

CURRICULUM VITAE

KYRITSIS APOSTOLOS

Assist. Professor, Physics Department, NTUA

Personal Information

Name **KYRITSIS APOSTOLOS**
Address **KRONOU ST. 4-8, 15 235, CHALANDRI , ATTICA**
Telephone **210 7723053 (home 210 6009374)**
E-mail akyrits@central.ntua.gr
Nationality **Greek**
Family status Married, two children
Military services Done in air force in the period from 06/09/1994 until 06/06/1996

PROFESSIONAL EXPERIENCE

14/07/2010 –

National Technical University of Athens, School of Applied Mathematical and Physical Sciences,
Department of Physics – **Assistant Professor**

Educational and research work, participation in administrative committees

3/10/2005 – 13/7/2010

National Technical University of Athens, School of Applied Mathematical and Physical Sciences,
Department of Physics – **Lecturer**

Educational and research work, participation in administrative committees

2001 - 2005

Greek Standardization Body, ELOT SA, **Certification Division**

Quality Management system auditor

20/4/2000 – 30/9/2005

Greek Standardization Body, ELOT SA, **Standardization Division**

Technical officer in charge of standardization activities mainly in the Materials, Energy, Information and
Communication Technologies (ICT) and Service sectors

1998 – 1999

Greek State Scholarships Foundation (I.K.Y.), scholarship for postdoctoral research - **Postdoctoral
Researcher**

Principal investigator – coordinator of the project “*Study of electrical and dielectric properties of solid materials, emphasizing on their dielectric behavior in alternating electric fields at low frequencies*” in collaboration with Physics Department in the University of Athens (prof. P. Varotsos) and Physics Department in the National technical University of Athens (prof. P. Pissis).

1997 – 1998

National Technical University of Athens, Physics Department – **Scientific collaborator**

Principal investigator in a European research project on electrotechnical standardization issues, with title “*CERAMELEC - Electrotechnical characteristics of advanced technological ceramics and their measurements*” in collaboration with European Committee of Electrotechnical Standardization CENELEC (WG 1 of CLC/BTTF 63-2)

1996 – 1998

University of Athens, Physics Department – National Technical University of Athens, Physics Department – **Scientific collaborator**

Research associate, participation in European and national research projects

ACADEMIC QUALIFICATIONS

1989 – 1994

University of Athens, Physics Department

Ph D in Materials Science – Physics (Grade: Excellent)

1984 – 1988

University of Athens, Physics Department

B.Sc. in Physics (Grade: Excellent)

1981 – 1984

Secondary Education level, High School in Kalampaka, Greece

High school diploma (Grade: Excellent)

TRAINING

2004 (26th of May - 17th of June)

Hellenic Management Association (EEΔE)

Training seminar (40 hours) «*Project Management*»

2003 (12-13 April)

Greek Standardization Body, ELOT SA

Training seminar for auditors of Quality Management Systems (20 hours) «*Analysis of the requirements of the standard EAOT EN ISO9001:2000 and Internal Audits*»

2000 (October)

Greek Standardization Body, ELOT SA

Training seminar for auditors of Quality Management Systems (24 hours) «*Auditing Quality management Systems*»

2000 (JULY)

European Center of High Technology, EUCAT S.A.

Training seminar (16 hours) «*Introduction to Quality Assurance and the standard EAOT EN ISO 9001*»

1993 (May and November)

National Technical University of Athens (NTUA)

Committ seminars «*Characterization of Polymers and Composite Materials*» and «*Polymeric Composite Materials*».

