

Associate Professor LEONIDAS N. GERGIDIS

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| PERSONAL INFORMATION | Date of Birth: 01 January 1974 Nationality: Greek Marital Status: Married, father of two children | |
| CONTACT INFORMATION-AFFILIATION | Associate Professor Leonidas N. Gergidis Dept. of Materials Science and Engineering E-mail: lgergidi@uoi.gr, lgergidis@gmail.com Website: http://www.materials.uoi.gr/lgergidis.html http://www.materials.uoi.gr/en/0,01,02.php | Phone: (+30) 2651007316 University of Ioannina, GR 45110 |
| EDUCATION | B.Sc. Degree in Physics Department of Physics, University of Patras, Greece | July 1995 |
| | Ph.D. in Chemical Engineering Department of Chemical Engineering, University of Patras, Greece <u>Thesis</u> : "Study of sorption and diffusion of alkanes in zeolites using molecular simulations" | July 2000 |
| MILITARY SERVICE | Obligatory Military Service: Officer in the Hellenic Armored Forces (total duration 21 months) 2nd Lt.- Res. Officer in Armored Forces Corps January 2001-October 2002 | |
| ACADEMIC POSITIONS | <p>a.Associate Professor at the Department of Materials Science and Engineering, University of Ioannina, Greece (Starting Date: 20 September 2019)</p> <p>b.Assistant Professor (Tenure-track appointment) at the Department of Materials Science and Engineering, University of Ioannina, Greece <u>Duration</u>: 20 March 2018 - 19 September 2019</p> <p>c. Assistant Professor at the Department of Materials Science and Engineering, University of Ioannina, Greece (03 September 2014-19 March 2018)</p> <p>d. Lecturer at the Department of Materials Science and Engineering, University of Ioannina, Greece (21 January 2011-02 September 2014)</p> | |
| LECTURING & TEACHING | <p>As Assistant Professor, Lecturer and Visiting Professor teaching assignment for a total of twelve (12) undergraduate courses at the Department of Materials Science and Engineering, University of Ioannina, Greece</p> <p><u>Undergraduate Courses</u></p> <ul style="list-style-type: none"> • Ordinary Differential Equations Fall Semester 2011-19 • Introduction to Materials Science and Engineering with Assoc. Prof. N.M.Barkoula Fall Semester 2011-19 • Numerical Analysis(theory & laboratory) Fall Semester 2011 • Probability and Statistical Analysis of Experimental Data Fall Semester 2012-19 • Partial Differential Equations Spring Semester 2011-20 • Physical Processes Spring Semester 2011-17 • Heat Transfer Spring Semester 2017 • Laboratory of Materials I Spring Semester 2018-20 <p><u>Graduate Courses</u></p> <p>i. Master's Degree of the Department of Materials Science and Engineering (MD-DMSE)</p> <p>ii. Interdepartmental Master's Degree "Chemistry of Materials" (MD-CHEMMAT)</p> <ul style="list-style-type: none"> • Mechanics of Materials (MD-DMSE) Academic Year 2014-18 Non-Linear and Gradient Elasticity: Theory and Simulation (1 Lecture) • Modeling and Simulation (MD-DMSE) 2014-18 Brownian Dynamics, Monte Carlo, Stochastic Differential Equations (2 Lectures) | |

- Chemistry of Materials: Catalytic and Microporous Materials (MD-DMSE,CHEMMAT) 2014-18 Modeling and simulation of Zeolitic Materials (1 Lecture)
- Multiscale modeling and simulation (MD-DMSE) 2014-17 Stochastic simulation methods, mesoscale methods, coarse graining of materials with applications to polymers, colloids (3 Lectures and Laboratory practice)
- Toughness and Nondestructive techniques (MD-DMSE) 2014-17 Nondestructive testing, wave propagation and numerical methods (3 Lectures)

Visiting Professor during four (4) academic years (2003-2007) and (December 2010-21January 2011) at the Department of Materials Science and Engineering, University of Ioannina. Teaching:

- Introduction to Computers and Computer programming I (Fortran) (Theory and Laboratory)
- Computer programming II (C++) (Theory and Laboratory)
- Physical and Chemical Processes
- Chemical Thermodynamics

