



TECHNICAL SCIENCES ACADEMY OF ROMANIA



**Euro-CASE
Members**

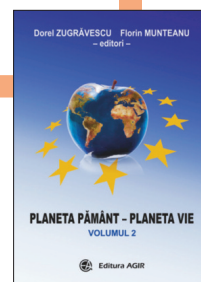
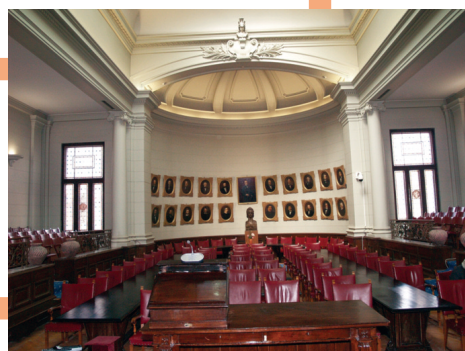
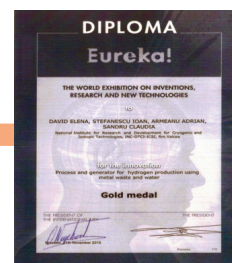
ANNUAL REPORT 2015

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TECHNICAL SCIENCES ACADEMY OF ROMANIA



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PRESIDENT'S FOREWORD

As in previous years, in 2015 we were all delighted to benefit from the increasing role the Academy had for the engineering community and society to which we had the chance altogether to bring our both personal and collective contributions.

We have managed to maintain our creativity and to perform our activity towards finding solutions to the country's major issues by remaining consequent and independent despite the political instancancies. The industry, the mineral resources, mobility and the urban planning are among some of the concerns we addressed.

We have and we will look forward to promoting the associative and academic spirit that leads to a collective responsibility among the team which does not diminish, but rather strengthens the individual commitment. It is our duty to value the "laboratory of ideas" represented by the Technical Sciences Academy of Romania. I speak, of course, about those ideas that stimulate not only scientific and technical creativity, but also the civic involvement. Romania needs to have its assets recognized and capitalized as, regardless of how prestigious and legitimate our objectives are, they fail to achieve their purpose without a civic participation.

At a first glance, the words mentioned above might seem mere intellectual exercise, with no practical support, unfamiliar to everyday struggles, but it is worth recalling the old saying "there is no better practice than a good theory", which we all know very well.

The Technical Sciences Academy of Romania (Academia de Științe Tehnice din România – ASTR) is an institution aimed to develop and value the knowledge and the experiences of its members, which should more widely and thoroughly known. A prosperous change in the public relations and communication is required in order for the ASTR to increase its visibility.

The opinions provided by the researchers, the specialists or the scientists regarding the greatest worries our citizens encounter must be known, too. Valuable speakers would be needed to attract audiences and to preserve respect towards our original values.

The opposites of role models who are so present in our lives, especially in mass-media, could be neutralized only with the help of what we call authentic mentors, primarily from creativity field from where welfare and prosperity come.

We are continuously considering how to permanently nurture the hierarchy of honor that we need the most. It is beyond this challenge that we put the basis of the Academy's actions and results in 2015.

President

Associate Professor Eng. Sc. Dr. EUR ING DHC

Mihai MIHĂIȚĂ



INTERNATIONAL RELATIONS AND COOPERATION

ASTR cooperates with Euro-CASE and European scientific organizations and supports the participation of its members and Romanian experts in European projects, congresses and international exhibitions of inventions.