SCIENTIFIC ACTIVITIES

TEACHING ACTIVITIES

- Teaching activities at NTUA, as Lecturer and, later, as Assist. Professor include:
 - Teaching basic course, at graduate level, of **Physics I** (Mechanics) for the School of Chemical Engineering (1st semester course), NTUA, in the period 2006 – 2014.
 - Teaching basic course, at graduate level, of **Physics II** (Electromagnetism) for the School of Chemical Engineering (2nd semester course), NTUA, in the period 2006 – 2014.
 - Teaching advanced course, at graduate level, in the field of experimental physics with the title “**Experimental Physics Techniques**” for the School of Applied Mathematical and Physical Sciences (9th semester course), NTUA, in the period 2011 – 2015.
 - In the running semester my teaching activities are as follows:
 - Graduate level
 - “**Materials Science**” basic course for all the students following Applied Physics direction (7th semester course)
 - “**New advanced materials**” advanced course in the field of materials science (9th semester course)
 - “**Methods of Materials Characterization**” advanced course in the field of materials science (8th semester course)
 - “**Polymers and Nanocomposites**” advanced course in the field of materials science (8th semester course)
 - Postgraduate level
 - “**Science of glasses and nanocomposite materials**” (2nd semester of MSc Program “Materials science and technology”)
 - “**Advanced laboratory exercises for materials I & II**” (1st and 2nd semester of MSc Program “Materials science and technology”)
 - “**Organic nanomaterials**” (2nd semester of MSc Program “Microsystems and nanodevices”)
 - “**Experimental methods of condensed matter and optoelectronics-II**” (2nd semester of MSc Program “Physics and technological Applications” – laboratory exercises)
 - Other teaching activities
 - Managing and teaching **laboratory exercises** (experimental part) of the basic course “Physics of Condensed Matter” (6th semester course), in the period 2006 – 2014.
 - **Supervisor of 2 PhD theses** (ongoing activity):
 - Thesis of Chris Chatzimanolis-Moustakas with title “*Nanocomposite polymeric materials for gas sensing applications*”
 - Thesis of Dionysia Aravopoulou with title “*Study of molecular dynamics and phase transitions in complex water-biomaterials systems*”
- Member of another 2 advisory committees for PhD theses (in the physics department, NTUA)
- **Supervisor** of 10 diploma theses of students of our School and of 8 master theses of students of 2 MSc programs.
 - In the period 2005 – 2014, **member of the committee** “Educational laboratories” of Physics department. During the period 2008 – 2014 I was acting as coordinator of this committee.
 - Since 2006 member of the committee of **Practical Exercise** of our School, representing the Physics Department.
 - Scientific responsible for **Erasmus** bilateral educational agreement with the Universität des Saarlandes, Saarbrücken, Germany (Prof. Rolf Pelster) since 2006. The duration of this collaboration was extended to 2021.

- As staff member of Greek Standardization Body, ELOT SA, Standardization Division, my teaching activities include:

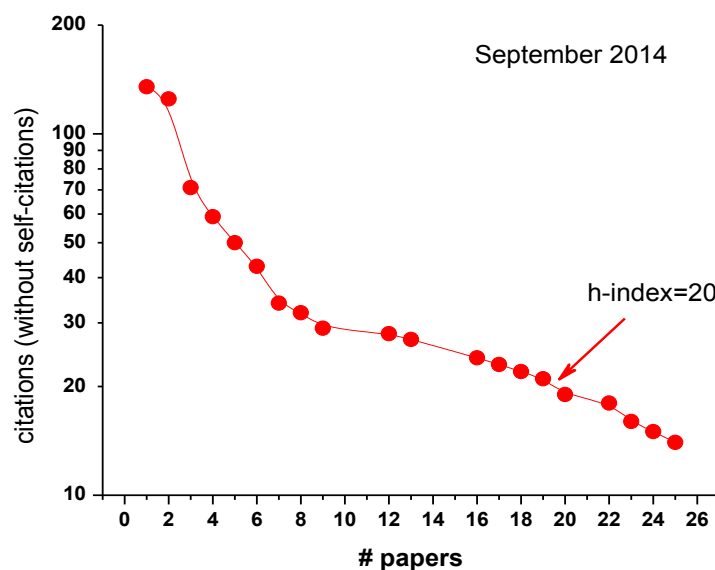
– Tutor in training 2-days seminar intended for public servants in the field of *Market surveillance according to the New Approach requirements* (November 2001, under the auspices of General Secretariat of Industry, Ministry of Commerce and Development). All the necessary teaching material had been developed by the three (in total) tutors.

– Tutor in a 3-day seminar held in Skopje (FYROM) with title “*Effective industry and business participation in standardization activities*” intended to staff members of various national institutions and governmental agencies of FYROM (6 – 8 June 2005). I was the sole tutor in the seminar and I had prepared the teaching material. The aim of the seminar was the introduction of concepts like, standardization activities at national and international level, organization of standardization committees, rules of participation and effectiveness of standardization procedures and the dissemination of best practice methodologies.

