

DESTINATION

STEM

Destination:

Green Careers



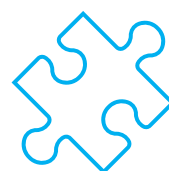
Articles, interviews, and ideas to

help you choose your future green career.

Careers awareness resource for young people featuring STEM related
Careers content. Suitable for 11–18-year-olds.

Content

Introduction	2
What do we mean by Green Careers?	3
Choose Plant Life for a Sustainable Future	4
Zero Emission Energy From the Heat Beneath Our Feet	8
How do you deal with 20 Million Tonnes of suffocating seaweed?	12
My life and work in the UK: exploring air quality through the eyes of a young graduate engineer.	16
Protecting a Scottish town, its businesses and residents from river	21
Plant Health Heroes – keeping UK plants healthy	24
STEM Challenge	28
Useful information and resources	29
Message from STEM Learning	31



Articles and interviews are taken from recent editions of Catalyst Magazine, a free digital science journal filled with exciting STEM led research, industry research and development and career insight. You can access Catalyst at: <https://catalyst-magazine.org/>



What do we mean by Green Careers?

Any job, role or occupation that contributes to preserving or restoring the environment and our planet can be described as a green career. Many industries are immediately seen as 'green' such as renewable energy, energy efficiency, green technology such as electric cars, improving the environment or agriculture processes but it may surprise you to find out that most industries have green careers.

There is a green career to suit everyone, roles vary across a whole host of industries, each requiring different skill sets and offering a satisfying career that many may not have thought of as 'for them.'

These are a tiny fraction of the jobs and roles classified as green careers, the one thing they have in common is they are effective in the short and long term, literally making the world a better place.

Farm manager, coastal defence engineer, climate change specialist, data analyst, wind turbine technician, solar panel installer, forester, conservationist, electrical equipment repairer, architect, aeronautical engineer, meteorologist, environmental consultant, waste management specialist, energy and carbon analyst, packaging designer, ecologist, environmental solicitor, insurance assessor, actuary and construction workers building environmentally friendly and energy efficient homes.

A successful and satisfying career needs nurturing: inspiration, the right skills, training, and qualifications are all vital, but it's just as important for young people to understand that routes and pathways into careers can be different for everyone, which could be on the job learning, an apprenticeship, or a university degree.

What do we mean by green skills?

Green skills are the skills needed to adapt services, processes, and procedures to address climate change. They can be defined as the abilities, values, attitudes,

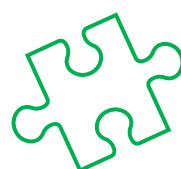
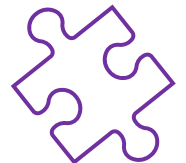
and knowledge needed to develop and live in a resource-efficient and sustainable society.

As industry changes to support net zero, new jobs will be created with green skill requirements. Current jobs and roles will need to adapt, requiring employers to retrain employees and realign skills and experience to meet the needs of their industry.

Education has a key part to play, by raising awareness of the opportunities available to young people, reinforcing skill development, and highlighting career paths and qualifications needed whether a student is heading for university, an apprenticeship or employment.

What does 'Net Zero' mean?

Put simply, it is the reducing of greenhouse gas emissions to as close to zero as possible, with any remaining emissions reabsorbed from the atmosphere by oceans and forest. The UK target is to meet our net zero commitment by 2050.





Choose Plant Science For a Sustainable Future

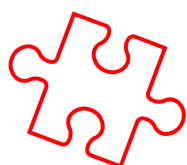
What can we do about a growing human population, increasing demand for food and a shrinking supply of resources and perhaps most importantly the threat of climate change? Understanding plant biology and ecology is now more important than ever before if we are to find solutions for these critical 21st century challenges.

Written by: Dr Manisha Sharma
Plant Scientist, Biosciences College
of Life and Environmental Sciences
University of Exeter

Plant science is a rapidly progressing multidisciplinary study of plants. When I first started my journey as a researcher I found everything in my field was developing at an overwhelming speed.