- *General Secretary of ASTR, Professor Eng. Sc. Dr. DHC Valeriu V. JINESCU attending to Euro-CASE General Assembly and annual conference, Brussels, November 2015.*

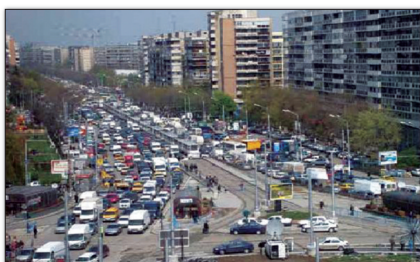


- *Professor Eng. Sc. Dr. DHC Florin Tănăsescu, vice-president of ASTR, and Professor PhD Phys. Wilhelm Kappel from Department of Materials Science and Engineering, meeting in Chişinău (R. Moldova) with first vice-president of the Moldavian Academy of Sciences – Acad. Ion Tighynianu – regarding the development of joint research programs.*

CONFERENCES AND SYMPOSIUMS

In 2015 the members of ASTR organized and moderated scientific events, conferences, symposiums, studies and debates, such as:

- ▶ **Air Navigation Convention** – Bucharest, March 5–6.
- ▶ **Conference “PUBLIC SPACE AND URBAN MOBILITY”** – Bucharest, March 7.



- ▶ **“WATER AND SUSTAINABLE DEVELOPMENT”** – Themed conference dedicated to **World Water Day** (Bucharest, March 19) organized together with Technical University of Civil Engineering of Bucharest and the National Administration “Romanian Waters”, to which specialists and politicians in liability attended.

Romanian Senate President, Mr. Călin Popescu - Tăriceanu, gave a presentation entitled **“EU Danube**



Strategy for economic and social development of Romania's Danube areas”, highlighting three current elements: supporting the development of industrial zone Romania – Danube, development and support for agriculture and ecological reconstruction of the Danube.

- ▶ **International Conference SACI 2015: Applied computational intelligence and informatics**, May 21–23.
- ▶ **L'Air et L'eau Conference** – Bucharest, AGIR headquarters, May 29, to which Professor René Moreau, member of the French Academy of Sciences, professor at Grenoble University attended.



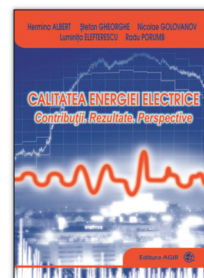
- **General Assembly of the Romanian Academy of Technical Sciences – visibility, prestige, objectives,** Bucharest, June 12.

ASTR areas of action for 2015 was based on three major objectives: *scientific research and innovation; promoting engineering knowledge; continuous involvement in engineering education and problem-solving orientation.*



- **National Committee Symposium “In situ behavior of Construction” (CNCisC),** June, held at Lucian Blaga University of Sibiu.
- **The 3rd South East European Welding Congress –** Timișoara, June 3–5.
- **Themed workshop “ROMANIAN ENERGY’S DIRECTION”,** Bucharest, June 16, organized together with the General Association of Engineers in Romania.

There were presented two papers recently published in AGIR Publishing House: **“The electricity market in Romania”** and **“Power Quality”**.



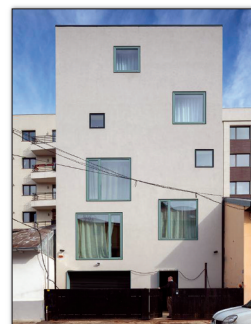
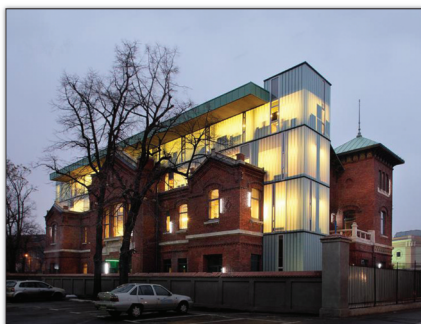
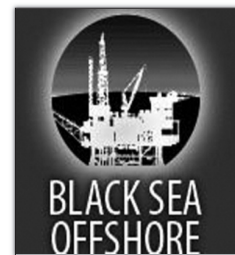
- **Balkan Mining Congress BALKANMINE 2015,** Petroșani, September 20–23.



- **6th International Conference COMPUTATIONAL MECHANICS and VIRTUAL ENGINEERING – COMEC 2015** (Brașov, October 15), organized by Brașov Branch together with Transilvania University of Brașov and the Romanian Society of Applied Mechanics.

