





# **queen's gambit:** the launch of a research career

**Barbora Tupá (ed.)**



Institute of Sociology of the Academy of Sciences of the Czech Republic  
Prague 2007

This publication has been published by the National Contact Centre for Women in Science of the Institute of Sociology of the Academy of Sciences of the Czech Republic thanks to the support of the Ministry of Education, Youth and Sports and the support of the Research Plan of the Institute of Sociology of the Academy of Sciences of the Czech Republic "Sociological analysis of long-term social processes in Czech society in the context of European integrational policies, development of the knowledge-based society and of human, social and cultural capital", No. AV0Z70280505.

The publication was reviewed by: **Mgr. Kateřina Lišková, Ph.D. and Josef Chuchma**

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ISBN 978-80-7330-131-6

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Chess is a game of logic and strategy, and requires creative thinking and imagination. Chess is a science. The opening often determines the course of the whole game. Equally, the beginning of a scientific career is important in terms of which options and opportunities open up and how they will influence the future of a scientific career. Here I would like to present ten young women who have chosen science for their future. They are at the beginning of the game, opening with the queen's gambit – an opening that opens up the chessboard for the queen. What is at stake for them? The opportunity to do what they like, to contribute to the development of human knowledge and to fulfil their childhood dreams. They don't like sacrificing even a small pawn and *don't capture just for the sake of capturing*. Science is a game of chess. It is a strategic game where you have to combine tactics and think several moves ahead. The scientific careers of these women have often been as tortuous as the path of a knight on a chessboard.

There is and always will be a lack of young people in science.  
They dismantle myths and are the motor that propels science forward.  
It is necessary to do our utmost to keep them and attract them toward science.

**Prof Blanka Říhová**

Two years ago, in 2005, the National Contact Centre for Women in Science launched the project Female Talents. The goal was to present female researchers at the beginning of their scientific career, who have accomplished their first initial achievements and whose futures lie before them. I was interested in what these young researchers worked on and how they came to their line of research, in their experience gained abroad and their plans for the future. I asked them what bothered them about science and how they felt, as women scientists. It was interesting and entertaining to listen to their stories, which were as varied as the scientific disciplines they had chosen, and at the same time it rang true with me when they talked about the satisfaction and self-fulfilment that research gave them.

At the beginning I contacted heads of research and educational institutions with the request to recommend successful and talented women researchers and PhD students whose work they valued highly. Some were supportive and forthcoming and proudly introduced their students and colleagues; on other occasions I encountered incredulity about what a meaningless and useless project I was working on. Is the effort to talk about women in science really a waste of time and empty talk? Some of the young researchers I contacted refused an interview, expressing unease and doubts about their work and the uniqueness of their talent. Those who were confident about their talent and the significance of their work and who received support from the people around them took part in the project and I talked to them about their life and work. I present ten of these women in this publication, *queen's gambit: the launch of a research career*.

The goal of this book is to introduce female researchers and their work, at early-stages in their career; young women who have chosen an academic career, succeeded in their efforts and have managed to enter the world of science. It is interesting that the stories they tell about their journeys to their disciplines depict these journeys as natural. These are not stories about overcoming difficult obstacles and their experiences of marginalisation, though this does not mean that there were no pitfalls on that road. They do mention some. They also talk about their scientific and life role models, people close to them and their successes. Their animation as they talk about their work is captivating even for a person who knows nothing about the topic, so one gets the idea that they will be good role models for other students.

When asked about equality and fair conditions for men and women in science, their responses get short. As if there was nothing to discuss. It appears to disrupt the security of their narratives, bringing up self-conscious, even negative, reactions. As it turned out, though, the image of fair science is often more of an a priori assumption than a lived experience. Questions about why the representation of women in leadership positions is low often opened the space for their own thoughts on this issue. The original assumption that women and men have the same conditions for scientific work and that their work is measured equally clashed with the fact that we find most leadership positions are occupied by men. If the glass ceiling in science is a thing of the past and there is nothing standing in the path of young female researchers on their way to the top, why are there so few women? And of those few female researchers who have made it to the imaginary top and head excellent teams, what do they have that the others lack? Good luck? Perseverance? A tolerant partner?

Questions remain, and we are faced with a paradox. The fact that these young women have not encountered behaviour they would call discriminatory does not mean that discriminatory behaviour does not exist and that it has not dissuaded someone else from a scientific career. The fact that these women have decided on a career in research, have joined research teams and are doing well in the Czech Republic and abroad can attest to the fact that they were lucky enough not to have encountered greater obstacles, or did not perceive such incidents as obstacles because they were part of their everyday experience.

Practice and the Centre's activities make clear that unequal conditions for women in science are formed by many factors, including the different approach of teachers to boys and girls, the degree of attention paid to them, the confidence and prejudices that boys and girls face in various disciplines. When reminiscing about their studies, the young researchers good-humouredly remember the ironic remarks of their teachers about "girls and technical disciplines" or "girls' industriousness and boys' talents". Everyone will be able to call up such memories. The young researchers do not see such remarks, often made jokingly, as discrimination. Although such slighting and sneering can be taken as a trifle, through continued repetition and subconscious acceptance it gains force, affects our ambitions and forms and reinforces stereotypes in society.



The young women's narratives make it clear that they perceive the issue of the equality of women and men in science primarily as an issue of parenthood. As if for them mothering and parenthood could explain most of the inequalities that surfaced during our discussions. They talk about how difficult it is to make up for the time they lose with small children and to keep up with developments in their fields. Although they do not condemn 'child-free-ness' as an available strategy, none have opted for it voluntarily. One of the explanations may be that there is strong pressure to conform to the traditional woman's role which they mention, and even overstate. For one, children are a reason to leave science, for another they are a source of inspiration and for yet another they represent a challenge as the woman tries to measure up to the role of a good mother and researcher at the same time. Importantly, these young women, as well as generations before them, perceive issues related to work-life balance as a purely private matter. Without open debate about options and measures to facilitate a work-life balance in society, there will be no demand among researchers for such measures.

The issue of establishing a family and bringing up children was often the only disadvantage these young women mentioned. Maybe they were lucky enough that they did not encounter others, or maybe they did not want to talk about them. As was mentioned several times, they are still young, often students, and thus feel protected. They feel that 'real science' and the 'fight for positions' is still ahead of them. If they had not been lucky and had instead encountered scepticism and doubt, maybe we would not be writing about them and they would not be doing science. It's not enough to be talented; you need to have a chance to nurture your talent, you need the confidence of your supervisors and support from the people around you. You have to have the opportunity to let your skills and talents blossom. Talent and aptitude are socially formed phenomena, and social conditions are critical stimuli for their development. Therefore, discovering and developing a talent depends largely on a supportive environment, motivation, the confidence of others and confidence in one's own abilities. From this perspective, the ironic remarks of teachers and stereotypical assumptions that women are simply not good at something no longer seem to be harmless teasing but contribute to the discrimination of women and the suppression of their potential. The way we stereotypically think about women's and men's abilities and how we support or underestimate them in their endeavours is an active force through which we fulfil these stereotypes.

We are aware that by publishing this book we partly contribute to the construction of the idea of talented and unique women while research is primarily about team work and co-operation. Our goal was not to put forth a selection of unique profiles of talented experts who, being exceptional, stand out. *Queen's gambit* is a set of narratives about what life is like for young women who are successful in science.

Chess is a just game – the better player wins. Unfortunately the same cannot be said about science. Maybe you started the game missing a few pieces or your opponent's rules were slightly different from those you knew. I believe that these young women which I have the honour to present here will continue playing with joy and gusto, and that their game will be victorious.

**Barbora Tupá**

## Alena Rettová

Dr Alena Rettová graduated with degrees in Philosophy, German Studies and African Studies from the Faculty of Arts, Charles University. Between 2001 and 2005 she lectured at Charles University in Prague, and between 2005 and 2006 at the University of Bayreuth in Germany. Since September 2006 she has been a lecturer in Swahili Literature and Culture at the School of Oriental and African Studies, University of London, UK. She has published two monographs on African philosophy, a commented anthology of Ndebele literature translated into English and Czech, papers on African languages, African philosophy and literatures in African languages and a number of translations from Swahili, Yoruba, Ndebele, Shona, Bambara, German and Spanish. Together with Kenyan poet Adbilatif Abdalla she translated Vaclav Havel's *Vernisage* into Swahili (Uzinduzi 2005). Alena Rettová introduced the term "Afrophone philosophy" (philosophy in African languages) into specialised discourse and since 2004 her research has systematically been concentrated on this area of research. Today she is preparing a monograph *Afrophone Philosophies: Reality and Challenge*. In addition, she is working on a philosophical biography of William Mkufyi, who writes in Swahili, and a monograph on understanding and recording time in Afrophone languages.

The interview was published in August 2006.



## **African languages have completely bewitched me**

I wanted to know what the meaning of life was

### **To start, could you describe the topic of your research?**

I study African philosophy, philosophy in African languages, and literature in African languages – specifically the Swahili region, Swahili literature and culture. In Africa there are about 2,000 languages classified into four language families. I concentrate primarily on the Niger-Congo family, which covers pretty much the whole of Africa south of the Sahara with the exception of a few regions of the Nilo-Saharan and Khoi-San language families. In the north of Africa, languages of the Afro-Asiatic language family are spoken. I myself speak Swahili and read in several other languages.

### **When did you become interested in African culture?**

When I started studying philosophy I realised that a person knows at least a little bit about Indian, Chinese and Hebraic philosophy. But we often don't know anything about African philosophy. Not even the fact that there is something like that. I also became motivated when I was doing German studies. I became interested in African languages; they completely bewitched me. It was these two moments at the beginning – African philosophy and African languages.

### **And is there then anything like African philosophy?**

Of course there is, although there is no simple answer to a question about African philosophy. Today, there is – let's say – Western-style African philosophy, which is a full-fledged part of the global philosophic discourse and which appeared approximately in the middle of the 20th century. However, this is far from everything that Africa has to offer in terms of philosophy. In African languages you encounter an issue about the very term "philosophy". What from our perspective constitutes philosophy is not often called philosophy. There are relatively few areas where the term "philosophy" exists and is used. But as the German anthropologist and philosopher Kai Kresse demonstrated, a number of discourses, be they religious discourses, analyses of literature or various wise man discourses, are philosophical. Among these I concentrate on written literature in African languages.

### **First you started studying philosophy, then you added German Studies, and still later African Studies. Were you interested in philosophy from early on?**

I guess so, but it was more of an existential than a professional issue. Not that I wanted to know who said what. More like, I wanted to know what the meaning of life was. I got over this fairly early on and then I started to feel that I wanted to concentrate on something factual – empirical knowledge which a person can further expand. I think that in this sense Afrophone literatures are a great playing field.

### **What do you think is the specificity of African philosophy?**

It is precisely this question that is one of the questions of African philosophy – whether it is specific in any way. Various philosophical schools answer differently. One says that there is nothing specific about African philosophy and that the only thing that can be specific are certain topics related to Africa as a geographical space. Other schools say that African philosophy is specific and completely different from the rest of philosophy. The specificities that they claim are, for example, that African people are more emotional, that they do not rely on logical analysis but intuition. These are roughly the characteristics attributed to women in the West. There are a lot of similarities between these two stereotypes – a typical woman and a typical African. The Senegalese philosopher and poet Léopold Sédar Senghor says that white soldiers during the world wars, when they fought side by side with African soldiers recruited in the colonies, were astonished by the fact that Africans were sensitive to dance and the arts almost as much as women. This is, of course, a very radical claim against which some of the other schools have protested.

### **And what are you inclined to think?**

Rational and critical aspects of various discourses in Africa are often overlooked precisely because they seemingly do not belong to philosophy. It cannot be denied that there are highly rational and critically oriented discourses in African cultures. I am inclined to think that philosophy should be critical, analytical and carried out by individuals. That's also the direction of my research.

African woman suffers from three types of historical and social oppression

### **Are there any women in African philosophy – either as philosophers or as a topic?**

There are African feminists who tend to call themselves womanists. They distance themselves from Western feminism, and in their theories you can often find a simplified understanding of what Western feminism is. Womanists claim that unlike Western feminists they do not want to live without men because they are their husbands, brothers, fathers... They want women in African society to be fully valued. They say that the African woman suffers from three types of historical and social oppression: racial oppression by whites, including white women, gender oppression by men, and economic oppression in the sense of African poverty. There are women writers and active philosophers in Africa. There are fewer of them than men, but they are there.

### **Is it possible to develop and build the idea of feminism in African society?**

I don't know, I have not studied this issue in depth, but my impression is that it is similar to what it is like here, in the Czech Republic. There is a certain contempt for feminism which, however, attests more to the fact that women have relatively high self-confidence. They do not feel they are oppressed and are aware of their position in society. I think that feminism in Africa is more similar to Czech feminism than, for example, to Western feminism.

### **How many people in the Czech Republic are doing African Studies?**

There are not many experts. In university you can see a large generation gap – one group of experts became established in the 1960s when the field was experiencing a huge boom. That was interrupted for political reasons. Today there is a young generation of passionate African Studies scholars, but African Studies is about to close down now at the Faculty of Arts at Charles University.

### **For what reason?**

The future of small disciplines is not rosy. In practice you encounter the problem of not having enough associate and full professors. And of course, a small field cannot afford many internal employees. Resources in the Czech Republic are also inadequate. In the library, most of the material you find is from the 1970s and in Russian, and there is no way you can write a great paper with this. Students then have to travel, which is not easy when you are young and poor. There are no fellowships for African Studies scholars, and students often get to go abroad thanks to fellowships in other disciplines – German Studies, Roman Studies etc. The situation has gotten slightly better at the Faculty of Arts of Charles University thanks to the introduction of one-off targeted fellowships.

### **You spent a long period of time on a fellowship in Germany. Can you compare the level of African Studies here and there?**

I spent a year in Leipzig and a year in Bayreuth. The two universities were quite different. In Leipzig, African Studies is a huge discipline; there are great teachers but the quality of seminars is lower because of the huge numbers of students who are not that motivated. They are children who are more interested in exotic stuff than studying Africa seriously. In comparison, in Bayreuth the field is tiny and you can count the number of students on one hand. But the entire humanities studies focuses on Africa and a lot of disciplines are closely related to African Studies – geographic studies of Africa, culture and history of Africa etc. African Studies as such, which in Germany mostly means the study of African languages, is really superb and the quality of lectures is great. The demands placed on students are tremendous and many of them run away to Leipzig because they're lazy. The library is absolutely exceptional – one of the best in Europe. Professors are also great and students often speak African languages fluently. Czech students are also great, but compared to Bayreuth they suffer from a lack of resources and a limited range of lectures. In the Czech Republic a university cannot offer teachers an appropriate financial reward. Many teachers flee to diplomatic services or abroad. A person is never in education only for the money, but when your salary does not even cover your rent, then you have a problem. And if you try to make some money on the side, then of course your research suffers.

