Tomas Bata University in Zlín

Science Activity Annual Report

2018

CONTENT

1 DEFENDED DOCTORAL THESES

In 2018, a total of 52 theses were defended: 23 at the Faculty of Technology, 14 at the Faculty of Management and Economics, 2 at the Faculty of Applied Informatics, 12 at the Faculty of Multimedia Communications and 1 at the Faculty of Humanities.

1.1 Faculty of Technology

Degree Programme: CHEMISTRY AND MATERIALS TECHNOLOGY

Degree Course: Technology of Macromolecular Compounds

Ing. **Tomáš Barbořík**, Ph. D.

Date of defence: 7. 12. 2018

Supervisor: prof. Ing. Martin Zatloukal, Ph.D., DSc.

Viscoelastic Modeling of Extrusion Film Casting for Polymer Melts: Investigation of Flow Stability

Abstract

In the first part of this Ph.D. Thesis, the extrusion film casting process has been presented and negative phenomena that represent serious process limitation have been discussed. Following section is dedicated to the listing of both experimental and theoretical works and different mathematical models describing the extensional kinematic in film casting that have been published since 1970s. In the next section, novel viscoelastic extrusion film casting model utilizing 1.5D membrane approximation was derived considering single-mode modified Leonov model as the viscoelastic constitutive equation, energy equation, constant heat transfer coefficient, advanced crystallization kinetics taking into account the role of temperature, cooling rate and molecular stretch, crystalline phase dependent modulus and temperature dependent relaxation time. The model has been successfully validated for branched low-density polyethylenes and linear isotactic polypropylenes by using suitable experimental data taken from the open literature. The model has consequently been used for systematic parametric study in order to reveal the role of variety dimensionless variables (such as planar to uniaxial extensional viscosity ratio, extensional strain harde-

ning, Deborah number, second to first normal stress difference ratio at the die exit, draw ratio, heat transfer coefficient and flow induced crystallization) on polymer melt/solid behavior during the extrusion film casting process with specific attention to unwanted neck in phenomenon. Obtained knowledge together with the suggested model can be used for optimization of the extrusion die design (influencing flow history and thus die exit stress state), molecular architecture of polymer melts, processing conditions in order to minimize neck-in phenomenon as well as to optimize the production of flat polymeric films and porous membranes via extrusion film casting technology.

Ing. **Martin Cvek**, Ph.D.

Date of defence: 7. 9. 2018

Supervisor: doc. Ing. Michal Sedlačík, Ph.D.

Magnetorheological Systems with Optimized

Abstract

The field-responsive materials belong among necessary attributes of today´s modern society as they offer a sophisticated solution for many technical needs. From this perspective, the immense potential is assigned to the magnetorheological (MR) systems, which are composed of micron-sized soft ferromagnetic particles dispersed either in non-magnetic dispersing medium or an elastomeric matrix. The feature of these systems known as the MR effect is the ability to rapidly, reversibly and in a controlled manner change their rheological/viscoelastic properties upon the exposure of an external magnetic field. The presented doctoral thesis is devoted to the development of novel MR systems with controlled performance and enhanced stability properties through the advanced particle-grafting technology. The emphasis is given to the design and synthesis of ferromagnetic core-shell structured particles via atom transfer radical polymerization (ATRP). Using different reaction conditions, this technique allows achieving desired polymer shells with defined structure, molecular weight and thickness. As known, the quality of polymer shell plays a major role in particle stability and also significantly influences the performance of both, the MR suspensions and the MR elastomers. Herein, synthesized particles exhibit remarkably enhanced thermo-oxidation and chemical stability without unsuitably affected magnetization. To this date, this combination of characteristics was challenging to achieve via

conventional modification techniques and majority of attempts was not successful. The inventions in Thesis provide significantly enhanced sedimentation stability with negligibly lower MR effect of the MR suspensions. Further, the embedding the ATRP polymer-grafted particles into suitable polymer matrix improves interfacial compatibility and even intensifies the relative MR effect when used in the MR elastomer systems. Moreover, the obtained MR elastomer is characterized by improved magnetostriction and damping capabilities. As presented in this doctoral thesis, the specially-designed core-shell structures prepared via surface-initiated ATRP may contribute to the development of the next-generation of the MR systems with well-balanced properties tailored towards a specific application, which was not possible to achieve by foregoing conventional methods. In a view of potential applications, the prospects are expected in the areas ranging from automotive to civil engineering, especially in the development of emission-free MR brakes or semi-active MR bridge bearings preventing the bridge degradation.

Ing. Bc. **Jiří Drábek**, Ph.D.

Date of defence: 7. 12. 2018

Supervisor: prof. Ing. Martin Zatloukal, Ph.D., DSc.

Applied Rheology for Production of Polymeric Nanofibers

Abstract

The first part of this work summarizes the current state of knowledge in area of melt blown technology, which allows production of polymeric nanofibers, with specific attention to the most commonly utilized polymers (including linear and branched polypropylenes), description of methodologies to produce nanofibers, the role of processing conditions on produced fibers, related flow instabilities and high shear rate rheology. In the second part of this work, chosen polymers, methodologies and instruments are provided in order to understand complicated relationship between polymer melt rheology, their molecular structure, process conditions and formation of polymeric fibers produced via melt blown technology. For such purpose, different polypropylenes (PPs) (namely linear, branched and their blends) having well defined molecular architecture were chosen and rheologically characterized in very wide shear rate range utilizing advanced constitutive equations. Then, the chosen PPs were used to produce polymeric fibers on the melt blown pilot plant line

under different processing conditions in order to perform particular correlations. It has been found that the melt strength of branched PP can increase at short degradation times due to, presumably, creation of a high number of short branches, even if the molecular weight decreased due to chain scission. For the first time, it has been discovered that the secondary Newtonian viscosity (occurring above shear rates of 2×106 s-1), depends linearly on the average molecular weight, which suggests that polymer chains are fully disentangled at the secondary Newtonian plateau region. It was found that introduction of long-chain branching into PP, keeping the average molecular weight and polydispersity index the same, can firstly, decrease the secondary Newtonian plateau, which can primarily be attributed to smaller coils size and higher availability of the free volume for the branched PP in comparison with pure linear PP melt and secondly, it stabilizes melt blown process due to increased elasticity. Obtained scientific knowledge can help to understand production of polymeric nanofibers and its optimization considerably.

MSc. **Haojie Fei**, Ph.D.

Date of defence: 28. 2. 2018

Supervisor: prof. Ing. Petr Sáha, CSc.

Fabrication of flexible supercapacitors with high electrochemical performance

Abstract

Flexible supercapacitors are one kind of promising energy storage device for portable electronics. To gain a supercapacitor with high flexibility and electrochemical performance, such as high energy density, power density and cycling stability has drawn massive attention. However, to achieve this goal, there are challenges in the preparation of flexible electrodes and solid-sate electrolyte as well as the design and fabrication of flexible supercapacitors. This doctoral thesis work is focused on the fabrication of flexible supercapacitors with high electrochemical performance based on reduced graphene oxide (RGO) hydrogel. Two composite RGO hydrogel film electrodes with redox-active materials, polyaniline (PANI) or manganese dioxide (MnO2) were prepared. Suitable gel/hydrogel electrolytes were prepared to match the designs for each flexible supercapacitor. In the study, important factors on the flexibility of final devices have been discussed. Two strategies, free-

movement configuration and the reduction of the thickness of entire devices were applied to improve the flexibility of the assembled supercapacitors.

Ing. **Pavlína Holčapková**, Ph.D.

Date of defence: 14. 12. 2018

Supervisor: prof. Ing. Vladimír Sedlařík, Ph.D.

Utilisation of whey fermentation products for antimicrobial modification of biodegradable polymers

Abstract

The doctoral thesis focuses on utilising whey fermentation products for antimicrobial modification of biodegradable polymers. The theoretical part describes the latest advances in biodegradable polymers, as well as potential application of whey as a fermentation medium for producing substances with antibacterial properties. Description is given on antimicrobial alteration of polymers and on modifying polymer systems with bacteriocins. The experimental part of work is dedicated to preparation of novel, biodegradable, PLA-based polymer systems - modified with bacteriocin nisin - in the form of blend films or microparticles. The author investigates the general characteristics of structural, thermal and mechanical properties, as well as the effect of the given polymer matrix on the release profile of nisin, through the employ of chromatographic separation techniques. As for the antibacterial properties of the materials, these are evaluated by three different testing methods. Finally, the activity exhibited by the systems containing nisin is gauged for stability over the long-term and stability under conditions of high temperature.

Ing. **Lukáš Münster**, Ph.D.

Date of defence: 29. 8. 2018

Supervisor: doc. Ing. et Ing. Ivo Kuřitka, Ph.D. et Ph.D.

Dialdehyde cellulose preparation, characterization and utilization as crosslinking agent for PVA

Abstract

Solubilized dialdehyde cellulose (DAC) obtained from alpha cellulose modification via simple oxidation by sodium periodate was prepared and characterized. Immediately after preparation, solubilized DAC was stabilized by low pH in order to suppress degradation. The influence of DAC solubilization and its aging under acidic conditions on DAC properties was analysed. Molecular mass distribution (GPC), reactive aldehyde group content (titrimetry), crystallinity (XRD), vibrational spectra (FT-IR), thermal stability (TGA) and structural composition (LC-MS, NMR, SEM) were of the main interest. Furthermore, DAC was utilized as a suitable crosslinking agent for poly(vinyl alcohol) (PVA). The reactive aldehyde groups of DAC formed on the C2 and C3 carbons of anhydroglucopyranose unit serve as crosslinking counterparts for hydroxyl groups of PVA under acidic conditions. Appropriate catalyst system must be introduced to ensure formation of crosslinked acetal/hemiacetal bridged network of hybrid PVA/DAC hydrogels. Initially, two concentrations of catalyst system and different drying temperatures were chosen and their influences on the PVA/DAC xerogel and hydrogel properties were investigated by several analytical methods (FT-IR, XRD, TGA, network parameters etc.). Next, fresh and aged acidic DAC and two chemically distinct catalyst systems were employed in the crosslinking of PVA. The crosslinking effectivity and efficiency of these crosslinking systems (crosslinker + catalyst) were investigated in the terms resulting PVA/DAC hydrogel properties, i.e. crystallinity (XRD) and stiffness (tensile testing) of the dried gel, furthermore structural and functional network parameters of swollen gels were characterized. Finally, comparison between DAC and glutaraldehyde (GA) crosslinker was carried out using broad range of these PVA crosslinkers with subsequent evaluation of network parameters of prepared PVA/DAC and PVA/GA hydrogels. Acidified DAC exhibited the capability to act as an effective crosslinker for PVA with the resulting hydrogel properties dependent on the choice of concentration of catalyst system and the drying temperature. Moreover, it was found that the properties of PVA/DAC are governed by the molecular weight of used DAC. The acidic condition retains DAC usability as a crosslinking agent even after 28 days from its preparation. It was found that DAC possesses exceptional crosslinking efficiency at very low concentrations compared to GA and enables formation of hydrogels of very high swelling capacity. This behaviour arises from DAC macromolecular character as it forms "two-phase" network topology containing regions of very high crosslink density adjacent to DAC chains embedded in a matrix formed by linear parts of PVA macromolecules.

Ing. **Silvie Pekařová**, Ph.D.

Date of defence: 20. 9. 2018

Supervisor: prof. Mgr. Marek Koutný, Ph.D.

Determination of gaseous products by gas chromatography for the monitoring of biodegradation processes with the consideration of properties of the macromolecular substrates investigated

Abstract

First part of this thesis is looking at the study of the biodegradation proceses on anaerobic environment. Each chapter of the theoretical part is concerning the anaerobic fermentation, where the plant biomass is used in large. And finally, the substances, which could in this case of the preparations appear and cause a potential inhibition to the biogas production. Based on the study were for the experiment purposes chosen the inhibition substances furfural, 5-hydroxymethylfurfural, gallic acid, and tannic acid and the influence of these substances on the production of methan in biogas has been observed. The highest inhibition in/of production of methan has been prooved to appear with 5-hydroxymthylfurfural, already at 0,2 g/l and further then furfural in concetration from 1 g/l. It was observed that gallic and tannic acid did not influence the production of methan in biogas, moreover the production of methan was supported by the addition of these to acids. Second part of the this work is focusing on obseration of the biodegradable processes of polylactic acid and its compounds in compost. In the theoretical part the brief describtion of the character, proces and the application of polylactic acid (PLA) as well as the possibilities of modification of PLA with the addition of different substances, that can improve its mechanical, chemical or physical properities. In the experimental part is described morphology of the produced mixed materials and subsequently their biodegradation in compost is looked at. The substances used for the preparation of mixed films were triacetin, polyhydroxybutyrate and seven other commercially accessible non-modified or organo-modified montmorillonite. Significant accelerance of biodegradation was noted with the mixtures PLA/Cloisite 10A compare to the pure PLA. Due to its easy intercalation and homogenic dispersion of silicon dioxide layers in polymer matrix. Third, no less significant part is a chapter studying the starch-based materials and its biological degradation in the compost environment. These materials were prepared using different production processes, with different degree of mo-

dification and content of cellulose fibres. In the theoretical part the problematic of starch and its modification is briefly summarised. In the experimental part, the biodegradation of those materials in connection to its composition in compost is described. In connection to the starch materials, the composition of microbial consortium using the molecular biological methods was determined. On the bases from the gained results the microbial consortium contributing to the biodegradation of those materials was identified and was predominantly represented by bacteriaria Tuberibacillus, Geobacillus and Alicyclobacillus.

Ing. **Jana Šerá**, Ph.D.

Date of defence: 20. 9. 2018

Supervisor: prof. Mgr. Marek Koutný, Ph.D.

Study of biotic and abiotic degradation of polyesters using molecular biology methods

Abstract

The biodegradation of the aliphatic aromatic copolyester and this copolyester in the mixture with starch in the soil under mesophilic conditions was studied. Measurment of CO2 production (GC/TCD), mechanical properties changes, molecular weight changes (GPC) and optical and scanning electron microscopy demonstrated that the presence of starch promotes biodegradation of PBAT. To obtain the overall image of the degradation processes of the studied copolyester, the effect of temperature on the rate of abiotic hydrolysis of selected polyesters (PBS, PBSA and PBAT) was also monitored. The results showed that the rate of degradation of materials increased with increasing temperature. Members of degrading PBAT consortium isolated from soils were identified by molecular biology methods (PCR-DGGE, sequencing). Microbispora bispora was the most frequently present bacterium in soils. Molecular biology methods were also used to assess the effect of application of nutrients and terminal electron acceptors on microbial communities in an anoxic environment (sites contaminated by BTEX and aviation fuel). The application nutrients and terminal electron acceptors has supported the growth of some bacterial species that are potential degradators of BTEX. Application of terminal electron acceptors has also positive influence on the growth of some degradators of hydrocarbon petroleum, which is one of the components of aviation fuel.

