological & Geotechnical Engineering, Stability of Underground and Surface excavations, Continuum Mechanics & Fracture Mechanics.

Undergraduate Courses (1993-date)

- (1) **Surface Mining and Quarrying** – Courses and Lab assignments regarding deposit modelling, design, planning and cost analysis of surface mines and quarries (8th Semester).
- (2) **Stability analysis of Underground & Surface Excavations** – Courses and Lab exercises (8th Semester)
- (3) **Underground Mining Methods and Tunneling Design/Construction principles** – Courses and Lab assignments regarding deposit modelling, design, planning and cost analysis of an underground mine (9th semester),
- (4) **Theory of Elasticity & Fracture Mechanics** – Courses and Lab exercises (9th semester).
- (5) **Rock Mechanics and Rock Engineering** - Courses and Lab assignments (8th Semester)
Undergraduate Courses (2014-date).
- (6) **Drilling - Blasting and Tunnel Boring** - Courses and Lab assignments (7th Semester)
Undergraduate Courses (2014-date)

(emphasis is given on using autocad™ and surpac™ design tools and geostatistical tools in mine planning and design, and analytical as well as numerical tools (either continuum or discontinuum) for geomechanical stability computations and drill-blast computations; also boring performance and other excavation equipment performance calculation. Also the following topics are covered like rock mechanics and rock engineering, mining methods selection –planning-design and feasibility analysis, mining equipment and their automation, loading, transportation, ventilation, mine safety, primary and secondary crushing and grinding plant design, and the mine environment).

Post-graduate courses (2000-date)

(7) Advanced Rock Mechanics, Poromechanics and related Environmental problems

(winter semester)

(8) Mass Mining Operations and tunnelling by NATM and TBM methods *(spring*

semester)

7. Training

- He has supervised more than forty (40) Diploma Theses at Technical University of Crete.
- He has supervised more than ten (10) MSc dissertations.
- He has supervised four (4) successfully accomplished PhD theses.
- He has participated in more than ten (10) committees of PhD dissertations in Greek Universities.

Over the past 12 years, workshops and seminars were offered to practitioners in the industry and post-graduate students. The following is a partial list of courses that have been provided:

- Exadaktylos G. (1998) Seminar on “Characterization of the mechanical properties and damage of Natural Building Stones”, 19th Carrara Fair, Italy, 27-31 May, 1998.
- Exadaktylos G. (2004), Lecture on “Advances in Tunneling Mechanics”, Technical University Graz, Graz, Austria.
- Exadaktylos G. (2005), Series of Lectures devoted to “Conventional and Mechanized Tunnelling” at l'Ecole Nationale des Ponts et Chaussées, Feb. 2005.
- Exadaktylos G., (2009) “From Geology to Input Parameters for Simulation Models & Excavation Machines (TBM’s & Roadheaders)”, Seminar in EURO:TUN 2009 Workshop, 2nd International Conference on Computational Methods in Tunnelling, Ruhr University Bochum, 8th September 2009.
- Exadaktylos G. (2010) “Elementary Fracture Mechanics”, 21st ALERT Doctoral School, Friday 8th October 2010, Aussois, France.
- Exadaktylos G. July 11th 2014 “On the development of a Rock-Lab web driven and relational data base”, Ruhr Universitaet Bochum (Germany).
- Exadaktylos G. July 10th 2014, “Performance analysis of TBM’s by using analytical cutting models and geostatistics”, Ruhr Universitaet Bochum (Germany).
- Exadaktylos G. July 11th 2014, “Strength of Materials Relational Databases Design”, Ruhr Universitaet Bochum (Germany).

8. Partial List of Supervised Young Researchers currently in Academia

- G. Efremidis (Lecturer of Rock Mechanics – Dept of Civil Engineering University of Volos - Greece)
- P. Liolios (Research Assistant – Dept of Mineral Resources Engineering, Chania – Greece)
- G. Saratsis (Research Assistant – Dept of Mineral Resources Engineering, Chania – Greece)
- K. Kaklis (Research Assistant – Dept of Mineral Resources Engineering, Chania – Greece)
- E. Baradakis (Administration – Technical University of Crete)

9. Membership of professional bodies

- Technical Chamber of Greece,
- Hellenic Society of Mining Engineering,
- Hellenic Society of Soil Mechanics & Geotechnical Engineering (EEEE&GE),
- International Society of Rock Mechanics (I.S.R.M.),
- Affiliate Member in the Porous Media Research Institute (PMRI)-University of Waterloo (Canada) (he has been proposed by Prof. Maurice Dusseault),
- Member of the Research for Future Infrastructure Networks in Europe – REFINE as representative of Hellenic Construction Technology Platform,
- Panel Member of the Infrastructure Panel on “The Role of Geology in the Planning and Building of Infrastructure” approved by the Council of Geological Society of America (GSA).
- Member of the Hellenic Society of Theoretical and Applied Mechanics (elected on 2013).
- Member of the Society of Mining Professors, SOMP (www.mineprofs.org).

