Faculty of Social Sciences
Faculty of Science
Faculty of Mathematics and Physics

1. Relevance of the strategy

Faculty of Social Sciences
Both, students and staff mobility are useful to complete the set of cooperating countries in the Far Eastern region and to progress from accidental contacts to more systematic forms of teaching and research cooperation.
Japan is one of the strong states in the region and at the same time represents one of the important global actors. Japanese ties with the Czech are developing successfully including the academic sphere, on the other hand, the fact the e.g. Sasakawa Foundation left Central Europe created certain gap. Mutual academic cooperation is good for both sides first because of developing economic ties and secondly because both sides keep tradition of research of each other. It would be fine to have good contacts with the Slavic Research Center at the Hokkaido University and Tokyo University of Foreign Studies doing area studies.
Another objective of the project is an intensification of cooperation with the Tokyo University of Foreign Studies and Waseda University whose specific expertise makes them a valuable partner for teaching and research.
Shifting geopolitics and geoeconomics continuously raise the relevance of the Asia-Pacific region. Top Japanese universities with their proven record of academic excellence provide a possible access to the region and its issues. Existing formal framework secured through the inter-university agreements provide an excellent starting point for intensified cooperation. With the expected funding, the nature of existing exchange (limited to student mobility) could easily evolve into more extensive matrix of regular mutual contacts including also Ph.D. candidates and academic staff.

Faculty of Science
PHYSICAL GEOGRAPHY
The Faculty of Science (Charles University in Prague) and Shimane University in Japan (Research Centre on Natural Disaster Reduction) are the planned partners for cooperation in the topic of natural hazards and risks and disaster reduction. Both institutions already cooperate under the International Consortium on Geo-disaster Reduction.
Japan is a country with lots of natural hazards, and their efforts on disaster reduction are highly evaluated. The partner in Japan is the Research Centre on Natural Disaster Reduction, Shimane University, Japan. The research team in Czech Republic is used to working on several international projects (e.g. Peru, Ethiopia) dealing with natural hazards where our doctoral students are already included (e.g. from Czech Republic, Italy, Peru). Both partners are also one of the leading persons in the International Consortium on Geo-disaster Reduction (F. Wang – Director General and V. Vilimek – Management Director). Their institutions belong to the founders of ICGdR (2013). Both sides will benefit from the cooperation on natural disaster reduction between Czech and Japan. The incorporation of our PhD students into the research topics of the International Consortium on Geo-disaster Reduction is also planned (using summer schools, practical training).
ORGANIC CHEMISTRY
The project will enable exchange of students as well as the teaching staff that will promote mutual exchange of ideas. Firstly, short stays in the hosting laboratories will enable students to participate on research project studied. Secondly, working on different or related projects will enable students to broaden horizons of their scientific as well as cultural knowledge. Thirdly, exchange of teaching staff will promote mutual understanding and it could also lead to joint project, which is highly desirable.
The list of higher education institution involved:
Japan: a) Hokkaido University, Sapporo, b) Sophia University, c) Kyoto University, d) Institute for Molecular Science, Okazaki
The applicant has personal and professional contacts in all of these institutions.

GENETICS
Our project is aimed at analysis of pycnogonid evolution by cytogenetic and molecular cytogenetic approaches. Pycnogonids or sea spiders are widespread and diversified marine arthropods found from the poles to the tropics and from the littoral zone to the deepest sea. More than 1300 of extant species have been described, which are usually classified into eleven families. Life history is little known in most species. Origin of this enigmatic group can be traced back to the late Cambrian. Recent molecular, developmental, and paleontological analyses indicate a basal position of pycnogonids in the arthropod subphylum Chelicerata. Despite wide distribution and considerable diversity of pycnogonids, informations about these animals are not available or limited in most biological fields including genomics, genetics, molecular biology, taxonomy, evolutionary biology, embryology, and ecology. Cytogenetics of these arthropods is unknown. In the framework of proposed project, selected standard and molecular cytogenetic techniques will be adapted to obtain maximum data about pycnogonid chromosomes. Selected species will represent a cross-section through all major clades of pycnogonids. This strategy is optimum to obtain detailed informations about pycnogonid cytogenetics. These data will be used to reconstruct chromosome evolution of pycnogonids. Considering position of pycnogonids among basal clades of Arthropoda, informations derived from the project could be also important to reconstruct ancestral karyotype of arthropods as well as evolution of their cytogenetic features.
To fulfil the proposed project, it is necessary to establish a close international cooperation between specialists on invertebrate cytogenetics and pycnogonid biology. Specifically, the project will be based on cooperation of two research groups, namely team of dr. J. Král (Charles University in Prague, Czech Republic) and team of Dr. K. Miyazaki (Seto Marine Biological Laboratory, Kyoto University, Japan). Dr. Král is one of a few specialists in area of chelicerate cytogenetics. His team modified for chelicerates various cytogenetic techniques including electron microscopy and methods of molecular cytogenetics. Dr. Miyazaki is an outstanding expert in pycnogonid biology. Applicants have considerable experience with national and international projects dealing with chelicerates. In the framework of the project, selected techniques of standard and molecular cytogenetics will be introduced into laboratory of dr. Miyazaki to study evolution of pycnogonids by cytogenetic methods. Data derived from the project will be used also by dr. Král, namely to analyse chelicerate cytogenetics.
To make the proposed project effective, two training stays are necessary. First, Dr. Král and his student will stay at Japan to train Japanese team (preparation of chromosomes, chelicerate cytogenetics) and to obtain data on pycnogonid cytogenetics. During following stay of Japanese team at Prague, members of the Czech team will introduce Dr. Miyazaki and his student into techniques of molecular cytogenetics. Involvement of students into the training will accelerate introduction of cytogenetic methods into laboratory of Dr. Miyazaki.
Faculty of Mathematics and Physics
There exists a long term collaboration between Charles University in Prague and other prestigious universities in the areas of applied mathematics, physics or computer science. It is always beneficial for the partnering institutions to have the opportunity to give or receive expertise trainings on new methods, solutions or sharing knowledge like (lattice theory and general algebraic systems, recently in Constraint Satisfaction Problem etc.).
MANA, NIMS, Tsukuba, Japan

