# **IDWGS 2023**

Saturday 11 February 2023 is the International Day of Women and Girls in Science. On this occasion, we have prepared medallions of two female doctors and two female medics who are engaged in research activities at our faculty.

Doc. MUDr. Vladimíra Radochová, Ph.D. MUDr. Jana Langrová, Ph.D. Jinan Fazal Anjali Rachelkar

As well as finding out what they have done or are currently doing in their research, you will also find out what motivated them to study medicine, what they enjoy about science or what they plan to do in the future.

# Assoc. Prof. Vladimíra Radochová – Looking for the Answers to Questions

*"It's like in the fairy tale about the three nuts for Cinderella, you never know what will hit your nose on the way",* comments Assoc. Prof. Vladimíra Radochová, M.D., Ph.D. from the Department of Dentistry of the Faculty of Medicine in Hradec Králové and the University Hospital Hradec Králové.

Assoc. Prof. Vladimíra Radochová is engaged in her clinical practice at the Department of Dentistry and also works as a teacher. She became interested in scientific activities while she was studying dentistry at the Faculty of Medicine in Hradec Králové. At that time, she was most interested in the field of periodontal and oral mucosal diseases, especially oral lichen planus, under the guidance of Assoc. Prof. Ivo Dřízhal. Her main research interest to this day is the correlation between periodontal disease and overall health and diseases of the oral cavity. *"I am now specifically focusing on the immune response in periodontal disease, the oral microbiome and autoimmune diseases that manifest in the oral cavity,"* adds the associate professor Radochová.



A simple childhood wish and a promise to her siblings led her to study dentistry. *"The story is banal and perhaps even childishly naive. The idea of being a dentist was born in my childhood. My older sister was terribly afraid of the dentist and I promised her as a little girl that one day I would be a dentist and she wouldn't have to be afraid in my office. And in the end, that's what happened."* 

But there was still a long way to go to fulfill her dream. First in 2007 she graduated in Dentistry and then started working as a doctor at the Department of Dentistry of the University Hospital Hradec Králové and as an assistant at the Faculty of Medicine in Hradec Králové.

She is pleased that she can share her knowledge and experience with her students. In her opinion, for a dentist in the routine practice is all about working with your hands. *"But at the clinical workplace one sees many less commonly occurring diseases. Many diseases are not adequately researched. But if a doctor is inquiring enough and thinks about diseases in a broader context, it opens up many questions to which we don't know the answers. And we need to look for them," she says, describing the diversity of his profession.* 

Assoc. Prof. Radochová finds inspiration for hes scientific work everywhere, you can learn even from negative things. *"There are a lot of people around you that form your interest, personality, behaviour, approach to patients and work in general. To name one or two is probably impossible. If you are perceptive, you are able to take something positive from everyone, even from a bad example, for your future work."* As an example of an inspiring personality, she finally mentions Prof. Stephen R. Potter from University College London. He is a good role model for her as a doctor-scientist and a refined man at the same time. *"He is such a prototype of the word professor, which is often forgotten in our country", explains.* 

And what is the key to becoming a good scientist? According to Vladimíra Radochová, the most important is a high frustration threshold, which seems even more important than intelligence, as well as the ability to take risk, curiosity and teamwork. She adds that no matter how enjoyable and fulfilling your work is, burnout can affect anyone who is overly focused on work and does not allow her or his mind to take a break. That's why she herself spends her time outside of work mainly doing sports, skiing and skating, cycling, hiking together with her husband and daughter. But

her biggest hobby is travelling which brings us back to her innate desire to explore and discover the new, the unknown and the unexplored.

## Dr. Jana Langrová – Scientific Work Has Its Own Magic

Dr. Jana Langrová comes from Městec Králové, the birthplace of King Přemysl Otakar II. She dreamed of studying medicine as a child. After finishing her studies at the high school in Poděbrady, she started to study at the Faculty of Medicine in Hradec Králové. *"I was interested in biology, especially in how the human body works, so that was probably the main reason why I decided to study medicine in the end,"* she says, adding that at the beginning of her studies she thought she would focus on paediatrics in the future.

