

CURRICULUM VITAE

Marios S. Valavanides, PhD

Athens
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Personal / Contact

Name : **Marios S. Valavanides**
Position : Professor (Hydraulics and Flow in Porous Media)
Organization : University of West Attica
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Studies

Academic

- 1998 **PhD** (in Fluid Mechanics), University of Patras, Department of Chemical Engineering, Laboratory of Physicochemical Hydrodynamics & Transport Phenomena. PhD Thesis title: “*Macroscopic Theory of Two-phase Flow in Porous Media based on Integration of Pore Scale Phenomena*”. Supervisor: Prof. A.C. Payatakes. <http://thesis.ekt.gr/11044>
- 1989-1991 **Postgraduate Specialization** (in Composite Materials), University of Patras, Dept. of Mechanical & Aerospace Engineers, Laboratory of Applied Mechanics. Subject “*Damage Tolerance in Advanced Thermoplastic Composite Aerospace Constructions*”.
- 1989 **Diploma in Mechanical Engineering**, University of Patras.

Languages

English (proficient), French (fluent), Greek (native language).

Awards / Grants

- 1991-1996 Scholarship for post graduate studies granted by the Foundation of Research and Technology Hellas / Institute of Chemical Engineering & High Temperature Processes (ICE-HT/FORTH)
- 2021-2022 Society of Petrophysicists and Well Log Analysts (SPWLA) Foundation, Grant, \$3000.00
- 2021-2022 German Academic Exchange Service (DAAD - 5752335 Research Stays for University Academics and Scientists, 2021), for a 3-month research stay at the Institute of Applied Mechanics (MIB) / Univ. of Stuttgart

Professional Background

Work history

Full time positions:


- 3/2020-to date **Professor.** University of West Attica; Faculty of Engineering; Dept. of Civil Engineering.
- 3/2018-3/2020 **Associate Professor.** University of West Attica; Faculty of Engineering; Dept. of Civil Engineering.
- 2/2015-3/2018 **Associate Professor.** TEI Athens; School of Technology Applications; Dept. of Civil, Survey & GIS Engineering.
- 6/2006-2015 **Assistant Professor.** TEI Athens; School of Technology Applications; Civil Infrastructure Engineering Department.
- 2002-2006 **Project Manager.** FORTH PHOTONICS LTD & SA, a FORTH spin-off company developing innovative diagnostic imaging technologies. Business planning and development projects, market assessment of core technology applications, competitive intelligence. Implementation, overall responsibility, coordination and follow-up of R&D related grants (total budget ~3,12 M€).
- 1999-2002 **Technology Transfer Consultant.** IRC HELP-FORWARD, Foundation of Research & Technology Hellas (FORTH) and Federation of Greek Industries (FGI). Information, mediation and advisory services in technology transfer and commercialization of research results. Achievement: prepared and mediated the spinning-off of FORTH PHOTONICS (venture capital investment of 2,5 M€).
- 1997-1998 **Research Assistant,** Institute of Chemical Eng. - High Temperature Processes ([ICE-HT](#)/FORTH).
- 1991-1997 **Post graduate student,** Institute of Chemical Eng. - High Temperature Processes ([ICE-HT](#)/FORTH). Participation in Research Projects

Part-time (on contract) positions:

- 2021- to date **Adjunct Professor** (on contract), Hellenic Army Corps of Engineers. Duties: course on *Fluid Mechanics and Applied Hydraulics*.
- 2003-2006 **Adjunct Tutor** (on contract); Dept. of Shipbuilding, Dept. of Energy Technology; TEI Athens.
- 2005- 2020 **Adjunct Tutor** (on contract), Hellenic Open University. Duties: teaching courses for post graduate studies on *Technical Project Management*.
- 2003-2006 **Adjunct Tutor** (on contract); Dept. of Shipbuilding, Dept. of Energy Technology; TEI Athens.
- 1998 **Scientific Collaborator and Lecturer** (on contract); Dept. of Mechanical Eng.; TEI Patras.

Professional / Scientific Affiliations

- Hellenic National InterPore Chapter – Founding Member (2019)
- CCS – Complex System Society (since 2018)

- SPWLA – Society of Petrophysicists & Well Log Analysts (since 2018)
 - SCA - Society of Core Analysts (since 2014)
 - InterPore – International Society for Porous Media (since 2012)
 - PM Greece - Network of Project Managers in Greece (since 2012)
 - SPE - Society of Petroleum Engineers (since 2004)
 - Hellenic Society of Rheology (1998)
 - Hellenic Technical Chamber (since 1989)
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R & D Activities

Management of RTD Projects

1. ARCHIMEDES III (grant contract NSRF-EDULL) 2012-2015
Contractor: TEI Athens MIS 379389 *Budget: 100,0k€*,
ImproDeProF: “Two-Phase Flow in Porous Media: Improvement of the Mechanistic Model DeProF and Implementation in Practical Applications.”
Scientific Manager M.S. Valavanides <http://users.uniwa.gr/marval/ImproDeProF.html>
2. HERON (grant contract GSRT - HP-2) 2003-2006
“Industrial research project for the development and certification of innovative diagnostic spectral imaging devices”
Contractor: FORTH Photonics Hellas AE. *Budget: 442,3 k €*,
Industrial research for the development of innovative diagnostic devices based on *FORTH Photonics* proprietary Spectral Imaging Technologies (Multi- & Hyper-spectral Imaging and Dynamic Spectral Imaging).
3. PRAXE B (grant contract no GSRT - 03 PRAXE 11) 2003-2005
“Commercialization of research results activities leading to the design, development, production and commercial exploitation of diagnostic imaging technologies, devices and systems”,
Contractor: FORTH Photonics Hellas SA *Budget: 2.094,4 k €*
Implementation of FP’s start-up and business development plan
4. SMART R&D Project (grant contract DTI/SMART -LOT/031/428) 2004-2005
“Optical Biopsy Colposcope”
Prime Contractor: FORTH Photonics LTD *Budget: € 137,9 k€*
Subcontractors: Imperial College of Science, Technology & Medicine & FORTH Photonics Hellas SA
Feasibility study to assess the performance of FP’s proprietary dynamic spectral imaging technology in detecting and identifying non-invasively cervical abnormalities including cervical neoplasias and cancer. In collaboration with the Imperial College of Science & Technology and the University of Athens.