Previously unknown pathways were being discovered almost weekly, regular scientific conferences were offering absolutely new content, and it appeared that every issue of coveted journals had to have at least one paper on my topic of study.

To answer my curiosity about the impact of this research field, I started a quest to find the burning questions that plant science is addressing.



How biologists approach them and how they stumble upon answers stretching from common sense to complicated regulatory mechanisms?.

The questions plant science is addressing:

1. Food to feed billions:

Plant biology is a broad and diverse field with potential to preserve future well-being of this planet and its inhabitants. The expanding world population is set to be over 9 billion by 2050 and will require abundant food and resources to survive.

To keep pace with growing food demands the agricultural capacity must be doubled from its existing levels. The research in plant science is advancing to maximise food production from existing arable land. This approach is beneficial to safeguard rainforests from being converted into cultivated land. The researchers are not

only focusing on the yield of crops, but also on other desirable features such as improving the quality, nutrition, and shelf-life of food.

Across the globe, there are combined efforts to develop an effective plant breeding program for major crops. Plant scientists are exploring options to improve current agronomic practices, soil management and cropping system.

Researchers are also finding ways to reduce yield loss due to pests, disease, and weeds by breeding resilient varieties. There are ongoing efforts to increase abiotic stress tolerance, photosynthetic efficiency, and fertilizer efficacy in crops. However, to be successful in our goal of sustainable agriculture we need significant investment in agricultural science and active engagement of young innovative minds.

- Plant science research is focused on maximising food production.
- Improving quality, nutrition and shelf-life food
- Improving current agricultural practices
- Developing disease and stress resistance crop varieties



The expanding world population is set to be over 9 billion by 2050 and will require abundant food and resources to survive.

At present, fossil fuel combustion generates more than 80% of annual energy consumed globally, contributing enormously to global warming.



2. Tackling the energy crisis and climate change:

The global carbon cycle involves carbon production by photosynthesis,

accumulation in the soil and oceans, and release from the geological and biological resources. However, human activities and deforestation have upset the balance of the carbon cycle in our ecosystem. At present, fossil fuel combustion generates more than 80% of annual energy consumed globally.

As a result, contributing enormously to global warming and biological species extinctions. Incidentally, the trail to find the most environmentally sustainable way for energy production also ends with plant-based solutions. Biofuel energy produced from biomass rich cellulose crops (maize, sugarcane and Agave) is energy- dense and compatible with the current petroleum-based energy setup. To further reduce our global carbon footprint, there

is a substantial research interest in the development of microalgae (unicellular aquatic plants) due to their tremendous potential to capture CO₂ emissions and produce biofuels.

Rewarding Research: Microalgae could be the source of next generation fuel while simultaneously absorbing CO₂ from the atmosphere.

3. Protecting biodiversity and improving global health.

Biodiversity refers to the original components of our crops, and farmed livestock. The continuous genetic improvement in these constituents ensures adaptation and flexibility to the current and future needs. Agricultural biodiversity is vital for the production systems reinforcing ecosystem progression such as pollination, soil erosion aversion, water, and nutrient cycling. The plant research community is alarmed by the loss of diversity from agro-ecosystems which will have negative effects on human health.

Research efforts are undergoing to increase resilience of agricultural ecosystems and simultaneously reducing our ecological footprints. Scientists are utilizing diversity in crop system to help cope with the pests and diseases as well as improving soil quality. The success in these efforts is going to be a win-win option creating benefits to both biodiversity and human health.

'Ecoagriculture': Plant scientists are coordinating biodiversity conservation to reduce intense agriculture footprint on our landscapes

How biologists approach the problems:

It all starts with –the formulation of hypothesis

The amazing pace of advance in our understanding of plant biology is, perhaps, due to the development of new tools and methods. However, everyone should agree, that mere techniques without ideas are featureless. Biological research across the spectrum has started and developed quite similarly. As a matter of fact, all big discoveries were the result of detailed hypothetical framework.

