



CROSSLINK — CONNECT — COMPREHEND



EURASIA-PACIFIC UNINET

ANNUAL REPORT

2019/2020



Eurasia-Pacific Uninet is a network which aims at establishing contacts and scientific partnerships between Austrian universities, universities of applied sciences, other research institutions and member institutions in East Asia, Central Asia, South Asia, and the Pacific region. With its member institutions, the network promotes multilateral scientific cooperation, joint research, and conferences, as well as faculty and student exchanges. Eurasia-Pacific Uninet supports the concept of Austrian higher education policy with its focus on excellence.



EDITORIAL

by Ao. Univ.-Prof. Dr. Wolf-Dieter Rausch

Dear Members of our network, dear Colleagues,

Here we present you with the activities during covid times in the period of 2019 to 2020. We all were faced by difficult times, restrictions, inability to travel and possibly disease. Some even lost loved ones in these days.

The problems are not over as we all know. Travel restrictions for international flights continue and exorbitant flight prices make travels non-affordable.

Nevertheless it is as well necessary to show optimism. The virus has changed to a less virulent modification, we learned to live with implications of infection and a large body of knowledge has been accumulated on prevention and treatment of such an infection.

Inside this booklet are projects which were performed in places which could be reached even in covid times. But it contains as well reports where the project was completed only by electronic communication and data exchange. Webinars and internet conferences were performed. We should not abandon our experiences in the future, such options are valuable for an even closer cooperation and sometimes save even the necessity of travelling.

Finally we hope activities will restart as to joint projects, summer schools and other forms of exchange including the Ernst Mach worldwide fellowships or as well fellowships from other countries as China.

I hope, the optimism of the little girl on the front page will as well be infectious to all of you,

With the best wishes for a continuing friendship and successful cooperation,

Ao. Univ.-Prof. Dr. Wolf-Dieter Rausch President of the Eurasia-Pacific Uninet

Heat and Mass Transfers within the Lithosphere

PROJECT

8 / 2019

Etienne SKRZYPEK, Christoph HAUZENBERGER, Simon SCHORN

University of Graz

Rustam OROZBAEV National Academy of Sciences of Kyrgyz Republic

The project aimed at gathering an international team of Earth scientists in order to study a unique geological object located in NW Kyrgystan: the Makbal complex. The complex crops out at the border between Kyrgyzstan and Kazakhstan and represents a so-called ultra-high pressure (UHP) metamorphic terrane. It is a rare geological feature that gives insight on tectonic processes that occur at depths of about 100 km or more and for which our knowledge remains limited. As such, it can be used to constrain heat and mass transfers that take place within the Earth's lithosphere. The study of this complex required a combination of field and laboratory work, and relied on the cooperation between the Institute of Geology at the National Academy of Sciences of the Kyrgyz Republic (NASKR) and the Institute of Earth Sciences at the University of Graz (UG).

Joint activities

1) Field work, NW Kyrgyzstan (12 days, 22/07-03/08/2021)

Participants : R. Orozbaev, N. Seiitkaziev (Institute of Geology, NASKR);
E. Skrzypek, C. Hauzenberger, S. Schorn (Institute of Earth Sciences, UG)

In Summer 2021, the international team met for field work in NW Kyrgyzstan. The expedition was efficiently organized by R. Orozbaev (NASKR). Based at Talas city, the participants formed several groups of two to three people and carried out several profiles to cover the nearby Makbal complex, at elevations ranging from ~ 1500 to 3100 m. They conducted lithological and structural mapping of the different geological units, and collected more than hundred rock samples for further analyses. The sampling strategy aimed at gathering material for obtaining new petrological and geochronological data, but also to initiate research projects at both institutions (e.g. Bachelor and Master projects).

2) Analytical work & Scientific communication (8 days, 21/11-28/11/2021)

Participants : R. Orozbaev (Institute of Geology, NASKR); E. Skrzypek,
C. Hauzenberger (Institute of Earth Sciences, UG)

In Autumn 2021, R. Orozbaev (NASKR) visited the University of Graz to perform analyses related to the project, and to give a presentation about his research on UHP complexes from Kyrgyzstan. He could exchange with

staff members at the Institute for Earth Sciences (UG), but also with students as he attended the petrology group seminar. He prepared several zircon samples for age dating, imaged them with a Zeiss Gemini DSM 982 Scanning Electron Microscope, and performed isotopic analyses at the NAWI Graz Central Lab for Water, Minerals and Rocks. He also had the opportunity to visit famous geological localities from south Styria.

Results and Outlook

- Before the Summer 2021 survey, structural data were only scarcely available for the Makbal UHP complex. The new field survey significantly improved the density of this dataset, which will be used in upcoming scientific publications.

- The amount and variety of new samples gathered thanks to the field survey guarantees innovative research directions, as suggested by the collection of thin sections (~ 100 pieces) that was already prepared and partly analyzed. The material already serves as a basis for two research projects conducted by students at the University of Graz

BRUNNER Daniel – "The composition of white mica in the UHP Makbal complex" (ongoing Master thesis)

FUCHS Laura – "Contact metamorphism at the margin of the Kaindy granite (Kyrgyzstan)" (ongoing Bachelor thesis)

- The exchanges fostered by the EPU project gave the opportunity to sign a Memorandum of Understanding between both institutions (NASKR & UG). The Memorandum demonstrates the intention to collaborate for at least the next five years. It was officially signed by both representatives in Summer 2021.

- The research on UHP complexes in Kyrgyzstan will continue, since a new EPU project was granted to the same team for 2022 (EPU 18/2020, Minerals under pressure).



Photo 1. Project participants during field work in NW Kyrgyzstan (l. to r. Brunner, Schorn, Skrzypek, Orozbaev, Hauzenberger).



Photo 2. R. Orozbaev (NASKR) and C. Hauzenberger (UG) signing the Memorandum of Understanding between both institutions.

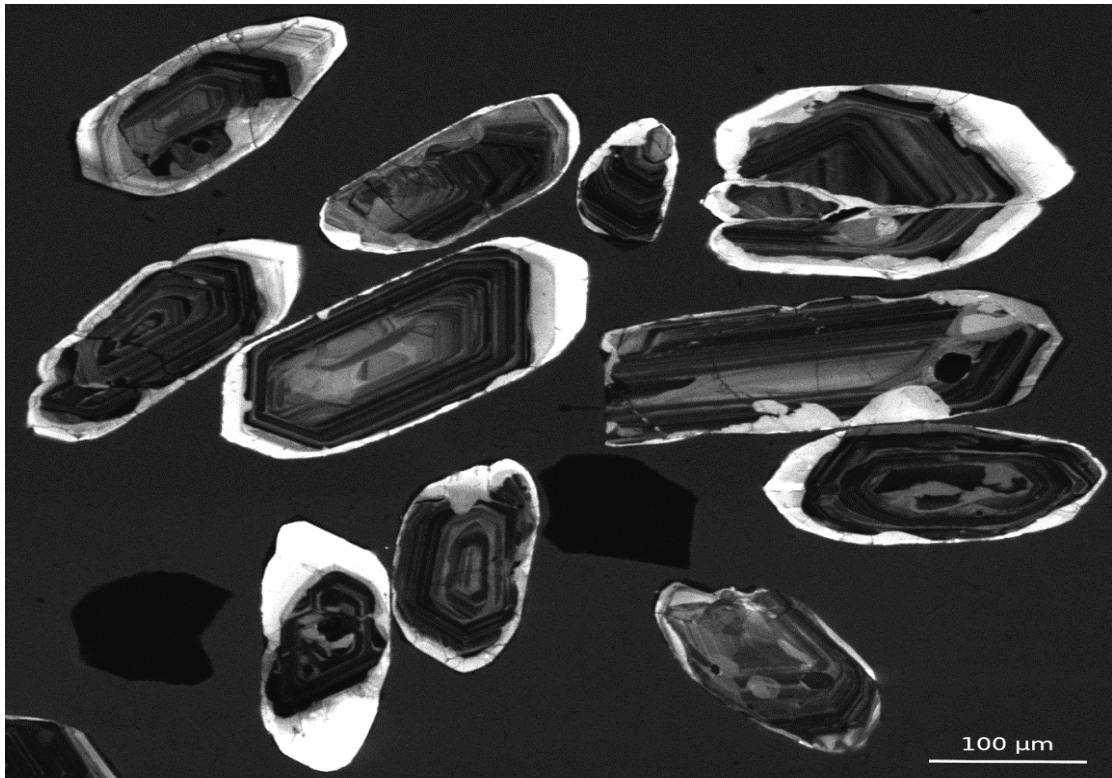


Photo 3. Ca. 500 million year-old zircons prepared and analyzed at NAWI Graz in November 2021.



Photo 4. Project participants visiting the famous eclogite locality in Hohl, south Styria.

Epidemiological trends in food allergy

PROJECT
12/2019

Yan Ma Department of Pathophysiology and Allergy Research,
Medical University of Vienna

Sun Jinlyu Department of Allergy, Capital Medical University

Wei Fuhua The First Affiliated Hospital of Nanjing Medical University

Brief introduction of the project:

Food allergy is becoming an important public health problem that affects children and adults worldwide. In fact, 1–3 % of adults and 6–8 % of children have a true, immunoglobulin E (IgE)-mediated allergy. The European Academy of Allergy and Clinical Immunology has created a task force to develop guidelines for the diagnosis and management of food allergy.

Approximately 15–20 % of the population in Central Europe suffers from pollen allergies, and 50–93 % of birch pollen allergy patients develop an allergy to pollen-associated food allergens. Many food allergies, particularly allergies to milk, egg, soy, and wheat, are usually outgrown within the first 10 years of life. In contrast, allergies to peanut, tree nuts, fish, and shellfish are often lifelong, although 20 % of individuals may

outgrow peanut allergy. Peanut and tree nuts are responsible for the most serious allergic reactions and food allergy-related fatalities.

To understand the regional specificities of food allergies and develop effective therapeutic interventions, extensive regional epidemiological studies are necessary. While data regarding incidence, prevalence, regional variation and treatment in food allergies are available for western countries, such studies may not be available in many Asian countries. China accounts for almost 20% of the world's population and has a vast ethnic diversity, but large scale meta-analyses of epidemiological studies of food allergy in China is lacking. A literature search revealed 22 publications on the prevalence of food allergy in Chinese populations. A review of these studies showed that the prevalence of food allergies in China is comparable to that in western countries, even though the Chinese diet is vastly different from that of the West and may vary even greatly within China, and finally, specific antigenic triggers of food allergy vary between China and the West and also within China. Current clinical management of food allergy in China include allergen-specific immunotherapy, Chinese herbal medicine, acupuncture and Western medicine. This study demonstrates an unmet need in China for a thorough investigation of the prevalence of food allergies in China, the specific foods involved, and characterization of the specific antigenic triggers of food allergy with respect to ethnicity, age, and diet in China.

Joint Meetings in Beijing, in Nanjing, China and in Vienna, Austria via Skype/Webex

The meetings of the joint project on “Epidemiological trends in food allergy: from West to East” and on the actual topics of the Chinese herbal medicine and COVID-19 were held in 2020, 2021 in Nanjing, in Beijing as well as in Vienna several times via Skype/Webex/WeChat. The professors, postdocs and students of the partner institutions participated in the joint meetings. Several scientific articles have been prepared and published in the international top journals.

Exchange activities in China and in Austria during this project

PhD students Ms. Tang Mo and Ms. Zhao Ning from Xiyuan Hospital, China Academia of Chinese Medicine Sciences, Beijing, China visited the Medical University of Vienna from 1st November 2021 to 28th February 2022 and from 16th October 2021 to 31th October 2022, respectively. They join our Thesis Seminar of “New Developments and comparative aspects in allergology, oncology and immunology”, “Progress Report in Comparative Allergology, Oncology and Immunology” and Journal Club of Molecular Research in Traditional Chinese Medicine Science. PhD student Ms. Jiang Tianchi, visited Prof. Dr. Ji-Fu Wei, Director of Research Division of Clinical Pharmacology, The First Affiliated Hospital of Nanjing Medical University, Nanjing, China in Nanjing and performed the

data analysis of herb medicine together with Prof. Li's colleagues.

Publications

- He S, Lyu F, Lou L, Liu L, Li S, Jakowitsch J, Ma Y: Anti-tumor activities of *Panax quinquefolius* saponins and potential biomarkers in prostate cancer. *J Ginseng Res.* 2021 Mar;45(2):273-286. doi: 10.1016/j.jgr.2019.12.007. Epub 2020 Jan 7. IF: 6.060, TOP Journal.
- Wang W, Yang L, Song L, Li C, Yang B, Miao Y, Ma Y, Xue M, Shi D. Combination of *Panax notoginseng* saponins and aspirin potentiates platelet inhibition with alleviated gastric injury via modulating arachidonic acid metabolism. *Biomedicine & Pharmacotherapy.* 134 (2021) 111165. IF: 6.530, TOP Journal.
- Wenting W, Lei Song, Lin Yang, Changkun Li, Yan Ma, Mei Xue, Dazhuo Shi: *Panax quinquefolius* saponins combined with dual antiplatelet therapy enhanced platelet inhibition with alleviated gastric injury via regulating eicosanoids metabolism in a rat model of acute myocardial infarction. *J Ethnopharmacol.* 2021. in press. IF: 4.360, TOP Journal.
- Leyi Zhang, Jiaqin Huang, Danli Zhang, Xiaojing Lei, Yan Ma, Yun Cao, Jingling Chang: Targeting Reactive Oxygen Species in Atherosclerosis via Chinese Herbal Medicines. *Oxidative Medicine and Cellular Longevity.* 2022, Article ID 1852330. IF: 6.543, TOP Journal.

- ZHANG L, HUANG X, CAO Y, GENG Q, MA Y, ZHANG G: Analysis of clinical application of "Harmonizing Ying Wei" in the treatment of insomnia.
- Zongying Xu, Xueli Zhang, Wenya Wang, Yan Ma, Di Zhang, Dongmei Zhang, Chen Meng: Fructus mume (Wu Mei) Attenuates Ulcerative Colitis Rats by Regulating Inflammation Cytokines, Oxidative Stress and Neuropeptides in Acetic Acid-(AA) Rats. *J Med Food*. 2022. In press.

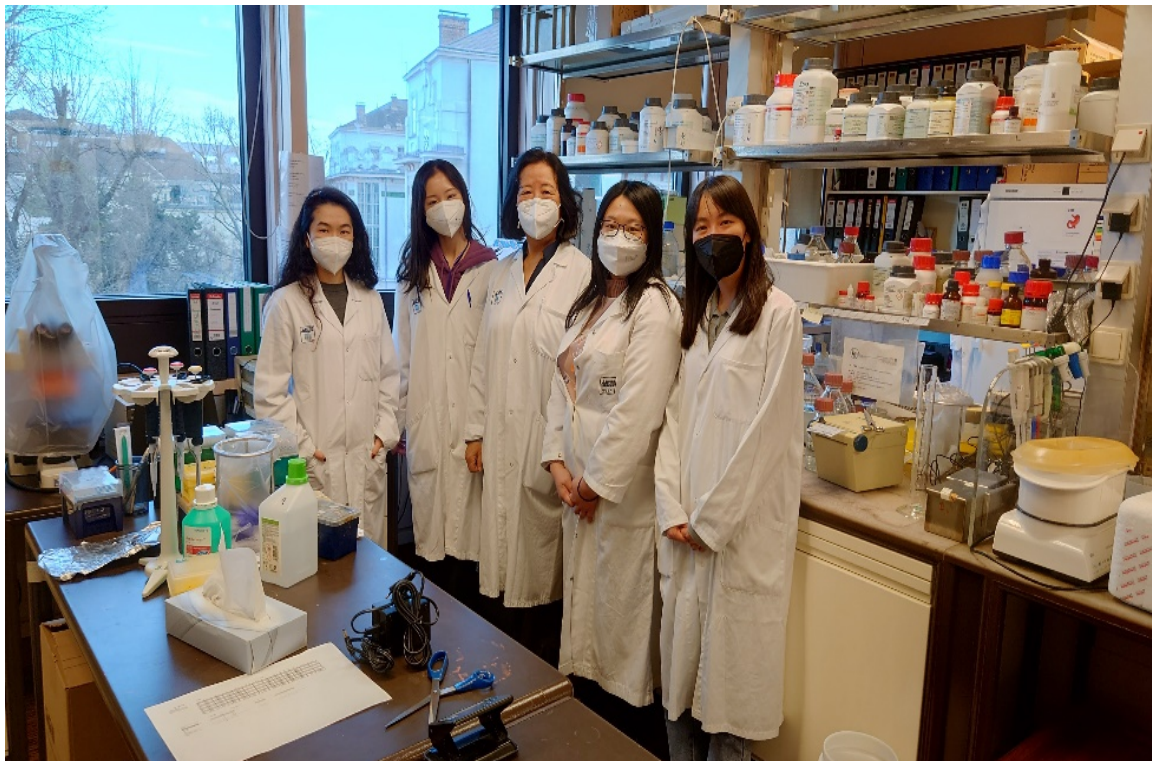


Figure: Chinese exchange PhD students were doing research experiments in the laboratory of the Department of Pathophysiology and Allergy Research at the Medical University of Vienna.

Design of novel hierarchical
porous carbon materials for
high energy electrochemical
capacitors

PROJECT
15/2019

Qamar Abbas, Bernhard Gollas

Graz University of Technology

Vladimir Pavlenko

Al-Farabi Kazakh National University

This project was awarded to Dr. Qamar Abbas of Graz University of Technology (TU Graz) as project leader. The focus of this project was preparation of nanoporous carbons with hierarchical distribution of pores and simultaneously possessing high specific surface area. In the framework of this project, scientific partner from Al-farabi Kazakh National University visited the Institute of Chemistry and Technology of Materials, TU Graz in June-July 2022. Dr. Vladimir Pavlenko in cooperation with the project leader produced high quality hierarchical carbon materials by using the equipment available in Graz.

These novel carbon materials were produced from silica nanoparticles as template and D-glucose as precursor material. Then these carbons were used to produce symmetric supercapacitors using ionic liquids as electrolytes. The supercapacitors were tested at 24C and down to -40C to understand the charging mechanism in these novel templated carbons at

low temperature compared to the commonly available activated carbons.

This work has been published in a peer-review journal :

V. Pavlenko, S. Klebekkyzy, D. Knez, Q. Abbas, Z. Mansurov, Zh. Bakenov, A. Ng, Revisiting the carbon mesopore contribution towards improved performance of ionic liquid-based EDLCs at sub-zero temperatures, *Ionics* 28, 893–901 (2021), <https://doi.org/10.1007/s11581-021-04354-w>

Furthermore, low cost precursor material like aluminum citrate was used to produce templated carbons with hierarchical pores. Then these carbons have been used to assemble electric double-layer capacitors which are being tested at TU Graz. This work is currently ongoing at TU Graz in collaboration with partner from Al-Farabi Kazakh National University.

Besides, new carbon materials have been produced by using rice husk as precursor material at Al-Farabi Kazakh National University. These carbons have been transported to the partner at TU Graz and are being physicochemically characterized. Later on, these carbons will be used to produce electrodes for symmetric carbon/carbon supercapacitors in aqueous electrolytes.

Overall, as a result of the EPU project, a productive scientific collaboration has been established with partner from Kazakhstan which will result in more scientific outcomes in the future.

ANMMEC - Austrian Nepali Mutual
Medical Education Cooperation

PROJECT
21/2019

Markus Ritter

Paracelsus Medizinische Privatuniversität

Rajendra Koju

Kathmandu University School of Medical Sciences

Report

The following representatives of the PMU visited the KUSMS and its university hospital Dhulikhel Hospital: Prof. Wolfgang Sperl (President), Prof. Markus Ritter (Head of the Center for Physiology, Pathophysiology and Biophysics and EPU Project Leader), and Dr. Rosalyn Eder (Head of International Relations).

The visit was necessary to re-start the project as the implementation was disrupted by the COVID19 pandemic. It was also the opportunity to introduce Prof. Sperl as the new president and Dr. Eder as the new head of international relations and contact person for KUSMS. During the visit, the new MoU between PMU and KUSMS was signed and officially celebrated together with PMU students, KUSMS students and academic staff, as well as Dhulikhel Hospital management.

The PMU delegates took part in various meetings with key academic and management personnel at KUSMS, and in the morning conferences held at Dhulikhel Hospital. They observed students during their practical exams, observed daily operations in the pediatrics unit of Dhulikhel Hospital, visited two community outreach centers outside Dhulikhel (Dolakha Community Hospital and Kinertar Outreach Center), met with PMU students who are currently on internship at the Dhulikhel Hospital, and with KUSMS students who are interested in internship at the PMU university hospital. They also attended a presentation on a collaborative project on community health, and how the concept of community outreach is integrated in the medical curriculum of KUSMS.

In addition, Prof. Markus Ritter conducted a lecture with medical students on Physiology (approx. 60 1st year students). The topic was “Basic electrophysiology of cells” .

During the discussions with KUSMS faculty staff, the following areas for intensive collaboration were identified: Early Life Care, Anatomy, Rehabilitation, and Public Health, particularly community health and adolescent health. It was also agreed that both institutions will create specific frameworks for student and faculty mobilities from KUSMS to PMU, and explore funding opportunities to support these mobilities.

On 14th February 2023, a meeting at the PMU will be held to discuss concrete steps to support the partnership with KUSMS.

