



## Research at Czech University of Life Science Prague is focused on Biobased Economy

**The Biobased Economy** is an economy driven by efficiency in using crops and biomass for food, feed, chemicals, energy and fuels. As the third largest university in Prague, with a constantly growing student population, Czech University of Life Sciences (CULS) is quite competent to take up this challenge. CULS is working on all chains of the Biobased Economy, through fundamental research, applied research and education.

At CULS we focus on research in food production, biotechnology, bioeconomy, environmental protection, specific aspects of sociology, economics, as well in technical engineering and forestry sciences. Research outcomes often lead to important discoveries, e.g. in ethology of domestic and wild animals, in biotechnology and biomedicine, as well as in strategic studies of social adaptability to situations caused by changes in the natural and socio-economic environment. Our research has shed new light on the presence and impact of pollutants in the environment; on protection and restoration of forest ecosystems; on decontamination of soil and polluted water. Research in economics elucidates the transformation of post-communist countries in the larger context of Europe and Asia, market balance of agricultural commodities in the Czech Republic, etc.

CULS is well aware that top quality research is impossible without international collaboration, and that is why, for the sake of clarity, main areas and certain typical orientations of research at CULS, including selected projects, are indicated below.

**If you are interested in working together or in detailed information, please contact the project managers as listed, or the CULS Department for Strategy ([strategie@czu.cz](mailto:strategie@czu.cz), +420 224 384 048).**

## Sustainable production of plants, animals a bioactive substances

**H2020:** Food security, sustainable agriculture and forestry, marine and maritime and inland water research

- SFS-15-2016-2017: Breeding livestock for resilience and efficiency
- SFS-17-2017: Innovations in plant protection
- SFS-28-2017: Functional biodiversity – productivity gains through functional biodiversity: effective interplay of crop pollinators and pest predators

**Environmentally friendly economic systems:** Technological procedures for cultivation friendly to natural environment and soil and measures for an increased resistance of crops against environmental stress factors. Biological methods for protection of crops. Ecological breeding of livestock.

Pavel Tlustoš, tlustos@af.czu.cz	BIOFECTOR - Resource Preservation by Application of BIOefFECTORs in European Crop Production, 2012 – 2015	EC, FP7
Svatopluk Matula, matula@af.czu.cz	WATERMAN - Dissemination of research results in semi-arid and arid ecosystems with a focus on sustainable water resource management in Ethiopia, 2006 – 2008, No. 31694	EC, FP6
Miloslav Zouhar, zouhar@af.czu.cz	Development of the new methods of grain and vegetable preservation against pathogen and pests with botanical pesticides used in ecological and integrated agriculture, 2013 - 2017	Ministry of Agriculture Czech Republic
Lukáš Trakal, trakal@fzp.czu.cz	Simulation of metal transport in innovatively remediated soils using hydropedological and complex hydrogeochemical modelling, 2014 – 2016	Grant Agency Czech Republic
Aleš Vaněk, vaneka@af.czu.cz	Thallium isotope systematics in anthropogenically-affected geosystems – A biogeochemical approach, 2014 – 2016	Grant Agency Czech Republic



## Renewable resources bio-based economy

### H2020: BIOTECHNOLOGY

#### H2020: Food security, sustainable agriculture and forestry, marine and maritime and inland water research

- SFS-04-2017: New partnerships and tools to enhance European capacities for in-situ conservation
- SFS-27-2017: Permanent grassland – farming systems and policies
- RUR-05-2017: Novel public policies, business models and mechanisms for the sustainable supply of and payment for forest ecosystem services
- BB-03-2017: Adaptive tree breeding strategies and tools for forest production systems resilient to climate change and natural disturbances

