

## The Top ten scientific developments in Latvia in 2010

### In scientific research:

- The results of fundamental research in quantum physics related to optically polarized atoms have been described in the monograph: Marcis Auzinsh, Dmitry Budker, Simon Rochester. *Optically Polarized Atoms: Understanding light-atom interactions*, published by Oxford University Press (*Dr.habil.phys.* Mārcis Auziņš, University of Latvia in collaboration with University of California, Berkeley).
- The three-dimensional structure of an enzyme gamma-butyrobetaine hydroxylase was established that will enable the development of new pharmaceutical substances with cardioprotective effect (*Dr.biol.* Kaspars Tārs, *Dr. biol.* Andris Zeltiņš, *Dr.biol.* Ainārs Leončiks, *Dr. biol.* Andris Kazāks, *doct.stud.* Jānis Rūmnieks, Svetlana Koteloviča, Jeļena Šaripo, *Dr. pharm.* Maija Dambrova, *Dr.pharm.* Edgars Liepiņš, *doct. stud.* Jānis Kūka, *Dr.habil.chem.* Edvards Liepiņš, *doct.stud.* Kristaps Jaudzems, *Dr.chem.* Artūrs Vīksna, Latvian Biomedical Research and Study Centre, Latvian Institute of Organic Synthesis, University of Latvia).
- An encyclopaedic dictionary *Valodniecība Latvijā: fakti un biogrāfijas* [Linguistics in Latvia: facts and biographies] was published. The dictionary is divided into two parts: the first part contains timeline of the events related to linguistics and cultural history and covers the period from 13th century through 2009; the second part contains over 500 biographical entries of Latvian and foreign linguists (*Dr.habil.philol.* Andrejs Bankavs and *Dr.habil.philol.* Ilga Jansone, Latvian Language Institute of the University of Latvia).
- A new effect of electron and high-frequency electromagnetic wave interaction in gyrotron resonator was detected, which served as a basis for developing the theory of accelerating their motion in fusion reactors (*Ph.D.* Oļģerts Dumbrājs, *Dr. habil. math.* Andrejs Reinfelds, University of Latvia in collaboration with Maryland University).
- For the first time, one of the most valuable sources of medieval history – *Investigation Protocol by Franciscus de Moliano, 1312* was translated from Latin into Latvian and released into scholarly circulation. This work uncovers unique historical evidence of the policy and battles in the Baltic lands and Livonia at the turn of the 14th century (*Dr.habil.hist.* Ēvalds Mugurēvičs, Institute of Latvian History, University of Latvia).

### In practical applications:

- For the first time, a stem cell transplant was successfully implanted into the heart muscle of an infant with severe heart disease (*Dr.habil.med.* Aris Lācis, *Dr. med.* Andrejs Ērglis, *Children's Clinical University Hospital and Latvian Centre of Cardiology and Cell Transplantation Center at the Pauls Stradins Clinical University Hospital*).
- Europe's largest multilingual terminology portal *EuroTermBank* was created and launched; the portal provides a single access point to multisectoral and multilingual terminology, including Latvian terminology (*Dr.sc.comp.* Andrejs Vasiļjevs, *Mg.sc.comp.* Raivis Skadiņš, *Dr.philol.* Tatjana Gornostaja, *Dr.habil.sc.comp* Juris Borzovs, *Dr. habil.philol.* Valentina Skujiņa, *SIA Tilde, University of Latvia, Latvian Academy of Sciences*).
- A new autonomous and remote underwater vehicle was designed for studying aquatic environments (*Dr.habil.sc.ing.* Jānis Vība, *Dr.habil.sc.ing.* Semjons Cifanskis, *M.sc.ing.* Vladimirs Jakušēvičs, *Dr.sc.ing.* Bruno Grasmanis, *Dr.sc.ing.* Igors Tipāns, Guntis Kuļikovskis, Rīga Technical University in the frames of the EU project).
- A technology for depositing LiFePO<sub>4</sub> thin film coatings was developed. The latter are used on batteries and accumulators in portable electrical appliances and microelectronics (*Dr.phys.* Jānis Kleperis, *Dr.chem.* Gunārs Bajārs, Jānis Šmits, Gints Kučinskis, Institute of Solid State Physics, University of Latvia).
- The most comprehensive database of Latvia's dendroflora was completed and *Latvijas kokaugu atlants* [Atlas of Latvian Woody Plants] was compiled and published; this work opens up new opportunities for studying biological diversity in Latvia (*Dr.habil.geogr.* Māris Laiviņš, Maija Bice, *doct. stud.* Ilmārs Krampis, *Dr.biol.* Dzintra Knape, *Dr.biol.* Dagnija Šmite, *Dr.biol.* Viesturs Šulcs, Institute of Biology of the University of Latvia).