

Laudatio

on
the Doctor Honoris Causa
academic title awarding
to

Professor Dr. Marius Stan



Stimate Domnule
Profesor Dr. Marius Stan,
Stimați membri ai Senatului
Universității POLITEHNICA
din București,

Distinși Oaspeti,
Doamnelor și Domnilor,

Este o deosebită plăcere și, de
asemenea, o mare onoare de a vă
prezenta acest *Laudatio* pentru cariera
și profilul Profesorului Marius STAN, de
la Departamentul de Securitate și
Energie Globală, Institut Național
Argonne, SUA, personalitate academică
și științifică la nivel mondial, căruia
Senatul Universității POLITEHNICA din
București a decis, în unanimitate, să-i
acorde titlul de *Doctor Honoris Causa*.

Most esteemed
Professor Dr Marius Stan,
Esteemed members of the
University POLITEHNICA
of Bucharest Senate,

High distinguished Guests,
Ladies and Gentlemen,

It is a great pleasure and also an honor
to present this *Laudatio* for the career
and profile of professor Marius STAN,
Energy and Global Security Directorate,
Argonne National Laboratory, USA,
worldwide academic and scientific
personality, to whom the Senate of the
University POLITEHNICA of Bucharest
has unanimously decided to award the
Doctor Honoris Causa title.

Profesorul Marius STAN s-a născut în Urziceni, în anul 1961. În anul 1986 a obținut, cu rezultate deosebite, titlul de inginer la Facultatea de Fizică a Universității București. După un stagiu la ROFEP S.A., a devenit cercetător științific la Institutul de Chimie-Fizică al Academiei Române, în grupul condus de dna Academician Maria Zaharescu. În 1997 a obținut Doctoratul în Chimie, sub îndrumarea lui Dr Dumitru Marchidan. În același an a început un stagiu postdoctoral la institutul de cercetare „Los Alamos National Laboratory” din S.U.A. În scurt timp a fost angajat permanent și a creat un grup dedicat studierii proprietăților termodinamice ale materialelor.

Profesor Dr. Marius Stan este recunoscut internațional ca unul dintre întemeietorii modelării și simulării pe calculator a fenomenelor care apar la multiple scale temporale și spațiale. Din 2010 este cercetător principal la Institutul de Cercetare „Argonne National Laboratory” din Chicago. Este

Professor Marius STAN was born in Urziceni, Romania in 1961. In 1986 he graduated with honors in engineering from the Physics Faculty of the University of Bucharest. After a period at ROFEP S.A. he became a Scientific Researcher at Institute of Chemistry and Physics of the Romanian Academy in the group led by Ms. Academician Maria Zaharescu. In 1997 Marius obtained his Ph.D. in Chemistry under the supervision of Dr. Dumitru Marchidan. In the same year, he began a post-doctoral internship at the Los Alamos National Laboratory Research Institute in U.S.A. In a short term, he was permanently employed and created a group dedicated to studying the thermodynamic properties of materials.

Professor Marius Stan is internationally recognized as one of the founders of computer modelling and simulation of phenomena that occur in temporal and spatial multiscale. Since 2010, he is Principal Researcher at the Argonne National Laboratory in Chicago. He

directorul grupului „Sisteme Fizice Complexe” din cadrul Centrului de Știință Sistemelor al Institutului Național Argonne și a adus contribuții la înțelegerea și predicția proprietăților sistemelor multi-componente prin utilizarea inteligenței artificiale, machine learning și simulări multi-scală. Dr. Stan a dezvoltat modele teoretice ale sistemelor fizice și materialelor care sunt „eterogene prin concepție” și a îmbunătățit înțelegerea mecanismelor de transport cuplat al căldurii și destinderea termică a elementelor ceramice și aliajelor prin simulări cu elemente finite. Dr. Stan a proiectat materiale pentru stocarea energiei (Li-O) și pentru electronică (Hf-Si-O) prin dezvoltarea de modele libere de energie și realizând simulări pentru evoluția microstructurii. Dr. Stan a îmbunătățit evaluarea, în prezență incertitudinilor, a diagramelor de stabilitate de stare prin dezvoltarea de modele termodinamice și utilizând analiza bayesiană și machine learning. Este profesor la Institutul de

leads the “Complex Physical Systems” Group in the Systems Science Center, and improves the understanding and prediction of multi-component systems properties by using elements of artificial intelligence, machine learning, and multi-scale computer simulations. He developed theory and models of physical systems and materials that are “heterogeneous by design”, and improved the understanding of coupled heat transport, species diffusion, and thermal expansion of ceramics and alloys by performing Finite Element Method (FEM) simulations. Dr. Marius San designed materials for energy storage (Li-O) and electronics (Hf-Si-O) by developing free energy models and running Phase Field (PF) simulations of microstructure evolution. He improved uncertainty evaluation of phase stability diagrams of multicomponent systems by developing thermodynamic models and using Bayesian analysis and machine learning. He is a professor at

Informatică (Computation Institute) al Universității Chicago și profesor la Institutul de Știință și Inginerie (NAISE) al Universității Northwestern, ambele în Chicago.