Ing. Bc. **Alice Tesaříková**, Ph.D.

Date of defence: 22. 6. 2018

Supervisor: doc. Ing. Dagmar Měřínská, Ph.D.

Polymer Special and Multifunctional Films

Abstract

Doctoral thesis is focused on preparation, properties and utilization of polymer special and multifunctional films. Issues of preparation and enhancement of selected properties, such as mechanical or barrier, are outlined. However, polymer films are not necessarily applied only as barriers. A variety of them may be emploed in the the food industry or in the other areas of industrial production as well. Therefore, doctoral thesis focuses not only on films with improved barrier properties, but also on films produced from recycled materials. Thesis is divided into two main parts. Theoretical part is devoted to brief description of polymeric, multilayer, multifunctional films and applied polymer matrices from the group of polyolefins, their copolymers and vinyl polymers. The paper also describes manufacturing processes and methods used to evaluate selected film properties. Major focus is placed on nanoparticles and their application in polymeric films. The second part presents the results obtained during the doctoral study in the form of a short summary of published articles. Full-text research is to be seen at the end of the paper.

Degree Programme: CHEMISTRY AND MATERIALS TECHNOLOGY

Degree Course: Chemistry and materials technology

Ing. **Eva Achbergerová,** Ph.D.

Date of defence: 2. 10. 2018

Supervisor: doc. Mgr. Robert Vícha, Ph.D.

Development of modified hydrophobized hyaluronic acid useful for theranostics preparation

Abstract

Drug delivery systems have become more important in pharmaceutical, medical, and even cosmetic industry. However, limited knowledge about their behavior, interactions and fate in biological systems entail substantial difficulties within their applications. Above mentioned disadvantages could be overcome using smart nanocarriers - theranostics, which provide combination of therapy and diagnosis. This work is focused on synthesis and characterization of original hyaluronan derivatives suitable for formation of polymeric micelles, which are detectable using optical imaging. With respect to applications in biological systems and considering available technical facilities, fluorescent dyes cypate and nile blue were chosen as contrast agents for hyaluronan labeling. The second aim of this work was to prepare superparamagnetic iron oxide nanopraticles (SPION) coated with oleic acid as potential therapeutic or diagnostic agents. Fluorescent labeling enabled effective and relatively easy detection of hyaluronan derivatives, i.e. polymeric micelles, in biological systems. Within in vitro experiments, it was found that hyaluronan polymeric micelles were able to enter and deliver loaded drug into fibroblasts. Furthermore, it was observed that hydrophobized hyaluronan could penetrate the skin. Using non-invasive preclinical optical imaging, effective tumor accumulation of fluorescently labeled hyaluronan derivative was detected in BALB/C mice in vivo. Doxorubicin and SPION delivered by hyaluronan polymeric micelles exhibited anticancer effect. This work demonstrates the potential of hyaluronan for preparation of drug delivery systems, which are detectable in biological systems both in vitro and in vivo.

Ing. **Alena Matelová**, Ph.D.

Date of defence: 2. 10. 2018

Supervisor: doc. Mgr. Robert Vícha, Ph.D.

Development of a suitable and original modification of hyaluronic acid for drug delivery systems

Abstract

Presented doctoral thesis was focused on the preparation of the set of hyaluronan (HA) derivatives modified with different carboxylic acids containing aromatic ring in their structures. The benzene rings in these side-chains attached to HA were located in varying distance from polymeric backbone or the benzene ring was changed for sterically more

hindering structures. The aim of the thesis was to find out if and how the aromatic carboxylic acids influence the properties of derivatives and mainly micelles made thereof. Micelles were loaded with aromatic model substances and aromatic micelles drug loading was compared with aliphatic micelles drug loading. It was found, that aromatic micelles loaded higher amount of model compounds than aliphatic micelles.

Ing. **Markéta Měrková**, Ph.D.

Date of defence: 23. 5. 2018

Supervisor: doc. RNDr. Jan Růžička, Ph.D.

Biodegradability of compounds applied for materials protection and modification

Abstract

The work was focused on a study of microbial degradation of selected synthetic both high and low molecular weight substances used for materials and products modification. It mainly dealt with the study of biodegradation of water-soluble polymers, poly(vinylalcohol) and poly(vinylpyrrolidone), and the study of the decomposition of some low molecular weight compounds, commonly used in the cosmetic industry, namely 2-ethylhexylsalicylate, 2-ethylhexanol, and cocamidopropylbetaine. In theoretical part of the thesis the general characteristics, production way and the most significant uses of the substances are briefly described, including base knowledge on their toxicological properties. Furthermore, today's knowledge about biodegradability of these compounds is summarized. The biodegradation of these substances was evaluated mainly on the basis of reduction of their concentration during the experiments and on the basis of microbial growth. In addition, some factors affecting the course of biodegradation, such as the inoculum size, pH or the presence of other microorganisms, were studied as well. In the experiments on the study of biodegradation of high molecular compounds, the biodegradability of poly(vinylalcohol) was confirmed; both used strains, Sphingomonas sp. JK2 and OT2, were able to decompose the polymer even when their minimal inoculums of 100 cells/ml were applied. In contrast, microbial degradation of poly(vinylpyrrolidone) has not been confirmed. In some cases bacterial strains capable of decomposition were newly isolated and their growth and degradation properties were examined; Rhodococcus sp. ES 12 capable of

2-ethylhexylsalicylate utilization and Pseudomonas sp. P capable of 2-ethylhexanol utilization were obtained from activated sludge and finally deposited in Czech Collection of Microorganisms. Furthermore, the nature of the symbiotic relationship between Pseudomonas sp. FV and Rhizobium sp. FM, capable of cocamidopropylbetaine biodegradation in mixed culture, was revealed.

Ing. **Štěpán Vinter**, Ph.D.

Date of defence: 5. 10. 2018

Supervisor: doc. Ing. Vratislav Bednařík, Ph.D.

Stabilization/solidification of hazardous wastes using silicone polymers

Abstract

The doctoral thesis dealt with the stabilization and solidification of hazardous waste using silicone polymers. The waste sample came from the industrial process of plating steel parts and it was characterized by a high content of zinc and soluble compounds (chlorides). Commercially available products containing different silicone polymer with different polymerization reaction mechanisms (addition and 1 or 2-components condensation) were used as binders. Immobilization of pollutants in the silicone polymer matrix was studied using both microencapsulation and macroencapsulation methods. For comparison of the efficiency of the studied process, the waste was also stabilized/solidified using hydraulic binders commonly used for the physico-chemical treatment of waste. The effectiveness of the stabilization/solidification procedure used was tested by leaching tests in distilled water and dilute acetic acid. The results obtained from the leaching tests were compared with the limit values for hazardous waste landfills. Additionally, samples of solidified waste were studied by X-ray diffraction analysis to identify changes in the structure of the waste during the stabilization process. The influence of observed parameters (binder and water content) of the individual solidification mixtures was evaluated by the design of experiment statistical method. The most efficient method was based on the stabilization of the waste using Portland cement and microencapsulation using the silicone polymer vulcanized using the addition reaction.

Degree Programme: FOOD CHEMISTRY AND TECHNOLOGY

Degree Course: Food Technology

Ing. **Petra Dvořáková**, Ph.D.

Date of defence: 28. 8. 2018

Supervisor: prof. Ing. Stanislav Kráčmar, DrSc.

Effect of specific hydrocolloids and hydrocolloid blends on gluten-free bread quality

Abstract

Increasing demand of gluten-free breads leads to widespread researches to offer quality goods. Gluten-free flours (amaranth, buckwheat, chickpea, millet, quinoa and rice) themselves, in two-component blend (50% rice flour and 50% amaranth, buckwheat, chickpea, millet or quinoa flour) and in three-component blend (60% rice flour, 20% amaranth flour and 20% buckwheat flour etc.) were submitted to the baking test. Satisfactory results presented the combination of buckwheat and rice flour in portion of 50% buckwheat and 50% rice flour, thus baking test of the blends from buckwheat 10% and rice 90% to buckwheat 90% and rice 10% was conducted and the sample buckwheat 40% and rice 60% evaluated as the best sample with 1.30 cm3 g-1 specific volume, hardness of 17.1 N and any negative effect on sensory properties. To improve the overall bread quality, eight hydrocolloids (agar, carob bean gum, gelatine, Kappa-carrageenan, sodium alginate, sodium carboxymethyl cellulose, tragacanth and xanthan gum) themselves and in two-component blend were applied to the rice flour in 0.5 and 1.0% portion to flour weight and submitted to the baking test including hardness and moisture content 24 and 72 hours after baking. The best results reached the rice samples in combination with agar-cellulose 0.5%, alginate-cellulose 0.5%, alginate-xanthan gum 1.0%, carob gum-cellulose 0.5%, carrageenan-gelatine 0.5%, cellulose-gelatine 1.0% and gelatine-tragacanth 0.5%. The blends were then applied to the sample of 40% buckwheat and 60% rice flour (BR 4060) and baking test evaluated. The hydrocolloid blends improved loaf specific volume from 1.30 cm3 g-1 to 1.85 cm3 g-1 (BR 4060-agar-cellulose 0.5%), improved dough and bread yield, did not significantly affect baking loss and moisture content 24 and 72 h after baking but deteriora-

ted hardness 24 and 72 h after baking (except for BR 4060-alginate-cellulose 0.5%) compared to the rice and BR 4060 samples.

Ing. **Radka Flasarová**, Ph.D.

Date of defence: 28. 8. 2018

Supervisor: doc. Ing. František Buňka, Ph.D.

Biogenic amines in selected cheese groups

Abstract

The aim of this dissertation thesis was to deal with rice and occurrence of biogenic amines in selected groups of natural cheeses. These amines can play important physiological functions at many microorganisms, plants and animals. On the other hand, higher concentrations of biogenic amines may have a negative effect on consumer health. Cheeses represent suitable environment for the rise of higher concentrations of biogenic amines. Number of microorganisms used in the cheeses production as feed microorganisms exhibit a marked positive decarboxylase activity. Thanks this reaction free amino acids appeared which are than decarboxylated to form biogenic amines. In the practical part, the content of biogenic amines in natural cheeses was monitored. The samples were taken from various stages of the technological process of production. Subsequently, the degree of ability to produce biogenic amines by means of microorganisms was investigated. The microbes were isolated and identified from cheeses. The decarboxylase activity of selected strains has been investigated in a real Dutch-type natural cheese which was made in laboratory. It has been found that representatives of the Lactococcus lactis subsp. cremoris CCDM 824 and CCDM 946 show a marked positive decarboxylase activity. Production of putrescine and tyramine at significantly high concentrations was observed. The putrescin amount at the end of the maturation time of both samples were greater than 800,0 mg.kg-1. During the monitoring of the decarboxylase activity of non-starter bacteria, it was found that in the presence of the Lactobacillus paracasei strain DEPE T51 and DEPE T52, no such rise of significant concentrations as in the case of Lactobacillus curvatus subsp. curvatus DEPE T3 and DEPE T36. The total amount of biogenic amines in Lactobacillus paracasei DEPE T51 and DEPE T52 did not exceed 100 mg.kg-1. For bacteria of the genus Lactobacillus curvatus subsp. curvatus DEPE T3 and DEPE T36, significant tyramine-positive decarbo-

xylase activity was observed, because the tyramine concentration was from 188, 2 to 222,1 mg.kg-1. on the 90th day of maturation. Two samples inoculated by means of Lactobacillus curvatus subsp. curvatus DEPE T3 a DEPE T36 showed tyramine concentrations in 66% from total numbers of 8 biogenic amines which were studied.

Ing. **Petra Janovská**, Ph.D.

Date of defence: 2. 10. 2018

Supervisor: doc. Mgr. Robert Vícha, Ph.D.

Study on a relationship between structure and binding properties of supramolecular complexes of 1-adamantylated ligands and cavitands based on cyclodextrins and cucurbiturils

Abstract

This doctoral thesis is focused on preparation of heteroditopic and heterotritopic supramolecular ligands consisting of adamantane skeleton. (Benz)imidazolium core was used as a positively charged part of ligands. Subsequently, ability of new ligands to form supramolecular complexes with macrocycles based on cyclodextrins (CD) and cucurbit[n]urils (CBn) was studied by means of 1H NMR, ESI-MS and ITC. Geometry of formed complexes was suggested according to 2D NMR experiments and supported by molecular modelling. In the case of heterotritopic ligands with central binding site based on 4,4'-disubstituted biphenyl, formation of quaternary complex in rotaxane manner with one beta-CD macrocycle at central site confined by two supramolecular CB7 stoppers at terminal sites was observed. In the case of heterotritopic ligand with central binding site based on 1,3-disubstitued adamantane, distinct arrangements of quaternary complexes were observed as CB7 and CB8 displayed different individual binding affinities towards binding sites. Whereas CB7 preferred the terminal adamantane sites to lock one beta-CD unit at central adamantane site, CB8 was confined at the central site by two beta-CD units sitting at the terminal sites. One of the most important achievement of this work is description of supramolecular behaviour of heteroditopic ligands with binding sites based on 1-adamantyl and butyl, respectively. Employing these ligands, we were able to determine quantitatively the attractive interactions between beta-CD and CBns and even repulsive interactions between two CBn units within a ternary complex. In addition, ternary complexes, whose

arrangements did not match individual preferences of macrocycles, were observed. Thus, we demonstrated the importance of lateral interactions between macrocycles and competitive-compensation phenomenon for design of complex supramolecular assemblies.

Ing. **Eva Sedláčková**, Ph.D.

Date of defence: 4. 12. 2018

Supervisor: doc. Ing. Pavel Valášek, CSc.