A child forms your personality in quite a dramatic way

**You are finishing at the Institute of the Near East and Africa. What comes next?**

In September I am starting at the School of Oriental and African Studies (SOAS) at the University of London. An opening was advertised after a Swahili intellectual from Zanzibar, Farouk Topan, who had taught there for a number of years, left. Together with three other applicants I was selected for the shortlist; I was invited for an interview and got the position. It is quite a narrowly defined position – Swahili literature and culture. In the world there are many people studying Swahili but only a few of them also concentrate on literature. It was great luck because SOAS is really very prestigious and my position is not limited. For example, in Germany academics are facing great hardships because only professors are awarded permanent positions. Everyone else is employed on a fixed-term contract. And if you don't get a professorship you can be employed by a university for only twelve years. Then you have to leave; you are around forty and suddenly you have nothing. Therefore many German academics leave for the US where positions are permanent.

**Do you see any disadvantages when doing scientific work on account of being a woman?**

No. Although it is certainly true that it is more difficult for a woman to find a balance between family and work. I have a seriously handicapped son and his birth meant the end of everything for me. We spent a lot of time in the hospital and I thought that I would never go back to academic work. It was my PhD supervisor, Professor Kropáček, who made me apply for a doctoral programme. Then I started teaching at the Faculty of Arts and I think that it gave me the energy to face my personal problems. I came to feel that my life had some meaning and that I was not only the mother of a handicapped child. So the start of my motherhood was very difficult. But after you get over the beginning, you become more steadfast and you get to know your own self, you realise what your values are and that everything has value. This applies generally; a child forms your personality in quite a dramatic way. Of course, the problem of how to balance my scientific work and care for my son has always been there and always will be. But fortunately I have a mother and father who take care of him a lot.

**Has the birth of your son affected your scientific work?**

Yes and no. I tried hard to avoid being a mother who sacrifices herself for her child and talks of nothing other than how to prevent developing sore skin on the child's bum. This gets even stronger among mothers of handicapped children, and the narrowing down of their perspective is almost absolute. I worked hard to avoid this; I did not even want to talk about my son with people too much. On the other hand, when we were in the hospital, I wrote a book where I linked medical topics with the issue of African philosophy – this book would never have been written without my son. Also, in Swahili literature there are topics that are very close to me and which I like using to start my lectures. Even if students don't know the background, I think that they can feel when a certain topic means something for me. Tanzanian writer Euphrase Kezilahabi wrote a book on hydrocephalus – a pathological accumulation of cerebrospinal fluid in the brain. I often use this book to open my courses in Swahili literature. When students see an image of a brain affected in this way and next to it they have a book in an incomprehensible language, it often gives them incentive to go deeper into the language and read.

## Lenka Drábková

Lenka Drábková, a biologist by training specialising in botany, graduated from the Natural Science Faculty at Charles University in Prague. In 2003 she defended her dissertation thesis at the same faculty. Since 1999 she has been working at the Botanical Institute of the Academy of Sciences of the Czech Republic in Průhonice, and since 2007 she has also been working at the Institute of Molecular Genetics of the Academy of Sciences of the Czech Republic in Prague-Krč. During her research career she has received a number of national and international fellowships and grants, including the Framework Programme 5 and 6 projects Sys-Resource, Cobice and Synthesis. Her research is concentrated on the phylogenesis and evolution of higher plants. She regularly presents the results of her work at international biological conferences. Last year she organised an international phylogenetical workshop of the Willi Hennig Society at the Botanical Institute of the Academy of Sciences CR. Lenka Drábková is an author of a number of studies published in prestigious international journals as well as in Czech periodicals.

The interview was published in June 2006.





## **For a lay person, DNA at the bottom of a test tube has very little to do with a living plant on a meadow**

Phylogenetic tree of life

### **What is your field of research and what do you concentrate on?**

My research field is botany, or more specifically taxonomy and the molecular phylogenesis of plants. I study higher plants – I am not really sure to what extent you understand: simply, it's not moss, lichen or green algae. And to be very specific, my main field of interest right now is the phylogenesis of one family – Juncaceae, the Rush family.

### **Before you continue, I will ask a lay question: what is phylogenesis?**

Phylogenesis refers to the historical development of organisms in the evolutionary process. I study the developmental relationships between certain groups of plants: in what ways plants are related to each other and what types in a given group are more ancestral and which more derived (this scientific discipline is called phylogenetics). The phylogenetic tree of life is being assembled; and I contribute a small pebble – my family – into this grandiose study which started in North American and which the EU later joined. This study covers all organisms on the Earth, from bacteria to plants and animals to human beings. I had already worked on the phylogenesis of the Rush family during my postgraduate studies and now I am continuing. Of course, I also study other topics but generally they are related to the issue of evolution.

### **As you say, you study the Rush family. Do these plants grow in the Czech Republic?**

It's a cosmopolitan family which means that you can find it all over the world. There are many representatives here which you can easily find in any meadow – for example, *Luzula campestris*, which is the most common rush, the field woodrush. However, I do not only study the species found in the Czech Republic; I study the family from a global perspective. Today there are a total of 443 identified species of this family. I would like to elucidate the whole evolution and put together a phylogenetic tree of this group. It's not just traditional botany – morphology, anatomy, karyology; molecular taxonomy also plays an irreplaceable role. Here you get to the DNA level and you sequence individual segments of the DNA – chloroplast DNA, mitochondrial DNA and nuclear DNA. You get data with which you build the phylogenetic tree of a given group.

**Besides laboratory research, does your work also involve going out in the field?**

Exactly, my work takes place both in the lab and in the field. We call this a combination of green and white botany. The green one, in the field, that's the start of it all. In the white one, in the lab, you have DNA at the bottom of a test tub, and for a lay person this has very little to do with the original plant in the meadow. The best approach is to go from the absolute basics through analysis to interpretation. You collect plants, you identify them, you extract the DNA and then you amplify it, sequence it and analyse the data obtained. Often, though, you can't get the plants in the field; you can't find them or they're endemic and grow, for example, only in one location in South America. Then you have to go to the herbarium. Fortunately, you can analyse DNA obtained from dry herbarium material, and in some cases that's the only thing we have.

**Too bad you can't go to South America to get your 'material'.**

Yes, that would be great but it would be a rather expensive trip. Of course you can apply for a travel grant or plan the trip as part of a larger project. If you have a permit to collect and bring live plants, then you can grow them in the experimental garden at our institute in Průhonice.

**You have a special garden?**

Exactly, we have an experimental garden with greenhouses, hothouses and free areas to grow plants.

**How does it look? You have a patch of land where you grow bulrush? What if it hybridises with other species?**

Sure you have to make sure that close species do not hybridise. Hybridisation experiments are often carried out to find out, for example, whether a given plant is a "good species" or whether it hybridises freely with other species. Those that do not hybridise are considered very good and fixed species which are stable enough not to hybridise.

**And these plants will have a relatively simple tree of life?**

Such plants definitely have clear end taxa. If a group has a very strong reticular evolution (when plants hybridise with one another), you don't get a tree but a whole network. These are usually young species which are very closely related and don't have a reproductive barrier.

## Green and white botany combined

**Do you prefer bench work or the field?**

I started off with classical botany, that is, field botany. Relatively early on I started going on excursions with

botanists from the Botanical Institute in Průhonice to learn to identify plants and describe them. When I studied biology at Charles University in Prague, I still was sure that I would be doing traditional botany. Then it turned out that contemporary taxonomy is not only the descriptive (alpha) taxonomy but that modern molecular methods are entering into it. They can answer many questions which traditional morphology cannot answer at first glance, which is quite important. So I started studying various applications of molecular biology methods to botanical hypotheses. When I was starting my postgraduate studies, my main area of interest was the molecular phylogenesis of the Rush family.

**Are the results obtained with classical approaches different from molecular results?**

At first it could appear that they differ a lot, but I have to tell you one thing which I find interesting: when you put together a phylogenetic tree based on molecular data, you get certain groups of plants that have the same predecessor. Many of these groups are then confirmed morphologically, but many are not. So suddenly you have certain plants which, using molecular methods, surface unexpectedly somewhere completely different. And you ask: why? And you have to go back to the alpha taxonomy and look for features supporting your new hypothesis. And the most interesting thing is that with many groups and species you can find some feature that supports such a new hypothesis, such a new classification. It is amazing to me that a person can discover so many things that were not completely clear at first glance.

**Do you feel any hierarchy between “green” botanists and lab botanists?**

I think there is some differentiation. Molecular biology as an applied science entered botany fairly recently, and because of this some botanists comprehend it only partially and sometimes not at all. Nevertheless, these two areas are mutually interlinked and today one cannot be unconnected to the other; it's important to know both.

**Would you say that you are professionally so deformed that when you go on vacation, you watch which plants grow there, how they hybridise and the like?**

Absolutely, you can never “switch off”. Basically they are work holidays or else there would have to be no plants. I had a plan to go on vacation to Cyprus and I wanted to travel around, see the local monuments and learn something about history. Instead, I contacted local colleagues-botanists, went around the island and collected plants. Basically I collected material which I then processed after the holidays. This is normal in our line of research.

**And it's a confirmation of the fact that you enjoy your job.**

Yes, my work is my hobby. Otherwise, you could not really do research at all.

**You said that as early as secondary school you went to the Botanical Institute and the Department of Botany at the Natural Science Faculty of Charles University. What attracted you? The desire to be able to name all those flowers?**

The first impulse was exactly such a descriptive motive: I don't know what it is and I want to know. Already in elementary school I participated in the biological Olympiad and was in contact with people working in research or doing specialised work. So biology was a clear choice. At one time I was considering zoology because animals seemed to be more interesting at the beginning. But we had a small apartment and where could I raise an animal? Plants were easier to grow! (laughs) So in this way I slid toward botany. In secondary school I started going on excursions with the botany department. It was amazing: you were in the countryside and when someone found a plant that they did not know, the excursion leader identified the plant, told a "fairy tale" about it, showed us its features and how it differs from other related plants. Perhaps I started a little earlier than others. I was a baby. I really like remembering those times because it was really a very pleasant form of education.

Hoarding has no place in science

**You were on fellowships abroad. Could you tell me what you did abroad and what these fellowships meant for your work?**

It was a great experience. I came to a new environment, met people whose names I knew only from papers. When I met Prof Mark Chase, the head of Jodrell Laboratory in London, I said to myself: Wow, this is really an important figure! That fellowship was divided between the Royal Botanical Garden in Kew and the Natural Science Museum where I studied herbarium specimens and obtained plant material for DNA extractions. This is very important for plants that you can't grow in your garden. I had the opportunity to take advantage of amazing and superbly equipped labs. They had a special room for each type of DNA manipulation. At that time this was not so at the Botanical Institute. I saw what laboratory work should look like. My second fellowship was at the Biological Institute in Copenhagen. There I also studied herbarium specimens and extracted DNA in the lab, and amplified it and obtained sequences for phylogenetic analysis. I learned to work with phylogenetic programmes and to analyse molecular data sets. Those were the beginnings of my work abroad.

**What should I picture when you use the term 'herbarium specimen' and the study of herbarium specimens?**

On a sheet of A3 format paper you have a pressed plant. In some collections the plant is glued in one place with a piece of paper. Elsewhere they glue the whole plant to the paper. For DNA extraction you need just a relatively tiny piece of leaf or stem. If the item was not subject to too much chemical degradation (during plant

conservation or herbarium collection disinfection), the DNA is of sufficient quality and can be used successfully. Working with dried plants is more difficult because DNA is chopped into small sequences. It's financially demanding and time consuming, but it can be done. It's the only way with plants that are endemic and all we have is just that one herbarium specimen. For example, I have *Luzula atlantica* from one herbarium collection which no one brought again from the original location. Two years ago an expedition set out to find it but unfortunately they did not. So I don't have a living plant and I obtained the DNA from a herbarium specimen.

**And *Luzula atlantica* belongs to the group that you study?**

Yes, it's a woodrush growing in the Atlas Mountains in central Morocco. It's a very interesting plant which is quite unique among woodrushes. It stands completely apart, really between two taxonomic categories of woodrushes and it is becoming clear that it will be a "missing link" to a long extinct ancestor. As you see, it's not so completely easy to find something in the field. If the population of a species is small and your localisation is not absolutely exact ... Not even field botany is easy.

**If a live plant is not at hand, you have to go to a herbarium?**

Exactly. The unwritten rule is that if you have one herbarium specimen, you can take a piece for molecular, anatomical or palynological studies. On a piece of paper you have to state that you have taken such and such piece of a leaf of this plant for a molecular analysis, then who you are, where you are from and for which project you will use it. The unwritten rule is that each herbarium specimen should only be used once. If you see in a herbarium that another researcher took a piece of the plant and obtained DNA from it, then you write to them and ask them to give you the aliquot of this DNA before "destroying" the herbarium specimen again.

**And are there "hoarders" who do not want to share their sample?**

I'm sure there are but I think that this is quite out of place in science. Nevertheless, if you obtain a sequence of a certain segment of DNA and publish it, you have an obligation to add this information to a public database. There it is searchable under its name, such as *Luzula atlantica*, and other people can freely work with such a published sequence. So hoarding, as you say, cannot be well practised.

**Has anyone contacted you for the DNA of a woodrush or bulrush?**

People working on a certain group know about each other. We have even started a working group to study the Juncaceae family which we formed with colleagues from Germany at a conference in California, and we agreed to share data and to co-operate. Then teams from Denmark, Ireland and Australia joined us.

When I do something, I do it full bore

**How time consuming is your work?**

Basically, 24 hours a day is too little. The question is how much you want to give it. If you want to do quality research and achieve something, you have to be in the lab until late, dry and process the material you have brought from the field and test phylogenetic hypotheses...

**And is it possible to combine such demanding research with a private life and caring for a family?**

You have to surrender some of your ambitions and shift your priorities elsewhere. I am thirty and I am starting to deal with this issue because my biological clock is starting to tick. When I do something, I do it full bore, which means that I would also like to take care of my family in that way and not to shunt it to one side. But at the same time I want to do research full bore. I will have to find a compromise. For a woman it's always a big dilemma. EU grants contain a provision that if a woman goes on maternity leave she is leaving the research process for some time, and this time is not included in the project implementation period. The same is true when you apply for grants for junior researchers. The time spent at home with children is deducted from your real age. And I think that this is only fair.

**How do you plan to combine these two worlds?**

Well, those are the plans and desires ... it's not all that easy – in the lab you work with carcinogens and other substances that are not completely good for your health. If you want to have a child, you should leave the lab for some time before that and do a different type of work. So I have a plan: to work at full bore and get laboratory data which I can then gradually process when I am at home with a child. You can write papers at home, no problem.

**But it does not end with returning after parental leave, does it...**

I think that help from grannies is necessary, but often they are not readily available. When men get involved in the process of domestic work, you can pull it off. But when they don't want to be involved .... Many women leave science. Another reason is the inadequate financial reward; and if your partner also works in research, it's difficult. I still live with my parents. If they were not supporting me this whole time I would not have stayed in science after university and who knows if I would have even been able to finish university. Both my parents work in research and so they both really understand.

## Lucie Sedmihradská

**A university teacher and researcher, Dr Lucie Sedmihradská graduated with a degree in Finance from the School of Economics in Prague where in 2001 she defended her dissertation. She received several grants, including the Jean Monnet Project Czech Republic (1999–2002) and a postdoctoral grant from the Grant Agency of the Czech Republic (2003–2005). In the school year 2001/2002 she was on a fellowship at the Carl Vinson Institute of Government at the University of Georgia. In 2002 she became an assistant professor at the Department of Public Finances at the School of Economics where she contributes to many Czech and international research projects. Her research is concentrated on public budgets and budgeting at the level of state and municipalities. She is married and has two sons.**

The interview was published in May 2005.