10. Reviewer & Member of Editorial Board of Scientific Journals

- Reviewer of International Journals:
Soils and Foundations,
International Journal of Solids & Structures,
International Journal of Fracture,
Geotechnical & Geological Engineering-An International Journal,
Int. J. Rock Mech. & Mining Sciences,
Engineering Fracture Mechanics,
Rock Mechanics & Rock Engineering Journal,
Tectonophysics,
International Journal of Numerical & Analytical Methods in Geomechanics,
Experimental Mechanics,
Advances in Water Resources,
Engineering Geology,
Int Journal of Architectural Heritage,
CMES, ASCE Journals, etc.
- Member of Editorial Board “Coupled Systems Mechanics (CSM)” *An International Journal of Interactions of Structures, Fluids, Soil, Wind, Foundation and Multiple Systems.* Editor-in-Chief: Prof. Chang-Koon Choi (KAIST).

- Member of the Editorial Advisory Board: The Open Construction & Building Technology Journal.
- Member of the Editorial Review Board of the Scientific Journals International (SJI) in Civil Engineering, Architecture, Environmental Engineering.
- Member of the Editorial Review Board of ISRN Mechanical Engineering is part of the International Scholarly Research Network (ISRN).

11. Administrative experience

- 1999 - on: Director of *Mining Engineering Design Laboratory*, School of Mineral Resources Engineering, Technical University of Crete.
- Member of the Senate of the Technical University of Crete in the periods 1994-1995, 1998-1999, 2003 - 2005.
- 1993 – on: Member of the General Assembly of the Mineral Resources Engineering School, Technical University of Crete.
- Member of the Special Post-Graduate Assembly of the Dept of Mineral Resources Engineering, TUC (2005 - on).
- 1997-1999: *Project Coordinator* of EU R&D Project, Standards, Measurements & Testing Programme, SMT4, “Characterization of Mechanical Properties and Damage of Natural Building Stones in Historical Monuments”.
- 2002-2005: *Project Coordinator* of R&D EU Project EVK4-CT-2002-00080, “Integrated tool for in situ characterization of effectiveness and durability of conservation techniques in historical structures, DIAS”.
- 2014 – on: Director of *Rock Mechanics Laboratory*, School of Mineral Resources Engineering, Technical University of Crete.

12. Key qualifications

His expertise refers to:

Mineral resources exploration and evaluation, Geostatistics, Mining Engineering (both Surface and Underground), Tunnelling, Excavation Engineering, Rock and Soil Mechanics, Geological & Geotechnical Engineering, Recovery-Storage of Energy-Natural Resources, Continuum Mechanics & Micromechanics, Fracture Mechanics, Damage Mechanics, and Computational Mechanics.

13. Publications

13.1. Dissertations

1. Exadaktylos, G., “*Computer Aided Blast Fragmentation Prediction*”, M.Sc., Dept. of Mineral Resources Engineering, Virginia Polytechnic Institute and State University (VPI&SU), USA, 1988.
2. Exadaktylos, G., “*Effect of pre-existing rock discontinuities in excavation by drilling and blasting in underground stopes*”, Ph.D., Dept. of Mining & Metallurgy Engineering, National Technical University of Athens, 1989.

