



Závěrečné zhodnocení studentských vědeckých projektů přijatých k řešení v rámci projektu OP VVV CZ.02.2.69/0.0/0.0/19_073/0016928 a jeho Interní grantové soutěže VŠCHT Praha – IGRA@UCTP

Složení Hodnotícího panelu:

prof. Dr. Ing. Dalibor Vojtěch
doc. Ing. Aleš Rajchl, Ph.D.
doc. Ing. Pavel Řezanka, Ph.D.
doc. Dr. Ing. Pavlína Basařová
doc. Ing. Helena Čížková, Ph.D.
prof. Ing. Aleš Helebrant, CSc.
doc. Ing. Miloslav Lhotka, Ph.D.
doc. RNDr. Jana Říhová Ambrožová, Ph.D.
doc. Ing. Tomáš Hlinčík, Ph.D.

Členové Hodnotícího panelu (HP) v souladu s podmínkami projektu IGRA@UCTP zhodnotili závěrečné zprávy studentských vědeckých projektů přijatých k řešení v rámci projektu OP VVV CZ.02.2.69/0.0/0.0/19_073/0016928 a jeho Interní grantové soutěže VŠCHT Praha – IGRA@UCTP podle parametrů pro závěrečné zprávy, včetně zhodnocení stanovených výstupů projektů, splnění vzdělávací aktivity a absolvování zahraniční stáže dle pravidel výzvy OP VVV a zadávací dokumentace Interní grantové soutěže VŠCHT Praha – IGRA@UCTP (vnitřní dokumenty).

Zápis z členů Hodnotícího panelu, které obsahovaly vyjádření k hodnocení ukončených studentských vědeckých projektů, byly elektronicky předány pracovníkům orgánů zajišťujících studentskou grantovou soutěž.

Z finální kontroly studentských vědeckých projektů vyplývá, že všichni řešitelé řádně odevzdali závěrečné zprávy a závěrečné zprávy splňovaly všechny formální požadavky. Drobné formální chyby závěrečných zpráv byly po konzultaci s řešiteli odstraněny.

Výzkum byl dle závěrečných zpráv prováděn ve shodě s podanými projektovými návrhy a cíle projektů byly splněny. Všichni řešitelé ve svých zprávách náležitě okomentovali dosažené výsledky. V případě drobných nedostatků byly závěrečné zprávy vráceny příslušným řešitelům k doplnění.

Čerpání plánovaných finančních prostředků proběhlo u všech řešených projektů bez větších závad, přidělené finanční prostředky byly využity účelně a hospodárně. V případě dvou projektů došlo ke krácení rozpočtu o nezpůsobilé jednotkové náklady z důvodu nesplnění formálních podmínek způsobilosti jednotkových nákladů dle pravidel výzvy OP VVV (nesplnění vzdělávací resp. zahraniční aktivity u předčasně končících řešitelů).

Většina podpořených projektů splnila deklarované vědecké výstupy formou článků, nejčastěji formou prezentací či posterů na konferencích nebo abstraktů ve sbornících. Některé další publikační výsledky vytvořené v rámci projektů budou publikovány v průběhu roku 2023.

Příloha: Souhrnné Zhodnocení studentských vědeckých projektů je přílohou 1 tohoto zápisu.



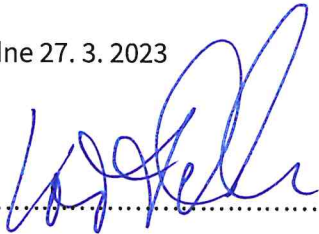
EVROPSKÁ UNIE
Evropské strukturální a investiční fondy
Operační program Výzkum, vývoj a vzdělávání



Zapsala:

Ing. Kateřina Kovaříčková,
konzultant a metodik projektu IGRA@UCTP
V Praze dne 27. 3. 2023

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Podpis:.....

prof. Dr. Ing. Dalibor Vojtěch
předseda Hondotícího panelu IGRA@UCTP
prorektor pro vědu a výzkum



