

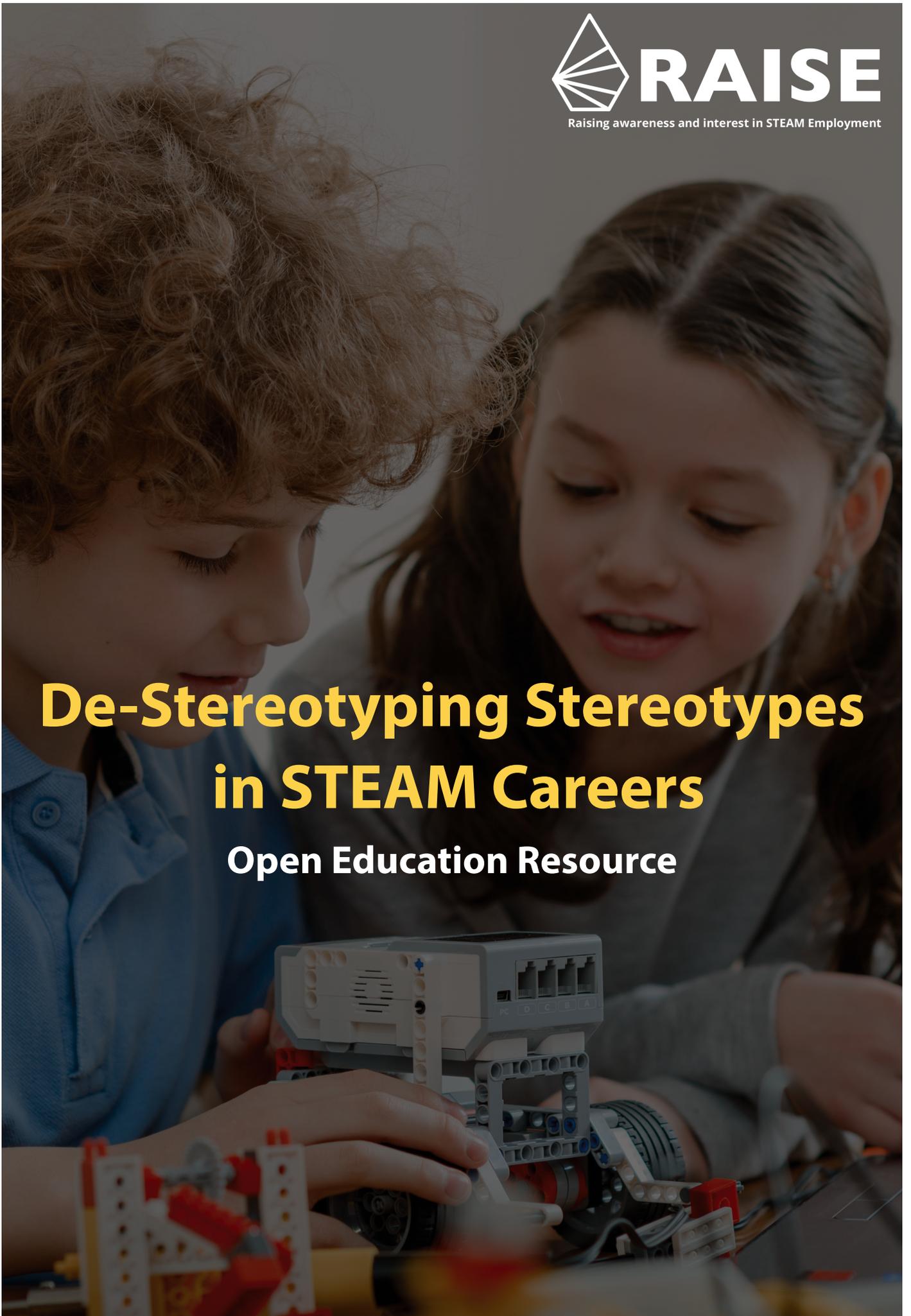


RAISE

Raising awareness and interest in STEAM Employment

De-Stereotyping Stereotypes in STEAM Careers

Open Education Resource





Raising awareness and interest in STEAM Employment

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RAISE
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PROJECT RATIONALE

The STEAM field is one of the main agents of change in the 21st century. Efforts need to be made to create more awareness and interest in STEAM employment. The RAISE project is a step towards achieving this goal across several European Union Countries.

The European Commission is currently working towards reducing the skills mismatch being observed around Europe. Policies are being drafted to address these skill shortages and surplus due to changes in the employment sector which require Europe's population to develop new skills. Through the project, we will be able to provide information on the qualifications and soft skills required by employees for particular STEAM careers, with VET education being given a priority. By doing so, we would be empowering individuals whilst ensuring that everyone has equal access to knowledge about opportunities in the job market not only in their home country, but in a total of 5 European countries.

A New Skills Agenda for Europe (2016) states that by raising awareness on Vocational Educational employment, more people would make vocational education their primary choice (European Commission, 2016, p. 3). Surveys (Rosa, Pisa & Timss) show that 13-15 year olds in developed countries do not believe that science is important for their careers (inGenious, 2014) and very few aspire to become scientists (ASPIRES, 2013).

Furthermore, most students and families are not aware of what science can lead to in terms of careers (ASPIRES, 2013). A technological application will be developed as part of this project, and will provide guidance and counselling on careers in Europe, with primary focus being placed on the partner countries, and would help to motivate users to take up a career in STEAM.

A number of open education resources will be developed throughout the duration of the project which will be available for educators and science communicators to download and use with their respective students and visitors. Career Cafés and Career Days will be organised to encourage dynamic, two-way interactions between students and professionals working in the field.

Training will also be provided to partner organisations who will hold sessions with educators from partner countries to build a network of STEAM Ambassadors who will all work towards achieving the objectives of the project.

WHY THIS OPEN EDUCATIONALE RESOURCE?

Careers in STEM continue to be male-dominated. While making great strides in areas such as the Biological Sciences, in general, women continue to be under-represented and marginalised in areas such as Chemistry, Engineering, Physics, and Computer Science. Whilst women have made significant progress, they are still in the minority in most STEM disciplines, and the proportion of women tends to decrease as seniority/tenure increases¹.

Despite the fact that numbers of males and females participating in, and excelling at, science are roughly equal throughout primary and secondary school, fewer women enter STEM majors in college, and fewer still graduate with a STEM degree. The pattern continues as lower percentages of women pursue advanced degrees in STEM areas and fewer yet obtain jobs in STEM areas².

Gender segregation in the vocational orientation of adolescents has been well documented for decades in most OECD countries (OECD, 2006, 2012). The persistence of gendered paths in career choices has recently been reflected in the current Global Gender Gap Report of the World Economic Forum (WEF), which states that on average men are underrepresented in the fields of education, health and welfare whereas women are underrepresented in the STEM fields (WEF, 2017, p. 31). Moreover, on the basis of the occupational aspirations of 15-year-old adolescents, the prognosis for change in gender-based disparities in occupational and academic choices suggests that gender segregation in the education and labour market will remain persistent (OECD, 2017).

The persistence of horizontal gender segregation in educational and occupational fields contributes decisively to the spread of gender-stereotypic beliefs about a natural fit of women in careers in more expressive and human-centered fields and men in technical and math-intensive fields (Charles and Bradley, 2009). Gender stereotypes are part of a broader belief system that includes attitudes toward female and male family roles, female and male occupations, and gender-associated perceptions of the self. As bipolar constructs, gender stereotypes imply that what is masculine is not feminine and vice versa (Deaux and LaFrance, 1998; Worell, 2001; Renfrow and Howard, 2013). The social role theory (Eagly and Wood, 2012) suggests that gender roles and their occupants are highly visible in everyday contexts and that gender stereotypes emerge in response to the observation of women and men in different social roles and in role-linked activities related to occupational choices (Koenig and Eagly, 2014). This theoretical assumption was confirmed in a study by Miller et al. (2015), which analyzed how women's enrollment in science courses relates to the gender-science stereotype. Based on a survey of about 3,50,000 participants in 66 nations, this study concluded that explicit and implicit national gender-science stereotypes were weaker in countries with a higher female enrollment in tertiary science education. This study also demonstrated that stereotypes about science were strongly gendered, even in countries with high overall gender equity. In addition, a meta-analysis of two major international data sets—"Trends in International Mathematics and Science Study" (TIMMS) and the "Programme for International Student Assessment" (PISA)—has confirmed that gender equity in education is important not only for girls' math achievement but also for girls' self-confidence and valuing of mathematics (Else-Quest et al., 2010). Furthermore, a cross-national data analysis has indicated that gender differences in math are closely related to cultural variations in opportunity structures for girls and women, in particular to gender equity in school enrollment, women's share of research jobs, and women's parliamentary representation (ibid., p. 103).

1 Hill, C., Corbett, C. and St. Rose, A. (2010). Why So Few? Women in Science, Technology, Engineering, and Mathematics. Retrieved from the AAUW <link: <https://www.aauw.org/files/2013/02/Why-So-Few-Women-in-Science-Technology-Engineering-and-Mathematics.pdf>>

2 McGill, C.M., and Woudenberg, D.L., (2012, June). Gender matters in STEM majors! Retrieved from the NACADA Clearinghouse of Academic Advising Resources Website: <link: <http://www.nacada.ksu.edu/Resources/Clearinghouse/View-Articles/Gender-issues-in-STEM-majors.aspx>>.

Accordingly, the low proportion of women in STEM leads to the spread of a gender stereotypical image of math and science as a male domain and beliefs about male supremacy in technical and math-intensive fields. In turn, such beliefs affect young people's career choices, leading to a mutual reinforcement of gender stereotypes, and gender gaps in career related interests and choices (Nosek et al., 2009, p. 10,596).

In Switzerland gender segregation is also persistent and is especially noticeable in the STEM field (FSO, 2013). In educational tracks at the universities of applied science, with only 21.3% of women enrolled in STEM courses in academic year 2017–2018. However, some STEM fields are more strongly gender segregated than others. The lowest proportion of women is in the fields of informatics (10.4%) and technology (8.5%), whereas in the fields of chemistry and life-sciences the proportion of women is considerably higher (43.7%) (FSO, 2019a). In secondary education, gender is almost balanced in chemistry and biology (girls 18.4% and boys 20.5%) as a subject of specialization, whereas considerably more boys (18.4%) than girls (4.4%) decided to specialize in the subjects math and physics (FSO, 2019b). It is, thus, important to distinguish between different STEM disciplines and subjects when addressing the gender gap in the STEM field (Rosser, 2012; Ertl et al., 2017).³

³ ElenaMakarova1,BelindaAeschlimann,andWalterHerzog,TheGenderGapinSTEMFields:TheImpactof the Gender Stereotype of Math and Science on Secondary Students' Career Aspirations, 2019



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Narratives of STEAM

STEM Professionals narrate their stories



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ALBERT SCIBERRAS

Teacher (Physics/Engineering)

Malta

Brief description of your job/what are you working on right now:

I teach secondary level Physics and Engineering.

Have you always wanted to do the job you have now:

When I was young I always thought I wanted to be an engineer as I thought you get to work on engines. Later on in life, upon learning the difference between the two I realised I needed to find another career. Having had an extremely positive secondary school experience and after furthering my knowledge in Physics, I decided I wanted to combine the two and so pursued a career in teaching.

What do you wish people knew about your job?