**Perhaps it was a mistake to think that the difference between having one child and two children can't be so great. In fact it's a major change.**

I'm unemployable in the private sector

**To start, who influenced you and brought you to the study of economics?**

Rather than economics, I should speak about public finance. Doc Hamerníková was a strong influence; she is the dean at the Faculty of Finances and Accounting at the School of Economics. Ten years ago when she was the head of the department she had many ideas, built the department and launched a lot of things. Our entire department is a strongly feminised environment. Perhaps the reason why not many men stayed is that the department was headed by such a temperamental woman. My husband Milan and I were colleagues in our PhD programme. After completing our studies we did not want to stay in one place. However, my chances of doing what I do were greater because he was and still is under pressure to make money. And he also had some conflicts with the leadership, mostly women, and so he left. I would say that in some respects I had an easier time of it than he did.

**And he left for the private sector?**

My husband is a 'tax man'. He studied tax theory and now he does taxes. He changed his job because of the children. It was quite easy for him to find a job; unlike him, I'm unemployable in the private sector. A thirty-year-old woman with two children who has never worked... Plus I am over-qualified, which was partially also my husband's problem. He has a doctorate but it turned out to be more of a problem. They liked him and so they hired him – but if he did not have the doctorate, it would have been easier for him.

**Why do you think it is a problem? Is it expected that a highly educated person will have greater demands?**

No, I'd say the others are afraid, they don't know what to expect. For example, he is the only one in the firm besides the management who can speak English. I speak four languages, which I would never state anywhere if I were looking for a job. It's not possible to make use of them in one company anyway. I used them for my studies, for my research. In a private company I would be afraid and would carefully consider what to put on a CV. With two children I don't stand a chance, anyway. Maybe in ten years, but then I will be a forty-year-old woman without experience. I don't think I would have a chance.

With two children I don't stand a chance

**You have two small children. How do you manage to keep in touch with your field and not “get stalled”?**

Now it's a big problem. I completed my doctoral studies in 2001. Then I went to the US for a year and that was followed by the one and only year when I worked full-time. In August 2003 our first son, Honzik, was born and I spent half a year at home. The next half-year I taught at one-third of the full-time equivalent, and then my belly was big again and our second son, Vojtik, was born in December 2004. When there was just one of them, it somehow worked. I was getting things ready for teaching, looking up new information, but now this does not work. Since the birth of our second son I have written two publications, but I put them together out of things that I already had at home on my computer. I don't know at all what will happen now. People always said that you get the most done at home, but I can't do anything there and I don't get anything done at school either. Luckily I have the advantage that my mom is already retired and so she took care of Honza. And Milan, when it was necessary, also took time off to baby-sit Honza, but with two kids it does not work at all. Perhaps it was a mistake to think that the difference between having one child and two children can't be so great. In fact it's a major change.

**So the support you get at home is quite good.**

Certainly, although I don't know whether I will have the strength to work on weekends and in the evenings. You don't get anything written if you do it half an hour at a time. I don't even get the materials ready in half an hour and I can't leave them lying around on the table because they would be gone in no time because of the kids. Perhaps when the kids are older it might get better.

**Can you tell us what specifically you did before you went on maternity leave?**

I was an assistant professor at the Faculty of Finances and Accounting, so I was doing tutorials for two courses in Public Finance. In January 2002 I started my postdoctoral grant that I received from the Grant Agency of the Czech Republic, on “the Municipal Budgetary Process”. The goal of it was to map how municipalities draft budgets and to propose potential measures. I think that I managed to map the budgetary process of municipalities. Now it's necessary to use this data to write a publication but I am afraid that I won't manage to draft the proposal of measures as I had planned. I carried out a questionnaire survey; I have already processed about two thirds of it and so there is a little left. Hopefully I will manage this.

**Well, quite a topical issue today..**

Yes, I think so. It offers quite a range of topics for research because approximately 20 % of all public finances go through municipal budgets, and that's quite a lot. And not much is known about how municipalities go about drafting their budgets. I know more about the budgetary processes in American municipalities than about Czech ones. In the US there are so many books and papers on this topic, but in the Czech literature this is a marginal

issue. So there is clearly space for research because not much has been done here. The Grant Agency placed the condition on applicants for postdoctoral grants that they can be as old as thirty-five and that no more than three years can have passed since they defended their dissertation. If a woman meets these criteria, it's absolutely clear that she has to have had at least one kid during this time, if she wants a kid. Sometimes women don't want to have children. One solution would be if the grant could be interrupted. I have already asked twice for a change in the budget due to the birth of a child. It's too bad that I had to use the travel budget differently in the first and third years. Last year I went to two conferences abroad. All three of us did. I was still breastfeeding so my husband took care of Honzik, I was at the conference, and my husband fetched Honzik for breastfeeding. We were in Vilnius and then in Milan. It was quite all right with one child but this year, again, it's not working. And I am really, really sorry that the funds cannot be transferred because next year, I could go again.

**Do you think that at foreign conferences it is expected that a woman might come with children and that they are ready for this by providing, for example, baby sitting and other services?**

There was a conference of the Network of Institutes and Schools of Public Administration in Central and Eastern Europe (NISPAcee) in Vilnius and we were the only ones with a child. Americans come there as supervisors and other experts from Western countries; many of them told us that they admired us for coming. Honza was nine months old and was not walking yet. When we went to Milan for a World Congress of the International Institute for Public Finance (IIPF), there was a couple from Germany with a girl who was about one year old. I have to say that everyone looked at us with astonishment. It really depends on the husband's willingness to adapt to such a situation. Maybe in the West a person can hire a nanny; in the Czech Republic it's hard.

For me America was one big disappointment

**Could you tell us about your experience abroad?**

When I started my doctoral studies, there was an EU fellowship, the Jean Monnet Programme, for students of economic sciences. My husband and I received a three-year fellowship – two thousand euro per year to travel and buy literature. I spent the first and second year in Italy. The third year unfortunately fell through because I was already in the United States. I also had a student stay in the Netherlands where I studied literature and consulted. In this way I got to materials that I would otherwise have had no access to. It's true, I speak Dutch so I could work with original materials.

**So you speak Dutch, Italian, English and German. How did you manage that?**

Well, gradually. English and German, I take for granted. Dutch was a coincidence. I wanted to study Swedish but

they did not have Swedish classes at the language school. But they offered Dutch and I went for it. Italian – that was a typical situation. Such a handsome Italian he was... I don't know what happened to him but I passed the state exam in Italian. I was really lucky that in my doctoral programme there was a group of people who helped and pushed each other. Milan, my husband, and I were the first to finish a doctoral programme at our department in only three years.

**Can you compare, based on your experience, the functioning of science here and abroad?**

For me America was one big disappointment. From Prague I was used to everyone working mostly on their own stuff. I was totally mistaken in thinking that there would be a research team with one experienced researcher supervising his "mice" and working together on something. I thought that I would be incorporated into such a team regardless of what I studied. Well, that did not happen. Co-operating with Americans was very difficult. There were two people from the Czech Republic. One person who wanted to remain in touch with the Czechs took us and we were his 'children'. No one else knew what to do with us. Maybe it was our mistake as well, but I tried to change it at the beginning. Then I gave up. We did not manage to really mix with them; they continued to think that we were doing a different discipline. But I wanted to do anything even if just to see how they worked. I failed at that. In terms of my research the environment seemed very competitive. To be able to go to so many conferences and have so many grants as in the Czech Republic, I would have to have been much older in the US. Just the fact that I had a doctorate at the age of twenty-seven seemed very exotic there. I think that they partially doubted the quality of our educational system.

I don't think that I have ever seen as many women in science anywhere as I have here

**The issue of women in science is not so topical here, but I believe that it's given more attention abroad.**

I don't think that I have ever seen as many women in science anywhere as I have here. If I compare the conference of the Network of Institutes and Schools of Public Administration in Central and Eastern Europe in Vilnius and the World Congress in Milan, the number of women and men and junior and senior people was more balanced at the "Eastern" one. At the "world" one there were almost no women. There were a few young women, but among the more senior people there was a minimal number of women apart from the associate professor from our department.

**What I had in mind was people reflecting on the issue of women in science, but it goes hand in hand with what you are saying.**

The people at the institute in the US where I was were divided into “faculty” and “staff”, and I don’t think there was a single woman among the “faculty”. Therefore I still think that in the Czech Republic it’s all right. I don’t think that I would have had the opportunities I did if I had been somewhere else. Not only as a woman but in general. During my studies there were many grants for “poor” countries from Eastern Europe.

**Abroad some companies and universities have various measures that take into account the biological path and the personal history of women, and try to balance out the handicap caused by motherhood.**

I don’t know about that, but I think that there are not many things like that here. I was awarded a grant the same week that I found out I was pregnant with Honza. If I had not received the grant the first time around, I would not have applied again. And that means that I would have lost the opportunity to apply for a junior grant and I would have only qualified for an “adult” grant. And I think that you have to be an associate professor to get it. I think that it would be useful to raise the age limit for some types of grants for women-mothers. No one takes this into account here. At school they were forthcoming and offered a one-third of the full-time equivalent. But it was not quite as easy for my husband’s schoolmate. Instead of offering support so that she could start working on her habilitation, they told her: for this you should wait until the child starts going to school.

**Maybe it should not be up to the good will of individual heads of departments.**

It seems to me that to a certain degree the possibility of becoming a teacher lies in having personal contacts. Generally, a new position has to be created, for which the head has to get money from somewhere. Some doctoral students can’t stay at the school after finishing their PhD. And I also had the advantage of being a woman and so everyone believed I would stay at the department. With men there is always the fear that in time they will go somewhere better. Basically, I was an extreme case: because I come from Prague, it was not expected that I would ever want to leave Prague. The only thing that could happen was that I would get pregnant.

**Do you think that men and women do research differently?**

I think so. The drive at the Department of Public Finance comes from women. Men are, you know, great personages, and perhaps more individualists. When team work or large projects were at stake, the leaders were almost always women. It seems to me that women at our department are very active. They were very enterprising in obtaining contracts and grants.

**How is this reflected in your opinion that men and women do research differently?**

I think that men choose one research problem and then they study it. Maybe women don’t go as deep but they study more things. In the context of our department I think that women are better at selling their work. On the other hand, when you look at the citation index, you don’t find women there.

**What's the reason?**

I don't know, they're just different. In our journal *Political Economy*, men publish much more. I don't know why. But women have grants as well and are successful.

**In your experience, do women in your line of research or in science in general not have children?**

We have a colleague who, it seems, does not want children or does not plan on them. From my perspective, though, she should take advantage of this and go abroad more often. My father works at the Institute of Physics of the Academy of Sciences, and there it's either young women who don't have children or older women who did not have children. If I imagine our family situation in reverse, with my husband staying at the university and me going to a private firm, I can't imagine that he would go abroad for a longer fellowship. I admit that I don't expect to go abroad for a longer fellowship, either.

**Nevertheless you feel that the responsibility does not fall only on you.**

I think that we decided to have children and so we have them. And both of us have to adapt to it. Milan understands this; if he did not, then it would be absolutely beside the point to be talking about harmonising family and research because it would be the end of research. Of course, you can survive at a university for some time without any development, but it does not make any sense to stay if a person does not become an associate professor by a certain age.

## Eva Muchová

**A theoretical chemist by training, Eva Muchova graduated with a degree in Physical Chemistry from the Natural Science Faculty, Charles University, in Prague. In 2007 she will defend her doctoral thesis. She is currently a PhD student at the Institute of Organic Chemistry and Biochemistry where she studies theoretical photochemistry and simulations of hydrogen-bound complexes. She has authored several papers in international journals. She received an award for the best poster at the meeting of the American Chemical Society. In addition to her research, she organises the chemical Olympiad and contributes to preparing students for international chemical Olympiads.**

The interview was published in November 2006.





## Chemistry is a science where things pop, light up and change colours

Chemistry is a circus

### **By way of introduction, could you say what your field of expertise is and what you do?**

I do theoretical, computer chemistry. Sometimes we call it “administrative chemistry” because we don’t work in a lab but instead do computer simulations. Our lab looks like a regular office. We don’t wear white coats, we don’t do experiments, and the only chemical we use is the dish detergent. Through computer simulations we create small models. I study photochemistry and photochemical processes – how molecules react after exposure to radiation when they receive energy they don’t normally have. Maybe it sounds a bit abstract but the reaction of a molecule to light is a totally normal thing. Take molecules in our body, every day they are exposed to sunlight.

### **Why is it necessary to simulate these states with computers?**

There are still things that are not known about photochemical processes. We study tiny systems because the large ones cannot be studied with quantum chemistry and with the technical equipment we have today. We are interested in what happens when one tiny molecule in a gas phase is exposed to radiation. And why do we do something like this? Contemporary science does not understand in detail everything that happens with large molecules after excitation – here I mean proteins, nucleic acids etc. In a live organism these molecules are not isolated so you have tens of thousands of other processes going on and it’s not possible to take a look at one specific phenomenon in detail. So this is what our modelling systems are for, we describe one specific phenomenon.

### **What is the applicability of your research in practice?**

This is a question that we all fear a little. We do basic research – in ten years’ time maybe you will be able to read in textbooks about what we discovered. People ask me what our research can bring to their regular lives – sometimes this is difficult to answer. Basic research does not have that goal. The question is quite general: what does basic research do?

### **How did you arrive at your discipline?**

I was always interested in chemistry. In secondary school I took part in every single chemistry Olympiad and therefore it seemed natural to study chemistry in university. In secondary school you don’t really think whether you will have a job after graduating. Your head is still in the clouds. I went to study at the Natural Science Faculty. There I clearly preferred theory over experiments – I have never been too good at them. Maybe you heard about the training camp for Olympiad participants. It’s a summer camp for secondary school students in chemistry and

biology which takes place every year in Běstvína. There are lectures and courses where students acquire new and supra-standard information, and in this way get ready for the next rounds of the Olympiad. Lectures are given by university students and teachers, which ensures that the quality of the camp courses is very good. Plus a person meets people who are like him. Some students may feel a little excluded from the class and in this camp they have a chance to meet people who are like them.

**And for you, was going to a chemical summer camp a joy, or torture?**

The camp was absolutely grand. I found my best friend there, and many other friends. Until last year I went there to lecture. Young people get the opportunity to try all possible things there which they can't try out at home. It's really because of several doctoral students and young researchers that the camp works so well. I met all of them in Běstvína where I would go in the summer. When I started university, they offered me the opportunity to go to Běstvína as a lecturer and lab technician, which was an offer you don't turn down. I personally liked lectures better than experiments. Chemistry is a science where things pop, light up and change colours, and for most students this is fun. But for me it was really a circus. I did not have a lab at home and I did not care for it so much. The work I am doing now is paradoxically much more interesting for me – on the monitor you actually see many molecules in detail and you can better imagine how things work.

**Do you think that young students can take you as a role model?**

It's a camp like any other – it's not just about chemistry. I think that a woman's presence is healthy for the functioning of a team. Women tend to 'soften the edges' a bit and can offer a different perspective. When a female student sees a woman doing research, maybe they won't feel so 'different'.