13.2. Papers in Refereed Journals

1. Tsoutrelis, C.E., Exadaktylos, G.E. and Kapenis, A.P., (1990). Study of the rock mass discontinuity system using photoanalysis, *Mineral Wealth* 68/1990, pp. 9-18.
2. Exadaktylos, G.E., and Tsoutrelis, C.E. (1990). Experimental study of the influence of joints on the mechanical properties of Pentelikon marble. *Mineral Wealth* 66, pp. 13-22 (in Greek).
3. Exadaktylos, G.E., and Tsoutrelis, C.E. (1991). Fragmentation analysis using the photographic method. *Int. J. of Surface Mining and Reclamation* 5, pp. 55-64.
4. Tsoutrelis, C.E., Exadaktylos, G.E. (1992). Calculation of fracture radius of rocks around blastholes-An approximate solution. *Mineral Wealth* 76, pp. 13-22. (in Greek).
5. Exadaktylos, G.E. (1992). Mixed-mode fracture mechanics. *Mineral Wealth* 79, pp. 55-64. (in Greek).
6. **Tsoutrelis, C.E., and Exadaktylos, G.E. (1993). Effect of rock discontinuities on certain rock strength and fracture energy parameters under uniaxial compression. *Geotechnical and Geological Engineering* 11, pp. 81-105.**
7. Tsoutrelis, C.E., Exadaktylos, G.E., and Kapenis, A.P. (1993). Estimation of the modulus of deformation of a heavily jointed rock mass lying between rocks of known moduli. *Mineral Wealth* 82, pp. 17-20.
8. Tsoutrelis, C.E., Exadaktylos, G.E., and Kapenis A.P. (1992). Estimation of the Rock Mass Modulus of Deformation Using Geomechanical Relations and Mathematical Models. *Mineral Wealth* 1992, pp. 285-302, Volume in memory of Prof. L. Mousoulos (in Greek).
9. Tsoutrelis, C.E., Exadaktylos, G.E., and Gikas, N.G. (1994). Ultrasonic characterization of apparently isotropic decorative stones. *Mineral Wealth* 89, pp.7-12.
10. Moshovis, E., Vafidis, A. and Exadaktylos G. (1994). Application of seismic tomography for the discontinuities characterization of marble quarries. *Hellenic Marble Magazine* 112, pp. 43-45. (in Greek).
11. **Exadaktylos, G. and Tsoutrelis, C.E. (1995). Pillar failure by axial splitting in brittle rocks. *Int. J. Rock Mech. Min. Sci. & Geomech. Abstr.*, Vol. 32, No. 6, pp. 551-562.**
12. Bardzokas, D. and Exadaktylos, G. (1995). Plane contact of a cylindrical opening stiffened by a thin shell. *Engineering Transactions*, 43 (1-2), pp. 27-44.
13. Bardzokas, D. and Exadaktylos, G. (1995). Integral equations of thermoelasticity and thermoconductivity for cracked isotropic or anisotropic multiply connected bodies with reinforcement. *Arch. Mech.*, 47(2), pp. 173-202.
14. Tsoutrelis, C.E., Exadaktylos, G.E., (1995). Underground exploitation of Pentelikon marble. *Hellenic Marble Magazine* 115, pp. 71-83. (in Greek)

15. Bardzokas, D., Exadaktylos, G.E. and Anastaselos, G. (1996). The effect of stringers and patches on the stress intensities around cracks in plates. *Engineering Fracture Mechanics*, Vol. 55, No. 6, pp. 935-955.
16. **Vardoulakis, I., Exadaktylos, G. and Aifantis, E., (1996). Gradient elasticity with surface energy: Mode III crack problem. *Int. J. Solids Structures*, Vol. 33, No. 30, pp. 4531-4559.**
17. Exadaktylos, G., Vardoulakis, I. and Aifantis, E. (1996). Cracks in gradient elastic bodies with surface energy. *Int. J. Fracture* 79, pp. 107-119.
18. Exadaktylos, G. and Aifantis, E. (1996). Two and three dimensional crack problems in gradient elasticity. *J. Mech. Beh. Mtls.*, Vol. 7, No. 2, pp. 93-117.
19. Tsoutrelis, C.E., Exadaktylos, G.E. (1997). Contribution of geomechanics for the design of rooms in underground marble quarries. *Mineral Wealth* 103, pp. 7-24. (in Greek).
20. Tsoutrelis, C.E., Exadaktylos, G.E., Gikas, N.G., and Nomikos, P.P. (1997). Fracture control growth in plexiglas under decoupled conditions. *Explosives Engineering*, March 1997, pp.4-9.
21. Tsoutrelis, C.E., Exadaktylos, G.E., Nomikos P. and Asvestas, G. (1997). Roof stability of rooms in underground marble quarries. *Technica Chronika* 17, No 1-2, pp. 17-31 (in Greek).
22. Antipov, Y., Bardzokas, D., and Exadaktylos, G. (1997). Partially stiffened elastic half-plane with an edge crack. *International Journal of Fracture* 85, pp. 241-263.
23. Antipov, Y.A., Bardzokas, D., and Exadaktylos, G.E. (1997). Interface Edge Crack in a Bimaterial Elastic Half-Plane. *International Journal of Fracture*, 88, pp. 281-304.
24. **Exadaktylos, G. and Vardoulakis, I. (1998). Surface instability in gradient elasticity with surface energy. *Int.J. Solids Structures* Vol. 35, No. 18, pp. 2251-2281.**
25. **Exadaktylos, G., (1998). Gradient elasticity with surface energy: Mode-I crack problem. *Int. J. Solids Structures* Vol. 35, Nos 5-6, pp. 421-456 .**
26. Tsoutrelis, C.E., Gikas, N., Nomikos, P., and G. Exadaktylos (1998). Use of Notched Boreholes for Fracture Controlled Blasting in the Ornamental Stone Quarries. *FRAGBLAST, The International Journal for Blasting and Fragmentation* 1, pp. 445-463.
27. Kourkoulis, S.K., Exadaktylos, G.E., and Vardoulakis, I. (1998). U-notched Dionysos-Pentelicon marble beams in three point bending: A demonstration of non-linearity, anisotropy and microstructural effects. *International Journal of Fracture* 98, pp. 369-392.
28. **Vardoulakis, I., Exadaktylos, G.E., and Kourkoulis, S.K. (1998). Bending of marble with intrinsic length scales: A gradient theory with surface energy and size effects, *J. Phys. IV France* 8, pp. 399 - 406.**
29. Mistakidou, E., Bambakidou, K. and Exadaktylos, G. (1998). Einfluss der mineralogischen und technischen eigenschaften bei der marmorexplorierung im beispiel von marmorsteinbruchen aus Volakas und Nikisiani, Griecheland. *European Journal of Mineralogy* Vol. 10, No. 1, 1998, p. 197.
30. Exadaktylos, G.E. (1998). Some Basic Half-Plane Problems of the Cohesive Elasticity Theory With Surface Energy. *Acta Mechanica*, Vol. 133 No. 1-4, 1999, pp. 175-198.
31. Exadaktylos G., Tiano P. and Filareto C. (2000). Validation of a model of rotary drilling of rocks with the drilling force measurement system. *Internationale Zeitschrift für Bauinstandsetzen und Baudenkmalpflege*, 6. Jahrgang, Aedificatio Publishers, Heft 3, 307-340.

