
IDWGS 2025

Tuesday **11 February 2025** marks the 10th anniversary of **the International Day of Women and Girls in Science (IDWGS)**.

The International Day of Women and Girls in Science is an opportunity to promote full access and equal participation for women and girls in science and related fields.

Gender equality in science is crucial for building a better future for all, yet women and girls continue to face systemic barriers and biases in pursuing scientific careers.

In celebration of the International Day of Women and Girls in Science, we interviewed three interesting women who are involved in science and research at our Faculty of Medicine and University Hospital Hradec Králové.

prof. Martina Řezáčová, MD, Ph.D.

Associate prof. Nela Jouklová, DDS, Ph.D.

Associate prof. Dana Čížková, MD, Ph.D.

The women researchers talked about their journey to becoming a scientist, the key challenges female scientists are currently facing and their perspectives.

We also asked them about their development as a scientist, and their perspectives on women and girls in science. In the interview you can find answers and ideas for discussion.

The joy of the magical Aha! moment, that's what I love about science, says prof. Martina Řezáčová, MD, Ph.D.

The first of the trio of scientists, we would like to introduce to you, is Professor Martina Řezáčová, who has been doing scientific research for more than thirty years. In the following interview, she reveals, among other things, what she enjoys most about the world of science, and who is her greatest inspiration. We also talked about why young women shouldn't be afraid to enter the world of science, and whether the modernised version of the witch is still the typical image of a woman in science in the 21st century.

- She studied General Medicine at the Faculty of Medicine in Hradec Králové, graduating in 1996.
- Since 2007 she has been the head of the Department of Medical Biochemistry at the Faculty of Medicine in Hradec Králové.
- In 2014, she was appointed professor in medical chemistry and biochemistry.
- She started to work in science during her medical studies, and is involved in research in the field of oncology.
- Since 2024, she has been part of the OncoPharm project team, which is concerned with the development of new approaches in cancer treatment.

1. When and why did you decide to become a scientist? What motivated you to do so?

I decided to pursue a career in science during my medical studies. The main motivation for me was my innate curiosity – the desire to understand how molecular processes affect the functioning of life, and the development of disease. I wanted to better understand these complex mechanisms, and discover something new, that could contribute to better diagnosis and treatment. For me, science is a fascinating journey of discovery into the unknown, constantly presenting new challenges, and opportunities.

2. What are you specifically involved in? Can you give us a little insight into your work?

My work focuses on understanding into the molecular mechanisms that regulate life and disease. Specifically, I study how cells respond to DNA damage, for example from ionising radiation or cytostatics, and what processes are activated in them – whether it is to repair damaged DNA, stop cell division or induce cell death. This research is particularly important in oncology, where we are looking for ways to increase the effectiveness of cancer treatment while minimising side effects. In addition, I also study natural compounds, and their potential. My aim is not only to understand the underlying biological processes but also to produce practical results that can improve healthcare.

IT IS AN EXTREMELY FULFILLING FEELING, WHEN YOU SUCCEED IN SOLVING A COMPLEX PROBLEM OR DISCOVERING A NEW PRINCIPLE.

3. What do you enjoy most about science?

What I enjoy most about science is that magical aha! moment – the moment when everything fits together like pieces of a puzzle and you suddenly see a clear picture. It's a very fulfilling feeling, when you manage to solve a complex problem or discover a new principle. But the fascinating thing is that it doesn't end there – for every problem solved, there are often more questions and unexplored areas. It's a never-ending process of discovery, that keeps you motivated to dig deeper, seek answers, and keep learning. It is this never-ending journey that attracts me most to science.

4. I've read, that since last year, you have been involved in a multi-year research project called OncoPharm, can you describe what this is about?

The OncoPharm project focuses on developing new approaches to cancer treatment. The aim of the project is to create a knowledge platform for more effective, and personalised cancer treatment. We are working with colleagues from the Faculty of Pharmacy in Hradec Kralove, the University Hospital in Hradec Králové, and Generi Biotech. Together, we are trying to develop new treatments and compounds, that are more effective against tumours, have fewer side effects and overcome the problems associated with resistance to current treatments.

