Nikos Pelekasis

I. CURRICULUM VITAE

1. PERSONAL

Address:	Department of Mechanical Engineering, University of Thessaly, Volos 38334.
Communication	Tel: +30-24210-74102 Fax: +30-24210-74085 Email: pel@uth.gr
	Int : http://www.mie.uth.gr/Pelekasis.html
Marital status:	Married with two children
Date of Birth:	November the 4th 1963.
Languages:	English (fluent), French (basic)
Military Service:	25/3/95-25/9/96

2. EDUCATION

Ph.D. in Chemical Engineering, **9/86-10/91**
State University of New York at Buffalo, **Buffalo NY**
Dissertation: "A study on Drop and Bubble Dynamics via a Hybrid Boundary Element - Finite Element Methodology"

Diploma in Chemical Engineering, **9/81- 6/86**
National Technical University of Athens, **Athens, Greece**
Thesis Title: "A Numerical Study on the Effectiveness of Solar Collectors in the Process of Drying of Agricultural Products."

3. ACADEMIC EXPERIENCE

I. Assistant/Associate/Professor of Computational Fluid Dynamics **10/2001-**
Dpt. of Mechanical Engineering, University of Thessaly, **Volos Greece**
Laboratory of Fluid Mechanics & Turbomachinery
Full time faculty position involving research, teaching and administrative duties.

Undergraduate Teaching Duties	**Graduate Teaching Duties**
Partial Differential Equations (2002-08)	Comp. Fluid Dynamics with FEM (2002-12)
Computational Fluid Dynamics (2002-)	Intr. to Applied Mathematics (2009)
Introduction to Fluid Mechanics I (2009-)	Advanced Fluid Mechanics (2013, 2016-17)

Administrative Experience

Department Head	9/2013-9/2015
Vice President & Director of Graduate Studies	9/2011-9/2013
Director of the Fluid Mechanics & Turbomachinery Laboratory	9/2010-9/2013
Director of the Division of Energy and Industrial Processes Technology	9/2007-9/2008
Coordination of the Departmental Seminar Series	9/2002-9/2005

Selected national research projects in the fields of bubble, drop and film dynamics include the PENED, HRAKLEITOS I and II, PYTHAGORAS, ARISTEIA and NIARXOS programs funded by the Greek Secretariat of Research, the Ministry of Education and the NIARXOS foundation, almost all of which were coordinated by Dr. Pelekasis. Involvement in EUROPEAN collaborative projects includes the EURATOM project for the study of controlled thermonuclear fusion and the COST D32 action for the study of cavitation and sonochemistry. The above research activity has lead to the successful completion of 6 PhD Dissertations under the supervision of Prof. Pelekasis.

II. Research Associate **10/96-9/2001**

Department of Chemical Engineering, University of Patras **Patras, Greece**

Laboratory of Computational Fluid Dynamics Dpt. of Chemical Engineering

Actively involved in research in the context of Greek & European research projects, in the fields of film stability, bubble dynamics and stability of liquid bridges, in collaboration with Prof. Tsamopoulos. Also appointed as part time Lecturer(/407) for teaching undergraduate "Partial Differential Equations" and "Introduction to FORTRAN programming".

Selected projects include the PLATO and IKYDA European programs for the collaboration with French (Technological University of Compiegne) and German (University of Goettingen, Drittes Physikalisches Institut) Institutions, the KARATHEODORI research program funded by the University of Patras Research Committee and the INCO-COPERNICUS European program for the collaboration between European and Eastern European Institutions.

III. Post Doctoral Fellow **1/92-8/94**

The Levich Institute at City College of CUNY, **New York NY**

Conducted Research in the Area of Suspension Mechanics with Application in Separation Processes, Funded through NASA Grant NAG-1-1159, in collaboration with Prof. Acrivos.

IV. Visiting Researcher **1997-2002**

Universite de Technologie de Compiegne **Compiegne, France**

Laboratory of Biomechanics Department of Biological Engineering

In the framework of the "Sejours scientifiques en France" CNRS program, in conjunction with the FrancoHellenic "PLATO" program. Research in the field of Biomechanics and supervision of graduate students in collaboration with Prof. Barthes-Biesel.