Příloha 1: Souhrnné Zhodnocení studentských vědeckých projektů

Číslo	Příslušnost	Řešitel	Název	Schválený rozpočet	Projekt krácen	Zálusodnění krácení	Změna v řešitelích	Mobilita splněna	Vzdělávací aktivita splněna	Komentář HP ke splnění cílů projektu
IGRA-2021-001	FCHI	Ing. Kateřina Králová (roz. Hruběšová)	Multi-Omics Approach in Medical Research	1 597 200	ne		ne	ano	ano	This project aimed to combine information from numerous analytical methods to create a panel of specific blood plasma-based biomarkers with the ability to differentiate hepatocellular carcinoma from controls with high accuracy. The project focused on the optimization of blood plasma sample processing, optimization of measurement conditions, analysis of sample series, data statistical evaluation, and determination of HCC biomarker panel. The comprehensive methodology for the analysis of blood plasma was developed. A manuscript is under preparation. The goals of the project were met. The number of hours of compulsory education has been fulfilled. Mandatory foreign mobility has been fulfilled (1x summer school, 2x conference).
IGRA-2021-005	FPBT	Ing. Jiří Bejček	Design and evaluation of RNA-dependent RNA polymerase inhibitors of Severe acute respiratory syndrome coronavirus-2	1 916 640	ano	Nesplnění vzdělávacích aktivit končící řešitelky	ano	ano	ne	The project was focused on screening of potential inhibitors using in silico method and subsequent evaluation of selected RNA-dependent RNA polymerase inhibitors of SARS-CoV-2 using different approaches. It was a very up-dated, complex and ambitious project solved thanks to the cooperation of five doctoral students. The results of planned experiments, mentioned in the original project proposal were summarized and it is clear from the report, that all research activities were implemented and the planned objectives were met. The results were presented at two conferences. Lead Researcher, Jiří Bejček, completed a 1-month internship at the University of Geneva and thus fulfilled his mandatory foreign activities.
IGRA-2021-009	FTOP	Ing. Lucia Tajnaiová	Evaluation of the hazards of plastic personal protective equipment: An assessment of the environmental impact and a quantification of human exposure to microplastics	1 597 200	ne		ne	ano	ano	Project was divided into two main parts, the first one dealt with the degradability test (i.e. to evaluate the decomposition tests of several types of surgical masks and respirators in different conditions) and the second one dealt with the microbiological tests (i.e. fluorescence microscopy) and ecotoxicity tests with freshwater animals. Another part of research there was a design and construction of breathing simulator to determinate the amounts of microfibers sheds from masks and respirators. Also, in this research was performed a life cycle assessment of masks and respirators (publication in an English impacted journal is currently undergoing English grammar correction). The research in whole the range of study is valuable, these are very interesting new data and we recommend publishing them in impacted journals and at events of popularization of science. The goals of the project were met. The number of education hours and required foreign mobility have been fulfilled.



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IGRA-2021-013	FTOP	Ing. Mgr. Ekaterina Korotenko	Comprehensive assessment of treatment methods for MSWI fly ash	1 597 200	ne		ne	ano	ano	The main objective of the project was to evaluate viable pathways for fly ash treatment in the Czech Republic. The project was divided into 4 WPs, i.e. technological assessment including technological data collection and analysis, ecotoxicological assessment, LCA data collection and analysis and fly ash viable pathways. The research in whole the range of study is valuable, these are very interesting new data and we recommend publishing them in impacted journals and at events of popularization of science. The goals of the project were met. The number of education hours and required foreign mobility have been fulfilled.
IGRA-2021-016	FCHT	Ing. Soňa Hříbalová	Potassium-sodium niobate (KNN) lead-free piezoceramics – preparation, characterization and microstructure-property relations	1 597 200	ne		ne	ano	ano	The researchers of this project prepared and characterised the potassium-sodium niobate piezoceramics. Additionally, in order to solve the problems with the commercially produced KNN powder, they developed the own powder synthesis. The theoretical models for the description of relations between microstructure of prepared piezoceramics and functional properties were used and verified. The KNN processing was optimised in order to obtain the materials with the most suitable properties for potential applications. The results of the project were published in one paper up to now. Two other papers are ready for submission and preparation of other three papers is in the progress. Results were disseminated also by three oral and one poster presentation at international conferences. As concerning the educational activities, they were fulfilled both by research team and by mentors. The planned abroad activities were fulfilled partially by attending three international conferences and by research stays at CNR-ISTEC Faenza (Italy). It can be stated that the project was solved successfully