At first, scientists deliberate about a problem and postulate hypothesis. Next step is to test the hypothesis that involves advanced (cool!) techniques, operating equipment, conducting tests, and recording data. The selection of experiments is decided based on biological question that needs to be answered. The fundamental biology is built around the principles of genetics playing substantial role in the plant's exploratory science.

Precision genome editing is a paradigm shifting tool being used in crops to improve stress tolerance, improve nutrition quality, shelf life, and disease resistance, and much more not

yet imagined. Leveraging these techniques effectively, however, requires the ability to identify target genes for desired modifications. This knowledge originates from the imperative 'basic research' discipline of plant biology. Basic research envisions to describe the plants and its components and how they might behave when modified on gene-by-gene basis. The gene and pathway function is deduced using genomic, transcriptomic, proteomic, biochemical, cell biological, and phenomic data sets. The information generated from here can be used to validate initial hypothesis allowing iterative improvements in plant sustenance.

The fundamental biology is built around the principles of genetics playing substantial role in the plant's exploratory science.



Careers in Plant biology:

The perception of plant science as of low status compared to biomedical disciplines is now transforming. Plant science encompass diverse, satisfying and 'plantastic' career options. For a career in this field, students should select college courses in plant pathology, entomology, molecular biology, biochemistry and plant physiology. Practical training through laboratory coursework and research experience in established academic or industrial labs are highly effective in building awareness of opportunities in this field.

Students should look for experimental training opportunities from undergraduate level itself to gain necessary research experience.

To conduct basic research or to advance to jobs directing applied research, a master's or doctoral degree is required. Advanced degree programs in plant science include classroom and fieldwork, laboratory research, and a thesis or dissertation based on independent research.

Plant scientists gets plenty of work opportunities in universities, laboratories, environmental agencies, and biotechnology & pest management companies, among others. Without sounding dramatic there are significant changes in the field of plant research round the corner.

Hopefully, we will start to see people with knowledge of crops, ecology and biodiversity valued more.

Glossary

Heat engine – a technology used to convert heat into mechanical power or electricity

Heat pump – a technology that upgrades heat to a higher temperature for heating purposes.

Chiller – a technology that uses heat to provide a cooling effect.

Efficiency – the ratio of how much electricity is generated by a heat engine to the amount of heat input.

Find out more

BBC news article on using waste heat from the London Underground:
www.bbc.co.uk/news/uk-england-london-49482840

UK government report on waste-heat recovery in UK industry:

<https://www.gov.uk/government/publications/the-potential-for-recovering-and-using-surplus-heat-from-industry>

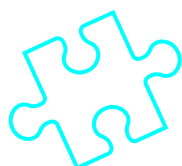
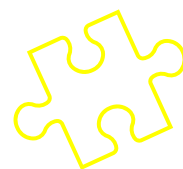
UK government Heat Recovery Support Programme:

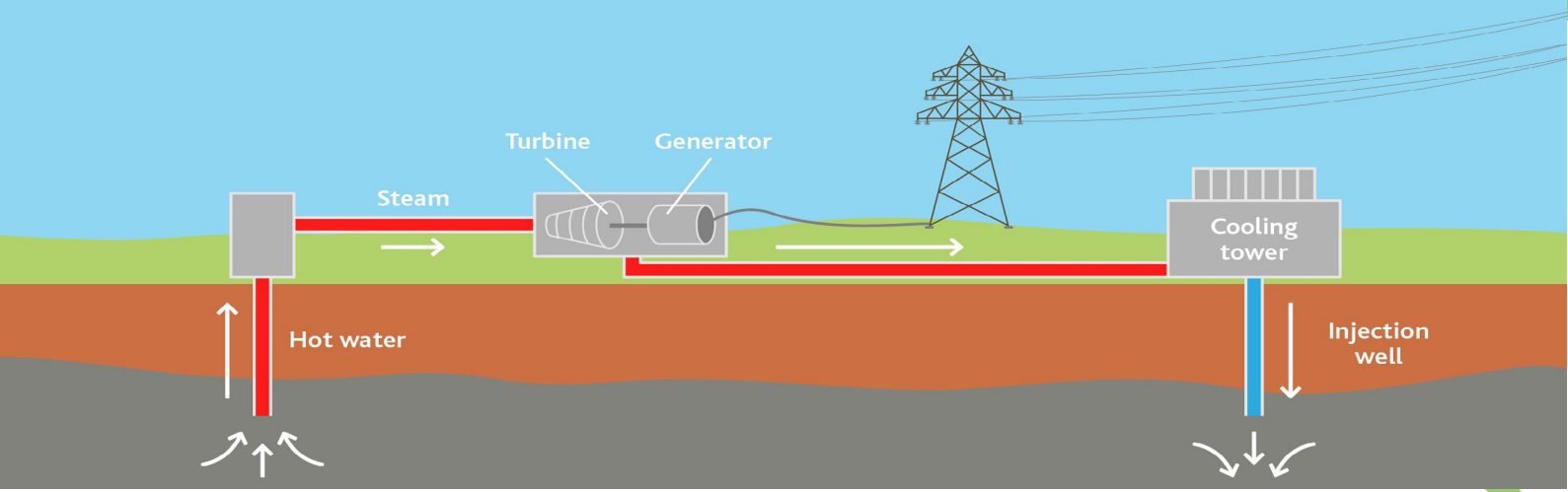
<https://www.gov.uk/government/consultations/industrial-heat-recovery-support-programme>

About the author

After stumbling into the field of engineering after enjoying maths, physics and product design at school, I went to university to undertake a degree in mechanical engineering. This left with me a passion for renewable energy and I haven't look back since. I now work as a researcher developing new technologies that can reduce our impact on the environment.

[Catalyst Magazine Issue 37](#)





Zero Emission Energy From the Heat Beneath Our Feet

The world is crying out for plentiful, low-cost, zero emission sources of energy. What if there was a source of energy that could be accessed anywhere in the world to generate heating, cooling, or electricity – that was low cost, zero emissions, and always available?



Written by: John M Clegg
Chief Technology Officer,
Hephae Energy Technology

But we took it further.

Before I was 30 years old, I was put in charge of a team developing what was effectively a downhole robot. We called it a rotary steerable system (RSS). Our “robot” was able to measure its position and orientation relative to the Earth’s gravitational and magnetic fields. It could then use that information to control a mechanical system that would steer the direction of the well. A lot of people think that oil wells are vertical holes drilled from the surface, but this has not been true for a long time. Nowadays, most them start off vertical but end up being drilled horizontally, parallel to oil or gas bearing rocks. Our “robot” made this job significantly easier.

I learned to enjoy working on drilling rigs like the one shown in the Drilling Rig image at the end of my article. Working in this industry allowed me to travel all over the world – to thirty-one countries the last

I graduated with a degree in Engineering Science in 1984, fully intending to carve out a career in aerospace. I was going to design and build new generations of aircraft and the engines that would power them. It only took me two years to realise that my future lay in an entirely different industry: energy.

In 1986 I joined a company based in Gloucestershire. It supplied the world with drill bits for oil and gas wells. It might sound very mundane, but it turns out that designing a drill bit that will work under the extreme environmental conditions found deep underground is a significant challenge for mechanical design and materials engineering

time I counted!

But if we fast forward three decades, to the present day, the world is a very different place. We now have a much better understanding of the impact of carbon dioxide emissions on the global climate. We also know that we need to do everything we can to reduce emissions, ideally at least to zero.

I am now semi-retired, and I've written a couple of books about innovation (which is the introduction of new products or services). I have written about how important it is to meet the needs of all of society when developing new things, and not just think about making profit for a corporation.

I have come to believe very strongly that engineering should do good for society. Now, I've been fortunate to find a way to link these values with the technology I helped to develop all those years ago. I have co-founded a new company, Hephæ Energy Technology, to develop the equipment we will need to drill high-temperature geothermal wells.