4. PAPER & PROPOSAL REVIEW

Dr. Pelekasis serves as referee for articles considered for publication well reputed international scientific journals including:

Physics of Fluids, Journal of Fluid Mechanics, Journal of Engineering Mathematics, Journal of Applied Mathematics & Computing, Journal of Computational Physics, Journal of the Acoustical Society of America , International Journal of Thermal Sciences , International Journal for Numerical Methods in Fluids, Computers & Fluids, ASME Journal of Biomechanical Engineering, Ultrasound in Medicine & Biology.

He also regularly serves as referee for proposals submitted to the Greek Secretarial for Research (GSRT) and the Ministry of Education of Greece.

He has served as a member of the GSRT National Committee for planning future calls for supporting basic research in Greece (2010-2011).

6. CONFERENCE ORGANIZATION

1. Organizing Committee of the 3rd-6th International Meetings of the Hellenic Society of Rheology, 2001-2011.
2. Organizing Committee of the first five Schools on the Physics and Technology of Fusion, held by the Greek EURATOM Association in Volos from 2002 to 2011.
3. President of the Organizing committee of the FLOW-2012 conference held in Volos in November 2012.
4. Conference chairman of the 8th Conference of the Greek Association of Computational Mechanics, held in Volos in July 2015.
5. Organizing Committee of the HSTAM-11 Conference, Athens in May 2016.

7. PROFESSIONAL AFFILIATIONS

1. Member of the EUROMECH Association for Fluid Mechanics, 2006-
2. Alternate Member of the Executive Board of the Greek Association of Theoretical and Applied Mechanics (HSTAM) December 2015-.
3. Secretary and (2013-2015) and Alternate Member of the Executive Board (2016-) of the Greek Association of Computational Mechanics (GRACM).
4. Member of the Greek Technical Chamber (TEE) 1986-.

8. RESEARCH INTERESTS

- Bubble and Drop Dynamics
- Dynamics of Red Blood Cells, Contrast Agents and Bio-materials
- Thin Films, Interfacial Flows & Flow-Structure Interaction
- Hydrodynamic and Magneto-Hydrodynamic Stability & Transition
- Applied Mathematics, Bifurcation Theory & Dynamical Systems
- Boundary Elements, Finite Elements & Parallel Computing

9. AWARDS

1. Hellenic Mathematical Society Award (1980).
2. Best paper award in the Scientific Contest on "Modelling of Sonovue Microbubbles in an Ultrasound Field", 10th Eur. Symp. on Ultr. Contrast Imaging, Rotterdam 2005, with K. Tsiglifis & V. Sboros.

II. PUBLICATIONS

1. Journal Articles

1. N. A. Pelekasis, J. A. Tsamopoulos, G. D. Manolis, "Equilibrium shapes and stability of charged and conducting drops.", Phys. Fluids A2(8), 1328 (1990).
2. N. A. Pelekasis, J. A. Tsamopoulos, G. D. Manolis, "Nonlinear oscillations of liquid shells in zero gravity." stability of charged and conducting drops.", J. Fluid Mech. 230, 541-582 (1991).
3. N. A. Pelekasis, J. A. Tsamopoulos, G. D. Manolis, "A hybrid finite- boundary element method for inviscid flows with free surface.", J. Comp. Phys..101(2), 231-251 (1992).
4. N. A. Pelekasis, J. A. Tsamopoulos, "Bjerknes forces between two bubbles. Part I: Response to a step change in pressure.", J. Fluid Mech. 254, 467-499 (1993).
5. N. A. Pelekasis, J. A. Tsamopoulos, "Bjerknes forces between two bubbles. Part II: Response to an oscillatory pressure field.", J. Fluid Mech. 254, 501-527 (1993).
6. N. A. Pelekasis, A. Acrivos, "Forced convection and sedimentation past a flat plate.", J. Fluid Mech., 294, 301-321, (1995).
7. N. A. Pelekasis, J. A. Tsamopoulos, "Dynamics of charged and conducting drops via the hybrid finite-boundary element method.", Engr. Anal. with Boundary Elements, 15, 339-348, (1995).
8. N. A. Pelekasis, "A convection - shear induced resuspension model for crossflow microfiltration" Chem. Engng. Sci. 53 (19), 3469-3481, 1998.
9. A. Diaz, N. Pelekasis & D. Barthes-Biesel "Transient deformation of a capsule suspended in straining flow", Phys. Fluids 12(5), 948-957, (2000).
9. N. A. Pelekasis, J. A. Tsamopoulos, "Linear stability of a gas boundary layer flowing past a thin liquid film that grows over a flat plate", J. Fluid Mech, 436, 321-352, (2001).
10. D. N. Smyrnaios, N. A. Pelekasis & I. A. Tsamopoulos, "Boundary layer flow of air past solid surfaces in the presence of rainfall" J. Fluid Mech, 425, 79-110, (2000).
11. N. A. Pelekasis C. Economou & J. A. Tsamopoulos, "Linear oscillations and stability of a liquid bridge in a DC electric field:" Phys. Fluids 13 (12): 3564-3581 (2001).
12. A. Diaz, N. Pelekasis & D. Barthes-Biesel "Effect of membrane viscosity on the dynamic response of an axisymmetric capsule" Phys Fluids 13 (12): 3835-3838 (2001).