Thesis Secondary Aromatics in Alcoholic Bewerages Determined by the Crop Year of Fruits

Abstract

This thesis is focused on summarizing the current state of knowledge in the field of methods of obtaining, analyzing and using biologically active substances of plant origin. Attention is paid mainly to secondary and tertiary aromatic substances arising in selected grape wines and fruit distillates, their qualitative composition and quantitative occurence of individual aromatic components. Attention is paid mainly to developmental trends during production years. In addition, I have given an overview of current analytical methods used to identify and determine individual biologically active plant substances, whereas the greatest attention is mainly focused on modern instrumental analytical methods. The aims of the thesis have been defined and specified together with the methodology required for their achievement on the basis of the knowledge gained not only by studying scientific and professional literature, but also industry literature. In the next part of the thesis the results obtained are discussed, conclusions are formulated and ways of further research and practical applications within the studied issues are suggested.

Ing. **Tomáš Valenta**, Ph.D.

Date of defence: 8. 11. 2018

Supervisor: doc. Mgr. Barbora Lapčíková, Ph.D.

The study of foodstuff rheological and thermal properties

Abstract

The Doctoral Thesis deals with the issue of rheological and thermal properties of foodstuffs and additives based on polysaccharides and proteins which are widely used as food hydrocolloids. Rheological analysis was used to determine intrinsic viscosity and flow parameters of polysaccharide solutions (guar gum, kappa-carrageenan, xanthan gum) and gelatin/polysaccharide blends. Using suitable rheological models (Ostwald-de Waele and Herschel-Bulkley model), it was possible to define temperature and concentration dependency of flow parameters, the effect of solvent used and to examine the conformational transition of the dissolved polymers. Rheological analysis of polysaccharides solutions both in distilled water and 0.07M KCl in the temperature range from 20 to 45 °C confirmed the concentration and temperature dependency of the solutions viscosities as reflected in observed changes of flow parameters. The transition from double helical polysaccharide structure to single coil conformation (in salt solution) and the disentanglement of coils' chains (in distilled water) promoted by elevating temperature were proved at temperature about 30 °C by a detectable change of the Kraemer constant temperature dependency. Gelatin/polysaccharide blends in 0.07M KCl and 0.07M NaCl solutions were studied in the temperature range 25-45 °C by the same rheological models. Flow parameters of the blends were affected by the conformational change of the polysaccharide (helix-coil transition), as well as by the conformational ordering of gelatin, characterized by the dissociation of gelatin triple helices into flexible coils, and gel-sol transition. There was an evident change of the parameters at temperature about 35 °C. Thermogravimetric analysis and differential thermal analysis were employed to determine thermal properties of powder polysaccharides. The results of thermal analysis showed that powder samples exhibit varying ability to bind moisture depending on their structure. The temperature of the endothermic process (polysaccharide order-disorder transition) was determined at different heating rates. Peak temperature of the endotherm was found in the range 50-85°C, influenced by the applied heating rate and moisture content of the sample. Activation energy (Ea) of the phase transition associated with the kinetics of water evaporation was calculated by several kinetic models (Friedman model, Kissinger model, and Model-free kinetics). The Arrhenius model was used to evaluate the temperature resistance of the molecular structure of hydrocolloid water and salt solutions, prepared from the powders. Results of the Arrhenius model indicate that energy necessary to promote viscous flow of solutions is higher for samples in distilled water than in 0.07M KCl, suggesting the ion-induced as-

sembly of molecular chains in salt solution. In both cases, Ea was substantially reduced by application of higher shear rate.

Ing. **Eva Wrzecionková**, Ph.D.

Date of defence: 2. 10. 2018

Supervisor: doc. Mgr. Robert Vícha, Ph.D.

Study of the mechanism of isochroman-1-one derivatives formation by the reaction of acyl chlorides with benzylmagnesiumhalogenides and the possible utilization of this reaction for synthesis of bioactive compounds

Abstract

Isochroman-1-one derivatives represent an important class of compounds with various functions, especially in plant metabolism. Nevertheless, they are little explored. Recent literature describes only a small number of synthetic procedures that lead to these interesting substances. One possible way for formation of compounds with isochromanone skeleton is reaction of acyl chlorides with benzylmagnesiumhalogenides, which was reported in 2006. The aim of this work was to examine the reaction in detail and to suggest a way of isochroman-1-one derivatives formation. The influence of reaction conditions, i.e., initial concentrations of starting compounds, reaction times, different solvents and some additional components in the reaction mixture were investigated. The role of other substances, which were isolated from the crude reaction products along with the isochromanones, was also investigated. These compounds were treated under the conditions of original reaction to reveal whether they can produce the desired isochromanone. Particular attention was paid to track the distribution of selective isotope labeling of starting compounds, as the above experiments did not bring new insight into mechanism of isochromanone derivatives formation. It was clearly shown by means of tracking the distribution of 18O isotope from the starting [18O] adamantane-1-carbonyl chloride using mass spectrometry that only one oxygen atom of the lactone ring of isochromanone comes from the starting acylchloride. Within the work on isochromanone formation experiments, monocrystals suitable for diffraction Xray analysis were prepared in the case of five isolated isochromanones. It has been found that these derivatives can adopt two distinct conformations in the solid state. The crystals of both polymorphs were prepared in the case of one derivative. In addition to

isochromanone derivatives, the structure of the corresponding 1,2,3-trisubstituted 1,3-diones, which are also products of the studied reaction, was investigated. It has been demonstrated using instrumental methods, i.e., RTG, IR, NMR and Raman spectroscopy, that these compounds, with bulky substituents in all above mentioned positions, exit exclusively in the in dioxo forms both in the solid state and in the solution.

Degree Programme: PROCESS ENGINEERING

Degree Course: Tools and processes

Ing. **Alexander Čapka**, Ph.D.

Date of defence: 26. 9. 2018

Supervisor: doc. Ing. Soňa Rusnáková, Ph.D.

Dependability of Composites Constructions

Abstract

Sandwich materials are construction elements which have been well-known for a relatively long period. They were already used in the construction of British aircraft during the period of World War II. In Czechoslovakia, First mention of sandwich materials in technical magazines was already around the year 1960. Sandwich materials are marked by their very favourable mechanical properties related to their weight. Sandwich materials have been the subject of much research and their mechanical properties are already well-known. Only a small part of research has been applied to a certain type of sandwich material - to the polymeric composite panel with a honeycomb core - which already is, in itself, a construction element. Very little research has been dedicated to the fatigue life of these construction elements. It is evident that no comparison has been made of the life of polymeric composite sandwich panels with a honeycomb core of same static strength (load capacity), but of differing life expectancy. The basic aim of this thesis is determination of the fatigue life of basic, constructional and similar-in-strength comparable elements of composite sandwich-type panels with a honeycomb core. The research results are Wöhler's curves. The main scientific benefit of the work is the up-to-now unapplied method of statistical processing of measured data by the socalled Horn´s procedure. The practical advantage is proposal of the method of research of the life expectancy of sandwiches, which is applicable, in particu-

lar, in the development of terrestrial means of transport, where the question of life expectancy plays a major role. In determining life expectancy a whole line of methods is utilised. Basic methods are experimental and very time-demanding, which means also very costly. Currently, besides the experimental methods, use is made of computer-analytical methods and of simulation methods linked to them (again very costly, especially due to the high-cost SW). In this work an experimental method is used, which utilizes basic test equipment, which is several times cheaper than currently used testing machines. On this simple machine small samples are taken off and measured and then statistically processed by a special method designated for the analyses of small samples. The result of such-obtained data can be utilised for the design of further refined procedures of research of life expectancy. This subsequent research (on expensive equipment) can be directed at e.g. only on a certain section of Wöhler's curve, related to operation of the given terrestrial means of transport. A secondary target: active infra-red thermography is one of many methods of nondestructive tests suitable for detection of sandwich defects. This work proves that with the aid of infra-red thermography it is possible to achieve the same, or even better test results, namely with improved effectivity than that achieved by the up-to-now mostly utilised ultrasound methods.

Ing. **Jana Knedlová**, Ph.D.

Date of defence: 26. 9. 2018

Supervisor: doc. Ing. Libuše Sýkorová, Ph.D.

Study of Surface Integrity of Polymer Materials at Laser Machining

Abstract

At present, both manufacturers and customers of components made of polymeric materials are increasingly demanding on the quality of the finished parts. A significant role is played by, the use of modern technologies, such as a laser. This dissertation belongs into the field of unconventional technology and is primarily focused on laser machining of polymeric materials. The key aim of the thesis is the study of surface integrity of selected polymer materials obtained by laser machining. The main attention is solution to the determination of the "laser machinability" of polymer materials, the roughness of machined surfaces in

the change of technological parameters, the width of the heat influence and, last but not least, the possible structural changes due to concentrated energy of radiation.

Ing. **Petr Krátký**, Ph.D.

Date of defence: 26. 9. 2018

Supervisor: doc. Ing. Martina Hřibová, Ph.D.

Study of mechanical properties of thin polymer layers

Abstract

The aim of this dissertation is to determine the structural character of changes in mechanical properties of polymeric materials bound by ionizing beta radiation using selected tests. The theoretical part summarizes the basic knowledge about polymeric materials with focus on polyamides and the influence of ionizing radiation on their arrangement. More specifically, three selected materials are described. They are polyamide 6, polyamide 6.6 and polyamide 11. The theoretical part also focuses on the description of the individual tests that are used to examine the structural changes of materials and which have been used in this work. Selected tests include determination of gel content after radiation crosslinking, splitting index (SI), Infrared spectroscopy (FTIR), wide angle X ? Ray diffraction (WAXS), selective etching, scanning electron microscopy (SEM), differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), density and water absorption. The experimental part, based on the theoretical part, focuses on the identification of the influence of the modification on the structure and properties of selected polymeric materials. The analyses mentioned above were used to verify the structural changes of polyamides. Samples made of polyamides by injection method were subsequently irradiated with beta radiation. The beta irradiation effect on polyamides with aditive of polyfunctional monomer has been predominantly cross-linking as determined by gel content, splitting index and FTIR. WAXS, FTIR and DSC analyses prooved that the polyamide did not change the type of crystalline phase, only the quality and degree of chain ordeliness was reduced. TGA curves showed a slight increase in decomposition temperature in the case of cross-linked samples, but less resistance to thermal decomposition than non-irradiated specimens. In the case of PA 6 and PA 6.6, the network formed significantly better resisted to the etching agent, as demonstrated by the selective etching and SEM images. The rate of absorption

affecting mechanical properties with the degree of irradiation increased (PA 6). The modification to a certain radiation dose significantly improved the mechanical properties of the selected materials, including the modulus of elasticity, creep behaviour and hardness.

Ing. **Milena Kubišová**, Ph.D.

Date of defence: 24. 5. 2018

Supervisor: doc. Dr. Ing. Vladimír Pata

Quality Assessment of Surface of Polymer Parts in a Non-Normative Form

Abstract

The topic of the dissertation is the examination and evaluation of surface quality in a non-normative way. The central part of the thesis is research on the preparation of surface replicas, determination of how to print the surface and how to evaluate the replica. This technology is very little explored regarding product surface quality control. Surface replication has been used for a long time. DentacrylTM is commonly used for replication. However, this material has some disadvantages that outweigh the benefits. The work brings new directions and methods for evaluation. For the production of replicas are used impression compounds used mainly in dentistry. Therefore, in the field of dentistry, we are looking not only for the necessary inspiration for the choice of materials suitable for surface sensing but also for knowledge in the field of preparation and the application of impression materials themselves. It also uses the non-contacting profile of the Talysurf CLI 500, where the underlying roughness parameters (Ra, Rz, Rp, Rv and Rt) were read on both the original surface and the surface replicated. Subsequently, these parameters are compared using statistical methods.

1.2 Faculty of Management and Economics

Degree Programme: ECONOMICS AND MANAGEMENT

Degree Course: Management and Economics

Ing. **Barbora Dombeková**, Ph.D.

Date of defence: 18. 6. 2018

Supervisor: doc. Ing. David Tuček, Ph.D.

Evaluation model for risk factor local muscular load

Abstract

The presented dissertation deals with local muscular load as a significant risk factor of the work environment which has been considered as the most frequent cause of occupational diseases in the Czech Republic for several years. The first part consists of literary research focused on ergonomics, risk factors of the work environment, local muscular load, occupational diseases and their impacts and on the importance of prevention in the field of ergonomics. The second part of the dissertation characterizes the research objectives and methodology, whose results are presented in the third part of the dissertation. The third and final part of the dissertation presents the results of the research on the ergonomics awareness and local muscular load among companies in the Czech Republic, on the extent to which local muscular load is present at the examined workplaces, the criteria for identifying the local muscular load at the workplace, a number of general effective measures to reduce it and a list of key indicators for the implementation of corrective actions. The main part of the dissertation are the results of analysis of the level of local muscle load on selected works together with the identification of key risk factors and concrete proposals to reduce them. All is seen as a prevention of health problems and negative impacts associated with local muscular load (financial, organizational).

Felix Ondieki Kombo, Ph.D.

Date of defence: 12. 11. 2018

Supervisor: doc. Yuriy Bilan, Ph.D.

Corporate Social Responsibility (CSR) in the Banking Industry: A Model for Increasing Financial Performance

Abstract

The banking sector is considered to be an important component in the financial services' industry while banks are spending millions of dollars on corporate social responsibility (CSR). Many banks have created task teams to introduce the CSR concept properly so that to guarantee higher profits through CSR practices. However, a common CSR framework that can be adapted and implemented by commercial banks to achieve financial returns is still lacking, thus subjecting CSR as a philanthropic activity that is mostly applicable to developing countries. The dissertation uses two sets of data: primary data collected from bank customers, employees and managers and secondary data collected from banks' financial statements and annual reports so that to develop a model that can be used to increase financial performance by banks through CSR. Using the IBM SPSS Modeler 22.0 and NVivo software, the dissertation provides the model, taking into account three pillars of CSR (economic, environmental and social) and three accounting based measures (ROA, ROE and PPE). The findings indicate a positive relationship between CSR and financial performance in commercial banks based on accounting measures. Therefore, better CSR practices lead to higher financial performance in commercial banks.

Oksana Koval, Ph.D.

Date of defence: 19. 6. 8

Supervisor: prof. Ing. Felicita Chromjaková, PhD.

Conception of Continuous Process Improvement in Shared Service Centers Based on Lean Methodologies

Abstract

Shared Service Centers are an invisible driven force for effectiveness of the companies and organizations globally. Implementation of the shared service centers (SSCs) enhances organizational competitiveness through cost decrease, process standardization, and economies of scale. Implementation of SSCs provides additional benefits including enhanced risk management, consolidation of operations, raise of organizational flexibility, "and brin-

ging value drivers beyond productivity-such as customer service, business agility and support for new capabilities-to the fore" (Dunkan 2009). To achieve declared goals SSCs implement Continuous Improvement (CI) initiatives, regardless of the mixed findings on the effectiveness of CI. CI is top priority for the majority of the SSCs globally, despite the growing evidence of SSCs not being able to realize the benefits and desired results from CI efforts (Hodge, 2015).