2. Quality of the cooperation arrangements

Faculty of Social Sciences
There are established forms of cooperation in the form of inter-university agreements, then project cooperation like the support of Japanese studies (Sasakawa and Nippon Foundation) in 2004-2008. The Department of International Relations at the Institute of Political Studies has a long-term, intense experience with international students (including those in English-taught programmes) and a booming practice of guest professors on which the proposed arrangements will build. The Department of International Relations actively aims at the internationalization of its curriculum, student body and the research and teaching experience of its academic staff. The academic employees have a long-term practice in cooperating with their foreign counterparts, and our students depart to spend their exchange stays at the Tokyo University of Foreign Studies and Waseda University. Head of the department will be responsible for the formulation of specific goals of the mobility (especially at the level of academic staff) and information thereof vis-a-vis the employees and the students. Specific goals of the proposed mobility will be formulated in coordination with the directors of the department’s study programmes whose coordinators will then communicate them to the students.

Faculty of Science
PHYSICAL GEOGRAPHY
Both leaders visited the partnership organizations (even with students) in 2013-2014 and set up the priorities (PhD students), roles and tasks in the educational system (teaching in laboratories, modelling of hazardous processes to reduce risks, using remote sensing data). Vit Vilímek visited the Research Centre on Natural Disaster Reduction, Shimane University in October 2014. At that time, a field trip to investigate the natural hazards in the surrounding area of the university was conducted, and a visit to the laboratory was performed. While, in 2013, the Director of the Research Centre on Natural Disaster Reduction, Shimane University, Prof. Fawu Wang visited Charles University with his two students. At that time, we made a joint investigation of an open pit coal mine (NW Bohemia), and investigated the hazards caused by mining operations on the foothills of the Krušné hory Mts. In addition to the topics in the home countries we plan to incorporate into the education system our experiences from third countries. In this project we will apply the joint education to graduate students using common field research and equipment. In the Research Centre on Natural Disaster Reduction, Shimane University there is advanced equipment such as a landslide dam simulating unit and a chain surface wave array system. The submarine landslide simulator and water reservoir landslide modelling flume are rather unique pieces of laboratory equipment. The laboratories at Charles University in Prague are oriented towards sedimentology analysis and dendrogeomorphology (using a laser scanner). Each department will be responsible for its teaching process; nevertheless, an exchange of teachers is also planned. Sharing experiences, data and methodologies, and laboratory equipment will enhance the possibilities for our students to work in larger research teams on a true international level. Both institutions also expect to contribute to joint cooperation with other research contacts, international research programmes (e.g. International Programme on Landslides – IPL) or databases (GLOFs database). Our most recent joint publication Yang et al. (submitted) deals with rainfall-triggered
shallow landslides on the Mt. Aso caldera in Japan. Both countries are in fact facing similar hazards – shallow landslides after intensive rainfall. Another example of recent cooperation is the modelling of debris flows from the area of the Cordillera Blanca in Peru (the Czech team including PhD students gathered the field data, and the Japanese team is currently working on the modelling of the flow).

ORGANIC CHEMISTRY
The applicant has personal and professional contacts in all the above mentioned institutions. In addition the applicant spent totally 2 years in Japan as a postdoc and 3.5 years as associated professor at Hokkaido University. The applicant keeps close contact with his former colleagues and collaborators.