Women prefer a bird in the hand to two in the bush

**Do you think that women deal with problems differently? Do you personally work differently than your colleagues?**

We all probably approach problems in the same way: we try to solve them. But each of us does it in their own way. Maybe I also work differently than my colleagues because I am no fan of computers. In our work it is sometimes necessary to write short scripts. Guys will easily spend a whole afternoon writing a universal script which is absolutely perfect. I will create something that will help me with the specific problem I am dealing with but I don't like to spend a lot of time polishing scripts to perfection if I know I will use them three times. And I am also not so crazy about constantly improving and upgrading my computer. And some women in our team feel the same.

**There is a presumption that, in addition to their job women have other obligations at home?**

I guess so, but with the example I gave, that's not a matter of gender relations. A computer is a tool for me which I need for my work. For me it's not that much fun. But there are girls who enjoy it and play with it.

**Does your work require a huge time investment, doing overtime etc.?**

The indisputable advantage of our work is that you can switch off the computer and then go home. If someone wants to be very successful and come up with new things, they of course have to work hard. If you want to succeed, then you have to be very smart or work more than others.

**Do you think that it will be easy to combine research with family when you have children?**

To tell you the truth, I don't know if I will spend my entire life in research. And it's a question whether you really want to be looking for ways to combine work and family when you have small children. I would really like to spend time with my kids.

**You're not sure whether science is the right thing?**

My husband and I would like to have children soon. That means leaving your line of research for at least five years. It's hard to start again, especially in a field where within a year you've already been left behind. Plus you get the typical female problem of under-estimating yourself: are you good enough to be at the top? And if not, do you want to accept not being at the top?

**What does it mean to be at the top?**

That means that great ideas come to you. Women sometimes under-estimate themselves in this respect and are not certain whether they will be able to come up with grand ideas.

**So is it mostly men who are at the top in your field?**

Because of the higher percentage of men in the field there are naturally more of them in top positions. I don't think that women are dumber. But they have different priorities.

**What can be the reason that women have less confidence?**

It's my feeling. It's said that women's work is undervalued. On the other hand I think that few women will ask for a high salary in a job interview. They fear that they won't measure up to the high standards. So maybe women are partially to blame for the differences in salaries.

**Why is it that men are not ashamed to ask for a high salary?**

Women prefer a bird in the hand to two in the bush. A man makes it known if the conditions offered are lower than his expectations. He says that he will look elsewhere ... A woman is happy to find a job.

**Do you think it is important to talk about women in science and to thematise gender aspects of research?**

I don't want to brush it aside; it must have some meaning, and the results of projects dealing with this are certainly interesting. But I would not overestimate it either. I definitely don't think that male and female researchers compete with each other. It's also difficult for me to judge this because I am still a student. It is as if we are hidden under an umbrella and our boss does the politics. Personally I have never encountered being under-estimated or overlooked by teachers. Maybe it's also about having poor self-confidence. Perhaps it's also about being brought up in an atmosphere where it was better not to excel. Maybe there is still some diffidence. When I see younger colleagues today, especially young women, I see that they have much more self-confidence than we did. Maybe in ten years' time you will have nothing to do in your centre for women in science. The issue will naturally fade away and die out. Even house work will stop being a topic in time. I don't know how you feel about it, but I don't see domestic work as a gender issue. That I try to have a pleasant environment is a display of love for my husband. I don't think that it's encoded in me that a woman = ironing and laundry. The fact that a man has a penis does nothing to prevent him from approaching the sink. But I have to admit that my husband does things I don't take to, as well as typical regular maintenance. In this sense we are happy to observe gender stereotypes!

Things are grand at home

**Is your husband also a researcher?**

My husband is an "ex-researcher", a colleague from the lab. Now he works in a bank.

**Why did he leave? Poor financial conditions?**

Well, more like he wanted to change his field. In his current job he has learnt a lot of new things. He feels that he uses his knowledge to solve real problems which are important for someone, and someone actually pays for the solution. Unlike our little artificial problems.

**You work in basic research. Do you ever have doubts about the meaning of your work?**

There are periodic depressions which I guess that everyone working in basic research and trying to push the limits of human knowledge rather than producing something as tangible as a new medicine gets from time to time. Sometimes it is hard to explain to people around you what we are actually doing when it's to no one's benefit. Although your results can be used at some point by someone else to design new medicine. With women colleagues who already have children we agree that depression from being 'good-for-nothings' is perhaps more acceptable for women than for men. You say to yourself: OK, I'm not doing all that great at work but then I go home and I am needed!

**Do you have any experience with working abroad?**

I took an advantage of an opportunity to go for a short fellowship in Warsaw. If I were to compare the two, I would have to say that the lab in the Czech Republic is 100% better. Not only in terms of equipment but also the style of work. Here we have good communication between team members. The Polish team was small so they did not have the seminars that I am used to in Prague. And the fewer students you have in a group, the worse it is for a newcomer. When I started as a master's student, I was not good at working with a computer. Fortunately, there was a functioning group with several students and they helped me. When you can't make a picture, you don't go to your boss. There is a student who tells you: You chump, this is the way to do it! And in two year's time you are doing the same for someone else.

**Do you think that your fellowship in Poland was useful for you?**

It was useful in that a person sees their own group in a different light. Mostly you encounter the opposite attitude – people go abroad and they are continually amazed by how advanced things are there. I had the opposite feeling: things are grand at home!



## Marcela Fejtová

**Marcela Fejtová is a researcher specialising in artificial intelligence and bio-cybernetics. She graduated in technological cybernetics from the Electrotechnical Faculty of the Czech Institute of Technology where she has been employed since 2001. Together with her colleagues, she was awarded several prestigious Czech and international awards for her I4Control® system – a Special Prize of the Jury of the Czech Head project (2004, [www.ceskahlava.cz](http://www.ceskahlava.cz)), the European IST Prize (2006, <http://www.ict-prize.org>) and the 2006 International Engineering Fair Gold Medal (2006, <http://www.bvv.cz/msv>). Her research looks especially into the use of new technologies in medicine and in assistive technologies. The I4Control® system is her most prominent project to date. The system provides a new computer periphery which allows a person to control a computer using eye or head movements, and is intended especially for handicapped people. The principle can also be used in other areas, especially in medicine and industry.**

The interview was published in January 2006.





## **Most handicapped people desire to work and actively communicate with the world around them**

Studying at the Czech Institute of Technology had great pluses  
– girl-only places were never crowded!

### **To start, could you tell me what you're doing and what your line of research is?**

I work in a special field which is called bio-cybernetics. It is a scientific discipline dealing with the application of technology in medicine. We try to develop systems, devices or algorithms that can help with using the latest computer technologies in applied medicine. As an illustration, take a doctor watching a patient's EEG. It can be monitored 24 hours a day, for three days or long term. To go through the whole record would be too long and demanding. Devices we develop record when fluctuations are within a norm, and this facilitates and accelerates the doctor's work. It does not replace it but improves diagnostics and patient care.

### **How did you come to choose the university where you studied?**

That was quite simple because I studied at a secondary technological school specialising in weak current. From the beginning I was moving toward technical fields. At home everyone went to technological schools so the choice was clear. When I started studying at the Czech Institute of Technology, I was captivated by a number of "bio-subjects". Therefore I decided to continue studying in this field. Out of 250 students, there may have been about three or four other female students studying with me in parallel classes.

### **Did it mean anything during your studies that you were almost the only woman among men?**

I had been used to this since secondary school. In some respects it was also positive. For example, we had swimming courses and the guys hardly fit into the changing rooms and showers whereas I had the entire space for myself. So I have to say that it also had great advantages – girl-only places were never crowded!

### **Any disadvantages?**

Some people made it clear to me that there's no place for women at a technical school. Once we were taking a test on something I already studied at secondary school and therefore I knew it well. I did it fast and without problems. The professor did not believe that I had written it and checked my stuff to see whether I had a "crib sheet" from which I could copy the answers.

**You said that you came from a family of engineers. Did they approve of your choice?**

At the beginning, when the time came for a decision as to my secondary school studies, there was a huge dilemma. Because my grandfather taught at an academic secondary school (gymnasium), my father tried to steer me toward gymnasium as well. He was of the opinion that after graduating from it you could continue your studies anywhere you wished. On the contrary, my mother said she did not know what would happen with me if I did not finish my tertiary education and therefore she wanted me to have a complete specialised secondary education. So at the beginning there was a small schism in opinion. Recently my mother told me that back then my father had told her that if I were no good at engineering, it would be her fault. After I successfully completed secondary school, my father apologised to my mother and said she had made a good decision and that he was happy that I had gone to study at the technological secondary school. My brother went there after me without any disputes.

I can't say that we are some sort of "trashy class B".

**Your name is today linked with the development of new technology. Can you introduce it?**

Originally this equipment was conceived as a way of helping handicapped users. The majority of them are normal people who can do any type of work and the only limitation is their physical handicap. For example, because their upper limbs are not mobile, their use of computer technology is very limited, and even that is exceptional. Once I read an article about people suffering from muscular dystrophy, when their muscles gradually stop functioning. One of the last muscles to go are the muscles controlling the eye. Once I saw handicapped people using a computer with a special mouthpiece. I felt terribly sorry for them; it seemed so terribly denigrating. Of course, later I found out that they themselves did not perceive it this way. I felt that it would be good to help these people. I wondered whether hand movements could not be replaced by eye movements. So we started developing equipment which would enable an eye to control a computer. However, the road to the final product, which can be used in normal practical life without any complications, was long: from the idea, through the study, the construction of prototypes, to the definitive version that can be used by people suffering from a reduced ability to move the arm. My brother and I worked on the development of the equipment together. We involved our entire family in the development of the prototype in our "home factory", which should really be called "doing it on a shoestring". Our design has a camera built into eyeglass frames. This is a great advantage because there are a lot of systems using a camera. The problem with using a camera in these systems is that the design engineers usually attach the camera to the side of the monitor. This resulted in the major problem of ensuring that the position of the user's head was constant. This means that you have to either fix the position of the user's head or spend large sums of money on buying a camera. By locating the camera on the frame of the glasses we saved ourselves a lot of work. That was the first big advantage of our system. The second big advantage was that the equipment replaces a computer mouse. The device is located in a small plastic box which

is connected to the computer and acts as a regular mouse and fully replaces its functionality. You don't have to install any software on the computer, plus it can control any application that is controllable with a mouse. Most systems and equipment produced for handicapped people demand their own software developed for a specific device. The system not only gets more expensive but the user also has to learn to use this new software. Most handicapped people desire to work and actively communicate with the world around them. Often, this is impossible because of the lack of suitable equipment. Thanks to our device a handicapped person can write email, read a paper, take advantage of the internet (for example, find out information about a new medicine); they can take advantage of the information society in any way they wish. The pilot study for the I4Control® system was done in the Jedlička Institute for physically disabled young people. Among others, it was tested on a boy suffering from muscular dystrophy. He was studying at a gymnasium and he expected our equipment to allow him to complete his studies and find a job. I myself can't imagine not being able to read about what I am interested in or to look up new information on the Net. I hope that our equipment will allow him to do all this.

### **How do handicapped people receive your equipment?**

When we first went to the Jedlička Institute, I was really scared. But I have to say that the atmosphere there was really pleasant... They have a totally different attitude to the world and life; they take care of each other and help each other. In today's fast-paced times when everyone is uncompromisingly pursuing their own goals, such an attitude is like a balm on the soul. Therefore I really like co-operating with them.

### **How does the I4Control® system work? I can imagine moving a cursor, but less so other tasks such as writing.**

Our existing equipment, even without any supporting utilities, functions in such a way that eye or head movements control a computer cursor on a computer screen. Clicking is replaced with eye blinks. So if a person wants to write, they open an application – a dialogue where they get a keyboard with the normal buttons and you just click. You can write text documents and email. Of course, for a healthy person this is not the ideal way to use a computer. Paradoxically, because handicapped people are used to using compensatory tools, controlling the keyboard is much less laborious for them than it is for healthy people. We are now in the process of producing a tool that will be much less demanding in terms of control. The current model still requires some precision and detailed positioning of the cursor.

### **And doesn't a user have to deal with the issue of "unwanted clicking" because of the natural blinking of the eye? How do you prevent this?**

The blinking which replaces the mouse click is not the blinking we are used to in normal life. We can't even influence blinking through our own will for long. Technically speaking, we should really say the blink-click is closing the eye, and the I4Control® system determines, according to the length of the blink, whether it is a click or a double click.

**At what stage of production is your equipment?**

Now we have a newer, second version which is ready for industrial manufacture. The only thing we need for the production is to obtain the required certificates. We have been contacted by Czech and foreign producers. Recently we took part in the IST Grand Prize exhibit in Brussels, which is a prestigious European product competition linked to information technologies. From 300 applicants, a jury selects the best 20 to receive the IST European Grand Prize. I have been approached by many entrepreneurs offering to produce our equipment. The problem is that they made offers without knowing how the equipment functions, who it is intended for or who it should serve, which made it seem like they were not serious proposals.

**Did any important scientific endeavour precede this invention?**

Our department specialises in bio-cybernetics and has developed a number of various algorithms to help doctors. So I can't say that we are some sort of "trashy class B", as my mother says. But it will probably not be as hugely successful as the I4Control® control because this equipment is in a way unique.

There can be a long string of various influences and ideas that have caught your eye, and then you say to yourself I can do it better!

**How does such an idea appear? By accident?**

There are many ideas and a lot of information in my head. By being on scientific turf, I can see when something catches the attention of my co-workers. Then we discuss the issues and it suddenly becomes obvious that what you are hearing can be used in a certain way. Then you start working on that idea.

**So at some point you put together the things that you know?**

I can't say that you see something that instils an idea in you. There can be a long string of various influences and ideas that have caught your eye, and then you say to yourself, I can do it better!

**What did receiving the special prize of the jury for helping handicapped people mean to you?**

It was definitely a great honour and helped support our future plans. It also resulted in a lot of publicity, thanks to which a number of potential users contacted us.

**There is the idea that women and IT don't go hand in hand. This can result in women being afraid of information technologies. Do you have any explanation for what causes this fear?**

Perhaps it's a lack of information. Generally, unless you hit a computer with a hammer, you aren't going to damage anything. Hardware and software can always be restored. I would say that a person's age is also an issue, and the degree to which circumstances force him or her to start communicating with a computer.

**Do you think that women and men do science differently?**

In my opinion it's good to have mixed teams. Maybe women's thinking processes take different paths, but they generally reach the same result. For example, when my brother and I write the same computer programme, we each write it in a completely different way.

**Do you have any experience with research abroad?**

I have not been on any fellowships abroad. I always encounter opposition from my father because he can't bear it when I go away for longer periods of time.

**What would you say is the quality of bio-cybernetics in the Czech Republic compared to other countries?**

I would say that we are a contemplative nation in the sense that we try to invent new things. We have the appropriate abilities, in terms of both creativity and productivity. The only issue is the extent to which we can and will position ourselves because in science everything depends on money and support. They have good administrative and financial support abroad. They don't have to be constantly looking for grants. If we don't get a grant, we don't have any resources to finance our own work – development. And we also have to manage the entire agenda around this development. Project management takes up so much time. In our case, during their working hours employees are dealing with students, teaching and administration. It is not until after working hours, when the workplace calms down, that people can work on research projects.

