Ionel –Valentin Vlad
President of the Romanian Academy

Present academic and scientific positions:

- President of the Romanian Academy (2014-2018)
- Vice-President of the Romanian Academy (2010-2014)
- Head of the group" Nonlinear and Information Photonics" in the Laser Department of the National Institute for Laser, Plasma and Radiation Physics
- Professor at the University of Bucharest, Faculty of Physics

Fields of Expertise
Nonlinear Optics, Nanophotonics, optical information processing, holography and imaging, optical instruments with lasers

Education and Training
"Titu Maiorescu - I.L. Caragiale" High School, Bucharest
Polytechnic Institute of Bucharest, Faculty of Electronics and Telecommunications, 1961-1966, Diploma supervised by Prof. Gh. Cartianu, Member of Romanian Academy (MAR).
Post-graduation studies at University of Bucharest, Faculty of Physics (Acad. Prof. Şerban Ţiţeica and Prof. M. Gavrilă, MAR).
He continued his studies of lasers and holography in Paris, Université de Paris VI (Prof. Maurice Françon) and at CGE, France (1969-1970, recommended by Prof. Ion Agârbiceanu, MAR, with a national research fellowship).
In 1972 he defended his PhD Thesis *Methods of information processing in conventional and real-time holography* (supervised by Prof. Gh. Cartianu, MAR) and obtained the title of PhDoctor in Electronics and Telecom.

Professional career
After completing the studies, he started his research activity at the Institute of Atomic Physics, in Bucharest, Laboratory "Optical Methods in Nuclear Physics" (led by Prof. Ion Agârbiceanu, MAR). There he made the first active medium solid state laser in Romania (in 1968 with G. Nemeş). In the same year, he got the position of researcher. He founded and led the Laboratory of Holography in the Institute of Atomic Physics, Laser Department. In 1984 he was invited for an academic visit to TH-Darmstadt, financed by the German Authority for Academic Exchanges (DAAD) for research on optical phase conjugation with Prof. Theo Tschudi.
In his research activity, he reached the position senior researcher gr. III and continued his teaching activity at the Polytechnic Institute of Bucharest and at the Faculty of Physics, University of Bucharest. In the period 1984-1989 he was deputy head of the Laser Department in the Central Institute of Physics.
After 1990, he became senior scientific researcher gr.I and head of the Laboratory of Nonlinear and Information Optics in the Laser Department of the National Institute for Laser, Plasma and Radiation Physics. He was promoted (associate) Professor at the University of Bucharest, Faculty of Physics (since 1991). was vice-president of the Scientific Council in the Institute of Atomic Physics and co-director of the Romanian Center of Excellence in Photonics a unit of Basic Science National Research Programme (2003-2006). In the interval

2004-2008, Prof. Vlad, MAR, was national project director and group leader of EU Network of Excellence in Nanophotonics ("PHOREMOST").

International scientific collaboration

Prof. Vlad was visiting/invited professor at Université de Paris VI, CGE-Marcoussis, "A.F. Ioffe" Phys-Tech. Institute – Sankt Petersburg, with Prof. Yu. I. Ostrovsky, S.I. Stepanov and M.P. Petrov; T.U. Darmstadt with Prof. Theo Tschudi (with a DAAD Fellowsip), Chiba University, with Prof. Jumpei Tsujiuchi (with a JSPS Fellowship as Professor, 1991), Centro de Investigaciones in Optica (with a Catedra Patrimonial de Excelecia offered by Mexican Fed. Government, with Prof. Cristina Solano and Prof. Daniel Malacara,1993) from Leon (Mexico); Imperial College - Blackett Laboratory, with Prof. Chris Dainty and Prof. Mike Damzen (with Royal Society Fellowships as Professor, 1993-2003), Max-Planck-Institute for Quantum Optics – Garching - München, with Prof. Herbert Walther (with Max-Planck Gesellschaft Fellowssips as Professor and External Collaborator, 1994-2000); at the International Centre for Theoretical Physics – ICTP Trieste, with Prof. G. Denardo and with AIEA Fellowships as Senior Associate (1993-); at US Air Force – Lab. Hanscom, MIT (Boston area, with a "Windows of Science" Fellowship awarded by the European Aggency for Aerospace R&D - London Headquarters,1999); at Universita degli Studi "La Sapienza, Roma (Department of Energetics, with Prof. Mario Bertolotti, Eugenio Fazio and Concita Sibilia, with TRIL Grants awarded by ICTP and grants in the frame of Italo-Romanian Colaboration Programme, 1997-); Visiting Professor at ENS Paris and Cachan (2008) and Ecole Polytechnique – Lab. Optique Applique Palaiseau, Institut d'Optique, Thales Palaiseau and Elancourt (2009, with Prof. Jean Pierre Huignard, Prof. Pierre Chavel and Prof. Gilles Pauliat, Project of Ultra-high Intensity Lasers, Thales-NILPRP); Projects and visits with Prof. François Kajar (ENS-Lyon and Univ. "Politehnica" Bucahrest) etc.