A handful of countries have been lucky enough to be able to use geothermal energy for heating for thousands of years. In the last hundred or so years they have also used it for electricity generation. These countries are all close to regions of tectonic activity where continents are rubbing against each other. In these places, heat can get very close to the surface – places like Iceland, New Zealand, Indonesia, and Italy.

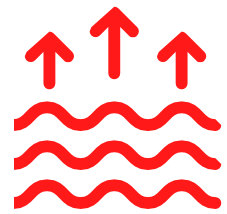
People drill in these locations to find hot water that is naturally present deep underground. The hot water can be produced as steam and drive power stations to generate electricity. And it's worth mentioning that this electricity can be generated all the time, unlike wind turbines or solar panels.

Now, a new generation of unconventional geothermal wells is being proposed. These wells will not require heat close to the

surface. Why not? Because if you drill sufficiently deep you can find heat anywhere. They will not require water to be naturally present because they can introduce their own fluids.

Using these wells, we will be able to pump cold water into the ground and get steam back, ready to generate electricity. The steam will be created by the natural heat in the rocks below. Even better, water is not the only fluid that can be used for this. In fact, it's very possible that liquefied carbon dioxide will do the job even better. Imagine be able to put carbon dioxide to good use for the environment!

People drill in these locations to find hot water that is naturally present deep underground. The hot water can be produced as steam and drive power stations to



The (AGS image) shows a few different proposals for these wells, so-called “Advanced Geothermal Systems” or AGS for short. As you can see, some of the designs are very complex, almost like downhole radiators! Despite their complexity, the “robot” I mentioned earlier is already capable of drilling these shapes. The only challenge when moving to geothermal wells is the temperature.

The sensors and electronics developed for our oil and gas industry drilling “robot” will work up to temperatures between 150° C and 175° C. Although it's possible to drill geothermal wells for local heating and cooling, and even extract a small amount of power, at temperatures like this, hotter is better for geothermal electricity generation.

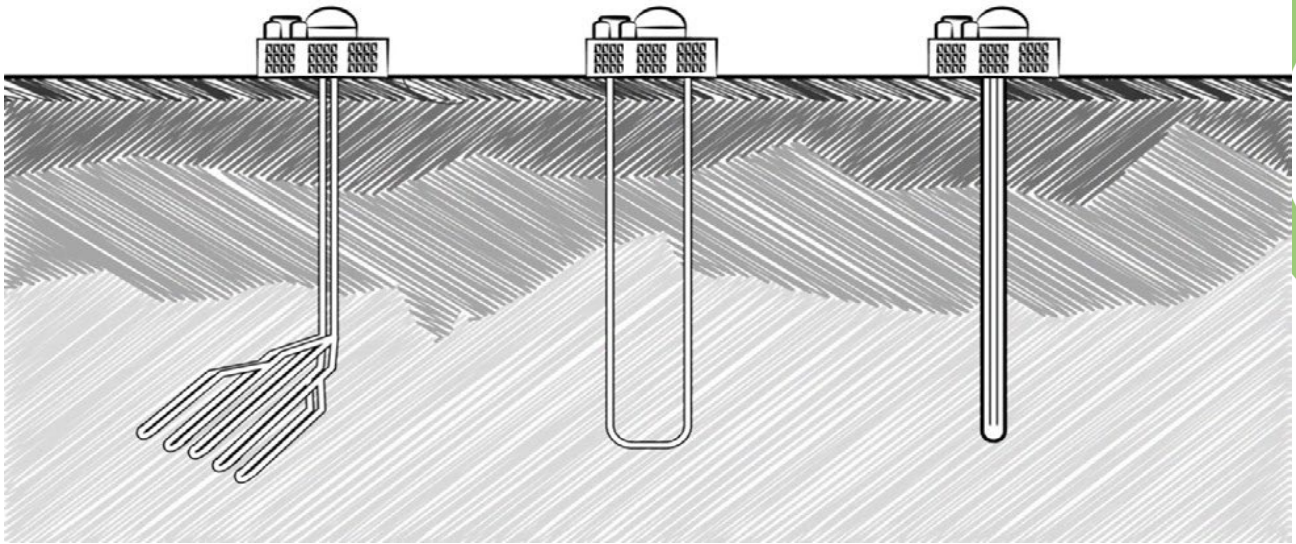


Image: Advanced Geothermal System

Soon it's likely we will need to be able to drill to temperatures between 300° C and 500° C. At these temperatures, the electronics used in our "robot" will literally melt!