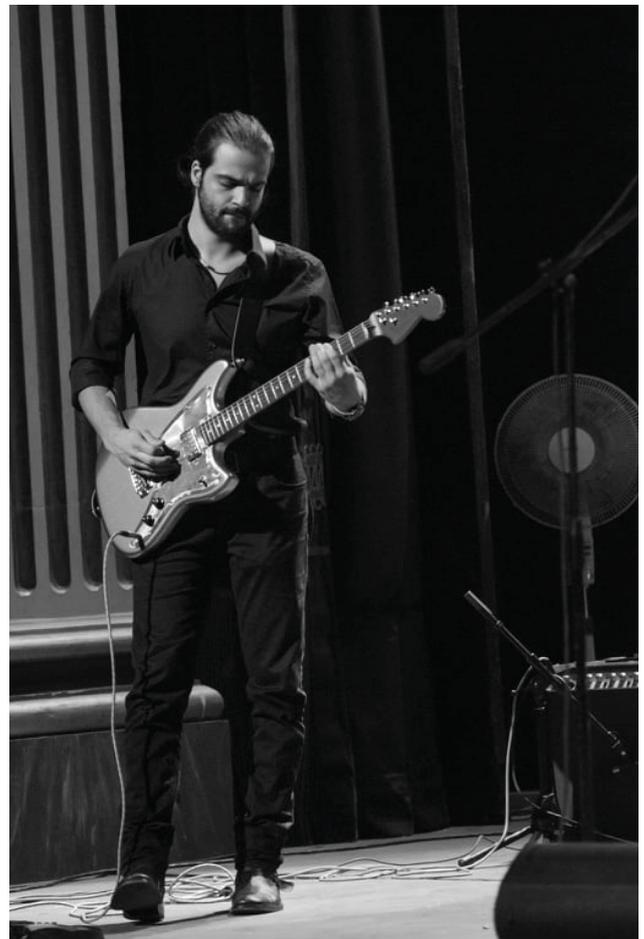
That the job constantly keeps you on your toes by throwing different challenges at you; a student might challenge some information you thought was clearly established, another might ask you to explain in simple terms the latest discovery within the scientific community, or even trying to get a student to understand a simple concept.

What skills do you need most for your job?

Communication and presentation skills are extremely important in order to be able to make sure students achieve the lesson's objectives. Being able to empathise and bond with students is also very important because if the students are not comfortable around you, they will not have the best school experience.

What's your favourite thing about your job:

I have two experiences that make it all worthwhile. The first is when I see a student's facial expression change from one of visible frustration because he can't understand the topic at hand, to one of bliss as he has his Eureka moment and realises that he has understood. The second is when I meet students years after I have stopped teaching them and during our little catch-up they remark that something I had said during a lesson left an such an impression on them that it has made them better adults.



What were your favourite subjects at school?

My favourite subjects were definitely Physics, Chemistry and Graphical Communication. The former two gave me the knowledge to understand why things around me happened the way they did whereas the latter fed my appetite for understanding diagrams, and drawings especially technical ones.

What inspired you to study STEAM subjects?

STEM subjects have always satiated my need to know why things are the way they are, while instilling in me the need to never take things at face value.

Training (university/college/apprenticeship)

I have a Bachelor's Degree in Education with Specialisation in Physics and a Post-graduate diploma in Creativity and Innovation, both of which I obtained from the University of Malta.

What were you like at a young age:

I would say I was a relatively well-behaved boy, but I did tend to get into trouble be it exploring too far away from home on my bicycle and returning with scraped knees, or causing the circuit-breaker at home to trip whilst attempting to add a switch to my lampshade using a pair of metal scissors.

What is your life-long dream?

My dream is to be able to lead a healthy happy life so that I can enjoy life to the fullest.

Hobby:

I enjoy DIY projects and playing music

Hobby:

Sports, talking to friends, reading.

Favourite food:

I can rarely say no to a proper pizza

Weird fact:

I have a preauricular sinus, something I share with most of my male maternal cousins and grandfather.

Skill/Party trick:

I am pretty decent at playing the guitar.

What would your autobiography be called:

That's not how it was supposed to work out.

ALJOŠA BOLJE

Researcher-Assistant

Slovenia

Brief description of your job/what are you working on right now:

I am studying the structural characterization of proteins in solid pharmaceutical forms. The studies consist of sample preparation, different analytical (spectroscopic and spectrometric) methods evaluation, data analysis and interpretation. In conjunction with FFA (Uni LJ), Lek d. d. as industrial partner is collaborating within the studies of the described project.



Have you always wanted to do the job you have now:

Not really. There were several other things that I wanted to do as job in my life. One that was really intense was the wish of becoming a professional musician and live from that.

What do you wish people knew about your job?

That chemistry can be really interesting and funny, despite the fact that the subject is quite difficult and not really for everyone. But as a job, being a chemist/scientist, is very interesting and I wish that people could understand exactly what a chemist really does.

What's your favourite thing about your job:

That you never know all the answers to the science questions. There is always something to be discovered and this makes you feel that more and more can be achieved. Which is difficult but at the same time you can motivate yourself from this as much as you want.

What inspired you?

All the things that can be achieved in science, all the discoveries, all the milestones in the history.

The wish that someday your research will be a brick in the wall of such things.

Training (university/college/apprenticeship)

FKKT (Uni LJ), FUB (Berlin Germany)

What were you like at a young age:

I would say quite funny, but at the same time smart and resourceful. A positive kind a person.

What were your favourite subjects at school

Mathematics, Chemistry, Physics, Music.

Hobby:

Professional musician (drummer-percussionist).

Favourite food:

Fish food

Weird fact:

There isn't anything which is interesting enough to be mentioned.

What would your autobiography be called:

Aljo di Meglio

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ANNA HENSCHEL

PhD researcher

United Kingdom

Brief description of your job/what are you working on right now:

I am a scientist in training – I am learning to conduct experiments, collecting information about research questions that I am interested in and writing about my findings.



Have you always wanted to do the job you have now:

Ever since I was very young, I have been very curious. I remember my parents gave me an encyclopedia for my birthday once, and I was content sitting on my couch browsing the book, learning about maths, physics, famous historic events and so on.

What do you wish people knew about your job?

Not all scientists work in a so-called 'wet lab', ie have to wear white lab coats and use pipettes. A lot of scientists, like me, work in a normal office, but with some fancy equipment that we need to conduct our experiments.

What's your favourite thing about your job:

What I like most about being a researcher is that I get to spend time thinking deeply about questions that interest me, and that I can learn new things every day.

What inspired you?

I was very fortunate in that I have been mentored by wonderful women in science, ever since I started studying Psychology for my undergraduate degree. Seeing these women run their labs with poise, enthusiasm and wisdom inspired me to pursue a career in science.

Training (university/college/apprenticeship):

I studied in Germany for my undergraduate degree in Psychology. After a research internship abroad, I decided to do my Master's degree in Amsterdam, where I graduated cum laude. After another research internship, I applied for my PhD, and here I am now, in Glasgow!

What were your favourite subjects at school?

My favorite subjects changed as I got older, but initially they were English, History and Nature Studies.

Hobby:

I still love to read, photography and sports. I enjoy running and swimming.

Favourite food:

Definitely Pasta.

Weird fact:

I have a robotic research assistant!

Skill/Party trick:

I can recite Sonnet 18 – in its original old-English pronunciation.

What would your autobiography be called:

The scientist – There and Back Again.

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ANTONELLA PERUCCA

Professor

Luxembourg

What did you study?
Mathematics

Why are you passionate about science?
My mother used to play games with me using numbers and set theory, using my older sister's books.

Brief description of your job/what are you working on right now:
Researcher in number theory and mathematical didactics.
Inventor of mathematical exhibits.

Have you always wanted to do the job you have now:
When I was 4 I knew I wanted to do mathematics, although I had no idea of what the job would be. When I went to the University I believed that I would become a mathematical teacher....I only discovered what a PhD was when I was already at the University.

What do you wish people knew about your job?
It is very cool, makes you ready to do any other job. It is an ethical job, and research helps the world!

What's your favourite thing about your job:
My colleagues are a set of very intelligent people.

What inspired you?
Helping others gives me a lot of energy.

Training (university/college/apprenticeship)
Math competitions in high-school, University, PhD, 2 Postdocs, 1 Lecturer, now Professor.

What were you like at a young age?
Courageous, I never followed what the others did without reflecting whether it made sense for me (I did not smoke or do stupid things just to uniformize).

What were your favourite subjects at school?
Math, German

Hobby:
Inventing jokes, making artworks, singing.



Favourite food:
Cream custard.

Weird fact:
I was 2 years younger than my school-mates (and that was illegal!).

Skill/Party trick:
I can speak to strangers by finding some excuse for it.

What would your autobiography be called:
Simply me, the small mathematician who saw things the others overlooked.

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CHRISTINE CANNATA CI

Interventional & Diagnostic Radiologist

Malta

Brief description of your job/what are you working on right now:

I am a doctor currently in my final year of specialty training in Radiology. Diagnostic radiology involves the interpretation of images such as plain radiographs (x-rays), CT scans and MRI scans and making use of ultrasound to reach a diagnosis. Interventional radiology is the use of these imaging techniques to guide minimally-invasive procedures such as delivering chemotherapy right into the artery supplying a tumour in the liver in order to shrink it, eradicating tumours by ablating (burning) them using a needle which emits microwave energy, removing blood clots from the brain when a person has a stroke, opening up arteries in the legs of patients with diabetes thus preventing gangrene and amputation... all of these are done through very tiny incisions which are less than 1cm across. I have completed my training in diagnostic radiology and in addition to this I am subspecializing in interventional procedures mostly related to the liver and kidneys.



Have you always wanted to do the job you have now:

I have wanted to be a doctor for as long as I can remember. My aunt was a nurse and I used to love visiting her at work and interacting with the patients there. I also had a wonderful paediatrician when I was young and in fact, I went into medicine thinking I would do paediatrics because I also love children. I realized Radiology was the specialty for me during my first year of medical school when we got to see scans during our anatomy module. The more I learnt about the specialty, the more I liked it. It's like a puzzle – something is wrong and it's up to you to find out what. You're given some information by another doctor who has seen the patient and you have to reach a diagnosis using that information and the images you are given. The interventional aspect is also very exciting. A diagnostic radiologist very often does not meet any of his/her patients; they only see the scans. An interventional radiologist has the opportunity to meet and actually treat patients too. It's a very delicate but also very rewarding job.

What do you wish people knew about your job?

That it exists! Most people do not know radiologists exist. In real life they usually meet a physician or surgeon who is responsible for their care and on TV these same doctors are

portrayed as interpreting scans themselves. While most physicians and surgeons can perform basic interpretation of such scans, they rely on us for final reports. In fact, we work closely with all the other specialties and contribute to patient care in a behind the scenes fashion through informal discussions and formal weekly meetings during which we discuss patient management. Interventional radiologists are an even rarer breed of doctors, with female interventional radiologists being very difficult to come across (I am one of three on the island). When patients meet us, they often think we are surgeons simply because we perform procedures. While we work closely with our surgical colleagues, our work is very different as is our training.

What skills do you need most for your job?

Patience, determination and perseverance. Those would definitely be the top three. Medical school and post-graduate training are not easy and can be very tiring so it is important to be patient and not to give up even if sometimes the road seems tough. This is also important when working in radiology because sometimes cases can be very challenging and hard to crack. Being good at recognizing patterns and spotting the difference (yes, just like the game!) are definite assets in diagnostic radiology. In interventional radiology dexterity and hand-eye co-ordination are essential as during procedures your eyes look at a screen, your feet press pedals intermittently while your hands handle wires, catheters (very thin tubes) and needles – everything has to happen at the same time, independently but in a co-ordinated manner, much like playing a very complex video game!