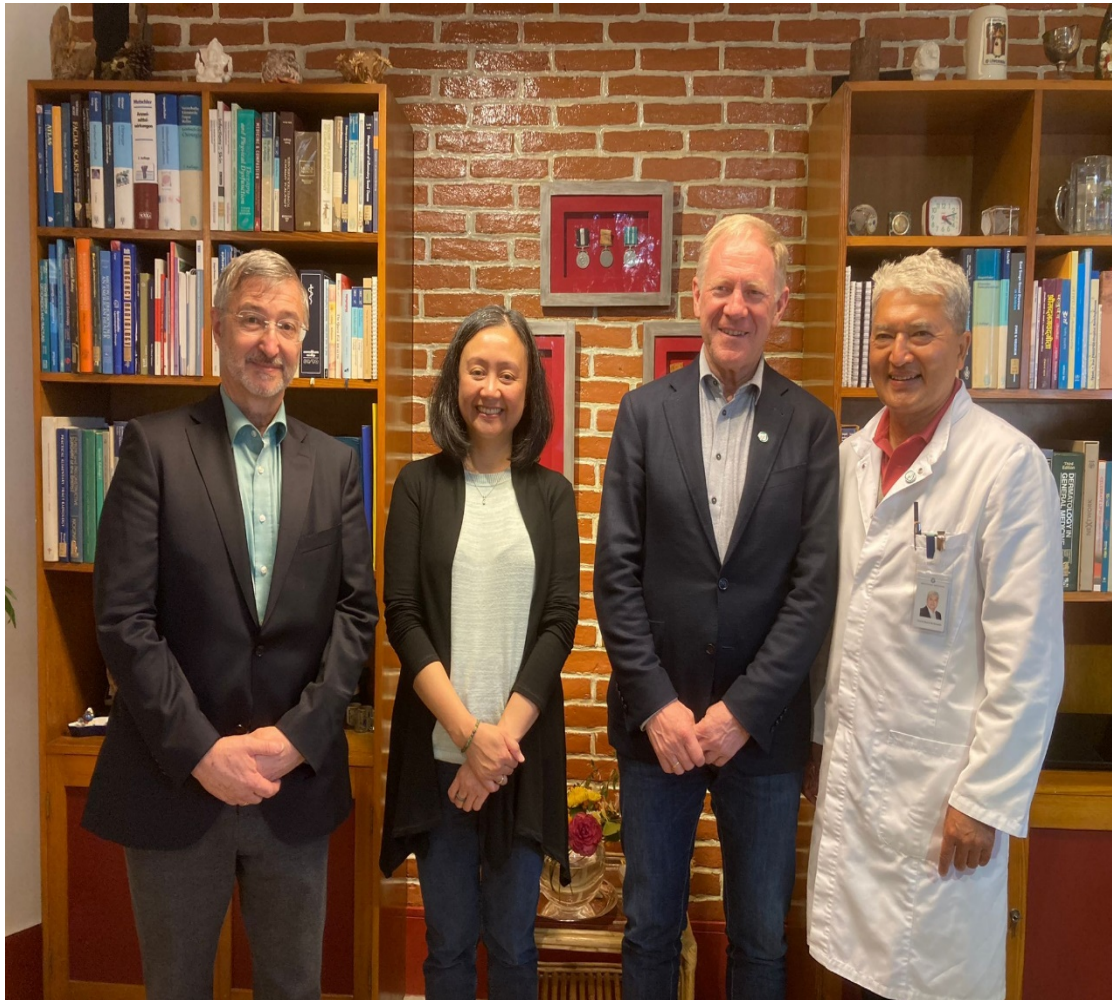


Foto 1: (L to R) Prof. Markus Ritter, Dr. Rosalyn Eder, Prof. Wolfgang Sperl and Prof. Ram Shresta (Executive Director of KUSMS)



Foto 2: Infront of Dhulikhel Hospital, Kathmandu University Hospital



Foto 3: Prof. Wolfgang Sperl with KUSMS students and faculty (class lecture)



Foto 4: Prof. Wolfgang Sperl with KUSMS students and faculty (bedside teaching)



Foto 5: Visit to Dolakha Community Hospital



Foto 6: Visit to Kinertar Community Outreach Center



Foto 7: Visit to Kinertar Community Outreach Center



Foto 8: Students from the lecture of Prof. Ritter



Foto 9: Official signing of MoU

Priming effects in the
carbon dynamics of Alpine
subsoils

PROJECT 30/2019

Douglas Godbold

Institute of Forest Ecology, BOKU

Yandong Zhang, Feng Chenxin

North Eastern Forestry University

As due to Covid restrictions no travel was possible to China, all of the work was carried out in Austria. The two planned visits of Ms Feng were changed in to a single 4-month research visit, and arrived in June 2021. Due to No-Covid quarantine restrictions in China, Ms Feng has remained in Vienna and is still working on the project.

In order to investigate the soil mineralisation process under the root exudate input, we collected 64 undisturbed 50-60 cm long soil cores in two alpine forest sites (47°17'N, 14°46'6"E; 47°19'N, 14°43'E) of two altitudes (1428m and 1743m) at Wasserberg Gaal, Austria on 5, July, 2021. The high elevation site is characteristic of a diffuse alpine tree line, the lower elevation site is a typical montane spruce forest. Both sites are entirely composed of Norway spruce, and are 80-120 years old. Following sampling, we conducted a 60-days incubation experiment on the undisturbed 50 cm long soil cores kept at 15°C in a growth chamber to

simulate the measured forest soil temperature. The soil cores were supported in Styrofoam boxes that exactly fitted the soil core. First, for each core the position of the A and B horizons were determined, and to simulate the input of root exudates in to the soil, maize sugar was added once a week at the rate of 22.75 mgC week⁻¹ for each layer. The maize sugar solution was injected with a syringe into 24 holes in soil core for each layer, to create a homogeneous carbon input. During the incubation, 4 times (week-0, week-1, week-3, week-8) a destructive sampling of 4 replicate cores was carried out. And mineral N, available P, microbial biomass carbon (MBC), soil dissolved carbon (DOC) and enzyme activities of Leucine-amino-peptidase (LEU), N-Acetyl-glucosaminidase (NAG), β -Glucosidase (GLS), β -Xylosidase (XYL), cellulobiosidase (CEL) and Acid phosphatase (PHO) were measured. And we found the following result,

In maize sugar amendment, the mineral N content in A horizon of the low altitude site was significantly lower ($p < 0.05$) than control at the end of week-8, while for high altitude site it was lower than the control at the end of week-3 (Figure 1). Meanwhile, the delta-mineral N in A horizon for both sites were also significantly lower ($p < 0.05$) than B horizon at the end of week-3 and week-8, and it decreased and turned to be negative as incubation processed. But no difference in mineral N, nor delta-mineral N (Table 1) was observed between different incubation time in B horizon. Similar observation was also found in soil available P content. The delta-

available P (Table 2) was significantly lower in A horizon than B horizon, and it decreased with incubation time in A horizon for high altitude soil, but increased in B horizon for low altitude soil. The above results suggest that the sugar addition resulted in a greater N and P consumption in A horizon than B horizon, which can be explained by the higher MBC content in A horizon, as microbes need N and P to maintain the activity during metabolism. But in other studies, using homogenised soils with one-pulse carbon input, delta-mineral N was always found to be increasing and positive at the end of incubation. This suggests that in the intact soil profiles with continuous carbon input, microbial growth exceeds N-mineralization.

At the same time, we found a positive correlation ($p < 0.01$) between N availability and N-acquiring enzymes (NAG and LEU) through the whole incubation period in control, but only for the end of week-3 and week-8 in sugar amended soils, which suggests sugar addition might have disturbed the soil N balance at the beginning of incubation, but microbes gradually succeeded in rebuilding a new balance as incubation time increased. Meanwhile, a positive correlation ($p < 0.01$) between DOC and carbon-acquiring enzymes (GLS, XYL, CEL) were found in both control and treatments, which is in line with previous studies.

However, the correlation was negative between available P content and carbon-acquiring enzymes (CEL, GLU) in some treatments, and it could

be due to the reduced need for decomposing C, while P availability was enough for microbes. At the same time, the correlation between DOC content and N-acquiring (NAG), P-acquiring (PHO) enzymes were found to be positive at the end of week-3, which could be possibly explained by the increasing need of N and P for microbes while metabolising C, as microbes need P to synthesize ATP, and N to produce enzymes during the process.

The above results suggest that continuous sugar addition could have a great influence on soil N and P mineralization process by affecting the microbial needs of C, N and P, but that the influence strongly depends on soil depth.

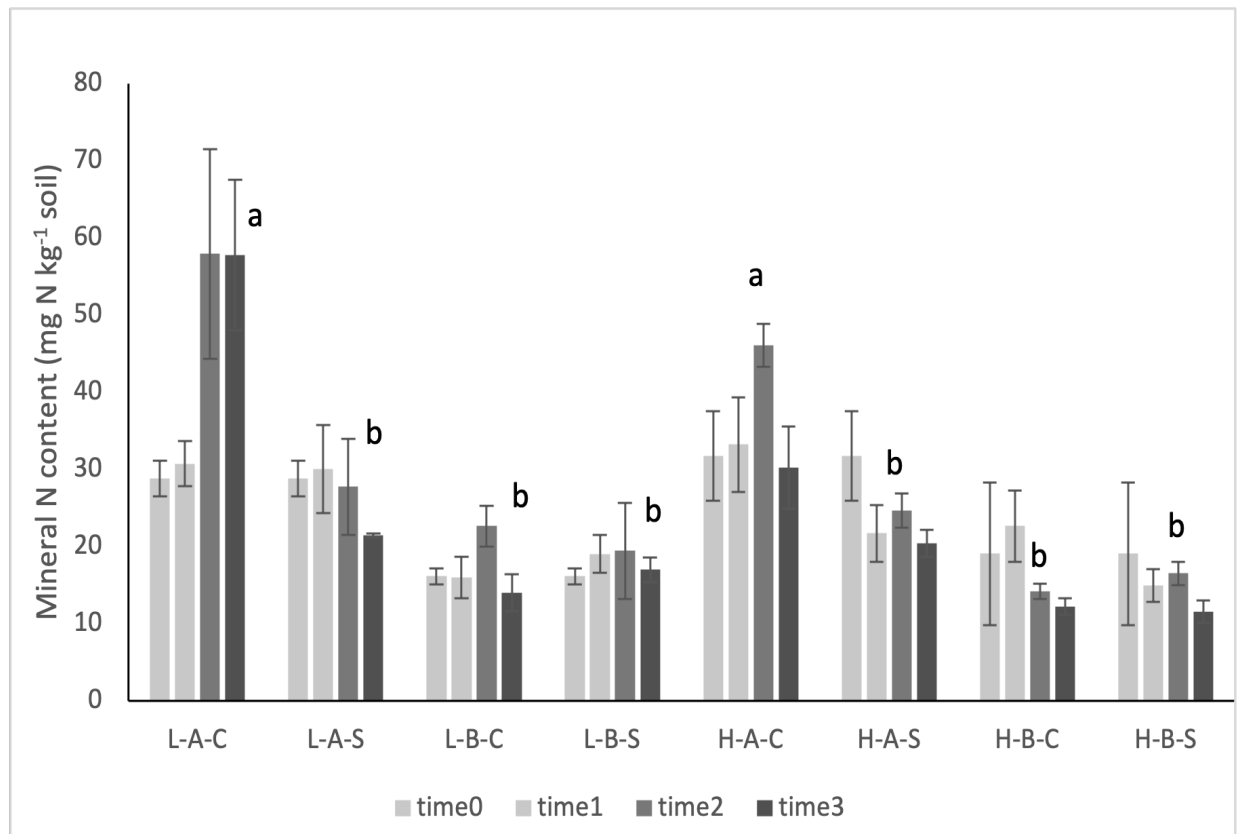


Fig.1 The mineral N content in soils of two horizons from two altitudes in Austria. C and S represent control and sugar amendment respectively. L and H represent low altitude and high altitude site respectively. A and B represent A horizon and B horizon

respectively. Different letters within one altitude show the significance level. Friedman test was used to test the difference between the mineral N content among different treatments. $p < 0.05$. $n=4$.

	Time1	Time2	Time3
L-A	-0.69Aa	-30.21Ab	-36.36Ab
L-B	3.06Aa	-3.19Ba	2.98Ba
H-A	-11.49Ba	-21.48Cb	-9.83Ca
H-B	-7.73Ba	2.32Bb	-0.67Bb

Table.1 The delta-mineral N (mg N kg^{-1} soil) in soils of two horizons from two altitudes in Austria. L and H represent low altitude and high altitude site respectively. A and B represent A horizon and B horizon respectively. Delta-mineral N = mineral N_S - mineral N_C , where C and S represent control and sugar amendment respectively. Time 1, 2, 3 represent week-1, week-3, week-8 respectively. Uppercases within one incubation time show the significance level between different altitude and horizon treatments. Lowercases within one altitude and horizon treatment show the significance level between different incubation time. Friedman test was used to test the difference between the delta-mineral N content among different treatments. $p < 0.05$. $n=4$.

	Time1	Time2	Time3
L-A	-2.40 Aa	4.08Aa	3.34Aa
L-B	1.93Aa	-1.86Aa	23.17Bb
H-A	-14.25Ba	-10.99Ba	-30.24Cb
H-B	3.98Aa	-9.58Bb	-0.66Aa

Table.2 The delta-available P (mg P kg^{-1} soil) in soils of two horizons from two altitudes in Austria. L and H represent low altitude and high-altitude site respectively. A and B represent A horizon and B horizon respectively. Delta-available P = available P_S -

available P_C , where C and S represent control and sugar amendment respectively. Time 1, 2, 3 represent week-1, week-3, week-8 respectively. Uppercases within one incubation time show the significance level between different altitude and horizon treatments. Lower cases within one altitude and horizon treatment show the significance level between different incubation time. Friedman test was used to test the difference between the delta-available P content among different treatments. $p < 0.05$. $n=4$.

We are currently preparing the full set of results for publication.

Ectomycorrhizas and root dynamics in boreal forests of Mongolia

PROJECT

31/2019

Douglas Godbold

Institute of Forest Ecology, BOKU

Burenjargal Otgonsuren School of Agroecology, Mongolian University
of Life Sciences

Due to Covid-19 restrictions most of the contact was by zoom until February 2022. During the time when travel was not possible we organized monthly meetings (Otgonsuren, Dashbat, Godbold) mainly to discuss previous obtained results. These results come from the Masters thesis of Khatanbaatar Dashbat. The thesis was submitted and approved in March 2021. The soil samples were taken in Mongolia during 2019, before the start of covid restrictions and during preparation of the project proposal.

Mongolia's forests are located in a unique transition zone between the Siberian taiga forest and the Central Asian steppe-zone. The climate has long and cold in winter, and the growing season is short and dry. The studies aimed to better understand N dynamics in Mongolian boreal forest soils. This is one of the first investigations of N cycling on Mongolian

forests. The N-mineralization and N availability in soils under four tree species were determined at two locations. The soil samples were collected from a depth 0-10 cm of the uppermost soil layer (O horizons) from under each of the species, *Pinus sylvestris* (Scots pine), *Pinus sibirica* (Siberian pine), *Larix sibirica* (Siberian larch) and *Betula platyphylla* (Japanese white birch) at Bogd-Khan Mountain Nukht and Batsumber forests. Soil sampling was carried out in March, June, October and August (2019) in the two forest types. N-mineralization was assessed in a laboratory under controlled conditions and an *in-situ* field incubation method. Abiotic and biotic parameters were examined to identify differences between forest trees. These factors can influence the N cycle in the soil. For example, temperature, C/N-ratio, and water content were correlated with net N-mineralization of NH_4^+ and NO_3^- as essential variables influencing biogeochemical processes. The mineralization rates of NH_4^+ and NO_3^- were higher in *Larix sibirica* and *Betula platyphylla* as compared to *Pinus sylvestris* and *Pinus sibirica*. The results showed that N availability is high when the soil thaws in spring or when rainfall increases in autumn. The nitrogen availability varies depending on the tree species (*Pinus sylvestris* > *Pinus sibirica* > *Betula platyphylla* > *Larix sibirica*). N availability showed a general decrease over the two years of the investigation. This study identified 23 ectomycorrhizal morphotypes associated with *Pinus sylvestris*, *Pinus sibirica*, *Larix sibirica* and *Betula platyphylla*. Several of

the morphotypes were common to all tree species. This work provided the basis for the Keynote lecture ‘Belowground carbon and nitrogen cycling in Mongolian forests in the face of climate change’, presented at the online conference ‘Ecology and technological development’, held at MULS in 29 October 2021.

With lifting of Covid-19 restrictions in Mongolia and the possibility to travel outside Ulaanbaatar, we started to take fine root samples as described in the project proposal. In October 2021 fine root samples were taken in *Larix sibirica* stands at Khuvsgul province (Picture 1) and at Bogd Khan natural reserve (Picture 2). This work is part of the masters thesis of Bolormaa Tundevjalbuu. The fine roots were removed from the soil cores and scanned on a flatbed scanner in Mongolia. The scans were analysed in the laboratory at BOKU in March 2022 after the end of the project funding. In addition, the C/N ratio of the soils was measured.

In February 2022, Douglas Godbold travelled to MULS to take soil samples as written in the project proposal. Frozen soil samples were taken at Bogd Khan (Picture 3), and transported frozen back to Vienna. During this trip a soil coring system was transferred to MULS to enable further co-operation in the future. The frozen soil cores will be analysed during summer 2022 at no cost to the project. The cost of the 5-day trip exceeded

the 1500 euro per trip maximum. Since 2020 to 2022 the cost of flights to Mongolia have increased by 50%, and the number of potential flights is extremely limited, this makes it impossible to remain within the 1500 euro limit.



Picture 1. Taking of soil and root samples in the Khuvsgul province.
Shown are Bolormaa Tundevjalbuu (left) and Burenjargal Otgonsuren (right).



Picture 2. Taking of soil and root samples in the Bogd Khan.
Shown are Burenjargal Otgonsuren (left) and Bolormaa Tundevjalbuu (right).



Picture 3. A frozen soil core taken at Bogd Khan.

The effect of increased nitrogen
deposition on ectomycorrhizas
of *Pinus koreiensis*

PROJECT

32/2019

Douglas Godbold

Forest Ecology, BOKU

Duan Wenbiao

North Eastern Forest University

Due to Covid-19 restrictions contact directly with Prof Duan was only by email. However, in May 2021 Ms Hangyu Lan came to Vienna funded by a Chinese Student Scholarship. Ms Lan worked on the previous project EPU 25/2018. In Vienna, Godbold and Lan were able to work on the ectomycorrhiza samples taken in the 2018 project. These morphotypes were dominated by black coloured morphotypes, and were identified by DNA sequencing at no cost to the project. Thirty-one different ectomycorrhizal morphotypes were detected (Figure 1). No difference was shown between the N addition treatments. These results will be used together with studies on *Pinus cembra* in Austria and *Pinus sibirica* in Mongolia in a comparative study of these closely related tree species.

Relative abundance (%) of each morphotype of total root tips in Liangshui

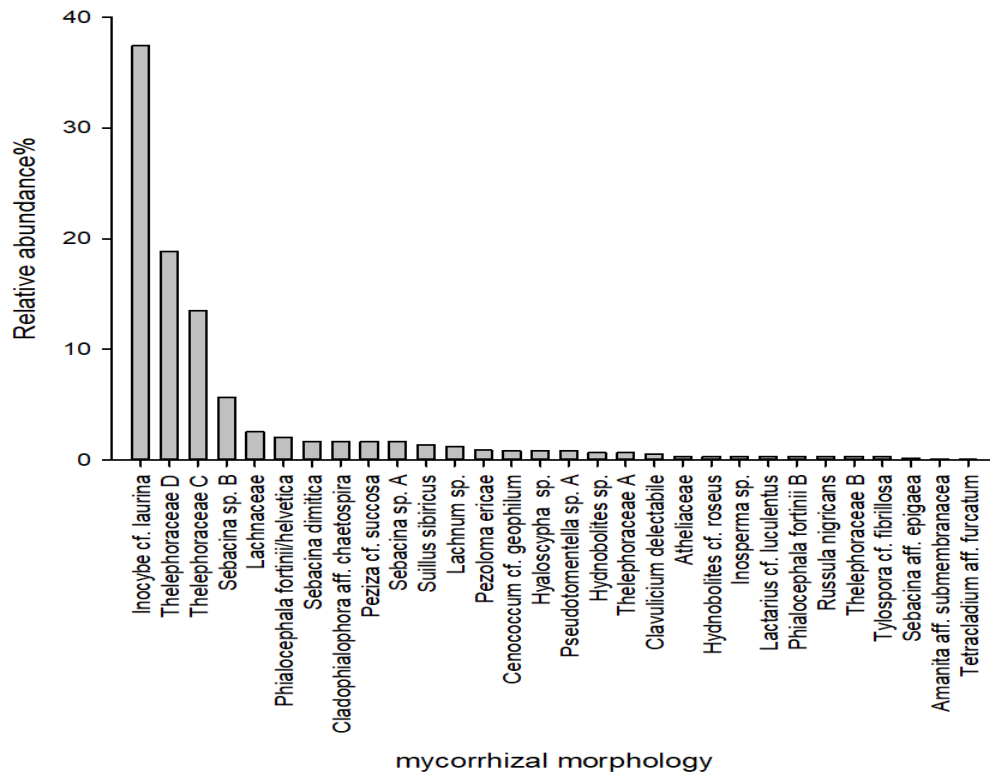


Figure 1. Ectomycorrhizal taxa on Pinus koreiensis at Liangshui, China

Effects of Scalp Acupuncture on Heart Rate Variability in Patients with Insomnia

PROJECT

35/2019

Gerhard Litscher, Lu Wang Medical University of Graz, TCM Research
Center Graz, Research Unit for Complementary and Integrative Medicine
Sun Yuanzheng, Tianyang Yu, Yang Yan Heilongjiang University of
Chinese Medicine

Summary

The difficult times caused by the Covid-19 pandemic and the associated problems, also in the area of research management of intercontinental and transcontinental acupuncture research projects, require targeted, adequate solutions. For example, the current research project approved by Eurasia Pacific Uninet (35/2020), which should have been carried out through a mutual exchange of scientists, could only be carried out 'online' due to corona using the now established method of teleacupuncture. The report (see also attached publications) is focused on the long-term cooperation between the TCM (Traditional Chinese Medicine) Research Center of the Medical University of Graz in Austria and the Heilongjiang University of

Chinese Medicine in Harbin in China. In addition to the methodology of scalp acupuncture, the interventions and the assessment using heart rate variability (HRV), the report summarizes the results of patients with sleep disorders. According to the results of this pilot project, scalp acupuncture can be used as an effective method for stroke patients with insomnia and spleen qi deficiency. A discussion of scalp acupuncture in connection with HRV as well as historical considerations on the topic complete the project report [1,2].

Keywords: Acupuncture, scalp-acupuncture, heart rate variability, evidence-based complementary medicine, insomnia, stroke

[1] Litscher G. und die Mitglieder des EPU-Projektteams: Effekte der Skalp-Akupunktur auf die Herzratenvariabilität bei Patienten mit Schlafstörungen. Ein Projektbericht (Studiendesign) zur Teleakupunktur mit Harbin in Covid-19-Pandemie-Zeiten. *Akupunktur & Aurikulomedizin* 2020; 46(3): 9-12.

[2] Litscher G. und die Mitglieder des EPU-Projektteams: Skalp-Akupunktur und Herzratenvariabilität bei Patienten nach Schlaganfall mit Schlafstörungen. *Teleakupunktur mit Harbin in Covid-19-Pandemie-Zeiten. Akupunktur & Aurikulomedizin* 2022; 48(1): in press.