Commercialization of RTD results

- *FORTH Photonics*. Performed feasibility studies on the development of new system applications of proprietary spectral imaging technologies into various fields (2002-2003)
- The *FORTH Instruments* spin-off. Performed a feasibility study on the creation of *FORTH Instruments*, a new technology based firm, as a *FORTH* spin-off. Valuated the applications of proprietary spectral imaging technology to biomedical diagnostics and non-destructive testing & analysis of heterogeneous surfaces. Performed market research and provided competitive intelligence; designed, processed and implemented the start-up business plan (at start-up); located venture capital funding, mediated in negotiations, etc. Assignor *FORTH*, assignee *IRC Help-Forward/FORTH (11/2000-12/2001)*

- *QNC UNIFORM – Quasi Natural Consolidation of unconsolidated or poorly consolidated oil Formations*. Performed feasibility study aiming at attracting strategic partners for the purpose of setting a joint venture with the QNC-technology developers in order to proceed with its industrial exploitation. Assignor: ICE-HT/FORTH/ICE-HT&NTNU (Norwegian Institute of Science & Technology), assignee IRC Help-Forward/FORTH (11/2000-12/2001)
- Performed market research studies (office based) to evaluate the potential of various new technologies, and dissemination thereof into potential technology adopters. IRC HELP-FORWARD (FORTH / FGI)

Participation in R&D projects (National & EU)

- *1999 –present* Post-doc research assistant, ICE-HT/FORTH. Modelling of two-phase flows in porous media. Applications in EOR and soil remediation.
- *1998* ICE-HT/FORTH R&D project, SAGA/S-1 entitled: ‘Experimental study of the consolidation of silicate sand through precipitation of inorganic salt’
- *1998* ICE-HT/FORTH R&D project, EOK/ IN-9 (ENV4970457), entitled: ‘Pore-to-core scale-up studies of the transport properties of organic pollutants with natural attenuation’.
- *1997-1998* ICE-HT/FORTH R&D project, EIET/ S-1 (EKBAN/1.2/248) entitled: ‘New instrumentation for the early diagnosis and other biomedical applications’.
- *1995-1996* ICE-HT/FORTH R&D project, EOK/PE-6 entitled: ‘Anovel approach for the modeling of three phase flow in porous media with application to enhanced oil recovery’
- *1993 & 1994-1995* ICE-HT/FORTH R&D project, ΠABEPE-1 entitled: ‘New stable emulsion edibles based on Greek olive oil’
- *1991-1993* ICE-HT/FORTH R&D project, EOK/KA-18 entitled: ‘Improvement procedures for separating crystals from the melt’
- *1991* ICE-HT/FORTH R&D project, EOK/PE-4 entitled: ‘Development of a general computer aided technique for the characterization of the microscopic structure of porous media’ (μεταπτυχιακή υποτροφία)
- *1989-1991* University of Patras, contract PENED87-ED253 General Secretariat of Research & Technology entitled: ‘Thermoelastic Wave Propagation in Compsite Materials with complicate micromechanical structure and determination of their dynamic thermomechanical properties’.

Academic background

Areas of scientific interest

Continuum Mechanics, Fluid Mechanics, Thermodynamics, Statistical Mechanics, Process Optimization, Applied Mathematics, Composite Materials, Wave Propagation & Scattering, Homogenization Techniques.

Focus: Modeling, Characterization and Optimization of multi-phase flows in porous media, development of mechanistic model and tentative theory for steady-state two-phase flows in porous media (*DeProF* theory).

Recent research: recovery of the universal operational efficiency map of two-phase flow in porous media; identification and definition of critical flow conditions; development of a normative methodology for the characterization (capillary/viscous) of processes and systems; implementation of true-to-mechanism and multi-physics modeling routines in FEM simulators, process optimization with focus on energy efficiency.

Translation to other fields: modeling similarities across stationary off-equilibrium processes comprising canonical ensembles of physically admissible interstitial states (e.g. project portfolios, organizational structures etc).

Teaching & training activities

- 10/2010-to date Supervisor and Manager, TEI Athens, Dept of Civil Eng., stage/vocational education program and “Vocational Education of TEI-Athens Students” project (MIS299967)
- 2006 – to date Assistant Professor, TEI Athens, Dept of Civil Eng., undergraduate courses: “Hydraulics I & II”, “Land Reclamation & Irrigation”, “Management of Construction Equipment & Sites”
- 2005- to date Adjunct Instructor, Hellenic Open University, post-graduate Course “Technical Projects Management”.
- 2003- 2004 Adjunct Professor, TEI Athens undergraduate courses: “Transfer of Technology and Know-How”, Dept. of Naval Architecture, “Fluid Mechanics” Dept. of Energy Technology
- 1998 Adjunct Professor, TEI Patras, Dept. of Mechanical Eng., undergraduate course: “Building Installations”.
- 1991-1995 Appointed Teaching Assistant, University of Patras, Depts. of Mechanical, of Electrical and of Chemical Eng. tutorial courses “Statics”, “Dynamics”, “Vibrations”, “Applied Mathematics”, “Vector Analysis and Introduction to Differential Equations”, “Fluid Mechanics”, “Transport Phenomena”.

Supervision of Theses

- 2006 – to date Adjunct Supervisor, Hellenic Open University, 39 post-graduate theses on “Technical Projects Management”.
- 2003- 2004 Assistant Professor, TEI Athens, Dept of Civil Eng., 14 undergraduate theses, subjects: Hydraulics, Irrigation Systems, Two-phase Flows in Porous Media, Construction Equipment etc.

Academic evaluation committees

Member in 13 Elective and 5 Recommendation Committees; evaluation of candidacies for academic positions (Lecturer, Assistant Professor) in Technological Educational Institutes.