Teaching Assistant at the Department of Chemical Engineering during the Graduate School, Department of Chemical Engineering, University of Patras, Undergraduate Courses-Laboratories:

- Physical Chemistry Fall Semester 1996,1997,1998
- Physics II Laboratory Spring Semester 1996,1998
- Numerical Methods Spring Semester 1997

RESEARCH
EXPERIENCE-
PARTICIPATION IN
FUNDED RESEARCH
PROJECTS

- r1. Researcher:** "Thermoelectrical monitoring and control of hierarchical materials' for aerospace industry", Program HORIZON 2020, funded by COMMISSION OF THE EUROPEAN COMMUNITIES **in progress**
- r2. Researcher:** "Integrated - automated control system for photovoltaic parks using IR thermography from drones", Program Investigate-Create-Innovate, ESPA 2014-2020 **in progress**
- r3. Researcher:** "Advance technologies for thermoelectric energy harvesting from hierarchical composite materials", Program ATHENA,ESPA 2014-2020 **in progress**
- r4. Academic Advisor:** Greek State Scholarship Foundation (IKY) for 30 months to my doctoral student Mr. V. Stavrou for "Study of magnetic nanofilms and nanoparticles using micromagnetic finite elements simulations" **in progress**
- r5. Collaborating Researcher:** IKY and German Academic Exchange Foundation DAAD, collaboration between University of Ioannina and Augsburg University, Institute of Physics, P.I. Prof. I. Panagiotopoulos, Program IKYDA2015, Two years duration: **01/01/2015-31/12/2016**
- r6. Post doctoral researcher:** "On Molecular Dynamics Simulation of the forces between colloidal Ag and Au nanoparticles", Department of Chemical Engineering The Pennsylvania State University, USA **April 2008-May 2009**
- r7. Post doctoral researcher:**"On the theoretical and computational investigation of the conformational properties of dendritic molecules", Research co-funded by the European Union in the framework of the the program Pythagoras I of the Operational Program for Education and Initial Vocational Training of the 3rd Community Support Framework of the Hellenic Ministry of Education University of Ioannina, Greece **April 2005-May 2006**

RESEARCH
INTERESTS

Study of porous, composite, polymeric and magnetic materials in basic and applied research. Mathematical modeling of wave scattering and wave propagation in materials and materials with microstructure, assisted by numerical implementations with special functions, finite elements among others for applications in biomaterials but also in the general context of composite materials. Modeling and simulation of gradient elasticity problems with applications in biomedical technology. Modeling of composites, electronic materials and integrated devices for power generation. Modeling using Molecular Dynamics and Monte Carlo molecular simulations of porous materials. Coarse grained Molecular and Brownian dynamics simulations for polymeric materials and for the self-assembly of

polymers with applications amongst others in the chemical industry and biomedicine. Numerical simulation of micromagnetic problems with finite elements and finite differences for nanomagnetic materials with applications in information storage, magnetic sensors and medicine. In the framework of basic research, development of problem solving techniques for classical boundary value problems. Study of stochastic differential equations for applications related to inverse problems.

Research interests-projects and related work can be found in representative scientific articles (A-) in peer reviewed Journals and Conference Proceedings (P-) :

- Scattering and wave propagation in materials, composite materials and materials with microstructure using analytical and numerical methods (A8,A17,A30)
- Gradient elasticity theory and numerical simulations for biomedical applications and biomaterials (A6,A10,A21,P4)
- Atomistic and molecular simulations of microporous materials (A1,A2,P1)
- Monte Carlo and Molecular-Brownian Dynamics simulations of dendritic polymers and polymer brushes (A9,A18,A20)
- Computer modeling of the self-assembly of polymers(A14,A15,A29)
- Modeling of magnetic materials using micromagnetism and Finite Element-Finite Differences Methods (A25,A31,A34)
- Nano-particle molecular dynamics simulations and Van der Waals interactions calculations (A12)
- Stochastic Differential Equations and Inverse Problems (A28)
- Modeling thermoelectric phenomena for energy harvesting materials and applications (A33)