High-tech acupuncture for
prevention of lifestyle diseases
–A Sino-Austrian cooperation
– Continuation 2019/2020

PROJECT
36/2019

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Summary

The difficult times caused by the Covid-19 pandemic and the associated problems, also in the area of research management of intercontinental and transcontinental acupuncture research projects, require targeted, adequate solutions. For example, the current research project approved by Eurasia Pacific Uninet (36/2019), which should have been carried out through a mutual exchange of scientists, could only be carried out 'online' due to corona using the now established method of tele acupuncture. The report (see also attached publications) is focused on the long-term cooperation between the TCM (Traditional Chinese Medicine) Research Center of the Medical University of Graz in Austria and the Hubei University of Chinese Medicine in Wuhan in China. According to the results of this

project, high-tech acupuncture can be used for prevention of lifestyle diseases as an effective method.

Part 1:

Immediate effect of acupuncture and moxibustion at Guanyuan (CV 4) and Zusanli (ST 36) on heart rate variability in patients with qi-deficiency syndrome.

Objective: To compare the immediate effect of acupuncture and moxibustion at Guanyuan (CV4) and Zusanli (ST36) on heart rate variability index in patients with qi deficiency syndrome.

Methods: Ninety patients with qi-deficiency syndrome were randomly divided into an acupuncture group, a moxibustion group and a blank group, 30 patients in each group. The patients in the acupuncture group were treated with acupuncture at Guanyuan (CV4) and Zusanli (ST36) for 15 min; acupuncture was given once. The patients in the moxibustion group were treated with moxibustion with identical acupoints and treatment duration. The patients in the blank group received no intervention. The symptom scores of qi-deficiency syndrome in each group before and after treatment were recorded. The average heart rate and index of heart rate variability including total power, low frequency(LF), high frequency(HF) and logarithm of LF/HF ($\log LF/HF$) were tested 5 min before treatment, 5 min, 10 min, 15 min during treatment, and 5 min after treatment.

Results: The symptom scores of qi-deficiency syndrome were reduced in the acupuncture group and moxibustion group after treatment ($P < 0.05$). Compared before treatment, in the acupuncture group, the HF was increased 5 min during treatment ($P < 0.05$), but was reduced 15 min during treatment and 5 min after treatment ($P < 0.05$, $P < 0.01$). The log LF/HF was increased 5 min and 10 min during treatment and 5 min after treatment ($P < 0.01$). The difference of average heart rate between 5 min before treatment and 5 min after treatment in the acupuncture group was higher than that in the moxibustion group and blank group ($P < 0.05$), and the difference of log LF/HF was higher than that in the moxibustion group and blank group ($P < 0.05$, $P < 0.01$).

Conclusion: Acupuncture and moxibustion has immediate effects on heart rate variability in patients with qi-deficiency syndrome, and the effect of acupuncture is superior to moxibustion, which may be related to the benign regulation of acupuncture on autonomic nervous system.

Part 2:

Study on the difference of the effect of acupuncture single point and the compatibility of acupoints on qi-deficiency syndrome.

Objective: Observe the effect of single-point application of Zusanli (ST 36) and Guanyuan (CV4) and the compatibility of acupoints on the improvement of symptoms of patients with qi-deficiency syndrome and

their different effects on the index of heart rate variability.

Methods: 120 patients with qi-deficiency syndrome were randomly divided into acupuncture double-point group (group A), acupuncture Zusanli (ST36) group (group B), acupuncture Guanyuan (CV4) group (group C), sham acupuncture group (group D), each group 30 cases, another 30 healthy subjects were recruited and included in the healthy control group (group E). In group A, acupuncture at Zusanli (ST36) and Guanyuan (CV4) on both sides at the same time, group B acupuncture at Zusanli (ST36) on both sides, and sham acupuncture at Guanyuan (CV4) at the same time, group C acupuncture at Guanyuan (CV4) and sham acupuncture at Zusanli (ST36) on both sides. In group D, sham acupuncture at Zusanli (ST 36) and Guanyuan (CV 4) on both sides at the same time was treated once every other day, 10 times in total. The heart rate variability of the subjects was detected before the treatment, the first treatment, after the fourth treatment and after the treatment, and the quantified score of the symptoms of qi-deficiency syndrome was performed.

Results: The scores of qi-deficiency syndrome in group A, group B, and group C after the fourth treatment and after treatment were lower than before treatment (all $P < 0.05$). The index of heart rate variability of patients with qi-deficiency syndrome was lower than that of healthy subjects ($P < 0.05$), and the correlation coefficient was higher. Before treatment, the total power of heart rate variability (HRV total) in group A was lower than

that in the healthy control group ($P < 0.05$). Compared with before treatment, mean heart rate (mean HR) decreased and HRV total increased after the first treatment in group A, HRV total and heart rate variability (HF high frequency band) increased after treatment in group B, and the first in group C. The total HRV increased after 10 treatments, and the total HRV increased after the first treatment in group D. The differences were statistically significant (all $P < 0.05$). Compared with the fourth treatment in this group, HF in group B increased after the end of treatment ($P < 0.05$). Compared with group B, mean HR in group A was significantly different after the fourth treatment ($P < 0.05$); compared with group E, mean HR in group A increased after the first and fourth treatments. Heart rate variability (LF low frequency band) decreased before treatment and after the end of the tenth treatment (all $P < 0.05$). Compared with group C, LF in group B was higher after the first and tenth treatments ($P < 0.05$).

Conclusion: The compatibility of Zusanli (ST36) and Guanyuan (CV4) acupoints is superior to its single-point application in improving qi-deficiency syndrome and regulating heart rate variability, and has a long-lasting effect. The difference between the compatibility of acupoints and the use of single acupoints is reflected on the different regulating sympathetic and parasympathetic effects.

Part 3:

Different Effects of Acupuncture at Different Strong Points on Heart Rate Variability of Qi Deficiency Syndrome: A Randomized Controlled Study.

Objective: Observe the effect of acupuncture at different strong points on the improvement of symptoms of patients with Qi-deficiency syndrome and different effects on the index of heart rate variability (HRV), and explore the acupoint specificity of different strong points.

Methods: 90 patients with Qi deficiency syndrome were randomly divided into acupuncture Zusanli (ST36) group, acupuncture Guanyuan (CV4) group, fake acupuncture group, 30 cases in each group. Acupuncture Zusanli (ST36) group acupuncture both Zusanli (ST36) and Guanyuan (CV4) simultaneously with fake acupuncture, acupuncture Guanyuan (CV4) group acupuncture at Guanyuan (CV4) acupuncture, simultaneously fake acupuncture Zusanli (ST36) on both sides, fake acupuncture group simultaneously fake acupuncture at Zusanli (ST36) and Guanyuan (CV4) on both sides. The acupoints were treated once every other day, 10 times in total. Before and after treatment, quantitative scoring of Qi-deficiency syndrome and detection of heart rate variability of subjects were performed.

Results: The quantitative scores of Qi-deficiency syndrome symptoms in acupuncture Zusanli (ST36) group and acupuncture Guanyuan (CV4) group decreased after treatment compared with before treatment (all $P < 0.05$). Compared with this group before treatment, the mean heart rate

(Mean HR) after treatment in acupuncture Zusanli (ST36) group and acupuncture Guanyuan (CV4) group was lower than that in fake acupuncture group ($P < 0.05$), and the total power of heart rate variability (HRV total) after treatment in acupuncture Zusanli (ST36) group and the RR interval of all sinus beats. The standard deviation (SDNN), the root mean square (r-MSSD) and the very low frequency band (VLF) of the difference between adjacent sinus RR intervals within 24 hours before and after treatment were significantly increased. The total HRV of acupuncture Guanyuan (CV4) group increased, and the difference was statistically significant. Academic significance (all $P < 0.05$). Compared with acupuncture Guanyuan (CV4) group after treatment, there were significant differences in the increase of VLF, low frequency (LF), HRV total, SDNN, and r-MSSD in acupuncture Zusanli (ST 36) group ($P < 0.05$).

Conclusion: Acupuncture at Zusanli (ST36) and Guanyuan (CV4) has different regulating effects on heart rate variability of Qi-deficiency syndrome, and both have acupoint specificity, and acupuncture at Zusanli (ST36) is better than acupuncture at Guanyuan (CV4) on the regulation of autonomic nerve function.

Part 4:

COVID-19 Lockdown in Wuhan: Heart Rate Variability in Females and Males – A Pilot Study

In a pioneer transcontinental pilot study conducted with 50 volunteers, it was revealed that women could have apparently overcome the world's toughest lockdown in terms of changes in the general state of health measured using the heart rate variability parameter better than men. The results of the present study obtained in Wuhan provide information on the initial trend.

(<https://www.nsu.ru/n/humanitiesinstitute/departments/kafedra-vostok/>)

together with the Research and Educational Center “Heritage” of the NSU (<https://www.nsu.ru/n/humanitiesinstitute/research/heritage/>) and brought together researchers from across Europe, Central and East Asia. Apart from the Russian organizers, Alfred Gerstl and Richard Trappl (video message) were asked to give introductory speeches. Subsequently, the Austrian delegation gave presentations: While Stephanie Ziehaus presented on “The Qing after the Imperial Turn: Paradigm Shifts and New Frontiers in Global History”, Martin Mandl spoke about “The Most Delicious Place on Earth: Taiwan's Cuisine in International Relations”. Alfred Gerstl – also a member of the scientific committee which prepared the conference – presented on “The Sino-US Rivalry in the Indo-Pacific: The Strategic Responses of Great and Middle Powers”. Furthermore, he gave a public lecture on “Current Developments in the Indo-Pacific”, attended by staff and students of the Department of Oriental Studies. All in all, the conference, the public lecture and formal and informal talks with high-level representatives of the EPU partner university NSU further strengthened the bilateral cooperation. Alfred Gerstl was Visiting Professor in 2018/19 and might be invited again, also Stephanie Ziehaus was in concrete talks about conducting research at NSU.

A field trip from 28 September to 3 October 2021, organized by Elena Voytishek from the NSU, enabled the Austrian delegation to get closer

insights in the Altai region and conduct talks about cooperation possibilities with interested institutions with the EPU. The Altai has for millennia been a meeting place of cultures from North, East, West, and South. Its geopolitical significance in the relations of East and West is still obvious today, reflected in the “four corner” borders of Russia, Mongolia, China, and Kazakhstan in the region. Building on the well established cooperation between the University of Vienna and the NSU, a major outcome of the visit in Russia were concrete plans for jointly organizing a workshop in Central Asia with local EPU partners.

The scientific exchange between Austria and Russia was further complimented by collaboration talks of the Austrian EPU delegation with several other Russian institutions during the field trip, including Gorno-Altai State University and high-level representatives of the local parliament in Gorno-Altai (at the National Museum of State of the Republic of Altai) and the President of the Chamber of Commerce in Novosibirsk. The Chancellor of Gorno-Altai State University is highly interested in joining the EPU and already requested an EPU draft contract. The vice-president of the local parliament and the president of the Chamber of Commerce also emphasized their interest in becoming non-academic EPU partners and establish an institutional collaboration. Thus, all in all, the academic exchange with Russia was highly successful and will lead to further cooperative projects.





Innovative Pilot Project: Research on Laser Acupuncture and Laser Medicine

PROJECT

2/2020

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Report

The difficult times caused by the Covid-19 pandemic and the associated problems in the area of research management of intercontinental and transcontinental research projects, required targeted, adequate solutions. For example, the current research project approved by Eurasia Pacific Uninet (02/2020), which should have been carried out through a mutual exchange of scientists, could only be carried out 'online' due to corona using new established methods (e.g. tele-conferences and/or tele-acupuncture). The report (see also attached publications) is focused on

the already long-term cooperation between the TCM (Traditional Chinese Medicine) Research Center of the Medical University of Graz in Austria, two institutions in Beijing and one in Wuhan in China.

Research on Laser Acupuncture and Laser Medicine – Innovative Pilot Project with Beijing and Wuhan in COVID-19-Pandemic-Times [1]

This innovative project within a successful Sino-Austrian cooperation on high-tech acupuncture between Beijing University of Chinese Medicine, Hubei University of Chinese Medicine in Wuhan, China Academy of Chinese Medical Sciences in Beijing and Medical University of Graz deals with the promotion of a new research field entitled laser acupuncture and laser medicine.

Laser acupuncture is defined as “Photonic stimulation of acupuncture points and areas to initiate therapeutic effects similar to that of needle acupuncture and related therapies together with the benefits of PhotoBioModulation (PBM)”.

The practice of laser acupuncture in China still seems to be in its infancy. Therefore, together with the Austrian project partners in China, a high-quality introduction into the topic is performed. For this purpose, the first textbook report about laser acupuncture and innovative laser medicine in Chinese language has been released recently. Within opinion leader and

student discussions, the important new research field has been promoted in an evidence-based scientific new 'online' way due to pandemic. This offers the opportunity to intensify already existing cooperations.

From Non-Invasive Neuromonitoring to Transcranial Photobiomodulation [2]

Helmet designs have not only been used successfully in integrative medicine for decades in acupuncture research, but they are also increasingly being used in the field of transcranial photobiomodulation (TPBM), primarily in so-called mental diseases. The project leader has been dealing with developed helmet constructions for neuromonitoring for over 25 years and not only gives an overview of the development of these methods, but also shows new methods and perspectives. The future of this branch of research certainly lies in the development of so-called sensor-controlled therapy helmets for TPBM.

The topic of transcranial photobiomodulation and the new future-oriented ideas were presented [a-c] among others in an 'online' meeting organized by the Eurasia Pacific Uninet and the China Academy of Chinese Medical Sciences as part of a keynote lecture on December 7, 2022 (2022 Austria-China Online symposium on Future Trend in Traditional Chinese Medicine; Tencent meeting ID: 335-645-698) [a].

The Future of Laser Acupuncture – Robot-Assisted Laser Stimulation and Evaluation [3]

Laser acupuncture breaks new ground by developing enormously through biomedical engineering equipment and methods from the field of artificial intelligence. ‘Robot-assisted laser acupuncture’ is the future-oriented buzzword. By means of a smartphone and artificial intelligence, it will be possible in the near future to use laser acupuncture as a so-called home treatment method for the benefit of many patients. Within this project a special issue in the renowned journal ‘Life’ entitled ‘Laser Acupuncture: Past, Present and Future’ was developed. In a contribution from the project leader [3] the procedure of laser acupuncture stimulation from the development of the first laser to robot-assisted laser acupuncture is briefly shown. The latter has already become reality and is to be made accessible to a broad group of patients as a home treatment system by researchers from Taiwan in the near future. The new equipment is based on a smartphone with integrated methods of artificial intelligence (e.g. automatic image recognition).

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Lasermedizin. Innovatives Pilotprojekt mit Peking in COVID-19-Pandemie-Zeiten. *Akupunktur & Aurikulomedizin*. 2022; 48(2): 15-20.

[2] Litscher G. Integrative Medicine and Helmet Constructions — A Feature Article about Milestones and Perspectives. *Sci*. 2022; 4(4): 38.
<https://doi.org/10.3390/sci4040038>

[3] Litscher G. The Future of Laser Acupuncture — Robot-Assisted Laser Stimulation and Evaluation. *Life*. 2023; 13(1): 96;
<https://doi.org/10.3390/life13010096>

Presentations

[a] Litscher, G. Transcranial photobiomodulation, photo acupuncture and laser medicine - The importance in COVID-19 era. 2022 Austria-China Online Symposium on Future Trend in Traditional Chinese Medicine; DEC 7, 2022; Beijing, CHINA. 2022. [Keynote lecture; online]

[b] Litscher, G. Transcranial photobiomodulation. International ISLA Congress for Medical Laser Applications; SEP 9-10, 2022; Beverungen, GERMANY. [Keynote lecture]

[c] Litscher, G. Acupuncture research on different continents - Examples of successful cooperations. 1st World Acupuncture Forum; MAR 14-18, 2022; Davos, SWITZERLAND. 2022. [Keynote lecture; online]

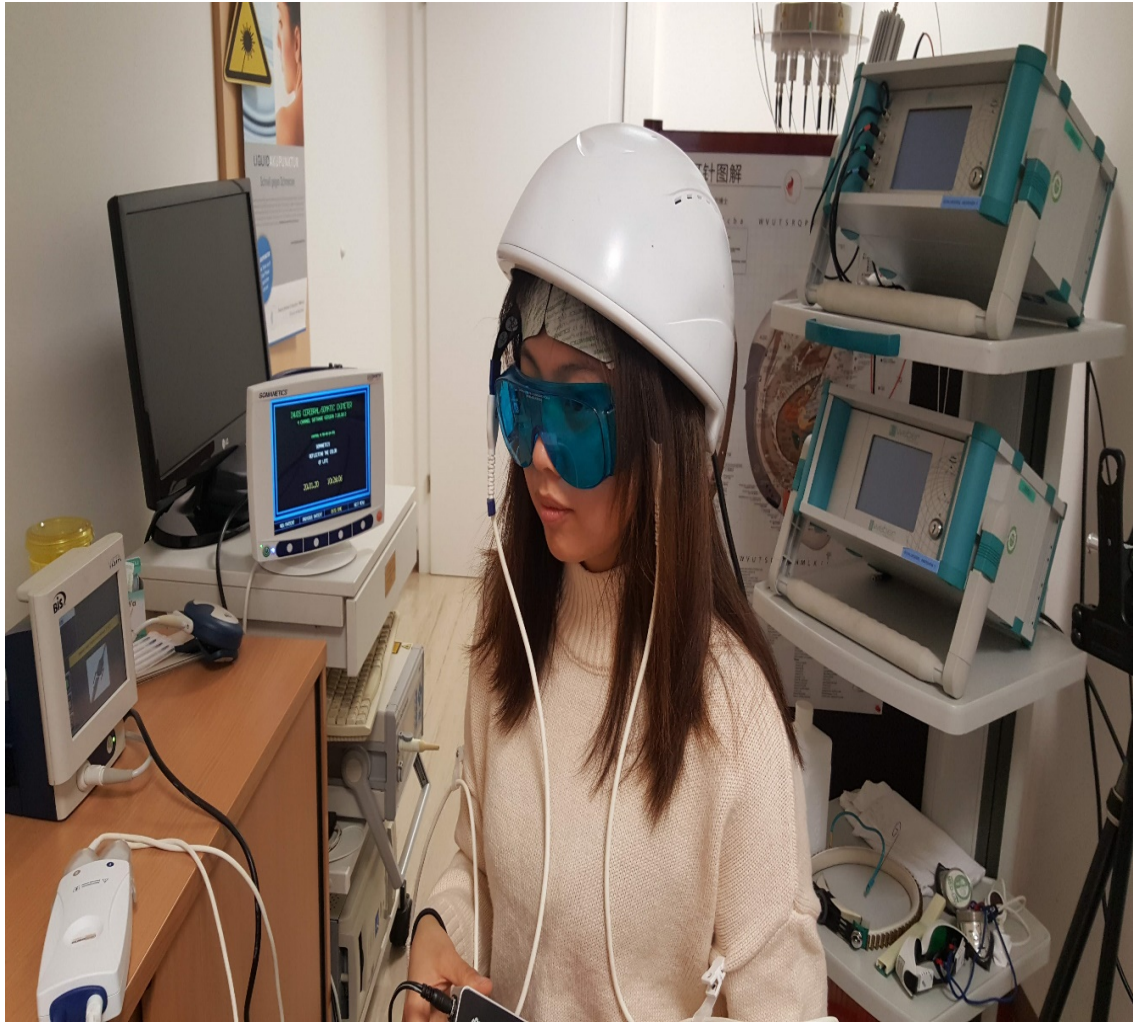


Fig: 1: Cerebral photobiomodulation - Research at the Medical University of Graz (© G. Litscher).

Gerhard Litscher

激光针灸和 新型激光医学

格拉茨医科大学中医药研究中心



第一本中文激光针灸教科书



Fig. 2: Laser Acupuncture and Innovative Laser Medicine. The first basic textbook in Chinese language by Gerhard Litscher.

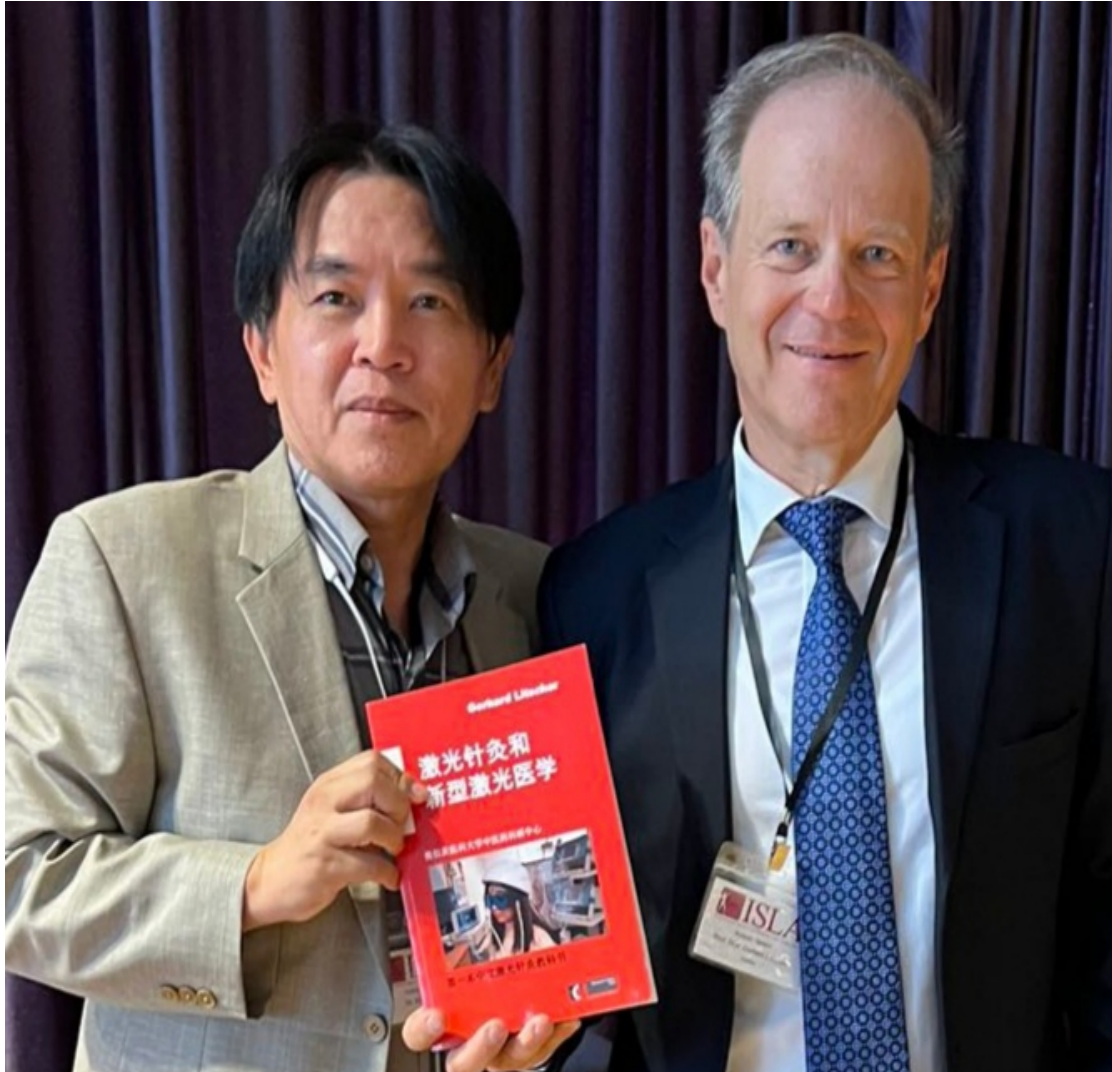


Fig. 3: Promotion of the EPU-project 'Laser Acupuncture and Laser Medicine' in Europe and Asia. (Dr. M. Chen and Prof. G. Litscher at the 21st International ISLA Congress for Medical Laser Applications in Beverungen, Germany, Sept. 2022).