Opponent reviewer in PhD thesis support by Isha Shavani, NTNU, Norway, Nov. 18, 2016

Reviewer

- *Journal of Hydrology*, Elsevier (2020)
- *Journal of Hazardous, Toxic, and Radioactive Waste*, ASCE (2020)
- *Water*, MDPI (2020)
- *Processes*, MDPI (2018)
- *Applied Sciences*, MDPI (2018)
- *Computation*, MDPI (2018)
- *Energies*, MDPI (2018)
- *Sustainability*, MDPI (2018)
- *TiPM*, Transport in Porous Media (2017)
- *IJOGCT*, Intl. Journal of Oil, Gas and Coal Technology (2015)
- SPE Reservoir Evaluation & Engineering Journal, [Technical Editor](#) (2009)
- Federation of Greek Industries (FGI), appointed Referee at national committees, evaluations of grants applications for industrial RTD projects (2001-2002).
- IPMA, International Project Management Association, Assessor for IPMA Project Excellence Award Applications (2012)

Publication record (see attached list)

- 1 working paper ([group W](#))
 - 16 publications in international scientific journals ([group A](#))
 - 4 publications in books ([group B](#))
 - 2 organizations of mini-symposia ([group C](#))
 - 22 publications in international conference proceedings ([group D](#))
 - 20 presentations in scientific conferences ([group E](#))
- Other:
- 3 presentations on Conventions/Workshops/Forums ([group F](#))
 - 3 Technical Reports and Comments ([group G](#))
 - 3 Lectures / Notes ([H](#))

Publications

(corresponding author)

W. Working papers

- W.1 Valavanides, M.S., Kamvyssas, G., Zarikos, I. 2019 “Effective, absolute permeability of periodically layered sandstones based on homogenization theory”, *Journal of Applied Geophysics*, http://users.uniwa.gr/marval/publ/Valavanides_etal_JAppGeoph_2020.pdf

A. International Scientific Journals

- A.1 Karadimitriou, N., Valavanides, M.S., Mouravas, K., Steeb, H. 2023 “Flow Dependent Relative Permeability Scaling for Steady-State, Two-Phase Flow in Porous Media: Laboratory Validation on a Microfluidic Network” *Petrophysics* **64**(5), 656:679, <https://doi.org/10.30632/PJV64N5-2023a4>, http://users.uniwa.gr/marval/publ/Karadimitriou_etal_Petrophysics2023.pdf
- A.2 Valavanides, M.S. 2022 “Flowrate Dependency of Steady-State Two-Phase Flows in Pore Networks: Universal, Relative Permeability Scaling Function and System Characteristic Invariants” *Transport In Porous Media*, on-line publ. <https://doi.org/10.1007/s11242-023-02012-5>
- A.3 Valavanides, M.S. 2018 “Review of steady-state two-phase flow in porous media: independent variables, universal energy efficiency map, critical flow conditions, effective characterization of flow and pore network” *Transport in Porous Media* **123**(1), pp. 42-99, <https://doi.org/10.1007/S11242-018-1026-1>
- A.4 Valavanides, M.S. 2018 “Oil Fragmentation, Interfacial Surface Transport and Flow Structure Maps for Two-Phase Flow in Model Pore Networks. Predictions Based on Extensive, *DeProF* Model Simulations” *Oil & Gas Science and Technology – Rev IFP Energies nouvelles* **73**(6), pp. 1-36, <https://doi.org/10.2516/ogst/2017033>
- A.5 Kamvyssas, G., Valavanides, M.S. 2017 “Analytical solution of the saturated flow problem in 7-spot, 2D geometries” *Fresenius Environmental Bulletin* **26**(9), pp. 5523-5528, http://users.uniwa.gr/marval/publ/Kamvyssas_Valavanides_FEB_26_2017.pdf
- A.6 Valavanides, M.S., Daras, T. 2016 “Definition and Counting of Configurational Microstates in Steady-State Two-Phase Flows in Pore Networks” *Entropy* **18** (054), pp. 1-28, <http://dx.doi.org/10.3390/e18020054>
- A.7 Valavanides, M.S., Totaj, E., Tsokopoulos, M. 2016 “Energy Efficiency Characteristics in Steady-State Relative Permeability Diagrams of Two-Phase Flows in Porous Media” *Journal of Petroleum Science and Engineering* **147**, pp. 181-201, <http://dx.doi.org/10.1016/j.petrol.2016.04.039>
- A.8 Tsakiroglou, C.D., Aggelopoulos, C.A., Terzi, K., Avraam, D.G., Valavanides, M.S. 2015 "Steady-state two-phase relative permeability functions of porous media: A revisit" *International Journal of Multiphase Flow* **73** pp. 34-42, <http://dx.doi.org/10.1016/j.ijmultiphaseflow.2015.03.001>
- A.9 Valavanides, M.S., Skouras, E.D. 2014 “Rational well spacing for soil remediation processes” *Fresenius Environmental Bulletin* **23** (11a), pp. 2847-2851, http://users.uniwa.gr/marval/publ/Valavanides_Skouras_FEB_23_11_2014.pdf

- A.10 Valavanides, M.S. 2014 “Portfolios as off-equilibrium processes: similarities and affinities” *Procedia – Social and Behavioral Sciences* **119** pp. 539-548, <http://dx.doi.org/10.1016/j.sbspro.2014.03.060>
- A.11 Valavanides, M.S. 2012 “Steady-State Two-Phase Flow in Porous Media: Review of Progress in the Development of the *DeProF* Theory Bridging Pore- to Statistical Thermodynamics- Scales” *Oil & Gas Science and Technology* **67**(5), pp.787-804, <http://dx.doi.org/10.2516/ogst/2012056>
- A.12 Valavanides, M.S., Payatakes, A.C. 2001 “True-to-Mechanism Model of Steady-State Two-Phase Flow in Porous Media, using Decomposition into Prototype Flows” *Advances in Water Resources* **24** (3-4), pp. 385-407, [http://dx.doi.org/10.1016/S0309-1708\(00\)00063-4](http://dx.doi.org/10.1016/S0309-1708(00)00063-4)
- A.13 Valavanides, M.S., Constantinides, G.N., Payatakes, A.C. 1998 “Mechanistic Model of Steady-State Two-Phase Flow in Porous Media Based on Ganglion Dynamics” *Transport in Porous Media* **30**, pp.267-299, <http://dx.doi.org/10.1023/A:1006558121674>
- A.14 Kyriaki, K., Polyzos, D., Valavanides, M. 1997 “Low-frequency scattering of coated spherical obstacles” *Journal of Engineering Mathematics* **31**, pp. 379-395, <http://dx.doi.org/10.1023/A:1004242312322>
- A.15 Paipetis, S.A., Polyzos, D., Valavanidis, M. 1993 “Constitutive relations of periodic laminated composites with anisotropic dissipation” *Archive of Applied Mechanics*, **64**, pp 32-43, <http://dx.doi.org/10.1007/BF00792342>
- A.16 Polyzos, D., Valavanidis, M., Paipetis, S.A. 1991 “Dynamic Properties of Ellipsoidal Particle Composites” *Science and Engineering of Composite Materials* **2**(1), pp. 11-27, <https://doi.org/10.1515/SECM.1991.2.1.11>,