Conferences and symposiums

- ▶ ***“Black Sea Offshore” Conference*** (Bucharest, October 20–21). The event theme was devoted to “strategic” and “practice” issues in oil activity in the Black Sea. There is an actual increasing tendency of the markets to address the Black Sea as a regional “hotspot” with high investment potential.
- ▶ ***“How the study of Antarctic fish has led to the first bionic chip and molecular selective minimally invasive surgery” Conference*** held by Professor Boris Rubinsky from University of Berkeley, California, Department of Bioengineering and Mechanical Engineering – Bucharest, AGIR headquarters, October 22.
- ▶ **HIGH POTENTIAL ENERGY EXPLOITATION AND TRANSPORT OF DANUBE** (Bulgaria, November), debate at the University of Ruse.
- ▶ ***“The general urban planning of the city Bucharest. Novelty and innovation”***, debate organized within the department Construction and Urbanism – Bucharest, November 25.



- ▶ **European Congress of Automotive Engineers EAEC-ESFA**, Bucharest, November 27.
- ▶ Participation to European projects:
 - **Cros Border Project with Bulgaria: “Risk monitoring in the Danube area in case of emergencies”.**
 - **Manufacture of lightweight aluminum transport by friction welding FP7 – Flexifab.** The project consortium consists of partners from 9 countries (England, Austria, France, Germany, Greece, Portugal, Romania, Spain and Sweden). The project’s goal is to develop a flexible system for welding friction stir for automated manufacture of complex structures used in the conveyance sector – automotive, rail, water, air.

RESEARCH, INNOVATION AND TECHNOLOGY TRANSFER

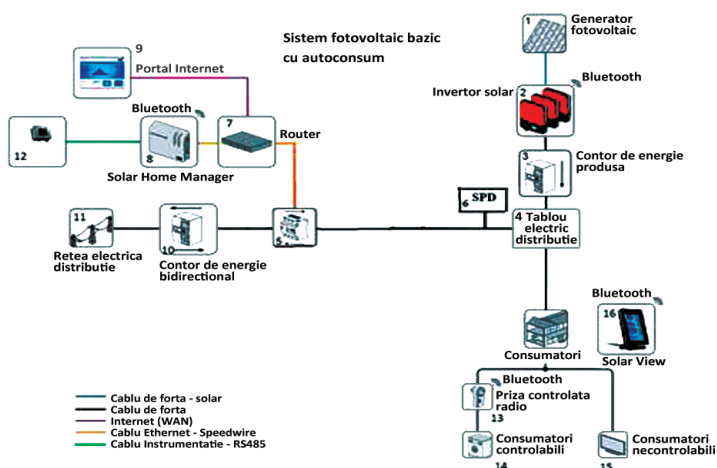
ASTR members are involved in conducting numerous research programs (European and national) in engineering. The research applicability in industry is the main ASTR objective aimed to support the scientific and economical development in Romania. Therefore, new equipment and thermo-chemical heat treatment for the automotive industry have been developed, new mechatronic and cyber-mechatronics systems for industrial processes have been researched and implemented and new solutions for solar systems have been designed etc.



Mechatronic intelligent unit



Cyber-mechatronic system



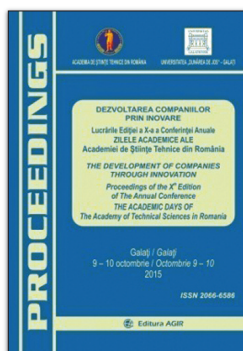
Basic photovoltaic system with grid connection with self-consumption

ACADEMIC DAYS OF ASTR

Academic Days of ASTR have become the event expected by the scientific community in Romania and abroad every year. The event preserved its tradition and organizes visits to factories.



The 10th edition of the **Academic Days of ASTR** named "**Companies development through innovation**" was held in Galați on 9–10 October 2015, in partnership with the "Dunărea de Jos" University of Galați. The visit took place at Galați Shipyard, and the discussions and new acquaintances developed during the meeting enabled the proper conditions for achieving new partnerships between the academic and industrial sector.



