



LATVIAN ACADEMY OF SCIENCES

## ACHIEVEMENTS IN SCIENCE 2023

### DIPLOMA OF THE PRESIDENT

#### **1. Novel materials for development of all-optical temperature sensor (OPTSEN).**

*Authors:* LAS academic Uldis Rogulis, LAS corresponding member Anatolijs Šarakovskis, *Dr.phys.* Andris Fedotovs, *Dr.phys.* Andris Antuzevičs, *Ph.D.* Meldra Ķemere, *M.sc.* Pāvels Rodionovs. Institute of Solid State Physics, University of Latvia. *M.sc.* Kalvis Alps, *M.sc.* Vineta Kiseļeva. Light Guide Optics International.

#### **2. Magnetohydrodynamic Generator Driven by a Thermoacoustic Engine for long term deep space flights.**

*Authors:* *Ph.D.* Artūrs Brēķis, *Dr.phys.* Jānis Freibergs, LAS academic Agris Gailītis, *Dr.phys.* Antoine Alemany (France). Institute of Physics, University of Latvia.

#### **3. Fast and cost-effective machine learning based system for microorganism growth analysis.**

*Authors:* *Dr.phys.* Aleksejs Ļihačovs, *Dr.sc.ing.* Dmitrijs Bļizņuks, *Dr.phys.* Ilze Ļihačova, *Dr.biol.* Jānis Liepiņš, *M.sc.* Ilya Balmages, *Dr.med.* Aigars Reinis, *M.D. (medical degree)* Svjatoslavs Kistkins, *M.sc.phys.* Emīlija Vija Ploriņa, *M.sc.biol.* Edgars Baranovičs, *Dr.sc.ing.* Pāvels Osipovs. Laboratory of Biophotonics, Institute of Atomic Physics and Spectroscopy, University of Latvia, in co-operation with Institute of Microbiology and Biotechnology, University of Latvia, Riga Technical University, Institute of Smart Computer Technologies, Pauls Stradiņš Clinical University Hospital, Laboratorija Auctoritas Ltd.

#### **4. Novel aptamer technology for identifying tumor therapeutic targets.**

*Ph.D.* Kārlis Pleiko, *Ph.D.* Maartja Haugas, *Ph.D.* Vadims Parfejevs, *Ph.D.* Teodors Pantelejevs, *Ph.D.* Emilio Parisini, *Ph.D.* Tambet Teesalu, LAS corresponding member Una Riekstiņa. Centre of Pharmaceutical Sciences, Faculty of Medicine, University of Latvia.

#### **5. Prevention of stroke-induced brain damage by enhancing mitochondrial bioenergetics.**

*LAS academic* Līga Zvejniece, *Dr.biol.* Baiba Švalbe, *Dr.pharm.* Edijs Vāvers, *Dr.pharm.* Melita Ozola, *Dr.chem.* Solveiga Grinbergs, *M.Sci.* Baiba Gukalova, *M.Sci.* Eduards

Sevostjanovs, *LAS academics* Edgars Liepiņš and Maija Dambrova. Latvian Institute of Organic Synthesis.

## **6. Development of selective inhibitors of tumor cell energy metabolism.**

*M.Sci.* Pavels Dimitrijevs, *Dr.pharm.* Marina Makrecka–Kūka, *Ph.D.* Teodors Panteļejevs, *LAS academic* Pavel Arsenyan. Latvian Institute of Organic Synthesis.

## **7. Various faces of extracellular vesicles in cancer: potential roles and applications in cancer diagnostics, monitoring and treatment.**

*Authors:* Lilite Sadovska, Dr. Pawel Zayakin, Dr. Cristina Bajo-Santos, Agnese Brokāne, Dr. Kristaps Eglītis, Dr. Rūdolfs Cešeiko, Dr. Zane Kalniņa, Prof. Aija Kļaviņa, Prof. Vilnis Lietuvietis, Prof. Jānis Eglītis, *LAS academic* Aija Linē. Latvian Biomedical Research and Study Centre, Riga East University Hospital, Latvian Academy of Sport Education.