13. D. N. Smyrnaios, N. A. Pelekasis & I. A. Tsamopoulos, Two phase boundary layer flow in laminar film condensation over a horizontal tube. Phys. Fluids 14 (6): 1945-1957, (2002).
14. N. A. Pelekasis, A. Gaki, A. Doinikov & J. A. Tsamopoulos, Secondary Bjerknes forces and the phenomenon of acoustic streamers. J. Fluid Mech., 500, 313-347, 2004 (2004).
15. D. G. Talaslidis, G. D. Manolis, E. Paraskevopoulos, C Panagiotopoulos, N. A. Pelekasis & J. A. Tsamopoulos, Risk analysis of industrial structures under extreme transient loads. Soil Dynamics & Equake Engng 24(6), pp. 435-448 (2004).
16. E Lac, D. Barthes-Biesel, N. Pelekasis & J. Tsamopoulos, " Spherical capsules in three-dimensional unbounded Stikes flows: effect of the membrane constitutive law and the onset of buckling " J. Fluid Mech., 516 303-334, 2004.
17. K. Tsiglifis & N. Pelekasis, 'Non-linear oscillation and collapse of elongated bubbles subject to weak viscous effects', *Physics of Fluids,17(10),* 1-18, 2005.
18. N. Pelekasis "Bifurcation Diagrams, Linear Stability Analysis and Dynamic Simulations of Free Convection in a Differentially Heated Cavity in the Presence of a Magnetic Field", *Physics of Fluids 18(3),* 1-23, 2006.
19. K. Tsiglifis & N. Pelekasis, "Numerical simulations of the collapse of laser and acoustically generated bubbles", Ultrason. Sonochem.14(4), 456-469, 2007.
20. K. Tsiglifis & N. Pelekasis, 'Non-Linear Oscillations and Collapse of Elongated Bubbles Subject to Weak Viscous Effects: Effect of Internal Overpressure', Physics of Fluids, [19] 072106, 2007.
21. K. Tsiglifis & N. Pelekasis, 'Radial oscillations of insonated contrast agents – Effect of the membrane constitutive' Journal of the Acoustical Society of America, 123(6), p. 4059-4070, 2008.
22. Thomas DH, Looney P, Steel R, N. Pelekasis, W. N. McDicken, T. Anderson, and V. Sboros 'Acoustic detection of microbubble resonance', Applied Physics Letters 94 **(** 24)**:** 243902 2009.
23. M. Vlachomitrou, & N. Pelekasis, "Nonlinear interaction between a boundary layer and a liquid film", J. Fluid Mech, **638** 199-241, 2009.
24. M. Vlachomitrou & N. Pelekasis "Short to long wave resonance and soliton formation in boundary layer interaction with a liquid film**"**. J. Fluid Mech. **660**, 162-196, 2010.
25. K. Tsiglifis & N. Pelekasis, 'Parametric Stability and Dynamic Buckling of an Encapsulated Micro-Bubble subject to Acoustic Disturbances' Phys Fluids, [23] 012102, 2011.
26. D. Dimopoulos & N. Pelekasis "Three dimensional stability of free convection vortices in the presence of a magnetic field" Fluid Dyn. Res. 44 (2012) 031405 (16pp).
27. K. Tsiglifis & N. Pelekasis, "Dynamic simulations of insonated contrast agents", Physics of Fluids 25, 032109 (2013).
28. Thomas DH, Looney P, Butler M, N. Pelekasis, W. N. McDicken, T. Anderson, and V. Sboros 'The fate of lipid shelled microbubbles in response to consecutive ultrasound pulses', Phys. Med. Biol. 58 (2013) 589–599.
29. D. Dimopoulos & N. Pelekasis "3d Stability analysis of Rayleigh- Bénard Convection of a liquid metal layer in the presence of a magnetic Field – Effect of wall electrical conductivity", Fluid Dyn. Res. 46 (2014) 055507, (31 pp).
30. N. Pelekasis, L. Benos & R. Gomes "Deflection of a liquid metal jet/drop in a tokamak environment", Fusion Engineering and Design 89 , 2930–2936, 2014.
31. A. Lytra & N. Pelekasis, "Static Response and Stability of Coated Microbubbles – Multiplicity of Solutions and Parameter Estimation", Fluid Dyn. Res. 46 (2014) 041422 (21pp).
32. A. Lytra & N. Pelekasis, "Static response of coated microbubbles: Modeling simulations and parameter estimation" Procedia IUTAM 16 (2015) 123 – 133.
33. S. Kakarantzas, B. Knaepen, M. Caby, L. Benos, I. Sarris and N. Pelekasis, Investigation of various nozzle configurations with respect to IFMIF and liquid walls concepts, Fusion Engineering and Design , 98–99, 1337-1340, 2015.
34. N. Pelekasis, L. Benos, (2016), Static Arrangement of a Capillary Porous System (CPS): Modelling, Fusion Eng. and design 117, 180-187, 2017.
35. M. Vlachomitrou & N. Pelekasis " Dynamic simulation of a coated microbubble in an unbounded flow: Response to a step change in pressure", JFM 822, 717-761 (2017).

