

Ambassador of Science of the Republic of Slovenia Award for the international promotion of Slovenian astronomy and opening up opportunities for new generations

Prof. Dr Andreja Gomboc

University of Nova Gorica, Centre for Astrophysics and Cosmology

Key words: astronomy, astrophysical transients, black holes, International Astronomical Union, European Astronomical Society

Overview of achievements

Through her research, networking and organisational work, astrophysicist Prof. Dr Andreja Gomboc has made a significant contribution to establishing Slovenian astronomy as a recognised part of the international scientific community. As the initiator of Slovenia's membership in the International Astronomical Union (IAU) and the European Astronomical Society (EAS), she paved the way for global recognition of Slovenian research. Through her research networks, she opens doors to key international collaborations, data and opportunities.

She participates in some of the world's largest astronomical projects, such as the LSST sky survey at the Vera Rubin Observatory and the Gaia mission. She combines Slovenian expertise with cutting-edge research, fosters the exchange of knowledge between Slovenia and the rest of the world and provides younger generations with access to a world-class research environment. Through leadership roles in international associations, teaching and many years of promoting astronomy, she strengthens the development and visibility of Slovenian astronomy both in Slovenia and internationally.

Zois Prize for lifetime achievement

for research into intellectual history and the future development of the public sphere

Prof. Dr Slavko Splichal, Member of the Slovenian Academy of Sciences and Arts

University of Ljubljana, Faculty of Social Sciences

Key words: communication studies, theory of the public sphere, public opinion, mass communication, information society

Summary for a general audience

Prof. Dr Slavko Splichal, Member of the Slovenian Academy of Sciences and Arts, is one of the most prominent Slovenian and internationally recognised critical theorists of the public sphere, public opinion and social communication. For more than five decades, he has been researching the conditions for and obstacles to the socialisation of the media and the democratisation of the public sphere, as well as how they are influenced by politics, capital, technology and ideology.

His work has made a significant contribution to understanding the development of the public sphere from the Enlightenment to the digital age. He has highlighted the risks posed by social media, big data and artificial intelligence in an era of capital-controlled digital platforms. He has pointed out the paradox that increasing digital visibility and accessibility could foster the development of a democratic and critical public sphere, yet in practice they threaten it.

As a professor, mentor, writer, scientific editor and initiator of international scientific cooperation, he played a decisive role in establishing communication studies in Slovenia and linking the field to leading global research developments. By integrating critical theory, empirical research and social engagement, he has left a lasting mark on our understanding of communication as one of the foundations of a democratic society.

**Zois Prize for lifetime achievement
in environmental sciences**

Prof. Dr Milena Horvat

The Jožef Stefan Institute

Key words: environmental sciences, environmental analytical chemistry, mercury biogeochemistry, human biomonitoring, metrology in chemistry

Overview of achievements

For more than four decades, Prof. Dr Milena Horvat has been researching how chemical substances circulate in the environment and reach humans through various pathways. She has gained international recognition primarily through her research on mercury and its accumulation in food and the human body. The particular value of her work lies in connecting the entire process, from measurement to action.

She has developed methods capable of detecting even very low concentrations of harmful substances in the environment and the human body and has ensured that measurements are comparable across laboratories and countries. This makes it possible to monitor environmental changes over time, assess the extent of human exposure, and determine whether pollution reduction measures are actually effective. She also involves residents of the areas under study in her research and ensures that the findings are openly accessible to everyone.

At the Jožef Stefan Institute, she has established an internationally recognised research environment and, as a mentor, has trained a new generation of researchers. In this way, she brings together environmental research, human health research, and reliable measurements into a coherent whole that contributes to more effective protection of the environment and human health.

**Zois Prize for outstanding achievements
in the study of corrosion mechanisms and protection of materials against corrosion**

Prof. Dr Ingrid Milošev

The Jožef Stefan Institute and the Valdoltra Orthopedic Hospital

Key words: chemistry of materials, metal corrosion, electrochemistry, corrosion protection, protective coatings and corrosion inhibitors

Overview of achievements

Prof. Dr Ingrid Milošev explains how corrosion shortens the lifespan of metallic materials. This poses a major challenge for both industry and everyday life, as corrosion threatens everything from machinery, ships and bridges to medical implants, such as artificial joints.