SCIENCE IS A FASCINATING WORLD FULL OF CHALLENGES, DISCOVERIES AND OPPORTUNITIES, WHERE YOU CAN APPLY YOUR CURIOSITY, CREATIVITY, AND ANALYTICAL SKILLS.

5. Who is your scientific role model, and why?

My biggest scientific role model is my mother, a radiobiologist, who has become my biggest inspiration with her tenacity and determination. She started out as a lab assistant, but through her incredible diligence at work, she worked her way through university, got her PhD, became an associate professor, a professor, and eventually the head of her department. She did this not only because of her expertise but also because of her strength and ability to deal with the challenges of everyday life. During this journey, she also took care of two daughters - my sister and me - and her ailing mother. Her perseverance, her dedication to science and her family, and her tremendous hard work are a lasting inspiration to me.

SCIENTISTS ARE WOMEN OF DIVERSE PERSONALITIES, APPEARANCES AND INTERESTS, WHO SHARE A PASSION FOR DISCOVERY AND FOR SOLVING INTERESTING PROBLEMS.

6. What do you think, people think of when they hear the word scientist? Do you think, there are any stereotypes associated with women scientists?

I think, that when the public thinks of the word 'scientist' or 'chemist' they often picture a person in a white lab coat, hidden behind complicated instruments in a laboratory, surrounded by chemical test tubes and twisted glass coolers - a slightly modernised version of the witch of the swamp, concocting potions amidst the smoke and bubbling cauldrons. Maybe it's a woman with a stern expression, glasses and hair in a tight bun - something out of a cartoon.

And when stereotypes are added to the word 'scientist', people sometimes slip into absurd images - like the geek who has no time for anything but work, or the perpetually brooding person who is detached from reality. But in reality, women scientists look and live quite normally - they are women with different personalities, looks and interests, united by a passion for discovery and solving interesting problems. They work with modern technology, analyse data and lead teams, often in fields that people would not associate with this image. No swamps, no poisons - in my field, lab coats, pipettes and endless emails. But I have to admit, having a bit of that alchemist aura can be fun sometimes!

7. What advice would you give to other women (considering a career) in science?

My advice to women considering a career in science would be simple: Don't be afraid and go for it! Science is a fascinating world full of challenges, discoveries, and opportunities, where you can use your curiosity, creativity and analytical skills. Don't be afraid of obstacles or stereotypes - they are there to be overcome. In science, it doesn't matter where you come from, what you look like or whether you're male or female - it's your passion and determination that counts. And don't forget that a career in science can be wonderfully flexible, allowing you to balance work and home life. So if science appeals to you, go for it - science needs your ideas and your world view!

Associate prof. Nela Jouklová, DDS, Ph.D.: What if we could restore the pulp, and bring the tooth back to life?

Associate Professor Nela Jouklová was led to science by chance and is now researching stem cells from dental tissue, which she says is a bit like the tooth fairy. She recently spent several months on a fellowship at the University of Tennessee in the USA. In the following interview, she also talks about her grandfather, who is her greatest scientific role model, and the essential qualities of a good scientist.

- She studied Dentistry at the Faculty of Medicine in Hradec Králové, graduating in 2014.
- After graduation, she started working at the Department of Dentistry, the Faculty of Medicine, and the University Hospital in Hradec Králové. She is the head of the Restorative Department and Endodontics.
- She investigates the role of stem cells in tooth repair.
- She has completed several international internships in Canada, and the USA.



1. When and why did you decide to pursue a career in science? What motivated you to do so?

The questions of "how" and "why" have been with me since childhood. Science has always been a way for me to discover, learn and push the boundaries of human knowledge. I want to contribute to making the world a better and more evolved place. As a dentist, I also see great progress every day - new materials and treatments are constantly changing what dentistry can do. Whereas a few years ago some teeth would have been lost, today we can save them thanks to advances. But it requires constant training and the ability to keep up with new knowledge.