"But after my second year, I started coming to the electrophysiology laboratory and I found out that scientific work has its own magic. After graduating from medical school, thanks to the interesting work and the friendly team, I started working at the Department of Pathological Physiology, "she explains. She has been with the department for 20 years now and recently assumed the position of its head. She says her work is diverse, because it includes a wide range of activities from teaching students, basic research to the possibility of applying the gained knowledge to clinical practice.



Her teacher, professor Zuzana Kubová, who worked in the electrophysiology laboratory, involved her in scientific activities. In the laboratory, Dr. Langrová also met professors Miroslav Kuba and Jan Kremláček, who were and still are passionate about their work and can motivate the researchers around them – including herself. As she says, it is thanks to these three colleagues that she started working on visual evoked potentials (VEPs).

"VEPs is an objective, non-invasive method used to assess the functional status of the visual pathway. In particular, I look at various physiological parameters that can affect the nature of the resulting VEPs. I am researching how age and aging of the human body affects the processing of visual information. One result of this work was to determine age norms for the different types of visual stimuli used in our lab," she describes.

The findings were used in a number of applied research projects, for example in patients with dull eyesight, optic neuritis, multiple sclerosis or neuroborreliosis. Dr. Langrová even worked with deaf people or children who are learning to read by using the fused reading method. She also regularly follows a family whose members suffer from a rare genetic disease of the optic nerve.



Currently, Dr. Langrová is part of a team that deals with visual rehabilitation of visually impaired seniors with macular degeneration of the retina. This is a serious disease of mainly the central part of the retina, which can lead to severe visual impairment. People who suffer from this disease lose their central vision and are unable to focus, recognize details of faces and have difficulty reading. Such a significant change in vision is traumatic for patients. Unfortunately, as the doctor notes, medicine has limited options for treating it.

"We are now trying to find out how a special implanted lens or modified glasses in combination with visual rehabilitation can help patients. During the few months that we work with patients, I am involved in objectifying the function of the optic nerves by using evoked potentials. Other methods we use to assess the impact of rehabilitation are reading speed measurements and questionnaire surveys to determine quality of life, " she explains.

She would like to continue this research because she believes that it can bring new knowledge to help people with this serious disease. *"We have already found out in a previous project that lens implantation combined with visual rehabilitation significantly improves the patient's visual acuity and so helps to improve quality of life,"* she adds.

### Jinan Fazal – Science Full of Transformative Experience

Jinan Fazal is studying at our Faculty of Medicine in Hradec Králové in the 5th year of the General Medicine program. She decided to be a doctor for two reasons. Firstly, she has always had the acumen for sciences since childhood and secondly, as part of her hobbies, music and art, she discovered that she is also manually skilled. She considers this a good combination for her dream of becoming a surgeon. *"I aspire to become an accomplished plastic and reconstructive surgeon in the future. As I am also an avid artist. I believe this is the perfect specialty for me. I wish to focus mainly on a specific branch of reconstructive surgery i.e., craniofacial surgery," she says.* 

Even when she was in high school, she realized she was more of a STEM woman. Her family members are also involved in science. Therefore, it was not surprising that she became involved in scientific activities during her studies at our faculty. And with her very first research project, she won first place in the theoretical and preclinical section of the Student's Scientific Activity (SVOČ) 2022. Her project focused on assessing DNA damage in cell lines treated with anti-cancer drugs, under Dr. Darina Muthna's supervision at the Department of Medical Biochemistry.



"We essentially treated breast cancer cells with varying concentrations of a particular chemotherapeutic agent to measure the toxicity of the drug. By utilizing a certain biomarker, we were able to determine the degree of toxic injury to the cells. In doing so, we have been able to conclude that we may use this marker as a tool for early screening of genotoxic compounds and it may also have the potential to advance research in cancer therapy and drug development," she explains. She actively participated in carrying out the laboratory experiments under dr. Muthna's supervision and played a part in the analysis and evaluation as well. As she says, it seemed like a lot of learning on the job, but she was grateful to have had a brilliant, kind and patient teacher such as dr. Muthna.