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IGRA-2021-018	FCHT	Ing. Marek Čubiňák	Alloxazine photon catching antenna for molecular switches in organic electronics	2 395 800	ne		ne	ano		The research team has developed and described a synthetic pathway leading to the halogenated alloxazines and isoalloxazines. The numerous attempts were made for preparation of a molecular switch for organic electronics. The experimental part of research was during all implementation period accompanied and supported by quantum chemistry calculations. Although there are not final results for molecular switch synthesis yet, it can be stated, that this research group brought the new valuable knowledge to the field of organic electronics. The partial results of the project were published in Journal of Organic Chemistry in cooperation with the Prof. Sikorski group from Adam Mickiewicz University Poznań. The project results were also disseminated at several international conferences. As concerning the educational activities, they were fulfilled both by research team and by mentors. The planned abroad activities were fulfilled partially by attending international conferences and by research stays at Georg-August Universität Göttingen (Germany), Adam Mickiewicz University Poznań (Poland), IRC Barcelona (Spain) and by attending the IMPRS Summer School. It can be stated that the project was solved successfully, although the desired molecular switch was not obtained yet. The results obtained during this project solution could be helping to the further research and development of this area.
IGRA-2021-019	FPBT	Ing. Jakub Papík	Microbial degradation of lignin in peatlands	1 597 200	ne		ne	ano	ano	The project involved three subsequent tasks to reach the main aim to characterize the microbial communities that are involved in lignin turnover in Soos National Nature Reserve peatlands. All planned research activities were carried out according to plan and the scientific objectives were met. Unfortunately, the final report of the project does not indicate whether the partial results were presented at international conferences (as stated in the original project proposal) and what is the status of the 2-3 publications planned for publication in high-impact scientific journals. All members of the project research team completed required educational training activities. Jakub Papík and Tereza Šmrhalová completed a 5-weeks internship at the University of Milan, Jakub Papík also participated in a PhD course in Copenhagen (40 hours) and thus both doctoral students with work capacity ≥ 0.3 fulfilled their mandatory foreign activities.



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IGRA-2021-020	FPBT	Ing. Nikola Vrzáčková	Exploring the proinflammatory effect of emerging chlorinated contaminants in adipocytes	1 277 760	ne		ne	ano	ano	The project was divided into two interlinked working packages. The first task was to develop a procedure for the loading of tissue cultures cells with chlorinated paraffins (CPs) and to subsequently study their biological effects. The second part was based on the development and validation of chromatographic method to support the first part of project and to follow the possible changes occurring during CPs interaction with biological matrix. The scientific goal of the project was met, and based on promising results was extended by further studies. Compared to the summary interim report, the final activity report is very clearly written. Publication outputs of the project cover six posters at international conferences and two scientific articles in preparation. All members of the project research team completed required educational training activities. Both doctoral students, Nikola Vrzáčková and Jakub Tomáško, attended and actively participated in international conferences and workshops (7 x), thus fulfilling their mandatory foreign activities.
IGRA-2021-025	FCHT	Ing. Aneta Kalvodová (roz. Vovesná)	Application of in silico modelling in the development of formulations for topical drug delivery	2 236 080	ne		ne	ano	ano	By comparative in silico and in vitro testing of thoroughly chosen APIs, the topical drug delivery was studied. The membrane computational modelling of the stratum corneum skin layer was constructed. The precision of this computational model was verified by several in vitro experiments using artificial lipid membrane and porcine skin. These results will enable to study the permeability of APIs through the skin in silico and can minimize the experimental in vitro procedures. The results of the project were published in one paper up to now. The second prepared paper is under review. As concerning the educational activities, they were fulfilled both by research team and by mentors. The planned abroad activities were fulfilled partially by attending international conferences and by research stay at Rutgers University (USA). It can be stated that the project was solved successfully.
IGRA-2021-026	FCHI	Ing. Jiří Suchan	Focusing on triplet states: Photoredox chemistry of pteridines	2 076 360	ne		ne	ano	ano	This project aims to develop new computational methods for the description of triplet-state chemistry and to describe both theoretically and experimentally the photoredox-chemistry of pteridines. All experiments were concluded in time. The steady-state spectra were simulated, and a suitable method for transient spectra calculations was chosen. A new computational protocol for simulating redox potentials was created. The first results were published in Q1 Journal. The goals of the project were met. The number of hours of compulsory education has been fulfilled. Mandatory foreign mobility has been fulfilled (3x internship, 3x conference).