Pavel Tlustoš, tlustos@af.czu.cz	Technologies for fast growing species intended for biomass production in contaminated soils of the Přebram region.	Norway Grants
Miroslav Svoboda, svobodam@fld.czu.cz	Formit - FORest management Strategies To Enhance The MITigation Potential Of European Forests, 2012 – 2016	EC, FP7
Aleš Vorel, vorel@fzp.czu.cz	Creation of the handbook for beaver conflicts and definition of the status and population development of beaver at the Czech Republic to increase of effectivity „Programme care“, 2014 – 2016	Norway Grants
Jaroslav Červený, cerveny@fld.czu.cz	Protection plan for lynx, wolf and bear in Czech Republic, 2014 – 2016	Norway Grants
Róbert Marušák, marusak@fld.czu.cz	Support system for decision at forest Engineering to strengthened of production and nonproduction function of the forest, 2013 – 2017	Ministry of Agriculture Czech Republic
Radim Kotrba, maugli46@volny.cz	Towards a long-term Africa-EU partnership to raise sustainable food and nutrition security in Africa	H2020



## Food and health

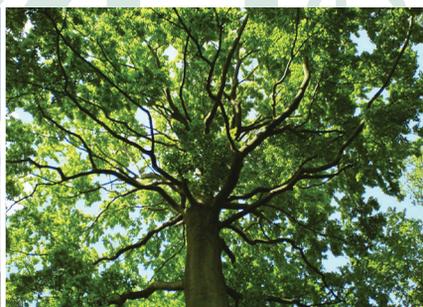
**H2020:** Food security, sustainable agriculture and forestry, marine and maritime and inland water research

- SFS-10-2017: Research and approaches for emerging diseases in plants and terrestrial livestock
- SFS-13-2017: Validation of diagnostic tools for animal and plant health
- SFS-35-2017: Innovative solutions for sustainable food packaging

**Quality and composition of crop and livestock agricultural products and opportunities for their influencing:** factors influencing the quality of meat, milk and eggs, reproduction of livestock.

**Alternative forms of food production and consumption:** regional food, local distribution systems (farmer markets, community-supported agriculture, direct sales), farm processing and production of goods with a higher added value.

Lukáš Zagata, zagata@pef.czu.cz	FARMPATH - Farming Transitions: Pathways Towards Regional Sustainability of Agriculture in Europe, 2011 – 2013	EC, FP7
Michal Lošťák, lostak@pef.czu.cz	CERTCOST - Economic Analysis of Certification Systems for Organic Food and Farming, 2008 – 2011	EC, FP7
Josef Soukup, soukup@af.czu.cz	SIGMEA - Sustainable Introduction of GMOs into European Agriculture, 2004 – 2007	EC, FP6
Jiřina Száková, szakova@af.czu.cz	Transformation and speciation of selenium in the food chain: the effect of selenium fortified diet, 2013 – 2016	Grant Agency Czech Republic
Eva Tůmová, tumova@af.czu.cz	Solution of some factors of growth in clothes of chicken, turkey, rabbit and nutria meat quality, 2015 – 2018	Ministry of Agriculture Czech Republic



## Clean Environmental Technology

**H2020:** Secure, clean and efficient energy

- BB-02-2017: Towards a method for the collection of statistical data on bio-based industries and bio-based products

**Renewable energy sources:** Theoretical studies and practical applications of renewable technologies (photo-voltaics, biomass, heat pumps).

**Engineering and technologies in waste management:** Design of machine equipment, operation and maintenance of machines and equipment, utilization of machinery, tender specifications of technical parameters, operational efficiency.

**Machinery for urban agriculture and parks:** Design of machine equipment, operation and maintenance of machines and equipment, utilization of machinery, tender specifications of technical parameters, operational efficiency.