B. Articles in Books

- B.1 Valavanides, M.S., Payatakes, A.C. 2002 "Comparison of Two-Phase Flow in 2-D and 3-D Pore Networks Using a True-to-Mechanism Theoretical Model (DeProF)" in S.M. Hassanizadeh *et al.* (Editors), “Computational Methods in Water Resources (CMWR XIV)”, ISBN: 0-444-50975-5 Elsevier
- B.2 Valavanides, M.S., Payatakes, A.C. 2000 “A true-to-mechanism model of steady-state two-phase flow in porous media, including the contribution of the motion of ganglia and droplets”, in L.R. Bentley et al (Editors): “Computational Methods in Water Resources XIII”, Vol. 1. pp. 239-243, ISBN 9058091236, A.A Balkema, The Netherlands, http://users.uniwa.gr/marval/publ/Valavanides_Payatakes_CMWRXIII_2000.pdf
- B.3 Payatakes, A.C., Valavanides, M.S. 1998 "True-to-mechanism macroscopic theory of steady-state two-phase flow in porous media", in V.N. Burganos et al (Editors): "Computational Methods in Water Resources XII", Vol. 2, pp. 3-10, ISBN 1-85312-653-5
- B.4 Payatakes A.C., Constantinides, G.N., Valavanides, M.S. 1998 “Hierarchical Theoretical Models: An Informal Introduction”, in G. Dassios *et al* (Editors): “Mathematical Methods in Scattering Theory and Biomedical Technology”, ISBN 0582368049, Addison Wesley Longman Ltd, *Pitman Research Notes in Mathematics Series*, No 390, pp. 158-169, http://users.uniwa.gr/marval/publ/Payatakes_et_al_PitmanRNMS_390_1998.pdf

C. Organization of Symposia

Valavanides, M.S., Hansen, A., Burganos, V. N. "Simulation (lab, virtual) as a source of new knowledge" Minisymposium MS 1.12 in *8th International Conference on Porous Media*, Cincinnati, Ohio, USA, May 9-12, 2016 <https://www.interpore.org/65-event-booking/8th-international-conference-on-porous-media-annual-meeting/375-minisymposia14-2>

Valavanides, M.S., Ioannidis, M.A., Tsakiroglou, C.D., Vizika, O. "Unconventional Modeling of Multi-Phase Flows in Porous Media" Minisymposium MS 1.03 in *7th International Conference on Porous Media*, Padova, Italy, May 18-21, https://www.interpore.org/images/conferences/15Padova/minisymp_abstracts/MS_1_3.pdf

D. Conference Proceedings

International Conferences:

- D.1. Valavanides, M.S., M.S., Karadimitriou, N., Steeb, H. 2022 "Interstitial Flow Instabilities During Steady-State Two-Phase Flow in Microfluidic Pore Network Models", 13th Panhellenic Scientific Conference in Chemical Engineering PSCCE, Art. P-478, University of Patras, June, 2-4, http://users.uniwa.gr/marval/publ/Valavanides_etal_2022_PSCCE13_P478.pdf
- D.2. Valavanides, M.S., Karadimitriou, N., Steeb H. 2022 "Flow Dependent Relative Permeability Scaling for Steady-State, Two-Phase Flow in Porous Media: Laboratory Validation on a Microfluidic Network", *SPWLA 63rd Annual Logging Symposium*, 0054, Stavanger, Norway, Jun 11-15, DOI: 10.30632/SPWLA-2022-0054, http://users.uniwa.gr/marval/publ/Valavanides_etal_2022_SPWLA63_0054c.pdf
- D.3. Valavanides, M.S., Mascle, M., Youssef, S., Vizika, O. 2020 "Steady-State Two-Phase Flow in Porous Media: Laboratory Validation of Flow Dependent Relative Permeability Scaling", *The International Symposium of the Society of Core Analysts SCA2019, E3S Web of Conferences* **146**, 03002, <https://doi.org/10.1051/e3sconf/202014603002>
- D.4. Valavanides, M.S. 2018 "True to mechanism, flow dependent relative permeability scaling for steady-state 2-phase flows in porous media", paper SCA2019-066, *Society of Core Analysts Symposium - SCA2018*, Trondheim, Norway, Aug. 27-30, http://users.uniwa.gr/marval/publ/Valavanides_SCA2018_066.pdf
- D.5. Valavanides, M.S. 2018 "The taxonomy of steady-state two-phase flows in porous media", paper SCA2019-123, *Society of Core Analysts Symposium - SCA2018, Trondheim, Norway, Aug. 27-30*, http://users.uniwa.gr/marval/publ/Valavanides_SCA2018_123.pdf
- D.6. Valavanides, M.S. 2016 "Oil fragmentation, interfacial surface transport and flow structure maps for two-phase flow in porous media" paper 34 *Dynamics of Evolving Fluid Interfaces 2016*, Lyon, France, Oct. 12-13, http://users.uniwa.gr/marval/publ/Valavanides_DEFI_2016_abstr.pdf
- D.7. Valavanides, M.S. 2015 "ImProDeProF Project: Recent Advances and New Challenges in the development of the DeProF tentative theory for steady-state two-phase flow in porous media" SCinTE 2015, Athens, Nov. 5-7, http://users.uniwa.gr/marval/publ/Valavanides_SCinTE_2015.pdf
- D.8. Skouras, E.D., Kalarakis, A.N., Valavanides, M.S., Burganos, V.N. 2015 "Two-Phase Flow Calculations in Pore Unit-Cells Implementing Mixed FEM/Lattice-Boltzmann Simulators" COMSOL 2015 Conference, Grenoble, Oct. 14-16, http://users.uniwa.gr/marval/publ/Skouras_etal_FEM_LB_COMSOL2015.pdf