În perioada 2013-2015, dl Dr. Stan a fost Consilier Principal pe Probleme de Informatică și Director Național la Ministerul Energiei al S.U.A., în Washington DC, în timpul administrației Președintelui Barak Obama. În această calitate a dezvoltat elemente ale strategiei S.U.A. în domeniul energetic și a condus programe naționale de cercetare cu un buget de peste 50 de milioane de dolari. Dr. Marius STAN a încheiat recent un Act Personal Interguvernamental (IPA) cu Departamentul de Energie din S.U.A. al Energiei Nucleare (DOE-NE). IPA permite alocarea temporară a oamenilor de știință sau a inginerilor calificați la posturi în cadrul agenților federale. Dr. Marius STAN a fost consilier principal pentru modelare și simulare pentru secretarul adjunct al DOE-NE și director tehnic național pentru programul de modelare și

the Chicago Institute of Computer Science and professor at Northwestern University's Institute of Science and Engineering (NAISE), both in Chicago.

During 2013-2015, Dr. Stan was the Principal Counselor on IT Issues and National Director at the US Department of Energy in Washington DC during President Barak Obama's administration, being able to develop elements for the US strategy. In the energy field and has run national research programs with a budget of over 50 million \$. Marius has recently completed an Intergovernmental Personnel Act (IPA) appointment with the U.S. Department of Energy Office of Nuclear Energy (DOE-NE). An IPA permits the temporary assignment of skilled scientists or engineers to positions within federal agencies. Marius STAN served as Senior Advisor for modeling and simulation to the Assistant Secretary for DOE-NE and as National Technical Director for the Nuclear Energy Advanced Modeling and

simulare avansată în domeniul energiei nucleare (NEAMS). În calitate de director al programului NEAMS, Dr. Marius STAN a coordonat activitățile cu hub-urile de inovare DOE și a reprezentat DOE-NE în interacțiuni cu programele din cadrul Oficiului de Științe și al Administrației Naționale de Securitate Nucleară.

În cadrul Organizației de Cooperare Economică și Dezvoltare (OECD), dl Dr Stan a creat și condus un grup de dezvoltare strategică a modelării pe calculator, din care fac parte reprezentanți ai 16 țări. În ultimele două decenii, Domnia Sa a elaborat o strategie internațională pentru Organizația de Cooperare și Dezvoltare Economică (OECD) - Agenția pentru Energie Nucleară (NEA), care a condus la crearea unui grup de lucru în care s-au dezvoltat simulări și modele pe mai multe niveluri pentru energia nucleară și cinci grupuri internaționale de experți din opt-sprezece țări OCDE.

Profesor Dr Marius Stan a inițiat, în 2002, seria de simpozioane de Modele

Simulation (NEAMS) program. As director of the NEAMS program, Marius coordinated activities with the DOE energy innovation hubs and represented DOE-NE in interactions with programs in the Office of Science and the National Nuclear Security Administration.

Within the Organization for Economic Cooperation and Development (OECD), Dr. Stan has created and lead a group "Multi-Scale Modelling of Fuels and Structural Materials for Nuclear Systems" for strategic development for computer modelling which includes representatives from 16 countries. In the last two decades, Marius developed an international strategy for the Organization for Economic Cooperation and Development (OECD) – the Nuclear Energy Agency (NEA) that resulted in a working party on multiscale models and simulation for nuclear energy and five international expert groups involving eighteen OECD countries.

Professor Marius Stan created the

de Materiale și Simulați pentru Combustibili Nucleari (MMSNF), care defineau și promovau concepțele „modelelor și simulărilor pe mai multe niveluri”, o metodologie care este acum utilizată la nivel mondial pentru proiectarea materialelor. Dr. Stan este Past Chair al Comitetului Științific al proiectului european “F-BRIDGE” privind combustibili nucleari avansați pentru generatoarele nucleare de nouă generație, Past Chair al Comitetului Științific al Centrului de Cercetare de Frontieră din cadrul Ministerului Energiei, SUA privind „Știință Materialelor pentru Combustibili Nucleari”, fost membru al Directoratului MaRIE (Matter Radiation Interaction in Extremes), membru al Comitetelor Stărilor Aliajelor TMS) al Societății Metalelor și Materialelor (TSM), al Societății Informatică a Materialelor (ASM), membru al Societății Americane de Fizică (APS) și al Societății Americane Nucleare (ANS).