**In this context we are hearing about brain drain. Is this a real threat for your discipline?**

From my experience I know we have a problem. The financial situation is usually one of the most frequent reasons – researchers' salaries here are still much lower than abroad. The leadership of our department fortunately tries to keep young people in the department and even to lure potential new staff. In terms of contacts, there is really no reason to go on long-term fellowships because the department leadership often manages to invite prominent people with whom we would normally go study. By having a foreign specialist available here in the Czech Republic we can discuss a lot of stuff and agree on the spot, and we can even start a closer collaboration. It's easier than making the rounds of foreign universities trying to establish new contacts there.

**Do you think that science in general carries prestige in society?**

I spend most of my time in academia so I can't judge what people who don't know scientists think about them. This year, in June 2005, Science in the Streets took place in Prague. This is a project that aims to show people what researchers do. We were exhibiting our equipment and I have to say that we encountered a lot of interest among the inhabitants of Prague – more and more people kept arriving to see how our equipment works. It was a friendly atmosphere.

**How did you participate?**

We put our equipment on exhibit in the Black Rose complex of buildings where we also organised a poster session. Specifically for this event we produced a small robot made of Lego – a small car which drives around and is controlled by eye movement. I knew that if you showed people how to move a cursor, no one would even notice in the crowd. But when you have a small car going around, there was constantly a crowd of people wanting to try and to see how it works.

**It's probably also an issue of popularising science.**

Sure, we also wanted people not to think that a scientist is an elderly man with glasses who sits at his desk and is constantly scribbling something.

As far as ideas are concerned, I am going through a fruitful period.  
And new ones are beginning to “mature” right now...

**Do you have anything like leadership by older, more experienced colleagues, something like mentoring at your department?**

Always when I get an idea and I am still totally euphoric, I run to share it with my supervisor, Prof Štěpánková. She channels my thoughts and tells me what would be good to do and what we should or should not forget about. But she does not restrict me in any way in my efforts. She just channels the stream of my work and thoughts. She gives me advice about what to concentrate on, what to emphasise, whom to contact etc. It's really about scientific leadership. She does not impose any restrictive conditions on what I have to do and what I must not do. I really appreciate this because such freedom is really important for me. And I also get tremendous personal support, which is especially important for me.

**You mentioned that the Czech Institute of Technology elected a new rector and one of his goals is to make technology studies more attractive for young women. Do you have any idea how he wants to do this?**

I really don't know. I think that girls are discouraged by the fact that it's a technical discipline which is closely related to math, physics and other typically technical disciplines. They are probably afraid of the potential for failure...

**You mentioned that you start doing research when the place calms down, and the admin duties and teaching are finished. How can you combine such a style of work with motherhood and having a family?**

This is something that my parents also rebuke me for. I have set my future priorities: first I want to finish the work on the new equipment and see it through to the end. And only then will I start thinking about having a family.

**Can you estimate what time horizon you are talking about when you say "seeing it through to the end"?**

That's a question ... I can't say because if I plan a concrete schedule, it ends up being different anyway. I just don't do it. I give it free rein.

**And what if something grand occurs to you again?**

As far as ideas are concerned, I am going through a fruitful period. And new ones are beginning to "mature" right now. But if a family comes, then I will put everything aside. But until then I will work on realising my ideas.





## Doubravka Olšáková

Doubravka Olšáková is an historian specialising in Czech and European history of the 19th and 20th century, the issue of collective memory and oral history. She completed her master's studies at the Faculty of Social Sciences, Charles University, in political science with a specialisation in political philosophy and comparative political science, and in international territorial studies with a specialisation in Western Europe. In 2000 she was awarded the Bolzan Prize of the rector of Charles University for the best student thesis. In 2002 she defended a Diplôme des Études Approfondies at the Université Paris I, Panthéon Sorbonne, in contemporary history and foreign affairs. She was awarded several important fellowships during her studies, and of these she most values the Industrie-Club Düsseldorf fellowship awarded to five students from the around the world. She also received a grant from the Visegrad Fund and a grant from the French government. In 2003 she enrolled in a doctoral programme under double supervision at the Pedagogical Faculty of Charles University and the Université Paris IV, Sorbonne. Between 2001 and 2004 she was a junior researcher at the Research Centre for the History of Science at the Institute for Contemporary History of the Academy of Sciences of the Czech Republic; in 2006 she returned to the Institute after a fellowship abroad. In 2007 she became the head of the research-editorial department at Masaryk Institute – the Archive of the Academy of Sciences. She is the author of specialised studies and monographs (*Ernest Denis. Život a dílo*. Prague 2003).

The interview was published in March 2007.



## **You can't just turn everything upside down and start writing 'herstory'**

I'm the new broom that sweeps clean

### **You're a young, talented historian. What's your specialisation in history?**

Since the beginning of 2007 I have been working at the Masaryk Institute – the Archive of the Academy of Sciences of the Czech Republic. The director of the Institute, doc Ivan Šedivý, chose me to head the research-editorial department. My line of research is the 19th century and Czech historiography after 1945. I studied Jan Garrigue Masaryk only intermittently in relation to the dispute over the meaning of Czech history. My position as head of a department lies in the fact that I try to energise the Institute and to introduce new methods and an interdisciplinary approach to history. I would like to open it up to colleagues from other disciplines – sociology, philosophy, art history etc., to expand its activities and attract foreign experts.

### **So you want to bring fresh air to Masaryk Institute?**

I'm the new broom that sweeps clean. It's not so easy at this age to join a department where you don't know anyone, where there are people about whom you have only read or who lectured you in school. At first I was under the protection of the director, but then I decided that 'closed season' was over and I started making the rounds myself. The best way to become accepted by a group of people is through one's peers. Recently I entered the office of a certain associate professor who called mine a "pleasant visit". When I expressed my pleasure about this welcome, he said: "We have not had a conflict yet so there's no reason not to welcome you". Something to look forward to.

### **How did you come to study history?**

It was a total coincidence. I graduated from a Czech-French gymnasium. Then I started studying political science and I also took up international territorial studies with a specialisation in Western Europe. And then I met someone who steered me toward history and Czech history of the 19th and 20th centuries – the teacher PhDr Jiří Rak. Then I received the Bolzan Prize, the rector's award at Charles University for the best student thesis, and my path to history was preordained. Now I am a doctoral student at the Pedagogical Faculty, Department of History and the Dialectics of History. A lot of people are quite critical about the Pedagogical Faculty and ask me why I did not go to a "sound" faculty. I answer simply: There are people there with whom I feel comfortable. The first rule of historian Petr Čornej, who started the Department of History and the Dialectics of History in the 1990s, was to build a good team. He did not insist on having excellent researchers who would compete with each other over who has the most citations, but on building a good collective. The collective is still there and compared to other places it works great. I would like to try something like this at the Masaryk Institute. To have people with a good

publication record, who have ideas, and also those who can carry out things and bring them to life. You don't have to have twenty excellent researchers in one place who together make up one excellent team, but you do need a team of good people. We'll get there later when science opens up more to foreign researchers.

**Do you think that academics adequately communicate the results of their research to the public?**

It varies from topic to topic. Contemporary Czech history, the years 1948 and 1968, are topics that will always be interesting for the Czech public. It is a topic that is important as we now reflect on the past 50 years. As far as older periods are concerned, it's much more problematic.

**Are historians the ones who "do" history?**

Interpretations do history. The objectivity of scientific facts has been a problem since the 19th century here. When working on the historiography after 1945 I worked using the method of oral history and talked with historians. They are the 'worst' respondents you could imagine. They were asked to reflect on historiography in the 1970s. But they know the method, they know you are recording, that the interviews will be transcribed and archived, that you will be looking for details in archives. I had a unique chance to see the self-stylisation of a historian in the 20th century who lived under a communist regime.

I was in France, Poland, Hungary, Germany,  
but I like working here in the Czech Republic best

**One of the feminist concepts of historical interpretation works with the concept of his-story and her-story. What's your position on that?**

History is usually stories of great men written by other great men. Sometimes when I listen to my colleagues I have the feeling that they actually believe it. Nevertheless, this does not mean that now is the time to turn everything upside down and start writing 'herstory'. I think that women historians are talented in interpreting texts differently. They see different things than men. I like reading all the positivist texts because I don't know a single female historian writing as positivistically as men. I admire them for it and salute them because I personally would not enjoy it. I think that we all recognise that there are certain areas where the other is doing better, and there co-operation can work. My female colleagues and I agree that to have a beer with Mr Historian is great and charming, but when you leave you say to yourself: What are we talking about anyway when these gentlemen have had the answer all along? When you hear their grandiose concepts you ask: Where do they get such certainty? And for this one thing I envy them. Because I just can't do this.

**Precisely, where do you think that they get this certainty?**

No idea, maybe it's in the way boys are brought up.

**Maybe it's a mistake in how girls are brought up ...**

I can't imagine that I would introduce a new concept with such self-assuredness ...

**Do you think that 'women's topics' in history will get their space in the research community?**

**Is it difficult to come up with a new theme and make it a topic?**

Sure, when you compare the starting position of a female and male doctoral student, her starting position is much worse. The opinions of a male doctoral student are taken *a priori* as a well-established scientific fact. A female doctoral student has to establish her position and fight for it. As for the topic of their research interest, it depends very much on what is a topic in the historical community. If you manage to push the topic you are working on as the topic that is talked about, you generally have the game in your hands. At that point it does not even matter if the topic is scientifically good, or average. Your ability to promote a topic among your colleagues-historians plays a huge role.

**Could you say how such topics are promoted?**

I think that it is done mostly through informal channels. Of course, you can organise a lecture on your topic and discuss it at length, but much more is done in private, over a coffee or upon a chance meeting. Then the barrier is more permeable.

**You studied in France. What did this experience give you?**

If you want to get a doctorate in France, you should also pass a so-called D.E.A. (Diplôme des Études Approfondies) which is to prove that you understand the basics of scientific work and that you have acquired a certain scientific erudition. After I passed it, I started a doctorate 'under double supervision', which is a fairly new thing in the Czech Republic. It means that during your doctoral studies you move between the Czech Republic and France. The experience acquired in France gave me greater courage to leave the Czech Republic and go abroad. For many historians specialising in more ancient history it is often a problem to go further than Vienna – this is the syndrome of Central Europe. Maybe I am the opposite extreme. Partially it requires courage and partially the desire for knowledge, but especially the effort to try something new and get the most out of it. In the Czech Republic the paths are well trodden and you just go along. It's easier, and if it does not work you don't get hurt. Direct experience is also invaluable for building contacts. Sure, you can send an email but generally no one answers, and if they do, they give a non-committal answer. When you go there, you present your project and find colleagues who are interested in doing the same thing, and you can be almost sure that you'll co-operate.

**And where did you enjoy working most?**

I was in France, Poland, Hungary, Germany, but I like working here in the Czech Republic best. The support I get

here is tremendously important. On a fellowship you tend not to build more permanent relationships and, for them, you are just a fellow who will be gone in no time. I always liked to come up with a project and work on it. In the Czech Republic I have been given this trust, and I have been able to come up with totally new things.

It's nice to talk about how difficult it is for us, but men should also hear about this

**Do you think that the issue of women in science has its place in academic debates?**

I definitely think it does. In Paris you can see wonderful L'Oréal posters. The company awards top women researchers and you can see the awardees with a description of their research achievements. I stopped to read what these women accomplished. I think this is one of the best ways to influence the public. I remember the conference *Women Scholars and Institutions* organised by the Institute for Contemporary History a few years ago. It was great but there were only women in the audience. It is necessary to invite men and seek their opinions, to explain to them what bothers women. It's nice to get together and talk about how difficult it is for us, but men should also hear about this because it's they who are in the position to make decisions.

**Do you think that society is willing to discuss the unequal conditions of women in science?**

I think the willingness is there. Practical implementation is a problem. For me it would be interesting to see, for example, the results of research showing how much harder women researchers have to work before they are assessed as being at least equal to men.

**Research is unique because of the time demands and this may collide with the traditional role of a woman tending to a household and children. How do you deal with this?**

I have come up with a system where for several weeks I concentrate only on my research and nothing disturbs me, and then I go to France for several weeks to live my family life. I like working like this much better. You are right, in science it's not so easy just to switch off in the evening. Even when reading at home in the evening something by Tyl or Kohout, I switch tracks and work again. Other people just read and relax, but you work. In history it seems particularly difficult.

**What are French men like?**

A French man works a lot so he is not at home really. French women are emancipated differently. My partners complained about my fellowships and trips abroad and that I kept going away. A good colleague of mine, a historian, told me that my premise that men want to live with a smart, intelligent woman is wrong. According to him, a regular guy wants someone who cooks him a warm meal and is at home in the evening. I can do both.

## Elena Buixaderas

Dr Elena Buixaderas comes from Spain where she completed her BA studies in physics in 1993 at the Faculty of Physics at the University of Saragossa, with a specialisation in optical physics and astrophysics. Between 1994 and 2001 she continued her MA studies at the Technical School of Telecommunication Engineering at the University of the Basque Country in Bilbao. She received her doctoral training at the Institute of Physics of the Academy of Sciences of the Czech Republic at the Department of Dielectrics. She joined the department in 1996 after winning a difficult competition for a fellowship organised by the Basque Government Department of Education, Universities and Research in Spain. She completed her dissertation thesis during her six-month maternity leave, and in 2001 she defended *cum laude* at the University of Bilbao. In her dissertation she studied several ferroelectric and similar crystallic or ceramic materials with new spectroscopic methods. Between 2002 and 2003 she was on a fifteen-month fellowship at the CNRS Research Centre for Materials at High Temperature (CRMHT) in Orleans, France, where she worked on developing high temperature raman spectroscopy. Following a six-month break for another maternity leave, she has been with the Institute of Physics since 2004. In 2005 she received the Otto Wichterle Prize for extraordinary achievements for young researchers of the Academy of Sciences CR.

The interview was published in April 2007.





## **I just simply put grains of knowledge together**

People think that physics is much more complex and difficult than it actually is

**Your line of research is optical physics and solid state physics.**

**Can you describe in lay terms what you are actually studying?**

I study atomic vibrations in materials (in ceramics or crystals). In regular life you can find this in various electronic devices such as mobile phones and computers. For example, one of the fads today is smart cards, cards that can be read without physical contact. They contain some of the materials that we study. To give you a better explanation I would need to use specialised terms. And of course the work entails lab measurements.

**You have two small children. Who takes care of them when you stay at work in the evening?**

**Is this something that is a problem for you?**

Of course, this is a very important question. From my perspective there is no woman's or man's problem in science. The only problem is parenthood. When a person is young or childfree, you don't deal with these questions. You can stay in the lab until morning. I really do have big problems with this because someone has to take care of the children. Fortunately, my partner is willing to share responsibility for caring for the children with me. He is a great father and has a wonderful relationship with the children. I think that he's got more maternal instincts than I do.

**Physics is sometimes considered to be a masculine discipline.**

**Does this stereotype have any basis in reality?**

I have to say that there are very few women at our department, but the situation is getting better. When I was studying in Spain, the percentage of female students was minimal. Gradually girls are becoming more interested in technical disciplines. I don't know why it is said that physics is masculine, that's just a tradition. People think that physics is much more complex and difficult than it actually is. I think that it's just a matter of the mathematical language which looks strange. What you don't know always seems bizarre and difficult. For some reason physics calls up strange feelings in people. They think that we physicists are a little crazy and loopy. That's not true – we have our families, hobbies we like and things in life other than physics.