Gerhard Litscher und die Mitglieder des EPU (Eurasia Pacific Uninet) – Projektteams

FORSCHUNG IM BEREICH DER LASERAKUPUNKTUR UND LASERMEDIZIN

Innovatives Pilotprojekt mit Peking in COVID-19-Pandemie-Zeiten

Research on Laser Acupuncture and Laser Medicine

Innovative Pilot Project with Beijing in COVID-19-Pandemic-Times

Zusammenfassung

Dieses innovative Projekt im Rahmen einer erfolgreichen chinesisch-österreichischen Kooperation zur Hightech-Akupunktur zwischen der Pekinger Universität für Chinesische Medizin und der Medizinischen Universität Graz befasst sich mit der Förderung eines neuen Forschungsfeldes mit den Bezeichnungen Laserakupunktur und Lasermedizin. Laserakupunktur ist definiert als „Photonische Stimulation von Akupunkturpunkten und Bereichen, um therapeutische Wirkungen zu initiieren, die denen der Nadelakupunktur und verwandten Therapien ähnlich sind, zusammen mit den Vorteilen der PhotoBio-Modulation (PBM)“. Die Praxis der Laserakupunktur scheint in China noch in den Kinderschuhen zu stecken. Daher wird gemeinsam mit dem österreichischen Projektpartner in China, dem Dekan der Pekinger Universität für Chinesische Medizin, eine qualitativ hochwertige Einführung in die Thematik in Peking durchgeführt. Dazu ist bereits vor kurzem der erste lehrbuchspezifische Bericht über Laserakupunktur und innovative Lasermedizin in chinesischer Sprache erschienen. Im Rahmen von Meinungsführer- und Studentendiskussionen und Vorträgen soll das wichtige neue Forschungsfeld evidenzbasiert wissenschaftlich aufgrund der Pandemie „online“ beworben werden. Dies bietet die Chance, bestehende Kooperationen zu intensivieren und gegebenenfalls nach Zeiten der COVID-19-Pandemie neue gemeinsame Forschungsaktivitäten zu starten.

Schlüsselwörter

Laserakupunktur, Hightech-Akupunktur, chinesisch-österreichische Kooperation, evidenzbasierte Komplementärmedizin, innovative Lasermedizin

Summary


This innovative project within a successful Sino-Austrian cooperation on high-tech acupuncture between Beijing University of Chinese Medicine and Medical University of Graz deals with the promotion of a new research field entitled laser acupuncture and laser medicine. Laser acupuncture is defined as “Photonic stimulation of acupuncture points and areas to initiate therapeutic effects similar to that of needle acupuncture and related therapies together with the benefits of PhotoBioModulation (PBM)”. The practice of laser acupuncture in China still seems to be in its infancy. Therefore, together with the Austrian project partner in China, the dean of the of the Beijing University of Chinese Medicine, a high-quality introduction into the topic is performed in Beijing. For this purpose, the first textbook report about laser acupuncture and innovative laser medicine in Chinese language has been released already recently. Within opinion leader and student discussions and lectures the important new research field should be promoted in an evidence-based scientific new ‘online’ way due to pandemic. This offers the opportunity to intensify existing cooperation and to start possibly new joint research activities after COVID-19 pandemic times.

Keywords

laser acupuncture, high-tech acupuncture, sino-austrian cooperation, evidence-based complementary medicine, innovative laser medicine

Editorial

Integrative Medicine and Helmet Constructions—A Feature Article about Milestones and Perspectives

Gerhard Litscher 

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Abstract: Helmet designs have not only been used successfully in integrative medicine for decades in acupuncture research, but they are also increasingly being used in the field of transcranial photobiomodulation (TPBM), primarily in so-called mental diseases. The author of this article has been dealing with developed helmet constructions for neuromonitoring for over 25 years and not only gives an overview of the development of these methods, but also shows new methods and perspectives. The future of this branch of research certainly lies in the development of so-called sensor-controlled therapy helmets for TPBM.

Keywords: helmet constructions; helmet; acupuncture research; alopecia; transcranial photobiomodulation (TPBM); traditional Chinese medicine; integrative medicine; complementary medicine



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1. Introduction

Helmet constructions play an important role both in acupuncture research and in transcranial photobiomodulation (TPBM) therapy. One can differentiate, on the one hand, between helmets used for diagnostic purposes, which ideally contain numerous non-invasive sensors, and, on the other hand, helmets that primarily have a therapeutic function, for example, in the context of photobiomodulation (PBM) [1].

This article will deal with both variants, since the development and research of both methods reflects, among other areas of research, some of the author's research priorities over the past few decades and represents significant contributions to further research into evidence-based complementary medicine over the past 25 years. The reporting is supplemented by current studies that focus primarily on the latter areas, namely TPBM.

2. Materials and Methods

2.1. Search Strategy


For this article, the databases of PubMed, Google Scholar, and China National Knowledge Infrastructure (CNKI) were searched up to July 2022 (photobiomodulation helmet). The strategy and keywords have been adjusted according to the respective database.

2.2. Database Search

The search query in the databases resulted in a number of articles to be analyzed in more detail by the author (see Figure 1).

Editorial

The Future of Laser Acupuncture—Robot-Assisted Laser Stimulation and Evaluation

Gerhard Litscher 

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Abstract: This brief contribution is part of a Special Issue entitled ‘Laser Acupuncture: Past, Present and Future’ and primarily deals with the future of laser acupuncture from the author’s perspective. The procedure from developing the first laser to robot-assisted laser acupuncture is briefly shown. The latter has already become a reality and, in the near future, will be made accessible to a broad group of patients as a home treatment system developed by researchers from Taiwan. The new equipment is based on a smartphone with integrated artificial intelligence methods (e.g., automatic image recognition).

Keywords: laser acupuncture; laser stimulation; computer-controlled acupuncture; robot-assisted laser acupuncture; smartphone; home treatment; photobiomodulation

1. Introduction

The first laser came into being in 1960 [1]. The history of laser acupuncture (LA) began shortly thereafter. This history was recently summarized in a review article in a comprehensive form [2]. Within the scope of this editorial, a prediction and speculations are made as to how LA could develop further as an independent method and as a procedure in combination with so-called photobiomodulation (PBM) techniques in integrative medicine [3].

2. Definition of Laser Acupuncture

The number of LA studies listed in the Science Citation Index (SCI) and PubMed databases is steadily increasing. In Pubmed, there are 1188 articles on this topic as of 22 December 2022. The approved definition of LA and all kinds of photo acupuncture is: “Photonic stimulation of acupuncture points and areas to initiate therapeutic effects similar to that of needle acupuncture and related therapies together with the benefits of PBM” [4].

3. State of the Art and Future Aspects of Laser Acupuncture Stimulation

3.1. State of the Art

A repeated question regarding LA is that it only has limited stimulation methods. With manual needle acupuncture, for example, you can influence different stimulation modalities (lifting and thrusting the needle or rotating techniques), which should more complex with LA. But that is not true. Quite the contrary, with LA, there have recently been more stimulation options than with needle acupuncture.

These stimulation techniques are as follows:

Continuous wave stimulation.

Different frequencies.

Changing the focal point of the laser.

The most commonly used method is laser stimulation (continuous wave mode; cw). Most of the scientific articles concern laser cw stimulation. The wavelengths used in this



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Can Chinese herbal medicine play a role for preventing and treating COVID-19 in Europe?

PROJECT

4/2020

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Report

1. Brief introduction of the project:

Traditional Chinese medicine (TCM) is not only an effective solution for primary health care, but also a great resource for drug innovation and discovery (1). Traditional Chinese herbal medicine (CHM) has long history for preventing and treating different diseases cause by virus (2). Huangdi's Internal Classic (Huang Di Nei Jing), a Chinese ancient internal classic

recorded use of CHM to prevent and treat epidemics of infectious diseases including contagious respiratory virus diseases.

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by SARS-Cov-2 virus, resulting in severe acute respiratory syndrome, with high potential of spreading and infecting humans worldwide. The common symptoms of COVID-19 include fever, cough, and shortness of breath. In severe cases, pneumonia may occur and ultimately lead to organ failure and even death. Since December 2019, an outbreak of COVID-19 occurred in Wuhan and rapidly spread to many parts of China, and is currently posing a huge impact globally. This was followed by prevention programs recommending Chinese medicine (CM) in China. Chinese herbal medicine was incorporated into the Chinese national guideline for COVID-19 management, emphasizing the individualization of herbal treatment guided by pattern differentiation, which is a WHO releases new International Classification of Diseases (ICD-11) endorsed the approach (3).

Based on the historical records and ancient literature, as well as the clinical experience of SARS and H1N1 influenza prevention and treatment, CHM formula could also be an alternative approach for preventing the COVID-19. Therefore the CHM prevention and treatment programs were established in 23 provinces in China (4). Traditional Chinese herbal medicine approaches including oral administration of preventive herbal formulae, wearing herbal sachets, indoor herbal medicine fumigation were

recommended for prevention and treatment of COVID-19 in China. The results of the studies showed that the infection rate in the herbal formulae group was significantly lower than that in the control group (4). 26 traditional medicine guidelines that provide treatment measures for COVID-19 were issued in China (5).

The main principles of CHM used for preventing and treating the COVID-19 pandemic are to tonify qi (improve immune system) to protect from external pathogens, disperse wind and discharge heat, and resolve dampness according to Traditional Chinese Medicine (TCM) basic theory. The most frequently used herbs for the prevention and treatment programs included Radix astragali (Huangqi), Radix glycyrrhizae (Gancao), Radix saposhnikoviae (Fangfeng), Rhizoma Atractylodis (Baizhu), Flos Lonicerae (Jinyinhua), and Fructus Forsythia (Lianqiao). The most chosen herbal formulae were Xiaojin Dan (consists of 10 herbs), Sheng San Zi (consists of 21st herbs), Yupingfeng Powder (consists of 3 herbs) plus Sangju Decoction (consists of 8 herbs) (4).

2. Joint Meetings in Beijing, in Nanjing, China and in Vienna, Austria via Skype/Webex

The meetings of the joint project on “Can Chinese herbal medicine play a role for preventing and treating COVID-19 in Europe?” were held in 2021, 2022 in Nanjing, in Beijing as well as in Vienna several times via Skype/Webex/WeChat. The partners of both sides joined 2022 Austria-

China Online Symposium on Future Trend in Traditional Chinese Medicine on December 7th, 2022. Prof. Ma gave a presentation of “Chinese herbal medicine for hospital staff and Long COVID patients”. Several scientific articles have been prepared and published in the international top journals.

3. Exchange activities in China and in Austria during this project

PhD students Ms. Tang Mo and Ms. Zhao Ning from Xiyuan Hospital, China Academia of Chinese Medicine Sciences, Beijing, China visited the Medical University of Vienna from 1st November 2021 to 28th February 2022 and from 13rd October 2021 to 4th November 2022, respectively. They join our Thesis Seminar of “New Developments and comparative aspects in allergology, oncology and immunology”, “Progress Report in Comparative Allergology, Oncology and Immunology” and Journal Club of Molecular Research in Traditional Chinese Medicine Science. Austrian PhD student Ms. Jiang Tianchi, visited Prof. Dr. Songlin Li, Director of Research Division of Clinical Pharmacology, The First Affiliated Hospital of Nanjing Medical University, in Nanjing, China from 6th January 2023 to 20th February 2023 and performed the data analysis of herb medicine together with Prof. Li’s colleagues.

4. Publications

- Xuanbin Wang, Yan Ma, Qihe Xu, Alexander N Shikov , Olga N Pozharitskaya, Elena V Flisyuk, Meifeng Liu, Hongliang Li, Liliana

Vargas-Murga, Pierre Duez: Flavonoids and saponins: What have we got or missed? *Phytomedicine* (2022), Volume 109, January 2023, 154580. IF: 6.656

- Ning Zhao, Ying Wang, Yan Ma, Xiaoxue Liang, Xi Zhang, Yuan Gao, Yingying Dong, Dong Bai And Jingqing Hu: The Effects of Jia-Wei-Si-Miao-Yong-An Decoction in Regulating Intestinal Flora and Metabolites in Acute Coronary Syndrome. *Front. Cardiovasc. Med. Sec. Coronary Artery Disease*. doi: 10.3389/fcvm.2022.1038273. IF: 5.846, TOP
- Wenting Wang, Lei Song, Lin Yang, Changkun Li, Yan Ma, Mei Xue, Dazhuo Shi: Panax quinquefolius saponins combined with dual antiplatelet therapy enhanced platelet inhibition with alleviated gastric injury via regulating eicosanoids metabolism in a rat model of acute myocardial infarction. *J Ginseng Res*. IF: 6.060, TOP in press.
- Wenting Wang, Lei Song, Lin Yang, Changkun Li, Yan Ma, Mei Xue, Dazhuo Shi: Panax quinquefolius saponins combined with dual antiplatelet therapy enhanced platelet inhibition with alleviated gastric injury via regulating eicosanoids metabolism in a rat model of acute myocardial infarction. *J Ethnopharmacol*. IF: 4.36, TOP in press.
- Wu Z, Zhang X, Wang W, Zhang D, Ma Y, Zhang D, Meng C: Fructus Mume (Wu Mei) Attenuates Acetic Acid-Induced Ulcerative Colitis by Regulating Inflammatory Cytokine, Reactive Oxygen Species, and Neuropeptide Levels in Model Rats. *J Medicinal Food*. 2022

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- Zhang L, Huang X, Cao Y, Geng Q, Ma Y, Zhang G: Analysis of clinical application of “Harmonizing Ying Wei” in the treatment of insomnia. Chinese J TCM. March 2022, Vol.37, No.3.

- Zhang L, Huang J, Zhang D, Lei X, Ma Y, Cao Y, Chang J: Targeting Reactive Oxygen Species in Atherosclerosis via Chinese Herbal Medicines. Oxid Med Cell Longev. 2022 Jan 10;2022:1852330. doi: 10.1155/2022/1852330. eCollection 2022. PMID: 35047104. IF: 6.543,

TOP

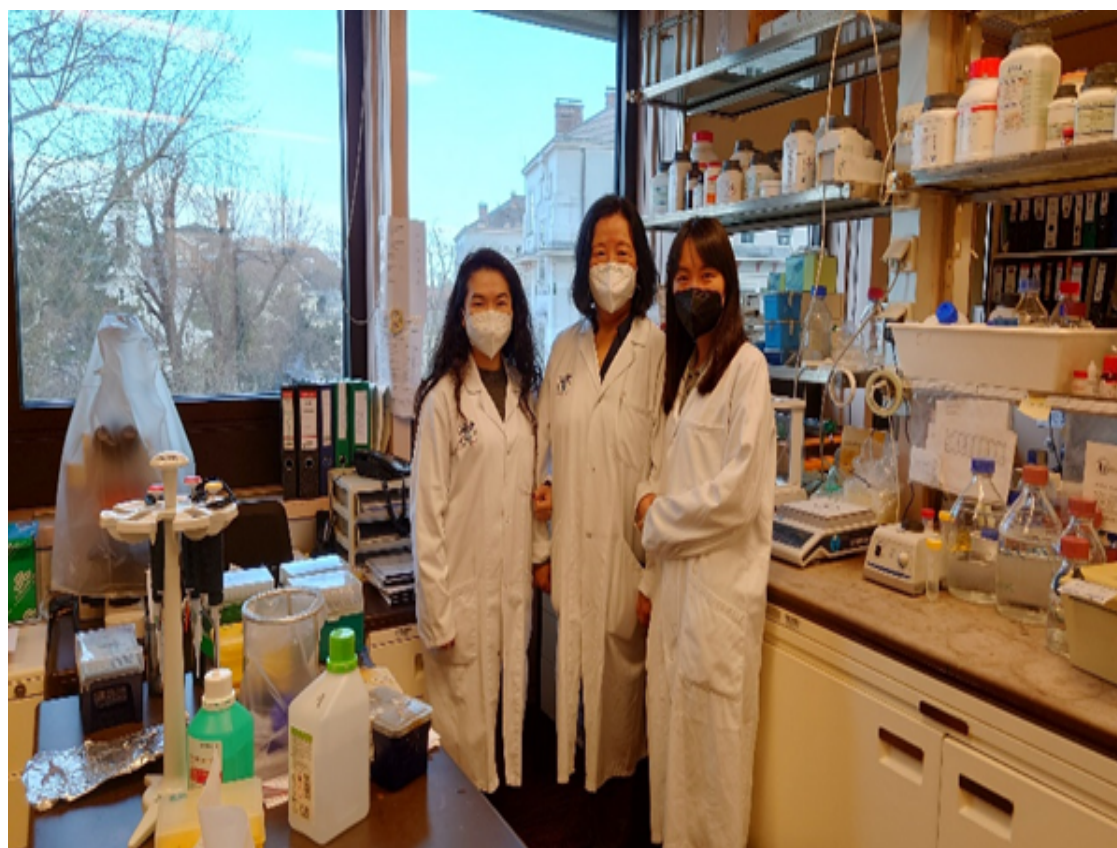


Fig 1: Chinese exchange PhD students Ning Zhao (3.10.2021 – 4.11.2022) and Mo Tang (1.11.2021 - 28.02.2022) were doing research experiments in the laboratory of the Department of Pathophysiology and Allergy Research at the Medical University of Vienna.



Fig 2: Chinese exchange PhD student Ning Zhao was doing research experiments together with our medical student in the laboratory at the Medical University of Vienna

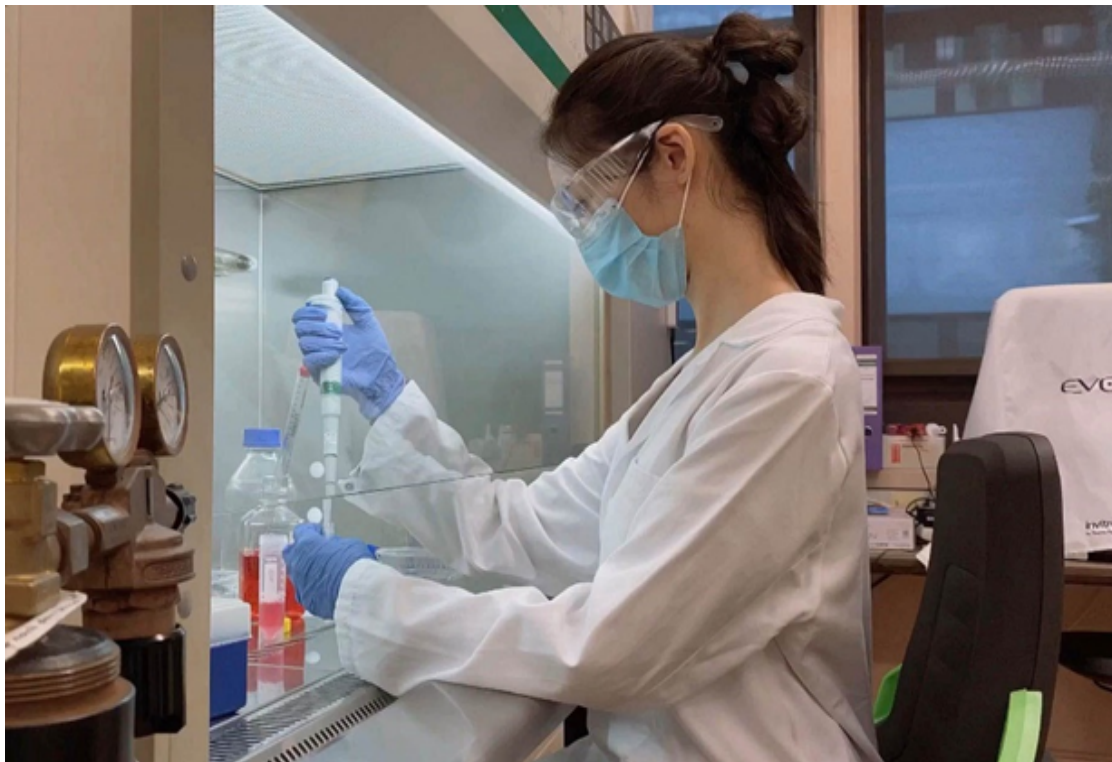


Fig 3: PhD student Tianchi Jiang from Medical University of Vienna was doing research experiments at the First Affiliated Hospital of Nanjing Medical University, Nanjing, China together with Prof. Songlin Li's colleagues.

Traditional Mongolian Veterinary Medicine (TMVM21)

PROJECT

6/2020

Stephan Kloos ÖAW Institut für SozialanthropologieMedical

Gunbilig Disan Mongolian Academy of Sciences

Report

This project aimed to initiate an interdisciplinary effort to study, document, and assess traditional veterinary medicine in Mongolia through an integrative approach consisting of biological, phytochemical, sociocultural, and historical expertise. For this purpose, my local project partner Gunbilig Disan and I successfully conducted a pilot study from 5-19 July in Ulaanbaatar and Dundgovi and Ömnögovi provinces in Mongolia. A one-day symposium took place on 7 July at the Mongolian University of Science and Technology (MUST) in Ulaanbaatar, with 6 speakers (including Gunbilig and me) and about 20 local experts.