SCIENTIFIC COMPUTING EXPERIENCE

- Programming and Scripting Languages: FORTRAN, C++, Python
- Development of in-house Molecular Dynamics and Monte Carlo simulation codes in the research area of molecular modeling of micro-porous materials such as zeolites using FORTRAN programming language
- Numerical solution of Scattering in Acoustics and for Gradient Elasticity problems developing in-house C++ and Mathematica codes
- Development of mathematical libraries for special functions and linear algebra extended for arbitrary precision calculations using C++
- Development of in-house Monte Carlo simulation codes for dendritic polymers using FORTRAN
- Development of in-house FORTRAN code for the solution of stochastic differential equations
- Development of in-house post processing computer programs in Fortran, C++, Matlab, Mathematica for the analysis of the solutions of ordinary and partial differential equations (ODE, PDE) problems & atomistic,molecular, coarse grained trajectories-configurations
- Development of in-house Matlab, Python and C++ codes for micromagnetic simulations
- Parallel programming using OpenMP
- Mathematica and Matlab
- DLPOLY and LAMMPS molecular dynamics parallel simulators
- NMAG finite element micromagnetics simulator
- Scientific data visualization programs: xmgrace, opendx, visit, vmd, paraview
- System administration for small laboratories using Unix and Linux operating systems

PUBLICATIONS

In peer reviewed journals:

1. **Gergidis L.N.**, Theodorou D.N., Molecular dynamics simulations of n-butane-methane mixtures in silicalite, *Journal of Physical Chemistry B*, 103, 3380-3390 (1999) ([Citation Index according to Google Scholar:66](#))
2. **Gergidis L.N.**, Theodorou D.N., Jobic H., Dynamics of n-butane-methane mixtures in silicalite using quasielastic neutron scattering and molecular dynamics simulations, *Journal of Physical Chemistry B*, 104, 5541-5552 (2000) ([C.I.:77](#))
3. Rangou S., Theodorakis L., **Gergidis L.N.**, Avgeropoulos A., Efthymiopoulos P., Smyrniaos D., Kosmas M., Vlahos C., Giannopoulos T., Synthesis, Molecular characterization and theoretical study of first generation dendritic homopolymers of butadiene and isoprene with different microstructures, *Polymer*, 48, 652-663, (2007) ([C.I.:14](#))