RESEARCH ACTIVITIES

• Publications

In **List of Publications** file are given the lists of my publications in refereed scientific journals (**78** in total), in refereed international conference proceedings (**33**) and the chapter books (**3**), as well. The following diagram has been constructed for the estimation of h-index of my published work, taking into account the citations appeared in the data base of ISI Web of Science in September 2014 (excluding the self-citations).



The analysis reveals a value of $h = 20$ for h-factor. In addition, my published work was **cited 1117 times (excluding the self-citations)** (September 2014, data base ISI Web of Science)

• Research Interests

My main research interests (related with published work) are the following:

① ***The investigation of electrical, dielectric and thermal properties of various materials and their corresponding characterization***

The list of materials investigated include ionic crystals (publ. 1, 3, as appeared in **List of Publications**), heterogeneous porous inorganic materials, like rocks, zeolites, clays and Vycor glass (publ. 33, 56, CP2 and CP4), advanced ceramic materials and other technological important materials, like Nylon 11 and resins for dental applications (publ. 34, 38, 42, 61 and PC12). The main part of this work deals, however, with polymers and composite polymeric materials, like copolymers and blends, hybrid polymeric systems, ionic polymers, hydrogels,

mixtures of polymers with various solvents (publ. 8, 13, 15, 20, 24, 27, 28, 35, 39, 41, 47, 50, 52, 57, 58, 62, 69, 78, CP3, CP5, CP7, CP9 and in No 3 in the list of the chapters in books in List of Publications)

② **The structure – property relationship in nanocomposite polymers**

Nanostructures are formed either due to phase separation of components in a multiphase system or due to dispersion of nano-inclusions within a polymer matrix. Special attention has been paid, last years, to interfaces and interphases in polymer nanocomposites, PNC, with inorganic inclusions, like metal oxides, clay, carbon nanotubes or graphene. Recently, my investigations were extended to a new type of PNC, the so-called core-shell type, where the polymers are adsorbed onto the surface of metal oxides, like silica or titania. In such PNCs the fraction of polymer at the interface can be tuned and the results can be compared with results obtained on model systems of thin polymer films or of confined macromolecules (publ. 16, 23, 29, 30, 31, 36, 39, 41, 46, 49, 50, 51, 52, 53, 61, 62, 68, 69, 70, 77, 78, CP7, CP8, CP9, CP13, CP25, CP31, CP33 and in No 1 and 3 in the list of the chapters in books in List of Publications).

Part of my research work is dedicated also to the investigation of phase separation in various complex polymeric systems by using Broadband Dielectric Spectroscopy, BDS, techniques, usually in combination with other methods for materials characterization (publ. 20, 24, 25, 26, 28, 30, 32, 35, 36, 40, 43, 48, 57, 63, 65, CP8, CP10, CP15, CP17, CP20, CP23 and in No 3 in the list of the chapters in books in List of Publications).

③ Major part of my research work deals with the **hydration properties of various materials** (organic, like polymers, and porous inorganic, like natural rocks, as well) and the investigation of water-matrix interactions. This topic was also the subject of my PhD thesis. More specifically:

– Employing the dielectric techniques of BDS and Thermally Stimulated Depolarization Currents, TSDC, I have investigated the hydration properties of many synthetic polymeric systems (both, hydrophobic and hydrophilic). In parallel, Sorption Isotherm measurements for water uptake and/or desorption, combined with dynamic water diffusion studies provide additional information about water distribution, water clustering and specific water-matrix interactions. Usually, Differential Scanning Calorimetry, DSC, measurements are also employed in order to study matrix plasticization effects, water crystallization/melting events and other phase transitions which may be affected by the water absorbed (publ. 5, 6, 7, 8, 10, 11, 13, 14, 15, 21, 22, 25, 34, 37, 42, 44, 47, 56, 64, 65, 70, 72, CP1, CP5, CP6, CP10, CP16, CP20 and CP22).

– Recently, my research interests were extended to the hydration properties of biomaterials and biological materials, like proteins and polysaccharides, as well. In these studies we focus on the interactions among water molecules and macromolecules and we study systematically water super cooling effects, uncrystallized water dynamics and various ice-like structures of water formed within those structures (publ. 55, 60, 66, 67, 71, 72, CP4, CP19, CP23, CP24 and CP23).

