

# Dimitris Marinakis

## *Curriculum Vitae*

### Contact

School of Mineral Resources Engineering  
Technical University of Crete  
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### Personal Information

Date of Birth: 18 September 1974  
Marital Status: Married, with 3 children

### Education

*Ph.D. in Reservoir Engineering, 2012*

Technical University of Crete, Greece  
School of Mineral Resources Engineering

*Dissertation:* Experimental and theoretical study of the formation and decomposition conditions for multicomponent natural gas hydrates hosted in subsea sediments of the bathypelagic zone: The case of the subsea mountain Anaximander

*Supervisor:* Prof. Nikos Varotsis

*M.Sc. in Engineering - Economic Systems, 2003*

National Technical University of Athens, Greece  
Department of Electrical Engineering

( in cooperation with the School of Law Economics & Political Sciences, Faculty of Economics, University of Athens, Greece and the Department of Industrial Management, University of Piraeas, Greece)

*Dissertation:* Study of the environmental impact of a vertically integrated process of olives for oil

*Supervisor:* Prof. Fragiskos Batzias

*B.Sc. in Chemical Engineering, 1997*

National Technical University of Athens, Greece  
Department of Chemical Engineering

GPA: 8.54 / 10

*Dissertation:* Formation of monomolecular cooper layer on silica-clay substrates for use as a selective adsorbent in the separation of gas hydrocarbon mixtures

*Supervisor:* Prof. Vassiliki Kaselouri-Rigopoulou

### Languages

English (excellent), Greek (mother tongue), German (fair)

## Professional experience

- 2003-present *Research Scientist and Laboratory Teaching Staff in the School of Mineral Resources Engineering, Technical University of Crete, Greece*
- PVT measurements and modeling for oil, gas and gas hydrates
  - Core Analysis testing (permeability, porosimetry, water saturation)
  - Rheological measurements on oil-water emulsions and drilling/cement slurries
  - Upstream facilities teaching and simulation
  - Flow assurance teaching
  - Fluid mechanics teaching
- 2000-2002 *Fluid Catalytic Cracking Production Engineer, Motor Oil Hellas – Corinth Refinery, Corinth, Greece*
- Fluid catalytic cracking production engineer
  - Surveillance during implementation and initial startup of new gasoline desulfurization and benzene removal units
  - Participation in design and implementation of advance process control system for the FCC units (Honeywell Advanced Process Control)
  - Participation in upgrading refinery's quality system to ISO 9000:2000
- 1997, 1999 *Independent Consultant / Researcher in Hydronomi and HYDRAM Consulting Enterprises, Athens, Greece*
- Pioneer works on rehabilitation of water pipeline network & leakage control.  
Application areas: Peristeri-Glyfada-Vouliagmeni
- Feasibility study for drying the wastewater sludge produced in the Athens wastewater treatment plant on Psyttalia
  - Feasibility study for the rehabilitation of Galatsi – Menidi - Kiourka Water
  - Designing of existing water pipeline network in AutoCAD and conversion to GIS application
  - Network assimilation on the computer and water flow calculation in the pipelines
- 1996-1997 *Research assistant in Department of Civil Engineering, National Technical University of Athens, Greece*
- Research on the characteristics and disposal potentialities of wastewater sludge, produced during the 1st and 2nd construction phase in the Athens Wastewater treatment plant on Psyttalia island
  - Wastewater flow measurement, comparison with the SCADA (computer records). Data correlation and error analysis
  - Installation and operation of PH-meter, conductivity-meter and data logger in the Athens wastewater treatment plant on Psyttalia island

## Research interests

Reservoir fluid phase behavior and PVT experimental & modeling  
Multiphase equilibria modelling (including cubic EoS models)  
Core analysis  
Multicomponent gas hydrates phase behavior (experimental studies & simulation)  
Gas hydrates host formation properties (permeability, porosity, compressibility)  
Water-in-oil and oil-in-water emulsion stability and flow properties for the oil upstream and midstream sectors  
Rheology of bentonite suspensions, oil well cements

## Research highlights

Development of software for performing vapor-liquid equilibrium calculations for teaching purposes - EoS models (rel. publication No 3)  
Development of software for multiphase equilibrium calculations with gas hydrates at saturated and unsaturated conditions (Undergraduate thesis in year 2017)  
Establishment of experimental systems for PVT and EOR equilibria studies (Undergraduate theses in years 2009, 2011, 2015-16)  
Establishment of a unique experimental system for gas hydrate phase equilibria studies (rel. publications No 2, 12, 13, 16)  
Establishment of a core flooding system for studying formation damage by drilling fluids under HPHT conditions and mitigation of formation damage via novel drilling fluid additives (rel. publications No 5, 6, 11)