What's your favourite thing about your job:

The fact that I get to help people. It can be very difficult when despite our best effort things do not go the way we wish them to, however we always give it our all and do our very best to ensure a successful outcome for our patients. It is also very rewarding when our treatments are successful or when we spot subtle signs to reach a diagnosis which ultimately leads to proper patient management and care. I also love the fact that it is varied and challenging – solving puzzles is fun!

What were your favourite subjects at school?

Biology and languages. I love learning new languages. They're fascinating, as is the human body. I also love the literary aspect of languages – I used to get told off at school because I was always lost whenever a teacher asked me to read in class... I'd have gotten engrossed in the story, tuned out whoever was reading aloud in class and kept reading alone, only to end up about 10 pages ahead of the class and completely embarrassed when the teacher realized I had no clue which page we were on.

What inspired you to study STEAM subjects?

STEM subjects have always satiated my need to know why things are the way they are, while instilling in me the need to never take things at face value.

Training (university/college/apprenticeship)

Doctor of Medicine & Surgery – University of Malta – 2011

Member of the Royal College of Surgeons – Edinburgh – 2013

Fellow of the Royal College of Radiologists – London – 2018
European Diploma in Radiology – Vienna – 2019

What were you like at a young age:

Very curious and talkative. I loved exploring and finding out how and why things work the way they do. Thankfully I had very patient parents who would answer my questions and who raised me in an environment where I could learn as much as I wanted to. I was, and still am, a bookworm so I spent a lot of time reading. I loved, and still love, Disney movies. I was quite into sports and trained in gymnastics for many years. I was also a big fan of musical theatre and in fact attended a musical theatre school too, though I can't sing to save my life. I really enjoyed outdoor adventures too which is why I went from Brownie to Guide to Ranger with the Malta Girl Guide Association and loved it.

What is your life-long dream?

Had you asked me this question a few years ago I would have replied "to be a doctor". Now that I'm there, my priorities have changed and, corny as it may sound, all I really want is to live a healthy, happy life surrounded by the people I love and cherish. There are other things I've always wanted to do and which are still on my bucket list, like going climbing in New Zealand or watching a musical on Broadway, but these are really only secondary to having enough time to spend in the company of those I hold dear.

Hobby:

Scouts! (though it doesn't feel right to call this a hobby... it's more a way of life. I'm a scout leader and most of my free time is taken up with scouting activities. It's a commitment, not a hobby).

Reading, travelling, theatre, dancing and adventure sports like abseiling and climbing.

Favourite food:

Roast fillet of beef (cooked rare)

Nutella

Weird fact:

I have an irrational fear of geckoes. I'm fine with lizards, but I'm petrified of their pink/white cousins which crawl up walls and like to come out at night.

Skill/Party trick:

I have good organisational skills... though that isn't of much use at a party. I can dance the night away though! I love to boogie.

What would your autobiography be called:

I've never thought about this before... quite a difficult question to answer. Probably it would be something along the lines of "Becoming Canna: My adventure book". Just to clarify, "Canna" is an abbreviation of my surname and it's what a lot of people outside of home call me. It took a while for me to get used to the nickname and embrace it, hence the "becoming" part of the title. "My adventure book" is a reference to one of my favourite movies, "Up". In this animated film Ellie keeps a book in which she chronicles her life's adventures and gives

this book to her husband before she passes away. I like to think of life as one big adventure and hope that at the end of my life I can look back and be happy with the adventure I'd have gone on, much like Ellie was.

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DANIEL MANGION

Msc. (Biology) student

Malta

Brief description of your job/what are you working on right now:

I'm currently studying the morphology and distribution of a particular species of daffodil (*Narcis*) on the Maltese Islands. Through in-situ data collection and subsequent statistical analysis I'm hoping to shed some light on the taxonomy (or how to classify) this problematic species, whose taxonomy is somewhat blurred due to a number of factors including a long horticultural history.

Have you always wanted to do the job you have now:

Not exactly. I've always enjoyed learning about science.

I became inspired to delve deeper into botany

during my Bachelor's degree at the University of Malta (UM). One of my lecturers (now my current thesis supervisor) recognized my passion and encouraged me further.

What do you wish people knew about your job?

I'm unsure if people realize just how important plant science is. One might rightfully argue that subjects like mine might do not conjure up thoughts of being at the forefront of discovering some new, cutting-edge product which will generate millions. It's usually more of someone studying agriculture or learning how to garden!

But the offshoots which stem from the study of plants have enormous potential. This becomes apparent when you take into account our dependence on plants for a number of commodities which we might sometimes take for granted (I know I do at times), including most medicine.

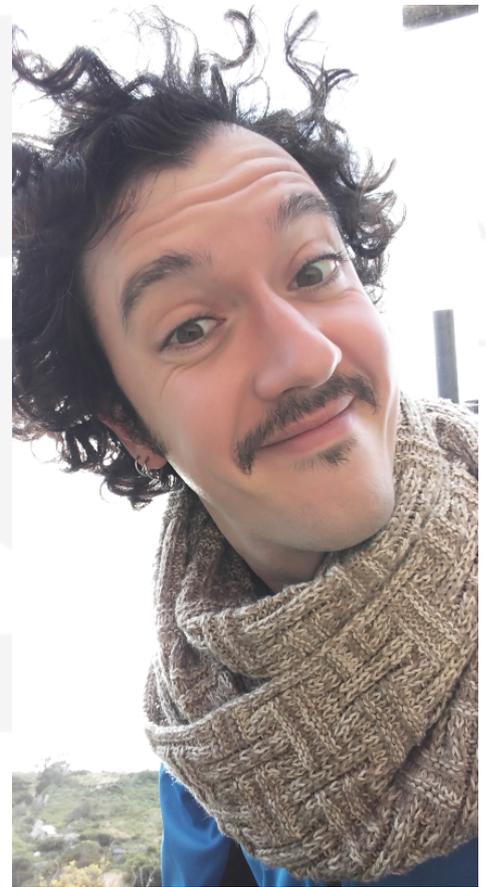
What skills do you need most for your job?

Besides a solid basis in the theory, I'd say having a keen eye for detail and interpersonal skills are very important. Computer literacy is also essential for statistical analysis.

However, besides these, the most important things to have, although not exactly skills are genuine curiosity and passion for your subject!

What's your favourite thing about your job:

I'm quite a neat person. So studying plant taxonomy gives me the chance to order things, or rather learn about the order of things. I also love being in nature and studying botany



requires you to go on fieldwork!

What were your favourite subjects at school?

Science and history were my favourites.

What inspired you to study STEAM subjects?

Mostly encouragement from my parents and teachers. As well as genuine curiosity about the natural world.

Training (university/college/apprenticeship)

- Education:

MSc. (Biology) - Ongoing

- Training/ work experience:

Laboratory demonstrator/ teaching assistant for the Department of Biology at the University of Malta (2 years).

Working to update the herbarium at the Department of Biology - Ongoing

Research assistant for Operation Wallacea (2-week expedition within Transylvania)

What were you like at a young age:

I was very energetic and adventurous I think, and my parents tell me I was always very much interested in natural history. I remember spending a great deal of time outside in the countryside or the garden. I was also a collector of pretty much anything; shells, fossils, bottle caps, stamps, crystals, you name it.

What is your life-long dream?

Life-long dreams tend to evolve as one goes through life. At the moment its to work either as a researcher or curator in a museum or botanical garden and/ or become a field-biologist. I'd also like to live in the countryside, ideally in a country in which the natural environment is appreciated and respected.

Hobby:

Gym, reading, trying to paint.

Favourite food:

Fried spicy chicken wings!

Weird fact:

I have a false tooth (a dental implant) which I had to get to keep the others from moving about.

Skill/Party trick:

I can draw a caricature of myself using any medium.

What would your autobiography be called:

A field guide for stress survival.

DITKA VIDMAR

Project manager

Slovenia

Brief description of your job/what are you working on right now:

We're coordinating a project that aims to bring experts together to improve the clinical pathway for patients with back pain in Slovenia.



Have you always wanted to do the job you have now:

Yes and no. I always wanted to work on something that would have a positive impact on the wellbeing of people at large. But the job I do now has been established only recently.

What do you wish people knew about your job?

Magic happens when people of different expertise come together and work together to solve a complex problem.

What's your favourite thing about your job:

That I can help people see the possibilities of collaboration and that such collaboration actually brings results.

What inspired you?

In general? I find inspiration in everything around me: in listening to people, in observing nature, reading books, watching videos.

Training (university/college/apprenticeship)

I studied biology and did a PhD in neuroscience, I did a course in mediation and am now learning how to facilitate the collaborative processes for solving complex problems.

What were you like at a young age:

Curious, playful, focused

What were your favourite subjects at school

Biology, Chemistry, Maths, Physics.

Hobby:

Sports, talking to friends, reading.

Favourite food:

I like variety, vegetables, sea food, sweets.

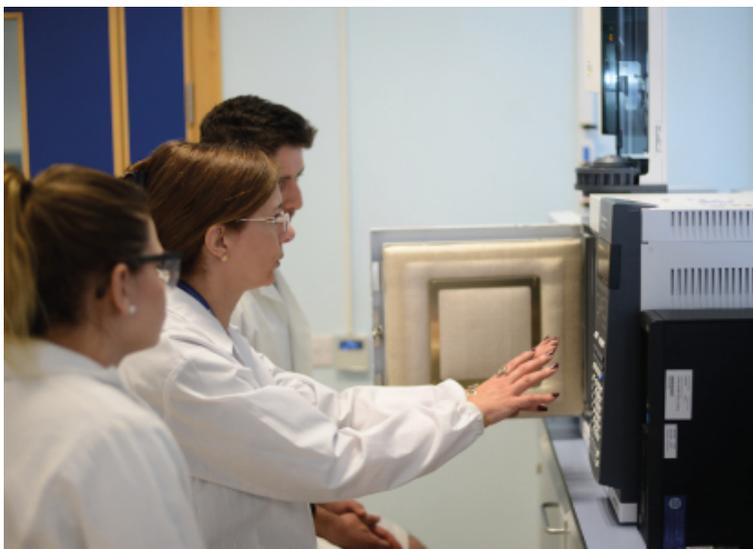
DOREEN MICALLEF

Deputy director, Institute of Applied Sciences

Malta

Brief description of your job/what are you working on right now:

Management and assessment of programmes carried out at our Institute. The programmes range from agriculture to industrial, environmental and health sciences.



I am also involved in research related to weight management and obesity and their relation to health and lifestyle factors.

Have you always wanted to do the job you have now?

I have always aspired to work as a researcher but I never imagined that I would be able to make it into management.

What do you wish people knew about your job?

The fact that having to move into management does not necessarily mean that you have to lose touch with your field of expertise – it just depends on how willing you are to continue your studies and research.

What's your favourite thing about your job:

I get to meet a lot of people, both students and persons outside of our Institute who are even experts in their areas, who help to enrich my knowledge and expertise.

What inspired you?

I always wanted to work in the health sector. As a young child, I loved science and I was a very curious child, always asking "...but why?" I used to love watching TV programmes that involved medicine and science but I always wondered why there were no women portraying those roles. I remember telling my dad one day that I would make him proud by being the first lady scientist. Just imagine my disappointment when I discovered that Marie Curie had beat me to it!