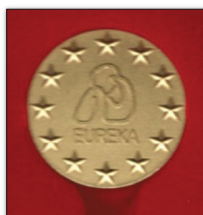
The communications addressed issues regarding *innovation in engineering, technology, management in mechanical engineering, electrical engineering, navigation and construction systems* and were published in the 10th edition of the *Proceedings* volume.

An exhibition of the inventions of young engineers was also organized.

PRIZES AND AWARDS

In 2015, our Academy members took part to some of the most important international invention exhibitions, and obtained several awards for their achievements, such as:

- Eureka diploma, gold medal and *Best Innovation Award* received from the Hong Kong Science and Technology Park Corporation, for ***“Method and generator for the production of hydrogen from scrap metal and water”*** (International Exhibition of Inventions – Geneva).
- Eureka diploma and a silver medal for ***“Security paper with electronic detection and validation”*** (International Exhibition of Inventions – Geneva).
- Excellence Diploma and gold medal for ***“Inductor-induced structure without ferromagnetic core for permanent magnet electrical machines”*** (International Exhibition of Inventions – Geneva).
- Silver medal for ***“Overhead electricity self-conductor against frost/ice”*** (EIS “INFOINVENT” 2015, Chişinău, R. Moldova).
- Gold medal for ***“Security paper with electrical detection and validation”*** (EIS “INFOINVENT” 2015, Chişinău, R. Moldova).
- Gold medal for ***“Romanian innovative equipment for complete characterization of surfaces with vector space”*** (EIS “INFOINVENT” 2015, Chişinău, R. Moldova).



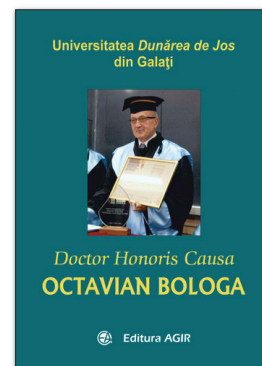
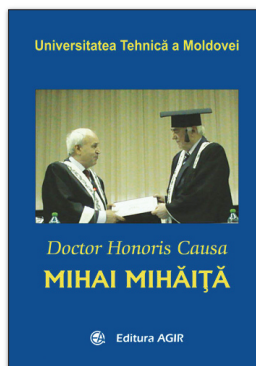
Prizes and awards

- Excellence Diploma and gold medal for ***“Process for mechanical reinforcement of polymeric membranes for PEM type used in electrochemical generators”*** (PRO INVENT 2015, Cluj-Napoca).



Awards granted to Academy members:

- **Nikola Tesla Award of the IEEE 2015** to Professor Eng. Sc. Dr. I. Boldea, member of ASTR.
- **“Honorary member” of the Moldavian Academy of Sciences** awarded to ASTR Vice-president, Professor Eng. Sc. Dr. Teodor Florin Tanasescu.
- **Honorary Doctor of Technical University of Moldova** awarded to ASTR President, Associate Professor Eng. Sc. Dr. EUR ING Mihai Mihăiță.
- **Honorary Doctor of “Dunărea de Jos” University of Galați** to Professor Eng. Sc. Dr. Octavian Bologa, member of ASTR.



ABOUT FUTURE ENGINEERS

A constant concern not only of ASTR scientific members, but also of the research managers and design institutes or technical universities members is to attract students into engineering and continuous improvement studies which help them evolve from student to young engineer.

- **Cluj ASTR subsidiary** has initiated the first competition for young researchers – funded by a local company – and awarded them within the **“INVENT PRO” Salon** Exhibition of Inventions held in 2015 in Cluj-Napoca.



- **Timișoara ASTR subsidiary** motivates competition spirit in a contest designed to reward the best graduation project by offering the annual prize **“Eminent student, eminent researcher”**.