Ravindra Hewa Kuruppuge, Ph.D.

Date of defence: 19. 6. 2018

Supervisor: doc. PhDr. Ing. Aleš Gregar, CSc.

The Influence of Internal Business Environment on Employees' Knowledge Sharing Intentions in Family Businesses in Sri Lanka

Abstract

The literature on knowledge management indicates that the sharing of knowledge among the members of a business determines the long-term sustainability of a business through innovations, while the literature on family businesses shows that family businesses face challenges that often threaten their survival in the long-term. The present study is of the view that the employees of family businesses are in a position to change this situation by engaging in knowledge sharing practices. This study raised the specific question: why do the employees in family businesses not engage themselves in knowledge-sharing with the fellow employees? The main objective of the study was to develop a comprehensive model in human capital by reviewing the determinants of the employees' tacit and explicit knowledge sharing intentions in successful family businesses. The use of a mix of the survey method and the interview method enabled the researcher to develop and test the theories. The inductive approach based on the data collected using in-depth interviews of 10 key cases of family businesses explored the nature of the employees' knowledge sharing intentions. The deductive approach tested a set of hypotheses using the data collected from 390 employees employed in a selection of family businesses. While the qualitative data of the study were analysed using thematic analysis, the quantitative data of the study were analysed using multivariate multiple and hierarchical regression models. The qualitative data analysis indicated four main categories, namely sharer, company, knowledge, and family

involvement. A detailed analysis of each category indicated the interconnection and interdependence of all categories together where individual motives & characters, institutional systems & procedures, teamwork, the nature of relationships, and leadership emerged as the major concerns of employees' knowledge sharing intentions. Quantitative analysis affirmed that employees' tacit KSIs have a greater influence on the explicit KSIs. The factors related to the organizational climate of the firm were identified as the key factors that determine the employees' tacit as well as explicit KSIs. Compared to the organizational climate, individual motivation and the social capital of the employees have little influence on the employees' KSIs. While the employees' attitudes mediate the relationship between social capital and KSIs, organizational identification partially mediates the relationship between the organizational climate and KSIs.

Ing. **Michael Adu Kwarteng**, Ph.D.

Date of defence: 12. 11. 2018

Supervisor: doc. Ing. Michal Pilík, Ph.D.

Modelling Consumer Aversion and Trade - offs towards Pre-Purchase Risk Factors in Online Second-hand Goods Market

Abstract

The market for second-hand goods continues to record strong growth in most economies around the world. However, as the second-hand market evolves, especially with the adoption of online e-commerce platforms, consumers' inclination for second-hand goods have also become complex. Whiles online transactions pose several risks to the consumer, the addition of used goods intensifies the risks to the user. As the risk factors brought about by online second-hand goods transactions persist, the relative importance or the level of aversion of these risks (weights) to the consumer have not clearly emerged. In view of this, this thesis proposes a model that would aid second-hand vendors to study and analyze the relative importance of pre-purchasing risks factors that consumers consider in online second-hand goods market. The model focused on understanding consumer aversion to pre-purchasing risk factors in online second-hand goods transactions in a trade-off setting. Thus, what risk factors are consumers willing to trade-off when contemplating on purchasing used goods online? Furthermore, the influence of perceived risk factors is studied

across different demographic profiles to understand the uniqueness of the online used goods purchaser and their preferences. Both qualitative and quantitative research methods (mixed) were adopted; whiles primary and secondary data collection approaches were adhered for gathering information.

Ing. **Šárka Palátová**, Ph.D.

Date of defence: 18. 6. 2018

Supervisor: doc. Ing. Miloslava Chovancová, CSc.

Cooperation Links of Agricultural and Food-processing Companies

Abstract

The aim of the dissertation is to create a scheme of the influence of factors affecting cooperative links in agricultural and food-processing companies. A specific commodity of pork has been chosen for the research. Based on exploratory research, issues of cooperative relationships and key factors influencing cooperative links of agri-food enterprises using quantitative research were identified and defined in the dissertation. A comparative overview has been made using indicators of agricultural and economic size of farms in EU countries based on an analysis of the structure of agricultural companies. The results of the cluster analysis based on these indicators show a high multidimensional similarity of the Czech Republic with Denmark, whose agri-food co-operations at high level and can also present an inspiration for Czech businesses. The created scheme of factors influencing cooperative links in agri-food enterprises in the pork commodity is a tool for creating co-operations among agri-business companies.

Ing. **Martina Polčáková**, Ph.D.

Date of defence: 6. 12. 2018

Supervisor: doc. PhDr. Miroslav Škoda, Ph.D.

Competency model of project managers in the Education Sector

Abstract

The dissertation with topic "Competency model of project managers in the Education sector "is focused on establishing of competency framework which should facilitate selection of a project manager at a given position. The main goal is to design a competency model of project managers in the field of education. At first there is done critical literature review of available resources in this dissertation. Furthermore the questionnaire sources have been created. Based on these results the proposal for the competency model of a project manager was established which was consulted in the selected educational institutions. The model will be a benefit not only for theory but especially for practice which can facilitate the selection of a suitable project manager in the education sector. Another benefit is clarification of the content of the knowledge acquisition between universities and practice.

Ing. **Martina Sopoligová**, Ph.D.

Date of defence: 18. 6. 2018

Supervisor: doc. Ing. Roman Bobák, Ph.D.

The Proposed Model of Cluster Policy

Abstract

The dissertation deals with cluster policy and different approaches to its realization. Its main objective is to analyze and compare the impact of cluster policy on the level of development of cluster organizations in the Czech Republic and Slovakia and, on the basis of research results, to propose a cluster policy model for Slovakia. The reason for addressing this topic is the fact that Slovakia has not yet taken any legislative form to support clusters; clusters are created here without the support of the state. In the introduction, the work focuses on the concept of clusters, its contribution to the economy, the models and the instruments of cluster policy. It provides the reasons and importance of state interventions in the implementation of cluster policy. One of the results of the thesis is a comparative analysis of cluster policy in selected European countries, which, with a variety of approaches to its implementation and examples of good practice, serve as a source in the creation of a cluster policy model for Slovakia. The input data for the analysis were obtained by studying strategies, documents and programs aimed at supporting and developing cluster organizations. To compare the level of development of cluster organizations in the Czech Republic and Slovakia, primary data collected from cluster managers and representatives of pu-

blic institutions was analyzed using a questionnaire survey and structured interviews. In the analysis of the obtained data and in the hypothesis testing, basic methods of decryption and inferential statistics were used. The research results confirmed that cluster policy in the Czech Republic and Slovakia was implemented in a different way, which was reflected in the different level of cluster development. Insufficient and unsystematic support for cluster organizations in Slovakia has not produced a comparable level of cluster organization development, as achieved in the Czech Republic, where the government recognized the importance of the cluster concept.

Degree Programme: ECONOMIC POLICY AND ADMINISTRATION

Degree Course: Finance

Do Thi Thanh Nhan, Ph.D.

Date of defence: 25. 6. 2018

Supervisor: prof. Dr. Ing. Drahomíra Pavelková

Cash holding, Corporate governance mechanisms and Firm value in transition economies: A study of listed corporations in Vietnam

Abstract

This study is conducted with the main aim to clarify the impact of the corporate governance mechanisms on the corporate cash holdings to improve the firm value in the Vietnamese context, investigating the sample of 610 listed firms on the Vietnamese Stock Exchanges including Hochiminh and Hanoi stock exchange for the period 2007-2015. Firstly, to achieve the main objective, the study affirms the impact of cash holding on firm value by the quantitative method to confirm the vital role of cash in the businesses. Secondly, the study reviews the literature and Vietnamese economy to define the components of corporate governance mechanisms which affect the cash holding level. The state ownership, some characteristics of the board of directors and listing requirements of Vietnamese stock exchange are considered as the important corporate governance mechanism factors which can affect the corporate cash holding level. The influence of these components on cash holding is tested by the quantitative method. The results demonstrate that the cash holding has an impact on firm value in an inverted U-shaped form. This confirms that corporate cash hol-

ding level affect the firm value. Then, the firms with the right level of cash reserve can increase their value. In order to keep the suitable amount level of cash, the firms need to understand whether the components of the corporate governance mechanisms influence the corporate cash holding. The findings indicate that state ownership has a negative relationship with the corporate cash holding. The firms who have a high percentage of the state ownership because they can easily to borrow money based on their political connections. Moreover, some characteristics of the board of directors (BOD) have the impact on the corporate cash holding. In detail, the corporate cash holding is higher when the chairman and manager are the same people. Meanwhile, the board ownership is negatively related to the corporate cash holding. The firms can consider these factors when they want to adjust the level of cash reserve. Besides that, the listing requirements of the stock exchange are one of the external components of the corporate governance mechanisms which affect the corporate cash holding level. The firms listed on the different listing requirements keep the different level of cash holding. The thesis contributes as a reference resource for corporate finance executives. The corporate governance mechanisms should be considered as the factors which affect the cash management. When the managers and the owners understand more about these relationships, they can decide better financial strategy which can improve their firm value.

Ho Thanh Tung, Ph.D.

Date of defence: 19. 6. 2018

Supervisor: prof. Ing. Jaroslav Belás, PhD.

The Capital Regulation Supervision Used In Vietnamese Commercial Bank Sector

Abstract

State Bank of Vietnam (SBV) set a plan of full application of Basel supervision and regulation framework (Basel III). By the end of 2018, all commercial banks should comply with the regulation. In 2010 SBV has issued regulatory framework which incorporates some principles and rules of Basel II. Before the full implementation of the regulation, Pilot study is currently being conducted. This pilot study will demand reliable analysis in order to deepen banking regulation and to make the banking system sound, transparent and pre-

pared for further development. In this thesis, the author review the current state of knowledge related to the banking regulation, conduct an empirical analysis and synthesise findings. Most importantly, the author suggests indicators which should be monitored; the author points to the most vulnerable and problematic issues Vietnamese commercial banks face and proposes a methodological framework which should be followed to achieve successful transition to a new banking environment under the Basel III framework. Given the complexity of studied area, this thesis focus mainly on the capital regulation and supervision. On average, the empirical evidence shows that Vietnamese commercial banks pursued credit growth at a higher priority than capital regulation requirements. Retained earnings and risk-weighted assets are permutations to account for the bulk of both higher risk-weighted capital ratio and capital-to-total-assets ratio, while the shares issuance played a lesser role. The author finds that the manner of the adjustment by the Vietnamese commercial banks to the capital target led to a loss in efficiency. Also, the empirical analysis was conducted on the same sample as the original Pilot program. Using quantitative analysis, this thesis also acquires a deeper understanding of the associations between the capital regulation implementation and the operation of banking business, and the associations between the capital regulation implementation and banks' efficiency, adding a case study of Vietnamese commercial bank sector in the pilot period of the regulatory application Basel framework. These contributions could benefit to both theory and practice.

Le Tuan Bach, Ph.D.

Date of defence: 5. 12. 2018

Supervisor: prof. Dr. Ing. Drahomíra Pavelková

Influence of Concentration Ownership Structure on Accounting Conservatism Adoption: Case of Vietnam

Abstract

This thesis responds to previous studies' call for research on the influence of concentration ownership on accounting conservatism adoption. With regard to a transition country as Vietnam, both state and foreign ownership are common types of concentrated ownership. Therefore, this thesis focuses on exploring the effects of state and foreign ownership on accounting conservatism adoption separately also concurrently. Theoretically, the thesis is

expected to extend the literature on the role of corporate governance to financial reporting quality as well as practically to provide useful knowledge of financial information quality to financial statements users, regulators and accounting standard-setters in Vietnam.

Orkhan Nadirov, Ph.D.

Date of defence: 25. 6. 2018

Supervisor: Assoc. Prof. Bruce Dehning, Ph.D.

The Relationship Between Changes in Income Tax Rates and the Motivation to Work

Abstract

Taxes are related to wages in two ways. First, taxes directly reduce after-tax wages, which leads to direct economic effects, referred to in the economics literature as the income effect and the substitution effect. Second, there is a psychological effect. Taxes can have a psychological effect that can increase or decrease the motivation to work. In this paper, behavioural theories are developed and demonstrated and these show that workers at high and low levels of pay behave differently when tax rates change. One theory posits that to survive, workers must maintain a subsistence level of income. A change in taxes changes the minimum number of hours of work required to maintain this subsistence level of income. The second theory prescribes that the utility for leisure is not constant, but is an increasing function of income. This is due to the larger opportunity set of activities available at higher levels of income. The theories can be demonstrated by considering the changes in hours worked in reaction to changes in labour income tax rates. In countries with low wage rates, as labour income taxes increase, the motivation to work increases, because workers have to work more to maintain a minimum level of income. In countries with high wage rates, as labour income taxes increase, the motivation to work decreases, because workers have a high preference for leisure. The theories are tested using a time-series cross-section of data covering 15 countries for 50 years. The findings imply that wage levels and preferences for leisure/work can account for the differences in changes in hours worked in response to changes in tax rates.

NGO Minh Vu, Ph.D.

Date of defence: 25. 6. 2018

Supervisor: prof. Dr. Ing. Drahomíra Pavelková

Customer Relationship Management (CRM) and the Financial Performance of Small and Medium Enterprises in Dynamic Environment: An Investigation in Vietnamese Tourism Industry

Abstract

The main objective of this dissertation is to provide a comprehensive framework for Customer Relationship Management (CRM) implementation for Small and Medium Enterprises (SMEs) in order to dramatically and sustainability improve SMEs' financial performance. For achieving this objective, the dissertation work also attempted to address the two current noticeable CRM-related research gaps. The first one is about the full mechanisms through which CRM can improve firm's financial performance. The second one concerns about the integration of change-mechanism into CRM for dealing with fast-paced changes in the current dynamic business environment. For developing the framework, theories and frameworks from organizational economics, strategic management and marketing literatures are reconciled to form the unifying framework of sources of performance differentials as the theoretical background. Then, another three rounds of investigations are conducted for defining the successful factors for the successful CRM implementation and testing their impacts to SMEs' performance. The first qualitative investigation using in-depth interviews with 41 managers in SMEs in Vietnamese tourism industry have provided profound information for defining the unique characteristics for each factor in the proposed framework. Especially, the Customer Agility concept from operational management field is integrated into the framework for the first time in order to provide a brand new and more comprehensive approach toward CRM implementation in SMEs. Then the framework is tested on data collected from a survey of 111 SMEs in tourism industry in Vietnam using Partial Least Square Structural Equation Modeling (PLS-SEM). As the last attempt, the findings from previous two rounds of investigations are reflected and justified in the case study research in two chosen tourism SMEs.