Networking visits and interviews were conducted at the Institute for Veterinary Medicine (Mongolian University of Life Sciences), the International Institute for the Study of Nomadic Civilizations (UNESCO), the Mongolian Academy of Sciences (MAS), and the National University

of Mongolia. Furthermore, we had discussions with a number of traditional Mongolian medicine experts and regulators on traditional Mongolian veterinary medicine. On a 5-day field trip to Dundgovi and Ömnögovi provinces, my collaborator Gunbilig Disan could collect medicinal plant samples in the Gobi desert, while we both conducted interviews with nomadic herders in the region.

Altogether, 12 in-depth interviews were carried out with various experts, herders, and stakeholders; Mongolian language primary sources and literature were located and partially scanned; and a number of plant samples were collected for biological/chemical analysis at the MAS and BOKU Wien. Existing networks in Mongolia were strengthened and new networks created, leading to a new Memorandum of Understanding between the ÖAW Institute for Social Anthropology and the National University of Mongolia (NUM) (to be signed in October). Besides analytic reports on the collected plant samples, the main outcome of this project should be a larger follow-up project proposal.

Mongolian herders traditionally use a number of herbal remedies and external therapies (e.g. bloodletting), and with official veterinary services being inadequate in the countryside, the herders increasingly use them again in an effort to reduce dependence on state services.

This knowledge is transmitted informally from generation to generation and varies strongly across different families and regions (we collected

some of this knowledge in the Gobi). At the same time, old Mongolian scriptures exist in Tibetan language (written by lama emchi) on veterinary medicine (we located a number of important old scriptures and newer studies thereof). Although these scriptures and their knowledge are usually not available to herders, traditional herbal products based on this knowledge are popular among herders if and when they are available. Thirdly, efforts are made at the Institute for Veterinary Medicine to revive traditional Mongolian veterinary medicine by developing herbal products for veterinary services, based on these old scriptures, herders traditional knowledge, and biological research. We visited this institute, had in-depth interviews with researchers there, and were shown (and photographed) samples of these products.

However, although over 100 such products have been developed so far, none of them is commercially available, due to reasons of policy and administrative structures.

In general there exists great interest (both scholarly and practical) in Mongolia to conduct more collaborative, interdisciplinary research on the topic, which is seriously underresearched.

It is also clear that the topic touches on, and combines, many different contemporary issues, from veterinary medicine to zoonotic epidemics to climate change, from global capitalism to national politics, and from old knowledge to new scientific innovations.

Art & Anthropology.
Scientific-Artistic Research between
Mongolia and Austria

PROJECT

7 / 2020

Maria-Katharina Lang Österreichische Akademie der Wissenschaften,
Institut für Sozialanthropologie

Baatarnaran Tsetsentsolmon National University of Mongolia,
Department Anthropology and Archeaology

Uranchimeg Dorjsuren Mongolian National University of Arts
and Culture, School of Fine Art and Graphic Design

Report

Within the project transdisciplinary workshops and project meetings were organised to discuss experiences with artistic-scientific collaborative work and to initiate new coopeartion. One main aim of the workshops and the meetings was to elaborate on concepts for artistic-scientific projects, which would form an integral part of future exhibitions.

Workshop I in Ulaanbaatar (27/06/2022)

The major workshop took place in Ulaanbaatar at the Gallery of Artist's Union in cooperation with the Academy of Fine Art and National

University of Mongolia (NUM), including a focus on the history and recent developments of “Mongol Zurag” (Mongolian painting style).

Mongol Zurag as technique has been continued and revived in new ways by some of the participating artists. Mongol Zurag is a unique style which flourished as an art form of national identity and neo-traditional style in the late 1950s and 1960s in Mongolia after the first professionals were trained in the Soviet Union. It was developed as a new traditional style of painting ‘to protect Mongol identity and nomadic traditional culture against the totalitarian Sovietisation campaign’. The opening notes by Tsetsentsolmon Baatarnaran and Dr. Lang were followed by the key note „Dust & Silk“: Exhibition Concept, Designing and Displaying“ by Christian Sturminger and Dr. Lang. Prof S. Ganzam gave the presentation „Mongol Zurag Programme at the Academy of Fine Art“ followed by Prof. G. Amarsanaa’s talk on „Traditional Method and Technology of Mineral Colour“ and Dr. Lhagvademchig Jadamba (NUM) presentation „The Visual Representation of the Buddhist Concept“. The presentation were followed by rounds of discussion. After a joint lunch a workshop together with the artists Baatarzorig, Baterdene Batchuluun, Nomin Bold and Khosbayar Narankhuu were held. Within the workshops new trends in Mongol Zurag and contemporary Mongolian art were discussed as well as the participation and possible contributions of the artists to a new exhibition at the Völkerkundemuseum VPST in Heidelberg (Germany) in 2023.

Workshop II & III in Vienna & Ulaanbaatar

A smaller workshop in Vienna took already place at Weltmuseum Vienna in April 2022 and another in October 2022 with participation of the artists Nomin Bold and Baatarzorig as well as Ts. Baatarnaran, Dr. Lang and Christian Sturminger (artist and exhibition designer).

Results and Sustainability

Both workshops served to prepare articles and to create new drafts for projects and exhibitions. With the workshops we started and continued innovative artistic-scientific processes and dialogues between Ulaanbaatar and Vienna and beyond. They focused on intersections and entanglements of tradition and modernity approaching from both artistic and anthropological perspectives. It was an excellent opportunity for Austrian and Mongolian researchers and artists to exchange theoretical knowledge and artistic practices and enhance networking. The project contributed to finish a co-authored research article by Baatarnaran and Lang, document interviews and to develop concepts for future projects and exhibitions. Some results will be incorporated in the upcoming exhibition „Dust & Silk“ at Völkerkundemuseum VPST in Heidelberg (Germany) opening in May 2023. Continuing the well-established cooperation between Austrian and Mongolian scientific and artistic institutions, it will enable further possibilities to expand this important and valuable cooperation with special

emphasis to art-based research.

The project was a result of the series of previously implemented projects with the generous initial support of EPU. The exchange will lead to new project ideas and the development to new larger cooperation projects including Mongolian and Austrian participants and institutions. Not least, through the project the existing collaboration between the Austrian Academy of Sciences and Mongolian institutions will be further strengthened and the endeavours strengthen Mongolian Studies internationally, in this case in Austria and the Institute for Social Anthropology, will be given further support. More than ever it is important to spread and deepen the knowledge of the specifics of Mongolian culture, history and art internationally.

ART & ANTHROPOLOGY. Artistic—Scientific Collaboration between Mongolia and Austria

Date: 27 June, 2022

Venue: Gallery of Artists' Union (Ulaanbaatar)

Programme

- 11:00— 11:10 Opening notes
Dr. Tsetsentsolmon Baatarnaran (Department of Anthropology and Archaeology / National University of Mongolia)
& Dr. Maria-Katharina Lang (Institute for Social Anthropology / Austrian Academy of Sciences)
- 11:10— 11:30 „Dust & Silk“: Exhibition Concept, Designing and Displaying
Dr. Maria-Katharina Lang (DeAW), Mag. Christian Sturminger
(project partner and exhibition designer, Vienna)
(Exhibitions “Dust & Silk “at Weltmuseum Wien and
“Steppe & Silk Roads”at MARKK in Hamburg)
- 11:30— 11:45 Mongol Zurag Programme at the Academy of Fine Art
Prof. S. Ganzam (Department of Traditional Art / Academy of Fine Art)
- 11:45— 12:00 Traditional Method and Technology of Mineral Colour
Prof. G. Amarsanaa (Department of Traditional Art / Academy of Fine Art)
- 12:00— 12:20 Visual Representation of Buddhist Concept (working title)
Dr. Lhagvademchig Jadamba (Department of Anthropology and Archaeology / National University of Mongolia)
- 12:20— 12:45 Coffee Break
- 12:45— 13:45 Workshop with artists on contemporary art in Mongolia and artistic-scientific research (Baterdene Batchuluun, Nomin Bold, Khosbayar Narankhuu and Baatarzorig)
- 13:45— 13:50 Closing remarks
- 14:00 Lunch for speakers

Cooperation partners *Austrian Academy of Sciences, National University of Mongolia, Academy of Fine Art in Ulaanbaatar, Union of Mongolian Artists*

Project Funding *Eurasia Pacific Uninet (EPU), FWF / PEEK-AR 394-624*

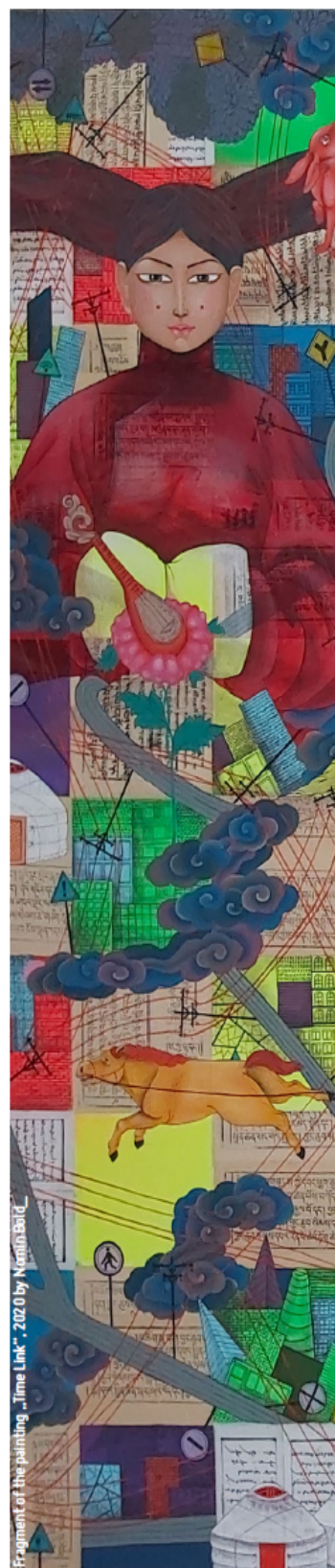


ÖAW
ÖSTERREICHISCHE
AKADEMIE DER
WISSENSCHAFTEN

EURASIA-PACIFIC
UNET

FWF

Der Wissenschaftsfonds.



Smart Public Participation

PROJECT

8 / 2020

Josef STROBL ÖAW, Kommission Geographic Information Science

Ainura NAZARKULOVA Universität Salzburg, Fachbereich

Geoinformatik

Harald VACIK Universität für Bodenkultur Wien, Institut für Waldbau

Gernot PAULUS Fachhochschule Kärnten, School of Geoinformation

Gulshaan ERGESHOVA Osh Technological University

Madiyar KADYLBEKOV Al-Farabi Kazakh National University

Asselkhan ADRANOVA Korkyt Ata Kyzylorda State University

Erkinbek ASHYROV Naryn State University

Zamirakhon KODIROVA Tajik Agrarian University

Tatygul URMAMBETOVA Kyrgyz State University of Construction,

Transport and Architecture named after N.Isanov

Report

This initiative aimed at enabling teachers and academic researchers from the Central Asia region to set up mobile (smartphone based) geolocated interactions related to current societal needs and issues.

Dr. Ainura Nazarkulova was visiting KSUCTA in August, 2022 and introducing SPP initiative.

Prof. Dr. Josef Strobl visited KSUCTA in December, 2022 to analyze and discuss results of the project. In addition, he was giving a lecture and conducting interviews with incoming students and faculty.

Dr. Shahnawaz was visiting Kazakh National University and Kyrgyz State Technical University (formerly KSUCTA) in December 2022. During his stay, he was conducting workshop for MSc and PhD students at KSTU. At KazNU 22 PhD students and and junior faculty were participating in his workshops.

PhD students Kelinbayeva Rosa from KazNU and Kydyr Nazarkulov from KSUCTA were actively joining the GI_Salzburg conference in July 2022 and participated in teaching module development workshops where geolocated public participation applications were introduced and used by participants.

Dr. Dinara Abiyeva from the Kazakh National University during her stay in Austria was focusing on Public Participation GIS tool sets, its design and use. She was also attending classes and practicing new teaching approaches. Her e-portfolio story map is available here <https://zgis.maps.arcgis.com/apps/MapSeries/index.html?appid=ee809d0dbf004b01b50e2c21dbeb6313> .

PhD students Gulshaan Ergeshova and Gulzara Mamazhakypova from Osh

Technological University conducted a short intensive visit to Austria in December, 2022. They focused on designing a QuickCapture survey for simple interface mobile data acquisition. By configuring such online apps as feedback channels from a general public towards decision making bodies, a framework for structured participation by stakeholders in designing their future environments and livelihoods was prototyped by visiting scholars.

Due to difficulties caused by the global situation most of the targeted academics from Central Asia could not use this opportunity to visit Austrian institutions, the budget therefore was not fully used as it unfortunately could not be transferred into 2023.

to conduct field research and obtain missing data material (documentation, photographs, measurements, material samples) for the FWF-funded research project. Rohit Ranjitkar and Swosti Kayastha – colleagues in Nepal – supported the team in arranging meetings/interviews with local stakeholders. The team introduced the work and activities of Institute of Conservation in Patan as well as the collaboration with Kathmandu Valley preservation Trust (KVPT), Patan Museum and Lumbini Buddhist University to the new UNESCO representative of Nepal, Mr. Croft. Some ideas of probable collaboration were discussed. Among them e.g. a small seminar on conservation connected to the “50 years of WH Convention” which could be supported by UNESCO, also to raise public awareness. Further, Mr. Croft suggested to add the Institute to the scientific committee for Kathmandu Valley and also to involve the Institute as consultant in the conservation at Lumbini (WH site). UNESCO Office will further support the Institute in establishing further contacts to Nepalese universities. For the FWF-project a number of samples from stones, mortar, terracotta and plaster were taken from monument at Patan Durbar Square for further analyses in Vienna in order to close knowledge gaps. Further, photographic documentation and measurements were done.

This visit also served as a basis for the conservation campaign to follow from mid-August to mid- September 2022 where approximately 20-25 persons (students and staff) are planned to participate.



Fig: 1: Overview of the Patan Durbar Square.

© Institute of Conservation, University of Applied Arts Vienna, photo by Martina Haselberger, Katharina Fuchs



Fig: 2: Problem of salt efflorescence in Tusha Hiti, Royal Palace.

© Institute of Conservation, University of Applied Arts Vienna, photo by Martina Haselberger, Katharina Fuchs



Fig: 3: Sampling to research the material. © Institute of Conservation, University of Applied Arts Vienna, photo by Martina Haselberger, Katharina Fuchs



Fig: 4: Meeting of the team with Austrian Ambassador on-site.

© Institute of Conservation, University of Applied Arts Vienna, photo by Martina Haselberger, Katharina Fuchs

Summer Conservation Campaign in Nepal

Outgoing - Katharina Fuchs, Marta Anghelone, Franziska Marinovic

15.08-13.09.2022

Another project that could be realised with the grant from EPU was the summer conservation campaign in Patan, Nepal. Six senior conservators and eleven students worked on-site from August 15th till September 12th.

For the first time not only students from the diploma study programme of the Institute of Conservation but also from the newly established joint Master programme (Cultural Heritage Conservation and Management) could join. In addition, students of the Lumbhini Buddhist University in

Kathmandu and staff of the Patan Museum collaborated in the conservation projects.

Together many projects could be realised in the work period of four weeks.

The work included the maintenance of stone sculptures and fountains at the Royal palace. These showed heavy salt efflorescences. Firstly, samples were taken for analyses. The maintenance care included removing damaged joint mortar and repointing the joints, surface cleaning, and salt reduction. The local partners were instructed how to monitor the hiti and a monitoring concept was prepared. Another project, the conservation of the metal parts of the Degu Taleju Temple was done by the object-conservators. These consisted of dismantled top fire-gilded pinnacles and metal decorations. They were cleaned dry with brushes and wet with water and citric acid. Corrosion could be reduced with fibre glass pens and steel brushes. The conservators of the object conservation department also cleaned a silver shrine with Polyurethane sponges.

One of the three famous ivory windows is no longer on display due to its fragile state. It is exhibited inside the museum behind a glass. Upon closer inspection it became apparent, that it needed consolidation of many loose parts – this, as well as the cleaning of the surface was executed. A polychrome wooden relief, which was gifted to the museum, depicting a hindu goddess was consolidated and cleaned.

For many years the Tantric Royal Shrine was hidden in a small room in the

palace behind a multitude of other objects. They were cleaned away and the esoteric shrine can be experienced again. A discussion was carried through with the museum director concerning preventive measures to get rid of the rats that enter the room and the altar.

Another big project, tackled by a wall painting and paintings conservator was the conservation of two wall paintings in the Sundari Chowk. They needed conservation especially due to long cracks that were caused by the earthquake in 2015. These, as well as flaking paint layers, were consolidated after a dry cleaning with brush and sponges. The edges were repaired and hollow spaces were filled by grout injection. Old infills were afterwards retouched.

As the museum wants to reopen another part of its gallery again to the public, a team of four students and one senior conservator carried through the collection care and the re-shifting of the museum objects from temporary to other galleries. Due to the sealing of the showcases with bitumen and the humid climate, mold grew inside. The mold could be removed with an alcohol water mixture and the glue was reduced. All the objects inside the showcases were taken out, cleaned, corrosion was reduced if necessary and then mantled back.

While these conservation projects were going on, members of the UNESCO Office and TU Graz visited the Patan Durbar Square and were guided by the Institute's team and introduced to the ongoing projects.



Fig: 5: Cleaning of royal tantric shrine.

© Institute of Conservation, University of Applied Arts Vienna, photo by Barbara Rankl



Fig: 6: Retouching of a wall painting.

© Institute of Conservation, University of Applied Arts Vienna, photo by Martina Klinkert



Fig: 7: Wall painting after conservation treatment.

© Institute of Conservation, University of Applied Arts Vienna, photo by Martina Klinkert



Fig: 8: Group picture of the conservators' team.

© Institute of Conservation, University of Applied Arts Vienna, photo by Rohit Ranjitkar

Meeting to strengthen Austria-India collaboration

Incoming - Achal Pandya 21.08-24.08.2022

Indira Gandhi National Centre for the Arts (IGNCA) is a partner institution of the Institute of Conservation, University of Applied Arts Vienna, and is also an EPU member. Prof. Achal Pandya, Head, Department of Conservation, IGNCA, and Prof. Gabriela Krist, Head, Institute of Conservation, University of Applied Arts Vienna, held rounds of meetings in Vienna to identify the challenges in the field of conservation of cultural heritage in both the institutions, and ways in which this collaboration could be more fruitful in addressing these issues. Prof. Achal Pandya described the current assignment of planning a new storage for textiles in Crafts Museum, New Delhi and sought expertise of the textile conservators of the Institute of Conservation to conduct a workshop in order to train the students and staff of IGNCA who must carry on this task following the international set of standards. The idea of re-launching the summer school, as well as participation of students from IGNCA in courses led for MA Cultural Heritage Conservation and Management by the Institute have also been put forth for consideration. The opportunity was further used to show various facilities of the Institute to Prof. Pandya. As well, a meeting was held with Dr. Farkas Pinter, Senior Lecturer in the Conservation Science department to understand the research areas of the Institute. It has been further agreed to identify areas where mutual knowledge building between

both the institutions could be realised.

On this occasion, both the institutions signed a Memorandum of Understanding outlining the above-mentioned proposals, as well as IGNCA now becomes the official partner of the Institute in carrying out conservation projects in Nepal.



Fig: 9: MoU signed by Prof. Gabriela Krist and Prof. Achal Pandya.

© Institute of Conservation, University of Applied Arts Vienna, photo by Marion Haupt



Fig: 10: Meeting to intensify Austria-India collaboration.

© Institute of Conservation, University of Applied Arts Vienna, photo by Marion Haupt

Workshop in India

Outgoing - Carine Gengler, Hilde Neugebauer 21.11.-25.11.2022

The workshop “Storing Textiles – a Practical Approach” took place at the National Crafts Museum, New Delhi, India and was held by a team of the Institute of Conservation (Carine Gengler, Hilde Neugebauer). The 25 participants were composed of students and staff members of the Indira Gandhi National Centre for the Arts (IGNCA).

Following a first workshop in 2020, this time the focus was set on the practical implementation of storing textiles. As the National Crafts Museum is planning a new storage for its textile collection, this was a great opportunity for staff members, as well as the attending students to be introduced and trained in handling and packing of textiles. In the first three days, handling and packing of textiles was demonstrated and eventually practiced by the participants. Especially large two-dimensional textiles were treated, and different options were shown. The museum kindly provided the participants with shawls and other traditional flat textiles like saris for the participants to put their knowledge into practice. As it is immensely important that textiles are stored without creases and folds to reduce the risk of fibre breakage, they were either folded over paper rolls in order to be packed in large boxes or they were rolled on previously prepared tubes in order to be stored on a tube or roll rack. Also, three-dimensional textiles, like costumes or head dresses were padded and

different support materials were tested. Beside hands on exercises, theoretical lectures were given to introduce which materials can be safely used in a textile storage. A focus was laid on materials available in India and alternatives which can be used if certain materials are unavailable or too cost intensive. In critical discussions the actual storage situation was analysed and compared to actual standards for textile storages.

On both final days, the participants could demonstrate their newly acquired skills by packing selected objects of the collection for the planned long-term storage. A very large tent fragment was padded and folded and a collection of purses was packed in acid free boxes and prepared for the new storage.

At the end of the week, both IGNCA and the museum can resort to a large amount of motivated and trained conservators, to carry out the great task of relocating the museum's textile collection to its new storage.

Publications and presentations in conferences on all projects are underway.



Fig: 11: Preparation for the packing of the flat textile.

© Institute of Conservation, University of Applied Arts Vienna, photo by Carine Gengler, Hilde Neugebauer



Fig: 12: Rolling of textile for better storage.