- **Brașov ASTR subsidiary** organized the meeting **“The Graduate and the employer”** in its concern to prepare the graduate for a future profession.



About future engineers

All ASTR sections organize technical conferences aimed to enrich the engineer knowledge resources: *Smart grid and energy efficiency, electric transportation, nanomaterials and nanotechnologies, smart city, reindustrialization.*

- Training centers have been organized for young students to provide them support in their research or participation to Olympics.



- Upgrading the professional engineer level with PhDs organized under the leadership of more than 50 ASTR members.
- Student research circles in mechanics and materials resistance have been organized and conducted for many years thanks to the efforts of specialized departments.
- Transport Engineering Department has initiated a number of projects addressing themes like: **“Student today, professional tomorrow”** and **“Facilitating access for students of technical domain to the labor market”**.



ANNIVERSARIES

► Professor Eng. Sc. Dr. Dorel Zugrăvescu at 85th anniversary (born November 25, 1930)

Professor Zugrăvescu is a founding member of ASTR and member of the Romanian Academy, former director of the Institute of Geodynamics “*Sabba S. Stefanescu*” of the Romanian Academy and the UNESCO Chair in Bucharest, which turned 25 years of existence. On this occasion, ASTR granted to Professor Zugrăvescu “*Opera Omnia*” Award for entire activity in geodynamics.



► Professor Emeritus Panaite Mazilu, celebrated at the age of 100

Professor Mazilu is recognized as “Teacher of Engineers in Romania”. The direct contribution of Professor Mazilu can be easily noticed in the realization of courageous works, sometimes unique. In recognition to professor’s special merits, AGIR granted him “*Magister Artium*” diploma and ASTR “*Ad majorem edificatoris gloriam*” diploma at his anniversary moment.



Anniversaries

- **The 45 years celebration since the establishment of the National Institute of Research and Development for Cryogenic and Isotopic Technologies – ICSI Rm. Valcea (Bucharest, October 23),** institute with an outstanding contribution in achieving the heavy water plant in Romania – European premiere.

The event incorporated a series of events dedicated to the anniversary that mark an important milestone on the road to performance of the Romanian scientific and technical creativity. Academician Marius Sabin Peculea, known as “Romanian father of heavy water”, delivered an anniversary speech.



- **The 60 years celebration of the Department of Technical Sciences of the Romanian Academy (Romanian Academy Hall, Bucharest, November 27)**



ASTR EXECUTIVE COMMITTEE



PRESIDENT

Associate Professor Eng. Sc. Dr. EUR ING DHC

Mihai MIHĂIȚĂ



VICE-PRESIDENT

Professor Eng. Sc. Dr.

Radu MUNTEANU



VICE-PRESIDENT

Professor Eng. Sc. Dr.