Training (university/college/apprenticeship)

I first obtained a Diploma in Medical Laboratory Science. I then proceeded to read for a Bachelor of Science in Biology and Chemistry at the University of Malta. Soon after I obtained my membership within the Institute of Biomedical Science of the UK. I have recently graduated from the University of Chester, where I read for my M.Sc. in Weight

Management. I have just obtained my Post-Graduate Certificate in Research and will hopefully graduate with a Masters in Research soon.

What were you like at a young age?

I was extremely shy but very mischievous, as I loved to play pranks on my family and friends. I loved sports and I was an avid reader (no computers or mobile phones or electronic gadgets to distract us in my time!).

What were your favourite subjects at school?

Biology, Chemistry and Mathematics.

Hobby:

Ballroom and Latin Dancing.

Favourite food:

Sticky spare ribs and anything chocolatey.

Weird fact:

I think I'm pretty normal so I can't think of any.

Skill/Party trick:

Still need to find one!

What would your autobiography be called:

Curiosity doesn't always kill the cat.

ELAINE FARRUGIA

Senior Lecturer in ICT

Malta

Brief description of your job/what are you working on right now:

I am currently working as a Senior Lecturer in the MCAST institute of ICT. My responsibilities include research, lecture preparation, material preparation, lecture delivery, and preparing and carrying out assessment. I also supervise students doing their undergraduate projects and theses.



Have you always wanted to do the job you have now?

Not really. Originally I studied to be a software developer.

What do you wish people knew about your job?

Some people think that teaching/lecturing is a relatively relaxed and stress free job. I think that if you take it seriously it is anything but. Being a good teacher is a real challenge, and the interesting thing about it is that the perception of what a good teacher is might not be the same for every student.

What's your favourite thing about your job:

I like the fact that I have the opportunity to keep abreast with the fast evolving field of ICT, and share my knowledge and experience with my students. I also learn a lot from the students themselves!

What inspired you?

I wanted to have a technical job which challenges me but I also wanted the humanistic aspect. Teaching provided me with such a balance.

Training (university/college/apprenticeship)

University of Malta.

What were you like at a young age?

I was exposed to science at a young age and was always fascinated by it. I questioned a lot and was not easily satisfied with the answers I got. Nobody had any doubt I would pursue a career in this field!

What were your favourite subjects at school?

Mathematics, Computing and Physics

Hobby:
TV

Favourite food:
Pasta.

Weird fact:
Sometimes I put the same song on repeat for hours!

Skill/Party trick:
Does tongue rolling count?

What would your autobiography be called:
The best of me.

RAISE



Raising awareness and interest in STEAM Employment

ELENA TEA RUSSO

PhD Student

Italy

Brief description of your job/what are you working on right now:

I am studying protein sequences with computational methods, in order to better understand their function and evolution.



Have you always wanted to do the job you have now?

When I was a kid, I used to change my mind about my ideal job every 2-3 years. I had no idea such a job existed: I knew about the general idea of “research”, but I didn’t know how it was and what topics could actually be studied.

What do you wish people knew about your job?

That a good part of my job is to talk to other researchers, about both my own and their research. We do not stay closed in our offices: the more people you meet, the better your work gets.

What’s your favourite thing about your job:

It requires creativity, and sometimes to be intuitive; it is also a lot about trying things to see what happens. It makes me say “ah, yay, it works!” an “ugh, nope, that was not a good idea!”, and I really love these moments of surprise.

What inspired you?

Mostly my family and my friends from University.

But there was a moment when I realized research could be very interesting. During my bachelor, I was working on a project that simulated the solar system; I made a mistake and put two planets in the wrong position: the simulation went on and the planets were literally thrown out from the solar system. It was so unexpected it made me laugh so much, I cried. “This is research”, my professor told me later.

Training (university/college/apprenticeship)

B.Sc. In Physics at University of Trieste, with and Erasmus period in Loughboroug, UK; M.Sc. In Applied Physics at University of Bologna; now I am a PhD student at SISSA, Trieste.

What were you like at a young age?

I was extremely self-confident and egocentric. I used to have very strong opinions, even if this meant fighting with the grown-ups. I was so confident that I used to sing very loudly

songs from cartoons on my way from home to school, walking alone.

All of this faded when I turned 12, entered middle school and hit puberty.

What were your favourite subjects at school?

My first love was Mathematics. Then I met Physics (when I was 14) and Philosophy (when I was 16).

Hobby:

Writing, Drawing, Martial Arts.

Favourite food:

Nutella. YES, it IS a food, ok?

Weird fact:

If you look intensely at me while I am drinking, I will start to laugh and probably to choke.

Skill/Party trick:

I can find legal parking everywhere. True story.

What would your autobiography be called:

"Welcome wherever you are"

FRANCESCA RIZZATO

Science Communicator and Researcher

Italy

Brief description of your job/what are you working on right now:

In this moment I am both a science communicator and a researcher: I do some research (and this was my main job until a few months ago), but I also stand in between scientists and people, often kids, students or teachers, trying to make them communicate and interact at their best.



Have you always wanted to do the job you have now?

I was not aware, as a kid, of the possibility of being a science communicator, and for a long time I did not realize that it could really be more than just a hobby. And I was not so brave to imagine that I would be a researcher either. I did not have very clear ideas of my future when I was a kid...

What do you wish people knew about your job?

That researchers are human being like the rest of the world and not monsters or crazy people. That science communicators exist :D!

What's your favourite thing about your job:

The fact that every night when I go home I feel that I've learned something new.

What inspired you?

I think I chose research and science communication for my curiosity... I always want to know more... and every time I understand something I want to understand something more.

Training (university/college/apprenticeship)

I studied physics at the University of Padova (Italy) with an Erasmus period in Paris. Then I got a PhD in computational biophysics at SISSA in Trieste.

What were you like at a young age?

I loved reading and I was a responsible girl, but also very determined: if I decided something it was hard to make me change my mind. As a teenager, I spent a lot of time volunteering with younger kids and it is something that shaped me a lot.

What were your favourite subjects at school?

I have always been fond of learning, so I liked many subjects... of course I've always liked math: it was challenging, something like a game. I've always loved the languages, so English was a lot of fun, but also my native language, Italian, and further on French. I also loved philosophy and history in high school, for the complexity of the landscape they presented.

Hobby:

Reading, cooking, travelling. Science communication used to be one of my favourite hobbies, but now it's my work so I guess it's not valid any more!

Favourite food:

I love cooking and I'm Italian, so I know it's a bit a cliché, but I could not live without pasta with tomato sauce.

Weird fact:

I'm a bit crazy, ok but it's not polite to say I'm weird :S :D

Skill/Party trick:

I can bake a cake with any food restriction :D

What would your autobiography be called:

By taking so many wrong turns, she found herself on the right track.

HEND ABEIDI

Lecturer at University of Benghazi

Malta

Brief description of your job/what are you working on right now:

I have been working as a lecturer since 2002. Recently, I am doing a PhD in chemistry at the University of Malta. My research is about pollution in Malta.

Have you always wanted to do the job you have now:

Yes, since I was a child.

What do you wish people knew about your job?

It is very interesting, useful and helpful to all, even for those who do not care about research or pollution.

What skills do you need most for your job?

Computer literacy is a crucial ability to have as I often use computers when carrying out research. You also need to have a lot of patience to follow new research first hand. Another important skill to have as a researcher is the ability to work in a team.

What's your favourite thing about your job:

Well, to be honest, I love each and every part of my job; starting with the creation of the research problem, then collecting samples, preparing the samples in the lab to be determined and, finally, discussing the results.

What were your favourite subjects at school?

Maths and sciences.

What inspired you to study STEAM subjects?

Reading about pollution and of course the increasing of pollution day after day inspired me to do something to help our world.

Training (university/college/apprenticeship)

Bachelor of chemistry and Master from University of Benghazi in Libya my country, Mphil



degree from University of Malta and recently I am working towards a PhD at the University of Malta as well.

What were you like at a young age:
I loved adventure and experiments.

What is your life-long dream?
To be a scientist.

Hobby:
Reading, swimming and cooking.

Favourite food:
All the traditional food.

What would your autobiography be called:
It might be successful.

RAISE
Raising awareness and interest in STEAM Employment



JEAN-PAUL GILES

Professor

Luxembourg



What did you study?
Electrical engineering

Why are you passionate about science?

Trying to understand our world a bit better during a life-long learning process represents for me one of the highest values of a well lived life. It's an attitude capable of developing the very best "in" us and giving us the potential of generating useful technical solutions.

Brief description of your job/what are you working on right now:

I develop and realise interactive scientific stations related to the topics of sound & acoustics, optics, electromagnetism and more! I also do mediation jobs as well such as developing and delivering hands-on workshops.

Have you always wanted to do the job you have now:

Probably yes, but at the beginning of my career there was no such opportunity. At that time, the idea of "Science Centers" just started at my latitudes.

I used to work in the production industry but my personal interest led me to keep on developing my electronic laboratory and astronomical observatory. Conferencing and scientific projects helped me going on in the direction of scientific applications.

What do you wish people knew about your job?

The contribution to the scientific world by doing useful interactive science stations.

Offering mediations to the visitors.

Meeting passionate people

Making scientific experiences accessible to the (young) novices and specialists alike (by mediations, discussions, workshops, ...).

Generating new concepts/ideas leading to original presentations/workshops of natural phenomena.

What's your favourite thing about your job:

The potential of an international and multidisciplinary melting-pot of passionate people in science and technology.

Developing new things and generating new concepts (and improving old concepts).

What inspired you?

Electronics can be experienced by people from different levels, and with different budgets

available. The possibilities that emerge when you assemble or programme electronic components are endless. The role that it plays in our daily lives and in science (by transmitting information or by the means of the technology of measurement, ...) is fundamental.

Training (university/college/apprenticeship)

University of Kaiserslautern

Bachelor and Master in Electrical engineering and Communication technology

What were you like at a young age?

Little boy questioning himself about atoms and the universe. Investing lots of time and money in reading and experimenting.

What were your favourite subjects at school?

Mathematic, Physics, Chemistry, Electronics

Hobby:

(Radio-)Astronomy, Electronics.

Favourite food:

Pancake

Weird fact:

I can "see" with my finger-tips in total darkness (to get a precision task done).

Skill/Party trick:

None

What would your autobiography be called:

My faith in science and in the dimension(s) beyond.

JUAN JOSÉ BONELLO

Lecturer

Malta

Brief description of your job/what are you working on right now:

I am currently a lecturer within the Institute of Applied Science at MCAST.

I mostly lecture units related to BSc (Hons) in Environmental Engineering

- units that deal with monitoring the environment, studying our impacts on the environment, etc. I am also supervising a number of students who are working on their dissertation, with the main theme being "Anthropogenic activities on water".



Have you always wanted to do the job you have now?

I always wanted to work within the environmental sector. Thus, as soon as I finished my BSc and my MSc I started working with an environmental monitoring company. The job was very interesting and rewarding. However, I had spent a few months teaching science as a post-graduate student and I liked the idea of learning and passing on knowledge to others. This is because even though I am a lecturer, I still learn, whether from my own research or from discussions with my students. I believe that learning is a continuous process and you can learn from anyone and from anything.

What do you wish people knew about your job?