Pavel Tlustoš, tlustos@af.czu.cz	RESTEP - Regional Sustainable Energy Policy based on the Interactive map of Sources, 2011 – 2014	EC LIFE+
Jan Banout, banout@ftz.czu.cz	Vietnam - Sustainable energy on local level in the Thua Thi-en Hue Province, Vietnam, 2011 – 2013	Czech ministry of Foreign Affairs
Pavel Tlustoš, tlustos@af.czu.cz	Research and development of substrate technology to plant of edible and medicinal fungus with usage of waste material and waste heat from biogas plant, 2014 – 2017	Technology Agency of the Czech Republic
Jan Vymazal, vymazal@knc.czu.cz	Development of the technologies for filtration of storm-water from communications, 2013 – 2016	Technology Agency of the Czech Republic



## Natural resource management

**H2020:** Climate action, environment, resource efficiency and raw materials

**H2020:** Secure, clean and efficient energy

- SFS-30-2017: Closing loops at farm and regional levels to mitigate GHG emissions and environmental contamination - focus on carbon, nitrogen and phosphorus cycling in agro-ecosystems

**Recovery of territories affected by opencast mining** – reclamation, protection of landscape biological diversity, management of selected sites, recovery of landscape water cycle.

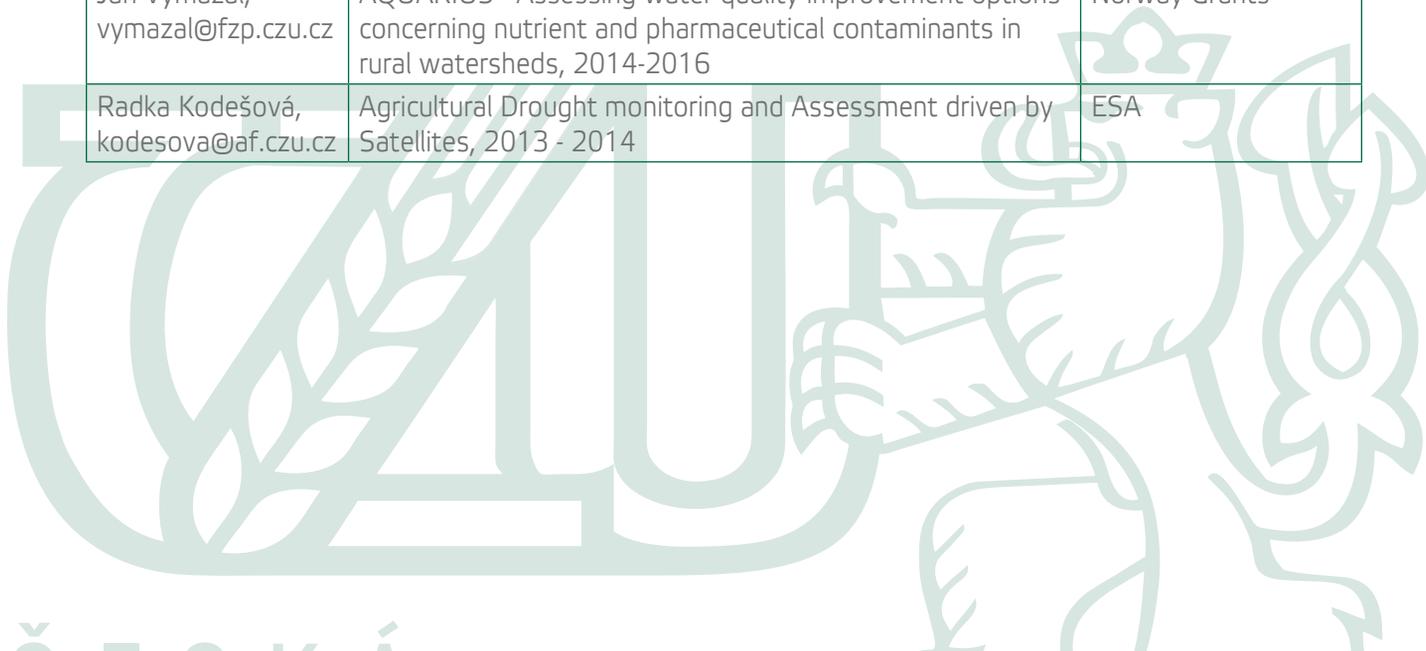
**Assessment of anthropogenic activities:** impact on properties and contamination of anthropogenic, forest and arable soils, circulation of water and elements in soils, hazardous elements in soils, impact of erosion, reclamation of soils, use of biomass and water ecosystems.