Together with her colleagues, she has developed numerous advanced protective coatings that serve various functions, ranging from inhibiting corrosion to enabling surfaces to repair themselves after damage. She pays particular attention to more environmentally friendly protective coatings and corrosion inhibitors that replace substances that are harmful to health and the environment. Her research findings extend the lifespan of metals and make materials used in industry and medicine safer.

She is one of the few researchers in the world to have received two of the most prestigious international awards in the field of corrosion research: the Uhlig Award of The Electrochemical Society and the European Corrosion Medal awarded by the European Federation of Corrosion.

**Zois Prize for outstanding achievements
in historical research into borders and memory in contemporary Europe**

Prof. Dr Borut Klabjan

Science and Research Centre Koper

Key words: transnational history, memory studies, national identifications, border areas, fascism and anti-fascism, Slovenian–Italian relations

Overview of achievements

Prof. Dr Borut Klabjan explores how borders, political changes and memories shape relationships between people and communities in Europe. His work has yielded new insights into Central Europe and the northern Adriatic region, with particular emphasis on border areas as meeting points of various cultures and historical experiences. His research on the northern Adriatic, fascism and anti-fascism, as well as his co-authorship of a monograph on the Narodni dom in Trieste, has garnered considerable attention for shedding light on the complex past of this region. By integrating political, social and cultural history, he has deepened our understanding of how societies preserve, interpret and use their past. His work successfully brings complex scientific content into the public sphere and encourages reflection on Europe's shared past. It significantly strengthens the international standing of Slovenian historiography and opens up new opportunities for its integration into leading contemporary scholarly debates.

**Zois Prize for outstanding achievements
in the development of artificial intelligence methods and their application in science**

Prof. Dr Sašo Džeroski

The Jožef Stefan Institute

Key words: explainable artificial intelligence, machine learning, computational scientific discovery, semi-supervised learning, artificial intelligence for science

Overview of achievements

Prof. Dr Sašo Džeroski develops artificial intelligence methods that not only make predictions but also explain how they arrived at them. While many methods operate as opaque black boxes, his approaches produce interpretable models that inspire greater trust among users.

He has developed numerous explainable machine learning approaches that automatically discover patterns in highly complex and incomplete data. His methods produce models in the form of decision trees, logical rules and mathematical equations – the kind that researchers would otherwise seek out and formulate manually. These methods enable us to predict gene activity, identify new active substances for medicines to treat tuberculosis and pulmonary fibrosis, and plan water management measures as well as the operation of the Mars Express space probe's instruments.

His work has significantly contributed to the development of modern artificial intelligence and its application in science, enabling researchers to make new discoveries more quickly and reliably.

**Zois Prize for outstanding achievements
in research on bioactive compounds from natural plant sources**

Prof. Dr Nataša Poklar Ulrih

University of Ljubljana, Biotechnical Faculty

Key words: biochemistry, encapsulation systems, functional foods, plant-based antioxidants, sustainable use of plants

Overview of achievements

Through her research, Prof. Dr Nataša Poklar Ulrih combines the fields of biophysical chemistry and food technology, investigating plant-derived bioactive compounds, their mechanisms of action and their potential applications in the food industry. She investigates polyphenolic compounds and other bioactive substances that protect cells against damage and may help reduce the risk of chronic diseases. Since these substances often degrade during processing and storage, she and her colleagues have developed innovative encapsulation systems that improve the stability, functionality and bioavailability of these compounds. Her research has shown that food production side-streams, such as onion and olive leaves, are a valuable source of bioactive compounds for the development of functional foods. In this way, she makes a significant contribution to the development of healthier and more sustainable foods and to the more efficient use of natural resources.

Zois Award

for major achievements in the field of theory of quantum materials out of equilibrium

Assist. Prof. Dr Denis Golež

Jožef Stefan Institute and University of Ljubljana, Faculty of Mathematics and Physics

Key words: quantum materials, quantum technologies, non-equilibrium dynamics, electronic states of matter, light and matter

Overview of achievements

The manufacture of components for modern electronics is approaching physical limits, therefore, scientists are looking for new approaches. Theoretical physicist Assist. Prof. Dr Denis Golež researches quantum materials whose properties arise from the interaction of a vast number of electrons. He is particularly interested in how they respond when disturbed from their equilibrium state by short laser pulses or an electric field. They can transform a material from an insulator into a conductor in a trillionth of a second, opening up possibilities for new, high-speed memory elements.