© Institute of Conservation, University of Applied Arts Vienna, photo by Carine Gengler, Hilde Neugebauer

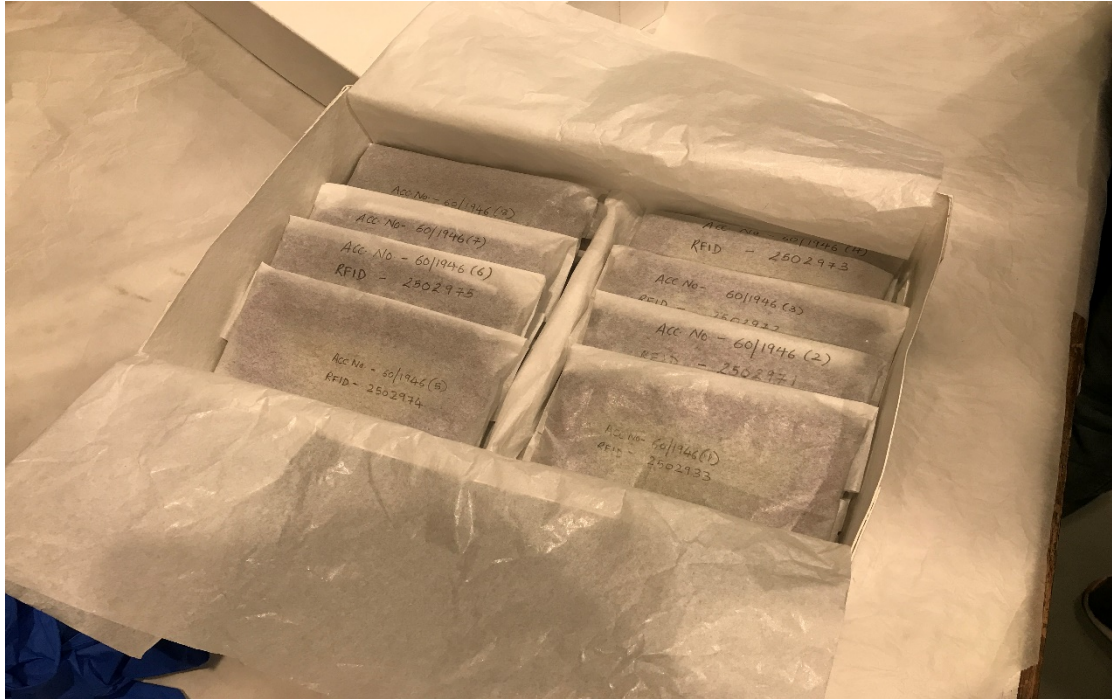


Fig. 13: Packing of textile purses in acid-free tissue paper.

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Fig. 14: Group photo of the workshop participants.

© Institute of Conservation, University of Applied Arts Vienna, photo by Carine Gengler, Hilde Neugebauer

Biodiversity at the southernmost forest strips
in Mongolia: first assessment of species status
and anthropogenic impact

PROJECT
12/2020

Florian KUNZ, Klaus HACKLÄNDER Universität für Bodenkultur
Wien, Department für Integrative Biologie und Biodiversitätsforschung,
Institut für Wildbiologie und Jagdwirtschaft

Ariunbold JARGALSAIKHAN, Onolragchaa GANBOLD, Erdenetushig
PUREVEE Mongolian National University of Education, Department
of Biology

Report

Introduction

With only 7.6% of the area covered by forests, Mongolia is a country characterized mainly by steppe and mountainous habitats. Hence, forest habitats are especially valuable for biodiversity, potentially hosting a wide range of different species. Yet, these forested areas become more and more impacted by an increasing human interest for timber, threatening their biodiversity.

To acquire fundamental knowledge about the species inhabiting these areas, we conducted a wide array of scientific sampling methods within three selected study sites. Our findings contribute to the knowledge about Mongolian forested habitats and are of major importance for further Mongolian nature conservation endeavors.

Study sites in Mongolia

Site #1: Nagalkhaan Mountain Nature Reserve This nature reserve was designated as a reserve to protect the southernmost part of the Khentii mountain range and its surrounding forest-steppe. It was initially established as Strictly Protected Area in 1957, but has been re-established as Nature Reserve within the Mongolian Protected Area network in 1995. The area consists mainly of Larch forests and mountain steppes.

Site #2: Shatan River Basin This site belongs to the Tuul River basin and Orkhon-Selenge basin. Common habitats consist of mixed forest (trees are larch and birch) on the mountain slopes and water meadows of the Kharaa, Ulgii and Shatan rivers. Our study area also included the Khan Kentii Natural Park.

Site #3: Khustai National Park The Khustai National Park (KhNP) was listed as a National Park in 1993. It is famous for the reintroduction of the Takhi (wild horse, *Equus przewalskii*). The National Park extends through the Khentii Mountains and includes the western edge of the Mongolian

steppe at the boundaries of Altanbulag, Argalant and Bayankhangai villages of Tov Province.

Mammal diversity

In each of the three survey plots we put up Sherman traps and pitfall traps and took measurements of the trapped small mammals. Traps were put up in the evenings along trapping lines and were baited with a mixture of cereals and fat. Early in the mornings, the traps were emptied to prevent heat stress during day. The measurement data is being used for long term studies and is collected by the Mongolian scientist on every possible occasion. We observed more frequent occurrence of Mongolian silver vole (*Alticola semicanus*) and Brandt's vole (*Lasiopodomys brandtii*) along habitats of dry steppe, whereas in humid valleys and along river banks the dominant species and only species we were able to trap was the Mongolian vole (*Microtus mongolicus*). Additionally, a method to count burrows was designed that should be tested for its effectiveness to conclude on species abundance. Other small mammal species that were observed, but not caught, were a member of the Dipodidae family (Jerboa): these are nocturnal inhabitants of the dry steppe, as well as a Gerbil (possibly *Meriones unguiculatus*) that also occurs close to human settlements.

Medium sized and large mammals were recorded using camera traps. In doing so, eight camera traps were brought into the field and deployed on

sensitive areas, resulting in presence evidence of several deer species. Additionally, Tarbagan Marmots (*Marmota sibirica*) and Corsac Foxes (*Vulpes corsac*) were observed regularly.

Bird diversity

We counted and listed bird species and individuals using a point-count survey. By doing so, several neuralgic points were selected and occupied by teams of two or three researchers, including Mongolian students offering them the opportunity to learn. Counts were then done for four hours, noting down all bird individuals that were counted according to a systematic form. Such counts will be repeated for several years to come, to estimate trends especially in raptor abundance.

Arthropod diversity

Collecting of terrestrial insects and spiders was carried out with the agreement of the Mongolian entomologist, to provide sampling in habitats, where no sampling has yet been conducted by the Mongolian colleagues. Hence, evidence of diurnal butterflies (*Nymphalis vaualbum*; *Aglaisurticae*) close to the research station of the University in study site #2 could be acquired. Additionally, riparian Carabidae and Staphylinidae were sampled along three river segments with different substrate (silt and gravel). At the same time, the Mongolian entomologist collected

aquatic insects on the same river segments, to provide a comparison of occurring riparian and aquatic insects. Sampled specimens were preserved and will be further processed and identified by the Mongolian partners. Abundance was at least assured for the bug *Saldula saltatoria*, which occurs in riparian habitats.

Epigeous arthropods were sampled with pittraps in three different habitats (forest with rocks, steppe with rocks and steppe without rocks). This was the first ever survey of these areas, resulting in a species overview of the insect diversity.

Bat diversity

To assess bat communities at the survey sites, we applied two approaches. First, we conducted mistnetting at each study site. We set up two to three mist nets in the early night hours (2-3 h from sunset). We chose locations close to water bodies or forests, where we assumed bat activity to be high. Since bats are elusive and difficult to capture, we also used ultrasonic detectors to record bats automatically. Specifically, we used one batcorder 2.0 (ecoObs GmbH, Nürnberg, Germany) with the following settings: Threshold -36 dB, Quality 20, posttrigger 400 ms, critical frequency 14 kHz. We deployed the batcorder within 5 nights at all study sites, resulting in 25 hours of recording.

To manage and measure the acoustic properties of the recorded bat call sequences, we used *bcAdmin 4* (version 1.1.11, *ecoObs GmbH*). Subsequently, the sonograms of the sequences were inspected manually using *bcAnalyze Light 3* (version 1.3.6, *ecoObs GmbH*) and assigned to species or species groups.

Altogether, we detected 40 sequences of at least two species. 33 sequences were assigned to the small *Myotis* group (Eastern water bat *M. petax*, Ikonnikov's bat *M. ikonnikovi*, Siberian bat *M. sibiricus* or David's *Myotis* *M. davidii*) and seven sequences to the genus *Eptesicus*, of which six were identified as the Northern bat *E. nilssonii*.

Plant diversity

The forest to steppe transition was in focus of the study interest. At the two main study sites (Shatan River valley and Nagalkhan Mountains), where this transition could be directly observed, vegetation surveys were performed along the transects from open treeless vegetation over the shrubland to birch (*Betula pendula* ssp. *mandshurica*) and larch (*Larix sibirica*)-dominated woods. In total, 14 plots (7 in each of the two areas) were studied. Within the plots, three subplots (0.25m × 0.25m) were selected in which the canopy cover of species was assessed by the Braun-Blanquet cover class scale and from which a soil sample was taken. These samples will be analyzed for soil nutrients by the Mongolian team. Leaves

were collected to estimate leaf area, specific leaf area and leaf dry matter content. 10% of the leaves were scanned using the mobile application LeafByte. The others were pressed, air dried and will be further analyzed by the Austrian team.

Diaspores of entirely 60 species and herbaria samples of 75 species were collected during the project. Collected diaspores would be measured to get an impression of such important reproductive traits as seed size, seed weight, morphological adaptations to dispersal, productivity and seed release height. Data should be published and included in the international trait data bases such like TRY. Many of the species of the Mongolian Flora are poorly considered in these databases and the data collected during the current project would be an important contribution in this context. In addition, two aquatic seed traps type Vogt 2004 were exposed in the Shatan river over a period of 48 hours to estimate the potential of hydrochorous seed dispersal in the area (Figure 4). Diaspores of 18 different taxa could be detected in the drifted material.

Conclusion

This rather short overview could not make up for all activities undertaken during the two weeks' joint field trip from Austrian and Mongolian researchers (from 05.09.2022 to 18.09.2022.). All in all, important fundamentals could have been acquired that will help understanding

biodiversity and guide nature conservation of these areas. During field trips, many challenges for biodiversity became obvious and research ideas were developed, which ultimately lead to a follow up proposal already submitted to take a closer look on human dimensions and adaptive traits. As such, the project was highly successful in both, generating fundamental insights and establishing further cooperation between the two partner institutions.

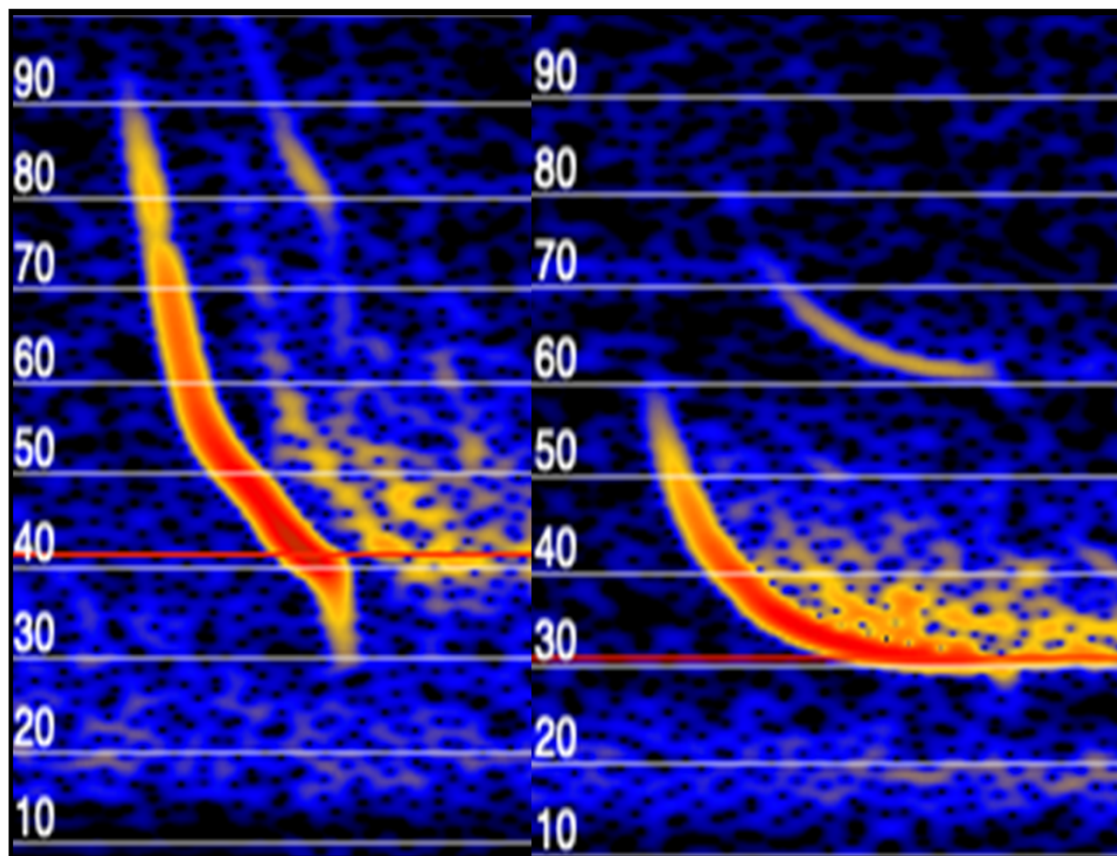


Figure 1: On the left hand, a call of a small Myotis, most likely *M. davidii* and on the right hand, a call of *Eptesicus nilssonii*. The white numbers indicate the frequency in kHz and the orange contours the intensity of the call at different frequencies (the darker, the more intense).



Figure 2: Measurement of morphometric parameters of a silver vole (*Alticola semicanus*).



Figure 3: Sprouting trap-sampled material from Mongolian plants at the greenhouse of the University of Natural Resources and Life Sciences, Vienna.





Figure 4-6: Austrian and Mongolian researchers working together to gather knowledge about Mongolian biodiversity.

Fieldtrip and workshop on traditional Mongolian veterinary medicine plants

PROJECT
13/2020

Thomas Rosenau, Stefan BÖHMDORFER Institut für Chemie
nachwachsender Rohstoffe

Stephan Kloos Institut für Sozialanthropologie, ÖAW

Gunbileg Disan ICCT, Mongolian Academy of Sciences

Avid Budeebazar Head Quarter of the Mongolian Academy of Sciences

Report

This report provides an Overview of the first field trip of Gunbileg Disan, mini-symposium and meeting held in Ulaanbaatar, Mongolia during 01-22 July 2022 in the frame of the EPU project on traditional Mongolian medicinal plants

1 MINI-SYMPOSIUM

Event at a glance

Attendees 16 in person, mostly faculty members, doctoral- and postdoctoral students; an additional six (6) speakers

Organized by

Joint Laboratory for Chemical ecology, ICCT, Mongolian Academy of Sciences

Institute of Chemistry of Renewable Resources, University BOKU

Department of Biotechnology and Nutrition, MUST (provided with conference/meeting premises)

Event Context and Purpose

The first mini symposium on traditional Mongolian veterinary medicine, under the support of the EPU project on traditional Mongolian medicinal plants, held at the Mongolian University of Science and Technology on Friday, July 08, 2022, was designed to introduce the project and to discuss the current development/situation of traditional veterinary medicine in Mongolia and reinvigorate some of critical questions from the project goals.

Together with faculty members, doctoral- as well as postdoctoral students, and invited speakers we have discussed how to develop future cooperation on the topic and to evaluate current development on biological, phytochemical, socio-cultural research of traditional veterinary medicine, engage partners from multiple sectors, and help prepare young generation researcher for career paths.

Key topics and speakers:

Gunbilig Disan, Mongolian Academy of Sciences-BOKU University

“Traditional Mongolian medicinal plants”-Project introduction

Purevsuren Sodnomtseren, Medical University of Mongolia

“Quality assurance in traditional medicines”

Bold Sharav, Mongolian Academy of Medical Sciences

“Overview of the classic scriptures of traditional medicine written by ancient Mongolian scholars”

Ganbold Yandag, Institute for veterinary medicine

“Methods in traditional veterinary medicine in Mongolia”

Budragchaa Davaanyam, Kitami Institute of Technology

“Development of plant based antiviral biopreparations for the treatment of livestock ”

Stephan Kloos, Austrian Academy of Sciences

“Traditional Veterinary Medicine in Mongolia: A preliminary historical and anthropological perspective”

Additionally, a discussion with young researchers was held during the mini symposium to educate and inspire students and specially to promote international mobility, and about existing possibilities for research and study in Austria with the aid of ÖAD and related programs.

2 FIELD TRIP

Event at a glance

Attendees three (3) in person, distance traveled ca. 2000 km

Event Context and Purpose

This project specifically targets the analysis of volatile organic compounds and phenolics profiles of selected medicinal plants. The Gobi flora consist of unique plants, with therapeutical values in traditional veterinary medicine (recorded in ancient manuscripts). Based on the knowledge gained during the project stages, and the mini symposium held before the field trip, we had several discussions to decide on a main trip route.

The field trip on traditional Mongolian veterinary medicinal plants was organized during July 11-16, 2022, travelling a distance of ca. 2000 km (Table 1).

Table 1 Route for the field trip

	Route	Provinces	Distance, km
	Ulaanbaatar	Ulaanbaatar	0.00
	Mandalgobi	Dundgobi Province	280
	Tsagaan suvraga aka White stupa	Dundgobi Province	280
	Dalanzadgad	Umnugobi province	150
	Gurvan Saikhan	Umnugobi province	290
	Bayanzag aka Flaming cliffs	Umnugobi province	150
	Mandal-Ovoo	Umnugobi province	90
	Saikhan-Ovoo	Dundgobi province	100

	Kharkhorin	Övörkhangai province	300
	Ulaanbaatar	ulaanbaatar	360

During the field trip we have visited several of herder families and reviewed them about the traditional animal healthcare, with attention the plants they use and collected corresponding plant samples together with them.

Based on the personal communications of local herders and knowledge/information gained during the pre-trip preparation we have collected 13 different species of plants. The voucher specimens were stored/identified with the help of Prof. Dr. Oyun Batlai, National University of Mongolia and Dr. Urgamal Magsar, Mongolian Academy of Sciences.

3 MEETING WITH SCIENTIFIC COMMUNITY

Several meetings with representatives of the scientific community in UB was called by Gunbilig Disan et al. during the field trip in Mongolia. Current research status and interest of stakeholders in the field of animal healthcare with attention to the traditional knowledge, use of various materia medica especially plants were discussed.

Development of future cooperation, international mobility (with ERASMUS capacity building program) in the field of chemistry of natural resources, analysis and restoration of paper artifacts, ancient books, and paper-sculptures.

MINI-SYMPIOSIUM 08 JULY 2022
ULAANBAATAR, MONGOLIA_

materia medica – health – heritage – economy

TRADITIONAL MONGOLIAN VETERINARY MEDICINE

Register here

[#TMVM2022](#)

Logos: UNINET, BOKU, ÖAW (Österreichische Akademie der Wissenschaften), cead

The poster features a background image of two people riding horses through a vast, hazy desert landscape with rolling sand dunes and sparse green vegetation. The text is overlaid on the left side, and logos and a QR code are on the right.













Sino-Austrian Joint Research Project –
Metabolic and pharmacological profiling
of the TCM formula Hanshiyi used for
the treatment of COVID-19

PROJECT
15/2020

Rudolf Bauer Institute of Pharmaceutical Sciences, University of Graz

Dagmar BRISLINGER Gottfried Schatz Research Center for
Cell Signaling, Metabolism and Aging, Medical University of Graz

TONG Xiaolin, LI Min China Academy of Chinese Medical
Sciences, Department of Endocrinology, Guang'anmen Hospital

Report

After granting the project, we have immediately started to work on the project. I have hired a PhD student (Stefanie Tiefenbacher) to work on the project.

We have arranged a video conference for a kick-off meeting on 25.10.2021 to discuss the details of the collaboration. We have purchased the herbal drugs contained in Hanshiyi Formula (HSYF) and started to analyze the individual herbs. The colleagues from CACMS finally sent us the plant material so that we could compare the plant material obtained in Europe with the plant material used at CACMS. Quality control of decoction pieces of the herbal drugs contained in HSYF was performed in Graz using

HPTLC and HPLC according to Chinese and European Pharmacopoeia. Decoctions of HSYF and of each single herb contained in HSYF were prepared and analyzed by HPTLC and HPLC, in order to assign the components of HSYF to the individual herbs. Extraction of HSYF and its single herbal components was also performed by using extraction solvents with increasing polarities (n-hexane, dichloromethane, ethyl acetate, methanol, butanol, water) to obtain more concentrated extracts for peak identification. Metabolic profiling of HSYF was performed by using LC-HRMS and constituents detected in the formula were assigned to their originating herbs and tentatively identified. Assessment of extracts regarding modulating effects on mucin synthesis in Normal Human Epithelial cells have just started Medical University of Graz in collaboration with Dagmar Brislinger.

By the Chinese colleagues, network pharmacology and molecular docking analyses have been performed in order to identify possible antiviral compounds in HSYF and their protein targets. In vitro cell culture models for assessing the pharmacological effects of HSYF in the treatment of COVID-19, especially regarding its possible effects on inhibiting viral proliferation, cytokine storm, and protecting endothelial cells have been established in Beijing, and pharmacological screening has been performed. We have regularly arranged so far 10 monthly video conferences to exchange our results and to discuss the progress of the project.

Unfortunately, because of the COVID-19 situation, it was not possible to organize any personal visit and to exchange scientists.

As an intermediate outcome of the project, the results obtained so far were presented at Symposium "NEXT GENERATION IN PHARMACOGNOSY" in St. Urban, Austria, on 19th of May 2022, at the DocDay of the Doctorate School of the Institute of Pharmaceutical Sciences in Graz on 4th of July 2022, at the 70th International Congress and Annual Meeting of the Society for Medicinal Plant and Natural Product Research (GA), in August 28 – 31, 2022 in Thessaloniki, Greece, at the Workshop on Prevention, treatment at different stage and post COVID-19 treatment of the Consortium for Globalization of Chinese Medicine (CGCM) on 8th of October 2022, at 11th TCM Pharmaceutical Analysis Conference in Shanghai November 5th, 2022, and at the 2022 Austria-China Online Symposium on Future Trend in Traditional Chinese Medicine on 7th of December 2022.

Work is still in progress, but unfortunately not further funded.

Chemical characterization of Hanshiyi formula by HPTLC, LC-MS and GC-MS

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INTRODUCTION

A recent review has summarized the role of TCM in the treatment of Covid-19 [1]. The TCM formula Hanshiyi (HSYF) has been developed in China to treat patients with Covid-19. It consists of 20 ingredients, which are listed in Tab. 1.

The National Health Commission of China has recommended the use of HSYF based on a first retrospective cohort study, which showed a significant reduction of severe cases in the treated group [2,3].

Tab. 1: The ingredients of HSYF.