- D.9. Valavanides, M.S., Skouras, E.D., Kalarakis, A.N., Burganos, V.N. 2015 "Integration of Flow Dependent Relative Permeability Maps for Two-Phase Flow in Porous Media into the COMSOL Multiphysics™ Earth Science Module" COMSOL 2015 Conference, Grenoble, Oct. 14-16, http://users.uniwa.gr/marval/publ/Valavanides_etal_COMSOL2015.pdf
- D.10. Valavanides, M.S., Totaj, E., Tsokopoulos, M. 2015 "Retrospective examination of relative permeability data on steady-state two-phase flow in porous media" *INASE 2015 conferences - Mechanics, Materials, Mechanical & Chemical Engineering*, Barcelona, Spain, April 7-9, <http://www.inase.org/library/2015/books/bypaper/MMMCE/MMMCE-17.pdf> , http://users.uniwa.gr/marval/publ/Valavanides_etal MMMCE2015.pdf
- D.11. Daras, T., Valavanides, M.S. 2015 "Number of Microstates and Configurational Entropy for Steady-State Two-Phase Flows in Pore Networks" *AIP Conf. Proc.* **1641** pp. 147-154, <http://dx.doi.org/10.1063/1.4905973>,
- D.12. Valavanides, M.S. 2014 "Operational Efficiency Map and Flow Characterization for Steady-State Two-Phase Flows in Porous Media" paper SCA2014-047, *Society of Core Analysts Symposium - SCA2014*, Avignon, France, Sept. 8-14, http://users.uniwa.gr/marval/publ/Valavanides_SCA2014-047.pdf
- D.13. Tsakiroglou, C., Aggelopoulos, C.A., Terzi, K., Avraam, D.G., Valavanides, M.S. 2014 "Explicit correlation of the steady-state two-phase relative permeability functions of porous media with the local flow rates" paper SCA2014-041, *Society of Core Analysts Symposium - SCA2014*, Avignon, France, Sept. 8-14, http://users.uniwa.gr/marval/publ/Tsakiroglou_etal_SCA2014-041.pdf , http://www.scaweb.org/assets/papers/2014_papers/SCA2014-041.pdf
- D.14. Valavanides, M.S., Kamvyssas, G. 2013 "Operational Efficiency Map of Steady-State Two-Phase Flow in Porous Media Processes" *InterPore2013, 5th International Conference on Porous Media*, Prague, 21-24 May, http://users.uniwa.gr/marval/publ/Valavanides_Kamvyssas_InterPore5_2013.pdf
- D.15. Valavanides, M.S. 2011 "Implementation of the *DeProF* Theory for Steady-State Two-Phase Flow in Porous Media to Improve Mass Transfer Around Rectilinear Sinks/Sources" paper 81, *7th GRACM International Congress on Computational Mechanics*, Athens, 30 June – 2 July 2011, http://users.uniwa.gr/marval/publ/Valavanides_GRACM7_81_2011.pdf
- D.16. Valavanides, M.S. 2011 "From Pore to Network to *DeProF* to *aSaPP*: Towards a complete description of steady-state two-phase flow in porous media, spanning pore-to statistical thermodynamics- scales" paper 80, *7th GRACM International Congress on Computational Mechanics*, Athens, 30 June – 2 July 2011, http://users.uniwa.gr/marval/publ/Valavanides_GRACM7_80_2011.pdf
- D.17. Valavanides, M.S. 2010 "Optimum Operating Conditions for Two-Phase Flow in Pore Network Systems: Conceptual Justification Based on Statistical Thermodynamics" SPE-135429-MS *2010 SPE Annual Technical Conference & Exhibition*, Florence, Italy, September 19-22, <https://doi.org/10.2118/135429-MS>, http://users.uniwa.gr/marval/publ/Valavanides_SPE135429_2010.pdf
- D.18. Valavanides, M.S., Payatakes, A.C. 2004 "Wetting Film Effects on Steady-State Two-Phase Flow in Pore Networks using the *DeProF* Theoretical Model" SPE-88713-MS, *11th ADIPEC Abu Dhabi International Petroleum Exhibition & Conference*, Abu Dhabi, United Arab Emirates, October 10-13, <https://doi.org/10.2118/88713-MS> , http://users.uniwa.gr/marval/publ/Valavanides_SPE88713_2004.pdf

- D.19. Valavanides, M.S., Payatakes, A.C. 2003 “Prediction of Optimum Operating Conditions for Steady-State Two-Phase Flow in Pore Network Systems Using the *DeProF* True-to-Mechanism Theoretical Model”, [SCA2003-18](#), *2003 International Symposium of the Society of Core Analysts*, Pau, France, 21-25 September, http://users.uniwa.gr/marval/publ/Valavanides_Payatakes_SCA2003_18_2003.pdf
- D.20. Valavanides, M.S., Payatakes, A.C. 2002 “Effects of Pore Network Characteristics on Steady-State Two-Phase Flow Based on a True-to-Mechanism Model (*DeProF*)” SPE-78516-MS, *10th ADIPEC Abu Dhabi International Petroleum Exhibition & Conference*, Abu Dhabi, United Arab Emirates, October 13-16, pp.379-387, <https://doi.org/10.2118/78516-MS>, http://users.uniwa.gr/marval/publ/Valavanides_Payatakes_SPE78516_2002.pdf
- D.21. Valavanides, M.S., Payatakes, A.C. 1998 “Prediction of the relative permeabilities for steady-state two-phase flow in porous media, using a mechanistic-thermodynamic model”, *ECMOR VI 6th European Conference on the Mathematics of Oil Recovery*, Peebles - Scotland, Sept. 8-11, <https://doi.org/10.3997/2214-4609.201406619>, http://users.uniwa.gr/marval/publ/Valavanides_Payatakes_ECMORVI_1998.pdf.
- D.22. Valavanides, M. S., Constantinides, G. N., Payatakes, A. C. 1996 “Simulation of the Motion of Oil Ganglia in Consolidated Porous Media. Crowding Effects”, *ECMOR V - 5th European Conference on the Mathematics of Oil Recovery*, Sep 1996, Leoben, Austria, cp-101-00032, ISBN: 3-9500542-0-0, <https://doi.org/10.3997/2214-4609.201406893>