Golež develops theories and computational tools that make it possible to describe these extremely rapid processes. In collaboration with leading research groups in Europe and the USA, he has demonstrated how laser light can create previously unknown, hidden states of matter in such materials.

As part of the ERC Consolidator Grant project, he is investigating how to preserve these short-lived states long enough for them to become useful in future quantum technologies.

Zois Award

for developing and establishing a child-centred approach to integrating immigrant children

Dr Mateja Sedmak, Dr Barbara Gornik and Dr Zorana Medarić

Institute for Social Studies, Koper Science and Research Centre

Key words: migration, immigrant children, child-centred approach, multiculturalism, integration policies and practices

Overview of achievements

Dr Mateja Sedmak, Dr Barbara Gornik and Dr Zorana Medarić have advanced a child-centred approach to the integration of migrant children. Their work is grounded in the recognition that adults' perspectives dominate the process of integrating children into a new environment, while children's own perspectives, experiences and needs often remain unheard. As leaders of the international MiCREATE – Migrant Children and Communities in a Transforming Europe project (Horizon 2020, Research and Innovation Action), they demonstrated that children's perspectives and experiences are crucial for understanding their needs and well-being, and supporting their successful into society. In doing so, they contributed to a significant methodological and analytical shift by involving migrant children as active co-creators of research, practices and policies that affect their lives. Their work supports more effective integration approaches and contributes to the recognition of children as social actors.

Zois Award

for major achievements in the field of ceramic layers for energy storage and conversion

Assoc. Prof. Dr. Hana Uršič Nemevšek

The Jožef Stefan Institute

Key words: nanotechnologies, ceramic layers, energy storage and conversion, electrocaloric materials, aerosol deposition of ceramic layers

Overview of achievements

Electronic devices are becoming smaller and more powerful, yet we also want them to be more energy-efficient and environmentally friendly. Special ceramic layers, which are the focus of research by Assoc. Prof. Dr Hana Uršič Nemevšek, play an important role in achieving this. She is among the world's leading researchers in the field of ceramic layers for energy storage and conversion, thereby paving the way for smaller, more efficient and environmentally friendly devices of the future.

She introduced the aerosol deposition method to Slovenia, which enables the fabrication of ceramic layers at room temperature. She and her colleagues were the first in the world to develop a flexible ceramic layer thinner than a human hair that can provide cooling, detect touch or vibrations and store energy. Such layers can be used for cooling microchips in phones and laptops, as sensors in smartwatches and flexible components of medical devices and as tiny capacitors for storing electrical energy.

Zois Award

for using oyster mushroom proteins in biomedicine and sustainable plant protection

Prof. Dr Kristina Sepčič

University of Ljubljana, Biotechnical Faculty

Key words: biomedicine, biotechnology, oyster mushroom proteins, cellular markers, sustainable bioinsecticides

Overview of achievements

Prof. Dr Kristina Sepčič studies proteins from edible oyster mushrooms that bind to specific lipids in cell membranes. She has demonstrated that these proteins can serve as safe and reliable tools for monitoring processes in living cells and gaining a better understanding of diseases such as cancer, neurodegenerative diseases and autoimmune disorders. Her research contributes to the development of new diagnostic approaches and a better understanding of cellular function.

She has also discovered protein complexes that are effective as eco-friendly bioinsecticides against two major agricultural pests – the Colorado potato beetle and the corn rootworm – while being safe for humans and most other organisms. Her work bridges two seemingly unrelated fields – biomedicine and agriculture – by advancing our understanding of cellular mechanism in health and disease and developing more sustainable methods of plant protection.

Zois Award

for significant achievements in in the field of algebraic and structural graph theory

Prof. Dr Ademir Hujdurović

Faculty of Mathematics, Natural Sciences and Information Technologies of the University of Primorska, Andrej Marušič Institute University of Primorska

Key words: network mathematics, graph theory, symmetries, complex systems, discrete mathematics

Overview of achievements

When using the internet, navigation systems, mobile phones or social networks, we become part of complex systems of connections that can be described mathematically. Mathematician Prof. Dr Ademir Hujdurović studies the structure of these systems.