36. K. Efthymiou, N. Pelekasis, MB Butler, D.H. Thomas and V. Sboros " The effect of resonance on transient microbubble acoustic response; experimental observations and numerical simulations", under review in the J. Acoust. Soc. America, 2018.
37. A. Lytra & N. Pelekasis, Static response of coated microbubbles compressed between rigid plates: Simulations & asymptotic analysis including elastic and intermolecular forces, under review in the Physics of Fluids.

2. Monographs

1. N. Pelekasis "Numerical Simulations of Bubble Dynamics". "Bubble and Particle Dynamics in Acoustic Fields: Modern Trends and Applications". Editor A. Doinikov, the Transworld Research Network Publishers, 2006.

3. Selected Presentations from International Conferences

The results of the above research activities, besides being published in well reputed international scientific journals, have resulted in a number, ~70, of oral presentations in well-established international and Greek refereed conferences. A list of selected such presentations follows.

1. N. A. Pelekasis, J. A. Tsamopoulos, "Nonlinear dynamics of a liquid shell.", 83d Annual AIChE Meeting, Nov. 1990. Abstract in Book of Extended Abstracts of AIChE, abstract 161G , 1990
2. N. A. Pelekasis, J. A. Tsamopoulos, "Nonlinear interactions between bubbles: A study on Bjerknes forces.", 84th Annual AIChE Meeting, Nov. 1991. Abstract in Book of Extended Abstracts of AIChE, p. 214, 1991.
3. N. A. Pelekasis, J. A. Tsamopoulos, "Bjerknes forces between two bubbles: Response to an oscillatory pressure field.", 85th Annual AIChE Meeting, Nov. 1992. Abstract in Book of Extended Abstracts of AIChE, p. 193, 1992.
4. N. A. Pelekasis & J. A. Tsamopoulos "Bjerknes forces between two bubbles", 3d EUROMECH Meeting, Goettingen Germany 1997. Abstract in Book of Abstracts of EUROMECH, 1997.
5. N. A. Pelekasis & J. A. Tsamopoulos "Forced convection and sedimentation in shear flows.", 3d EUROMECH Meeting, Goettingen 1997. Abstract in Book of Abstracts of EUROMECH, 1997.
6. N. A. Pelekasis & J. A. Tsamopoulos "Linear stability of a gas boundary layer flowing past a thin liquid film over a flat plate". 4th EUROMECH Fluid Mechanics Conference, Eindhoven Netherlands, Nov., 2000.
7. A. Gaki, N. A. Pelekasis, A. Doinikov & J. A. Tsamopoulos, "Secondary Bjerknes forces and the phenomenon of acoustic cavitation". 4th EUROMECH Fluid Mechanics Conference, Eindhoven Netherlands, Nov., 2000.
8. E Lac, N. Pelekasis, D. Barthes-Biesel, J. Tsamopoulos, "Deformation and break-up of capsules in simple shear flow." 54th Annual Meeting of Amer. Phys. Soc. Div. of Fluid Dynamics, Nov. 2001. Abstract in Bull. Amer. Phys. Soc.
9. E Lac, D. Barthes-Biesel, N. Pelekasis, J. Tsamopoulos, "Deformation of bio-artificial capsules in hyperbolic flow; influence of membrane rheology" Presentation in the 5th EUROMECH Fluid Mechanics Conference, Toulouse France, August, 2003
10. K. Tsiglifis, N. Pelekasis & V. Sboros, "Modelling of SonoVue™ Microbubbles in an Ultrasound Field", 10th European Symposium on Ultrasound Contrast Imaging, Rotterdam January, 2005. Article in conference proceedings, pp. 15-21.
11. K. Tsiglifis, N. Pelekasis "Weak Viscous Oscillations and Collapse of Elongated Bubbles" 98th Annual AIChE Meeting, Oct. 2005., Session 1J2, 2005.
12. K. Tsiglifis & N. Pelekasis, "Axisymmetric oscillations and collapse of an encapsulated microbubble subject to acoustic disturbances" Presentation in the 6th EUROMECH Fluid Mechanics Conference, Stockholm Sweden, July, 2006.
13. M. Vlachomitrou & N. Pelekasis, " Abstract title: Spatiotemporal evolution of Interfacial Waves between a Gas Boundary Layer and a Thin Liquid Film" Presentation in the 6th EUROMECH Fluid Mechanics Conference, Stockholm Sweden, July, 2006.