National Conferences:

- D.23. Valavanides, M.S., Karadimitriou, N., Steeb, H. 2022 "Interstitial Flow Instabilities During Steady-State Two-Phase Flow in Microfluidic Pore Network Models", *13th Panhellenic Scientific Conference of Chemical Engineering PSCCE*, Art. P-478, University of Patras, June, 2-4, http://users.uniwa.gr/marval/publ/Valavanides_etal_2022_PSPXM13_P478.pdf
- D.24. Valavanides, M.S. 2013 “Capillary vs Viscous Flow: Introduction of a Normative Methodology for Characterization of 2-Ph Flows in P.M.” *PSPM-6, 6th Panhellenic Symposium on Porous Media*, Kavala, Greece, September 9-10, http://users.uniwa.gr/marval/publ/Valavanides_PSPM6_2013.pdf
- D.25. Valavanides, M.S., Kamvyssas, G., Totaj, E. 2013 “Retrospective Examination of Relative Permeability Data and Operational Efficiency Aspects for Steady-State 2-Ph Flow in Porous Media” *PSPM-6, 6th Panhellenic Symposium on Porous Media*, Kavala, Greece, Sept. 9-10, http://users.uniwa.gr/marval/publ/Valavanides_etal_PSPM6_2013.pdf
- D.26. Tsakiroglou, C., Aggelopoulos, C.A., Terzi, K., Avraam, D.G., M. Valavanides 2013 “Dependence of the Steady-State Relative Permeability Functions of Porous Media on Flow Rates: A Revisit” *PSPM-6, 6th Panhellenic Symposium on Porous Media*, Kavala, Greece, Sept. 9-10, http://users.uniwa.gr/marval/publ/Tsakiroglou_etal_PSPM6_2013.pdf
- D.27. Valavanides, M.S., Skouras, E.D., Payatakes, A.C. 2009 “Energy efficiency optimization of two-phase flow processes near recovery wells in confined reservoirs, by implementation of the *DeProF* theory” *PSPM-4, 4th Panhellenic Symposium on Porous Media*, Patras, Greece, October 22-23, http://users.uniwa.gr/marval/publ/Valavanides_etal_PSPM4_2009.pdf
- D.28. Βαλαβανίδης, Μ.Σ., Παγιατάκης, Α.Χ. 1999 “Πρότυπο μόνιμης διαφασικής ροής σε πορώδη μέσα βασισμένο σε αληθείς μηχανισμούς κλίμακας πόρων και ανάλυση σε αδρές πρότυπες ροές” *2^ο Πανελλήνιο Επιστημονικό Συνέδριο Χημικής Μηχανικής*,

Θεσσαλονίκη 27-29 Μαΐου, Εκδόσεις Τζιόλα, ISBN 960-8050-00-6, σελ. 185-188,
http://users.uniwa.gr/marval/publ/Valavanides_Payatakes_PsXM2_1999.pdf

- D.29. Valavanidis, M., Polyzos, D., Paipetis, S.A. 1989 “Frequency Dependent Properties of Elastic Particle Composites” *2nd National Congress on Mechanics* Hellenic Society of Theoretical and Applied Mechanics (HSTAM), Athens, June 29-July 1,
http://users.uniwa.gr/marval/publ/Valavanidis_etal_HSTAM2_1989.pdf

E. Presentations at Scientific Conferences (oral/poster)

International Conferences

- E.1. Valavanides, M.S. 2018 “A multi-scale, inherently complex self-organizing process: Steady-State Two-Phase Flow in Pore Networks” *CCS2018, 5th International Conference of the Complex Systems Society*, Thessaloniki, Greece, Sept.23-28.
- E.2. Valavanides, M.S. 2017 “Steady-state two-phase flow in porous media: independent variables, critical flow conditions, universal energy efficiency map and effective, flow and system characterization.” PoreLab Group Kick-off Meeting, Oslo, Norway, Sept. 2017
- E.3. Valavanides, M.S. 2016 “A new methodology for effective, two-phase flow characterization of pore network structures” *InterPore2016, 8th International Conference on Porous Media & Annual Meeting*, Cincinnati, OH USA, May 9-12. Book of abstracts, ISSN 2518-3826,
<https://www.interpore.org/publications/conference-abstract-booklets>,
http://users.uniwa.gr/marval/publ/Valavanides_IPOR2016_1459.pdf
- E.4. Valavanides, M.S., Tsakiroglou, C.D. 2015 “Systematic laboratory study of steady-state two-phase flow in porous media” *Abu-Dhabi Research Conference and Exhibition ADRAC 2015*, UAE, May 24-26
- E.5. Valavanides, M.S., Daras, T. 2015 “Configurational Entropy Maps for Steady-State Two-Phase Flows in Pore Networks implementing the DeProF model algorithm” *InterPore2015, 7th International Conference on Porous Media & Annual Meeting*, Padova, 21-24 May
- E.6. Skouras, E.D., Kalarakis, A.N., Valavanides, M.S., Burganos, V.N. 2015 “Integration of relative permeability maps for two-phase flow in porous media into FEM solvers to investigate complex field-scale flows” *InterPore2015, 7th International Conference on Porous Media & Annual Meeting*, Padova, 21-24 May
- E.7. Skouras, E.D., Kalarakis, A.N., Valavanides, M.S., Burganos, V.N. 2015 “A Model for Spatiotemporal Varying Mass Transfer Problems During Two-Phase Flow Within Pore Networks, Based on the DeProF Model Description of the Flow Patterns” MS 1.03 P2055 *InterPore2015, 7th International Conference on Porous Media & Annual Meeting*, Padova, 21-24 May,
http://users.uniwa.gr/marval/publ/Skouras_etal_IPOR2015_P2055.pdf
- E.8. Tsakiroglou, C.D., Aggelopoulos, C.A., Terzi, K., Avraam, D.G., Valavanides, M.S. 2015 “Analyzing the steady-state two-phase flow relative permeability functions of porous media in the terms of their dependence on capillary numbers: An experimental study” MS 1.03 P2056 *InterPore2015, 7th International Conference on Porous Media & Annual Meeting*, Padova, 21-24 May
- E.9. Skouras, E.D., Kalarakis, A.N., Valavanides, M.S., Burganos, V.N. 2015 “Two-phase flow conductivity maps implementing FEM and Lattice-Boltzmann simulators in complex pore geometries” MS 1.03 P2057 *InterPore2015, 7th International*