He studies graph theory, a branch of mathematics that examines networks and the relationships between connected elements. It primarily reveals hidden patterns and symmetries, enabling us to better understand the functioning of highly complex systems and predict their properties. Such mathematical models are used to understand a wide variety of systems, ranging from transport and communication networks to connections between data, people and molecules.

In recent years, he has developed new mathematical approaches and solved several important open problems in the field of algebraic graph theory. As a researcher, mentor and dean, he also makes a significant contribution to the international recognition of Slovenian mathematics and continues the tradition of the world-renowned Slovenian school of graph theory.

Zois Award

for significant achievements in pharmacogenomics and targeted therapies for leukaemia

Prof. Dr Irena Mlinarič-Raščan

University of Ljubljana, Faculty of Pharmacy

Key words: pharmacy, pharmacogenomics, leukaemia, personalised therapy, targeted drugs

Overview of achievements

Prof. Dr Irena Mlinarič-Raščan investigates why a drug that is effective in most patients causes side effects in some. In her pharmacogenomic research, she studies the influence of an individual's genetic characteristics on their response to medications. She is helping to shift the field of pharmacy away from a 'one-size-fits-all' approach towards treatment tailored to individual patients.

In the field of leukaemia, she has helped establish how to identify patients at greater risk of serious complications even before treatment begins. Her research also includes why cancer cells develop resistance to drugs and opens up possibilities for developing new drug-based treatment approaches. Through advanced cellular research and the use of artificial intelligence methods, she has identified new molecular targets that could improve the treatment of chronic lymphocytic leukaemia.

She has also contributed significantly to understanding the reasons why some people become critically ill from infections such as COVID-19. Her work has made a significant contribution to safer and more effective treatment.

Puh Prize for Lifetime Achievement

for helping to lay the foundations of Slovenia's modern electric power system

Prof. Dr Ferdinand Gubina, Member of the Slovenian Engineering Academy

Retired professor at the Faculty of Electrical Engineering, University of Ljubljana; Milan Vidmar Electric Power Research Institute

Key words: electric power systems, energy security, electricity grid management, automation of power facilities, operational reliability

Overview of achievements

Prof. Dr Ferdinand Gubina, Member of the Slovenian Engineering Academy, is one of the leading experts in the field of electric power systems. He devised concepts for their management and developed solutions that have helped make Slovenia's electricity supply reliable, safe and tailored to the needs of modern society. His research did not remain confined to the academic sphere but was applied in the development and automation of power facilities, as well as in the planning and management of electricity grids.

He established a research department for electric power system management at the Milan Vidmar Electric Power Research Institute. As the founder and first president of the Slovenian professional association CIGRE, he connected the Slovenian energy sector with the international professional community. He made a significant contribution to the formulation of technical regulations and electrotechnical terminology. As a professor and mentor at the Faculty of Electrical Engineering of the University of Ljubljana, he trained generations of engineers and doctoral graduates who are currently developing the Slovenian energy sector.

He was also responsible for two other pioneering achievements: an electronic model of a nerve cell with the characteristics of a living one and a mathematical model of bipedal robot locomotion. A physical model has not been developed on its basis until 40 years later.

Puh Prize

for developing breakthrough sensor and recycling technologies and transferring them into practice

Prof. Dr Aleksandra Lobnik

Faculty of Mechanical Engineering at the University of Maribor, and Institute of Environmental Protection and Sensors (IOS)

Key words: sensor technologies, organophosphorus compounds, meat freshness monitoring sensors, nanomaterials, circular economy, recycling of water, plastics and textiles

Overview of achievements

Prof. Dr Aleksandra Lobnik is a leading Slovenian researcher in the fields of sensor technologies and the circular economy. She translates scientific excellence into high-value industrial solutions with measurable market impact. She has an impressive innovation portfolio of 35 patents.

As a co-founder of IOS, she introduced an advanced model for connecting science and business as early as 2006 and built an interdisciplinary team of leading experts. Under her leadership, the team has developed, among other things, sensor systems for monitoring meat freshness within packaging, a sensor for the rapid detection of hazardous organophosphorus compounds, and technologies for recycling water, textiles, and plastics. These breakthrough solutions enhance consumer safety, reduce waste and advance the circular economy. As a prominent advocate for science, she brings scientific achievements closer to the public, helps shape global trends and sets new standards in applied science.