14. K. Tsiglifis, N. Pelekasis, “Non-linear oscillations and collapse of encapsulated microbubbles subject to ultrasound”, 12th European Symposium on Ultrasound Contrast Imaging, Rotterdam January, 2007. Abstract in conference proceedings, p. 52.
15. K. Tsiglifis, N. Pelekasis, “Characterization of UCA Behaviour - Stability and Simulations”, 13th European Symposium on Ultrasound Contrast Imaging, Rotterdam January, 2008. Abstract in conference proceedings.
16. N.A. Pelekasis & K. Tsiglifis, “Stability and Simulations of pulsating contrast agents”, Acoustics 2008, Paris.
17. N.A. Pelekasis, K. Tsiglifis, B. Dollet, N. de Jong, D. Lohse & M Versluis, Non-linear extensions to shell models of ultrasound contrast agents: theory and experiment” Acoustics 2008, Paris.
18. N.A. Pelekasis & D. Dimopoulos, Magnetic Field Effects on Three Dimensional Stability of Natural Convection Flows in Differentially Heated Cavities, Presentation in the 7th EUROMECH Fluid Mechanics Conference, Manchester England, September, 2008.
19. V Sboros[1], E Glynos, N. Pelekasis, V Koutsos 2008 Nano-interrogation of a lipid shelled microbubble, IEEE International Ultrasonics Symposium, Beijing, China.
20. N. Pelekasis & D. Dimopoulos, 2009 ‘Magnetic Field Effects on Three Dimensional Stability of Natural Convection Flows in Differentially Heated Cavities’, 3rd Int. Symp. on Bifurcations and Instabilities in Fluid Dynamics, Nottingham, UK, Aug. 2009.
21. D. Dimopoulos & N.A. Pelekasis, Magnetic Field Effects on Three Dimensional Stability of Natural Convection Flows in Differentially Heated Cavities, Presentation in the 8th EUROMECH Fluid Mechanics Conference, Munich Germany, September, 2010.
22. N. Pelekasis & M. Vlachomitrou " Resonance and soliton formation in Interfacial Waves between a Gas Boundary Layer and a Thin Liquid Film" Presentation in the 8th EUROMECH Fluid Mechanics Conference, Munich Germany, September, 2010.
23. D. H. Thomas, P. Looney, M Butler, N. Pelekasis, T. Anderson, and V. Sboros, “The fate of microbubble spectral behaviour in the presence of a sequence of pulses**”** 16th European Symposium on Ultrasound Contrast Imaging, Rotterdam 2011. Best technical poster prize.
24. N. Pelekasis & K. Tsiglifis “Transient break-up, saturated pulsations and static/dynamic buckling of insonated contrast agents - effect of the constitutive law and characterization”, XXIII ICTAM, Beijing, China, 19-24 August 2012.
25. D. Dimopoulos & N. Pelekasis “Magnetic field effects on three dimensional stability of natural convection flows in differentially heated cavities”, XXIII ICTAM, Beijing, China, August 2012.
26. K. Efthymiu, K. Tsiglifis, S. Serpetzi & N. Pelekasis "Static and Dynamic Analysis of Contrast Agents – Parameter Estimates and the Effect of Constitutive Law”, 8th EUROMECH Conference, Rome Italy, September, 2012.
27. K. Efthimiu & N. Pelekasis “Acoustic interaction between a coated microbubble and a nearby surface – Steady pulsations vs. transient break-up” BIFD13, Haifa, Israel, July 8-11, 2013.
28. A. Lytra & N. Pelekasis “Static response and stability of coated microbubbles as a means of parameter estimation ” BIFD13, Haifa, Israel, July 8-11, 2013.