## Research projects

*Development of novel self-healing oil-well cements for use in oil-gas-geothermal drilling.*  
The aim of the study was to determine the synthesis of the cement slurry with the different additives that delivers optimal rheological and fluid-loss performance. A Greek G-cement was tested in comparison with a commercial cement, for rheological and filtration properties. In order to develop cements with improved elastic and self-healing properties, the effect of an elastomer additive (rubber) was also examined on the rheological and filtration behavior of the cement slurries.

*Scientific Coordinator for the Technical University of Crete: Prof. V. Kelessidis*

*Funded by: TITAN cement S.A., GEOTECH Georesource Technology S.A., ENDITECH S.A.*

*Budget: 67,000 €*

*Duration: Apr.2015 – Jun. 2015*

*Coursebook on Oil and Gas Exploration and Refining.* A text book was written for a training course on processes of oil-gas exploration and refinery – basic theory and technology. The project also included the compilation of an evaluation questionnaire for the trainees.

*Scientific Coordinator for the Technical University of Crete: Prof. N. Varotsis*

*Funded by: Technical Chamber of Greece*

*Budget: 20,000 €*

*Duration: Jan.2014 – Jun. 2014*

*Core Analysis - acidizing study in core plugs and grain size distribution – for a Greek Oil Company.* Core plugs were treated with hydrochloric acid 15% in order to study the changes in permeability. One of the plugs has undergone a second stage of acidization, in order to assess the effect of excess treatment on the properties of the formation. Grain size distribution study was conducted in the core plugs before and after acidization.

*Scientific Coordinator for the Technical University of Crete: Prof. N. Varotsis*

*Funded by: Kavala Oil S.A.*

*Budget: 5,000 €*

*Duration: Nov.2009 – Jan. 2010*

*Experimental study and modeling of gas hydrate formation conditions and migration mechanisms in marine sediments and the associated release of the enclathrated gas in marine environment.* The project tried to indulge into the drive mechanism and host formation characteristics that are responsible for the formation and migration of gas hydrates from dissolved gas in marine sediments, i.e. in absence of any free gas phase. The research involved testing of artificially made gas hydrates in natural marine sediment in laboratory, together with sedimentological analysis and modeling of the gas hydrate formation and migration processes.

*Scientific Coordinator for the Technical University of Crete: Prof. N. Varotsis*

*Funded by: European Social Fund & National Resources EPEAEK II \_ PYTHAGORAS.II*

*Budget: 90,000 €*

*Duration: 2005 – 2007*

*Experimental study for minimization of the reduction of core permeability from drilling fluids in oil-wells with the addition of Greek lignite.* The work aimed to determine the properties of drilling fluids that are responsible for the reduction of core permeability, at high temperatures, and develop proper additives with Greek lignite.

*Scientific Coordinator for the Technical University of Crete: Prof. V. Kelessidis*

*Funded by: European Social Fund & National Resources EPEAEK II \_ PYTHAGORAS.II*

*Budget: 50,000 €*

*Duration: 2005 – 2006*

*Development of a novel process for seawater desalination and condensation of water solutions and waste water effluents by using gas hydrates.*

The project was in collaboration with TEI Kavalas. A gas azeotrope of Xe and HFC-134a was used to formulate gas hydrates at pressure and temperature conditions near the ambient ones. Subsequently the process of gas hydrate formation and dissociation would be used in a fluidized bed reactor for the extraction of pure water from seawater and waste water effluents.

*Scientific Coordinator for the Technical University of Crete: Prof. N. Varotsis*

*Funded by: European Social Fund & National Resources EPEAEK II \_ ARCHIMIDIS II.*

*Budget: 75,000 €*

*Duration: 2005 – 2007*

*Study of the influence of mineralogy and overburden pressure on the phase behavior and formation kinetics of structure II gas hydrates contained in marine sediments.*

The project was in collaboration with the Centre for gas hydrate research, Heriot Watt University, Edinburgh UK.