Șerban RAICU



VICE-PRESIDENT

Professor Eng. Sc. Dr. DHC

Florin Teodor TĂNĂSESCU



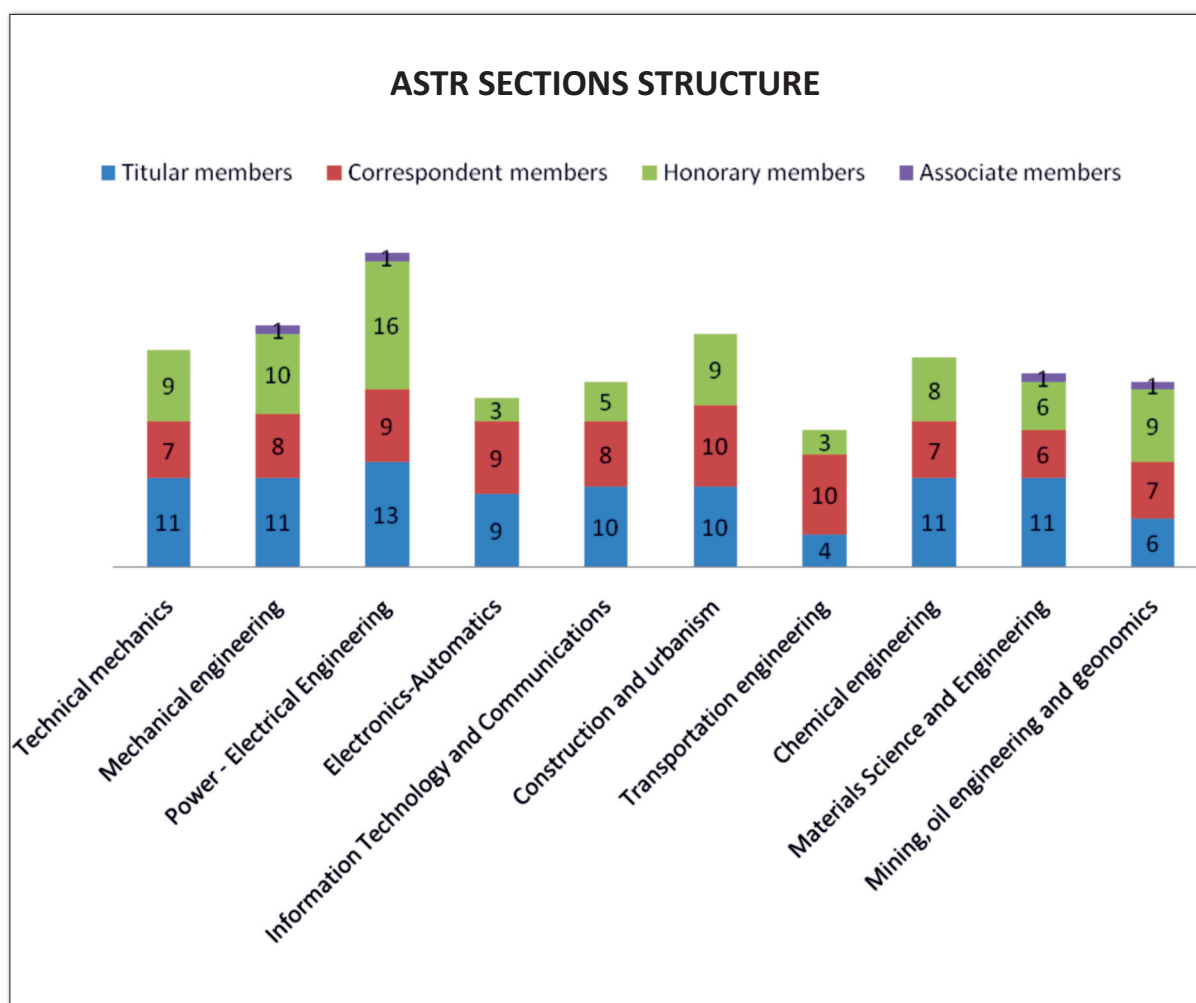
GENERAL SECRETARY

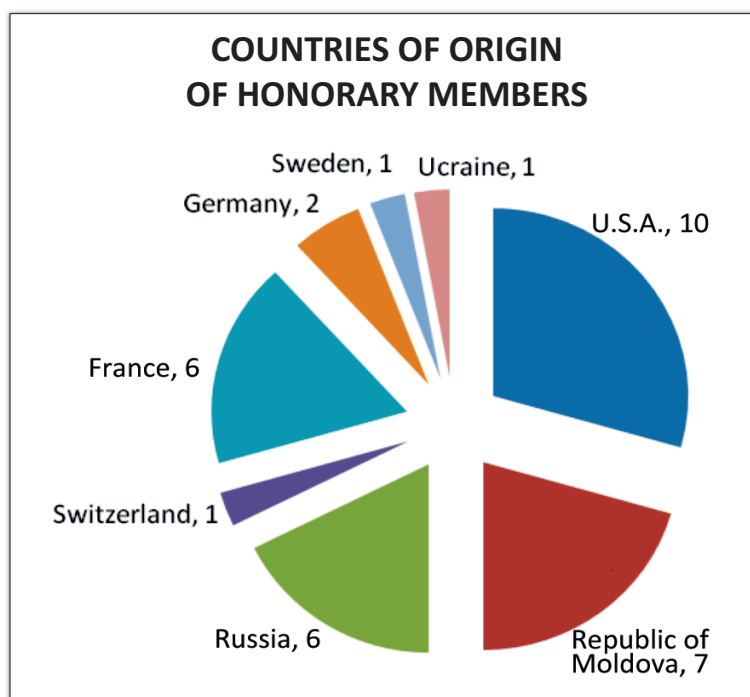
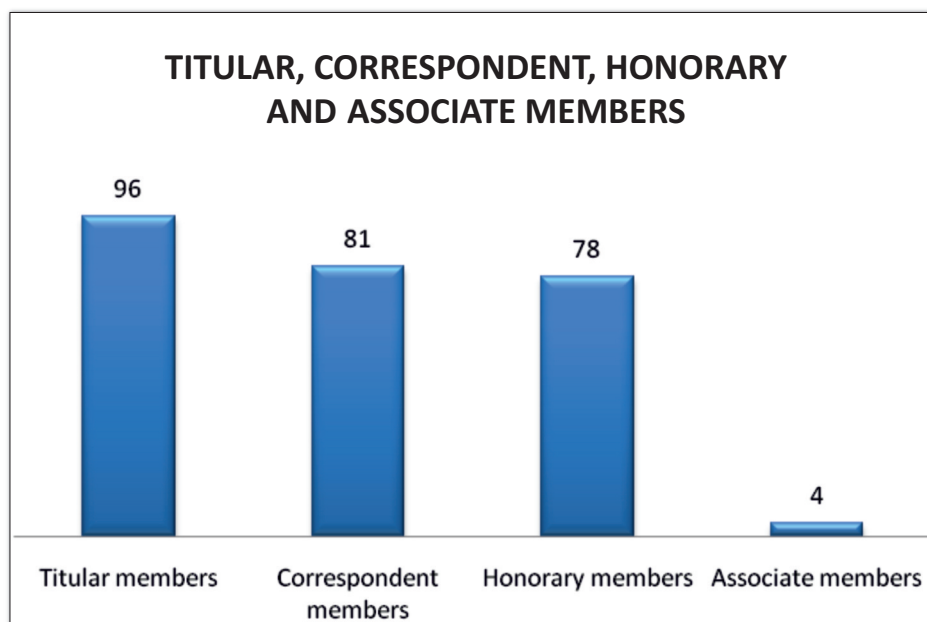
Professor Eng. Sc. Dr. DHC

Valeriu V. JINESCU

ASTR STRUCTURE IN 2015

The Technical Sciences Academy of Romania operates with 10 scientific sections composed of 259 members, including 96 titular members, 81 correspondent members, 78 honorary members (of which 34 from abroad) and 4 associate members.