Materials Models and Simulations for Nuclear Fuels (MMSNF) workshop series, in 2002, that defined and promoted the concepts of “multi-scale models and simulations”, a methodology that is now being used worldwide for materials design. He is Past Chair of the Scientific Advisory Committee of the “F-BRIDGE” European Community project on advanced nuclear fuels for the new generation nuclear reactors, Past Chair of the Scientific Advisory Committee of the U. S. Department of Energy Frontier Research Center (EFRC) on “Materials Science of Nuclear Fuels”, Past Member of the Board of Directors of MaRIE (Matter Radiation Interaction in Extremes) signature facility, Member of the Alloy Phase (Diagram) Committees of the Metals and Materials Society (TMS) and the Materials Information Society (ASM), Member of the American Physical Society (APS) and the American Nuclear Society (ANS).

Profesor Dr. Marius Stan a publicat o carte, nouă capitole în cărți de specialitate, peste 80 de articole științifice și a susținut peste 120 de prezentări invitate la conferințe științifice internaționale. Este membru în Materials Research Society, Minerals, Metals and Materials Society și membru în Consiliul Editorial al revistelor științifice Materials Theory, Journal of Phase Diagrams, Metallurgical and Materials Transaction A și Journal of Nuclear Materials.

Profesor Dr. Marius STAN a primit Premiul de Apreciere din partea Departamentului de Energie al SUA pentru "Contribuții semnificative în cadrul Programului de Modelare și Simulare din cadrul Biroului de Energie Nucleară" și „Premiul pentru Reducerea Poluării", al Departamentului de Energie al SUA.

Având în vedere realizările sale deosebite, pentru o carieră dedicată ca

Professor Marius Stan has published a book, 9 chapters in specialized books, over 80 journal scientific articles and has given over 120 presentations, 95 invited to international scientific conferences. He is a member of the Materials Research Society, Minerals, Metals and Materials Society and member in the Editorial Council of scientific journals, Materials Theory, Journal of Phase Diagrams, Metallurgical and Materials Transaction A, and Journal of Nuclear Materials.

Professor PhD Marius STAN received the Appreciation Award from the U. S. A. Department of Energy, for "Significant contributions to the Office of Nuclear Energy's Advanced Modeling and Simulations Program", the U. S. A. Department of Energy "Pollution Prevention Award" for innovative science and technology in nuclear materials.

Considering his outstanding achievements for a career as a scientist

om de știință și pedagog, în domeniul materiale noi cu aplicații în domeniul energetic și în cel al componentelor electronice, carieră ce ar putea fi considerată o referință pentru tinerele generații, Universitatea POLITEHNICA din București este onorată să acorde Dr. Marius Stan titlul de *Doctor Honoris Causa*.

Cele mai importante publicații

1. M. Stan, "Models and Simulations of Nuclear Fuels", Taylor and Francis (2018).
2. M. Stan, *Phase Field Methods to Evolve Microstructure of Materials*, in "Handbook of Materials Modeling," 2nd Edition, Springer (2018).
3. M. Stan and J. L. Sarrao, *Mesoscale Challenges: Modeling Microstructure Evolution*, in "Handbook of Materials Modeling," 2nd Edition, Springer (2018).
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5. C. Valot, M. Bertolus, L. Malerba, J. Rachid, T. Besmann, R. Masson, S. Phillpot, and M. Stan, *Integrated Multi-scale Modelling and Simulation of Nuclear Fuels*, in "State-of-the-Art Report on Multi-scale Modelling of Nuclear Fuels", Nuclear Science NEA/NSC/R/(2015)5, September 2015.

and a professor in the field of new materials with applications in the field of energy and electronics, a career that could be considered a reference for younger generations, University POLITEHNICA of Bucharest is honored to give Dr. Marius STAN the title of *Doctor Honoris Causa*.

The most relevant publications

1. M. Stan, "Models and Simulations of Nuclear Fuels", Taylor and Francis (2018).
2. M. Stan, Phase Field Methods to Evolve Microstructure of Materials, in "Handbook of Materials Modeling," 2nd Edition, Springer (2018).
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