*Scientific Coordinator for the Technical University of Crete: Prof. N. Varotsis*

*Funded by: EU Research Access to the European infrastructure for energy reserve optimization, EIERO.*

*Duration Oct. 2003 – Dec.2003*

*Exploration and Evaluation of the Eastern Mediterranean Sea Gas hydrates and the Associated Deep Biosphere.*

The project was a collaboration between 8 Universities and Research Institutes, targeted to explore and evaluate the Eastern Mediterranean Sea gas hydrates and the associated deep biosphere. The selected area for conducting the gas hydrate study was the Anaximander sea-mountains in the Eastern Mediterranean (av. water depth 2000m, bottom water temp. 12-14oC). The project involved in vitro study of gas hydrate characteristics, as well as study of retrieved pristine samples from the subsea area containing gas hydrates.

*Scientific Coordinator for the Technical University of Crete: Prof. N. Varotsis*

*Funded by: EU Framework Energy, Environment and Sustainable Development, EC CONTRACT EVK3-CT-2002-00068.*

*Total Budget: 2,642,100€.*

*Duration: 2002 – 2005*

## **Publications**

### **Journal papers**

1. **Marinakis D.**, Varotsis N., Perissoratis C., “Gas hydrate dissociation affecting the permeability and consolidation behaviour of deep sea host sediment”, *Journal of Natural Gas Science and Engineering*, vol. 23, p.p. 55-62, 2015. (5-Year Impact Factor: 2.111, SJR: 0.890 / Q1)
2. **Marinakis, D.**, Varotsis, N., “Solubility measurements of methane + ethane + propane mixtures in aqueous phase with gas hydrates at vapor unsaturated conditions”, *The Journal of Chemical Thermodynamics*, vol. 65, p.p. 100-105, 2013. (5-Year Impact Factor: 2.190, SJR: 1.095 / Q1)
3. Gaganis V., **Marinakis, D.**, Varotsis N., “A general framework of model functions for rapid and robust solution of Rachford-Rice type of equations”, *Fluid phase equilibria*, vol. 322-323, pp. 9-18, 2012. (5-Year Impact Factor: 1.987, SJR: 0.890 / Q1)

### **Peer-reviewed papers in conference proceedings**

4. Lytra S., Christidis G.E., **Marinakis D.**, “Rheological properties of bentonite suspensions after dynamic aging at high temperatures”, to be presented in the 16<sup>th</sup> International Clay Conference, Granada, Spain, July 2017.
5. Biotaki A., **Marinakis D.**, Kompitsaki M., Mavrigiannakis St., Kelessidis V., “The Effect of Mud Contamination on the Properties of a G-Type Cement Slurry”, to be presented in the Annual European Rheology Conference, Copenhagen, Denmark, April 2017
6. Biotaki A., **Marinakis D.**, Zografou M., Kompitsaki M., Kelessidis V., “Rheological and filtration properties of newly developed class G-type cement slurries; Investigations for field use and comparison with performance of cement slurries using standard oil-well G-type cements”, 11<sup>th</sup> HSTAM International Congress on Mechanics, Athens, Greece, May 2016.
7. **Marinakis D.**, Varotsis N., Perissoratis C., “Key sediment properties affected by the presence of gas hydrates in the ‘Anaximander’ deep sea mud volcanoes.”, 9<sup>th</sup> International Conference on Gas in Marine Sediments, Bremen, Germany, Sep. 15-19, 2008.