4. **Gergidis L.N.**, Kourounis D., Mavratzas S., Charalambopoulos A., Acoustic scattering in prolate spheroidal geometry via Vekua transformation: Theory and Numerical results, *C.M.E.S.: Computer Modeling in Engineering and Science*, 21, no.2,157-175 (2007). (C.I.:7)
5. Efthymiopoulos P., Kosmas M., Vlahos C., **Gergidis L.N.**, Conformational properties of dendritic homopolymers with interacting branching points, *Macromolecules*, 40, 9164-9173, (2007) (C.I.:10)
6. Vavva M.G., Protopappas V. C., **Gergidis L.N.**, Charalambopoulos A., Fotiadis D. I., Polyzos D., The effect of boundary conditions on guided wave propagation in two-dimensional models of healing bone, *Ultrasonics*, 48, 598-606 (2008) (C.I.:46)
7. Kourounis D., **Gergidis L.N.**, Charalambopoulos A., On the sensitivity of the acoustic scattering problem in prolate spheroidal geometry with respect to wave number and shape, *C.M.E.S.: Computer Modeling in Engineering and Science*, 28, no.3, 185-201 (2008) (C.I.:3)
8. Charalambopoulos A., **Gergidis L.N.**, On the dyadic scattering problem in three dimensional gradient elasticity: Analytic Approach, *Journal of Physics A: Mathematical and Theoretical*, 41, 395203 (33pp) DOI:10.1088/1751-8113/41/39/395203 (2008)(C.I.:9)
9. **Gergidis L.N.**, Moultois O., Georgiadis C., Kosmas M., Vlahos C., Off Lattice Monte Carlo Simulations of AB hybrid star dendritic copolymer, *Polymer*, 50,328-335 (2009) (C.I.:8)
10. Vavva M. G., Protopappas V.C., **Gergidis L.N.**, Charalambopoulos A., Fotiadis D. I., Polyzos D., Velocity dispersion curves of guided waves propagating in a free gradient elastic Plate: Application to Cortical Bone, *Journal of the Acoustical Society of America (JASA)*, 125,no 5, 3414-3427 (2009) (C.I.:70)
11. Mavratzas S., Charalambopoulos A., **Gergidis L.N.**, Acoustic scattering from two eccentric spheroids. Theory and Numerical investigation, *International Journal of Engineering Science*, 48, 2, 174-187 (2010) (C.I.:3)
12. Cole M. W., **Gergidis L.N.**, McNutt J. P., Velegol D., Kim H., Bond Z., Many body Van der Waals forces including chains, *Journal of Nanophotonics*, 4, 041560 doi:10.1117/1.3427144 (2010) (C.I.:2)
13. Moultois O., **Gergidis L.N.**, Vlahos C., Brownian Dynamics simulations on self assembly behavior of H-shaped Copolymers and terpolymers, *Macromolecules*, 43 (16), pp 6903-6911 (2010) (C.I.:16)
14. Georgiadis C., Moultois O., **Gergidis L.N.**, Vlahos C., Brownian Dynamics simulations on self assembly behavior of AB hybrid dendritic-star copolymers, *Langmuir*, 27 (2), pp. 835-842 (2011) (C.I.:24)
15. Tzounis P.N., **Gergidis L.N.**, Matikas T.E., Charalambopoulos A., Mathematical investigation of interfacial property in fiber reinforced model composites, *Journal of Composites B*, 43, 6, 2605-2612 (2012) (C.I.:8)
16. Charalambopoulos A., **Gergidis L.N.**, Kartalos G., On the gradient elastic wave propagation in cylindrical waveguides with microstructure, *Journal of Composites B*, 43, 6, 2613-2627 (2012) (C.I.:6)
17. Moultois O., **Gergidis L.N.**, Vlahos C., Self-Assembly behavior of thermoresponsive bis-solvophilic linear block terpolymers: A Simulation Study, *Macromolecules*, 45 (5), pp 2570-2579 (2012) (C.I.:4)
18. **Gergidis L.N.**, Kalogirou A., Vlachos C., Dendritic brushes under good solvent conditions: A Simulation Study, *Langmuir*, 28 (49), pp. 17176-17185 (2012) (C.I.:21)
19. Markou A., Beltsios K.G., **Gergidis L.N.**, Panagiotopoulos I., Bakas T., Ellinas K., Tserepi A., Stoleriu L., Tanasa R., Stancu A., Magnetization reversal in triangular $L1_0 - FePt$ nanoislands, *Journal of Magnetism and Magnetic Materials*, 344, pp. 224-229 (2013) (C.I.:3)
20. **Gergidis L.N.**, Kalogirou A., Charalambopoulos A., Vlachos C., Dendritic brushes under theta and poor solvent conditions, *Journal of Chemical Physics*, 139 (4), art. no. 044913 (2013)(C.I.:9)
21. Vavva M., **Gergidis L.N.**, Charalambopoulos A., Protopappas V., Polyzos D., Fotiadis D., Rayleigh wave propagation in cortical bone according to Mindlin's Form II gradient elastic theory, *Journal of the Acoustical Society of America (JASA)*, 135 (5), 31173126 (2014)(C.I.:3)
22. Kalogirou A., Moultois O., **Gergidis L.N.**, Vlahos C., Micellization Properties of Θ -Shaped, Figure-Eight-Shaped and Linked Rings Copolymers, *Macromolecules*, 47 (16), pp 5851-5859 (2014)(C.I.:7)
23. Moultois O., **Gergidis L.N.**, Kalogirou A., Vlahos C., Entropic Effects in Mixed Micelles Formed

by Star/Linear and Star/Star AB Copolymers, *Journal of Polymer Science Part B: Polymer Physics*, 53 (6), pp 442-452 (2015)(**C.I.:2**) (Figure 9 of the paper used as the cover of the journal's issue)

24. Kalogirou A., **Gergidis L.N.**, Moultois O., Vlahos C., Entropic Effects, shape, and size of mixed micelles formed by copolymers with complex architectures, *Physical Review E*, 92 (5), 052601 (2015) (**C.I.:1**)