Observing and (hopefully!) contributing to the development of your students is exceptionally rewarding. It makes all those sleepless night revising your students' work and answering emails at odd hours truly worth it.

What's your favourite thing about your job:

Communicating with students and sharing ideas with my colleagues on a number of topics, be it to embark on a new research project or to see how to help a particular student.

What inspired you?

A combination of things as well as people: As an environmental scientist I was flabbergasted how people polluted the environment, at times without even knowing, thus as a lecturer I am in an excellent position to promote and safeguard the environment. However, as an undergraduate and later on as a postgraduate I was lucky enough to have a number of tutors that were perfect role models and complemented one another and that made me realise the importance of passing knowledge onto others.

Training (university/college/apprenticeship)

BSc (Hons) Biology and Chemistry

MSc

MCST/EurOcean Internship Training at CESAM - University of Aveiro, Department of Biology, Aveiro, Portugal

What were you like at a young age?

I was quiet and always respectful to authority. But I was always competitive and ambitious, thus I always put my mind and heart into anything that I set out to do.

What were your favourite subjects at school?

All science subjects, but I also enjoyed studying different languages. I was always into sports, so PE (Physical Education) was also a subject that I enjoyed!

Hobby:

Diving; playing football and squash; hiking; reading (genre: Horror)

Favourite food:

Pan seared wild boar cooked medium to well in cranberry-red wine sauce and roasted potatoes on the side.

What would your autobiography be called:

“Magnum Opus” (ideally in a form of a graphic novel)

LEWIS HOU

Science & Arts Educator and Entrepreneur

United Kingdom

Brief description of your job/ what are you working on right now:

In my job I get to work with young people and different communities all across Scotland to explore science, arts and creativity together! This may be incorporating music and dance with the fiddle, running workshops or just having lots of chats with people and see what they are interested in learning more about whether it's about how music and dance is good for the brain or how languages reduce risk of developing dementia for example! Part of my job, as an entrepreneur, is then starting and developing projects with different people to help help make these things happen!

Have you always wanted to do the job you have now:

Definitely not. I've always wanted to try to understand and help people so when I went to university I thought I would be a clinical psychologist or social worker but I particularly enjoyed focusing on understanding the brain. I also loved being creative, playing traditional music and dancing too, but never thought it would be part of my job - I didn't start teaching myself the fiddle until I was 19 and in university actually! Now I have the absolute privilege to combine these things together and work in education and communities!

What do you wish people knew about your job?

The one downside to combining your hobbies and interests into your job is that it can sometimes be hard to stop doing it and it can easily take over your life. That doesn't have to be a bad thing as long as it's balanced with finding the time to slow down and take breaks and spend time looking after yourself and with friends and family, no matter how much you love something. I guess the other thing is that every day is a learning day, and I'm always learning about new research, different skills, musics and cultures, how to manage a social enterprise/company and certainly about myself too!

What's your favourite thing about your job:

No day is the same and I get to talk with so many fascinating and passionate people from all across Scotland, Europe and the world - I love that I get to travel a lot using my passions and hobbies, and share Scottish culture and science where I go!



What inspired you?

I came across a book "The Man Who Mistook His Wife For a Hat" by a neurologist Oliver Sacks who was not only a fantastic writer who really cared about people and communicated how deeply wonderful - and absurd/funny - the mind and brain could be! He wrote about music, art and creativity in the brain too and I was then hooked. When I took an Erasmus year in Montreal for university, I had the chance to do a project on music and the brain and that helped set me on my path of how to share this with schools and communities.

Training (university/college/apprenticeship):

I went to University of Edinburgh, originally to do psychology and philosophy, and started teaching science at festivals like Edinburgh International Science Festival part-time as well as playing for ceilidhs and discovered I really loved both of these things. When I graduated I had my first research post in neuroscience studying the shape of the brain with MRIs, but also started combining my love of ceilidhs and exploring science together as they both involve the spirit that everyone can join in if there is a welcoming atmosphere and clear instructions! That's how the social enterprise started and I now work on that full time!

What were your favourite subjects at school?

As well as music, I really loved biology, psychology and got to take philosophy too in school which I always enjoyed!

Hobby:

I love dancing!

Favourite food:

Lasagna.

Weird fact:

I have a 3D print of my own brain.

Skill/Party trick:

I'm pretty good at dabbing fast!

What would your autobiography be called:

Best laid plans of arts and science...

NEVILLE MAGRI

ICT Lecturer

Malta



Brief description of your job/what are you working on right now:

My main role is lecturing and mentoring in the field of networking and security for degree level students in the ICT institute. Apart from these daily tasks, I am also responsible for developing learning content and units with the aim of ensuring that the technical content being taught is in line with the industry. This is extremely important since it is highly dynamic in nature due to continuous changes and advancements in technology.

At the moment I am also preparing to finalize the last unit of a professional level industry certification in networking “CCNP Routing and Switching”. As a result of this commitment, I have attained more technical knowledge and skills which apart from gaining personal satisfaction, I am pleased that students are also gaining a much more engaging learning experience.

Have you always wanted to do the job you have now?

Before lecturing at MCAST, I had been working in the IT industry for 6 years. However my main inspiration was always to teach and impart knowledge to others within an educational setting. As a result, my current role is definitely a motivating factor.

What do you wish people knew about your job?

Statistically, more men tend to build a career in Information Technology especially in the field of networking. Unfortunately this could be due to a false perception by the general public where they often generalize the role to solely wire network infrastructures. There is definitely a lot more than one could imagine as the area is quite vast, and with more awareness I’m confident that more women can essentially become interested in establishing a professional career within this field.

What’s your favourite thing about your job:

My favorite thing about my job is that every day it poses a different challenge. Although there might be instances where you have to teach the same units to a number of different classes, every individual is unique which ultimately makes it more intriguing especially when demonstrating active participation in class. Furthermore, since IT is constantly changing, it is practically impossible to end up in a routine, which makes it even more engaging.

What inspired you?

IT has always interested me, and the fact that it is constantly changing and more technologies are emerging, it makes me more curious and keen to learn and understand how they work, the role they play and their impact on modern societies.

Training (university/college/apprenticeship)

Middlesex University

Matriculation Certificate Course at MCAST Business and Commerce Institute

What were you like at a young age?

At a young age I used to focus a lot on studying with the intent to achieve good grades. However, at the cost of lacking in sports. Presently I am definitely making up for that loss by participating in a number of sporting activities.

What were your favourite subjects at school?

Computing, Mathematics and Physics.

Hobby:

Gaming amongst friends in LAN parties, tennis, cycling and playing the trumpet.

Favourite food:

Chicken and Pasta.

What would your autobiography be called:

My lifelong journey

SIMON PHILIPPO

Research Scientist & Curator

Luxembourg

What did you study?

Geology and mineralogy

Why are you passionate about science?

I like to observe the nature and particularly the structures, colour and form changes. I try to understand them... and my biggest motivation is to discover something new.

Brief description of your job/what are you working on right now:

As a curator in a museum, the job is very varied: from managing the collection to studying each piece of it. Some scientific works can be used to increase the collection and its scientific value; collections allow us to have access to some geological localities which are not open anymore; creation of exhibits allow us to use our samples and knowledge to educate visitors.

At the moment, I'm working on specimens found 40 years ago. They were placed in the collections with a first determination. After reexamination, it appeared that it is a new species for Science. We are now describing completely the species to introduce it as a valid species... Here I meet my biggest motivation: Discovering.

Have you always wanted to do the job you have now:

As a child, I was a mineral collector. During my college years, geology was one of my favourite points of interest, especially for its naturalist approach. At university, a specialization in mineralogy was my goal.

My job is a perfect match of the knowledge acquired at university and my passion as a child. I never knew before that this job was possible.

What do you wish people knew about your job?

To be a curator in a museum is not only to put sample with labels in a storage. There is a lot of scientific and historic work before and after the entry of the specimens in the museum collections. To be a scientist in a museum is to preserve specimens for the next generations in better conditions, with the best description based on scientific knowledge.

What's your favourite thing about your job:

Discover: discovering new occurrences for a site we are studying; Recovering information of



a specimen by cross cutting all the existing informations; discovering a new form or colour for a well-known species; ... and the Holy Grail is to discover new mineral species.

What inspired you?

My first inspiration was the observation of the beauty of nature. I was always attracted by its geometrical forms and colours. A scientific field which combines natural beauty, geometrical shapes and colours is Mineralogy.

Training (university/college/apprenticeship)

College at the College Notre Dame de la Tombe à Kain (Tournai, Belgium)

Bachelor of Geological Sciences at the University Notre-Dame de la Paix – Namur (Belgium)

Master of Geological Sciences at the University of Louvain - Louvain-la-Neuve (Belgium)

PhD thesis in applied mineralogy at the University of Louvain - Louvain-la-Neuve (Belgium) into an European project

post-doctoral works at the Natural History Museum London

What were you like at a young age?

A bad student at college: professors said to me all the time that I was a lazy student. My only interest at that period was sports and observing nature. The lessons at college did not grab my attention or interest me.

What were your favourite subjects at school?

Geography, chemistry, physics and sport.

Hobby:

Western riding

Favourite food:

Romanian food

Weird fact:

Looking like Vin Diesel but with a scientific eye of the world.

Skill/Party trick:

Amazingly intelligent with a big general knowledge.

What would your autobiography be called:

“How to scrap to find the best of my Life”

SOPHIE KLECKER

Doctoral Candidate

Luxembourg

What did you study?

BSc in mechanical engineering
MSc in biomedical engineering
(biomechanics)

Why are you passionate about science?

I think it is just amazing how you can discover and learn more and more to yet only find out that there is even more to discover and learn. But the first reason I am passionate about science, the reason I chose scientific studies is how science can help you understand the world around you. How does a car/a plane/a boat/a toaster work? Why do broken legs heal? Where does rain come from? ...

Brief description of your job/what are you working on right now:

I'm working towards the next industrial revolution: developing robot control algorithms which combine the robustness of machines with the learning adaptability of humans for the automation of un-ergonomic manufacturing tasks.

Have you always wanted to do the job you have now:

No: from playschool to the age of 25 when I started my current position, my dream jobs included i.a. air hostess, inventor, journalist and teacher.

What do you wish people knew about your job?

As doctoral candidates we are neither well-paid soon-to-be-Nobel laureates nor lazy students who just do not want to start working quite yet.

What's your favourite thing about your job:

The freedom to dive deeper into different topics (ranging from artificial intelligence over programming languages to machine ethics) and learn something new basically every day.

What inspired you?

To pursue a PhD?! Contributing to the improvement of society and the world, but also learning new things and seeing my name as an author on a scientific paper :)

Training (university/college/apprenticeship)

Delft University of Technology, Université de Liège, University of Luxembourg.



What were you like at a young age?

Curious and not interested in spending more than 15 minutes on one task, I was a nightmare for my kindergarten teacher.

What were your favourite subjects at school?

Physics and philosophy

Hobby:

Travelling, baking, yoga and ballet.

Favourite food:

Fruit and cake.

Weird fact:

I had to pass my driving licence four times.

Skill/Party trick:

I enter the party on a unicycle.