Main scientific results and publications

He is the author of important scientific results obtained either by himself or together with his professors, colleagues and students: synthesis in time domain of functions with discontinuities of various orders (1965-1978, in collaboration with Prof. G. Cartianu, member of the Academy), creation and study of holograms in real time recorded in saturable absorbants (1969); creation of professional holograms in the country (1970); design and development of the first devices and systems for holography and image processing with lasers in Romania (1974, in collaboration with D. Popa) and a great number of devices used in research and by companies in the country; optical phase conjugation in lithium niobate crystal and amorphous semiconductors, using ultrashort laser pulse (picoseconds) (1981, in collaboration); making and study of optoelectric bistable devices meant for parallel image processing (1982-1985, cited four times in the treatise of prof. H.M. Gibbs, *Optical Bistability*, Academic Press, N.Y.,1985); original systems for optical information processing (1984-1989, in collaboration); elaboration of an original method for measuring vibrations with subatomic amplitude (picometers) using generation of a nonlinear optical network in GaAs:Cr and an original method of selfcalibration at this scale (in collaboration with S. Stepanov, D. Popa, a.s.o; the result is considered a reference in the field, being cited over 110 times since 1990, among others by Prof Elsa Garmire, ex-president of OSA, three times, by N.S. Prasad, from NASSA Langley and J.P. Huignard from Thales Palaiseau); direct spatial reconstruction of optical phase from images (collaboration with Malacara, work invited in *Progress in Optics*, pb.E.Wolf, 1994); mixing of laser waves in photorefractive crystals, particularly the study of the periodical sequence of electrons, laser induced on the surface of photorefractive crystals, using atomic force microscopy, possible to use in parallel photonic commutation at the level

of a sole electron (collaboration with Prof. H. Walther, Max-Planck Inst. Für Quanten-optik, Garching, 1994-2000); the theory of discreet Planck spectrum in Quantum cavities and discreet phonon spectra in nanostructures, which corrects well known physical laws and constants in tables (collaboration with Prof. N. Ionescu-Pallas, 1995-2007) ; finding of analytical solutions for the equations describing stimulated Brillouin scattering (SBS), of the analytical formula for conjugated reflectivity and their use for making high quality resonators for high power lasers (collaboration with Prof. M. Damzen, Imperial College and his ex- PhD students, V. Babin and A. Mocofănescu, 2000-2003); theory and experimental observation of optical spatial solitons which enable *guiding light by light* in tens of thousands of ultrafast parallel information channels (femtoseconds) in lithium niobate crystals (collaboration with prof. M. Bertolotti, E. Fazio from "La Sapienza" University of Rome and his ex-PhD student A. Petriş, 2000-2010, with results cited hundreds of times in international literature. His paper (in collaboration) "Efficient spatial soliton formation in BSO photorefractive crystals at 633 nm", published in *Apll. Phys. Lett*, 2004 is considered by Google-Research Gate "a milestone" and is cited 210 times in 10 years). The results of his researches in the fields of holography, optical information processing, nonlinear optics, Quantum optics, nanophotonics and laser measuring instruments have been explained in over 175 works, in over 220 papers presented at scientific manisfestations and in three patents, one also awarded in USA. Out of the books let us mention *Introduction to Holography* (1973); *Optical Information Processing* (1976, in collaboration), the treatise *Stimulated Brillouin Scattering. Fundamentals and Applications* (2003, London, in collaboration, cited over 130 times, also by Prof. G. Stegeman, CREOL, USA, in the treatise *Nonlinear Optics*, Wiley, 2012 and by Prof.R. Boyd, Rochester, in the journal *JOSA: B*, 2005); *Studies in Modern Optics* (2008, Bucharest). He is the publisher of eight volumes "Proceedings SPIE"(published in USA between 1994-2013).

Prizes and academic/professional acknowledgements

"T. Vuia" Prize awarded by the Romanian Academy (1978).

In 1991 he was elected corresponding member of the Romanian Academy and in 2009 titulary member of the Romanian Academy.