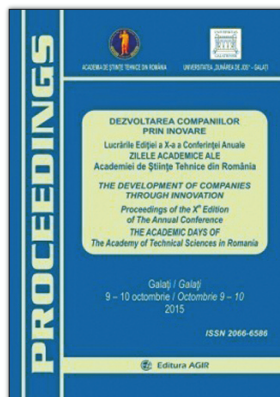
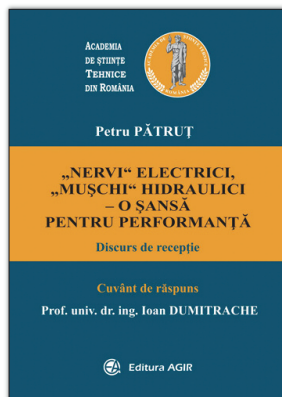
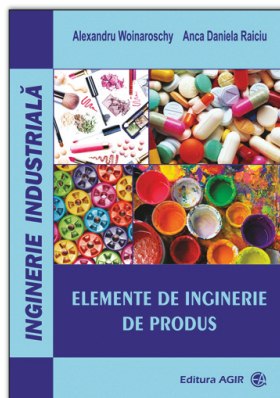
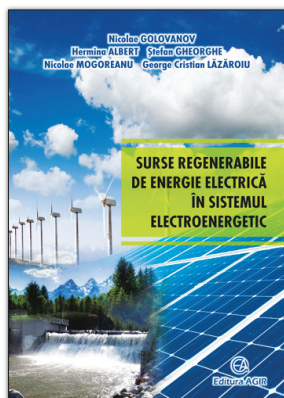
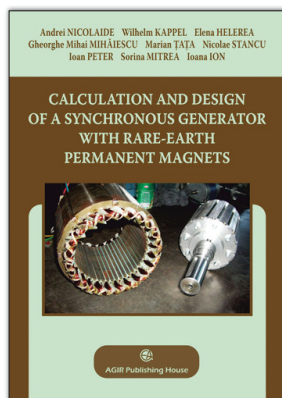
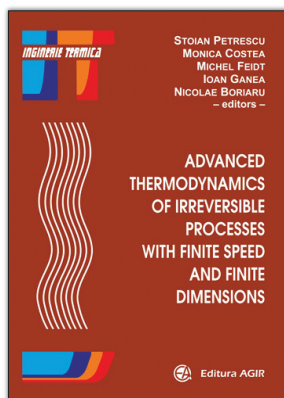




PUBLICATIONS

Scientific contribution of ASTR members, in 2015, was elaborated on by the emergence of a number of articles and books. We present some of the works published by AGIR.

- **ADVANCED THERMODYNAMICS OF IREVERSIBLE PROCESSES WITH FINITE SPEED AND FINITE DIMENSIONS.** Stoian Petrescu, Monica Costea, Michel Feidt, Ioan Ganea, Nicolae Boriaru
- **CALCULATION AND DESIGN OF A SYNCHRONOUS GENERATOR WITH RARE-EARTH PERMANENT MAGNETS.** Andrei Nicolaide, Wilhelm Kappel, Elena Helerea, Marin Tata, Ioan Petre, Georghe Mihăilescu, Nicolae Stancu, Sorin Mitre, Ioana Ion
- **FREE PARTICLE ANALYSIS METHOD IN A DIGITAL MEDIA CONTINUUM.** Vasile Năstăsescu, Ghiță Bârsan
- **ROMANIA'S ENERGY STRATEGY. STRATEGIC GUIDELINES ON MEDIUM AND LONG TERM.** Victor Vaida
- **RENEWABLE ELECTRICITY POWER SYSTEM.** Nicolae Golovanov, Hermina Albert, Ștefan Gheorghe, Emil Mogoreanu, Cristian George Lăzăroiu
- **EARTH. LIVING PLANET. VOL. II.** Dorel Zugrăvescu, Florin Munteanu
- **ELEMENTS PRODUCT ENGINEERING.** Alexandru Woinaroschy, Anca Daniela Raiciu
- **H₂O-H₂ ISOTOPIC EXCHANGE IN ROMANIAN LABORATORIES.** Marius Peculea
- **MATHEMATICAL MODELING – ACCIDENTS AND INCIDENTS EFFECTIVE INVESTIGATOR ON HYDRAULIC WORKS. *RECEPTION SPEECH*.** Dan Stematiu
- **ELECTRICAL NERVES, HYDRAULIC MUSCLES – A CHANCE FOR PERFORMANCE. *RECEPTION SPEECH*.** Petre Pătruț
- **PROCEEDINGS OF THE Xth EDITION OF THE ANNUAL CONFERENCE “THE DEVELOPMENT OF COMPANIES THROUGH INNOVATION”**
- **D.E.X. – ROAD VEHICLES (R-E-F-G).** Gheorghe Frățilă, Cristian Andreescu, Cornel Vladu, Raluca Moisescu, Cornelia Stan, Marius Toma



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