## **8. Benedikts Kalnačs. Pavērsiens. Rūdolfs Blaumanis latviešu un Eiropas literatūrā. Rīga: LU Literatūras, folkloras un mākslas institūts, 2022. 384 lpp. (A Milestone. Rūdolfs Blaumanis in Latvian and European Literature. Riga: Institute of Literature, Folklore and Art, University of Latvia, 2022.)**

*The monograph by Dr.philol. Benedikts Kalnačs is an innovative study of the works of the writer Rūdolfs Blaumanis (1863–1908) in the framework of Latvian and European writing at the turn of the 19th and 20th centuries. The study was purposefully implemented as a conceptually unified monograph, in which Blaumanis' works are analyzed from the perspective of comparative literary studies and regional literary history, taking into account the inextricable connection of the writer's activity with the Latvian writing tradition, as well as the connection with German and other European literatures.*

## **9. Raivis Bičevskis. Viņpus cilvēka. Rīga: LU Akadēmiskais apgāds, 2023. 264 lpp. (Beyond the Man. Riga: University of Latvia Press, 2023.)**

*The thesis of the monograph “Beyond the Man” by Dr.phil. Raivis Bičevskis reads: society creates the world in its image and likeness, or, more correctly, society replaces the world with itself – society has become the world, the world is society.*

## **10. Anita Rožkalne. Brīvie vektori. Rīga: Dienas Grāmata, 2022. 552 lpp. (The Free Vectors. Rīga: Dienas Grāmata Publishers, 2022.)**

*The author of the monograph about the oeuvre of the writer Gundega Repše, literary scholar Anita Rožkalne writes: “Gundega Repše is one of the most important Latvian writers. Her nearly thirty books – novels, prose collections, voluminous biographical essays, interviews with literary figures, also diaries and compilations of journalistic columns – reveal a deep sense of the world, but her artistic expression and the emphasized aspects of the content are always bright and challengingly individual. A vector is a direction towards a goal. The focus of this book is the impulses of the creation of literary works, the genesis of the idea, the artistic structure and reception of the works: free vectors that can be parallel to themselves at any point in space.”*

## **11. Development of medicinal forms of the leaf extract of the Latvian traditional medicinal plant tansy and its effect on the digestive tract microbiome and anti-parasitic control in sheep.**

*Authors: Dr.pharm. Dace Bandere, Dr.paed. Rudīte Koka, Dr.sc.ing. Agnese Brangule, Dr.chem. Līga Lauberte, Ph.D. Valentyn Mohylyuk, Oskars Radziņš, PhD students Renāte Teterovska (Šukele), Ance Bārzdiņa, Oxana Brante, Artūrs Paulausks. Rīga Stradiņš University. Authors: Dr.med.vet. Līga Kovaļčuka, Dr.med.vet. Dace Keidāne, Mg. Alīna Kļaviņa, Mg. Kristīne Ganola. Latvia University of Life Sciences and Technologies. Representatives of the sheep farming industry: Aija Šneidere “Mikaitas Ltd”, Veterinary Medicine Educational Centre and “Latvian Sheep Farmers’ Association” Ltd.*

## **12. Augu minerālā barošanās, diagnostika un mēslošanas optimizācija. Rīga: LU Akadēmiskais apgāds, 2023. 240 lpp. (Diagnostics of plant mineral nutrition and optimization of fertilization. Riga, University of Latvia Press, 2023.)**

*Authors: Dr.biol. Vilnis Nollendorfs, Dr.biol. Anita Osvalde, Dr.biol. Gunta Čekstere, Dr.biol. Andis Karlsons, Mg.env.sci. Laura Āboliņa. Institute of Biology, University of Latvia.*

## **13. Digital landscape atlas of Latvia.**

*Authors: Mg. Linda Ieviņa, Dr.geogr. Pēteris Lakovskis, Dr.geogr. Andris Klepers, Dr.oec. Ilze Stokmane, Dr.arh. Daiga Skujāne, Dr.oec. Agita Līviņa, Dr.arh. Aija Ziemeļniece, Dr.arh. Kristīne Vugule, Dr.arh. Natālija Ņitavska, and others. Institute of Agricultural Resources and Economics, Vidzeme University of Applied Sciences, Latvia University of Life Sciences and Technologies.*