8. Varotsis N., **Marinakis D.**, Karantzi K., Manoutsoglu E., E.Christidis G., Perdicatsis V., Kotsakis G., Perissoratis C., Ioakim Ch. "Sedimentary and sediment stability studies on the Mud Volcanoes (MVs) of the 'Anaximander' Mountains, Eastern Mediterranean." 3<sup>rd</sup> Annual meeting of Hotspot Ecosystem Research on the Margins of European Seas (HERMES), Carvoeiro, Portugal, March 2008.
9. **Marinakis D.**, Varotsis N., "Dissociation of multi-component gas hydrates in clays and their impact on the mechanical properties of the host sediment", Conference Abstract p.69, 3<sup>rd</sup> International Conference on Submarine Mass Movements and their consequences, Santorini, Greece, October 2007.
10. **Marinakis D.**, Varotsis N., Lazaridis M., "Effect of gas hydrate stability on climatic change. The case of 'Anaximander' mud volcanoes", Conference Abstract p.122, 10<sup>th</sup> International Conference on environmental science and technology, Kos Island, Greece, September 2007.
11. Kelesidis V., **Marinakis D.**, Tsamantaki C., "Laboratory assessment of drilling fluid formation damage in sandstone cores and mitigation with lignite additives for high temperature fields", paper SPE-107762-MS, SPE European Formation Damage Conference, Scheveningen, The Netherlands, May 2007.
12. **Marinakis D.**, Varotsis N., "Natural gas hydrates in deep sea sediments: The effect of the host formation on pore pressure and on hydrate characteristics." Geophysical Research Abstracts, Vol. 9, 10268, 2007.
13. **Marinakis D.**, Varotsis N., "Hydrates formed from dissolved natural gas in deep marine sediments", 5<sup>th</sup> International Workshop on Methane Hydrate Research & Development, Edinburgh, UK, October 2006.
14. **Marinakis D.**, Varotsis N., Kostakis G., Christidis G, et.al. "Gas hydrate research overview in Greece", 5<sup>th</sup> International Workshop on Methane Hydrate Research & Development, Edinburgh, UK, October 2006.
15. **Marinakis D.**, Varotsis N., Kostakis G., Christidis G, "How much gas hydrates can sediment host? Characteristics affecting sediment's store capacity", 2<sup>nd</sup> International Conference in Mineral Resources Management and Environmental Geotechnology, Chania, Greece, September 2006.
16. **Marinakis D.**, Varotsis N., Pasadakis N., Yang J., Tohidi B., Perissoratis C., "Thermodynamic study of undersaturated Hydrates formed from a Gas Mixture in Marine Sediments", VIII International Conference on Gas in Marine Sediments, Vigo, Spain, September 2005.
17. Yang J., Llamedo M., **Marinakis D.**, Tohidi B., Varotsis N. "Successful Applications of a versatile ultrasonic system for gas hydrates in unconsolidated sediments", Proceedings vol. 1 *Kinetics and Transport Phenomena*, 5<sup>th</sup> International Conference on Gas Hydrates, Trondheim, Norway, June 13-16, 2005. (ISBN 82-519-2065-5)
18. **Marinakis D.**, Varotsis N., Jinhai Y., Tohidi B. "The effect on the stability of the deep sea sediment caused by the dissociation of the contained gas hydrate: The case of the 'Anaximander' mud volcano sea bed", 32<sup>nd</sup> International Geological Congress, Florence, Italy, August 2004.
19. **Marinakis D.**, Varotsis N., Yang J., Tohidi B., Perissoratis C. "Gas Hydrates in the Eastern Mediterranean seabed: Energy potential and technological challenge", Advances in Mineral Resources Management and Environmental Geotechnology Conference, Chania, Greece, June 2004.
20. Perissoratis C., Ioakim Chr., Zacharaki P., Lykousis V., Sakellariou D., Kormas K., Woodside J., Amann H., Maggiuli M., Daehlmann A., De Lange G., Casas D., Ercilla G., Meyn V., Varotsis N., **Marinakis D.** "Exploration and Evaluation of the Eastern

Mediterranean Gas hydrates and the Associated Deep Biosphere”, EUROCEAN 2004, Galway, Ireland, May 2004.

21. Yang J., **Marinakis D.**, Tohidi B., Varotsis N. “Sediment geomechanical response to hydrate dissociation by depressurization: An experimental study”, Geophysical Research Abstracts, vol. 6, 07022, 2004.
22. Batzias F. A., Sidiras D. K., **Marinakis D.** “A GIS - Based Mapping of Pollution Caused by an Olive Pomace Oil Mill Operating in a NATURA 2000 Protected Area”, 2<sup>nd</sup> International Conference on Ecological Protection of the Planet Earth, Sofia, Bulgaria, June 2003.

## Teaching experience

### Undergraduate courses, School of Mineral Resources Engineering, Technical University of Crete

- 2016-2017 *Fluid mechanics, 6<sup>th</sup> semester. (Co-Teaching with Prof. D. Vamvouka)*
- Machinery (pumps, turbines)
  - Basic examples / problems wrt flow equations, equipment dimensioning, pressure-flow calculations

### Laboratory teaching and exercises in undergraduate courses, School of Mineral Resources Engineering, Technical University of Crete

- 2013-present *Fluid Mechanics, 6<sup>th</sup> semester.*
- Fluid rheology
  - Pressure drop of water in an annulus flow system
  - Settling velocities of solids in Newtonian fluids
- 2004-present *Reservoir fluids phase behavior, 7<sup>th</sup> semester.*
- Constant mass
  - Two-phase flash
- 2004-present *Reservoir Engineering, 8<sup>th</sup> semester.*
- Helium porosimeter
  - Mercury porosimetry
  - Permeability, Klinkenberg correction.
  - Connate water saturation

### Laboratory supervisor in undergraduate theses, School of Mineral Resources Engineering, Technical University of Crete