29. A. Lytra & N. Pelekasis “Static response of coated microbubbles: Modeling simulations and parameter estimation” DYNACAPS, Compiegne, France, July 15-18, 2014.
30. D. Dimopoulos & N. Pelekasis “Magnetic Field Effects on 3D Stability of Natural Convection Flows in Differentially Heated Cavities ”, EFMC10, Copenhagen, Denmark, 2014.
31. K. Efthimiu & N. Pelekasis “Acoustic interaction between a coated microbubble and a rigid boundary” 20th European Symposium on Ultrasound Contrast Imaging, Rotterdam, 2015.
32. Lytra, Pelekasis, Zafiropoulou, Zisis, Giannakopoulos, Sboros, Glynos, Koutsos, « *Static response of coated microbubbles: Modelling simulations and parameter estimation* », 8GRACM, Volos, Greece, July 12-15, 2015.
33. Vlachomitrou M. and Pelekasis N. “A numerical study of the dynamic behavior of an encapsulated microbubble in a wall-restricted flow » ECCOMAS Congress Greece, 2016.
34. Lytra A. & Pelekasis N. “Numerical study on the static response of contrast agent microbubbles”, 22nd European Symposium on Ultrasound Contrast Imaging, 19-20 January 2017, Rotterdam.
35. A. Lytra, K. Efthimiou, M. Vlachomitrou & N. Pelekasis “Static and dynamic response of coated microbubbles”, 8th Int. Meeting of the Hellenic Society of Rheology, Larnaka 2017.
36. A. Lytra & N. Pelekasis, Numerical study on the static response of a coated microbubble, FLOW

17 Conference, Paris France July, 2017.

4. Citations

The above publications have received 500 citations in well reputed international journals, according on the Web of Science Core Collection Citation Report (h index 13).

5. Invited lectures

1. N. A. Pelekasis "Bjerknes forces between two bubbles" Invited lecture in the context of the "Sejours Scientifiques en France" CNRS program, Universite de Technologie de Compiegne, France, Oct, 1997.
2. N. A. Pelekasis "Bubble-bubble interactions - Long wave instabilities in the interface between a growing water film and a gas stream." Invited lecture at Shell Research, Amsterdam, Nov., 1997.
3. N. A. Pelekasis, D. N. Smyrnaios & I. A. Tsamopoulos, "Stratified boundary layer flow of a gas stream and a liquid film past solid surfaces.", Invited talk at the 3d International Meeting of the Hellenic Society of Rheology Dedicated to Professor Acrivos, Patras, 2001.
4. N. A. Pelekasis "Stability of stratified two-phase flow", Dpt. of Mechanical & Industrial Engineering, University of Thessaly, Volos, 2001.
5. N. A. Pelekasis «Dynamic phenomena and applications in flows involving bubbles drops and thin films» Chemical Process Engineering Research Institute (CPERI), Thessaloniki, May 5th 2006.
6. N. A. Pelekasis "Viscoelastic Modelling, Stability Analysis and Numerical Simulations as a means to characterize Contrast Agents" Physics of Fluids Lab, University of Twente, Enschede, September 2007.
7. N. A. Pelekasis "Stability and simulations of pulsating contrast agents" Dpt. Of Biomedical Engineering, Institute for Materials and Processes, University of Edinburgh, September, 2008.
8. N. Pelekasis "Static and Dynamic Analysis of Contrast Agents – Parameter Estimates and the Effect of Constitutive Law" Imperial College, London, 2013.
9. N. Pelekasis "Static and dynamic response of coated microbubbles as a tool for shell parameter estimation" Imperial College, London, 2016.

