Výskumné pracovisko progresívnych technológií (VPPT) – H2020

Research Centre of Progressive Materials – H2020

MTF STU
Maximilian Strémy
maximilian.stremy@stuba.sk

STU MTF
SLOVENSKÁ TECHNICKÁ UNIVERZITA V BRATISLAVE
MATERIÁLOVOTECHNOLOGICKÁ FAKULTA SO SÍDLOM V TRNAVE

VPPT MTF STU v Trnave

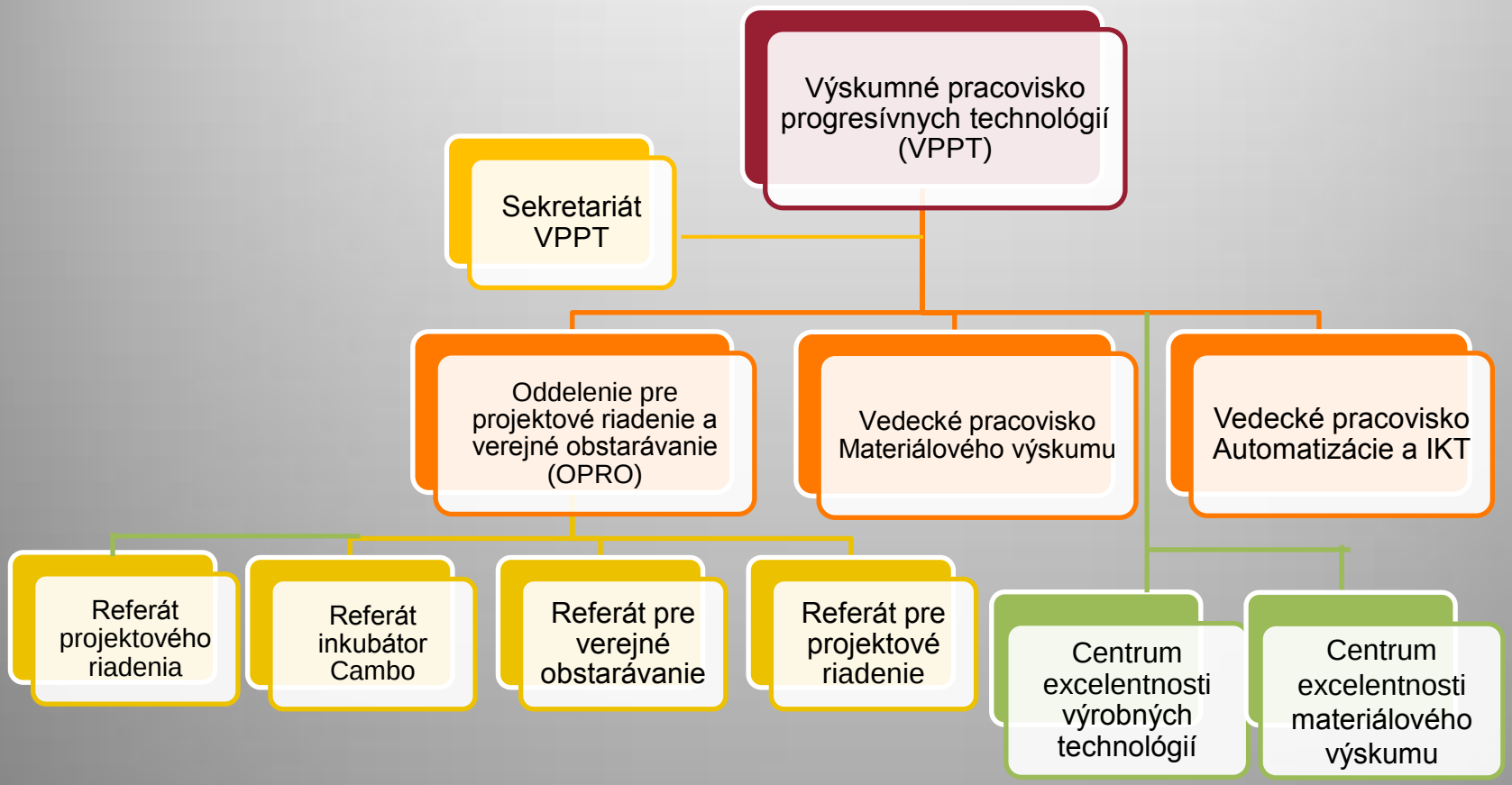
Zo SF EU

- **MTF** bola úspešná v 36 výzvach a v dvoch prioritných osiach SF (education & science)
  - celkom suma: 88,5 milion EUR
  - projekt **CAMBO (UVP-VPPT)**: **42,5 milion EUR**