What would your autobiography be called:

I don't know yet :)

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Raising awareness and interest in STEAM Employment

Activities

Inspiring the next generation of
STEM professionals





RAISE

Raising awareness and interest in STEAM Employment

MAKE A COLLAGE

Target group	ages 8-12 ages 12-18
Objective(s)	To reveal some of the gender biases that participants see, hear and experience all the time.
Summary	Make participants aware of their own biases and of the biases of the general public, so they can address them in their everyday lives. The aim of this activity is to be thought-provocative.
Materials	<ul style="list-style-type: none"> • Copies of typical girls' boys' and gender-neutral science magazines, • sheets of A4 or A3 paper, • scissors & glue • computer with sound and screen, • flipchart with markers.
Preparation	<ul style="list-style-type: none"> • Take time to gather magazines and be critical about which magazine to use, some could be more interesting than others. • • Split up students into groups of 2 to 4 participants per table and give them a variety of magazines (make sure to have a diversity of girl/boy/science/gender neutral magazines).
Duration	45 minutes

Description

1. Introduction (2 min)

Tell the students that they are going to make a collage. They will be working in pairs or small groups. Tell them to go through the magazines, focusing on the pictures, photos and illustrations. Decide which pairs or groups will use which magazines. Ensure that there are at least two collages of cuttings from each category of magazine. Tell the students to make their collages. They can cut pictures, photos and illustrations from the magazines and paste them on to sheets of A4 or A3 paper.

2. Main part (20 min)

Give the groups 20 minutes (5 minutes for each kind of magazine) to go through the magazines on their table. Each group takes notes about what they see and what strikes them and subsequently make a collage based on their notes.

3. Reflection & conclusion (20 min)
 - a. Ask the groups to compare their collages.
 - Are there differences between them?
 - In behaviour?
 - In mood?
 - In attitude?
 - In use of colour?
 - Other striking characteristics? For example, positive/negative features?
 - What are the differences?
 - Why are there differences?
 - Do the students think that this influences them?
 - b. Discuss this with the whole group.



WHO IS THE SCIENTIST?

Target group	ages 8-12 ages 12-18
Objective(s)	To tackle prejudice and show that we often judge people regarding their appearance and gender and from established social perspectives.
Summary	The activity is designed to stimulate educators to consider their gender biases and whether these influence their teaching.
Materials	<ul style="list-style-type: none">• Photos of persons of different ages and gender- Example: Photos of scientists when they were still kids.• Rope• Pegs
Preparation	<ul style="list-style-type: none">• Choosing and printing the photos.• Setting up the photos. Hanging the rope and fastening photos on it.
Duration	10 - 20 minutes

Description

The activity is a good way to stimulate participants to think about their gender stereotypes and about gender balance in general.

When asking participants “which of the kids in the photographs became a scientist” they tend to pick the male candidates. By asking participants to explain their specific choice of person, they are forced to think about their decision and also to reflect on the reasons for their choices.

The facilitator of the conversation can introduce statistical data about women in science (local and world) into the conversation. The activity is also a good opportunity to discuss the theoretical background of gender balance. Our society often expects science to be a male occupation.

Discussion in small groups makes people more at ease to share their opinions and to express their existing gender biases.



RAISE

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FISHBOWL DEBATE

Target group	ages 8-12
Objective(s)	This activity aims to effectively engage students and foster dynamic group discussion and active participation among students on STEM Careers.
Summary	The activities consist of lesson plans which can be used by teachers, home schoolers and science communicators.
Materials	<ul style="list-style-type: none"> • Large room with chairs
Preparation	<ul style="list-style-type: none"> • Group of students (9 to 12 students) • Facilitator (Teacher/science communicator) • Rapporteur (Student representative)
Duration	60 minutes

Description

1. Facilitator to introduce the topic of stereotypes and job roles by presenting a series of testimonials (example: in the form of a PowerPoint presentation) from current students or professionals attending a Tertiary Education institution or a local organisation, who work or study in the STEM fields.
2. Arrange chairs in a circle for the small group, making sure to include one or two empty chairs.
3. Seat the participants and introduce the session.
4. Assign roles to each student in a way to encourage a gender lens exercise. This will encourage students to think of a gender lens as though putting on spectacles. Out of one lens of the spectacles, they should focus on the participation, needs and realities of women in STEM Careers. Out of the other lens, students should focus on the participation, needs and realities of men in STEM Careers.
5. Encourage students to discuss. The following questions may assist the discussion process:
 - Is this only about participation of women?
 - Why does it matter?
 - Equality versus equity: what's the difference?
 - Gender lens checklists
 - Culture and Religion
 - Societal expectations and Social Roles
 - Governance – Do organizations include women and girls as active decision-makers?
6. Debrief by calling on a few groups to summarize their discussions.



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CHARADE GAME

Target group	ages 12-18
Objective(s)	This activity aims to positively influence the way students look at STEAM careers and the stereotypes associated with such careers. Furthermore, it highlights the importance of eliminating stereotypes and to provide career guidance free from bias.
Summary	This activity consists of charades combined with a quiz. Initially, the students try to guess the pictures of STEAM professionals together with keywords on cards by watching other students act them out. Pictures on cards, such as the one indicated in Figure 1, has to show photos of STEAM professionals that de-stereotype stereotypes. Furthermore, the quiz aims to enhance the students' knowledge and reduce associated stereotypes.
Materials	<ul style="list-style-type: none"> • Flash Cards • Large room • Stopwatch or other timing device • Notepad and pencil for scorekeeping • Blank slips of paper
Preparation	<ul style="list-style-type: none"> • Prepare a series of flash cards which graphically show different real STEAM professions. • Prepare a number of questions related with that particular STEAM profession (example: what is needed academically to choose that profession), stereotypes associated it with it and how to eliminate them.
Duration	10 - 20 minutes



Picture: Example of a flash card (Figure 1)

Description

1. Divide the students (9 to 12 students) into two teams, preferably of equal size.
2. Teachers or science communicator acts as the neutral timekeeper/scorekeeper, or pick members from each team to take turns.
3. Review the gestures and hand signals and invent any others deemed appropriate.
4. Each student then 'acts' out what is written on their card.
5. As rules, you can tell your students that they cannot speak, but pointing and other gestures are permitted.
6. The other students try to figure out what is written on the card.
7. Once the students figure out the STEAM profession, the teacher or science communicator asks students the pre-prepared questions of choice related to that particular profession.

4STEAM

Link to Resource	https://raiseprojecteu.files.wordpress.com/2020/01/4steam-workshop-plan-1.pdf
Target group	ages 8-12
Objective(s)	<ul style="list-style-type: none"> • Familiarize with different STEAM professions • Learn about the skills related to different STEAM professions • Learn about the 21st century skills associated with STEAM • Get to know real-life profiles of STEAM professionals • Learn to search for and integrate information • Integrate digital media into the learning process
Summary	<p>4STEAM is a card game based on the concept of Quartet. The goal is to collect as many cards as possible – or ideally all. Each card in this game is based on the profile of one STEAM professional from Luxembourg while the game can easily be extended and complemented with more examples from all over the world. While playing 4STEAM, students discover in a playful manner various STEAM careers and the respective skill sets associated with the job with a strong emphasis on 21st century skills.</p> <p>Example:</p> <div style="display: flex; justify-content: space-around;"> <div> </div> <div> </div> </div> <p>Each tile comes with basic information on the front required to play the game. A full interview from each STEAM professional is included into the resource pack (please see links in the materials section).</p>

Materials	<ul style="list-style-type: none"> • Pintables of the tiles – choose to print 4 slides per page to get reasonably sized cards - https://raise-projecteu.files.wordpress.com/2020/01/4steam_tiles_vf_2-1.pptx • Tile templates for game extension - https://raise-projecteu.files.wordpress.com/2020/01/4steam_tiles_template_vf-1.pptx • Full interviews with all STEAM professionals presented in the game - https://raiseprojecteu.files.wordpress.com/2020/01/4steam_full-interview_vf-1.pdf <p>Extra material:</p> <ul style="list-style-type: none"> • PC with PowerPoint installed • Printer • Thick white paper to print tiles • Scissors to cut out the tiles • For game extension: PC/tablet with internet access and/or printed or digital literature about STEM professionals.
Preparation	<ul style="list-style-type: none"> • Print the tiles on thick paper. • Bring scissors
Duration	60 minutes for playing the game 60 minutes for extension of the game

Description

This card game is based on the principle of “Quartet”. Currently there are 13 cards in the deck while the game can readily be played and extended.

Each card represents one person working in a STEAM field and lists the respective skill sets of hard and soft skills required in his/her job such as f. ex: knowledge in biology/mathematics, creativity, self-organization etc. Each skill is ranked with a number from 0-5 where 0 means that this skill is not at all required in the job and 5 means the skill is heavily required.

To start, cards are shuffled and dealt face down between 2-3 players. Players hold their stack in a way that the upper card is visible to the owner. The player with the largest shoe size starts. From this upper card he/she chooses one of the listed skills and speaks out the respective value (1-5). Without showing their uppermost card - the other players speak out the value for that respective skill. The player with the highest value collects the cards from the other players and puts them at the bottom of his/her stack and continues the game. If there are two or more players with the same value for a given characteristic, the person on the left of the latest player chooses yet another characteristic on his/her card and the

comparison with the others continues. The player with the highest value collects the cards from the other players and puts them at the bottom of his/her stack and continues the game.

The game is over when one player has collected all cards. The game can be stopped at any time and the person with the most cards wins the game.

The game can be played either with ready made tiles or the activity can be made more engaging as pupils will create their own cards f.ex. one card per pupil representing STEAM professionals of their own choice where information can be acquired through online research or by carrying out interviews with local STEAM professionals and creating the respective cards. Collected information is then used to create the backside of the cards.

This will induce some nice discussion about STEAM & 21st century skills required for these jobs amongst pupils and should be facilitated by the teachers. The idea is that pupils eventually have familiarized with the lives / profiles / backgrounds of various kinds of STEAM professionals. For each STEAM professional in the game, a full detailed interview is available in the resource, which allows teachers to present one or more persons in more detail to their class and discuss their profession and required skills.



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STEAMory

Link to Resource	https://raiseprojecteu.files.wordpress.com/2020/01/steamory-detailed-workshop-plan.pdf
Target group	ages 8-14
Objective(s)	<ul style="list-style-type: none"> • Familiarize with professions related to Science, Technology, Engineering, Mathematics (STEM) • Learn and discuss about discoveries in the STEM field and the persons behind • Facilitate discussions about stereotypes in STEM professions • Integrate digital media into the learning process • Learn to collect and summarize information
Summary	<p>STEAMory is a memory card game where the tiles show role-models from different STEM professions.</p> <p>The goal of the game is to find role-model couples whose professions match.</p> <p>Example: Particle physicist</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid green; padding: 5px; text-align: center;"> <p>Nuclear Physicist</p>  <p>Marie Curie 1867-1934</p> <p><small>Marie Curie was born in Poland. Together with her husband Pierre Curie she discovered the chemical elements radium and polonium which are both radioactive. She won two Nobel Prizes.</small></p> </div> <div style="border: 1px solid green; padding: 5px; text-align: center;"> <p>Nuclear Physicist</p>  <p>Sau Lan Wu 1940-</p> <p><small>Sau Lan was born in Hong Kong and, as a young scientist, she challenged herself to be involved in at least 3 major scientific discoveries. Among others, she contributed to the detection of the Higgs boson, the particle that gives matter mass.</small></p> </div> </div> <p>Each tile comes with a brief description of the person, which is presented, highlighting his/her achievements.</p> <p>A set of tiles 14 role-model tile pairs is available with the resource pack while the STEAMory game can be further be extended. Pupils can easily create new tiles with STEM professional pairs of their choice.</p>

Materials	<ul style="list-style-type: none"> • Printables of the tiles - choose to print 6 slides per page to get reasonably sized tiles - https://raiseprojecteu.files.wordpress.com/2020/01/stememory_tiles_vf.pptx • Tile templates for game extension- https://raiseprojecteu.files.wordpress.com/2020/01/stememory_tiles_template_vf.pptx <p>Extra material:</p> <ul style="list-style-type: none"> • PC with PowerPoint installed • Printer • Thick white paper to print tiles • Scissors to cut out the tiles • For game extension: PC/tablet with internet access and/or printed or digital literature about STEM professionals.
Preparation	<ul style="list-style-type: none"> • Print the tiles on thick paper • Bring scissors to cut out the tiles with pupils • For game extension: PC or tablet(s) and/or literature if the game will be extended
Duration	<p>60 minutes for playing the game</p> <p>60 minutes for extension of the game</p>

Description

The goal of this game is to collect matching pairs of STEM professionals i.e. pairs of people with the same profession. The resources come with 14 ready-made pairs, teachers and pupils are encouraged to extend the game.