25. Stavrou V., **Gergidis L.N.**, A. Markou, A. Charalambopoulos A., Panagiotopoulos I. , Micromagnetics of Triangular Thin Film Nanoelements, *Journal of Magnetism and Magnetic Materials*, 401, pp 716-723 (2016)(**C.I.:1**)

26. Kalogirou A., **Gergidis L.N.**, Milliou K., Vlahos C., Complexation of Polyelectrolyte Micelles with Oppositely Charged Linear Chains, *Journal of Physical Chemistry B*, 121 , pp 1982-1991 (2017) (**C.I.:1**)

27. Milliou K., **Gergidis L.N.**, Vlahos C., Molecular Dynamics Simulation of Brushes Formed by Dendritic Polyelectrolytes of the First Generation under Theta Solvent Conditions, *Journal of Polymer Science Part B: Polymer Physics*, 55, pp 1110-1117 (2017)

28. Charalambopoulos A. , **Gergidis L.N.**, A novel stochastic method for the solution of direct and inverse exterior elliptic problems, *Quarterly of Applied Mathematics*, 76, 1, pp 65-111 (2018)

29. Milliou K., **Gergidis L.N.**, Vlahos C., Polyelectrolyte Micelles in Salt-Free Solutions: Micelle Size and Electrostatic Potential, *Journal of Polymer Science Part B: Polymer Physics*, 56, pp 924-934 (2018)

30. **Gergidis L.N.**, Kourounis D., Mavratzas S., Charalambopoulos A., Numerical Investigation of the Acoustic Scattering Problem from Penetrable Prolate Spheroidal Structures using the Vekua Transformation and Arbitrary Precision Arithmetic, *Mathematical Methods in the Applied Sciences*, 41, pp 5124-5139 (2018)

31. **Gergidis L.N.**, Stavrou V.D. ,Kourounis D., Panagiotopoulos I., Micromagnetic simulations study of skyrmions in magnetic FePt nanoelements, *Journal of Magnetism and Magnetic Materials*, 481, pp 111-121 (2019)

32. Milliou K., **Gergidis L.N.**, Vlahos C., Directed Motion of a Polyelectrolyte Micelle along Tethered Chains of Oppositely Charged Polyelectrolyte Brush, *Journal of Polymer Science Part B: Polymer Physics*, 57, pp 621-631 (2019) (cover article of the journal's issue)

33. Karalis G. Tzounis L., Lambrou E., **Gergidis L.N.**, Paipetis A., A carbon fiber thermoelectric generator integrated as a lamina within an 8-ply laminate epoxy composite: Towards efficient thermal energy harvesting by structured materials, *Applied Energy*, 253, 113512 (2019)

34. Stavrou V.D., Kourounis D., Dimakopoulos K., Panagiotopoulos I., **Gergidis L.N.**, Magnetic Skyrmions in FePt Nanoparticles having Reuleaux 3D Geometry: A Micromagnetic Simulation Study, *NanoScale*, 11, 20102 (2019)

SUPERVISION OF STUDENTS

PhD Students:

- Vasilis Stavrou [started March 2016] "Study of Magnetic Nanoparticles using numerical simulations"
- Eleftherios Lambrou [started December 2018] "Modeling coupled field problems in composite materials"

Master Thesis Students:

- Vasilis Stavrou [5 year Diploma in Materials Science & Engineering, graduated March 2016] "Finite Element Micromagnetic Simulations for FePt nanoparticles: size and shape effects"
- Arsenios Gourras [4 year Diploma in Mechanical Engineering] 'Modeling sorption and transport properties in nanoporous materials using numerical simulations ', graduated November 2019

Undergraduate Diploma Thesis Students: 10 finalized and 3 are in progress

CONFERENCES- WORKSHOPS

Participation in more than 15 international conferences and workshops

SCHOLARSHIPS Postgraduate Scholarship, Department of Chemical Engineering, University of Patras, September 1995-July 2000

BIBLIOMETRIC-DATA Google Scholar : Gergidis
<http://scholar.google.com/citations?user=2NKfIpAAAAAJ&hl=en&cstart=0&pagesize=20>