32. Exadaktylos G. and Kaklis K. (2000). Applications of an explicit solution for the transversely isotropic circular disc compressed diametrically. *Int. J. Rock Mech. & Mining Sci.* 38, pp. 227 - 243.
33. Exadaktylos, G.E. and Vardoulakis, I. (2001). Microstructure in Linear Elasticity and Scale Effects: A Reconsideration of Basic Rock Mechanics and Rock Fracture Mechanics. *Tectonophysics*, 335, Nos. 1-2, pp. 81-110.
34. Exadaktylos, G.E., Vardoulakis, I., and Kourkoulis, S.K. (2001). Influence of nonlinearity and double elasticity on flexure of rock beams-I. Technical theory. *Int. J. Solids Structures* 38, pp. 4091-4117.
35. Exadaktylos, G.E., Vardoulakis, I., and Kourkoulis, S.K. (2001). Influence of nonlinearity and double elasticity on flexure of rock beams-II. Characterization of Dionysos marble. *Int. J. Solids Structures* 38, pp. 4119-4145.
36. Kourkoulis S. and Exadaktylos G. (2001). The displacement discontinuity technique in fracture mechanics: The subsurface crack problem. *Archives of Mechanics*, 53 (4), pp. 421-437.
37. Exadaktylos, G. E. (2001). On the constraints and relations of elastic constants of transversely isotropic geomaterials. *Int. J. Rock Mechanics & Mining Sciences*, 38(7), pp. 941-956.
38. Exadaktylos, G.E., and Stavropoulou, M. (2003). A closed-form elastic solution for stresses and displacement around tunnels. *Int. J. Rock Mechanics & Mining Sciences*, 39, pp. 905-916.
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13.3. Papers in Refereed Conferences

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91. Panayotounakos, D., Exadaktylos, G. and Vakakis, A. (2001). Analytical solution of the nonlinear damped Duffing oscillator. In *6th National Congress of Mechanics*, Vol. II (Aifantis & Kounadis Eds.), Thessaloniki, July 19-21, 2001, pp. 189-195.
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102. Exadaktylos G. (2005). On a Class of Contact Problems in Rock Mechanics, In *11th IACMAG Conference* in Torino, 19-24 June 2005 (Invited Lecture).
103. Stavropoulou, M., Saratsis G. And Exadaktylos G. (2006). A new approach for the design of tunnels in inhomogeneous soils and rocks (in Greek), In *50th Greek Conference of Geotechnical and Geoenvironmental Engineering*, Xanthi 31/5-2/6 2006, pp. 613-620.