**Is Spain more traditional in terms of maintaining stereotypical gender roles?**

Maybe you would be surprised. Spanish society has changed a lot in the last twenty years. Women started to be more self-confident and the Church does not have as much influence as before. My mother was still brought up

in the old way. If there were three sons and one daughter in a poorer family, it automatically meant that only the boys would study. There are, however, still things to improve because women have changed but men less so. I think that our generation will be very important because we will be the role models for our children. Nevertheless, there are still ideas about men's and women's roles in the air, and small children breathe in these ideas with the air. My six-year-old son has a computer game for flight simulations and when he was selecting the colour of his machine, he commented: "I don't know why pink is here, it's for girls and they can't drive!" But I don't like pink and I can drive a car. He gets this from what he hears and sees outside the home. And it's hard to fight these stereotypes, and they still dominate society. I don't think that women are wimps who need to be helped. We are strong by nature and we can do anything. *De facto* we don't need positive discrimination, but until people change the way they think it will be necessary, which I don't think is good.

**What was your parent's reaction when you told them you would be studying physics?**

I would say they suspected as much. I was always good at math and physics, and I did not want to study anything else. For some time I was attracted by biology, but then I realised that my memory was not good enough to remember all those difficult terms. I have always wanted to be a researcher, to ask how the world functions, to discover and get to know things. I admired people who did research.

**Did you have any role models when you were young?**

I guess that like any other physicist, my model was Albert Einstein. And even more important for me was Marie Curie Sklodowska. In biology it was the oceanographer Jacques Yves Cousteau. I have always admired them a lot and did not really think that I would do anything 'ordinary'. Maybe some girls want to be actresses but I didn't. I wanted to explore...

I rebel when someone tries to force me to do something

**Is it important to have a female role model for young girls?**

We're still in a phase when this is necessary. But one day, it will not matter who has made a discovery – whether it's a man or a woman. But now it is still important because women often do not even realise all the things they could be doing. They don't think about it.

**Maybe they don't have the necessary self-confidence...**

But there is nothing you can do about this, you either have it or you don't. There are also a lot of men who don't have any self-confidence.

**And is the topic of women in science interesting for you?**

Personally, I am against quotas for women's representation and positive discrimination in general. I think that if I were a man, I would feel piqued by it. If there is a problem for women in science it is a social problem. It's not about science. Czech society has not yet come to realise that half of the parenting duties should be done by men. Fathers should work part-time, not just mothers. Men have to realise that as parents they are as good as mothers, and that they can nurture a small baby just as well as a mother.

**Why do you think that changes related to parenting fall mostly on women?**

Sometimes I think that men are ashamed of asking for parental leave or a shorter work week, and maybe the employers would even cause problems. My partner works in a private company and he had problems. Companies are often not prepared for men asking them to cut their work week to 70 % to be able to leave work early, or not to work at all one day a week. If the whole thing falls on a woman, she has to work half-time and can hardly write as many specialised papers as her male colleagues. I work less than I am used to and I don't like it. I can't, for example, compete with men who have a small child at home but also have a wife. But what can I do?

**You said that men are ashamed to take over childcare. In what sense?**

They are afraid to ask for time off at work because they have small children. Men in general are afraid to lose their jobs. Maybe it's related to their 'hunter instinct'. Nevertheless, it is a stereotype that can change over time. A person can't be a parent and work at 100 % when children are small. But if two parents are working at, let's say, 70 %, that adds up to 140 %, which is more than one, right? If societies want (and need) children, this needs to be taken into account, otherwise the birth rate will continue to fall.

**How did you manage maternity leave?**

I was at home with my first child for half a year and then I went back at a half-time workload. Then I left for more than a year on a postdoc in France where I worked full-time and I was alone with my child. My partner sometimes came and spent a whole month with us but he could not leave his job in the Czech Republic for longer. With the second child it was impossible to manage and therefore I left for more than a year to go to Spain where my family lives. And here as well, I have the support of my partner's parents, without whom it would be impossible to manage. Our generation still has the advantage of having parents who are willing to sacrifice themselves. But when we are grandmothers, we will be working and won't have the time.

**When you decided to go to France for your postdoc, did your partner support you in this decision?**

If he had not supported me, I would not have gone. Not every woman is this lucky. Therefore I think that for some women it's better to remain single. Either you have the right partner or you don't. I myself did not really plan my family because in my eyes it was a huge complication. And then I met my partner and changed my opinion because he was willing to adapt to the needs of our children.

**Did you feel any pressure to have children?**

Yes, there was huge pressure and it was unpleasant. It's my nature to always rebel when someone tries to force me to do something, and just to spite them I go in the opposite direction. The more they pressured me and asked when I would have children, the more I resisted. And in the end I have two children, which was a real surprise for my parents. They no longer even held out any hope that they would become a granny and granddad.

**In 2005 you were awarded the Wichterle Prize for young researchers awarded by the Academy of Sciences of the Czech Republic for extraordinary research achievements. How did that happen with two children?**

I don't even know. I was at home with our second child so I was barely working at the time. I could not even go to receive the prize because I was in Spain. When they told me, everyone around congratulated me, but I was tired, the baby did not want to sleep and I had totally different things to worry about. It was all very bizarre.

**Are you proud of this accomplishment?**

Am I proud? I don't know. But I am really glad that someone has finally appreciated my work.

**What can institutes or grant agencies do to make life easier for researchers who are parents?**

It would surely help if it were possible to spend some of the grant money on baby-sitting. If you are supposed to be in a lab and working on an experiment and you do not have a partner to take care of your kids, you need someone for this. A child can start attending a kindergarten at the age of 4, but if you want to do top research you can't stay at home for four years. You don't publish, you don't work, and technologies advance. Of course, it's great to see when your child starts walking, but you also have to stay 'in'. And anyway, when your children grow up they won't appreciate that you spent those four years with them.

A person has only one life and therefore you have to study and try to understand as many things as possible

**Besides science you are also keen on literature.**

Yes, I translate contemporary Czech literature to Spanish. I have already translated two collections of poetry (Václav Hrabě and Viola Fischerová) and one novel by Alexandra Berková.

**How do you manage all this?**

I do translations at night when the children go to sleep, but recently I have not had much time to translate.

**Is this a way to take your mind off of science?**

Literature gives me a different way of understanding things. Understanding the world is the most important thing for me. A person has only one life and therefore you have to study and try to understand as many things as possible. One way is the rational path of science and the other, more emotional and emotive, is literature and poetry. Thanks to it you can get to know not only things but also people and their souls.

**Do you have any wish as to what you would like to achieve in science?**

Sure, it's nothing concrete but I know I want to continue. And one day we may discover something important. It's always about the whole team. You have to be prepared for the possibility that you won't discover anything. You just simply put grains of knowledge together.



## Marie Prchalová

**RNDr Marie Prchalová is a PhD student in hydrobiology at the Department of Ecology and Hydrobiology at Jihočeská univerzita in České Budějovice. Since 1998 she has been working at the Hydro-biological Institute of the Academy of Sciences in České Budějovice in the FishEcU group studying the ecology of fish in large inland waters. She specialises in fish occurrence gradients in reservoirs and in species and size selectivity of tenant networks. Between 2002 and 2004 she co-operated with the Research Water Management Institute in Prague on a project estimating the efficiency of fish transmigration at the Elbe in Střekov. She has also worked on projects researching tropical lakes and fish stocking in drinking water reservoirs in the Netherlands. In 2005 she was a successful primary investigator of a grant from the Fund of Higher Education Development, "Selectivity of tenant networks in sampling fish populations". She has contributed to drafting European and national standards and methodologies for net fish reduction in fish stock. She presents her research annually at international conferences and publishes in international impact factor journals.**

The interview was published in February 2006.





## **You have to work hard on a relationship as well as on science**

I am interested in why there are sixty fish at the inlet, thirty at the dike and only twenty in the middle

### **What is your field of speciality, your subject of research?**

I study fish, my field is fish ecology. My doctoral field of research is called hydro-biology. I have been working for years at the Hydro-biological Institute of the Academy of Sciences in České Budějovice. Our team studies ecosystems of large inland waters. Some people study the chemical composition of water, others the algae, still others the protozoa, and we specialise in fish. In our “fish” department there are about fifteen students and we complement each other's field work.

### **What does it mean exactly to study fish?**

I study large inland waters which serve as drinking water reservoirs. Fish in these reservoirs is very important because through the fish we can significantly affect the quality of the water. The higher the quality of the water before pipes take it through water purification plants to our water mains, the less it must be purified and the cheaper the process is. We have known for years that fish have a considerable influence on the state and quality of the water. With the proper stock, proper composition and number of fish in a reservoir, the water is purer. First it is necessary to find out what stock can be found in a given reservoir and then to regulate it. And for this you need to catch fish. And we know how to catch fish and with what.

### **How is this ‘art’ different from the knowledge of a good fisherman?**

Sometimes people ask me whether I catch fish on a fishing rod. We use certain types of nets – large nets similar to those used in the sea, nets that stand in the water and wait for fish, and we also use traps and dragnets.

### **And all this to map fish stock?**

It might not look like it but it's really hard work. A reservoir is basically a big pond with beaches, places full of roots, and only in the middle do you get free water. A different fishing tool, a different net must be used in each of those environments. Each net has a specific selectivity and in order to be able to get a complex picture about the fish stock in a reservoir, we need to know the pitfalls of the selectivity of the individual tools. And it usually takes several seasons. I personally have been doing this for ‘only’ eight years.

**What follows after you identify the state of a fish population?**

Either you increase the population of fish that is desirable or you recommend the removal of those species or sizes that are not appropriate. First, though, a person really needs to know how and where to fish. This is also what my dissertation is about. To put it simply, I am interested in why there are sixty fish at the inlet, thirty at the dike and only twenty in the middle. There are certain general rules which we try to describe using figures and to express statistically.

**In addition to working in the field, does your research entail lab work? How does it compare with those who study algae and protozoa?**

The larger an animal, the more work there is in the field and the less there is to do in the lab. There are also people on our fish team who deal with feed and work with fish stomachs and the digestive tract. In a lab I only play with numbers on my computer. At best I get to work with scales, but only at an elementary level. You can identify the age and size of fish from their scales, and the age structure of a population tells you a lot about its quality. Based on this you can predict the future development of a given population. In view of the fact that in one season we fish up to forty thousand fish, processing the data takes up pretty much the rest of the year.

**Do you prefer working in the field or in the lab? What do you like more?**

It's difficult to say. The field work takes up one month of the year, which is physically demanding. You don't find many women here. I have some muscles now but it's really hard work – for about two weeks you sleep only three hours a day, you get up in the early hours and work until late at night. Fieldwork is great, it cements the group and I really like going out, but I have been getting exhausted recently. And the rest of the year we 'create values' from the data collected.

**Do you work only for the Czech Republic?**

We were also hired by the Netherlands to assess the fish stock in their water management reservoirs. We have been going there since 1996. Now we try to work as a commercial group which can be hired to do similar work. Compared to foreign groups we have one great advantage – our budget is always lower. Since 2005 we have been hired repeatedly by mine owners from Ústí nad Labem who are interested in the environment, which is great. They flooded a few old mines and are interested in finding out what lives there and how to best use the existing fish stock.

**How did you come to study fish?**

I graduated from a secondary agricultural school. I did not want to study at a gymnasium because I liked having my own garden with couch grass and common dandelion. The agricultural school gave me some insight. And I wanted to continue with biology, I just did not know whether it was going to be flowers, fish or birds. But thanks to the fact that since childhood I have been fishing as a sport fisherman, I was inclined toward the fish. And my current supervisor helped me to make a decision – he was the first whom I contacted in the first year of my studies.

I am totally enthusiastic about science, it inspires me incredibly, but there is something that has been getting louder in the last few years

**There are probably not many women among fishermen ...**

In our team there are three women to fourteen men. So that's clear. But I think it's good because you really need to hang in there in the field and you really have to pull that net.

**On the other hand, your male colleagues must appreciate that you do pull, wouldn't you say?**

Well, it's just necessary to be able to do it. Either you pull or there's no place for you. And if a person does not work hard, it simply can't work. The team is divided into smaller units and each does something. I often head one of these subgroups.

**Have you ever encountered negative reactions for having a leadership position in this group?**

Not on my team, but I worked for one research institute and the situation there was worse. The people I was managing were purely technical workers. And in view of the fact that they were mostly of an older generation, we did not really get on well. They made it clear that our co-operation wouldn't work – they had a problem accepting tasks from a young woman.

**Your partner is not in science but both of you work a lot...**

It's true that we suffer from being workaholics a bit and we have to correct it. Consciously we try to slow down because although a person can work a lot, it does not lead to anything. I have come to understand that it is important to relax because then you see a problem much more clearly, you work better and you have better results. Maybe you spend less time working in terms of hours, but the results are better. So I try to relax actively.

**You plan to have a family. So will the net pulling stop? What will it mean for your scientific work?**

Of course I expect that this will unfortunately be the end of my career, or at least a very long break. I'm not so ambitious to give my baby to my grandmother after three months or hire a nanny and go back to work. I see the mission of my life in children and family rather than in work. I am totally enthusiastic about science, it inspires me incredibly, but there is something that has been getting louder in the last few years – to have a good relationship. You have to work hard on a relationship as well as on science. I don't think that I will have a child and then spend all my time at home, but I would like to find a solution that is satisfactory in terms of childcare and in terms of work. My work consists primarily of computer work and I can have a computer at home. And when I concentrate, I can do more work here than at the institute where I share a tiny office with two other colleagues. But it has its downside as well: a person loses touch with people, and colleagues can get the feeling that you're not working enough.

**Does your supervisor allow you to work at home?**

He does and he fully trusts me. This support at the personal level is very important for me. In science, results need to be seen, it's not just a person sitting at a computer. But unfortunately people are the same everywhere and it is still true that they tend to evaluate you according to whether they see you every day and less according to the work you have done.

The title RNDr does not mean anything for me

**You are getting ready for a trip to Venezuela. Is this a business trip?****Are you going to be studying fish there?**

No, it's just a private trip. Sometimes I take time off in the winter. To tell you the truth, I don't know much about foreign fish. I am able to say more about them than a botanist, but not that much more. So far I have not had time to look into this. I spent three months in Papua New Guinea where I was fishing and taking pictures of fish. I was interested in how the Food and Agriculture Organisation of the United Nations (FAO) introduced some species and caused a huge amount of confusion in the fish population. I am planning to write a paper on this, but there is little time and it keeps passing.

**Do you have any international study or work experience?**

I am still working on preparing my fellowship. I would like to go to Japan. For trips to Japan there is the Matsumi International Foundation, which provides sufficient funds. But not for too long because I would have to interrupt my work here. I would miss out on too much and I would have to extend my studies somehow. I was a member of an international group called Fishstrat which studies tropical reservoirs. Several times we were in Thailand, the Philippines, and Sri Lanka where we got a lot of data using sonar.