1	Arcaea semen	Jiao Binglang	11	Gypsum fibrosum	Shigao
2	Armeniacae amarum semen	Kuxingren	12	Hordel germinalis fructus	Jiao Malya
3	Atractylodis macrocephalae rhizoma	Sheng Baifu	13	Magnoliae cortex	Huopo
4	Atractylodis rhizoma	Cangzhu	14	Massa medicata fermentata	Shenqu
5	Citrateng fructus	Jiao Shansha	15	Notopterygii radix et rhizoma	Qianghuo
6	Cynanchi paniculati rhizoma	Xuchangqing	16	Phenitima	Dibao
7	Lapilli semen	Tingli	17	Pogostemonis herba	Huoniang
8	Dryopteridis crassirhizomatis rhizoma	Guanchong	18	Poria	Fuling
9	Sphadræ herba	Sheng Mahuang	19	Taoko fructus	Wei Caoqiao
10	Eupatorii herba	Pellan	20	Zingiberis rhizoma recens	Sheng Jiang

Besides the identification of active principles and modes of action, one major aim of this joint research project of TCM Research Center Graz and China Academy of Chinese Medical Sciences was to develop quality control methods for HSYF.

CONCLUSIONS

HPTLC was able to produce a typical fingerprint for every single herb of HSYF, but it was not possible to detect each ingredient in the mixture. Only 8 herbs could be identified in the mixture on the basis of typical markers by HPTLC.

By UHPLC-MS analysis, 10 of 20 herbs could be identified in the methanol extract of the mixture based on marker compounds.

Work is still in progress to find analytical methods for identification of all herbs and further marker compounds in the mixture of HSYF.

GC-MS Analysis

Through GC-MS analysis, 871 peaks were detected. 52 of these peaks were identified and are shown in fig. 2. The extraction of the volatile oil was done according to the 2020th edition of the Chinese Pharmacopoeia: Determination of volatile oil (general rule 2204 A). 75 g of the freeze-dried powder were weighed and given into a round-bottomed flask. The distillation was made with 750 ml water and afterwards dried with anhydrous sodium sulfate. 100 µl of the volatile oil were used as the test solution.

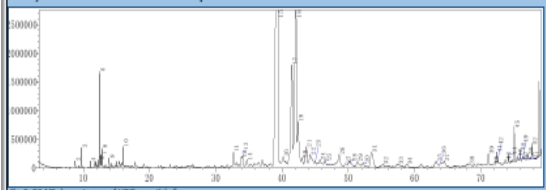


Fig. 2: GC-MS chromatogram of HSYF essential oil

Retention Time (min)	Peak Label	Reference Compound
2.31	Acetaboline (AS)	Acetaboline (AS)
3.16	Horadoline (HF)	Horadoline (HF)
5.18	Enhedine (EH)	Enhedine (EH)
9.56	Pseudoephedrine (PE)	Pseudoephedrine (PE)
11.93	Angialin (AG)	Angialin (AG)
14.09	Isocorydine	Isocorydine
15.58	Isocorydine	Isocorydine
18.21	Isocorydine	Isocorydine
20.78	Isocorydine	Isocorydine
22.19	Isocorydine	Isocorydine
23.10	Isocorydine	Isocorydine
25.04	Isocorydine	Isocorydine
26.78	Isocorydine	Isocorydine
28.20	Isocorydine	Isocorydine
31.86	Isocorydine	Isocorydine
32.42	Isocorydine	Isocorydine
34.71	Isocorydine	Isocorydine
35.06	Isocorydine	Isocorydine
35.44	Isocorydine	Isocorydine
36.36	Isocorydine	Isocorydine
39.84	Isocorydine	Isocorydine

RESULTS

HPTLC Analyses

All individual herbs and also the mixture of Hanshiyi herbs have been extracted with methanol by Accelerated Solvent Extraction. Two mobile phases and three derivatization methods have been elaborated to separate the constituents of the various ingredients in HSYF, and to identify markers for every component in the mixture (Fig. 1). By HPTLC, we succeeded to annotate 15 compounds in the mixture, which can act as markers for 8 of 20 contained herbs.



Fig. 1: HPTLC separation of every single herb and of the mixture of Hanshiyi formula. A: Ethyl acetate - formic acid - acetic acid - water (100:11:1:20); derivatized with ninhydrin reagent; heated for 5 min at 105°C and analyzed in 96. B: Toluene - ethyl acetate (90:10); derivatized with ninhydrin reagent; heated for 5 min at 105°C and analyzed in 96. C: Ethyl acetate - formic acid - acetic acid - water (100:11:1:20) derivatized with natural product reagent A and macrogel 4000; analyzed in UV 365 nm

UHPLC-MS/MS Analysis

By UHPLC-MS/MS, 224 compounds were identified in positive mode (36 by reference substances), and 84 compounds in negative mode (24 by reference substances). 20 major peaks can act as marker compounds for identification of 10 contained herbs, and are shown in the chromatograms in figs. 3 and 4.

Identification of further marker compounds is in progress.

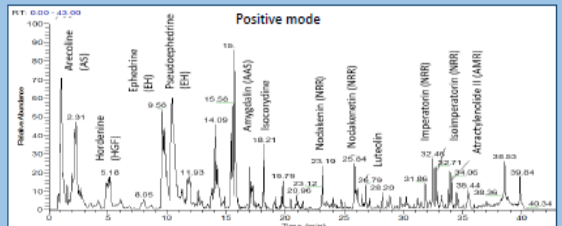


Fig. 3: UHPLC-MS chromatogram of HSYF in ES positive mode

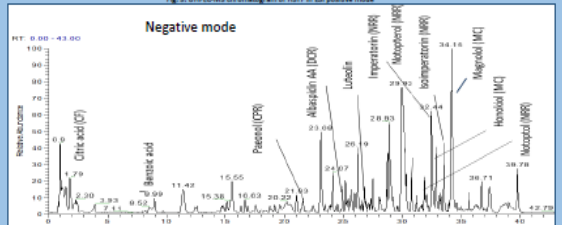


Fig. 4: UHPLC-MS chromatogram of HSYF in ES negative mode

METHODS

GC-MS Analysis

For the determination of volatile oil (general rule 2204 A) of the Chinese Pharmacopoeia, 75 g of the freeze-dried powder were weighed and given into a round-bottomed flask. The distillation was made with 750 ml water and afterwards dried with anhydrous sodium sulfate. 100 µl of the volatile oil were used as the test solution.

Shimadzu, Japan

Derivatization: ninhydrin reagent (A), antialdehyde sulphuric acid reagent (B), natural product reagent A and macrogel 4000 (C).

UHPLC-MS

Extraction: 0.5 g powder of HSYF were extracted with 10 ml methanol by ultrasonication for 30 min. Subsequently the sample was filtered through a 0.45 µm fiber membrane. Instrument: Thermo Scientific™ UHPLC™ 3000 hyperbaric liquid chromatography system coupled to a UHPLC Orbitrap mass spectrometer via an ESI Interface (ThermoFisher). Column: ACQUITY UPLC HSS T3 (2.1 mm x 100 mm, 1.8 µm). Mobile phase: water + 0.1% formic acid (A) and acetonitrile (B). Gradient: 0-5 min: 2% B; 5-20 min: 2→18% B; 20-30 min: 18→50% B; 30-35 min: 50→98% B; 35-38 min: 98% B; 38-38.1 min: 9→2% B; 38.1-43 min: 2% B. Injection volume: 8 µl.

ACKNOWLEDGEMENT

The project has been carried out in Austria within the framework Eurasia-Pacific Uninet, supported by a grant of BMBWF (EPU 15/2020). CACMS has been supported by National Key projects for international cooperation on science, technology and innovation; International cooperation research on the mechanism of Hanshiyi Formula in the treatment of COVID-19 (2021YFE0201100).



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NEXT GENERATION IN PHARMACOGNOSY | May 19 – 20, 2022

Scientific HMPPA Symposium | Schloss Bach, Schloss-Str. 1, 9554 St. Urban

PRELIMINARY PROGRAM

Thursday, May 19, 2022

Schloss Bach, Schloss-Str. 1, 9554 St. Urban

- Till 12:00** **Arrival at Schloss Bach**
- 12:00 – 13:30** **Lunch (informal get-together at Schloss Bach)**
- 13:30 – 13:40** **Welcome addresses**
H. Stuppner
HMPPA President, Institute of Pharmacy/Pharmacognosy, University of Innsbruck
- 13:40 - 14:40** **Session: PHYTOCHEMISTRY**
Chair: Judith Rollinger
- 13:40 – 13:45** **Baumgartner Vanessa | University of Graz**
Flavonoids as inhibitors of efflux pumps in *Escherichia coli*
- 13:47 – 13:52** **Malfent Fabian | University of Vienna**
Heterologous expression of terpene synthases from the endophytic fungus *Helotiales* sp. BL73 in *Streptomyces* spp.
- 13:54 – 13:59** **Redl Martina | University of Vienna**
Identifying and dissecting health promoting natural products for healthy aging
- 14:01 – 14:06** **Eichenauer Elisabeth | University of Vienna**
Phytochemical composition and active principles of traditional wound healing plants
- 14:08 – 14:13** **Zwenger Michael | University of Innsbruck**
Improved analysis and isolation of mycosporine-like amino acids
- 14:15 – 14:20** **Villicaña-González Eduardo | University of Innsbruck**
Isolation and pharmacological activity of paraconic acids contained in *Cetraria islandica*
- 14:20 – 14:40** **DISCUSSION**
- 14:40 - 15:40** **Session: PHARMACOLOGY**
Chair: Karin Ortmayr
- 14:40 – 14:45** **Haiss Patricia | University of Vienna**
Antiproliferative activity of evodiamine in vascular smooth muscle cells - mode of action study
- 14:47 – 14:52** **Bui Hoang Minh | University of Innsbruck**
Identification of natural products from traditional Vietnamese medicinal plants that target ferropto-inflammation
- 14:54 – 14:59** **Pirker Teresa | University of Graz**
Glucolipid-enriched extract of *Osmanthus fragrans* inhibits LPS-induced COX-2 mRNA expression, E-selectin expression, and IL-8 secretion
- 15:01 – 15:06** **Tiefenbacher Stefanie | University of Graz**
Metabolic and pharmacological profiling of the TCM formula Hanshiyi
- 15:08 – 15:13** **Rao Zhigang | University of Innsbruck, Michael-Popp Institute**
Rotational constriction of curcuminoids impacts 5-lipoxygenase and mPGES-1 inhibition and evokes a lipid mediator class switch in macrophages



Metabolic and pharmacological profiling of the TCM formula Hanshiyi (HSYF)

Mag. Stefanie Tiefenbacher, Prof. Dr. DDr. h.c. Rudolf Bauer



11th TCM Pharmaceutical Analysis Conference

Shanghai November 5th, 2022

Analysis of Hanshiyi, a formula which has been successfully used against COVID-19

Rudolf Bauer¹,

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AGENDA

15th Pharma DocDay
Monday, 4th of July 2022
Institute of Pharmaceutical Sciences



9 ⁰⁰ - 9 ³⁰	WARM-UP
	OPENING
9 ³⁰ - 9 ⁴⁵	Prof. Andreas Kungl Head of the Doctoral School of Pharmaceutical Sciences Prof. Andreas Zimmer Head of the Institute of Pharmaceutical Sciences Prof. Klemens Fellner Dean of the Faculty of Natural Sciences Prof. Joachim Reidl Vice-Rector for Research and Career Development
9 ⁴⁵ - 10 ⁴⁵	KEYNOTE LECTURE: LÄCHELT, Ulrich Ass.-Prof. Dr.
10 ⁴⁵ - 11 ⁰⁰	Flavonoids as Inhibitors of Efflux Pumps in Escherichia Coli 6 BAUMGARTNER Vanessa, <i>Pharmacognosy</i>
11 ⁰⁰ - 11 ²⁵	Characterizing Human PRMT-Kinase Interactions 7 MASSER Sarah, <i>Pharmaceutical Chemistry</i>
11 ²⁵ - 11 ⁴⁰	Expression and Anti-Viral Activity of the Carbohydrate-Binding Domain of Mannose-Binding-Lectin (MBL-CRD) 8 WEINHEIMER Lisa, <i>Pharmaceutical Chemistry</i>
11 ⁴⁵ - 12 ⁰⁰	CEREMONY „APOMEDICA AWARD 2022“
12 ⁰⁰ - 13 ⁰⁰	LUNCH BREAK POSTER SESSION
13 ⁰⁰ - 14 ⁰⁰	KEYNOTE LECTURE: GROSCHNER, Klaus O.Univ.-Prof. Dr.
14 ⁰⁰ - 14 ¹⁵	Heparin and Pentosan Polysulfate Bind SARS-CoV-2 Spike RBD, thereby Inhibiting SARS-CoV-2 Cell Infection 9 ENNEMOSER Maria, <i>Pharmaceutical Chemistry</i>
14 ¹⁵ - 14 ⁴⁰	Contextually Essential Genetic Interactions Characterize Cancer Cell Vulnerabilities 10 ANNERER-WALCHER Lukas, <i>Pharmaceutical Chemistry</i>
14 ⁴⁰ - 14 ⁵⁵	Metabolic and Pharmacological Profiling of the TCM Formula Hanshiyi 11 TIEFENBACHER Stefanie, <i>Pharmacognosy</i>
15 ⁰⁰ - 15 ¹⁵	Drug Targeting of Nanoparticles 12 PERAC Natasa, <i>Pharmaceutical Technology</i>
15 ¹⁵ - 16 ⁰⁰	COFFEE BREAK POSTER SESSION
16 ⁰⁰ - 16 ¹⁵	Labeling and Quality Control of [131I]MIBG in the Clinical Setting 13 PLHAK Elisabeth, <i>Pharmaceutical Chemistry</i>
16 ¹⁵ - 16 ³⁰	Open Flow Microperfusion to Evaluate Drug Penetration in the Buccal Mucosa 14 WILTSCHKO Laura, <i>Pharmaceutical Technology</i>
16 ³⁰ - 16 ⁴⁵	Characterising Proteome Changes Upon Overexpression of Protein Methyltransferases 15 AUERNIG Elisabeth, <i>Pharmaceutical Chemistry</i>
16 ⁴⁵ - 17 ⁰⁰	An Ethnopharmaceutical Approach to Point Out Ancient Strategies to Fight Antimicrobial Resistance 16 GROLLITSCH Selina, <i>Pharmacognosy</i>
17 ⁰⁰ - 18 ⁰⁰	KEYNOTE LECTURE: MAYER, Bernhard-Michael O.Univ.-Prof. Dr.
As of 18 ⁰⁰	CLOSING REMARKS GET TOGETHER



Consortium for Globalization of Chinese Medicine (CGCM)

Workshop 1: Prevention, treatment at different stage and post COVID-19 treatment

Date: 8 October, 2022 (Saturday)

Time: 8:30pm – 11:00 pm (Hong Kong time)

Mode: Online workshop (via Zoom)

Tentative Programme

Session 1: Opening Session		
8:30pm – 8:35 pm	Chairs Introduction: Prof. Yi-Chang Su and Prof. Jia-bo Wang	
8:35pm – 9:00 pm	Panelists Introduction: <ul style="list-style-type: none">- Prof. Yung Chi Cheng- Prof. Enzo Tramontano- Prof. Yubo Lyu- Prof. Zhao-Xiang Bian- Prof. Zhongqi Yang	
Session 2: NRICM101 and NRICM102 for COVID-19 Care		
Session Chair – Prof. Yi-Chang Su		
9:00pm – 9:20 pm	The Clinical Evidence of NRICM101 and NRICM102 for COVID-19	Dr Sunny Jui-Shen Lin
9:20pm – 9:40 pm	From “Ancient Prescriptions” to “Innovative Medicines”: Standardizing and Modernizing R&D of anti-COVID-19 TCM NRICM101 & NRICM102	Prof. Wen-Fei Chiou
9:40pm – 10:00 pm	The Pharmacological Research of Molecular Mechanism Elucidation of NRICM101 and NRICM102 for COVID-19	Prof. Yuh-Chiang Shen
Session 3: Yindan Jiedu Granules, Hanshiyi formula (HSYF) for COVID-19 Care		
Session Chair - Prof. Jia-bo Wang		
10:00 pm – 10:20 pm	The Clinical Evidence of Yindan Jiedu Granules for COVID-19	Dr. Yao Liu
10:20 pm – 10:40 pm	The Pharmacological Research of Yindan Jiedu Granules for COVID-19	Dr. Ying Feng
10:40 pm – 11:00 pm	Chemical Characterization of Hanshiyi Formula by HPTLC, LC-MS and GC-MS	Prof. Rudolf Bauer

Development of HPTLC and UPLC methods for quality control of Hanshiyi formula

Stefanie Tiefenbacher¹, Yanyan Zhou², Weihao Wang², Min Li³, Chensi Yao³, Xiaolin Tong³, Rudolf Bauer¹

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INTRODUCTION



Fig. 1: The ingredients of HSYF.

Tab. 1: The ingredients of HSYF.

1	Asac semen	Jao Binglang	11	Gypsum fibrosum	Shigan
2	Armeniacae amarum semen	Isatidigen	12	Hordii germinatus fructus	Jian Maya
3	Attractylodis macrocephalae rhizoma	Sheng Baicho	13	Magnoliae cortex	Huozuo
4	Attractylodis rhizoma	Cangchu	14	Massa medicata fermentata	Shenqu
5	Citraty fructus	Jao Shanzha	15	Notopterygi radix et rhizoma	Qianghuo
6	Cynench paniculati rhizoma	Xuchangqing	16	Pheretima	Dilong
7	Lepidi semen	Tingli	17	Pogostemonis herba	Huoxiang
8	Dryopteridis crassirhizomatis rhizoma	Guanshong	18	Poris	Fuling
9	Ephedrae herba	Sheng Mahuang	19	Taoko fructus	Wei Caoqiao
10	Eupatorii herba	Hellan	20	Zingiberis rhizoma recens	Sheng Jiang

Besides the identification of active principles and modes of action, one major aim of this joint research project of TCM Research Center Graz and China Academy of Chinese Medical Sciences was to develop quality control methods for HSYF.

CONCLUSIONS

HPTLC was able to produce a typical fingerprint for every single herb of HSYF, but it was not possible to detect each ingredient in the mixture. Only 8 herbs could be identified in the mixture on the basis of typical markers by HPTLC.

By UHPLC-MS analysis, 10 of 20 herbs could be identified in the methanol extract of the mixture based on marker compounds.

Work is still in progress to find analytical methods for identification of all herbs and further marker compounds in the mixture of HSYF.

UHPLC-MS/MS Analysis

By UHPLC-MS/MS, 224 compounds were identified in positive mode (36 by reference substances), and 84 compounds in negative mode (24 by reference substances). 20 major peaks can act as marker compounds for identification of 10 contained herbs, and are shown in the chromatograms in figs. 4 and 5.

Identification of further marker compounds is in progress.

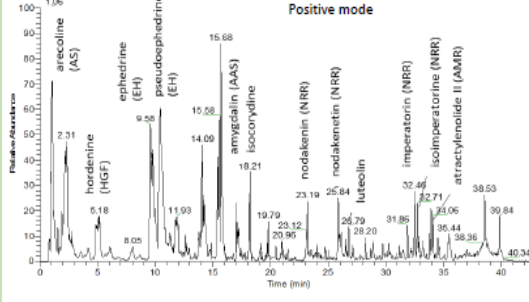


Fig. 4: UHPLC-MS chromatogram of HSYF in ES2 positive mode

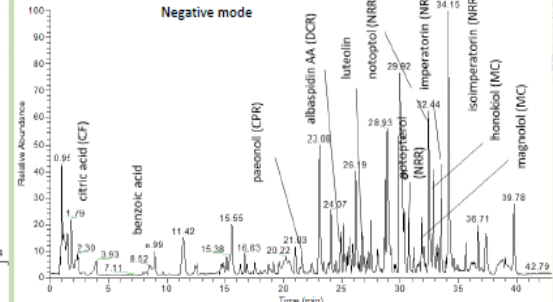


Fig. 5: UHPLC-MS chromatogram of HSYF in ES2 negative mode

MATERIAL AND METHODS

Plant material was obtained from Chinese Academy of Chinese Medical Sciences, Beijing. Extraction for HPTLC: Every single herb was ground, sieved (0.71 mm), and 5 g of each powder was extracted at 68°C by accelerated solvent extraction (ASE) using methanol with 52-54 ml methanol. Hanshiyi formula was mixed and extracted accordingly.

HPTLC:

Stationary phase: HPTLC Silica gel 60 F₂₅₄ aluminum sheets (Merck); Mobile Phase: see Fig. 3. Instruments: CAMAG TLC-Visualizer, automatic TLC-sampler 4, and automatic developing chamber. Derivatization: ninhydrine reagent (A), anisaldehyde sulphuric acid reagent (B), natural product reagent A and macrogol 4000 (C).

UPLC-MS:

Extraction: 0.5 g powder of HSYF were extracted with 10 ml methanol by ultrasonification for 30 min. Subsequently the sample was filtered through a 0.45 µm fiber membrane.

Instrument: Thermo Scientific™ UltiMate™ 3000 hyperbaric liquid chromatography system coupled to a LTQ Orbitrap mass spectrometer via an ESI interface (ThermoFisher).

Column: #####

Mobile phase: water + 0.1 % formic acid (A) and acetonitrile (B)

Gradient: 0-5 min: 2 % B; 5-20 min: 2→18 % B; 20-30 min: 18→50 % B; 30-35 min: 50→98 % B; 35-38 min: 98 % B; 38-38.1 min: 9→2% B; 38.1-43 min: 2% B

Injection volume: #####

ACKNOWLEDGMENT

The project has been carried out in Austria within the framework EurAsia-Pacific Uninet, supported by a grant of BMBWF (EPU 15/2020). CAMS has been supported by National Key projects for international cooperation in science, technology and innovation: International cooperation research on the mechanism of Hanshiyi Formula in the treatment of COVID-19 (2021YFE0201100).