GENETICS
Applicants have been not involved into projects between the Czech Republic and Japan. However, they have long-termed and very intensive cooperation. In the framework of this cooperation, J. Král has developed a technique for preparation of pycnogonid chromosomes and obtained first cytogenetic data of these animals.

Proposed project is based on two stays. We propose following organization of these stays:

Stay of dr. Král at Japan
Dr. Miyazaki will arrange collection of pycnogonids. He will introduce dr. Král and his student into biology of pycnogonids. Furthermore, he will provide J. Král with instruments, chemicals, and equipments, which are necessary for preparation of chromosomes. Dr. Král will train dr. Miyazaki and his student to prepare chromosome slides and to evaluate them. Furthermore, he will introduce members of Japanese team into chelicerate cytogenetics. Finally, dr. Král, his student, and Japanese team will produce chromosome preparations of selected species and evaluate them to obtain basic information about cytogenetics of pycnogonids. Selected chromosome preparations will be transported to the laboratory of dr. Král after his stay in order to use them for molecular cytogenetics.

Stay of dr. Miyazaki at the Czech Republic
Molecular cytogenetic experiments will be performed at laboratory of dr. Král (Charles University in Prague). His laboratory is properly equipped for these experiments. Dr. Král will train dr. Miyazaki and his student in techniques of molecular cytogenetics. Dr. Král will provide dr. Miyazaki and his student with instruments, chemicals, and equipments, which are necessary to conduct experiments of molecular cytogenetics.

Faculty of Mathematics and Physics
Inter-institutional Agreements will lead to professional cooperation. The purpose will be to organize for training visits between academic staff, share academic materials, collaborative research and publications, joint production and delivery of courses and program.

3. Quality of project design and implementation

Faculty of Social Sciences
Both, students and staff cooperation is based first on selection process according to local rules with respect to partners demands and needs, then sending them to partners country (no scholarship and accommodation assistance ix expected). Recognition of the mobility period will be made in mutual accord through the memorandum of understanding describing details of cooperation including grading, system of awards, transcripts issuing etc. Besides solidifying student mobility and extending it more substantially to the Ph.D. level, the project aims at developing the cooperation from individual teaching and research stays to joint research projects in the areas of mutual interest. Existing student exchange which has turned out most relevant and useful for our graduate students, primarily those working on issues related to the Asia-Pacific region, should be extended to include
stays by interested Ph.D. candidates. The project would also propose regular visiting teaching stays by academic staff from the Tokyo University of Foreign Studies and Waseda University. Once established, this cooperation should turn into direct personal contacts between researchers of both institutions, helping them identify common research themes which could then be turned into common research projects.

Faculty of Science
PHYSICAL GEOGRAPHY
The detailed objectives in the framework of natural hazards and risks will be specified in detail for the education process; field areas for practical training will be chosen and the joint Czech-Japanese team will be set up. The necessary data for laboratory analyses, tests, modelling and synthesis will be gathered from localities in the home countries or using remote sensing (or data from our archives will be used). The STARS programme will be available for some students (for the Czech partner) or Co-Tutelle (double degree) could be used for coordinated leadership of some doctoral studies. Some projects exist at a national level and university level to support Japanese students to go abroad. The selection of the participants is conducted by a special committee at a national level, and the successful candidates can obtain a certain amount of financial support for their staying outside of Japan. If we can form an agreement at the university level, the fees of the exchange students can be waived, and they can also obtain scores from the foreign university.

At Charles University in Prague we have already developed a selection process for student applications and their visit to a foreign institution should be connected not only with credits but also the progress in their diploma work is appreciated. We already have special Erasmus lessons (for Erasmus students) in our department. We are also used to including foreign students in our fieldworks. The education system in Prague consists of theoretical lessons, practical work in laboratories as well as field experiences. The quality of education in both institutions could be checked for instance during student conferences (at the faculty level) or at national conferences. Beside this we expect joint field work and small excursions between Japanese and Czech students (this model already works for several years between Czech and French students from Strasbourg).