**What was your role in this group?**

My supervisor is a member of this group, and a colleague of mine and I recorded data in tropical reservoirs. We tossed a coin – my colleague won the fieldwork and I the presentation of the results at a conference in Sri Lanka. We published a paper and I obtained the RNDr title. I wanted the title because at that time I was employed at a research institute and every week we went to Ústí nad Labem to the Střekov fish transit. We had to deal with the employees of the Elbe Watershed and directors of water power plants for whom titles are very important. When I introduced myself as RNDr Marie Prchalová from the Ministry of the Environment, Research Water Management Institute, they were willing to communicate with me. Otherwise they would have laughed in my

face. But I don't use the title much. And my salary at the Institute also increased, which was not all that minor ... Otherwise the title RNDr does not mean anything for me.

I'd like to hold on to science like 'grim death', but it's possible that a day will come when science does not want to hold on to me

**Do you think that women work differently in research than men? Do they have a different approach?**

I think that their approach is the same. Nevertheless, women's and men's thinking are not the same, which must surely become manifest in some way. I don't think that women enrich science in any significant way. There are exceptions, but those are rare. Firstly, you get the different way of thinking, and secondly, private life interferes with women's research. No matter what a woman does, she has to do a lot in the home. And that's the gist of the problem: if I have two hours a day less to do thinking, it shows somehow. And when kids enter the picture, women's conditions for research totally change. And I think that very few women researchers manage this well. I'm not saying that there are no successful women researchers who have kids, but I can't tell if their personal life or their children bear the brunt of this.

**So you don't consider your work comparable to your male colleagues' work?**

I know I will never be a top scientist. But on the other hand I have no chance of doing anything else. Going through information, reading papers, doing syntheses, and exhaustively and lengthily looking for the thread to the truth, that's all very demanding. The problem is that although I really enjoy it, it is only exceptionally that I am capable of such syntheses and pure distance. Men can concentrate their thinking on a single problem, focus, and they are also willing to spend more time on a problem. From my perspective men are better equipped for science. But it may be just because I am educated by my supervisor – a man – and that I have not met any female exceptions.

**Do you expect that house chores will fall predominantly on you rather than your partner?**

No, I think it's work for both of us, but my nature tells me that a woman should do the cooking and the dishes. Even if it is very difficult for me because it means spending a lot of time cleaning and caring for the house. So I am trying to come up with a way to share this work.

**What are your plans for the future?**

First of all, I want to finish my postgraduate studies. Then I would like to go on a fellowship, or perhaps write a grant to sustain me here in the Czech Republic. And since I will soon be twenty-seven, I would like to start getting

ready to have a child. I would like to have the first by the age of thirty, and I don't want just one. So I guess that's the main thing. I would like to hold on to science like 'grim death', but it's possible that a day will come when science does not want to hold on to me. Because maybe I will get on a team or in a situation where the results of my work won't be sufficient. That's possible. It's sad, but a person can't always satisfy everything a person wants from herself. But on the other hand it forces me to try really hard now.

## Markéta Pokorná

Ing Markéta Pokorná graduated with a degree in geodesy and cartography from the Faculty of Civil Engineering of the Czech Technical University in Prague, and she defended her masters' thesis there in 2004. She studied at the University of Hanover (2001/02), at the Alfred Wegener Institute for Polar and Marine Research (2003/04) and at the University of New Brunswick (2005/06). She took part in two research expeditions on the *Polarstern* icebreaker. As naval system manager she participated in bathymetric measurements of the Senegal coast and in Canadian projects in the Bay of Fundy and Bay of Chaleur. She was awarded study and travel fellowships under Erasmus, Leonardo, Hlávkovo stipendium, VIZE 97 and DFG. She has presented her work at conferences in San Francisco, Stralsund and Brno. Markéta Pokorná is the author and co-author of several scientific papers and popular-science articles. She occasionally presents her experiences and photo documentation from expeditions at various venues. Her photographs have been on display in the Czech Republic and abroad. She has published a declaration on gender issues to accompany her recent exhibit *Women, Men, Structures and Science* (2007). In 2000 she published her first declaration to Czech society called *I don't want to reproduce*. Since receiving a DAAD fellowship she has been working on her dissertation in oceanography at the Centre for Atmospheric and Marine Research in Hamburg. She works with the Aqua and ICESat satellite data. She studies the thickness of marine ice in the Antarctic Ocean.

The interview was published in June 2005.





## The first Czech woman mapping the seabed

The Czech Republic has a piece of ocean under Mexico's surface

### **Tell me about your research and your main field of interest.**

I completed engineering studies in geodesy and cartography at the Czech Technical University in Prague. My master's thesis was on mapping the seabed, which was a little exotic because we don't have a sea. In 2001-2002 I spent a year at the University in Hanover where I discovered lectures on marine geodesy. During these lectures, slides were shown from an Arctic expedition. It really grabbed me so I went to get information on whether I could also go on such an internship. I got an offer to take part in a two-month expedition from H. W. Schenke from the Bathymetric Department at the Alfred Wegener Institute for Polar and Marine Research in Bremerhaven. I started getting ready and learned the programmes. I also had to undergo a medical check-up. At the end of August I took off for eastern Greenland on a huge 120-meter icebreaker called *Polarstern*. It was an amazing experience to see the white land of glaciers and to do scientific work on the ship.

### **What was the size of the crew?**

There were about seventy people, I was the youngest. Half of them were sailors and the rest researchers. One fifth of them were women. I was the only person from the Czech Republic.

### **What is the percentage of women in your discipline?**

Unlike other civil engineering disciplines, you can find relatively many women in geodesy, but not more than a third. I have no idea about oceanography because I first encountered it during my studies in Hanover.

### **What are the possibilities of studying oceanography here in the Czech Republic?**

There are some. The Moldau watershed operates a survey ship. The *Valentýna II* has two foldout arms with ultrasound transceivers which send signals to the riverbed, and by measuring the time from the transmission and halving it you can calculate the depth of the river bottom and map it in this way. This technique is used especially after floods. In the Czech Republic we're not seeking to discover a submerged volcano or trench, but in finding the amount of mud in a particular place and where you need to dredge the bottom to allow ships to pass. I did one set of measurements on the *Valentýna II*. I wanted to see how data was mapped and processed. The programmes are operated by a single person. That's bathymetry in the Czech Republic. Recently I found out that the Czech Republic has a piece of ocean under Mexico's surface. It's a very interesting area in terms of material,

which is called poly-metallic concretion. We acquired this fairly large area around 1990 and share it with Bulgaria, Cuba, Slovakia, Poland and the Russian Federation. So theoretically there is another option for Czech bathymetry. And we also have our new Antarctic polar station which offers another option.

**Your work in Greenland was probably a lot more fun compared to sailing on the Moldau, right?**

The *Polarstern* is called a floating university. It's not just bathymetric measurements that are done there; there are also geochemists, biologists, geophysicists, and seismologists, and various experiments are carried out. There were not many geologists on board; the borings were processed by us, in the bathymetric lab. A person had to learn fast and was rewarded with new experience in other disciplines.

**What did your work consist of?**

Our task was to map regions that had never been mapped before. There are databases that record all the areas that are already mapped. There you can find that the area between 81°30' and 81°32', between certain meridians, has not yet been mapped. If a ship is going in this direction and the area is interesting for biologists, for example, the head of a research team may decide how much time will be spent on mapping. Then bathymetrists must quickly calculate at what speed a ship can go in order for the digital models of the terrain to be of an appropriate quality. My task in mapping was to watch the monitor and record errors; during the mapping I was giving orders to the gangway about where the ship should be going, and I edited the raw data in terms of depth, and then converted it to formats that are compatible with other programmes.

**Are people interested in what you do? Have you been contacted by any specialised media or a lab?**

By writing articles for magazines I try to popularise what I do. But just recently an editor of a magazine signed himself as the first author of my article on an expedition, although I 'only' co-operated with him. He got all the text and photographs from me. I don't know what to think of this. Also, a journalist from a fairly well-known daily contacted me and asked me for an interview. After doing the interview he sent me an email with a totally inappropriate and unprofessional address. I told myself this couldn't be true. When I objected, he apologised. Other than that, I don't see much interest in the media. I took part in the Czech-Slovak university student research work competition where I presented my work based on the recommendation of my supervisor. But compared to the geodetic and cartographic contributions that were presented, my presentation was somewhat unusual. One of the members of the jury told me later in the corridor that I can write anything I want because no one understands it there anyway. Before the presentation we had to submit a twenty-page text where my work was clearly presented. So this reaction was surprising and vexing for me.

**Because of the limited opportunities for bathymetry in the Czech Republic, one question comes to mind: what about joining a foreign team?**

I'm trying something like this now. But you have to have a fellowship and this is quite a problem for me. I have applied to several foundations and received support from VIZE 97. But the support was far below the costs I need to cover, and so I am now trying to get sponsorship from a company. But it takes a lot of time and it is difficult.

It's a vicious circle...

**Can you describe the problems you encounter when you try to find a fellowship?**

**Does your school have any agreements with other universities?**

There are some bilateral agreements, but not where I need to go. I am getting ready for a fellowship in Fredericton in Canada; the prestigious Ocean Mapping Group is there at the local university and they study the seabed. Upon invitation I went to Fredericton in February to present my work on the waters off western Ireland. Based on my presentation, Professor John Hughes Clarke, the head of the group who organises various international courses in bathymetry, offered me the opportunity to do my PhD there. The problem is of course money. Fees for foreign students are double that of local students. And if you are to pay the rent and for food together with the fees, you are in the red.

**Based on your experience abroad, can you compare how science is 'done' here and abroad?**

Recently I went to a meeting of the Academic Senate which organised a debate about what could be improved at the Czech Technical University. I was one of two students there. Abroad you see much more enthusiasm and student activity in university affairs. I saw libraries full of foreign journals and free access to electronic journal databases. As for geodesy, in the Czech Technical University library you find issues of a Czech specialised geodetic journal, but from abroad you get only a few flyers about foreign conferences. Updated electronic databases are available only to PhD candidates and academic staff so a normal student does not have access to them. And it's a shame because when science is not linked globally then things may get done twice, and it's not efficient.

**So do you feel that Czech geodesy does not co-operate externally and that there's no exchange of information?**

Co-operation is definitely lacking. Disciplines at the Czech Technical University rarely co-operate with Czech research institutes, and exceptionally with foreign ones. There is minimal contact with the commercial sphere. But such joint projects would bring publicity to the firms and money to the university. During my studies in Lower Saxony we co-operated with the cadastral office when we were doing measurements near the village of Lüchow;

the co-ordinates we calculated were added to their database. In Hanover there was a cycle of lectures where people from companies came and told us what they did. It was varied. For example, there were presentations of aeronautic photogrammetry or 3D object digitalisation used especially in the car making industry, or by a company that does mobile laser scanning of house facades in city streets.

**And would you say that it's a matter of limited financial resources or the personal approach of teachers to their work and yours?**

It's definitely a matter of money as well as motivation. I would definitely welcome greater motivation from the faculty and also a greater degree of interest on the part of students. It's a vicious circle. In Canada I attended a course and had the opportunity to watch how students work. It was more of a discussion than a lecture. Students asked questions and the lecturers answered in an easy going manner; no one felt injured or offended, much less taking a question as a provocation. Here you get absolute silence for an hour and a half, the duration of the lecture; it's a teacher's monologue.

The sooner a person has a family, the better...

**You said that geodesy was a field where you get quite a few women compared to other civil engineering disciplines. Have you ever encountered any stereotypical attitudes on the part of teachers toward students?**

There are stereotypical ideas about women's abilities. For example, when sitting for an exam a teacher told me to avoid math in the future. These are absolutely useless remarks that lower your self-confidence.

**You mentioned that in an interview you made some remarks about the position of women in science...**

During an interview I said that girls at the Czech Technical University have poor self-confidence and have a hard time advancing. One of the reasons is the lack of role models. In the corridors of the rector's office you have all these images of scientists from centuries past. It's only men and not a single woman. It also reminds me of the fact that the Czech Republic sent only men on its first expedition to Antarctica to build a station. Foreign teams are mixed and are approved by mixed commissions. A photo from a Chilean paper reminded me of a photograph of pioneering groups from the history of conquering the poles. I emphasise the word history. But now it's the 21st century!

**This may be related to the need of students to encounter role models during their studies. I would like to follow with another question: are there any female teachers at your school?**

There was not a single woman lecturer in geodesy when I was studying there. Today, there is a woman who

teaches remote land survey. It's to her credit that she 'spurred' me to go on that fellowship in Hanover. By doing this she really pushed me toward what I am doing now. I am thankful to her for this initial push. It really depends on role models. You could say that we see certain expert aspects from a similar perspective. Female PhD students in our field do the practical training and assist professors. When they finish their dissertation, they're thirty and leave to have children.

**Is this also something that you are thinking about?**

It's not something I am thinking about now, but of course I would like to have a family one day. I would like to do it before I am thirty, which is in fact fairly soon. When I talk with my friends who already work, they tell me about their experience from job interviews. Although the law prohibits this, they are asked whether they have children or even whether they are on the pill and whether they have a boyfriend. In one interview for a fellowship from an American company, they asked me what my goals were. My primary goals are to finish my PhD and have a family. It's not as simple as it might seem. I think that today, apart from the infamous glass ceiling, the door is open more to a career than to having a family. I know one Polish woman researcher from the Gdansk Polar Institute who had a child at the age of twenty. She did not plan it, but now her daughter is twelve and she is merrily working on her career. The older I get, the more I think that the sooner a person has a family, the better.



## Eva Chodějovská

Last year Eva Chodějovská completed her graduate work in archive studies and auxiliary historical sciences in combination with history at the Philosophical Faculty of Charles University in Prague by defending her master's thesis *Maps of Prague in Early Modernity. A catalogue of Prague maps until 1800*. Part of the thesis was published as "Options for recording and making available old maps in the Czech Republic, with special attention to the maps of Prague in the Prague archives" in: *Historická geografie – Supplementum 1*, Prague 2006. Since September 2006 she has been working as a junior researcher and curator of the map collection at the Historical Institute of the Academy of Sciences where she had worked during her studies. She is also a member of the international project Historical Atlas of Cities of the Czech Republic, and she works on the research plan The Atlas of Czech History. She is also the administrator of the Collection of Maps and Plans of the Archive of the Capital City of Prague, where she contributed to creating an organisational scheme for the collection and a computer database of maps and plans. In addition to historical geography and cartography, she studies the cultural history of early modernity, especially Czech-Italian contacts and the regional history of the area of Český ráj (Bohemian Paradise). During her studies she went on three study trips to libraries and archives in Germany, France and the Czech Historical Institute in Rome, and also spent one semester at the Università degli studi di Bologna in Italy. She is currently preparing her dissertation project analysing the renderings of early modern cities.

The interview was published in February 2007.





## **Old maps are part works of art and part works of science**

The collection of the Department of Historical Geography is rich and hides totally amazing things

### **Is your research your hobby?**

I am very satisfied. I do historical geography, which brings together what I like. I studied history and archive studies, although originally I wanted to study geography, and even before that architecture. So in the end all of this came together in historical geography.