Ionové centrum & nanotechnológie

- 6 MV Tandetronu plus 500 KV implantator
- **A 6.0 MV high-current Tandem accelerator system**
  - A dual ion-source injector system
    - A sputtering ion source
    - A duoplasmatron ion source
  - Low-ripple tandem accelerator with an X-ray radiation suppression system
  - Switching magnet
  - Beam line for ion implantation with a dedicated ion-implantation target station (substrate diameter up to 100 mm)
  - Beam line for ion beam analysis with a dedicated ion beam analysis target station
    - RBS set-up with channeling
    - PIXE set-up
    - ERDA set-up
- **A 500 kV air-insulated accelerator system**
  - Beam line and a dedicated target station for ion implantation
    - Target holder with heating / cooling option
    - Un-cooled carousel for one wafer size of choice up to 150 mm
- **A DC pulsed magnetron sputtering system**
- **An RF sputtering system with substrate bias**

VPPT – organizačná schéma



VPPT – expertise area

- materiálové technológie, nanotechnológie a nanovedy, jadrové štiepenie, jadrová fúzia, vodíkové a palivové články, rádioaktívne odpady, zmena klímy a výskum uhlíkového cyklu, radiačná ochrana
- kvantová chémia, benchmarking, ab initio, simulácie a modelovanie, matematické modely a reprezentácie
- umelá inteligencia, strojové učenie, interakcia človek - robot , robotika
- automatizácia a inžinierstvo riadenia v priemysle
- aplikovaná informatika v iných odvetviach (napr. v medicíne)
- big data, business intelligence, data mining, získavanie znalostí
- Vývoj expertných systémov
- mikroelektronika a vývoj hardvéru, prototypovanie, mikročipy
- Technológia senzorov, pneumatické systémy a pohony, riadiace a kontrolné systémy, priemyselné komunikačné technológie
- vývoj softvéru (GIS, telemetrické systémy, Distribuované riadiace systémy)
- Simulácia a optimalizácia procesov, Matematická reprezentácia

Horizon projects - submitted proposals

ICT 23 - Robotics - [i-CogBot] – Improving cognitive skills of the industrial robots

- Framework to support a cognitive architecture for an industrial robot
- Object detection and manipulation
- Object modelling, spatial cognition, automatic obstacle detection
- Planning system of action, sensing and learning
- Learning of cross-technique concepts
- Hardware and software architecture integration

ICT 17 - [EuroLangNet 21+3] European network 21+3 for HLT suport of Multilingual Knowledge Based Processes

- Modelling / modifying processes using multilingual knowledge to be suitable for automation
- Case studies/Modelling/Testing Informatics Tools and Applications for MT&LR (HLT in general)
- Automation of Multilingual Knowledge Based Processes in Natural Language (MT&LR)
- Multilingual Benchmarking Portal

Horizon projects - submitted proposals

LCE-10-2014 Competitive low carbon energy : Polymer bipolar battery

- Modelling and simulation
- Materials development
- Technological processing
- Specific material processing by gamma irradiation Gri
- Design and integration

ICT - Software for automatic translation from EU to South-Eastern Europe

- Machine translation aimed at SE Europe and states
- Test cases
- Design and implementation of the system
- Portal

Partners


THE UNIVERSITY OF HULL


vüje


Fraunhofer
IOSB


universidade
de aveiro


sgenia


KU LEUVEN
KAHO
KAHO SINT-LIEVEN


University of Maribor


ITRI
Industrial Technology
Research Institute


YMS


SIEMENS


SOVA DIGITAL
Design & Management Systems


foi
SVEUČILIŠTE U ZAGREBU
FAKULTET
ORGANIZACIJE I
INFORMATIKE
VARAŽDIN


U.PORTO
FACULDADE DE DESPORTO
UNIVERSIDADE DO PORTO


Coventry
University
Faculty of Engineering
and Computing

UNIVERSITY OF LEEDS


The
UNIVERSITY
of
PLYMOUTH


CATEC
CENTRO AVANZADO
de TECNOLOGÍAS
AEROESPACIALES


TECHNISCHE
UNIVERSITÄT
DRESDEN


UNIVERSITÀ
DEGLI STUDI
DI PALERMO

Project ideas & proposals
ICT

ICT-20- Technologies for better human learning and teaching : **[MultiTechEduc] Educational multilingual system and technologies with support for disadvantaged people(blind)**