– Following similar methodology like in the case of synthetic polymers, I have investigated also the hydration properties of natural rocks and clays. Worth noticing here, that my post-doctoral project in 1998 – 1999 was dealing with the comparison of low frequency dielectric properties of various hydrated heterogeneous materials as different as natural rocks and proteins (publ. 9, 33, 38 and CP14).

– For better understanding of the interactions between polymers and water we extended our investigations in mixtures of polymers with other small molecules, non-polar or polar organic solvents. The aim of these studies is to reveal the specific characteristics of polymer plasticization in the case where no strong intermolecular interactions occur and in parallel to investigate the crystallization and melting of solvent phase under these conditions. The comparison with the behaviour of aqueous mixtures will lead to useful conclusions (publ. 54, 59, CP18 and CP21)

④ **Molecular dynamics under spatial confinement**

The interest here is focus on:

– The investigation of water properties confined in various environments, like in the pores of inorganic medium (Vycor glass, gelsil, zeolite) or of polymer matrix (hydrophobic Butyl rubber or hydrophilic PHEA). In addition the effects of confinement on the glass transition of glass forming liquids have also been investigated (publ. 12, 17, 18, 19, CP2 and CP11).

– The effects of spatial confinement on the glass transition of polymers, like of PEO chains confined within PBO crystallites in PEO-PBO copolymers of various architectures and of PPO chains terminated with amine groups, the so-called Jeffamines, confined in the clay galleries during intercalation (publ. 28, 32, 45, CP17 and in No 2 in the list of the chapters in books in List of Publications)

⑤ **The use of dielectric measurements as a tool for various applications**

– Monitoring in situ the polymerization process, e.g. curing process, at various temperatures and environments (argon, nitrogen atmosphere or vacuum) using mainly interdigitated electrodes for signal recording.

– Investigation of gas sensing ability of various materials by in-situ recording the changes in dc electrical conductivity or in ac electrical response during the variation of the surrounding atmosphere. For the moment we can control the atmosphere with respect to alcohols and organic solvent vapours and ammonia gas, as well (apart the relative humidity, of course). Recently, our lab has procured the TA Sorption Analyzer VTI-SA which permits the investigation of the mass change of a material under environmental changes that can be similar to those in the set-up for the electrical measurements. Thus, we expect to have soon results from both experimental set-ups on the same materials, relating in this way the changes in electrical response with the mass of molecules absorbed into the matrix and their particular organization. This is the main subject of the PhD thesis of Mr. Ch. Chatzimanolis-Moustakas, thesis that is under my supervision (publ. PC26).

- Health monitoring studies on various polymer composites. In collaboration with the laboratory of mechanical tests in the Department of Mechanics in our school, we have developed a measuring set-up for simultaneous recording of both, strength-stress and electrical response of various polymer composites (publ. 76, CP27, CP28, CP29 and CP30)

⑥ **Synthesis and physical characterisation of polymeric scaffolds** for tissue engineering or regenerative medicine applications. In the framework of our collaboration with the *Center of Biomaterials and Tissue engineering* in Valencia, Spain (recently on the basis of NARGEL program) we work intensively on highly porous polymeric materials reinforced with silica, which are promising candidates for scaffolds in bone tissue engineering (publ. 73, 75).

⑦ On the basis of recently established collaborations with the Soft mater Group at Technical University of TUM (prof. C. M. Papadakis) and the Theoretical and Physical chemistry Institute at National Hellenic Research Foundation (Dr. A. Pispas) we investigate very intensively the **thermoreponsive behavior of novel polymeric systems** which are provided by both collaborating groups. Apart the investigation of the thermoresponsive transition in their aqueous solutions employin dielectric methods, another significant aim of this study is the investigation of uncrystallized water and other ice like structures of water formed in such solutions at subzero temperatures seeking for relationships/connections between various forms of water organization and particular characteristics of the thermoresponsive transitions (publ. 74).

⑧ Recently we have been involved in studies of molecular dynamics **in liquid crystals** (smectic and discotic forms) and **liquid crystalline polymers** (on the basis of the THALES program).