### **How did you come to choose your field of study?**

That was quite complicated. I grew up in a very inspiring environment at a Renaissance castle in eastern Bohemia and studied at a gymnasium in Jičín. These two places – Staré Hradky and Jičín – have strong *genius loci* thanks to the nature and monuments of Český ráj (Bohemian Paradise) as well as the local people – living and deceased. This environment led me to apply to study history and geography. I passed the entrance exams to university and had the longest vacation a person can have ahead of me. I was planning to go to England as an au-pair but this conflicted with the date of the initial get-together which was held in mid-August. The Natural Sciences Faculty did not allow me to postpone the date of registration so in the end it was decided that I would study history and archive studies at the Philosophical Faculty. It took me quite a long time to deal with this, but in the first year we had historical geography. After one excursion to the map collection at the Historical Institute of the Academy of Sciences of the Czech Republic I asked whether they did not need a part-time worker or “assistant researcher”. And associate professor Semotanová hired me. The first year I sorted the collection of atlases and then gradually I got to archive materials. The collection of the Department of Historical Geography is rich and hides totally amazing things.

### **Have you ever been sorry about your decision to sacrifice the Faculty of Natural Sciences?**

No, I was not sorry because in the end, in a roundabout way through old maps, I got back to geography. It's true that in some respects I feel a lack resulting from not having studied geography. If I had studied geography, I would have arrived at modern cartography, which would help me to understand old maps better. So in the area of historical geography I am a lay person, which is sometimes hard to bear. But I guess there is no other option because historical geography stands precisely on the border between the humanities and natural sciences.

**What about your colleagues? Where does their specialisation place them?**

There are in fact very few people who would call themselves historical geographers. Even I would not call myself that. By education they are either historians or natural scientists. Today the picture gets further complicated because of geo-informatics, a field that studies old maps with the latest computer methods.

**So you would not call yourself a historical geographer?**

It is really a borderline discipline and I have not been doing it long enough to be acquainted with everything it entails. In this sense I am more of an archivist, and I am most interested in old maps as historical sources. And that's the field of historical cartography – interpreting old maps, their logical ordering, and providing this to historians for further interpretation.

**You grew up in a castle archive. Is that where your love for old maps comes from?**

I grew up in an archive in the countryside, which is quite specific. My parents were intellectuals, scientists living voluntarily in the countryside, and they were also interested in local politics and cultural events. They invited interesting people to the castle. It is the Literary Archive of the Museum of Czech Literature, which archives personal collections of literary scientists, writers or publishers, and it is located at the castle in Staré Hradky near Jičín.

**This may sound mysterious to some people. Has the daily contact with old manuscripts and prints become banal for you over time?**

For some time yes, but relatively early I realised the uniqueness of what I had access to. On the other hand, during my studies I developed a scepticism regarding the objective knowledge of the past. What has been preserved is just a fraction of history. And it's a reflection, a subjective reflection. A single researcher is not able to capture even this fraction. Researchers introduce their own interpretations, education, opinions and experience when 'reading' the fragments. The resulting picture is influenced by too many factors.

**So you are sceptical about an objective knowledge of the past?**

Yes, in historical geography you can't say: 300 years ago the landscape looked like this. According to our education and to the best of our knowledge we strive to collect the maximum amount of information about what it could have looked like. We take advantage of comparisons but it still is not enough for objective knowledge. But there's no other way. It is one thing to search, interpret well and logically assemble the information discovered about a location, a person or an issue; to transfer such information further is another matter, though no less important! I graduated in history with a teaching specialisation because I was interested in how it is possible to transfer the information to a younger generation, to a wider non-specialised public. A historian's work results either in a text or a speech. Unfortunately, this final – and perhaps most important – stage of a historian's work is neglected in the training of historians, so you get agonisingly boring studies, and students have to listen to rhetorically inept lecturers. Plus sciences, especially the humanities, lose half of their meaning if they are not linked with current social developments.

**Is the history we learn in school a history of the man?**

In the past much more was preserved about men. The first things that were written and studied were the 'grand history', political history. And political history was formed by men. But I think that in the last ten years the production of publications about the family, the woman and everyday life is quite rich. In the Czech Republic there are many good researchers, especially women, involved in this field.

**What do you like about maps?**

Their ingeniousness. Even a small map is a sheet of paper which contains a large amount of information and behind it you get art and a lot of work. After hours or days of drawing (either by hand or on a computer) you get a densely covered sheet that a text would cover in twenty minutes, an hour.

**Would you be able to draw a map?**

It depends on what sort of map, but even as a small girl I took pride in being able to sketch the contours of a continent or a political map of Africa. Today, as historical geographers, we draft so called 'reconstruction maps' – we depict past phenomena with contemporary methods. By the way, old maps, and there's a huge debate about this, are part works of art and part works of science. They are precisely on the border, and several generations of historical geographers have been quarrelling about where that border is.

**What makes scientific work attractive for you? Have you ever had any doubts about what you do?**

Velmi si vážím toho, že můžu pracovat ve vědecké sféře. Vyhovuje mi organizace práce: důležitý je kvalitně splněný úkol, nikoli „odsezené“ hodiny v kanceláři. Je naopak žádoucí, aby historik studoval v archivech a knihovnách, aby historický geograf nebyl líný vypravit se do terénu. Konkrétně na mé práci mě baví její mezioborovost. Pořád se setkávám s lidmi, kteří se věnují na první pohled vzdáleným disciplínám – kartografy, geoinformatiky, stavebními inženýry a architekty, historiky umění, archeology, a od nich se něco nového učím. To člověku nedovolí, aby zlenivěl. Naopak. Tato spolupráce dává možnost daleko více se přiblížit oné historické pravdě a zároveň brání tomu, aby se člověk stal „zajatcem“ svého oboru a ztratil kontakt s vnějším světem. Věda, ať už jakákoli, není sama pro sebe. Výsledky bádání by měly sloužit celé společnosti.

An archive is something like a treasure

**You also studied in Italy, right?**

I spent half a year at a university in Bologna. In the third year most students went for a fellowship to Germany. I did not want to go there because everyone did. When I got to the university in Prague I remembered my long-

gone childhood wish to learn Italian. I attended a course at the Italian Cultural Centre for a year and a half and when the opportunity presented itself to apply for a stipend, I went to Bologna. It was extremely tempting, although this oldest of Italian universities has lost its former grandeur.

### **What did you study?**

I went there with a really nice research topic which I am actually still pursuing. It's a travelogue by Heřman Jakub Černín from Chudenice, an aristocrat sent by his famous father Humprecht Jan Černín, the constructor of the Černínský Palace in Prague, on a knightly journey around Europe. It was a tremendous experience because I had an opportunity to gain empirical experience in the actual environment. That's also the reason I like to travel, and I travel a lot. I can look at photos and read a lot about a given country or a place but the experience of standing there and looking is irreplaceable. Bologna is a great starting point for exploring the north of Italy.

### **How would you describe a knightly journey?**

A knightly journey was a requisite part of the education of any early modern aristocrat who wanted to find employment in society and at the emperor's court. Heřman's father, who also went on a similar journey, forced him to write a travelogue. Thanks to that, two volumes of a manuscript were preserved in the Klementinum library. It is written in the language of the country where the young man was residing at the time. The study of languages was another reason for his journey. And really, at approximately where the Rozvadov border crossing is today he "switched" from Czech to German, and in the passes of Southern Tyrol he switched from German to Italian, and so forth. In Bologna I studied his sojourn in Italy, which lasted almost two years. I studied at the State Archive in Mantua where Heřman's mother came from and I tried to unveil all the circumstances surrounding his journey. Gradually I reached the conclusion that even though we have such a great description of the journey, people and cities – though the travelogue is not rich in lyrical descriptions of the landscape – it must be supplemented with *vedute* and maps, and it is necessary to create a theatre for a reader, to present the scenery of a journey that took place in the second half of the 17th century. So in addition to editing and commenting the text I have been collecting the most appropriate *vedute* and old maps on the topic.

### **How did you enjoy your Italian sojourn?**

I won't hear a word against Czech education. Nevertheless, there are huge shortcomings in history and archive studies here in terms of practicality. To compare Prague and Bologna and the two universities is somewhat problematic. Italy is a totally different cultural environment; there's confusion and liveliness and people have a totally different attitude toward one another, absolutely different from our Austria-Hungarian template. What you can get done in Germany in a few days won't be done in Italy in three weeks. You need a stamp, or better two or three to be on the safe side, for everything. So I struggled a bit with the bureaucracy. Another reason why the comparison is hard is that for several years now Italian universities have been undergoing a transformation, and in 2002/2003 the old system was still in place while they were testing the new one: absolute chaos.

Nevertheless, I really like Italy and I love Italian because of its onomatopoeia and communicativeness. My husband has put it succinctly: Italy is grand, it has great music, great monuments, great food, it's just the Italians! Well, I am more open but I am not so completely crazy about their proverbial expressiveness and laxity.

**Archives have the reputation of being somewhat inaccessible. Is this a Czech specificity?**

I had the opportunity to work in archives in Germany, Italy and France. I think that archives in the Czech Republic are being opened to the public quite quickly. Thanks to *restitutions* (returning confiscated property after the change of the political regime in 1989) they have entered the awareness of the general public. People have come to understand that an archive is something practical where they can find useful information. In Italy and in France, where I tried to do a small study in the map collection of the Bibliothèque Nationale, I learnt first hand that for them an archive is still something like a treasure. It was similar to town halls in the Middle Ages where documents and municipal books were locked in coffers next to the municipal money and the sealant. Archivio Segreto Vaticano (the secret Vatican Archive) is an inexhaustible repository of sources about all of Europe. It is a venerated institution which a person should hold in esteem. You can force your way in only with a scientific title and a letter of recommendation, and you find yourself in a very strange atmosphere among impeccably dressed archive custodians who will help you but keep their distance. I think that an archive is an institution which a person should hold in esteem. And an archivist should also hold his work in esteem, and keep in mind that he has immediate access and responsibility for documents. At the same time, though, the institution should not be 'elevated' so that a regular person cannot reach it. Especially at the regional level it is important that students or chroniclers be able to find guidance in archives.

**What were you 'after' in Paris?**

In the Bibliothèque Nationale I tested the possibility of doing a project on the image of the city of Prague in early modern times; of course the material about this topic is located in foreign archives. As a consequence of historical developments, the plans for the campaign against Maria Theresia and the siege of Prague in the middle of the 18th century are located in Paris: the plans of military manoeuvres with vedute containing detailed descriptions, and sometimes even profiles of military commanders. For the most part the materials were informative leaflets published two or three years after the campaign, describing what the city looked like, which hills were occupied and from which ones Prague was cannonaded and how the campaign was carried out.

**Do you feel the Historical Institute supported you?**

History is really quite an undemanding discipline in terms of material equipment. The generations before us made do with a notepad, pen and box of cards, today we make do with a notebook and a flash disk. If an historian wants to do proper research, he has to base his work on the study of documents. And primary sources about Czech history are scattered throughout Europe, which is a result of the historical development of our country. A Czech historian can't do without foreign sources, without study trips. The Historical Institute offers good

conditions for us to take advantage of opportunities that the generations before us did not have – to set our research in the European context because the events did not take place on a deserted island and people did not stay in one spot.

## A window on another world

### **Do you think that the position of women in academia is specific in some way or more difficult?**

The position of women is more difficult in the sense that by a certain age they have to decide whether they want or don't want a family. If she wants a family, then for at least a year she 'drops out' of her field, from the everyday contact with colleagues and focused work. And for a woman researcher this is a serious handicap compared to other jobs. This is not to say that it does not affect her partner. Biologically, a woman's contribution to childcare and nurturing is greater. But I don't feel this is discriminatory, and in fact I am quite looking forward to it.

### **Do you have the feeling that your position in science and in society in general has changed since you got married?**

I have not felt anything like that. I think that results should speak for a person and what her name is is secondary. What is more important is that the partnership and the family function. Who has what surname is secondary. I think that differences between men and women are revealed in less obvious ways, such as women's propensity to pay more attention to her scientific output, for example in terms of the layout of a publication.

### **Do you think that it is important to talk about the position of women in science?**

I think that it is useful but it must not be overdone. Czech society is still partially in the shadow of the 19th century where you had the stereotype of the man as the breadwinner and woman as the person who tends to the house. Therefore it is absolutely legitimate to deal with this topic in the Czech Republic and draw attention to it. But the craft of a historian can be done by both equally.

### **Do you and your husband plan to have a family soon?**

Usually I answer this question by saying that the right time has not yet come. To earn extra money, take my thoughts away from research and for fun, I teach English in a kindergarten. It's a window on another world. At the same time it's important for my ability to focus on research. I try to avoid stereotypes, which I sometimes see in my colleagues-historians – it's about mental hygiene. So I am not afraid of small children!

**Is there anything we have not discussed yet that should be mentioned?**

I would like to say that it's necessary to continually expand one's horizons, to educate yourself, and not only in your discipline. I mean history is part of the humanities and so it's important to follow other areas of the humanities, especially cultural and political events in general. And also self-reflection and a critical approach to oneself is important – not to stay in the same old rut, which we all criticised our older colleagues or teachers for doing when we were at the beginning of our graduate studies.

**Do you think that Czech researchers have the ability to build contacts with the general public and to communicate to them the subject of their research and their findings?**

It's not easy to popularise science. You skate on thin ice because on the one hand you can be accused of simplifying, and on the other hand of being incomprehensible. With history there is also the danger that at first sight it seems simple – you don't need any special equipment, devices. But if someone wants to do history properly and not just create modern myths that are not substantiated by sources, you find out that you have to tackle at least Latin and German (including historical German), learn palaeography in order to be able to read old writs, heuristics (searching and collecting sources on a given topic, following specialised national and foreign literature and journals, processing the information obtained), to engage in historical critique (separate the more important from the less important, unmask forgeries, judge tendentious statements, 'fill in the blanks' through comparisons) and then put the research in an appropriate form: specialised text, lecture etc. No less important is the presentation of your work and communication with the public: a nicely laid out book, readable paper, smart and well organised textbooks, a comprehensible presentation on the radio or a lecture that is rhetorically appropriate. A lot of historians do not attribute as much importance to this phase of our work as they should. And by neglecting this, historians give room to lay researchers. Historical research demands great discipline, and has its own ethics. Therefore, if a populariser is not a historian, he should at least consult with an expert about his work before publication in order to avoid big mistakes which can be harmful. Historians should be prepared to co-operate with their colleagues among the lay public or write a popular book; history is not only the study of deceased people but to some extent also entails working with the living – it is to them that we present the results of our work so that they can learn from history, to find something interesting in it for themselves. Communication with the public is very important and should not be neglected.





# queen's gambit: the launch of a research career

**Barbora Tupá (ed.)**

Published by the Institute of Sociology of the Academy of Sciences of the Czech Republic

First edition

The publication was reviewed by: **Mgr. Kateřina Lišková, Ph.D. and Josef Chuchma**

Photographs: **Gabriela Kontra**

Translation: **Marcela Linková**

Editing: **Ken Ganfield**

Graphic design and layout: **Anna Issa Šotolová (Imagery)**

Printing: **ART D – Grafický ateliér Černý, s.r.o.**

Publisher's address: Jilská 1, 110 00 Prague 1

Distribution: Press and Publications Department of the Institute of Sociology of the Academy of Sciences of the Czech Republic, Jilská 1, 110 00 Prague 1, telephone 222 221 761, 221 183 217, 218, e-mail: [prodej@soc.cas.cz](mailto:prodej@soc.cas.cz)

Prague 2007

ISBN 978-80-7330-131-6