"Galileo Galilei" Prize (2005) awarded by the International Commission of Optics (ICO, part of ICSU)

He was elected "Fellow of the Optical Society of America" (1978), "Fellow of the Institute of Physics", London (1999), senior associated member of the International Center of Theoretical Physics (Trieste, 2003), member of Academia Europea (during Einstein Year, at Berlin-Potsdam, 2005), "Fellow of the International Society for Optical Engineering" (USA, 2007; When awarding this quality, held by at most 5% of the members, the Society mentions that " *Vlad is one of the world's leading researchers in dynamic holography, photorefractive crystals and nonlinear optics", SPIE News*, May 1, 2007).

Honorary member of the Academy of Sciences of the Republic of Moldova (2016).

Titles of *Doctor honoris causa* awarded by "Politehnica" University of Bucharest, "Aurel Vlaicu" University of Arad, "Vasile Goldiş" University of Baia Mare/Arad, "1 Decembrie" University of Alba Iulia, and Technical University of Cluj.

Activity/service in professional organizations

President of Physics Commission of Romanian Consultative College for R&D (1991-2002) and Vice-President of Grant Commission of the Romanian Academy (1994-2007). President of the Section of Optics and Quantum Electronics of the Romanian Physics Society (1990-2010); Founder and first vice-president of SPIE – the Chapter in Romania (1991-1993), President of EOS Consultative Scientific Committee (European Optical Society) and co-director of the European Optical Society (EOS, elected in Sept. 2011). He is a senior associate

member of ICTP (2003-2008), member of ICO Committee for "Galileo Galilei" Award (2006 to the present). He is editor-in-chief of the journals "Romanian Reports in Physics" , "Proceedings of the Romanian Academy: Series A" (the journals have the highest ISI Thomson impact factors among the Academy journals) and director of "Academica" journal. Member of the editorial boards for "Journal of European Optical Society" (UK, 2006 to the present) and "SPIE Reviews" (USA). He was member of the editorial boards of the journals "Optics Letters" USA, 1980-1990), "Journal of Optics: A" (UK 1998-2006), and "Journal of European Optical Society".

Member of the Romanian Physical Sociery, president of the Section of Optics and Quantum Electronics of the Romanian Physical Sociery (1991-2009), member of the Optical Society of America, of the European Physical Society, of the European Optical Society, of the International Society for Optical Engineering (SPIE - USA), founding vice-president of the Romanian Chapter of SPIE (1991-1993), member of the Consultative College for R&D and president of Physics Commission (1991-2002) of this College; vice-president of Grant Council of the Romanian Academy (1994-2006).

While Vice-president of the Romanian Academy he founded the School for Advanced Studies of the Romanian Academy (SCOSAAR) with a structure and organization compatible with the European doctoral schools, he co-ordinated the activity of evaluation of the research intitutes belonging to the Romanian Academy (also having had the experience of consultations with the Academy of Sciences in Paris); he coordinated elaboration of the Research Strategy of the Romanian Academy and its correlation with *National Strategy for Research, Development and Innovation*, and EU Programme "Horizon 2020"; together with President Ionel Haiduc he presented in the Romanian Parliament the position of the Academy against exploitation using cyanide at Roşia Montană (2013) a.s.o. In the position of President of the Romanian Academy he initiated and coordinates Romania's development strategy for the next 20 years, the elaboration of the new Law of the Romanian Academy, the events connected with the 150th anniversary of the Romanian Academy (in 2016), the events connected with the Centenary of Romania's Great Union, a.s.o.

Public acknowledgement of the activity in service of the country

He is distinguished with the National Order "The Star of Romania" in Knight Rank (2013) and with the National Order "Faithful Service" in Knight Rank (2008). The President of Romania, Klaus Werner Iohannis advanced him in the National Order "The Star of Romania" to the rank of Officer (1 December, 2015).H.M. The King Mihai I honnored him with the decoration " The Romania's Crown" in Commander Rank (2014). The President of Rep. Moldova, Nicolae Timofti confers him the high decoration "Order of Honor". He is distinguished with medal "Dimitrie Cantemir" (2013 - the highest distiction awarded by the Academy of Sciences of Moldova), medal "Alexandru Şafran" (awarded by F.C.E.R. in 2016) and others.

He was awarded with Orders "Sf. Treime", "The Cross of Maramures Voivodes", "Şagunian Cross", "St Joseph" Cross and others.

He was elected Honorary Citizen of the cities of Sebeş , Baia Mare (Decree no. 4 and declared Son of Maramureş) and Sălişte a de Sus – Maramureş.