Nguyen Thi Anh Nhu, Ph.D.

Date of defence: 5. 12. 2018

Supervisor: prof. Ing. Jaroslav Belás, PhD.

Financial literacy and Its Impact on Retirement Investment Choice: An Investigation of Vietnamese Employees

Abstract

The main objective of this research is to develop a conceptual framework which investigates and confirms the role of financial literacy and other key factors motivating people in the working stage to make investment choice decisions for financial well-being in the retirement stage. More specifically, in the literature review section, choice theories are explored in order to apply the aspects of choice theories to the context of retirement investment choice decisions. According to the review of empirical research into personal finance and financial decision-making, it is demonstrated that financial literacy plays a vital role and it is considered a prime factor in making informed investment decisions. Although recent research into financial behaviours and financial decision-making has been considered and developed, most research in this area has focused on saving intentions, retirement planning, stock market participation and derivative market participation. There is a limited number of research into the role of financial literacy in both basic and advanced financial literacy levels as well as other factors such as pension knowledge, financial risk tolerance and financial advice in the context of retirement investment choice decisions.

1.3 Faculty of Multimedia Communications

Degree Programme: VISUAL ARTS

Degree Course: Multimedia and Design

Amina Lami Akorede, Ph.D.

Date of defence: 20. 6. 2018

Supervisor: prof. akad. mal. Ondrej Slivka, ArdD.

Exploring animation film in a popular African folklore, through views expressed by a selection of high school pupils in Nigeria and Czech Republic

Abstract

I would first like to express gratitude to my thesis supervisor, Professor Ondrej Slivka, (FMK, Ateliér Animovaná tvorba, (KAAT); for all his support, comments, counselling, and patience with me during this long process of accomplishing my thesis. His knowledge of movie has been inspirational which proved helpful to me as I get ready to enter the animated movie industry. I am thankful to MgA Jan Živocký, who supervised me to produce the animated movie. I am immensely grateful. Next, I am full of gratitude to Mrs Eva Prokopová for the perpetual support with administrative paperwork throughout my studies. Special thanks to Sam Húšť, David Kaláč and his other music band members, Lukas Gregor, Prof Peter Štarchoň, Stephen Binus, Martin Stavjanik, Olga Agbo and others who facilitated my field /practical works. These are the school supervisors/ principals and teacher (Counsellor), Chief photographer, background music band leader of the film, without which the final output of this work would never have been satisfactory and acceptable. I am thankful to the target audience (the high school students), who took time and efforts to fill the survey and deliver responses to my questions. Thanks to all authors whose work was used in the procedure of writing this thesis which I have done my best to deliver appropriate credits and bibliographic evidences to. I would like to show appreciation to my friends who have spent numerous hours watching my animated movie and their feedbacks. Lastly, I would love to thank my family members, especially my parents (Dr Wahaab Akorede and Late Mrs Asiya Akorede) for the constant support, nurture, and love. It is not very common from my part of the world for a girl to be so supported in reaching her highest academic potentials, without any disruptions. I have been truly lucky indeed.

MgA. **Petr Babinec**, Ph.D.

Date of defence: 20. 6. 2018
Supervisor: doc. MgA. Jana Janíková, ArtD.

The development of audiovisual productions in the digital age

Abstract

The theoretical part of Doctoral Thesis focuses on the structural research of audiovisual productions in response to the availability of digital technologies. A qualitative research of six audiovisual productions provides a model for emerging productions and their sustainability and development in subsequent periods. The research is complemented by the analysis of the Audiovisual centers and their application in practice. The practical part describes directing of the documentary movie Batalives. It is focus on shooting techniques and selections of respondents and places.

Mgr. **Romana Čočková**, Ph.D.

Date of defence: 3. 12. 2018

Supervisor: doc. Mgr. Irena Armutidisová

Model of Multimedia Research Laboratory and its functioning using the principles of Design Thinking

Abstract

The presented doctoral thesis deals with the possibilities for involvement of university students in practice by means of their participation in the performance of real-life tasks using new approaches in classes, such as, for example, Design Thinking. The theoretical part describes terms related to the topic, trends and directions in the sphere of higher education in relation to the employability of graduates in the labour market, setting of cooperation between higher education institutions and business and industry in our country as well as on a European scale, the principles of design thinking and comparison of the existing models of Design Thinking. The current state of cooperation with practice at a particular higher education institution including the assessment of competences and abilities of students from their point of view and from the perspective of graduates of the given educational institution are analysed in the research part of the thesis. A comparative analysis of the current state of Design Thinking teaching methods used at universities in the Czech Republic and in research laboratories at universities forms part of the practical part. In the project part of the doctoral thesis, models of a Multimedia Research Laboratory are designed, namely a general model and another model designed for a particular university. The fundamental idea of the Multimedia Research Laboratory is based on the establishment of a centre for liaison between education and business and industry, implementation of a

practical course unit and at the same time a research unit intended for university students and teachers. This model will be designed in accordance with secondary analyses, as well as in accordance with a primary survey conducted among the target groups of students and graduates of the higher education institution, comparative analyses of Design Thinking teaching methods used at Czech higher education institutions and the existing laboratories focusing on similar issues in the environment of Czech higher education.

Mgr. **Kateřina Hábová**, Ph.D.

Date of defence: 3. 12. 2018

Supervisor: prof. Ing. Ján Grečnár, ArtD.

Communication Strategy of the Creative Centre of Faculty of Multimedia Communications at TBU in Zlin

Abstract

The topic of the dissertation thesis has been chosen because of the goal of the Faculty of multimedia communications of Tomas Bata Universty in Zlin to establish so called Creative centre aimed at business support for start-ups and freelancers from the field of design, audiovisual arts or advertising and marketing. Thesis deals with the CC as a business incubator and focuses on its marketing communications. The aim of the thesis is to design a communication strategy that would lead to the success of the CC ? so that there would be sufficient demand for its services and that the needs of the target groups would be met, thus turning them into satisfied and loyal ?customers?. The dissertation starts with theoretical part dealing with the theme of entrepreneurship, creativity and marketing communication. The foundations are used in the methodology and also in experimental part, framed as a marketing research consisting of several methodology parts: the market survey, business incubators communication analysis or target group analysis; the main part contains in-depth interviews with the management of successful European university business incubators completed with observation. In the last, creative part the communication strategy for KC is outlined.

MgA. **Jakub Hrdina**, Ph.D.

Date of defence: 21. 6. 2018

Supervisor: doc. ak. Soch. Ferdinand Chrenka

Influence of 3D technologies on process of creating design

Abstract

The main task of the dissertation is to analyze the use of 3D technologies in the process of creating design and their influence through the whole design process. The aim of the theoretical part of my work is to document the actual state of 3D technologies from the beginning to the present, also to deal with the different types of 3D technologies and their application in the steps of the creative design processes. The individual steps of these processes are associated with the 3D technology along with new media that can have a positive impact on improving or simplifying these design processes. In addition, the work is focused on the analysis of the methodology of design work using 3D technology and new media. The main task of the practical part of the thesis is the development of an interactive visualization system, which serves to present industrial design.

Mgr. **Barbara Hucková**, Ph.D.

Date of defence: 20. 6. 2018

Supervisor: prof. Mgr. Pavel Dias

Young World, Image Weekly News Magazine 1959-70

Abstract

The emergence of illustrated magazines in the last century was undeniable phenomenon of society and its demand for information. This area of journalism and photo journalism developed primarily in connection with the technological development of imaging and printing subsequently. The magazines have always functioned as a reflection of the demand in the society and its political and economic situation. It is also clear that a magazine quality has always been part of the writers and editors work and their ability to meet demand and expectations of the readers. Their visual and artistic form, however, was also influenced by the technical level of the printing industry and distribution options. My dissertation Image

magazine Young World (1959-70) describes the emergence and the first decades of the magazines content and its form during the 1960s. This period was selected because such a comprehensive study about this theme has not been published yet. Recorded interviews with editors and witnesses of this period, along with historical documents are part of the study and the subsequent assessment of how the editorial team reached the credibility and success with readers across the diverse spectrum of social interests and the reality of life in the 1960s of the 20th century in Czechoslovakia.

Mgr. **Kristýna Kovářová**, Ph.D.

Date of defence: 3. 12. 2018
Supervisor: prof. Ing. Ján Grečnár, ArtD.

Creative Centre as an Entrepreneurial Support Tool

Abstract

Doctoral thesis is focused on gaining good practice in the management of programmes and places oriented on business support with respect to the needs of so called creative class for the purposes of the planned Creative Centre. It is concentrated on marketing mix of services and human centred design as one of the modern approaches to services design. The theoretical ground brings insights into issues of entrepreneurship particularly in the Czech environment, concentrating on its specifics and problematic factors, entrepreneurial behaviour and attitudes, characteristics of beginning entrepreneurs. The theoretical base of the thesis is also concerned with entrepreneurial support programmes in the context of tertiary education and entrepreneurial support at the Tomas Bata University in Zlín. A substantial part of the theoretical base is a theme of the creative class and aspects of environment influencing creative activity and work in general. The main part of the thesis is comprised of primary foreign research which was published as a specialised monograph, later complemented by a research of UBI Index. At first the design part of the work draws on the theoretical base and processes results of the research and eventually it presents an assemblage of findings and possibility of their utilization for the planned Creative Centre including the draft of its involvement in the university-wide entrepreneurial support system aimed at students of Tomas Bata University in Zlín.

MgA. **Veronika Pasterná Szemlová**, Ph.D.

Date of defence: 3. 12. 2018

Supervisor: prof. akad. mal. Ondrej Slivka, ArtD.

Totalitarianism in animated film

Abstract

Theoretical part of Doctoral Thesis deals with criticism of totalitarian regime in short animated films, that were created in Czechoslovakia between 1948 and 1989. Besides analysis of films themselves it shows also troubles of their authors in context of national cinematography controled by censorship. The important part of the Thesis is description and analysis of authors own short animated movie Music box.

MgA. **Ondřej Puchta**, Ph.D.

Date of defence: 21. 6. 2018

Supervisor: doc. ak. Soch. Ferdinand Chrenka

Design of a peryphery for interaction with a personal computer with special intention to disabled with one hand partly or fully dysfunctional

Abstract

The dissertation thesis deals with the design of a periphery designed for interaction with a personal computer, designed with special intention to the needs of disabled users with one hand partly or fully dysfunctional. The aim of the thesis is the design of a periphery for interaction with a personal computer based on the results of the research, as well as to minimize the impact of using the PC at the work, but also in the others, e.g. leisure activities. All the major ways of interacting with a personal computer are analysed and compared with the respect to the nature of disabilities of users and the time spent working with the PC in order to clarify the current state of this problem, the thesis contains a description of the historical development in the selected area. An overview and analysis of current production, both conventional and specialized categories, are compared. The acquired knowledge is applied on the design of a functional prototype and verified the extent of their positives. Based on the findings from the tests carried out, there are presented two outputs with

significantly different concepts. The conclusions of the thesis can be used in the field of research, because they categorize individual types of peripheries and present the results of their mutual comparison. At the same time, they can be beneficial for the practice because they provide a comprehensive view of the current design of the peripheries for interacting with a personal computer.

MgA. **Juraj Šuška**, Ph.D.

Date of defence: 21. 6. 2018
Supervisor: doc. PhDr. Zdeno Kolesár, Ph.D.

Design and development of the author's collection of footwear, that is influenced by the tradition of the shoe industry in Czechoslovakia between the years 1945-1989

Abstract

The theoretical part of the thesis discusses the development of the footwear industry in former Czechoslovakia between the years 1945 and 1989. In the first part the structure of nationalized industry is described as well as the process of changes that the industry went through during that period. Consequently, the paper focuses on the role of designers in an environment of socialist economy and it also presents a list of the most significant designs produced over this time period. The practical part is closely connected with the theoretical part. Its main aim was to develop a functional prototype that is inspired by the findings from the theoretical research. The presented footwear collection was developed in collaboration with local footwear producers.

Mgr. MgA. **Pavel Trnka**, Ph.D.

Date of defence: 20. 6. 2018
Supervisor: prof. Ondrej Slivka, ArtD.

Didactics of Animated Art Using Digital Technologies

Abstract

This dissertation attempts to contribute to increasing the effectiveness of teaching animation (focused on film output) in non-specialized study groups. In this context, the work recommends appropriate digital animation technologies. Inspiration for effective didactic procedures was sought in professional schools dedicated to animation. We also present the author's artistic creative work accompanying the participating research section and the animation technology testing process.

MgA. **Soňa Zajacová**, Ph.D.

Date of defence: 21. 6. 2018
Supervisor: doc. Mgr. Ivan Titor

Eco Trendy - Eco Friendly

Abstract

Abstract

The impact of clothing production on environment requires stricter measures in industry. Therefore, this thesis deals with the procedures for creating sustainable design.

As a precondition for solving this issue in fashion has become an insight into the society and its relationship to fashion, clothing, and to consumerism. Therefore, the theoretical part is based mainly on the theory of the significant philosophers and sociologists, as Bauman's Liquid Modernity (2008), Lipovetsky´s Era of Emptiness(2008), and Fromm's(2014)off-axis modes to have andto be. Critical reflections on concepts such as fashion and trend, and the verysustainability were based on aneed to clarify them and to be able to continue working in this theoretical field. In the selection of key designers are included those who pushed issue of the sustainability into soluble form with possibilities in their time available. Attention is also paid to new technologies, materials and possibilities which arise from it. Selected information of the theoretical work has been used for a textbook Selected Chapters from the Technology of Clothing Course: Fashion and Art, Ecological Fashionwhich is used for teaching students of Studio of Fashion Design at TomasBata University in Zlin.

Dissertation thesis Eco Trendy-Eco Friendlyis divided into two main parts -theoretical and practical ones. The theoretical part consists of two main sections. The first chapter dealing with the question of fashion and ecology explains problems of their own terms as fashion,

clothing, trends and their inter-relations. It describes forming of mankind in society throughout history and therefore his influence on fashion.