- 2017 *Effect of salinity on the solubility of hydrate forming hydrocarbon gases in the aqueous phase, Mr. Ermis Proestakis, supervisor Prof. N. Varotsis*
- 2016 *Experimental determination of the volume changes induced to hydrocarbon mixtures due to CO<sub>2</sub> solution at high pressures and temperatures, Mr. Panagiotis Aslanidis, supervisor Prof. N. Varotsis*
- 2015 *Experimental determination of vapor-liquid density and isothermal compressibility for hydrocarbon mixtures at two-phase equilibrium conditions, Mrs. Melina Michailidi, supervisor Prof. N. Varotsis*

- 2011 *Experimental study of the compressibility factor (z) for liquid hydrocarbon mixtures with methane*, Mrs. Stavroula Zervopoulou, supervisor Prof. N. Varotsis
- 2009 *Experimental study of the compressibility factor (z) for rich CO<sub>2</sub> and N<sub>2</sub> hydrocarbon gas mixtures*, Mr. Rami Mahmoud, supervisor Prof. N. Varotsis

**Laboratory assistant in undergraduate theses, School of Mineral Resources Engineering, Technical University of Crete**

- 2017 *Development of experimental methodologies for the formation and characterization of petroleum emulsions*, Mrs. Theodora Dalakou, supervisor Prof. N. Pasadakis
- 2016 *Rheological properties of bentonite drilling slurries subjected to thermal aging at high temperatures*, Mrs. Sofia Lytra, supervisor Prof. G. Christidis

**MSc courses in Petroleum Engineering, School of Mineral Resources Engineering, Technical University of Crete**

- 2016-present *PVT simulation examples in CMG's WinProp software, 2<sup>nd</sup> semester.* (Instructor Prof. N. Varotsis)
- 2015-present *Production Engineering, 2<sup>nd</sup> semester.* (Co-Teaching with Dr. V. Gaganis)
- Upstream facilities for oil and gas production
  - Flow assurance

**Scientific supervisor in MSc theses in Petroleum Engineering, School of Mineral Resources Engineering, Technical University of Crete, Greece**

- 2017 *Heavy and Extra Heavy Oil: Midstream processes and transportation*, Mrs. Christina Argyropoulou
- 2017 *Pressure maintenance in oil production pipelines: Equipment and simulation*, Mrs. Dimitra Dalamanga
- 2017 *Oil-in-Water emulsions: Techniques and processes for maximizing the oil recovery in high water cut oil wells*, Mr. Vassilis Papakostas
- 2017 *Water-in-Oil emulsion treatment of Crude Oil effluent: Techniques, additives and simulation*, Mrs. Despoina Savvidou
- 2016 *Basic Design of Oil Process Train in Upstream Facilities*, Mr. Andreas Klothakis

**Laboratory supervisor in MSc theses**

- 2017 *Treatment of water produced from the oil wells: Processes and simulation*, Mrs. Danai-Evgenia Vallianou-Setta, supervisor Prof. N. Varotsis, M.Sc.



in Geotechnology and the Environment, School of Mineral Resources Engineering, Technical University of Crete, Greece (pending)

- 2016 *Solubility of gas hydrate forming hydrocarbon gases in aqueous mixtures at subsea marine sediments conditions*, Mrs. Georgia G. Bekiari, supervisor Prof. N. Varotsis, M.Sc. in Petroleum Engineering Technology, Department of Petroleum & Natural Gas Technology, School of Engineering Technology, Eastern Macedonia and Thrace Institute of Technology, Greece
- 2013 *Development of an experimental setup for measuring the compressibility factor ( $z$ ) of petroleum fluids at high pressures and temperatures. Comparison of test results with EoS simulations*, Mr. Rami Mahmoud, supervisor Prof. N. Varotsis, M.Sc. in Geotechnology and the Environment, School of Mineral Resources Engineering, Technical University of Crete, Greece

## **Service**

### **External reviewer for Journals**

Journal of Natural Gas Science & Engineering

Energy and Fuels

## **Miscellaneous**

- 1993-1998 Member of IAESTE (International Association for the Exchange of Students for Technical Experience), National Technical University of Athens, Greece
- 2004-2012 Representative of the Graduate students at the School of Mineral Resources Engineering, Technical University of Crete, Greece
- 2014-2016 Secretary of the Laboratory Teaching Staff Union at the Technical University of Crete, Greece
- 2016-present Chairman of the Laboratory Teaching Staff Union at the Technical University of Crete, Greece