104. Exadaktylos G., Stavropoulou, M. And Papadopoulos C. (2006). In situ estimation of the strength of building stones in historical monuments with the microdrilling method (in Greek), In *1st Greek Conference on Monuments Restoration*, Thessaloniki, 14 – 17 June, 2006.
105. Liolios, P. and Exadaktylos, G. (2007). Stress analysis of multiply fractured porous rocks, In *7th International Workshop on Bifurcations, Instabilities and Degradation in Geomechanics (IWBIDG 2005)*, Chania, June 2005 and in “Bifurcations, Instabilities and Degradation of Geomaterials, Exadaktylos and Vardoulakis (Editors), Springer, 2007.
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110. Meschke G., F. Nagel, J. Stascheit ,M. Stavropoulou, G. Exadaktylos (2008). Numerical simulation of mechanized tunnelling as part of an integrated optimization platform for tunnelling design, In *12th International Conference of International Association for Computer Methods and Advances in Geomechanics (IACMAG)* 1-6 October, 2008, Goa, India.
111. Stavropoulou, M.; Exadaktylos, G; Xiroudakis, G; Saratsis, G (2009). A geotechnical and EPB model of Mas-Blau L9 metro tunnel in Barcelona, *EURO:TUN 2009, 2nd International Conference on Computational Methods in Tunnelling*, Ruhr University Bochum, 9-11 September 2009, Aedificatio Publishers, 933-954.
112. Exadaktylos G. and Stavropoulou M. (2010). An engineering gradient bending theory, In *9th HSTAM International Congress on Mechanics*, Limassol-Cyprus, 12th-14th July, 2010.
113. Stavropoulou M., Xiroudakis G. and Exadaktylos G. (2013), A method for analysis of fluid flow, heat transfer and deformation processes in porous rocks and rock-like materials, *10th HSTAM International Congress on Mechanics*, Chania, Crete, Greece, 25 – 27 May, 2013, pp. 1-8.
114. Exadaktylos G. (2013), An Engineering Beam Theory with Surface Energy, (Plenary lecture), In *10th HSTAM International Congress on Mechanics* Chania, Crete, Greece, 25 – 27 May, 2013, pp. 1-9.
115. Saratsis G., Stavropoulou M. and Exadaktylos G. (2013), A posterior analysis of Sao Paulo tunnel-shaft collapse, *EURO:TUN 2013, 3rd International Conference on Computational Methods in Tunnelling and Subsurface Engineering* Ruhr University Bochum, 17-19, April 2013.
116. Exadaktylos G., Liolios P., Stavropoulou M. and Xiroudakis G. (2014), A generic relational database of materials with a strength modeling tool, *2nd International*

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117. Saratsis G., Stavropoulou M. and Exadaktylos G. (2014). Simulation of the Pinheiros - São Paulo cavern-shaft system collapse. *2nd Eastern European Tunnelling Conference Athens, Greece "Tunnelling in a Challenging Environment", 28 September - 01 October 2014 (to be presented).*

13.4. Books, Book Chapters and Special Journal Editions

118. *Bifurcation, Instabilities and Degradation in Geomechanics*, Springer, G. Exadaktylos & I. Vardoulakis (Editors), 2006, February 2007, pp. 480.
119. Special Issue: *Bifurcations, Instabilities and Degradation in Geomechanics*. Journal for Numerical and Analytical Methods in Geomechanics, Volume 31, Issue 3 (March 2007) Issue Edited by I.G. Vardoulakis, G.E. Exadaktylos.
120. Sulem J., Vardoulakis I. and Exadaktylos G. (1999). Microstructural effects in stress concentration and fracture mechanics problems in rock mechanics. *Chapter VI* in Book entitled "Fracture Series on Nonlinear Fracture Mechanics and Damage Mechanics" (WIT Press), Edited by Prof. Aliabadi of the University of London, pp. 161-200.
121. Exadaktylos G. (2006). Nonlinear rock mechanics, *Chapter 5* of Part 1: The Universality of nonclassical nonlinearity in book entitled "The Universality of Nonclassical Nonlinearity with Applications to Non-destructive Evaluations and Ultrasonics", (P.P. Delsanto, Editor), 2006, XXII, 546 p., Springer.
122. Stavropoulou M. and Exadaktylos G. (2009). From laboratory, geological and TBM data to input parameters for simulation models, *Chapter 5* in "Technology Innovation in Underground Construction", G. Beer Ed., Taylor and Francis, 2009.