ORGANIC CHEMISTRY
The expected phases of the project
i) Contact with the partner institution
ii) Supplementary financial support for each exchange will be sought by using internal finacing programs of the hosting institutions.
iii) Devising a plan of student exchange and topics to be studied in each lab.
iv) The tutors of the exchange students should visit the hosting isitutions

GENETICS
Proposed projects consists of three basic stages:
1. Stay of dr. Král at Japan
Dr. Král will introduce Japanese team into cytogenetics. Dr. Miyazaki will introduce Czech team into pycnogonid biology. Members of both teams will produce chromosome preparations as well as collect and evaluate basic data on pycnogonid cytogenetics.
2. Stay of dr. Miyazaki at the Czech Republic
Dr. Král will introduce members of Japanese team into molecular cytogenetics. Both teams will collect and evaluate data on molecular cytogenetics of pycnogonids.
3. Dissemination of results
Obtained results will be presented at meetings, conferences, popular and scientific journals
The best students will be selected to take part in the project.
Faculty of Mathematics and Physics

Only academic staff with deep expertise at partnering institutions will be selected to participate at classes as lecturers. Staff attending classes to deepen their knowledge, skills and expertise will participate at such classes which are relevant to their field of scientific expertise. Both parties will support the academic staff in terms of onsite support and any stay related issues.

4. Impact and dissemination

Faculty of Social Sciences

Dissemination seems to be organized through established academic and national structures. The proposed project aims at establishing a long-term, extensive mobility and cooperation scheme that will ensure swift, unhindered transfer of knowledge and research best practices from the Japanese partners to the Department of International Relations at the Institute of Political Studies.

So far, mobility between the Faculty of Social Sciences and its Japanese counterparts has been limited and, furthermore, without the objective of gradual intensification of such cooperation. The proposed project should lead to a more sustainable arrangement with full participation of academic employees. Apart from expanding the opportunities for students to spend a substantial part of their graduate or postgraduate period at a renowned Japanese institution, the sustainability component will be ensured by the focus on gradual development of peer-to-peer research cooperation.

The possibilities for student exchange will be communicated through existing and well established faculty channels. On the other hand, the department will play a crucial role in motivating, stimulating and steering its academic staff into investing necessary effort and energy into establishing mutual contacts with their Japanese counterparts. The result should be a web of regular contacts at a working level that will ensure the continuing relevance of the proposed mobility arrangements.

Faculty of Science

PHYSICAL GEOGRAPHY

Both partners can benefit from the high level of the post gradual education system which will be realised at an international level (highly equipped laboratories, international experience from several continents, performance under the International Consortium on Geo-disasters and in the framework of the Centre of Excellence on Landslide Risk Reduction). High impact factor publications, international summer schools and participation on international conferences will constitute the measures of quality.

The Czech partner will benefit from the Japanese experience with the high dynamics of hazardous processes, from the experience of how to mitigate disasters and from the high level of technical equipment used in Japan. Disaster reduction is also well implemented into the education process in Japan. The Japanese partner will benefit from the experiences we have in Prague from international projects in developing countries with high vulnerability of the society and from the variety of students from European countries studying in Prague (high level of mobility). The dissemination of results will be done through seminars and conferences in both countries and through joint publications. Through joint research, we can solve problems in natural disaster reduction which both of us are facing. Because of our positions in international organizations we will be able to offer students from both partner organizations good quality contacts for future doctoral studies and their incorporation into international research teams. The Czech partner is also an official holder of the Centre of Excellence on Landslide Risk Reduction for 2014 – 17.

References:
ORGANIC CHEMISTRY
The desired impact of the mobility is to expand further cooperation with laboratories and institutions abroad. It is expected that the obtained results will constitute important parts of these PhD theses as well as it is expected to publish joint paper. Eventually, joint project could be sought.

GENETICS
1. Selected standard and molecular cytogenetic techniques will be adapted for pycnogonids.
2. Obtained informations will be used to reconstruct chromosome evolution of pycnogonids. Data on cytogenetics of pycnogonids are missing.
3. Team of dr. Miyazaki will be introduced into cytogenetics of chelicerates and cytogenetic techniques. They will use these skills to expand their studies on biology and evolution of pycnogonids.
4. Informations derived from the project will be used by team of dr. Král to reconstruct chromosome evolution of chelicerates and arthropods. Team of Dr. Král will be involved into studies of pycnogonid cytogenetics.
5. Proposed project will form basis for following and more intensive cooperation of teams of dr. Miyazaki and dr. Král in area of chelicerate genomics and cytogenetics.
6. Involvement of students into project will improve their skills. Data from the project will be included into their theses.
7. Obtained results will be presented at scientific seminaries of applicant’s universities, national and international scientific conferences. Furthermore, they will be published at impacted scientific journals. Members of both teams will be involved into these papers.
8. Informations about biology of pycnogonids will be disseminated in public via popular biological journals (e.g. Živa at the Czech Republic). This animal group is neglected.

Faculty of Mathematics and Physics
The mobility project supports a cooperation of partner institutions; allow better data acquisition and reduction as well as a joint publication of common results incl. international scientific journals and at International conferences.
The results will be disseminated by lectures, publications in journals, lecture notes and web pages. Also, outreach activities aiming at general and academic public with the aim of explaining benefits of this kind of mobility will be executed.