To start, the tiles are placed face down onto a table. The person with the smallest feet can start. He turns around two cards of his choice and makes sure everybody around the table sees the frontside of the tile. If the pair matches, the player keeps the pair and presents the others the two persons. After he can play again. If the two tiles don't match, the next person can play. The game is over when no more tiles are on the tables i.e. when all pairs were uncovered. The person with most pairs at hand wins the game.

One possible scenario of how you can play the game is the following: The teacher/educator/science communicator introduces the activity and explains the basic rules. She/he makes groups of 3-4 people and each group receives a stack of printed STEAMory tiles. The groups play the game according to the rules where students present and discuss the respective STEM professionals when finding matching pairs. At the end, all students gather and the teacher/educator/science communicator/... facilitates a discussion about stereotypes in STEM disciplines. Ideally, he/she includes a before/after activity to test if the activity had an impact on pupils related to STEM stereotypes. Such an activity could for example be drawing a scientist before doing the activity and one after doing the activity to see if the perception has changed.

WHAT MAKES A SCIENTIST?

Link to Resource	https://raiseprojecteu.files.wordpress.com/2020/01/what-makes-a-scientist-first-level-lesson-outline.pdf
Target group	ages 6-8
Objective(s)	<ul style="list-style-type: none"> • To discuss what a scientist is • To discuss the diversity in the sciences and the jobs that exist • To discuss who can be a scientist and why • To begin approaching what a stereotype is • To allow pupils to question their own ideas
Summary	This lesson uses a series of activities and discussions to introduce the idea of stereotypes surrounding STEM careers. This includes discussion about what makes a scientist and the diversity in the sciences themselves.
Materials	<p>“Robyn and the Robin” Short story - https://raiseprojecteu.files.wordpress.com/2020/01/robyn-and-the-robin-gsc_raise.pdf</p> <p>Draw a Scientist:</p> <ul style="list-style-type: none"> - Paper - Colouring pens/pencils <p>Picture sorting activity:</p> <ul style="list-style-type: none"> - 1x set of science pictures per group - https://raiseprojecteu.files.wordpress.com/2020/01/sorting-pictures-activity.zip - 1x set of headings per group <p>Agree/Disagree activity:</p> <ul style="list-style-type: none"> - 1 x set of headings (agree/disagree or Yes /No/Not sure) - 1 x pack of discussion questions. These could also be taken from discussions as part of previous activity <p>Language Key</p> <ul style="list-style-type: none"> - Purple font denotes instructions and suggested questions - Green font denotes explanations you can give to the pupils - Black font denotes general information for your own knowledge

Preparation	Agree/Disagree activity: 1 x set of headings (agree/disagree or Yes /No/Not sure) 1 x pack of discussion questions
Duration	60 minutes

Description

All resources linked with this activity can be downloaded from <https://raiseprojecteu.com/resources/>

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STEREOTYPICAL SCIENCE

Link to Resource	https://raiseprojecteu.files.wordpress.com/2020/01/sterotypical-science-second-level-lesson.pdf
Target group	ages 9-11
Objective(s)	By the end of the lesson, pupils should have a better awareness and understanding of: <ul style="list-style-type: none"> • What a stereotype is • Negative stereotypes they may hold and the impact these can have. • Diversity in who can become a scientist • Unconscious biases and how to tackle them
Summary	This lesson aims to use a series of activities and discussions to break down negative stereotypes surrounding STEM careers. This includes discussion about who scientists are/can be and the diversity in the sciences themselves.
Materials	Profile Matching Activity: <ul style="list-style-type: none"> • 1x set of scientist pictures per group • 1x set of scientist biographies • https://raiseprojecteu.files.wordpress.com/2020/01/raise-scientist-profiles.pdf • https://raiseprojecteu.files.wordpress.com/2020/01/raise-profiles-answers-1.pdf
Preparation	Agree/Disagree activity: <ul style="list-style-type: none"> • 1 x set of headings (agree/disagree or Yes /No/ Not sure) • 1 x pack of discussion questions Discussion: <ul style="list-style-type: none"> • Discussion statements
Duration	60 minutes

Description

All resources linked with this activity, including glossary and answer document can be downloaded from <https://raiseprojecteu.com/resources/>



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BREAKING BARRIERS

Link to Resource	https://raiseprojecteu.files.wordpress.com/2020/01/breaking-barriers-workshop-plan-1.pdf
Subtitle	De-Stereotyping Stereotypes in STEM careers
Target group	ages 8-12 ages 12-18
Objective(s)	<p>During the activity, participants will</p> <ul style="list-style-type: none"> • Draw a STEM professional and describe what makes someone a STEM professional to understand what participants' think a STEM professional looks like/is. • Discuss whether they agree or disagree with statements related to Stereotypes and STEM careers. • Understand what the word 'stereotype' means. • Work in groups to come up with a list of STEM careers. • Become familiar with new jobs in the STEM field. • Become familiar with STEM professionals working in Malta.
Summary	<p>This workshop consists of 5 activities in total:</p> <ul style="list-style-type: none"> • Introduction: Explain what STEM stands for. • Activity 1: Draw a STEM professional + Use adjectives to describe STEM professionals • Activity 2: Use statements to spark a debate on stereotypes • Activity 3: Become more aware of the STEM careers that participants are aware of • Activity 4: Introduce participants to Maltese Professionals working in the STEM field, who can inspire participants. The profiles highlight the skills needed in each job rather than the academic or technical knowledge needed. The activity can also be used to introduce participants to a number of careers which they might not have been aware of. • Activity 5: Evaluation; re-draw STEM professional and re-write adjectives.

Materials	<ul style="list-style-type: none"> • Blank Sheets of Paper or Tablets • Pencil Colours/Crayons • Cut outs for Activity 2 • Cut outs for Activity 4
Preparation	<ul style="list-style-type: none"> • Prepare Strongly Agree, Agree, Disagree and Strongly Disagree Cards for Activity 2 • Cut out STEM profiles in Activity 4 • Cut out STEM photos in Activity 4 • When cutting photos and stem profiles, do not include the names of the individuals – leave them anonymous. • Prepare PPT slides for the profiles that you decide to give out to your participants. The PPT should be used to match the photos with the profiles and with the professionals' names.
Duration	<p>The full workshop will take approx. 1.5-2 hours.</p> <p>For a shorter workshop, read out less statements from Activity 2, and give out less profiles in Activity 4.</p> <p>Another option can be to split up the activities on two separate days</p> <ul style="list-style-type: none"> • 1 hour- Introduction, Activity 1 & 2 • 1 hour – Activity 3 & 4, Evaluation

Description

Printable photos and profiles can be found on <https://raiseprojecteu.com/resources/>

SCIENCE CAREER STORYTIME

Link to Resource	https://raiseprojecteu.files.wordpress.com/2020/01/science-career-storytime-detailed-plan.pdf
Subtitle	The Biologist , The Engineer, The Chemist and The Teacher
Target group	ages 4-7
Objective(s)	<ul style="list-style-type: none"> • To help children identify with characters in the stories related to STEM careers (Science, Technology, Engineering and Mathematics) • To humanise scientists and professionals working in the STEM field • Engage children by participating in STEM-inspired activities
Summary	<p>This resource is designed to facilitate the reading of stories about people who work in STEM fields. These individuals are just like any other person, with families, friends and hobbies who simply have a passion for science, are doing their own part to contribute to this world with their skills, and who hope to inspire children to one day follow in their footsteps.</p> <p>Following the reading of the story/ies, simple STEM activities have been provided to build on the narrative and to compliment the skills and activities that such a career might entail at the most basic of competences.</p>
Materials	<p>The resource includes:</p> <ul style="list-style-type: none"> • Story of a STEM professional • Illustrated image of professional to compliment the story • Activity Guide related to story
Preparation	<ul style="list-style-type: none"> • Time to purchase and prepare resources for hands-on activities • Setting up a Storytelling Space such as an open space with cushions.
Duration	60 minutes

Description

1. Set up a space where everyone can listen to you reading the story.
2. Show children one of the illustrations of the STEM professionals in the storytelling pack.
3. Ask them to notice things in the image and to try and guess who the story is about.
4. Ask the children what they think that person does or likes.
5. Read through the story with your class or group.
6. Follow up the story with a hands-on activity inspired by the character in the story.