III. RESEARCH PROJECTS

I. Assistant/Associate/Professor **11/2001-**
Dpt. of Mechanical Engineering, University of Tessaly, **Volos Greece**

Actively involved in research and the coordination of Greek & European research projects in the context of the following projects.

NIARXOS Foundation Scholarship 2018-

"Interaction between a coated microbubble and a nearby wall- Effect of viscoelastic, intermolecular and acoustic forces" Research Project funded by the Niarxos Foundation with a budget of ~50000 €.

ARISTEIA I 2012-2015

"Characterization of Contrast Agents for Medical Imaging and Drug Delivery with Ultrasound via Theoretical & Numerical Analysis of Static & Dynamic Response". Research project funded by the Greek Ministry of Education, carried out by the group led by Dr. Pelekasis as Coordinator. The total funding was 325000 € and covered the salaries of 2 PhD candidates and 3 Post Docs. Details on the activities of the project are provided in the wiki http://contrast-aristeia.mie.uth.gr/wiki/.

The ARISTEIA I project provided convincing evidence regarding the mechanical behaviour of coated microbubbles as well as ways to obtain reliable estimates of their viscoelastic properties via static and acoustic measurements and the corresponding static and dynamic response patterns. The NIARXOS project is targeted towards the investigation of different numerical tools, to

evaluate and distinguish the acoustic signatures of coated microbubbles in adhesion and free circulation in narrow capillaries.

EURATOM, WP13-DAS, WPDTT1-LM5 2008-
"Modelling activities of liquid metal PFC (Plasma Facing Components) solutions". Participation in the EUROPEAN fusion project and the Work Package WPDTT1 dedicated to the use of liquid metals as plasma facing components in the divertor region of fusion reactors; funding ~35000 € per year. Dr. Pelekasis is the coordinator of the activity that focuses on the modelling of a capillary porous system (CPS) as a means to deliver liquid metal to the interface with plasma.
"MHD turbulent transport in the blanket of plasma reactors" Participation in the EUROPEAN fusion project and the Work Package WP13-DAS; funding ~20000 € per year. Numerical and theoretical study in MHD stability aiming at heat transfer intensification in the presence of strong magnetic fields and free/force convection effects during transition to turbulence. Effect of the dynamics of transition on convective effects.

HRAKLEITOS I & II I (2003-2007) and II (2011-2015)
"Numerical study of the oscillations and interaction of acoustic and laser induced bubbles" and "Dynamic interaction between coated microbubbles (contrast agents) and a nearby wall in the presence of acoustic disturbances" as Principal Investigator. Funding by the Greek Ministry of Education. Allocated amounts are 35000 € and 45000 €, respectively.
The framework of HRAKLEITOS I initiated research in the field of contrast agent dynamics in the University of Thessaly and entailed numerical and theoretical analysis of radial and axisymmetric pulsations, where the effect of shell constitutive law on the microbubble dynamics was first pointed out. Consequently, the need to treat the shell as a viscoelastic solid rather than a viscoelastic liquid was pointed out along with the necessary parameters for describing shell mechanical properties. Boundary element and finite element simulations of pulsating microbubbles near a rigid or compliant wall were performed in the context of HRAKLEITOS I and II, in order to get a first assessment on the effect of boundaries on the acoustic signature of contrast agents. Radial pulsations were also examined in conjunction with acoustic measurements from the collaborating group from the University of Edinburgh that verified the nonlinear nature of the phospholipid shells and the importance of sub-harmonic resonance as a means to optimize contrast.