⑨ **Theoretical works** on dielectric relaxations in heterogeneous media stimulated by variation of temperature or pressure and on the compressibility of various alloys (publ. 4, 2)

On the other hand, there is increasing interest, recently, on atomistic molecular dynamics simulations on model PNC and on comparison between predicted dynamics and experimentally recorded molecular dynamics (in the framework of our collaboration with the group of prof. D. Theodorou, School of Chemical Engineering, NTUA)

⑩ Research on best experimental practice and uncertainty evaluation in measurements of nano-structured materials related with **metrological issues** of measuring devices and measuring procedures. Results of these studies have been presented in 2 National Conferences on Metrology: 19-20 October 2007 in the 2nd conference (held in Thessaloniki) "*Measurements of complex dielectric permittivity and conductivity of materials*" and 3-4 February in the 4th conference in Athens the presentation with title "*Estimation of dielectric characteristics of PNCs*".

• Participation in research projects

– **Project leader** in the following projects:

1. «Nanoreinforced hydrogels for tissue engineering applications - NARGEI», Support of postdoctoral researchers, Greek General Secretariat for Research and Technology, PE5(2551), a scientific collaboration with the Centre of Biomaterials and Tissue Engineering (Prof. J.L.Gomez Ribelles, Polytechnic University of Valencia), 23/3/12-22/3/15
2. "*Thermoresponsive polymers of complex architecture (ResComp)*" Projekt-ID 57055251, funded by Deutscher Akademischer Austauschdienst (DAAD) within the framework of the action "*Hochschulpartnerschaften mit Griechenland*", 1/1/2014 – 31/12/2016 (collaboration with C. M. Papadakis, Technical University of Munich)
3. «*Novel amphiphilic polymers of complex architecture*», Program funded by Bayerisches Hochschulfoerderungprogramm (BayFOR), a collaboration with the Technical University of Munich (prof. C. M. Papadakis), 1/1/2013 – 31/12/2013
4. "*Experimental investigation of the cooperative characteristics of the glass transition in amorphous polymers*", Program PEVE, NTUA 2007 - 2009
5. "*Structure and molecular dynamics of hyperbranched polymers, systems with urethane and urea linkages*", Egypt – Greece Agreement on Scientific and Technological Cooperation, Greek General Secretariat of Research and Technology, 2007 - 2008

In the period 2010 – 2014, I was strongly involved in the COST Action FA0904 "*Eco-sustainable food packaging based on polymer nanomaterials*", both, during the stage of the preparation of the proposal and afterwards as member of the Management Committee.

– Participation and administration of several European research projects as **principal investigator** (only recent projects are listed):

1. "*NanoBioMat, Nanostructured Biocompatible/Bioactive Materials*", FP7-PEOPLE-2013-IRSES-612484 (coordinator A. Derylo-Marczewska, University of Lublin, Poland) 1/1/2014-31/12/2017
2. ARISTEIA - *Interfaces and interphases in organic/inorganic polymer nanocomposites*, (coordinator Prof. P. Pissis, NTUA) GSRT, Ministry of Education, 6/9/2012-5/9/15.
3. THALES - *Liquid-Crystal-Dispersed Nanoparticles: Order and Complexity in Novel Soft Matter Systems*, (coordinator Dr. G. Nounesis, NCSR Demokritos) GSRT, Ministry of Education, 2012-15.
4. «*M-RECT, Multiscale reinforcement of semi-crystalline thermoplastic sheets and honeycombs*» FP-7-NMP-2009-LARGE-3 (Grant Agreement Number NMP – 2009 – 246067) (coordinator Dr. A. Wood, Victrex Manufacturing Limited, UK) (2009 – 2013)
5. «*COMPOSITUM – Hybrid nanocomposites and their applications*» FP7, Marie Curie Actions "People" project (Grant Agreement Number PIRSES – GA – 2008 – 230790) (coordinator Dr. J. Skubiszewska-Zieba, Marie Curie-Sklodowska University, Poland) (2009 – 2013)

6. "NaPolyNet - Setting up research intensive clusters across the EU on characterization of polymer nanostructure" FP7, Coordination and Support action project (Grant Agreement Number NMP3 – CA – 2008 – 218331) (coordinator Dr. C. Silvestre, National Research Center, Italy)

7. "COMPOSITUM – Hybrid nanocomposites and their applications" FP7, Marie Curie Actions "People" project (Grant Agreement Number PIRSES – GA – 2008 – 230790) (coordinator Dr. J. Skubiszewska-Zieba, Marie Curie-Sklodowska University, Poland).