The second chapter defines sustainable fashion. It deals with the formation and assumptions for the future. It also divides sustainability into four main categories –recycling, materials friendly to environment, timeless design and conceptual processing. It is also dedicated to new approaches and possibilities resolving the problem and future vision through new technologies.

The thesisrepresents not only collection of educational knowledge, but experimental and scientific-technological treatments too, which are aplicable in the clothing industry.

A number of projects that not only respond, but also represent different positions of possibilities how to work within thesustainability roots in the rich theoretical research.

The practical research consists of several complex projects, experiments and collections. Nomadiccollection, Be part ofand experiments Atmosfearand Obesityincurred as artistic projects.

In cooperation with experts we have implemented projects Instant Dressand Collagen Dress, project Reclaimed Futurewas initiated by a graphic designer. CollectionEchelonfor the sport brand Isadore Apparelrefers to the possibility of implementing sustainability into the yet existing brand.

The dissertation thesis is not only a set of educational knowledge, but also experimental and scientific-technological processing applicable in the clothing industry.

1.4 Faculty of Applied Informatics

Degree Programme: ENGINEERING INFORMATICS

Degree Course: Automatic Control and Informatics

Ing. **Martin Koláček**, Ph.D.

Date of defence: 11. 9. 2018
Supervisor: prof. Ing. Vladimír Vašek, CSc.

Utilization of thermal storage materials PCMs in specific applications of environmental engineering

Abstract

The dissertation thesis is an experimental research of heat storage materials. This research deals with the application of these materials as well as the dynamics of heat transfer from materials to the environment. Thermal energy storage materials Phase Change Materials (PCMs) are able to store a large amount of energy. This work is focused on utilization of heat accumulation in the form of heat and cold. Currently, there is a trend towards the elimination of the energy performance of buildings. It is expected to effectively design the building so as to reduce the fluctuations of the outdoor environment. The aim is to ensure the optimal microclimatic conditions within the building with minimal energy need. Thermal energy storage materials represent one of the important possibilities of thermal stabilization of the indoor microclimate of buildings. Doctoral study is focused on the research of the PCMs properties and streamlining cyclical discharge and charging of stored energy. Identification and final adjustment will use to design a device using PCMs.

Ing. et Ing. **Kateřina Sulovská**, Ph.D. et Ph.D.

Date of defence: 12. 10. 2018

Supervisor: doc. Mgr. Milan Adámek, Ph.D.

Research on Biometric Systems in Terms of Their Credibility and Integrity: Analysis of Gait Patterns Changes

Abstract

Nowadays, biometric systems take privileged position in property protection, as they come from unique characteristics of human body. Characteristics, that remain unchanged throughout the life. This work is focused on basic assumptions for a gait analysis intended for utilization in biometric systems. Although the gait recognition is used in trials to prove or disprove ones guilt, such system, based on gait recognition, is not used widely in praxis. To be able to apply gait biometrics into praxis, same as for example the face, retina, iris, fingerprint biometric systems, more deeper testing is needed to evaluate focusing mainly to two issues: whether the dynamic gait stereotype does not change significantly during the

human life, and if it is possible to clearly distinguish between indinviduals. Many ongoing researches study these and other questions to achieve high enough reliability and credibility of the system, which would significantly increase the security of both people and property. The worlds teams investigate the possibility to analyse the human gait (individual identification) from a common video recording. The 2D and 3D analysis are closely related. As all of the research options of the 3D analysis have not been worked out, interesting findings can be still found, supporting creation and development of algorithm for fast automated recognition. The potential of human gait, as one of the least known biometric characteristic for the public, is therefore great. Forensic, as well as common identification has also issues with identity thefts, which is more and more frequent especially in developed countries. This can be a great thread to all persons, mainly if it is about biometric data, which are directly connected to the person and their substitutability is in vast cases absolutely impossible. The biometrics has therefore two sides. On one hand, it can be an | 9 advantage (replacement of cards, codes, signatures), on the other hand it can be a significant interference with the individual?s privacy (i.e. identity theft after the plastic surgery, end of anonymity, tracking of all people, obtaining information about health, race). Up to date results of human gait variability are very satisfying and the gait is becoming one of the perspective biometric system. The issue is, if the systems will be able to operate in large scale. This is the task for researches all over the world. Some of the other questions forwarding to the future is also statistical methodoly used to evaluate data, as this is crucial to point out the (in)appropriateness of gait as a mass use biometry. Currently, the most commonly used method is the ANOVA. Our reseach focuses on the evaluation of the human locomotion under several different conditions (in a 3D measurements) to be able to test the appropriatness and reliability of gait dynamic stereotype for viable and reliable biometric system in praxis. As the results from the classical statistical analyses like ANOVA are not satisfactory in case of our data, we use a methodology more suitable for the character of obtained data functional analysis. Utilization of functional data analysis is in the field of biometric systems unique and often neglected, although this methodology is one of the most suitable ones for such type of data. The functional data analysis can highlight interesting connections that otherwise are not acquired by other statistical methods. Our analyses prove that the functional data analysis for testing gait trajectories brings very satisfactory, highly accurate results, which also confirms the high accuracy of measurement with the used 3D system.

1.5 Faculty of Humanities

Degree Programme: PEDAGOGY

Degree Course: Pedagogy

Mgr. **Magdalena Hanková**, Ph.D.

Date of defence: 30. 5. 2018
Supervisor: doc. Mgr. Soňa Vávrová, Ph.D.

Social and emotional needs of individually integrated pupils with physical disabilities in the secondary school environment

Abstract

The presented dissertation focuses on an important area of educational policy which is recently even more discussed, primarily in a foreign scientific literature - on social and emotional needs of individually integrated pupils with physical disabilities during their secondary school education. The theoretical part expounds the chosen issue with emphasis on the characteristic of the selected target group - adolescents with congenital physical disabilities - from the somatic, psychosocial and educational point of view. Furthermore, the attention is paid to social specificities that can be associated with congenital physical disabilities and thus determine pupils' integration and participation in the secondary school environment. The last theoretical chapter introduces not only social and emotional needs of pupils with physical disabilities as a part of the integrative educational practice, but also considers its current trends, factors and psychosocial aspects. The empirical part of the thesis presents the methodological background of authors' research as well as its results. The main aim of this qualitative research was to identify how the sample of ten graduates with congenital physical disabilities (cerebral palsy or spinal muscular atrophy) retrospectively reflects the fulfillment of their social and emotional needs in the secondary school environment. The data obtained through a semi-structured interviews was analyzed in accordance with the procedures of situational analysis which is classified as the second generation of the grounded theory. As a secondary method of data collection, the analysis of legislative, curricular and strategic documents of the Czech educational policy, as well as documents issued at European level, was chosen. The goal of this supportive method was to identify the reflection of social and emotional needs of pupils with special needs in

mentioned documents. Based on the research results, recommendations for pedagogical practice, application dimension of the thesis, but also the possibilities of further research in the chosen area are discussed.

2 DEFENDED HABILITATION THESES

In 2018, 8 habilitation theses were defended: 2 at the Faculty of Technology, 4 at the Faculty of Multimedia Communications and 2 at the Faculty of Applied Informatics.

2.1 Faculty of Technology

Course: Tools and Processes

doc. Ing. **Ondřej Bílek**, Ph.D.

Appointed with effect from: 1st November 2018

Modeling and Surface Quality Optimization for Milling of Inclined Planes

Abstract

Thesis deals with modeling and optimization of surface quality after ball-end milling in dependence on process parameters, including the slope of machined surface, tool geometry, cutting conditions and other technological parameters. In addition to the basic analytical survey and graphical processing of the behavioral trend, the methods of the planned experiment are used with a large number of input variables and are introduced optimal setting options. This part is followed by the statistical processing of data using multidimensional statistics, the aim of which is to determine the degree of similarity of the cutting parameters. Another methodology, based on Artificial Intelligence, uses seven artificial neural network structures and suggests an optimal surface prediction network for ball-end milling.

Course: Food Technology

doc. MVDr. **Michaela Černíková**, Ph.D.

Appointed with effect from: 1st June 2018

Selected Factors Influencing the Processed Cheese Consistency

Abstract

Habilitation thesis deals with the selected factors affected the processed cheese consistency. The effects of raw materials composition, especially the effects of different dry matter and fat in dry matter contents, dairy fat origin and the additions of carrageenans as an additive, on consistency of the above mentioned samples were described. The composition of the raw material mixture contains also emulsifying salts. Therefore, the effect of emulsifying salts, actually their ternary mixtures on the processed cheese consistency made from different types of natural cheese with different degree of maturity was investigated. Processing parameters, such as melting temperature, holding time of the melt and agitation speeds during the melting process were also studied. The last part of the habilitation thesis was focused on the possible substitution of emulsifying salts (also the change of the raw material composition) by κ-carrageenan. Additionally, consistency changes of samples manufactured from natural cheese with different degree of maturity were also investigated. Most of the presented factors were studied not only immediately after production, but also during cold storage with regard to changes in the processed cheese consistency.

2.2 Faculty of Multimedia Communications

Course: Multimedia and Design

doc. M.A. **Vladimír Kovařík**

Appointed with effect from: 1st May 2018

The Sun's apparent motions

Abstract

Presents a collection of 12 objects exhibited in the Klenová Gallery in 2015 as part of the official programme Plzeň 2015 - European Capital of Culture.

The objects were created in the past ten years, and we can observe recurring motif of the circle or its part.

In the long term, this topic has been the focus of my work in all the different implications of meaning, especially in relation to the human scale.

It is accompanied by the theme of time, especially its subjective perception, often realized as variants of pendulums or sundials.

The selection of the artworks represents the materials I work with most often, i.e., wood, metal, polymethyl methacrylate.

The following part presents the application of the above-mentioned (not only) artistic basis and conclusions in the studio teaching.

doc. MgA. **Libor Nemeškal**, Ph.D.

Appointed with effect from: 1st January 2019

Between Animation and Documentary Filmmaking

Abstract

A portfolio of audiovisual works entitled "Between Animation and Documentary Filmmaking" is a collection of nine documentary and twenty animated films from years 2011-2017, directed, edited or concept edited by Libor Nemeškal.

doc. MgA. **Kristýna Petříčková**

Appointed with effect from: 1st January 2019

Traditional Clothing and its Application in Contenporary Design

Abstract

The thesis submits a selection of the creative work of the author Kristýna Petříčková along with the exceed into her pedagogical activities. The particular examples exemplify the different ways in which traditional clothing can be Applied into contemporary design.

doc. MgA. **Martin Surman**, ArtD.

Appointed with effect from: 1st May 2018

Martin Surman - Original Work in the Field of Industrial Design and Its Reflection in Teaching Practice

Abstract

The habilitation thesis focuses on the author's own industrial designs put into practice, specifically on the individual product categories including the design of vehicles, furniture design and product design.
Design exhibitions and publications are also presented.
The last part of the work introduces the author's project of a 3D register of industrial designs.

2.3 Faculty of Applied Informatics

Course: Machine and Process Control

doc. Ing. **Radek Matušů**, Ph.D.

Appointed with effect from: 1st June 2018

Robustness of Integer Order and Fractional Order Control Systems under Conditions of Uncertainty

Abstract

This summary presents the habilitation thesis that deals with the robustness of integer order and fractional order Single-Input Single-Output (SISO) Linear Time-Invariant (LTI) control systems under conditions of parametric or unstructured uncertainty. Various approaches to incorporating the uncertainty into the mathematical model of a controlled plant, analyzing the robust stability of relevant closed control loops, or designing the robust controllers with conventional structures are presented. The obtained results were verified both by means of simulation and also during control of laboratory models.
With respect to the rich publication activities of the author, the habilitation thesis has a form of the anthology of published scientific works supplemented with a commentary according to the Section 3b) of Article 72 of Act No. 111/1998 Sb. on Higher Education Institutions and on Amendments and Supplements to some other Acts.
The habilitation thesis contains only the original scientific papers which are published in the journals with an impact factor and in which the applicant is the first author. The thesis incorporates 8 selected papers that were created during the author’s work at

the Faculty of Applied Informatics, Tomas Bata University in Zlín and that were published in 2010 – 2017. All of these papers are closely related to the topic of the habilitation thesis.

doc. Ing. **Libor Pekař**, Ph.D.

Appointed with effect from: 1st June 2018

The Use of Algebraic and Spectral Approaches for Time-Delay Systems Analysis and Synthesis

Abstract

This document represents a habilitation thesis summary of the habilitation thesis in the form of published or accepted-to-press papers followed by a commentary that outlines the main author's scientific and research areas and achieved results. The work is structured into the following three fields: Control design of time-delay systems in the algebraic and robust sense, zero-pole spectral shaping of the feedback control structures by means of a suitable tuning of controller parameters, and design of a simple yet sufficiently accurate algorithm to determine delay-dependent stability (DDS). The main contribution of this thesis can be seen in the intention to design relatively simple, acceptable by practitioners and effortlessly implementable procedures and algorithms for the analysis and synthesis of time-delay systems (TDS) mainly by using algebraic, numerical, robustness and spectral approaches; avoiding the use of excessive math. In the first area, the results extend general principles of the fractional representation of system models in order to design stabilizing and proper (feasible) controllers and extend them to TDS, including neutral ones, which yields the definition of a special ring of meromorphic functions. The procedure is verified by its application to control of a laboratory heating process. Regarding the second research area, an original algorithm for the dominant zero-pole placement that uses some optimization principles is proposed. Finally, the main author's contribution in the field of DDS can be seen in the design of an original numerical algorithm that has two forms: the continuous-time and the discretized one. These algorithms are validated via the mathematical model of a skater on the controlled swaying bow.

3 QUALIFYING LECTURES FOR PROFESSORSHIP

3.1 Faculty of Technology

Course: Technology of Macromolecular Compounds

prof. Ing. **Petr Slobodian,** Ph.D.