14. Invited lectures

1. Exadaktylos, G. (1997). Characterization of Mechanical Properties and Damage of Natural Building Stones in Historical Monuments. In 1st Annual Workshop on Environmentally Friendly Construction Technologies (Targeted Research Action), Organized by ECCREDI, Toulouse, France, October 30th-31st, 1997.
2. Exadaktylos G. (1998). Characterization of the mechanical properties and damage of Natural Building Stones. In 19th Carrara Fair 27-31 May, 1998.
3. Exadaktylos G. (2000). Determination of the compressive strength and angle of internal friction of rocks by microdrilling. In DRILLMORE Workshop: Drilling Methodologies for Monuments Restoration, BLfD – Munich, March 16-17, pp. 22 – 29.
4. Exadaktylos G. (2004). On new analytical solutions in Rock Engineering. Technical University Graz, Graz, Austria.
5. Exadaktylos G. (2005). Advances in the mechanics of underground openings and fractured rocks. Invited Lecture l'Ecole Nationale des Ponts et Chaussées, Feb. 2005.
6. Exadaktylos G. (2005). On a Class of Contact Problems in Rock Mechanics. In 11th IACMAG Conference in Torino, 19-24 June 2005.
7. Beer G. and G. Exadaktylos (2007). Consideration of geological conditions in numerical simulation, Guimares, Key Note Lecture, In 5th International Workshop on

Applications of Computational Mechanics in Geotechnical Engineering, University of Minho, Guimarães, Portugal.

8. Exadaktylos G. (2009). From Geology to Input Parameters for Simulation Models & Excavation Machines (TBM's & Roadheaders). Invited Lecture in EURO:TUN 2009 Workshop, 2nd International Conference on Computational Methods in Tunnelling, Ruhr University Bochum, 8th September 2009,
9. Exadaktylos G. (2010). A new method to solve crack problems based on G2 theory. In 21st ALERT Doctoral School, Friday 8th October 2010, Aussois, France.
10. Exadaktylos G. (2013). An engineering beam theory with surface energy, Plenary Lecture delivered on 25th of May 2013, In 10th International Congress on Mechanics (May 25th-27th, Chania, Crete, Greece).
11. Exadaktylos G. July 11th 2014 “On the development of a Rock-Lab web driven and relational data base”, Ruhr Universitaet Bochum (Germany).
12. Exadaktylos G. July 10th 2014, “Performance analysis of TBM's by using analytical cutting models and geostatistics”, Ruhr Universitaet Bochum (Germany).

15. Special Reports

- Rosakis, A.J., Owen D.M., Zaharieva R., Haberman K., Vardoulakis I., Exadaktylos G. (1999), Explosion at the Parthenon: Can we pick up the pieces?, Special Internal Report, California Institute of Technology (CalTech), Pasadena, CA.
- Data Specification on Natural Risk Zones –Technical Guidelines (2012), INSPIRE Infrastructure for Spatial Information in Europe, Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE), February 2012.

16. Unpublished (confidential) works and applications

A number of unpublished works have been produced by G. Exadaktylos that may lead to patents/intellectual rights and are related to:

1. The Microdrilling non-destructive technique for estimating the strength properties of geomaterials.
2. Performance model of TBMs.
3. Performance model for Roadheaders. Also transforming the roadheader into a “sensor” for characterization of ground mechanical properties (Sandvik internal project).
4. Web-driven relational Rock Mechanics Database tool (RMDB).
5. Web-driven relational STREngth of MAterials DataBase tool (STREMADB).
6. Decorative stone deposit modelling and quarrying methodology.

17. Organization of Conferences/Symposia

- 7th National Congress on Mechanics, June 24-26, 2004, Chania, Greece. Organizers: A. Kounadis, K. Providakis & G. Exadaktylos (3 Volumes of Proceedings).
- 7th International Workshop on Bifurcations, Instabilities and Degradation in Geomechanics (IWBIDG 2005) June 2005, Chania, Greece. Organizers: G. Exadaktylos & I. Vardoulakis, (CD-ROM of abstracts, a Springer Book edited with I. Vardoulakis and

a Special Issue of the Journal of Analytical & Numerical Methods in Geomechanics 31 (3) Special Issue: Bifurcations, Instabilities and Degradation in Geomechanics. Issue Edited by I.G. Vardoulakis, G.E. Exadaktylos).