**Landscape structure and forms of its planning by means of territorial planning tools and land management** – increased water retention and accumulation in landscape, development of settlements and major facilities with regard to landscape ecosystem.

**Assessment of impact of natural and anthropogenic processes in landscape** – monitoring of inorganic pollutants, modelling of selected hydrological processes, modelling of transport and sorption processes in soil, water and atmosphere.

**Support of multifunctionality and diversity in rural agriculture:** Design of innovative systems and approaches to rural economy contributing to expansion of agricultural land used in compliance with the principles of sustainable economy supporting the multifunctional role of agriculture for preservation of biological and cultural heritage and rural development, support of employment, reduced erosion and increased retention capacity of landscape, landscape formation function, reduction of greenhouse gas emissions, carbon sequestration, reduction or binding of heavy metals and chemical substances with a negative impact on natural environment, growth of rural tourism, renewable energy sources and activities with a stabilizing economical and social impact on rural areas.

Juraj Farkaš, farkas@fzp.czu.cz	BASE-LiNE Earth - Brachiopods As SENSitive tracers of gLobal marINe Environment: Insights	H2020
Luboš Borůvka, borůvka@af.czu.cz	iSOIL - Interactions between soil related sciences - Linking geophysics, soil science and digital soil mapping, 2008 – 2011	EC, FP7
Michal Komárek, komarek@fzp.czu.cz	ISOFIN - A new methodological approach for identification of industrial pollution: Isotope fingerprinting and bacterial community gangs, 2014-2016	Norway Grants
Jan Vymazal, vymazal@fzp.czu.cz	AQUARIUS - Assessing water quality improvement options concerning nutrient and pharmaceutical contaminants in rural watersheds, 2014-2016	Norway Grants
Radka Kodešová, kodesova@af.czu.cz	Agricultural Drought monitoring and Assessment driven by Satellites, 2013 - 2014	ESA



## Regional and Rural Development, Social and Economical Aspects

**H2020:** Health, Demographic Change and Wellbeing

**H2020:** Europe in a changing world - inclusive, innovative and reflective Societies

- SFS-29-2017: Socio-eco-economics – socio-economics in ecological approaches
- SFS-34-2017: Innovative agri-food chains: unlocking the potential for competitiveness and sustainability

**Socio-economic significance of non-forest crops and ecosystem services:** Calculation of social efficiency of crops, which, besides economic functions, have other significant roles (protection of soils, protection of waters, stabilization, etc.) depending on different regional characteristics.

**Education for sustainable development:** Education focused on understanding the interrelation of economic, social and environmental developmental aspects depending on differing regional characteristics and the gradual transformation of environmental education to education for sustainable development.

**Ageing of farming population and generational changes at farms:** social sustainability of agriculture, opportunities and impediments for young and starting farmers, innovation resources in transition towards higher sustainability of agriculture, farming succession (passing between generations)

**Cross-functional economic topics:** Economy of resources of Czech agriculture and their efficient use within multifunctional agro-food systems, Analysis of potential of biofood market in the Czech Republic.

**Cross-functional management topics:** multi-criteria risk analysis of project activities, Corporate Social Responsibility.

Lukáš Čechura, cechura@pef.czu.cz	Marker Directed Population Improvement, 2005 – 2008	EC, FP7
Michal Lošťák, lostak@pef.czu.cz	COMPETE – International comparisons of product supply chains in the agro-food sectors: determinants of their competitiveness and performance on EU and international markets, 2012 – 2015	EC, FP7
Jaroslav Havlíček, havlicekj@pef.czu.cz	ORGANICDATANETWORK – Data network for better European organic market information, 2012 – 2014	EC
Josef Soukup, soukup@af.czu.cz	PRICE – Practical Implementation of Coexistence in Europe, 2011 –2014	EC, FP7
Ludmila Dömeová, domeova@pef.czu.cz	Development and application of new methods of monitoring of regional life quality, 2014 - 2015	Technology Agency of the Czech Republic