Qualifying Lecture for Professorship in front of the Scientific Board of TBU in Zlín: 10th October 2017
Appointed with effect from: 14th June 2018

Polymer nanocomposites for sensing technology and novel methods for improving detection

Abstract

Carbon nano-allotropes (carbon nanotubes, nanofibers, nanowalls) are exceptional constituents of nano-composites, with respect to their remarkable properties, holding great potential in a new nano-composites design and nanotechnologies. When combined with polymers, these properties can be stimulated to fulfil the demand in domains as diverse as highly deformable strain and gas sensing, as thermoelectric materials or passive antennas, programmable membranes and materials with self-molding properties initiated by the resistive heating, an generally as a multifunctional polymer composites. All the above mentioned multi-functionality of carbon allotropes or their electrically conductive polymeric nano-composites depends on the physical parameters as the structural morphology and topology. The multi-functionality depends also on the chemical parameters linked with the adsorption of molecules on the carbon surface and the carbon/polymer interaction. Generally, the chemical and physical-chemical conditions will affect the composite functionalities already in the course of treatment, processing, fabrication and final forming. The composite properties may be further stimulated in feedbacks with analyses of the proper use for the detection of chemical surrounding, thermal or mechanical loading, thermoelectric features and interference with electro-magnetic or electrical fields.

4 IMPORTANT SCIENTIFIC AND SPECIALIZED ASSIGNMENTS

4.1 Projectst financed by the Czech Science Foundation (GACR)

In 2018, 13 projects financed by the Czech Science Foundation were implemented at the TBU in Zlín. Total eligible costs amounted CZK 15,115 thousand for TBU in Zlín in 2018.

4.1.1 Faculty of Technology

Standard projects

GA16-05886S Investigation the effect of polymer melt shear and elongational rheology on production stability of meltblown nanofibers and films
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: prof. Ing. Martin Zatloukal, Ph.D. DSc.
Implementation period: 2016 - 2018

Total project cost (CZK thous.):	4 358
Total project cost – TBU (CZK thous.):	4 358
Project cost of TBU in 2018 (CZK thous.):	1 721

GA17-09594S Reduction of biogenic amines content in model systems
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: prof. RNDr. Vlastimil Kubáň DrSc.
Implementation period: 2017 - 2019

Total project cost (CZK thous.):	7 103
Total project cost – TBU (CZK thous.):	5 230
Project cost of TBU in 2018 (CZK thous.):	1 858

4.1.2 Faculty of Management and Economics

Standard projects

GA16-25536S Methodology of Developing a Predictive Model of Sector and Company Performance in the Macroeconomic Context
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: prof. Dr.Ing. Drahomíra Pavelková
Implementation period: 2016 – 2018

Total project cost (CZK thous.):	2 940
Total project cost – TBU (CZK thous.):	2 940
Project cost of TBU in 2017 (CZK thous.):	960

GA17-13518S Determinants of budgeting and performance measurement systems design and impact of these systems on organizational behavior and organizational perform
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: doc. Ing. Boris Popesko, Ph.D.
Implementation period: 2017 – 2019

Total project cost (CZK thous.):	3 354

Total project cost – TBU (CZK thous.): 1 716
Project cost of TBU in 2018 (CZK thous.): 572

4.1.3 Faculty of Humanities

Standard projects

GA16-11983S German Literature and Culture in Moravian Wallachia: the European Dimension of the Regional Cultural Discourse
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: Mgr. Libor Marek, Ph.D.
Implementation period: 2016 - 2018
Total project cost (CZK thous.): 1 218
Total project cost – TBU (CZK thous.): 1 218
Project cost of TBU in 2018 (CZK thous.): 480

GA17-04816S The Dynamics of Self-Regulation in Socially Excluded Pupils
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: Mgr. Karla Hrbáčková, Ph.D.
Implementation period: 2017 - 2019
Total project cost (CZK thous.): 1 872
Total project cost – TBU (CZK thous.): 1 872
Project cost of TBU in 2018 (CZK thous.): 632

4.1.4 University Institute

Junior grants

GJ16-20361Y Smart systems based on modified graphene oxide particles
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: Ing. Miroslav Mrlík, Ph.D.
Implementation period: 2016 - 2018
Total project cost (CZK thous.): 5 590
Total project cost – TBU (CZK thous.): 5 590
Project cost of TBU in 2018 (CZK thous.): 1 735

GJ17-16928Y Modification of degradation behaviour of biodegradable polyester - polylactide through addition of specifically functionalized additives
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: Ing. Pavel Kucharczyk, Ph.D.
Implementation period: 2017 - 2018
Total project cost (CZK thous.): 3 165
Total project cost – TBU (CZK thous.): 3 165
Project cost of TBU in 2018 (CZK thous.): 1 617

Standard projects

GA17-24730S Novel Magnetorheological Elastomers Based on Modified Magnetic Fillers
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: doc. Ing. Michal Sedlačík, Ph.D.
Implementation period: 2017 - 2019
Total project cost (CZK thous.): 3 873
Total project cost – TBU (CZK thous.): 3 873
Project cost of TBU in 2018 (CZK thous.): 1 518

GA17-05095S Biomimetic materials based on conducting polymers
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: doc. Ing. Petr Humpolíček, Ph.D.
Implementation period: 2017 - 2019
Total project cost (CZK thous.): 7 611
Total project cost – TBU (CZK thous.): 3 879
Project cost of TBU in 2018 (CZK thous.): 1 293

Projects where TBU acts as a co-investigator

GA16-05961S Advanced Carriers for Platinum Drugs
Principal investigator: Masaryk University
Project investigator on behalf of TBU: Mgr. Jan Vícha Ph.D.
Implementation period: 2016 - 2018
Total project cost (CZK thous.): 9 763
Total project cost – TBU (CZK thous.): 1 983
Project cost of TBU in 2018 (CZK thous.): 661

GA17-05318S Conjugated polymers based materials as luminescence chemosensors
Principal investigator: Charles University in Prague
Project investigator on behalf of TBU: prof. Ing. Vladimír Sedlařík, Ph.D.
Implementation period: 2017 - 2019
Total project cost (CZK thous.): 6 285
Total project cost – TBU (CZK thous.): 3 060
Project cost of TBU in 2018 (CZK thous.): 1 020

GA17-10813S Novel plasma polymers with tunable stability and permeability
Principal investigator: Charles University in Prague
Project investigator on behalf of TBU: doc. Ing. Marián Lehocký, Ph.D.
Implementation period: 2017 - 2019
Total project cost (CZK thous.): 7 608
Total project cost – TBU (CZK thous.): 3 144
Project cost of TBU in 2018 (CZK thous.): 1 048

4.2 Projects financed by the Ministry of Industry and Trade of the Czech Republic

In 2018, 17 projects financed by the Ministry of Industry and Trade of the Czech Republic were implemented at the TBU in Zlín. Total eligible costs amounted CZK 14,286 thousand for TBU in Zlín in 2018.

4.2.1 Faculty of Technology

Projects where TBU acts as a co-investigator

The Operational Programme Enterprise and Innovations for Competitiveness (OP PIK)

EG16_084/0010268 Development of transtibial prosthesis made by 3D printing
Principal investigator: ING corporation, spol. s r. o.
Project investigator on behalf of TBU: doc. Ing. David Paloušek, Ph.D.
Implementation period: 2017 - 2019

Total project cost (CZK thous.):	3 435
Total project cost – TBU (CZK thous.):	403
Project cost of TBU in 2018 (CZK thous.):	403

4.2.2 Faculty of Applied Informatics

The Operational Programme Enterprise and Innovations for Competitiveness (OP PIK)

CZ.01.1.02/0.0/0.0/15_013/0005019 Knowledge transfer in mobile applications development
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: Ing. Tomáš Dulík, Ph.D.
Implementation period: 2016 - 2018

Total project cost (CZK thous.):	1 958
Total project cost – TBU (CZK thous.):	1 958
Project cost of TBU in 2018 (CZK thous.):	738

CZ.01.1.02/0.0/0.0/15_013/0004918 Knowledge transfer for application of computer vision methods in Dudr Tools company
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: Ing. Tomáš Dulík, Ph.D.
Implementation period: 2016 - 2018

Total project cost (CZK thous.):	1 958
Total project cost – TBU (CZK thous.):	1 958
Project cost of TBU in 2018 (CZK thous.):	737

Projects where TBU acts as a co-investigator

EG15_019/0004635 E-Line Fuel Dispenser
Principal investigator: Adast Systems, a. s.

Project investigator on behalf of TBU: Ing. Tomáš Dulík, Ph.D.
Implementation period: 2016 - 2018
Total project cost (CZK thous.): 20 497
Total project cost – TBU (CZK thous.): 2 070
Project cost of TBU in 2018 (CZK thous.): 467

EG15_019/0004580 INFOS Platform
Principal investigator: Cominfo
Project investigator on behalf of TBU: doc. Mgr. Milan Adámek, Ph.D.
Implementation period: 2017 – 2019
Total project cost (CZK thous.): 34 727
Total project cost – TBU (CZK thous.): 5 251
Project cost of TBU in 2018 (CZK thous.): 3 236

EG15_019/0004581 ENTER Modular System
Principal investigator: Cominfo
Project investigator on behalf of TBU: doc. Mgr. Milan Adámek, Ph.D.
Implementation period: 2017 – 2019
Total project cost (CZK thous.): 25 958
Total project cost – TBU (CZK thous.): 3 501
Project cost of TBU in 2018 (CZK thous.): 2 158

EG16_084/0008839 Application of Research Results Focused on the Introduction of New Technologies and Procedures into the Production of Large Workpieces
Principal investigator: Slovácké strojírny, a. s.
Project investigator on behalf of TBU: prof. Ing. Vladidír Vašek, CSc.
Implementation period: 2017 – 2019
Total project cost (CZK thous.): 35 700
Total project cost – TBU (CZK thous.): 9 600
Project cost of TBU in 2018 (CZK thous.): 458

EG16_084/0010327 Security System for Navigation and Communication of Airport Vehicles
Principal investigator: Masaryk University, TECHNISERV, spol. s r.o.
Project investigator on behalf of TBU: doc. RNDr. Vojtěch Křesálek, CSc.
Implementation period: 2017 – 2020
Total project cost (CZK thous.): 35 515
Total project cost – TBU (CZK thous.): 3 697
Project cost of TBU in 2018 (CZK thous.): 0

EG16_084/0009949 Research and development of advanced LED luminaires for industrial use
Principal investigator: TREVOS, a. s.
Project investigator on behalf of TBU: doc. Ing. Miroslav Maňas, CSc.
Implementation period: 2017 – 2020
Total project cost (CZK thous.): 18 582
Total project cost – TBU (CZK thous.): 3 072
Project cost of TBU in 2018 (CZK thous.): 0

EG17_107/0012477 Expert system for custom manufacturing enterprises with Industry 4.0 support
Principal investigator: CATHEDRAL Software, s.r.o.
Project investigator on behalf of TBU: Ing. Tomáš Dulík, Ph.D.
Implementation period: 2016 – 2020

Total project cost (CZK thous.):	7 480
Total project cost – TBU (CZK thous.):	3 735
Project cost of TBU in 2018 (CZK thous.):	0

TRIO Programme

FV20419 Intelligent System For Advanced Sorting of Forest Plants
Principal investigator: DENESA s. r. o.
Project investigator on behalf of TBU: prof. Ing. Vladimír Vašek, CSc.
Implementation period: 2017 – 2020

Total project cost (CZK thous.):	18 078
Total project cost – TBU (CZK thous.):	7 744
Project cost of TBU in 2018 (CZK thous.):	2 794

4.2.3 Faculty of Logistic and Crisis Management

TRIO Programme

Projects where TBU acts as a co-investigator

FV30337 Bioactive glass matrices for effective water hygienization
Principal investigator: NEDFORM s.r.o.
Project investigator on behalf of TBU: doc. Ing. Pavel Valášek, CSc.
Implementation period: 2018 – 2020

Total project cost (CZK thous.):	10 908
Total project cost – TBU (CZK thous.):	5 313
Project cost of TBU in 2018 (CZK thous.):	50

4.2.4 University Institute

The Operational Programme Enterprise and Innovations for Competitiveness (OP PIK)

Projects where TBU acts as a co-investigator

EG15_019/0004549 Imflamable systems according to EN 45545 for composite fabrication
Principal investigator: 5M s. r. o.
Project investigator on behalf of TBU: doc. Ing. Michal Sedlačík, Ph.D.
Implementation period: 2015 - 2019

Total project cost (CZK thous.):	14 116
Total project cost – TBU (CZK thous.):	1 306
Project cost of TBU in 2018 (CZK thous.):	323

EG15_019/0005090 Stenopeic opening for correction of presbyopia
Principal investigator: GEMINI oční klinika, a. s.
Project investigator on behalf of TBU: doc. Ing. et Ing. Ivo Kuřitka Ph.D. et Ph.D.
Implementation period: 2015 - 2019

Total project cost (CZK thous.):	3 600
Total project cost – TBU (CZK thous.):	1 801
Project cost of TBU in 2018 (CZK thous.):	676

TRIO Programme

Projects where TBU acts as a co-investigator

FV10756 Development of polymer carriers in sub-micro and nano-forms
Principal investigator: MVDr. Jiří Pantůček
Project investigator on behalf of TBU: prof. Ing. Vladimír Sedlařík, Ph.D.
Implementation period: 2016 - 2020

Total project cost (CZK thous.):	3 818
Total project cost – TBU (CZK thous.):	1 909
Project cost of TBU in 2018 (CZK thous.):	500

FV20088 Development of novel formulations for modification of asphalt mixtures using recycled polyvinylbutyral
Principal investigator: SKLOPAN LIBEREC, a. s.
Project investigator on behalf of TBU: doc. Ing. Tomáš Sedláček, Ph.D.
Implementation period: 2017 - 2020

Total project cost (CZK thous.):	2 929
Total project cost – TBU (CZK thous.):	1 952
Project cost of TBU in 2018 (CZK thous.):	946

FV30048 New additives for multifunctional modification of polymer surfaces
Principal investigator: Synthesia, a.s.
Project investigator on behalf of TBU: prof. Ing. Vladimír Sedlařík, Ph.D.
Implementation period: 2018 - 2021

Total project cost (CZK thous.):	20 000
Total project cost – TBU (CZK thous.):	3 200
Project cost of TBU in 2018 (CZK thous.):	800

4.3 Projects financed by the Ministry of Education, Youth and Sports of the Czech Republic

In 2018, 14 projects financed by the Ministry of Education, Youth and Sports of the Czech Republic were implemented at the TBU in Zlín. Total eligible costs amounted CZK 91,581 thousand for TBU in Zlín in 2018.