I was actually led to scientific work by chance. A week before graduation, I broke my arm, and leg and couldn't start working at the Department of Dentistry in Hradec Králové right away. Instead, I started helping my colleagues at the Faculty of Medicine with literature searches, and that's how I discovered the fascinating world of scientific research. The second key moment came, when Professor Jakub Suchanek offered me the opportunity to join his research team as a PhD student. It was a challenge that I accepted with enthusiasm - and to this day I have no regrets.

SCIENCE IS ABOUT PUSHING THE BOUNDARIES OF WHAT IS POSSIBLE.

2. What specifically do you do? Can you give us a brief introduction to your work?

I do research on stem cells isolated from dental tissue. These cells can be taken from both temporary and permanent teeth. We may be competing a bit with the tooth fairy, but stem cells have enormous potential. Under the right conditions, they can become many different types of tissue in the human body. This is a modern area of medicine that has a major advantage over other sources of stem cells - it does not require any further invasive surgery. Essentially, we are using tissue that would have ended up as biological waste.

At the beginning of my research, I focused on the long-term preservation of these cells, as their ability to regenerate naturally declines with age. Together with colleagues, I developed and patented a special medium that greatly improves the survival of cells stored at low temperatures.

As a dentist, I work in the Restorative Department and Endodontics. My scientific dream is to combine regenerative medicine with endodontics. In root canal treatment, we remove the non-living, infected pulp tissue from the tooth, and replace it with other material, thus preserving the tooth's function, but the tooth itself is no longer alive. But what if we could restore the pulp, and give the tooth back its life? That would revolutionise dental treatment. We're still a long way from that goal, but that's what science is all about - pushing the boundaries of what's possible.

IF I DON'T UNDERSTAND SOMETHING, I DON'T GIVE UP UNTIL I'VE EXPLORED IT FROM EVERY ANGLE.

3. I have read, that you have done several internships in the United States in recent years. Could you tell us what you did there?

2023 was a special year for me. After presenting our research at an international conference in Prague, I was offered an internship with Professor Huang at the University of Tennessee - Health Science Center in Memphis, USA. Professor Huang is one of the world's leading experts in regenerative endodontics and his team is working on stem cells, and the possibility of using them to restore tooth pulp.

I spent almost eight months in his lab - with a short break to return to the Czech Republic for my wedding. It was a great opportunity for me. Professor Huang is an extremely talented scientist, a meticulous perfectionist and an inspiring personality. I learned new methods, mastered new technologies and made many friends with whom I still work. Even though we are thousands of miles apart, thanks to modern technology, we can continue to work together.

4. What do you enjoy most about science?

I most enjoy discovering new things, pushing boundaries, and always having to think ahead. Every new discovery in a project, I am working on, motivates me to keep going. If I don't understand something, I don't give up until I've explored it from every angle.

Science is about patience and persistence. As Thomas Edison said, "I have not failed. I've just found 10,000 ways that won't work." That's the essence of scientific work - trial and error that eventually leads you to your goal. And that's what fascinates me about science.

MY GRANDFATHER'S PERSEVERANCE AND HARD WORK INSPIRE ME EVERY DAY.

5. Do you have a role model in science? A scientist you admire or who has inspired you in some way?

My scientific role model is my grandfather, Dr. František Morávek. He was not only a great-grandfather, but also an exceptional scientist. He was briefly the head of the Department of Histology and Embryology at the Faculty of Medicine in Hradec Králové. Despite the difficult conditions of the time, he managed to complete his doctorate in medicine and became a recognised expert in the field of radiation biology.

He devoted himself to research into post-radiation changes in bone marrow and bowel syndrome, published over a hundred scientific papers and was a member of the European Radiation Research Society. His care and precision were admirable - I still have some of his histological slides at home. Perhaps it was thanks to him that my scientific interest eventually turned to the study of cells. My grandfather's perseverance and diligence inspire me every day.

6. What do you think people think about women in science?

I think things are getting better. These days, maybe nobody thinks of a woman scientist as being alone in a white coat in a laboratory. Women are getting more and more involved in science and often doing lots of different roles. We have a great team in our clinic where everyone helps out, no matter what their gender is.