- Analysis , modelling, studies , testing, verifying of ICT systems, approaches and applications
- Cloud technologies in Educational systems Eductational multilingual system and technologies – architecture, design, integration [DB, portal]
- Machine translation in educational multilingual system – analysis, design, integration, testing
- e-Tools technologies and infrastructure in educational multilingual system – analysis, case studies, design and development (HW+SW)
- Design and Integration of Braille in educational multilingual system tools [portal, e-tools]

Factories of the future – FOF 9 - CT Innovation for Manufacturing **: Deep Learning,**

- Object identification and perception
- Scenarious for deep learning and test cases
- Design of algorithms for deep learning
- Implementation and testing
- Application experiments for highly flexible and near-autonomous robotics systems mentioned as one of the three targeted areas of technologies
- Integration to the factories of the future

Project ideas & proposals
ICT a Health (medical informatics)

Personalised Domestic Health Care Platform For People With Special Needs (for chronic patients)

- real-time health and vital sings monitoring
- data analysis and knowledge generation subsystems
- Decision Support System Implementation of expert system

Neuroplasticity – synapses and potential of the brain activity in response to movement

- Software / hardware design or integration
- Measurement on the choosen patients/samples and groups
- data analysis and knowledge generation (including data anonymisation)
- Hypothesis..

Biomonitoring – ageing in Europe & relation to the exposure of selected substances (biphenyls, phthalates etc)

Project ideas & proposals
Bioenergy

Call LCE 11 Developing next generation technologies for biofuels and sustainable alternative fuels

2nd generation of biofuels – contaminated biomass

- Testing the different plant species for phytoremediation.
- Testing the different type of pretreatment of lignocellulosic biomass for bioethanol production
- Research in bioethanol production.
- Research in analysis of impact of contaminated biomass used to bioethanol production.
- Research in analysis of secondary product from bioethanol production.

3rd generation of biofuels – Algae biofuels research

- Modeling microalgae processes – Mathematical approaches (computer models, simulations)
- Research in increasing the microalgae productivity:
  - Optimization of PBRs design
  - CO2 capture (CO2 negative technologies, CO2 from flue gas or from CCS technologies…)
- Utilizing lower grade waters for necessary nutrients additions
- Decreasing energy consumption and economizing all steps of biofuel production
- Building of a pilot plant.

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Project ideas & proposals
Progressive materials - ion beam , nanotechnologies

NMP -17-2014 – Post-lithium ion batteries for electric automotive applications

- Modelling and simulation of the electrodes and electrode materials
- Materials development and characterization Cathode/Anode/ Electrolyte and Separator
- Materials processing
- Specific material processing at experimental nuclear reactor sites
- Design and integration
- Ageing analysis

Production of hydrogen / storage materials

- improving effeciency ,design
- materials research (storage materials)
- Theoretical chemistry
- Hydrogen Production - fermentation, using algae, microorganisms

Project ideas & proposals
ICT & security & nuclear power plants

Protecting freedom and security of Europe and its citizens DRS-14-2015 : Critical Infrastructure Protection System

- Critical infrastructure architecture – general analysis
- Understand the current threats to critical infrastructure and key resources posed by terrorism
- To propose ,to design, to implement and evaluate the real-time control system for protection of selected critical Infrastructure points and threats
- Derivation of theoretical results on the basis of probability theory (algorithms of possible penetrations into protected object, simulation of the threat scenarios on the basis of mathematical analysis including etc)

Measuring and transmission of the selected parameters in the primary zone

- Research in measurement methods and approriate sensors (data acquisition of the parameters e.g. water temperature across all lines) - Sensorics, materials and technology research
- Transmission of information from the primary circuit of nuclear power plants
- Transmission reliability, optimal transmission capacity and rate etc

RCPT – Project ideas information

- RCPT is looking for feasible partners from academic and also private area, which would like to apply and work together on the join projects under the umbrella of EU research framework Horizon 2020 and similar
- RCPT is looking for partners and leaders (or interesting projects in the field of the expertises)
- Project ideas and proposals are not limited or closed – we are open for discussion.
- Expertise areas of the Research Centre are supported and extended by research areas of the Institutes or Departments of the Faculty
- Brief about Research Centre: http://www.mtf.stuba.sk/english/institutes/research-centre-of-progressive-technologies/institute.html?page_id=10646
- If you are interested or in case of any suggestions, project ideas or cooperation feel free to ask any of coordinators or write to maximilian.stremy@stuba.sk (in any of calls)

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