Jinan has had a very good experience with her first research project. As she says, she can say with absolute certainty that it was a very transformative experience. *"Under the mentorship of Dr. Muthna, I acquired new skills not just in the lab, but also in critical thinking, analysis, and evaluation. As someone who had no prior interest in research, giving this opportunity a chance helped me grow and hone my abilities and has further inspired me to pursue even more research projects," she says. Currently, she is working on another project, this time under the supervision of Assoc. Prof. Ilja Tachecí at the Gastroenterology Department (2nd Department of Internal Medicine), in this new project she focuses on adenoma detection rate correlation. She will be participating in SVOČ this year as well.* 

Right now, she is mainly focusing on her final exams and trying to make the most of her time in Hradec Králové with close friends as they will all be graduating soon. However, she does plan to continue research, exploring multiple specialties while she still is a medical student and hasn't specialized yet. *"I would like to try my hand at infectious diseases, particularly the role of a certain T-cell receptor mutation in HIV resistance, once I have completed my work in the gastroenterology department this year. Later in the future, I would like to focus more on clinical work but wish to continue to work on smaller, more specialized research projects on the side. After all, to ever fulfill my ambitions of becoming a craniofacial surgeon, I can't rely on that happening on its own," she adds.* 

### Anjali Rachelkar – Combining a Love of Science and Medicine

Anjali Rachelkar is studying in 6th year of General Medicine at our Faculty of Medicine in Hradec Králové. Her motivation to study medicine was quite straightforward – she wanted to serve people and be part of a noble profession that could provide her with the opportunity to make a difference in the lives of other's. The diversity of career options offered by the medical field was another massive draw that attracted her towards it.

"My journey towards studying General Medicine began after careful consideration of multiple specializations within the field. After considering all my options, it was clear for me that this faculty would be best suited for my needs as it provides excellent facilities and extremely knowledgeable staff," Anjali says, adding that all the years of studying at the Faculty of Medicine in Hradec Králové have been great.



In the future, she would like to become a cardiologist because she believes it is an exciting field filled with endless growth potential through new technology and advancements as well as research opportunities. What captivated her about this specialization was its ability to make tangible clinical impacts on patients' lives combined with a wide range of career prospects and lifestyle options.

She started her scientific activities in the third year of her studies at the Faculty of Medicine in Hradec Králové. She was motivated by her love of science and medicine and the opportunity to combine them. During her studies, she was introduced to the world of clinical research and found it fascinating. *"Realizing that I could use the knowledge gained from both medicine and research to develop new treatments for diseases and improve patient care, I was driven to become more involved in clinical research. Knowing that my contributions could be significant in improving patient care was a strong motivator for me,"* she explains.

As Anjali says, working on clinical research projects also helps her understand various topics in medicine and gain valuable skills such as analysing data and interpreting results. Last year, she participated in the Student's Scientific Activity (SVOČ) with her research on Significance of serum immunoglobulins in patients with chronic lymphocytic leukemia and she won the clinical section with it.

The study was a retrospective analysis of 178 cases, and it focused on hypogammaglobulinemia as a diagnostic and prognostic marker. Anjali's role in this project included collecting data, conducting statistical analysis, and searching the literature for additional findings pointing to this phenomenon. *"The research was based on analysing immunoglobin levels at the time of diagnosis in CLL patients. Through our study we were able to show that hypogammaglobulinemia is a frequent finding at the time of CLL diagnosis and that it can be an important prognostic marker. This has the potential to improve patient outcomes by allowing physicians to make more informed treatment decisions earlier in their care journey. Our findings also contribute to clinical practice by helping clinicians better identify patients who are at greater risk of disease progression or relapse after initial therapy has failed," she describes the impact of her work on practice.* 

In the future, Anjali hopes to do research into how cardiovascular health is affected by lifestyle choices such as diet, exercise and stress management. Her goal is to gain an understanding of the mechanisms that are involved in maintaining cardiovascular health and find ways to better support patients in making positive changes for their long-term heart health. *"Additionally, I'd like to explore the potential for developing new treatments and therapies for cardiovascular diseases, such as cardiac arrhythmias or ischemic heart disease,"* she adds.