7. What advice would you give to other women thinking of a career in science?

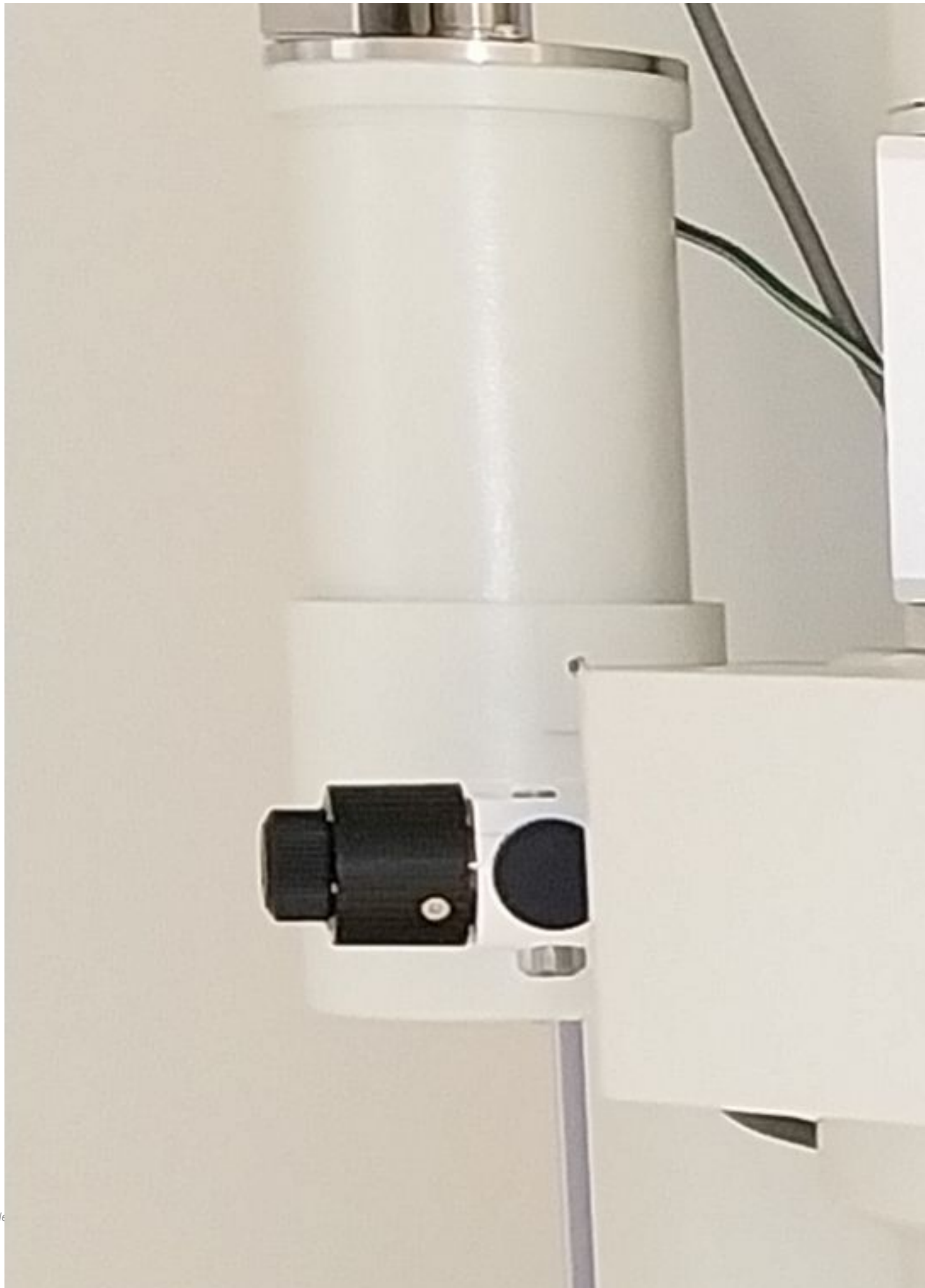
Don't be afraid to follow your dreams! If you enjoy science, you will definitely find your place in it. A career in science not only gives you the opportunity to work on interesting projects, but also to travel, meet new people, and collaborate with colleagues from all over the world.