PENED 2002-2008
"Effect of rainfall on the flight characteristics of an airfoil", in collaboration with the Greek Aerospace Industry and research groups from the Dpts of Mechanical and Chemical Engineering of the University of Patras. Funding agency: Greek Ministry of Research. Total funding 120000 €. Research and student supervision in the field of nonlinear boundary layer-liquid film interaction. Development of finite element code with high order basis functions, and nonlinear stability analysis to recover soliton formation.

Supervision of Ph.D Dissertations

1. K. Tsiglifis (2002-2007), "Numerical study of bubble dynamics in an ultrasound environment" funded by HRAKLEITOS I
2. M. Vlachomitrou (2003-2008), "Numerical study of boundary layer interaction with a liquid film flowing over a solid surface" funded by PENED.
3. D. Dimopoulos (2008-2013), "3d magnetohydrodynamic stability analysis of free and forced convection flows in ducts of rectangular cross section" funded by EURATOM (WP13 DAS).
4. K. Efthimiu (2010-2015), "Numerical study of the interaction between a coated bubble and a nearby surface" funded by HRAKLEITOS II.
5. A. Lytra (2012-2017), "Numerical & theoretical study of the static response of coated microbubbles subject to uniform and distributed load-apllication on the estimation of the shell elastic properties, funded by ARISTEIA I.

6. L. Benos (2013-2018), “First principles study of the static arrangement of a plasma facing component in the form of a capillary porous system (CPS)”, funded by EURATOM (WPDTT1).

II. Research Associate 10/96-9/2001

Department of Chemical Engineering, University of Patras Patras, Greece

Performed research of Greek & European research projects in the fields of bubble/drop, film and liquid bridge dynamics, and supervision of graduate students, in collaboration with Pr. Tsamopoulos.

KARATHEODORI 1999-2002

“Stability analysis of flow, heat transfer and film condensation from a stream of saturated vapour onto a cool surface” funded by the University of Patras Research Committee. Budget ~20000 €. Research and student supervision in the field of stability of boundary layer film interaction and its effects on heat transfer.

INCO-COPERNICUS PL971257, 1998-2002

"Cavitation phenomena in wastewater treatment". Funded by the European Commission, Directorate General XII. Total Budget 235000 €. Participating groups: University of Goettingen, Drittes Physikalisches Institut, Belorussian State University, University of Ufa, Russia. Research and student supervision in the field of bubble dynamics and multi bubble interaction aiming at energy localization and intensification. Collaborative research with Dr. Doinikov from Belarussia State University in bubble-bubble interaction with viscous effects.

IKYDA 2001-2003

“Study of bubble-bubble interaction coalescence and break-up” Bilateral Greek-German program funded by the corresponding fellowship agencies of the two countries. Total budget ~15000 €. Participating German Institution “University of Goettingen, Drittes Physikalisches Institut”. Exchange visits and research for studying bubble dynamics with application in the acoustic cleaning of surfaces.

PENED 1996-1998

“Stability analysis of stratified gas-liquid flow” funded by the Greek Secretariat of Research; budget 22000 €. Performed research in the field of film/boundary layer interaction.Project that supported young researchers and funded my first years of research in Greece.

Co-advising of Graduate Students

D. Smyrnaios (Ph.D) 1996-2002

“Interfacial phenomena and hydrodynamic instabilities in two-phase flows” Supervision in the framework of the KARATHEODORI research program of the University of Patras.

III. Visiting Researcher

1997-2002

Universite de Technologie de Compiegne Compiegne, France

In the framework of the "Sejours scientifiques en France" CNRS program, in conjunction with the FrancoHellenic "PLATO" program. Research in the field of Biomechanics and supervision of graduate students in collaboration with Pr. Barthes-Biesel. The effect of the constitutive law that is governing the mechanics of the shell surrounding composite particles such as capsules, i.e. encapsulated liquid drops, was studied in the presence of an external shear flow. Axisymmetric and 3d static and dynamic effects were considered via a boundary element formulation.

Co-advising of Graduate Students

Anna Diaz 1997-2000

“Transient behavior of an axisymmetric capsule in Stokes flow”

Etienne Lac 2000-2004

“Deformation and transport of a capsule in an unbounded three dimensional Stokes flow”