Illustrations can be found on <https://raiseprojecteu.com/resources/>

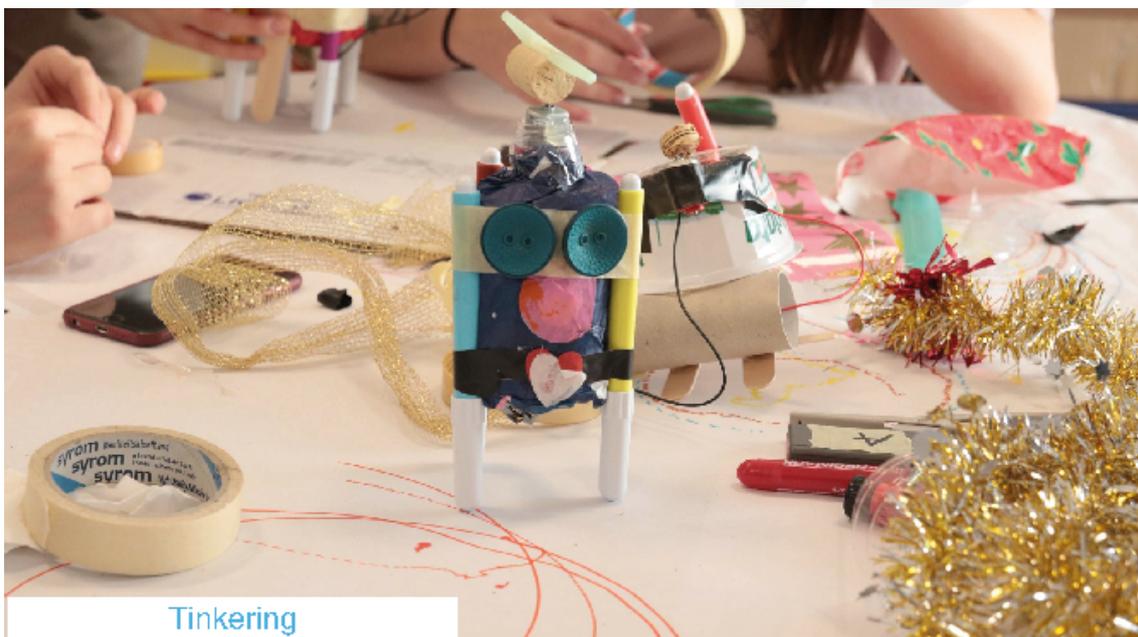
BECOME AN INVENTOR USING TINKERING

Subtitle	Disassemble a computer and build your own little robot
Target group	ages 8-12
Objective(s)	<p>Main objectives:</p> <ul style="list-style-type: none"> • Get a basic understanding of how simple objects can be used to create a little robot. • Understand how simple circuits works, perform basic engineering tasks. <p>This activity also contributes to de-stereotype three main stereotypes in science and particularly in IT-related activities. Thus, through the activity, students should be encouraged to recognise that:</p> <ul style="list-style-type: none"> • School dropout teenagers can still increase their science capital • School performance is not an indicator of a successful career in science • Gender is not an obstacle in pursuing a scientific career
Summary	<p>The aim of this activity is to empower students to perform simple IT tasks that show them how coding, or understanding how a computer works, are not so complex as they might expect.</p> <p>The activity can be composed of several sessions combining Scratch, disassembling and reassembling computers, up to building a robot using tinkering.</p> <p>Here we describe one session, focused on tinkering, and explain how this can be complemented with coding or disassembling/assembling a computer.</p>
Materials	<p>Typical tinkering material such as pens, cans, markers, rubber bands, Snap Circuits, lego, magnets, old electronics and items to take apart, batteries, wires, LEDs, play dough, tinfoil, paper, scissors, paper tubes, tooth picks, cups, clips, tape, glue, stapler, string, popsicle sticks, straws, egg cartons, ruler, wood blocks, etc. If available, also provide simple robotics kits.</p>

Preparation	<ul style="list-style-type: none"> • Set up a big table with all the above-mentioned materials available. • Prepare an introductory presentation, where you focus on explaining the objectives of the activity and making sure that they are clearly understandable for all participants.
Duration	60 minutes

Description

- This activity needs at least one facilitator (possibly more, depending on the number of participants).
- The facilitator starts by explaining how a simple robot can be built using very basic objects such as those available on the table.
- The facilitator gives students a “challenge”. I.e. by using what is available, they should try to create a “robot” that performs a specific task. For example, the robot should “walk” (move in different directions) following a specific path.
- Students are then given a set amount of time to come up with a solution. They can work individually or in pairs/groups.
- The facilitators walk around tables and help students understand the science behind what they are creating, as well as support them to overcome challenges when they are facing difficulties.
- At the end of the activities, all students show what they have created and share comments on them.





SUGGESTED ADDITIONAL ACTIVITIES:

Learn how to code with Scratch:

Scratch can be used by students to code their own interactive stories, animations and games. This programme is free of charge and includes block programming features.

Link to site: scratch.mit.edu

- This is a simple activity that can be done with students of the same age group.
- It has similar objectives as the previous one, as it helps students understand how coding can be something easy and accessible and it allows them to create for example simple videogames of their own.
- Students feel empowered by learning how to use a programme that is normally used by researchers in their “complex” research activities.
- For this activity you will need laptops for each student, Scratch installed on them, and an experienced facilitator who introduces the topic and helps them learn how to use basic commands.

Machine Learning:

This website is a free tool which can be used to introduce machine learning through a hands-on experience.

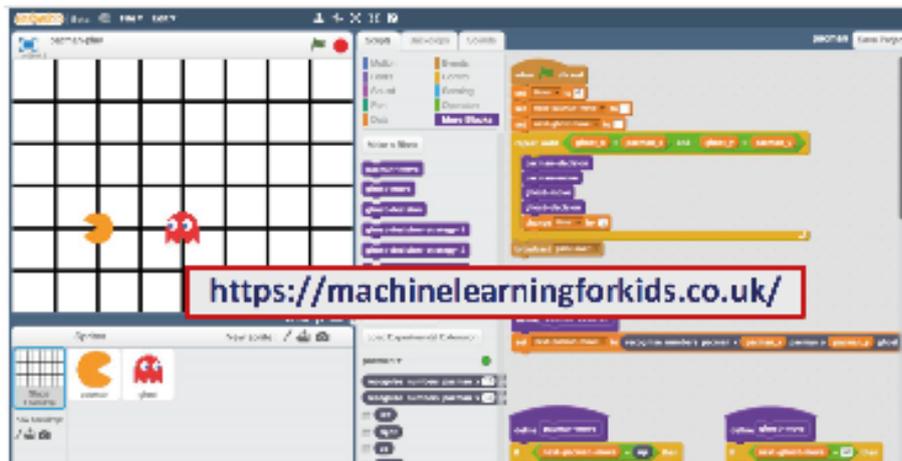
Link to site: machinelearningforkids.co.uk



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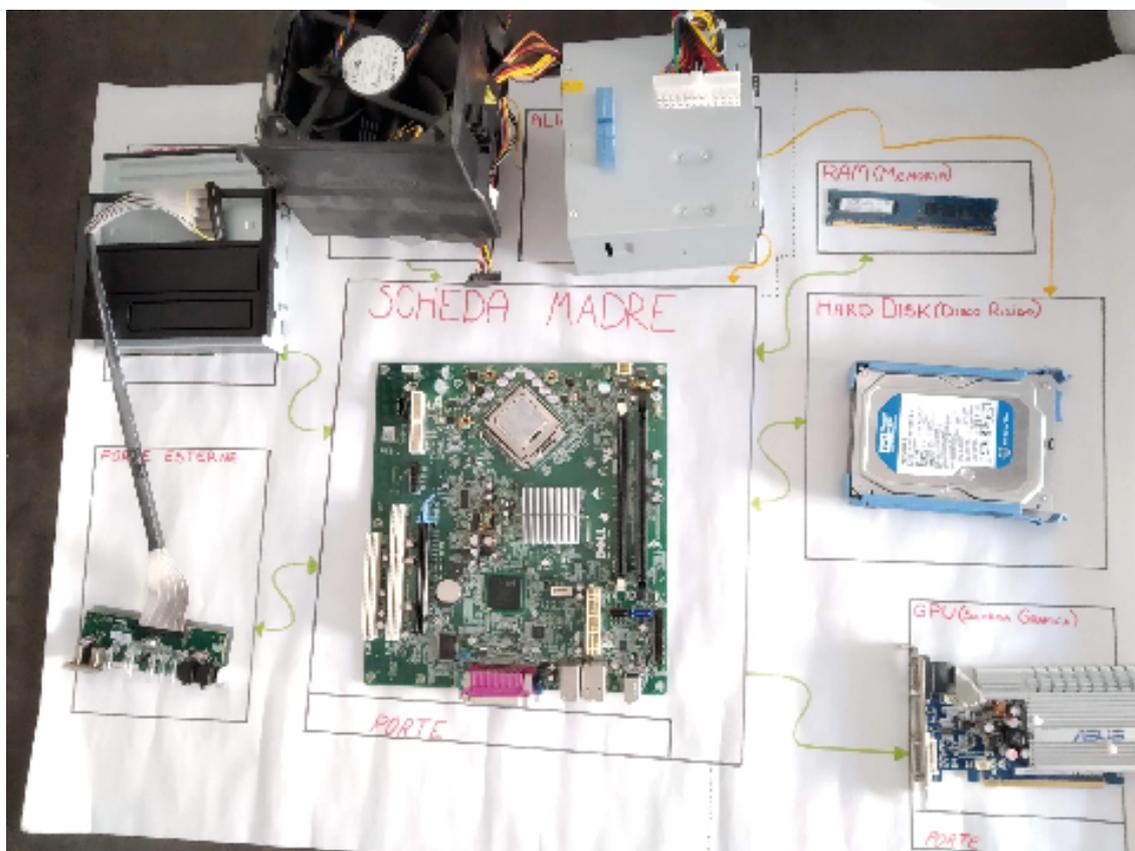
Scratch + Machine learning



Learn how to assemble and disassemble a computer.

Similarly to the previous ones, this activity makes IT more understandable and accessible to all ages.

Through the moderation of an experienced facilitator, the core idea is to allow students to open up a computer/laptop, take its core parts apart, and reassemble it on a large piece of paper, while understanding what each part does and how they are connected to each other.





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DISCOVER THE UNIVERSE THROUGH 5 SENSES

Link to resource	https://raiseprojecteu.files.wordpress.com/2020/01/images-for-inspiration.pdf
Subtitle	See, hear, smell, taste and touch the universe
Target group	ages 4-7
Objective(s)	<ul style="list-style-type: none"> • Use our five senses to understand the universe and relate it to things we can touch or smell, etc. here on Earth. • Find out what researchers know about the universe, and what they are still trying to find out. • Get a feeling of the complexity and challenges of observing and understanding something very far away from us.
Summary	The aim of this activity is to explore the universe and get a better understanding of what we know about it, by making use of our five senses. In this way, something usually very abstract and far away from us becomes something that we can relate to what we experience every day, through vision, hearing, smell, taste and touching.
Materials	<p>The activity requires:</p> <ul style="list-style-type: none"> • SIGHT - cards with images of the universe • TOUCH - exploring in a closed box (with a net inside), with a small hole big enough for kids to put their hands in it but not for seeing what is inside • TASTE – raspberries, that is what the universe tastes like • SMELL – small amounts of rum in glasses – that is what the universe smells like • HEARING - noise of the universe from headphones • Power point presentation with images and explanations.
Preparation	Set up all five sensorial activities, possibly at different tables, so that the children can move around from one activity to the other, while following explanations. You will also need a screen for power point presentation.
Duration	60 minutes

Description

This activity is usually facilitated by an astrophysics researcher from SISSA research centre but you do not need to be an astrophysics researcher to do this activity with your students! Below you can find a description of how the researcher usually carries out the session as an inspiration.

She starts by showing an image of herself as a kid at school and explaining how curious she was about the universe and the stars around us, and how mysterious that was for her. She explains how actually some of what we can find in the universe can be related to what we experience on earth.

With the help of simple power point slides, she then leads children through a journey of discovery, that usually starts with 'SEE' (showing good quality images of the universe that are available on a table for children to take, observe, discuss) and explaining what are the best ways to observe the universe from earth (for example, with a telescope in a place where there isn't too much light).

The second part is about 'TASTE', explaining how scientists, by analysing components of the Milky Way have discovered that if we could taste it, it would taste like raspberries, and inviting children to eat raspberries available on a table.

The third activity is about 'SMELL', explaining how scientists have been analysing chemical components of the space in our galaxy, and they think that if we could smell it, it would smell like rum – children are invited to smell little amounts of rum that are in glasses on a table.

The fourth activity is 'HEAR', and the facilitator explain that although in movies we often see and hear big noisy explosions happening in space, this is not what we would hear if we were in the middle of the space, and it would actually be quite the opposite. Students are invited to wear headphones connected to a laptop and listen to the sound of the universe, and be surprised by how calm and relaxing that is.

Finally, the last activity is 'TOUCH'. Students are invited to put their hands into a box and feel the pattern inside (a net). The astrophysicist explains that the universe's texture could feel and look a lot like a net (by eventually using a high resolution image of the universe for comparison), and explaining that "particles" of matter in the universe group together in a way that resembles long filaments that keep galaxies together (similar to how a fishermen's net keeps fish trapped inside). At the end of the activity, students can ask questions and walk around.



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