- Conference on Porous Media & Annual Meeting*, Padova, 21-24 May, http://users.uniwa.gr/marval/publ/Skouras_etal_IPOR2015_P2057.pdf
- E.10. Valavanides, M.S. 2015 “Two-Phase Flow and Pore Structure Characterization by means of Effective Operational Efficiency Indices (A conceptual approach)” MS 1.03 P2059 *InterPore2015, 7th International Conference on Porous Media & Annual Meeting*, Padova, 21-24 May, http://users.uniwa.gr/marval/publ/Valavanides_IPOR2015_P2059.pdf
- E.11. Valavanides, M.S. 2014 “Recent Advances and New Challenges in the *DeProF* Theory for Steady-State Two-Phase Flow in Porous Media” (by invitation) Shell Amsterdam Centennial Conference “*Rock & Fluid Physics: Academic and Industrial Perspectives*” Amsterdam, NL, Sept. 15-17
- E.12. Valavanides, M.S. 2012 “From Pore to Network to *DeProF* To *aSaPP*: Development of a Complete Theory for Steady-State Two Phase Flow in Porous Media, Spanning Pore- to Statistical Thermodynamics- Scales”, *Gordon Research Conference on ‘Flow and Transport in Porous Media’*, Les Diablerets, Switzerland, June 24-29, http://users.uniwa.gr/marval/publ/Valavanides_GRCFTPM_2012.pdf
- E.13. Valavanides, M.S. 2011 “A Complete Description of Steady-State Two-Phase Flow in Porous Media, Spanning Pore- to Statistical Thermodynamics- Scales” *Les Rencontres Scientifiques d'IFP Energies nouvelles International Conference on Flows and Mechanics in Natural Porous Media from Pore to Field Scale - Pore2Field*, Rueil-Malmaison, France 16 - 18 November 2011, http://users.uniwa.gr/marval/publ/Valavanides_IFPP2F_2011_DeProFaSaPP.pdf
- E.14. Valavanides, M.S. 2011 “A Retrospective View of Relative Permeability Curves for Steady-State Two-Phase Flow in Porous Media: Reveal of Optimum Operating Conditions” *Les Rencontres Scientifiques d'IFP Energies nouvelles International Conference on Flows and Mechanics in Natural Porous Media from Pore to Field Scale - Pore2Field*, Rueil-Malmaison, France 16 - 18 November 2011, http://users.uniwa.gr/marval/publ/Valavanides_IFPP2F_2011.pdf
- E.15. Valavanides, M.S., Payatakes, A.C. 2001 “Steady-State Fully-Developed Two-Phase Flow in Porous Media: Mechanistic Model and a Conjecture Concerning the Underlying Principle” HSR 2001 3rd International Meeting of the Hellenic Society of Rheology, Patras, Greece, June 10 – 14.
- E.16. Valavanides, M.S., Payatakes, A.C. 2001 “Prediction of Interstitial Macroscopic Characteristics of Two-Phase Flow in Porous Media Using the *DeProF* True-to-Mechanism Theoretical Model” European Geophysical Society XXVI General Assembly, Nice, France, March 25-30
- E.17. Valavanides, M.S., Payatakes, A.C. 2000 “True-to-Mechanism Model of Two-Phase Flow in Porous Media using Decomposition into Prototype Flows” *2000 Annual AIChE Meeting*, Los Angeles, CA, USA, Nov. 12-17.
- E.18. Payatakes, A.C., Valavanides, M.S. 1998 “True-to-Mechanism Macroscopic Theory of Steady-State Two-Phase Flow in Porous Media (Decomposition into Prototype Flow: *DeProF*)” *Gordon Research Conference on ‘Modeling of Flow in Permeable Media’*, Plymouth State College, New Hampshire, USA, Aug.3-7. Gordon Research Media, Proctor Academy, Andover N.H., USA, August 2-7, (1998).
- E.19. Valavanides, M.S., Payatakes, A.C. 1998 “New Macroscopic Theory of Two-Phase Flow in Porous Media based on the Actual Pore-Scale Mechanisms”, *HSR 1998, 2nd Meeting of the Hellenic Society of Rheology and International Symposium*, Crete, Greece, Aug. 31-Sept. 2.

- E.20. Payatakes, A.C., Avraam, D.G.,Constantinides, G.N. Valavanides, M.S. 1996 “Flow Regimes and Relative Permeabilities During Steady-State Two-Phase Flow in Porous Media” *7th International Symposium OIL FIELD CHEMICALS*, Geilo, Norway, March 17-20
- E.21. Payatakes, A.C., Avraam, D.G., Valavanides, M.S. Constantinides, G.N. 1992 “Prediction of Transient and Steady-State Relative Permeabilities Based on the Experimental and Theoretical Analysis of Two Phase Flow in Porous Media” *Gordon Research Conference on "Modeling of Flow in Permeable Media"* New Hampshire, Aug.10-14.