- Member of the Scientific Advisory Committee of the 2nd International Conference on Computational Methods in Tunnelling (EURO:TUN 2009) held September 9-11, 2009, in Bochum, Germany.
- Organization of a Special Symposium entitled: “Mechanics of Natural and Technological Disasters (or Hazards)” in the frame of the 12th International Conference on Computational & Experimental Engineering a Sciences (ICCES2012), Chania, Greece, April 30 – May 4, 2012.
- Member of the Organizing Committee of the 3rd International Conference on Computational Methods in Tunnelling (EURO:TUN 2013) to be held from April 17-19, 2013, in Bochum, Germany.
- Organization of the Mini-Symposium on the topic “From geological conditions to numerical modeling of underground excavations” in the EUROTUN2013 to be held from April 17-19, 2013, in Bochum, Germany.
- In the 10th International Congress on Mechanics (May 25-27, 2013, Chania, Greece) the Organization of MINI-SYMPOSIUM - "*Micromechanics of Materials and Generalized Continua*". Organizers: Prof. H.Georgiadis (National Technical University of Athens), Prof. G. Exadaktylos (Technical University of Crete), Prof. D. Polyzos (University of Patras). <http://www.10hstam.tuc.gr/Program.html>

18. Funded Basic & Applied Research Projects (1993-2013)

- Scientific responsible in ten (10) competitive collaborative RTD European Projects and one (1) NATO project.
- Scientific responsible in five (5) Research Projects funded by the Hellenic State (Ministry of Research and Industrial Development, Ministry of Education and Ministry of Cultural Heritage) and another five (5) projects funded by the private sector.
- Project Coordinator in two (2) European Commission collaborative RTD Projects in Rock Mechanics & Rock Engineering .

The total research funding achieved to-date as Scientific responsible is about *2 million euros*.

More specifically, the titles of the research programmes are listed below:

18.1. Previous Research Projects¹

1. ***Mathematical and experimental methods of analysis of the influence of mechanical, thermal, fluid-flow and electromagnetic fields on the behavior of simply and multiply connected deformable bodies. Funded by EU-INTAS Programme, (Project Duration: 1993-1994).***

¹ With bold letters the research projects with grants from international or national agencies

2. *Dynamic Deformation and Failure of Marble*. Funded by NATO Collaborative Research Grants Program, Partners: NTUA, Technical University Crete, California Institute of Technology (Project Duration: 1997-1998).
3. *Environmentally friendly Construction Technologies: A Targeted Research Action (TRA) of the European Commission*. Funded by EU BRITE EURAM Project (Project Duration: 1997-1999).
4. *Characterization of Mechanical Properties and Damage of Natural Building Stones in Historical Monuments*. Funded by EU FP4, Standards, Measurements & Testing Programme-SMT4., (Project Duration: 1997-1999). Project COORDINATOR, Total project funding: 1,088,197 ECU (826,200 EC Funding).
5. *Theoretical Modelling and Experimental Implementation of Nonlinear Acoustic Techniques for Micro-scale Damage Diagnostics (NATEMIS)*. Network funded by European Science Foundation ESF, (Project Duration: 2000-2005).
6. *Materials with microstructure: Constitutive modeling and computational aspects*. Funded by General Secretariat for Research and Technology in Greece (Project duration 2000–2001).
7. *Human-Network-Programme PLOUTON: Deep Geodynamic Lab at the Gulf of Corinth*. Funded by General Secretariat for Research and Technology in Greece (Project Duration: 2000–2001).
8. *Faults, Fractures and Fluids: Gulf of Corinth (3F-Corinth)*. Sub-contractor. Funded by EU FP5, EEC Energy Program, (Project Duration: 2001-2003).
9. *Effects of Weathering on stone materials: Assessment of their mechanical durability MCDUR*. Funded by EU, Growth Program, (Project duration: 2001-2005).
10. *Integrated tool for in situ characterization of effectiveness and durability of conservation techniques in historical structures, DIAS*. Funded by EU FP5, Energy Environment & Sustainable Development Programme, (Project duration: 2002-2005). Project COORDINATOR, Total Project EU Funding 1,250,000 €.
11. European Geotechnical Network for Research and Development *GeoTechNet* (EU Network).
12. *A Proposal for drillhole surveying for the production scheduling of limestone quarry at Kamari, Attiki (QUARRYSTAT I)*. Funded by TITAN Cement Co., Greece, 2003.
13. *Design and production scheduling of Kamari limestone quarry for the next 40 years QUARRYSTAT II (Study on Reserves Modelling, Pit Assessment & Long-term scheduling of the Operations) for the Kamari limestone-dolomite deposit under exploitation*. Funded by TITAN Cement Co., Greece, (Project duration: 2005-2006).
14. *Development of an integrated method of simulation of the mechanical behaviour of underground marble quarries in discontinuous rocks*. Funded by Greek Ministry of Education, Programme Pythagoras II (Project Duration: 2005–2007).
15. **TUNCONSTRUCT: Technology Innovation in Underground Construction structures**. Funded by EU FP6 NMP Program. (<http://www.tunconstruct.org/tcstatic/index.htm>), Workpackage COORDINATOR. (Project Duration: 2005–2007).
16. *Limestone ore reserves estimation, geostatistical modeling and production scheduling of Kamari open pit quarry – Phase II QUARRYSTAT III*. Funded by TITAN Cement Co., Greece, (Project duration: 2007).
17. *Study of the final reclamation plan of two neighboring limestone open pit quarries in Markopoulon, Attiki taking into consideration slope stability issues*. Funded by the quarry owners, (Project duration: 2007).