4.3.1 Faculty of Technology

INTER-EXCELLENCE Programme (2016 – 2024)

LTACH17015 Fabrication and electrochemical properties of hierarchical polyaniline /bimetallic oxides electrodes
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: doc. Ing. Natalia Kazantseva, CSc.
Implementation period: 2017 - 2019
Total project cost (CZK thous.): 5 970
Total project cost – TBU (CZK thous.): 5 970
Project cost of TBU in 2018 (CZK thous.): 1 990

4.3.2 Faculty of Management and Economics

Horizon 2020 Programe

Projects where TBU acts as a co-investigator

731264 SHAPE-ENERGY: Social Sciences and Humanities for Advancing Policy in European Energy
Principal investigator: Anglia Ruskin University (United Kingdom)
Project investigator on behalf of TBU: Ing. Přemysl Pálka, Ph.D.
Implementation period: 2017 - 2019
Total project cost (CZK thous.): 53 947
Total project cost – TBU (CZK thous.): 1 500
Project cost of TBU in 2018 (CZK thous.): 1 039

4.3.3 Faculty of Multimedia Communications

Educational Policy Fund

Support of Creative Activities of FMC of TBU in Zlín
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: doc. Mgr. Irena Armutidisová
Implementation period: 2018
Total project cost (CZK thous.): 1 700
Total project cost – TBU (CZK thous.): 1 700
Project cost of TBU in 2018 (CZK thous.): 1 700

Subsidy program to commemorate state anniversaries in 2018

A reminder of the past through the eyes of the future: A look at Jubilee Year 2018 through the eyes of young creators
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: doc. Mgr. Irena Armutidisová
Implementation period: 2018

Total project cost (CZK thous.): 500
Total project cost – TBU (CZK thous.): 500
Project cost of TBU in 2018 (CZK thous.): 500

4.3.4 Faculty of Applied Informatics

National Programme for Sustainability

LO1303 Promoting sustainability and development of the Centre for Security, Information and Advanced Technologies (CEBIA-Tech)
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: prof. Ing. Vladimír Vašek, CSc.
Implementation period: 2014 – 2019
Total project cost (CZK thous.): 98 710
Total project cost – TBU (CZK thous.): 98 710
Project cost of TBU in 2018 (CZK thous.): 17 888

4.3.5 Faculty of Humanities

Educational Policy Fund

Preventing Shock in Future Nursery and Primary School Teachers When Confronting Reality in the Period of the Commencement of Their Career
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: doc. PaeDr. Adriana Wiegerová, PhD.
Implementation period: 2017 – 2020
Total project cost (CZK thous.): 8 253
Total project cost – TBU (CZK thous.): 8 253
Project cost of TBU in 2018 (CZK thous.): 2 584

4.3.6 Faculty of Logistics and Crisis Management

COST Programme

Geographical aspects of Citizen Science: mapping trends, scientific potential and societal impacts in the Czech Republic
Principal investigator: AV ČR
Project investigator on behalf of TBU: RNDr. Jakub Trojan MSc Ph.D.
Implementation period: 2018 – 2020
Total project cost (CZK thous.): 2 805
Total project cost – TBU (CZK thous.): 1 228
Project cost of TBU in 2018 (CZK thous.): 360

4.3.7 University Institute

National Programme for Sustainability

LO1504 Centre of Polymer Systems Plus
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: prof. Ing. Vladimír Sedlařík, Ph.D.
Implementation period: 2015 - 2020
Total project cost (CZK thous.): 325 648
Total project cost – TBU (CZK thous.): 325 648
Project cost of TBU in 2018 (CZK thous.): 65 400

Danube region cooperation Programme (2017 – 2018)

8X17021 Antibacterial polymeric nanocomposites on the base of carbon nanomaterials
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: doc. Ing. Marián Lehocký, Ph.D.
Implementation period: 2017 - 2018
Total project cost (CZK thous.): 225
Total project cost – TBU (CZK thous.): 225
Project cost of TBU in 2018 (CZK thous.): 120

4.4 Projects financed by the Ministry of the Interior of the Czech Republic

In 2018, 3 project financed by the Ministry of the Interior of the Czech Republic was implemented at the TBU in Zlín. Total eligible costs amounted CZK 5,011 thousand for TBU in Zlín in 2018.

4.4.1 Faculty of Applied Informatics

Projects where TBU acts as a co-investigator

Security Research Programme in the Czech Republic

VI20152019049 RESILIENCE 2015: Dynamic Resilience Evaluation of Interrelated Critical Infrastructure Subsystems
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: Ing. Martin Hromada, Ph.D.
Implementation period: 2015 - 2019
Total project cost (CZK thous.): 33 881
Total project cost – TBU (CZK thous.): 8 763
Project cost of TBU in 2018 (CZK thous.): 2 141

VI20172019073 Identification and methods of protection of Czech soft targets against violent acts with elaboration of a warning system
Principal investigator: Soft Targets Protection Institute, z.ú.

Project investigator on behalf of TBU: Ing. Martin Hromada, Ph.D.
Implementation period: 2017 - 2019
Total project cost (CZK thous.): 9 664
Total project cost – TBU (CZK thous.): 3 103
Project cost of TBU in 2018 (CZK thous.): 1 001

VI20172019054 An analytical software module for the real-time resilience evaluation from point of the converged security
Principal investigator: TTC MARCONI s. r. o.
Project investigator on behalf of TBU: Ing. Jan Valouch, Ph.D.
Implementation period: 2017 - 2019
Total project cost (CZK thous.): 19 431
Total project cost – TBU (CZK thous.): 5 648
Project cost of TBU in 2018 (CZK thous.): 1 869

4.5 Projects financed by the Ministry of Agriculture of the Czech Republic

In 2018, 1 project financed by the Ministry of Agriculture of the Czech Republic was implemented at the TBU in Zlín. Total eligible costs amounted CZK 700 thousand for TBU in Zlín in 2018.

4.5.1 Faculty of Technology

Projects where TBU acts as a co-investigator

ZEMĚ Programme

QK1710156 New approaches and methods of analysis to ensure the quality, safety and health perfection of cheeses, the optimization of their manufacturing and the perfection of hygiene and sanitation together with the lowering of environmental load by waste water
Principal investigator: Výzkumný ústav mlékárenský s. r.o.
Project investigator on behalf of TBU: doc. Ing. František Buňka, Ph.D.
Implementation period: 2017 - 2021
Total project cost (CZK thous.): 18 838
Total project cost – TBU (CZK thous.): 3 252
Project cost of TBU in 2018 (CZK thous.): 700

4.6 Projects financed by the Technology Agency of the Czech Republic

In 2018, 12 projects financed by the Technology Agency of the Czech Republic were implemented at the TBU in Zlín. Total eligible costs amounted CZK 21,260 thousand for TBU in Zlín in 2018.

4.6.1 Faculty of Technology

THÉTA Programme

Projects where TBU acts as a co-investigator

TK01030054 Controlled biological methane production in situ
Principal investigator: EPS biotechnology, s. r. o.
Project investigator on behalf of TBU: doc. Mgr. Marek Koutný, Ph.D.
Implementation period: 2018 - 2022

Total project cost (CZK thous.):	15 464
Total project cost – TBU (CZK thous.):	3 490
Project cost of TBU in 2018 (CZK thous.):	479

4.6.2 Faculty of Management and Economics

ZÉTA Programme

TJ01000114 Application of smart governance approaches to organizational structures of municipalities in the Czech Republic
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: Ing. Filip Kučera
Implementation period: 2017 - 2019

Total project cost (CZK thous.):	1 523
Total project cost – TBU (CZK thous.):	1 523
Project cost of TBU in 2018 (CZK thous.):	772

Projects where TBU acts as a co-investigator

ÉTA Programme

TJ01000191 Innovation of tourism management systems by means of process management tools
Principal investigator: ZČU Plzeň
Project investigator on behalf of TBU: doc. Ing. Zuzana Tučková, Ph.D.
Implementation period: 2018 - 2022

Total project cost (CZK thous.):	11 974
Total project cost – TBU (CZK thous.):	1 387
Project cost of TBU in 2018 (CZK thous.):	248

4.6.3 Faculty of Applied Informatics

EPSILON Programme

Projects where TBU acts as a co-investigator

TH02020979 Distributed control system for regional heat and cooling supply conceived as Smart Energy Grid

Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: prof. Ing. Vladimír Vašek, CSc.
Implementation period: 2017 - 2020
Total project cost (CZK thous.): 9 383
Total project cost – TBU (CZK thous.): 4 701
Project cost of TBU in 2018 (CZK thous.): 1 405

4.6.4 University Institute

Programme Competence Centre

TE01020216 Centre of advanced polymer and composite materials
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: doc. Ing. Tomáš Sedláček, Ph. D.
Implementation period: 2012 - 2019
Total project cost (CZK thous.): 206 807
Total project cost – TBU (CZK thous.): 68 321
Project cost of TBU in 2018 (CZK thous.): 8 503

Projects where TBU acts as a co-investigator

TE02000006 Centre for alternative environment friendly high effective polymer antimicrobial agents for industrial applications
Principal investigator: SYNPO, akciová společnost
Project investigator on behalf of TBU: prof. Ing. Vladimír Sedlařík, Ph.D.
Implementation period: 2014 - 2019
Total project cost (CZK thous.): 126 338
Total project cost – TBU (CZK thous.): 31 824
Project cost of TBU in 2018 (CZK thous.): 1 920

EPSILON Programme

TH02020836 Development of novel plastic based environmentally friendly food packaging materials with added value
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: prof. Ing. Vladimír Sedlařík, Ph.D.
Implementation period: 2017-2020
Total project cost (CZK thous.): 3 984
Total project cost – TBU (CZK thous.): 1584
Project cost of TBU in 2018 (CZK thous.): 396

TH02020836 Conductive materials and their application for antistatic and dissipative treatment of the paper and polymeric products
Principal investigator: TBU in Zlín
Project investigator on behalf of TBU: prof. Ing. Vladimír Sedlařík, Ph.D.
Implementation period: 2018-2021
Total project cost (CZK thous.): 19 910
Total project cost – TBU (CZK thous.): 2 800
Project cost of TBU in 2018 (CZK thous.): 700

GAMA Programme

TG03010052 Commercialization at the Tomas Bata University in Zlin
Project investigator on behalf of TBU: Ing. Miroslava Komínková, Ph.D.
Implementation period: 2016-2019

Total project cost (CZK thous.):	10 563
Total project cost – TBU (CZK thous.):	10 563
Project cost of TBU in 2018 (CZK thous.):	3 872

ZÉTA Programme

TJ01000142 Individual Healthy Footwear
Project investigator on behalf of TBU: Ing. Petra Barešová, Ph.D.
Implementation period: 2018-2019

Total project cost (CZK thous.):	2 665
Total project cost – TBU (CZK thous.):	2 665
Project cost of TBU in 2018 (CZK thous.):	1 003

TJ01000329 Sensory-active polymer blends containing products of advanced extraction techniques of selected plants
Project investigator on behalf of TBU: Ing. Martina Hrabalíková, Ph.D.
Implementation period: 2018-2019

Total project cost (CZK thous.):	1 967
Total project cost – TBU (CZK thous.):	1 967
Project cost of TBU in 2018 (CZK thous.):	977

TJ01000330 Novel plastics stabilizers based on natural bioactive compounds
Project investigator on behalf of TBU: Ing. Anna Hurajová, Ph.D.
Implementation period: 2018-2019

Total project cost (CZK thous.):	1 975
Total project cost – TBU (CZK thous.):	1 975
Project cost of TBU in 2018 (CZK thous.):	985

4.7 Projects financed by the Ministry of Culture

In 2018, 1 project financed by the Ministry of Culture was implemented at the TBU in Zlín. Total eligible costs amounted CZK 903 thousand for TBU in Zlín in 2018.

4.7.1 Faculty of Multimedia Communications

NAKI II Programme

Projects where TBU acts as a co-investigator

DG18P02OVV059 Designers in the Czech Lands and the Czechoslovak Machinery Industry

Principal investigator: National Technical Museum
Project investigator on behalf of TBU: doc. PhDr. Zdeno Kolesár Ph.D.
Implementation period: 2018 - 2022

Total project cost (CZK thous.):	23 555
Total project cost – TBU (CZK thous.):	11 100
Project cost of TBU in 2018 (CZK thous.):	903

4.8 PROJECTS – SUMMARY

Number of projects implemented in 2018

Component part / Provider	European Commission	Czech Science Foundation	Ministry of Culture	Ministry of Industry and trade of the Czech Republic		Ministry of Education, Youth and Sports of the Czech Republic	Ministry of the Interior of the Czech Republic	Ministry of Agriculture of the Czech Republic	Technology Agency of the Czech Republic	Total
				MIT total	Operational Programme projects					
Faculty of Technology	0	2	0	1	1	1	0	1	1	6
Faculty of Management and Economics	1	2	0	0	0	0	0	0	2	5
Faculty of Multimedia Communications	0	0	1	0	0	2	0	0	0	3
Faculty of Applied Informatics	0	0	0	10	9	1	3	0	1	15
Faculty of Humanities	0	2	0	0	0	1	0	0	0	3
Faculty of Logistics and Crisis Management	0	0	0	1	0	1	0	0	0	2
TBU Library	0	0	0	0	0	0	0	0	0	0
University Institute	0	7	0	5	2	2	0	0	8	22
Rectorate	0	0	0	0	0	0	0	0	0	0
TBU total	1	13	1	17	12	8	3	1	12	56

Total costs acknowledged for TBU in Zlín in 2018 (in CZK thousands)

Component part / Provider	European Commission	Czech Science Foundation	Ministry of Culture	Ministry of Industry and trade of the Czech Republic		Ministry of Education, Youth and Sports of the Czech Republic	Ministry of the Interior of the Czech Republic	Ministry of Agriculture of the Czech Republic	Technology Agency of the Czech Republic	Total
				MIT total	Operational Programme projects					
Faculty of Technology	0	3 579	0	403	403	1 990	0	700	479	7 151
Faculty of Management and Economics	1 039	1 532	0	0	0	0	0	0	1 020	3 591
Faculty of Multimedia Communications	0	0	903	0	0	2 200	0	0	0	3 103
Faculty of Applied Informatics	0	0	0	10 588	7 794	17 888	5 011	0	1 405	34 892
Faculty of Humanities	0	1 112	0	0	0	2 584	0	0	0	3 696
Faculty of Logistics and Crisis Management	0	0	0	50	0	360	0	0	0	410
TBU Library	0	0	0	0	0	0	0	0	0	0
University Institute	0	8 892	0	3 245	999	65 520	0	0	18356	96 013
Rectorate	0	0	0	0	0	0	0	0	0	0
TBU total	1 039	15 115	903	14 286	9 196	90 542	5 011	700	21 260	148 856

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