The most important thing is perseverance. Science is not about instant results, but about patience and a willingness to keep learning. Every setback is just a step towards success, and this is true not only in science, but also in life.

Associate prof. Dana Čížková, MD, Ph.D., loves science because it's creative, collaborative and varied

We asked Associate Professor Dana Čížková, who studies how tissue regenerates, with a focus on skeletal and heart muscle tissue. She works in the electron microscopy laboratory with many Czech and foreign teams. In an interview, she told us, what she enjoys most about her scientific work, and what she wants to do in the future.

- She graduated from the Faculty of Medicine in Hradec Králové, study program General Medicine (2001).
- After her undergraduate studies, she started working at the Department of Histology and Embryology of the Faculty of Medicine in Hradec Králové, where she still works.
- She is interested in the study of tissue regeneration, focusing mainly on skeletal and cardiac muscle tissue, and electron microscope work.
- She received the Fingerland Prize, the prize of Czech Anatomical Society, and the prize of Czech Society of Histo- and Cytochemistry for the best original scientific publications.



1. When and why did you decide to get into science? What made you choose this path?

I decided to study theoretical subjects like histology and embryology in the last year of my undergraduate studies at the Faculty of Medicine in HK. I was fascinated by how ingeniously the human body is structured, at the level of organs, tissues and individual cells, and I was attracted by the microscopy that allows this structure to be visualised. I started my PhD studies without knowing more about what it meant to pursue science. But I learned a lot thanks to my supervisor, prof. Jaroslav Mokry, and other helpful colleagues, and today I am sure that it was the right decision.

IF WE UNDERSTAND HOW TISSUE REGENERATION WORKS, WE CAN CREATE NEW TREATMENT FOR VARIOUS DISEASES.

2. What are you specifically involved in? Can you give us a little background on your work?

I study how tissue can repair itself. This means the formation of new cells in the tissue, that ensure it renews itself. I specialise in skeletal muscle tissue, and heart muscle tissue. While stem cells in skeletal muscle have been studied quite a lot, and we understand a lot about how they form new muscle fibres, this is not yet the case for cardiac muscle. In fact, we don't even know, if stem cells exist in the tissue. Adult hearts only produce a small number of new cardiomyocytes, and the only way we know how to make them is by splitting the existing ones.

If we can understand how new tissue forms, we can use this knowledge to develop new treatments for diseases. I use electron microscopy as well as traditional histology and immunohistochemistry in my research. Our lab works with many other teams, including international ones, who come to us with different research topics. This means I am learning more and more, even about material science.

I WANT TO DO HIGH-QUALITY SCIENCE, OPEN AND HONEST.

3. What do you enjoy most about science?

It's very creative, team-based and diverse work. When a whole team spends months working on a topic, they achieve new and interesting results, that help to solve the problem, they're studying. They then manage to publish their results in a journal, that meets the necessary standards. This makes them feel happy and proud that their hard work was appreciated, and that they are one step closer to developing new ways to treat illnesses.

4. What do you want to do as part of your scientific work in the future?

I'd like to keep doing what I'm doing. Doing science that's good, open and honest. To develop more ideas and introduce new methods, to dedicate myself to my students. We'll see what opportunities arise.

5. Do you have a scientific role model you admire?

I respect many of my colleagues and I admire scientists, who lead cutting-edge teams. Everyone inspires me in a slightly different way, so I don't have one personality, that I look up to.

6. What do you think, people think of when you say "female scientist"?

Science is becoming more popular in the media, and many scientists, including women, are trying to make science more popular. I hope that the public's perception of us is improving. I think younger people, especially, don't see the scientific profession as being special. I'm not sure about the older generation. Maybe I'm wrong about the younger ones? It would be an interesting topic for research.

7. What advice would you give to other women thinking of a career in science?

If they are passionate about their work, then they should believe in themselves. If they have already gained some experience, they should be confident enough to go their own way.