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2022 Austria-China Online Symposium on Future Trend in Traditional Chinese Medicine

Agenda

7 th December 2022		
Vienna Time: 8:30-11:20 Beijing Time: 15:30-18:20		
Opening Ceremony		
Host: EPU		
8:30-9:00	Welcome address by EPU	
	Address by Prof. Wolf Dieter Rausch, EPU President	
	Address by LI Kun, Vice President of CACMS	
	Address by Prof. Dr. Rudolf Bauer, Institute of Pharmaceutical Sciences, University of Graz	
	Address by Mr. Lei Fengyun, Science and Technology Counselor from Chinese Embassy in Austria	
	Address Academician Huang Luqi, Vice Governor of the National Administration of Traditional Chinese Medicine and President of China Academy of Chinese Medical Sciences	
Keynote Speeches		
Theme I Current aspect and future direction		
Host: Prof. Wolf Dieter Rausch		
Time	Title	Name and Position
9:00-9:15	Brief introduction of the "Sino-Austrian joint laboratory for the prevention and treatment of severe infectious diseases with	Prof. Song Ping, Chief Physician, MD. Ph.D, Director of International Cooperation Department, CACMS

Minerals under pressure

PROJECT
18/2020

Etienne SKRZYPEK, Kurt STÜWE

University of Graz

Rustam OROZBAEV, Maksatbek SATYBAEV

National Academy of

Sciences of Kyrgyz Republic

Report

The project was designed to explore the behaviour of minerals during the formation of mountain belts. The goal was to monitor how the composition of one precise mineral - white mica - changes with increasing pressure in the continental crust, but also with respect to the composition of its host rock. The Makbal complex in NW Kyrgyzstan was selected as the main study area, because it gives a unique chance to access rocks that were originally located at depths from about 10 to 100 km. A second locality (Aktyuz, NE Kyrgyzstan) was briefly visited to prepare future joint projects. The project relied on a scientific collaboration that was established through a former Eurasia-Pacific Uninet project (EPU 08-2019). It was conducted between the Institute of Geology at the National Academy of Sciences of the Kyrgyz Republic (NASKR) and the Institute

of Earth Sciences at the University of Graz (UG).

Joint activities

1) Field work & Scientific communication, NW & NE Kyrgyzstan

(12 days, 07/07-18/07/2022)

Participants : R. Orozbaev, M. Satybaev (Institute of Geology, NASKR);
E. Skrzypek, K. Stüwe (Institute of Earth Sciences, UG)

In Summer 2022, the international team met for field work in NW and NE Kyrgyzstan. The expedition was led by R. Orozbaev and M. Satybaev (NASKR). Five days were spent in Talas region to map in detail the structure of the Makbal complex and to collect samples for petrological analyses. Field work often involved long hikes with more than 500 m positive elevation in order to access some of the most remote areas of the complex. Targeted sampling was facilitated by earlier field campaigns and allowed collecting about 30 rock specimens. These samples will be used to initiate research projects at both institutions (e.g. Bachelor and Master projects).

Three additional days were dedicated to a new locality (Aktyuz) in NE Kyrgyzstan. This was chosen because of the common occurrence of Rare Earth Element (REE) minerals (e.g. Kutessay deposit), which is the main research topic of E. Skrzypek. This second field target was chosen to initiate future collaborations on a different geological object and with new

research questions. Preliminary observations and sampling in Aktyuz will be used for scientific proposals and analyses.

One day was finally dedicated to scientific presentations by Austrian members at the Academy of Sciences in Bishkek. K. Stüwe gave an overview of the geology of the Alps while E. Skrzypek presented results on metamorphic fabrics in orogens. The talks were convened and translated by R. Orozbaev, and received a warm feedback from the audience at NASKR.

2) Analytical work (24 days, 11/10-23/10/2022 & 10/12-22/12/2022)

Participants : R. Orozbaev, M. Satybaev (Institute of Geology, NASKR); E. Skrzypek, K. Stüwe (Institute of Earth Sciences, UG)

In Autumn 2022, R. Orozbaev (2 visits) and M. Satybaev (1 visit) from NASKR visited the University of Graz. The first visit was dedicated to sample preparation (thin sections, mineral separations, heavy mineral mounts, polishing) and electron microprobe analyses. Both visitors could interact with researchers from the Institute for Earth Sciences (UG) and also with B.Sc. and M.Sc. students working on Kyrgyz samples collected during a previous field campaign (07/2021). The second visit involved once more sample preparation (heavy mineral mounts) and electron microprobe analyses as well as age dating of zircon from various Kyrgyz localities using facilities at the NAWI Graz Central Lab for Water, Minerals

and Rocks. The second visit also allowed R. Orozbaev to experience the Christmas atmosphere in Graz.

Results and Outlook

- Field survey in the most remote areas of the Makbal complex provided key data for understanding the structural evolution of the study area. Additional samples complemented the collection of Summer 2021 and could be used for B.Sc. and M.Sc. theses at the University of Graz.

BRUNNER Daniel – "The composition of white mica in the UHP Makbal complex" (ongoing Master thesis)

FUCHS Laura – "Contact metamorphism at the margin of the Kaindy granite (Kyrgyzstan)" (ongoing Bachelor thesis)

RECHBERGER Johannes – "Geochemistry of mafic rocks in the Makbal complex (NW Kyrgyzstan)" (ongoing Bachelor thesis)

- The visit to the second locality (Aktyuz, NE Kyrgyzstan) allowed sampling REE-bearing minerals for a new thermochronology study conducted in collaboration with the University of Melbourne, Australia (E. Skrzypek). Additional samples were used to determine the age of tectonic events in the Aktyuz complex (R. Orozbaev).



Photo 1. Project participants blessed by a rainbow (and an incoming thunderstorm) on the last day of field work in NW Kyrgyzstan (l. to r. M. Satybaev, K. Stüwe, E. Skrzypek, R. Orozbaev)

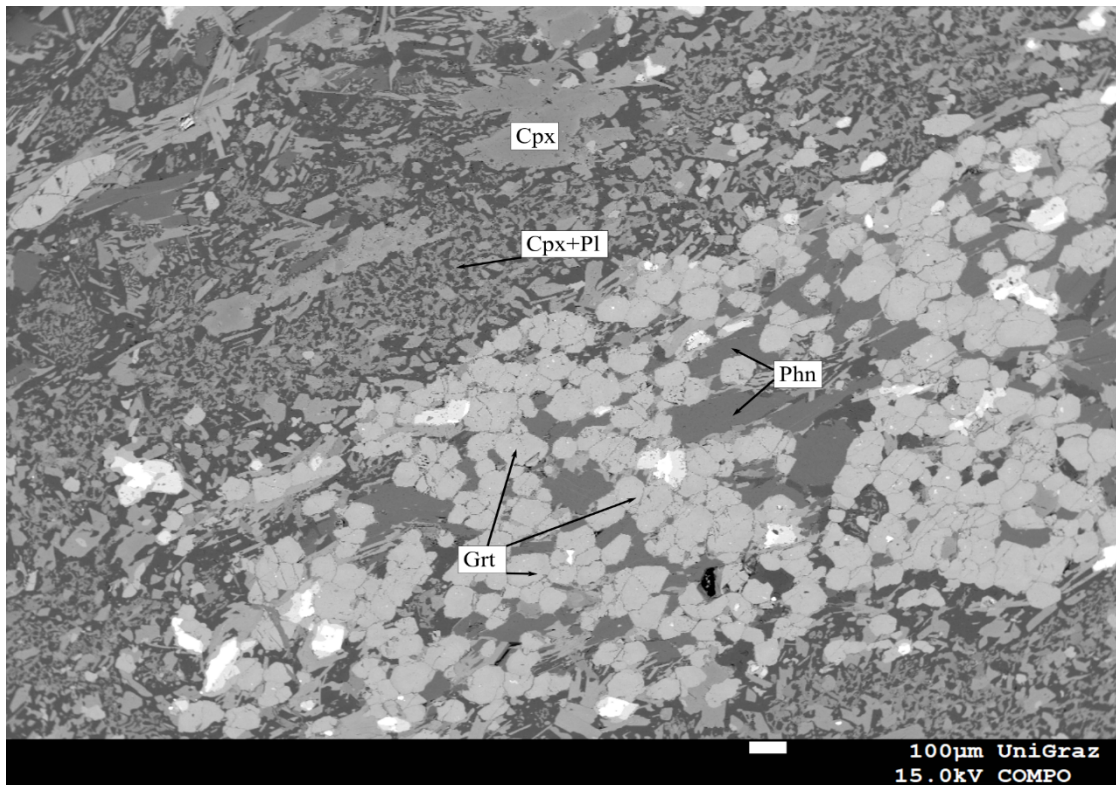


Photo 2. Electron microscope image showing garnet-phengite and clinopyroxene-plagioclase textures in an Aktuz eclogite analyzed at NAWI Graz in December 2022.



Photo 3. Scientific presentation given by K. Stüwe and convened by R. Orozbaev at the Academy of Science, Bishkek.

“DECCA - Digital Earth Competences
for Central Asia”

PROJECT
21/2020

Ainura Nazarkulova

Universität Salzburg

Akylbek CHYMYROV

Kyrgyz State University of

Construction, Transport and Architecture

Gulnara NYUSSUPOVA

Al-Farabi Kazakh National University

Nurbek KONGYRBAYEV

Korkyt Ata Kyzylorda University

Ernek BAIBAGYSHOV

Naryn State University

Zamirakhon KODIROVA

Tajik Agrarian University

Report

Within this initiative a coordinated set of capacity building measures were supported based on three actions listed in the application proposal. Funding supported the travel of key contributor Prof. Josef Strobl to ACA*GIScience located at KSUCTA in August, 2021 and the stay of PhD students and academic staff in Salzburg.

Prof. Strobl's visit was focused on objectives of the DECCA initiative and the facilitation and coordination of online learning processes. Based on

these organizational measures and staff training around 20 students were joining online classes during the academic year 2021/2022. Online classes offered from Salzburg University were Selected Topics in Geoinformatics, Introduction to Geoinformatics and Digital Earth Citizens. All students were receiving access to online learning facilities available through the University of Salzburg (Action 1)

Six PhD students and Professor Gulnara Nyussupova were coming for intensive workshops to Salzburg. PhD students are Zabira Rakhymbay and Azamat Yershbulov from KazNU, Kazakhstan; Alina Tynybekova, Nagima Alimbekova and Nursultan Ismailov from KSUCTA, Kyrgyz Republic and Khudoyberdi Abdivaitov is from TIAME, Uzbekistan . These workshops were co-taught by instructors from Austrian universities jointly with Central Asian academics, with this team teaching approach aimed at securing a strong support capacity in the region ultimately able to keep developing competences with future students in the field of geoinformatics (Action 2).

Five experienced junior researchers PhD students (from the above list) stayed one month each in Austria for intensive participation in applied projects, serving as a full immersion into the practice of working with cloud based geospatial resources in applied contexts. They were developing QuickCapture and Survey123 apps for collecting data by involving general

citizens and sharing their results by using visualization software ecosystems and generating storymaps (Action 3).

Here are links to the student's results:

1. Zabira Rakhymbay [Digital Earth Citizens \(arcgis.com\)](#)
2. Azamat Yershbulov [The Walk of Sculptures and Modern Art in Salzburg \(arcgis.com\)](#)
3. Alina Tynybekova [Alina Tynybekova \(arcgis.com\)](#)
4. Nagima Alimbekova - [Alimbekova Nagima \(google.com\)](#)
5. Khudoyberdi Abdivaitov <https://arcg.is/DvH01>

Professor Gulnara Nyussupova from Kazakh National University, and PhD student and lecturer Nursultan Ismailov from KSUCTA were joining discussions of teaching/learning module development within the APPEAR DEvision project together with other colleagues. They were also attending lectures about the Living Atlas potential for education and research and the potential of cloud and edge computing for global geospatial data. During their visit, they had an opportunity to develop personal connections with international researchers by actively participating in GI_Salzburg Conference and presenting their research results. (Action 3)

Due to the current global situation, travel was severely constrained and international travel became expensive during the project period, thus not all planned visits could take place. Most colleagues and PhD students from Central Asia could not afford high flight ticket prices. This was the reason

not all requested and budgeted funds were used within the project lifetime. Those who managed to visit Salzburg, their travel was supported by other projects in combination with EPU coverage of accommodation cost.



Figure 1: generating a map at ZGIS



Figure 2: working on their storymap/e-portfolio



Figure 3: PhD students working together



Figure 4: PhD students working together



Figure 5: Prof. G.Nyussupova & N.Ismailov discussing APPEAR DEvision Modules



Figure 6: Prof. Nyussupova&Ismailov at GI_Salzburg conference

Christianity on the Silk Roads:
Studies in Central Asia

PROJECT 23/2020

Dietmar W. Winkler

Paris-Lodron Universität Salzburg / ZECO

Kevin Todd White

Al Farabi Kazakh National University

Report

Along the Silk Road, the “Church of the East” found its way to Central Asia as early as the 5th century and reached the Chinese imperial court of the Tang dynasty already in the 7th century . In the European Middle Ages, at the times of the Mongols, this “East Syriac” Christianity was geographically the largest church of Christendom and encompassed an array of peoples that included Iranian, Syriac, Turkic, Mongolian and Chinese speakers. Official documents of the Church of the East in Mesopotamia, today's Iraq, give sparse information about these Christians in Central and East Asia. However, through their long-distance connections, they played a major role in the spread of beliefs and material culture. They are much underappreciated key players in the cultural exchange in both directions eastwards and westwards leaving behind rich textual, epigraphic, and archaeological remains.

Since 2003, the “ZECO – Zentrum zur Erforschung des Christlichen Ostens” of the University of Salzburg has established an internationally recognized research focus on East Syriac (“Nestorian”) Christianity in China and Central Asia. In 2019 – already once co-funded by the EPU (EPU 52/2018) – the ZECO was able to hold its sixth "Salzburg International Conference Syriac Christianity in China and Central Asia" in Almaty. It was the largest international scientific congress in Kazakhstan. Scholars came from Australia, Austria, Belgium, Canada, France, Germany, Great Britain, India, Italy, Japan, Kazakhstan, Kirgizstan, Netherlands, Turkey, USA, Uzbekistan etc. present the latest research results in the fields of history, archaeology, theology, philology, epigraphy, manuscripts (Syriac, Sogdian, Uighur, Chinese, Arabic, etc.) on East Syriac Christianity.

In order to maintain the scientific contacts and to work out further research perspectives, it was made possible with the support of the present project to enable a scientist to spend several months in Salzburg doing in-depth research. We decided on this option because only about half of the originally requested funding could be approved. EPU-funded we had Kevin White, head of the “Department of Nestorian Studies” of the Kazakh Academy of Sciences, in Salzburg, who conducted research at ZECO from March to June. In the process, he was able to acquire essentials on the history of the Church of the East, in which ZECO specializes. He also

supported the team in the presentation of the latest research results at the international congress of scholars in Syriac Studies "Symposium Syriacum" in Paris in the beginning of July.

The aim of the present EPU cooperation was to maintain the scientific exchange with central cooperation partners in Central Asia in order to enable the development of further research. The archaeological expertise of the Central Asian experts is absolutely necessary and complementary to our endeavours. In this way, EPU support has enabled positive further developments. In addition, again, an ERC-Synergy Grant was submitted and again we reached the last stage in the highly competitive selection process. However, among the 29 projects finally approved out of 441 submissions, only two were from the humanities. Unfortunately, we were not among them. However, the existing good contacts made it possible to submit a project application in the new FWF-Emerging Fields funding scheme on the basis of previous collaborations and already developed research perspectives.

The connection with Al-Farabi National University led to an important cooperation with the "Institute of Archaeological Studies/Department of Nestorian Studies" of the Kazakh Academy of Sciences and above with the most important new partner: the "International Institute of Central Asian Studies" (IICAS) of the UNESCO Silk Road Program.

However, a restructuring on the part of the partners, which occurred at the

end of 2022, now no longer allows this connection to be maintained via EPU, since EPU cooperates solely with universities. The Department of Nestorian Studies, has now been affiliated with IICAS, thus allowing for a more direct and straightforward formal collaboration with IICAS for us. The next Salzburg Conference will be held in cooperation between ZECO and IICAS in Samarkand (Uzbekistan), the headquarters of IICAS, in September 2023 and, like the Almaty Conference in 2018, will allow us to deepen research cooperation.

It could be suggested, therefore, that EPU could also facilitate collaborations with other scientific institutes (such as academies of sciences et al.) in order to ensure the exchange of scientists.

Establishment of biodiversity
monitoring sites for in Khan Khentii
Strictly

PROJECT
25/
2020

Hülber Karl Department Botany and Biodiversity Research,
University of Vienna

Gantuya Jargalsaikhan Research Institute of Animal Husbandry
(RIAH), Mongolian University of Life Science

Undrakh-Od BAATAR Administration of Khan Khentii Special
Protected Area, Ministry of natural, environment and tourism

Report

In spring 2022 project members participated in several online-conferences to organize the ingoing (to Austria) and outgoing (to Mongolia) travels, which were scheduled for Mai and June, respectively. Due to unpredictable problems to get the visas necessary for a stay in Austria – corona-related delays in the transport of required documents to/from the Austrian embassy in Beijing – the visit of the Mongolian scientists in Austria was postponed to September. In addition, alternatives of monitoring schemes which might be established were discussed. It was decided to take part in the Global Observation Research Initiative in Alpine Environments (GLORIA;

<https://www.gloria.ac.at/home>). Gloria is a global monitoring network comprising more than 100 target regions at all continents. Within each of these regions inventories of all vascular plant species on selected alpine summits were done and – as far as possible – will be repeated in ±regular intervals in the future. In addition, continuous measurements of soil temperatures at these summits will be performed to be able to track related changes in plant species composition and abundance to climatic changes. Observations and measurements are done based on a standardized protocol available at <https://gloria.ac.at/methods/manual> . A preselection of regions in Mongolia potentially suitable for the establishment of Gloria sites was done in the online-conferences. Their alpine summits must not be strongly affected by human land use (in particular grazing or tourism) and should be accessible with feasible effort. This ensures the detection of climate change-induced effects on vegetation not influenced by other aspects of global change (such as land use changes).

The project co-ordinator (Dr. Hülber) visited Mongolia in late June for about two weeks. During this stay some regions within the provinces of Bulgan, Uvurkhangai, Mittelgobi, Southgobi, Ulaanbaatar and Khentii were screened for potential region to establish the monitoring sites by the project partners. However, the Khan Khentii Special Protected Area itself turned out to be the most promising region to establish the intended biodiversity and environmental research and assessment sites, because of

the particularly low human impact. In addition, the big elevational range allows the observation of a wider range of vegetation types inhabited by a greater number of species. During an extended meeting with officials of the Khan Khentii Special Protected Area details on the logistic of site establishment were discussed. At the Khan Khentii Special Protected Area training session were conducted to allow a flawless establishment of sites by the Mongolian partners (lead by Gantuya Jargalsaikhan). In addition, one summit (Erdene mountain) was visited to check the local conditions (topography and vegetation). However, it turned out not to be highly suitable, so it was decided (in later discussion in Ulan Baatar and via email after the visit in coordination with the Gloria headquarter) to establish the monitoring sites at Asralt mountains because of the better accessibility. Two monitoring sites were already established there, two more will follow next year. The planned publication is targeted after re-visitation of the sites. Prof.Khadbaatar Sandag and Dr.Undrakh-Od Baatar visited Vienna from 08 September - 21 September, 2022 to exchange experience with researchers and Professors from Austrian Universities.

The Mongolian researchers visited following institutions:

The University of Vienna, University of Natural Sciences and Applied Life Sciences (BOKU), Institute of Agriculture Raumberg-Gumpenstein (HBLFA), Soil Survey Agency (Bodenschätzung, Finanzamt) and Nationalpark Donau-Auen.

The researchers from Mongolia got acquainted with nature conservation, protection and management of nature reserves in Austria. We got acquainted with the organizational activities of environmental monitoring, especially soil monitoring.

IN-COLLABORATE –
Inclusive Learning Settings for
School-Community Collaboration

PROJECT 27/ 2020

Michelle Proyer, Seyda Subasi Singh, Simon Reisenbauer, Center for
Teacher Education University of Vienna

Suresh Gautam, Prakash Bhattarai, Binod Prasad Pant Kathmandu
University

Report

The project started with an online meeting on the 2nd of February 2022 where the topics such as coordination, management of the project were discussed. Thanks to regular online meetings and communication, both teams developed an understanding about the current practices and relevant research on school-community collaboration in the context of teacher education. The participants of this meeting were Michelle Proyer, Seyda Subasi Singh and Simon Reisenbauer from University of Vienna and Suresh Gautam, Binod Prasad Pant, Tikaram Poudel and Prakash Bhattarai from University of Kathmandu.

The presentation of good practices of school-community collaboration could be achieved in both countries. Team of Kathmandu University presented their good practices and the context of teacher education and

inclusive education during a webinar organized by the team of University of Vienna on 20th of June 2022. At this webinar, project team members of Kathmandu University held a presentation on “Structuration of Inclusive Education: A case from Nepal”. This webinar was attended by more than 50 scholars from educational context.

The presentation of good practices from Austrian context were presented during the study visit to Nepal in December 18 - 25, 2022. Representatives from different departments were present during that meeting.

During this study visit, both project teams exchanged information on the structure of teacher education, inclusive education, practice teaching, internship and curriculum development.

In a follow-up meeting during the study visit to Nepal, possible topics for academic publications were identified and a timeline for working on an academic publication was prepared.

Additionally, opportunities for taking this project a step further by expanding the project to a larger scale were discussed and eligible programs that enable longer study trips, staff mobility and student mobility were identified.

Within the work done in this project, project teams from Austria and Nepal submitted a proposal for a poster presentation at an academic conference. The proposal was accepted and it will be presented by the team members in February 2023 digitally.

When copycats benefit platforms: The role of price distributions

PROJECT
28/2020

Wenjie Tang, Steffen Keck

University of Vienna

Xianchi Dai, Yu Lin

Chinese University of Hong Kong

Report

Project team meeting

Due to the travel restrictions in Hong Kong in connection with the Covid-19 pandemic, which were still largely in force in 2022, it was unfortunately not possible for most members of the project team in Austria to travel to Hong Kong or for members to visit Vienna. In November 2022 we were able to hold a meeting in Hong Kong and work together on our project.

Things to do before and during the stay in Hong Kong

In 2022, we have already conducted several experimental online studies in connection with the topic of the project, as well as collected empirical data from an online retailer based in Hong Kong. We have already held numerous online meetings to coordinate these activities.

During the meeting in Hong Kong we were able to meet in person for the first time. Within the framework of this meeting, we further analyzed the

data already collected and prepared the collection of further empirical and experimental data. In addition, we worked together on drafting a working paper based on the already existing results. Furthermore, we planned other possible future collaborations between members of the project team involving other researchers in several universities in Hong Kong.

Results

Despite the pandemic-related restrictions, which also hampered data collection in Hong Kong, we were able to collect and analyze the bulk of the data needed. We are currently summarizing the results in a working paper and have already submitted them to several European conferences for presentation in the summer of 2023. We expect to submit the final manuscript to a peer-reviewed journal in the summer or fall of 2023.

Sustainability

Most of the activities related to the project were carried out online by us. To further minimize the need for air travel, we held only one longer meeting of about 2 weeks instead of several shorter meetings.

The use of project funds

The project funds were used to pay the travel expenses to Hong Kong as well as hotel and subsistence expenses for the project team from Vienna. Since an originally planned further meeting in Vienna was not possible during the project period, only about half of the approved funds were used.

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