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IGRA-2021-027	FCHT	MSc. Bing Wu M.Sc.	A Case Study of Introducing Photoelectronic Characteristics of MnO ₂ for Photo-enhanced Performance in Energy Storage Areas: Supercapacitors, Rechargeable Li-ion Batteries and Li-air Batteries	1 597 200	ne		ne	ano	ano	Although, as explained in interim report, the originally proposed material, MnO ₂ , was not suitable for the project objectives, the project was solved successfully using MoTe ₂ . In detail was studied potential use of MoTe ₂ for energy storage applications as anode material for potassium ion batteries. The process of potassium intercalation during charge-discharge was studied by operando X-ray diffraction method showing several reversible as well as irreversible reactions of MoTe ₂ with potassium under various potential. For these experiments were developed electrochemical cell for in-situ characterization of batteries during charge-discharge processes. The results of the project solution were published in two papers yet, there are other two papers under review. The selected results were also presented at several conferences. As concerning the educational activities, they were fulfilled both by research team and by mentors. The planned abroad activities were fulfilled by internships at TU Dresden Germany and at Slovak University of Technology in Bratislava. It can be stated that the project was solved successfully.
IGRA-2021-028	FCHI	Ing. Lucie Mašková	Nature-based 3D bioprinted films with controlled in-situ synthesis of bactericides	1 916 640	ne		ne	ano	ano	The project was focused on the production process of 3D bioprinted thin films with antibacterial properties based on the defence mechanism of Allium plants. The experimental part was divided into 4 basic parts: synthesis of sulfoxides, preparation of emulsions, 3D bioprinting, and release tests. The synthesis of sulfoxides was performed with one exception (benzylilin). The planned goals were fulfilled and a novel functional material with antibacterial properties was developed. The goals of the project were met. The number of hours of compulsory education has been fulfilled. Mandatory foreign mobility has been fulfilled (2x summer school, 3x conference).



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IGRA-2021-029	FCHT	Ing. Petr Marvan / Ing. Iryna Danylo	Microplastic challenges in environment: Complex process for their determination and evaluation of potential pollution using correlative spectro-microscopy approach	1 756 920	ano	Nesplnění vzdělávacích aktivit a zahraniční aktivity končící řešitelky	ano	ne	ne	The research team prepared and tested the new apparatus for sample filtration from PTFE. They also tested the utility tool for its capability of loading Raman and SEM/EDS data and for its ability to find particles with different elemental composition. They prepared and measured the plastic microparticles pollution both by Raman spectroscopy and SEM/EDS. The interesting and important result was that SEM/EDS was not able to distinguish the type of plastic for similar materials as PP and PE. The results were partially presented at one conference. The manuscript for journal publication should be prepared during the first quarter of 2023. Some delay was partially given by the two changes in the research team, inclusive the change of lead researcher. It is a pity that the report does not explain the reasons for these changes. As concerning the educational activities, they were fulfilled both by research team and by mentors. There is logical exception of the one researcher who terminated her activity in the team early. The planned abroad activities were fulfilled by internships at ETH Zurich Switzerland, KU Leuven Belgium and Malvern Panalytical Netherlands. It can be stated that the project was solved successfully despite of significant team changes.
IGRA-2021-030	FCHI	Ing. Veronika Lešáková	Personalized medicine: Development of drug dosage forms for customized drug delivery systems	2 236 080	ne		ne	ano	ano	This project was focused on the development of drug dosage forms for special drug delivery systems. The aim was to develop and optimize three methods of producing personalized dosage forms: i) dual 3D print; ii) multiple unit dosage system; and iii) EvoBot-based automatic pipetting drug feeder. All experiments were concluded in time. The planned goals were fulfilled. The results obtained will form the basis of several publications in top journals. The goals of the project were met. The number of hours of compulsory education has been fulfilled. Mandatory foreign mobility has been fulfilled (2x conference, 3x summer school).