18. *In situ experimental measurements for the study of compatibility of Skyros marble that is used for the restoration of Adrianos Library Propylon in Monastiraki, Athens, Funded by the Greek Ministry of Cultural Heritage, (Project duration: 2007-2008).*
19. *Specific Technical Study for Safe Underground Exploitation of Dolomitic Marble of Volakas-Drama.* Project funded by: DIONYSSOMARBLE Co SA, (Project duration: 2010).

18.2. Current Research Projects

20. 2011-2015: *Designing Safer Urban Spaces (DESURBS)*". Collaborative project, It is funded through the EU FP7 programme as a capability project under the *10.2 Security of infrastructures and utilities* area of research as part of the *SEC-2010.2.3-1 Planning, (re)design, and (re)engineering of urban areas to make them less vulnerable and more resilient to security threats* call. <http://www.desurbs.eu/> .
21. 2012-2015: "*GEOMechanics and Environment of CO₂ geological Storage*". This research has been co-financed by the EU (European Social Fund – ESF) and Greek national funds through the Operational Program "Education and Lifelong Learning" of the National Strategic Reference Framework (NSRF) - Research Funding Program: Thales. Starting 2012.
22. 2013-2015: "ETMA-1: "Specific Technical Study of significantly reducing vibrations from large scale blasting at a surface quarry", Project funded by "Antoniadis Miltiadis e.a." (Project duration: 2013-2015).
23. 2014-2015: ETMA-2: "Specific Technical Study of control blasting at the surface quarry nearby an ancient cave", Project funded by Lithotopos IKE Co., duration 2014-2015.
24. 2014-2015: "Specific Technical Study for in situ monitoring of stresses and displacements in the underground caverns for the exploitation of marble at Volakas-Drama". Project MARMO-2, funded by: Nordia SA, (Project duration: 2014-2015).
25. 2015: *Marble reserves evaluation and short medium term planning of surface quarry and of the underground quarry of the Ariston white marble deposit, ARISTON-1, funded by PAVLIDIS SA Marbles and Granites* (Project duration: 2015).
26. 2015: *Quarry exploration and design of white Thassos marble (Saliara-1), funded by Morchus SA* (Project duration: 2015).
27. 2014-2015: Cooperation 2011 project ISTRIA (11_SYN_9_1389) on "Rock Falls Prevention and Protection" funded by the Operational Program Competitiveness and Entrepreneurship (co-funded by the European Regional Development Fund (ERDF)) and managed by the Greek General Secretariat of Research and Technology.

19. List of previous and present doctoral students

- Kaklis K. *The influence of anisotropy on the tensile strength of rocks*, PhD Thesis, Technical University of Crete, 1999.
- Liolios P. *A new hyperbolic failure model for Geomaterials*, PhD Thesis, Technical University of Crete, 2012.
- Saratsis G.. *Back-analysis of underground NATM tunnel or cavern collapses*, PhD Thesis, Technical University of Crete, 2014.
- Xiroudakis G., *A new performance model for Roadheaders and TBM's*, PhD Thesis, Technical University of Crete, 2015.

20. Teaching Statement

My aim is to provide to young students a strong foundation and a sturdy framework in the area of Sustainable Development in Mining focussing on extraction of mineral raw materials with special emphasis on exploration, sustainability, increased access to mineral resources (like for example mining at large depths and in difficult geoenvironments), and almost zero-environmental impact aspects. A second related area that I would like to further promote is Tunnelling Engineering and transfer of technology to Mining Engineering and vice versa.

I have a strong dedication to the teaching of young and talented students that are seeking to be professionals in the areas of mining engineering, exploration and ore reserves modeling, engineering geology, rock and soil mechanics, surface and underground mining methods, excavation engineering (blasting and performance modeling of excavating machines), TBM and conventional tunneling, extraction methods for energy resources recovery (hydraulic fracturing), advancement of computational methods for stability of geo-structures and the use of Fracture Mechanics and Damage Mechanics for studying and optimizing rock fragmentation with blasting or with mechanical tools or with comminution equipment. The interaction of mining operations with the environment is also a topic that should embrace the teaching referring to the above topics.

21.Citation indices (total number of citations and h index).

Over 500 citations and h-index=12 in the Scopus (July 2015).