National Conferences

- E.22. Σκούρας, Ε.Δ., Παρασκευά, Χ.Α., Βαλαβανίδης, Μ.Σ., Καλαράκης, Α. Ν. Καλογήρου, Ι, Μαυρίδης, Κ. 2015 “Υπολογιστική Διερεύνηση Ροϊκού Πεδίου Βιολογικών Υγρών σε Κλινικά Σημαντικές Συνθήκες με Απλεγματοτικές Μεθόδους” 10^ο Πανελλήνιο Συνέδριο Χημικής Μηχανικής, Εργασία 0280, ΠΑΤΡΑ, 4 - 6 Ιουνίου, 2015, <http://pesxm10.chemeng.upatras.gr/papers/15/280>
- E.23. Valavanides, M.S., Payatakes, A.C. “Energy Efficiency of 2ΦFlow in P.M. Processes — Correlation with Multiplicity of Internal Flow Arrangements (Preliminary Results)” *PSPM-4, 4th Panhellenic Symposium on Porous Media*, Patras, Greece, October 22-23, http://users.uniwa.gr/marval/publ/Valavanides_Payatakes_PSPM4_2009.pdf

F. Conventions / Workshops / Forums

- F.1. Valavanides, M. 2003 “FORTHPHOTONICS: Industrial Research for the development and certification of innovative spectral imaging technology diagnostic systems” *2nd Competitiveness Forum, Ministry of Development Gen. Secretariat of Research & Technology*, Athens, 2 December
- F.2. Valavanides, M.S. 2001 “Modes of Exploiting Mature Research Results and Innovation Financing”, *Micro & Nano Technology and Applications Technology Transfer and Business Partnership Event & Exploitation & Commercialisation of Research Results*, Thessaloniki, 15-16 November
- F.3. Valavanides, M.S. 2001 “Support actions for University spin-offs”, *IRC GOOD PRACTICE WORKSHOPS: Innovation Financing*, Innovation Relay Centres - Innovation Directorate - European Commission DG Enterprise, Cracow, Poland, 10-11 May
- F.4. Valavanides, M.S. 1999 “5th Framework Program & INCO ”Invited presenter, Eastern Mediterranean Engineers Convention, TCG/DEC, Heraklion, Crete, Greece, Nov. 25-28

G. Technical Reports - Comments

- G.1. Valavanides, M.S., Totaj, E., Tsokopoulos, M. (2015) “Retrospective Examination of Relative Permeability Data on Steady-State 2-Ph Flow in Porous Media Transformation of Rel-PermData (k_{ro} , k_{rw}) into Operational Efficiency Data (f_{EU})” ImproDeProF /Archimedes III, project internal report <http://users.uniwa.gr/marval/ArchIII/retrorelperm.pdf>
- G.2. Valavanides, M.S.(2013) “[Collection and Retrospective Examination of Relative Permeability Data on Steady-State 2-Phase Flow in Porous Media](#)”*Research*

- G.3. Valavanides, M.S. (2013) “Comments on [Analysis of Fundamentals of Two-Phase Flow in Porous Media Using Dynamic Pore-Network Models: A Review by V. Joekar-Niasar and S. M. Hassanizadeh (2012) *Crit. Rev. Env. Sci. Tech.* 42:18 pp. 1895–1976]” manuscript submitted to *Crit. Rev. Env. Sci. Tech.*, unsolicited, http://users.uniwa.gr/marval/publ/Valavanides_CommentsCREST_2013.pdf

H. Invited Lectures

- H1. Valavanides, M.S. 2022 “*Flow Dependent Relative Permeability Scaling for Steady-State Two-Phase Flow in Porous Media: Laboratory Validation on a Microfluidic Network*” *Pretty Porous Science Lecture #18* SFB1313 invited lecture, Institute of Applied Mechanics, Faculty of Civil and Environmental Engineering, University of Stuttgart, Germany, November 26, <https://www.sfb1313.uni-stuttgart.de/news/Pretty-Porous-Science-Lecture-18-Flow-Dependent-Relative-Permeability-Scaling-for-Steady-State-Two-Phase-Flow-in-Porous-Media-Laboratory-Validation-on-a-Microfluidic-Network-by-Marios-Valavanides/>
- H2. Valavanides, M.S. 2019 “*A new theoretical framework for two-phase flows in porous media – Recent advances and perspectives*” SFB1313 invited lecture, Institute of Applied Mechanics, Faculty of Civil and Environmental Engineering, University of Stuttgart, Stuttgart, Germany, November 26, <https://www.sfb1313.uni-stuttgart.de/news/SFB-1313-Lecture-by-Marios-Valavanides/>
- H3. Valavanides, M.S. 2018 “*Recent advances and new challenges in the development of the DeProF tentative theory on steady-state, two-phase flow in porous media*” invited lecture, Dept. of Fundamental Physics, Faculty of Physics, University of Barcelona, Barcelona, Spain, May14-17
- H4. Valavanides, M.S. 2016 “*Development of the DeProF tentative theory for steady-state flow in porous media*” invited lecture, Dept of Earth Sciences/Faculty of Geosciences, Utrecht University (UU), Utrecht, The Netherlands, October 18, http://users.uniwa.gr/marval/publ/Valavanides_UU_2016_ColloqSeriesPresent.pdf
- H5. Valavanides, M.S. 2016 “*Multi-phase flows in porous media: Recent advances and new challenges in the development of the DeProF theory for steady-state flow*” Colloquium invited lecture, Institutt for fysikk Norges Teknisk-Naturv. Univ. (NTNU), Trondheim, Norway, March 18, http://users.uniwa.gr/marval/publ/Valavanides_NTNU_2016_GenPhysColloq.pdf
- H6. Valavanides, M.S. 2014 “*Recent Advances and New Challenges in the DeProF Theory for Steady-State Two-Phase Flow in Porous Media*” Invited research lecture, Environmental Engineering Department, Technical University of Crete, Chania, Greece, Dec.18

I. Educational Notes

- Valavanides, M.S. 2004 lecture notes on “*Development and Transfer of Technology & Know-how*” course (in Greek), Dept. of Shipbuilding Engineers, TEI Athens, http://users.uniwa.gr/marval/publ/Valavanides_TT_2008.pdf