8. "Dielectric spectroscopy and complementary techniques for molecular dynamic study of polymers and organic crystals – DIEPOL", E.E., Programme MCA-ToK, 2005 – 2009 (MTKD-CT- 2005 – 029670) (coordinator Prof. J. Ulanski, University of Lodz, Poland).

– **Collaboration with many laboratories** abroad or in Greece

To mention a few:

University of Cologne, II Institute of Physics (prof. G. Nimtz, now retired), Universität des Saarlandes, Saarbrücken, Germany (prof. R. Pelster), Technical University of Valencia and Center of Biomaterials (prof. J.L. Gomez Ribelles), *Chuiko Institute of Surface Chemistry*, National Academy of Sciences of Ukraine (prof. V. Gunko), Tokai University, Hiratsuka, Kanagawa, Japan (prof. N. Shinyashiki), Soft Mater Group in Technical University of Munich (prof. C.M. Papadakis), National Hellenic Research Foundation (Dr. A. Pispas), National Research Center "Demokritos" (Dr. G. Nounesis).

Our laboratory takes part in these collaborations by sharing its facilities and expertise which are usually complementary to those of collaborating laboratories. Our dedication to systematic experimental investigations, on the cutting edge of technology, is the main reason for these longstanding collaborations. It is typical in such collaborations that two, three or more expert teams work closely together for the synthesis of the materials, the morphological characterization, the investigation of thermal transitions, hydration properties and dynamics (which is our expertise) and the properties and the performance of the materials according to applications envisaged. Details about the research facilities of Dielectrics Group can be found in our **web site** <http://dielectricsgroup.ntua.gr>. My contribution in extending, last years, the capacity of our lab with new devices, new experimental methods and procedures is very significant.

- Organization of training schools - workshops

– Demonstration (training) course "Characterization methodology and tools for new polymer nanostructured materials", 13 – 15 of May 2009, Athens (in the framework of Napolynet project, web site: <http://www.napolynet.eu>)

– German-Greek Workshop "Structural methods for the investigation of soft responsive matter", 12 – 16 May 2014, TU München, Campus Garching (in the framework of ResComp project, **web site**: <http://www.softmatter.ph.tum.de/rescomp>)

- Reviewer of scientific journals

I am acting as reviewer for the following scientific journals (with bold characters are the journals where I am reviewer in an almost regular basis):

- **Journal of Applied Polymer Science**
- **Journal of Thermal Analysis and Calorimetry**
- **Materials Chemistry and Physics**
- **Polymer Composites**
- Journal of Polymer Science, Part B: Physics Edition
- Journal of Non-Crystalline Solids
- Thermochimica Acta
- Macromolecules

- Chemical Physics
- European Physical Journal E
- Journal of Physics D: Applied Physics

- International organizing or advisory committees

Member of the International Advisory Committee of the series of conferences **International Symposium of Electrets** which are funded by and are organized under the auspices of IEEE.

- Invited lectures

- “*Molecular dynamics in intercalated poly (propylene-oxide) amines / layered silicate nanocomposites*” στο Workshop on Progress in Bio- and Nanotechnology, Technical University of Lodz (Poland), 12 – 14 February 2009
- “*Segmental and global chain mobility in intercalated poly (propyleneoxide) amines/Layered silicate nanocomposites*” in Symposium on *Effect of nanoparticles on the molecular dynamics in polymeric systems*, 6th IDMRCs Rome, 30 August – 4 September 2009
- “*Interfacial effects in polymer Nanocomposites: from a polymer matrix with in –situ generated inorganic nanoparticles to polymer/particle core-shell nanocomposites*”, 7th International discussion meeting on relaxations in complex systems, Barcelona (Spain), 21-26 July 2013,

ADDITIONAL INFORMATION

Languages

Greek : Native
 English : Very good
 German : Very good

Scholarships

1998 – 1999
 Postdoctoral fellowship by Greek State Scholarships Foundation (I.K.Y.)
 1991-1994
 Bodossaki Foundation postgraduate scholarship