That creates a significant technical challenge, but also an exciting one. I've spent the last two years researching how we can develop the high temperature electronics and sensors that we will need. I've also been looking at what other industries have done. The most exciting part of this research so far, for me, has been talking to the engineers at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California about their Venus rover. The surface of Venus is close to 500° C. This means that any conventional electrical or electronic system cannot survive there even for a few seconds. NASA has been looking at purely mechanical solutions to this.

One of the links at the end of this article will lead you to the results of a recent NASA competition where members of the public could make their own suggestions.

But it probably can't all be mechanical because any measurements and images would need to be transmitted back to us.

So, NASA has also been looking at how to do it using electronics and developing concepts for electronic systems.

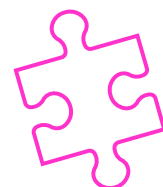
These systems might survive for a few weeks or maybe a month at the extreme temperatures on Venus.

There's a tantalising possibility that we could work with this team and use electronics developed for Venus to help us to extract the energy that humankind will need from the Earth.

It's just possible that one day our drilling "robot", and a different robot exploring the surface of Venus, could be distant cousins.

My decades in engineering have never ceased to surprise me in terms of the opportunities that have unfolded and what I have found as I turned corners in my career. I never expected it to take me so deep underground or so far out into space. Should you choose engineering as a career, I fully expect that it will surprise and delight you in the same way as mine has for me.

Good luck and reach for the stars!



Find out more

- www.energy.gov/eere/geothermal/geovision
- www.jpl.nasa.gov/news/nasas-venus-rover-challenge-winners-announced
- www.johnmclegg.com/blog/transition/the-heat-beneath-our-feet/

Glossary

AGS – Advanced Geothermal System

JPL – Jet Propulsion Laboratory

NASA – National Aeronautics and Space Administration

RSS – Rotary Steerable System

About the author

John has lived on three continents in a career in engineering in the energy industry spanning more than three decades. Having returned to the UK after many years overseas, John has set up a consultancy in innovation and has co-founded a company that will develop new technology for developing geothermal energy.

In his spare time, he used his knowledge to write a book 'Strategy and Innovation for a Changing World' which looks at sustainability through value creation and is available as a paperback.

John was educated in Engineering Science at Worcester College, Oxford University and is an alumnus of Oxford's Saïd Business School. John now lives in Cheltenham with his wife and two dogs.

Key skills:

Problem solving, creativity, staying positive and aiming high.



Image: Drilling Rig
Image courtesy of John Clegg

[Catalyst Magazine Issue 43](#)





How do you deal with 20 million tonnes of suffocating seaweed?

Seaweed is causing havoc in our oceans. Together, scientists from Mexico and the UK are working hard to find inventive solutions to the seaweed which washes onto shores every summer in the Caribbean.



Written by Amy Pilsbury
Graduate Research Assistant,
University of Exeter, Plymouth
Marine Laboratory, University of
Bath, Universidad Autónoma de
Baja California, BiorganixDr

Since 2011, a huge raft of free-floating seaweed has been growing every summer in the Atlantic Ocean. The seaweed, called Sargassum, is a macroalgae.

The seaweed grows quickly, creating large floating clumps in the 'Sargasso Sea,' a region of the Atlantic Ocean where multiple currents meet. Currents carry these clumps south. Favourable conditions cause it to grow out of control. The largest annual raft is named the Great Atlantic Sargassum Belt (GASB). It stretches from Mexico to

to the west coast of Africa, it is over 8500km in length. In 2018, the GASB was made up of over 20 million tonnes of biomass!



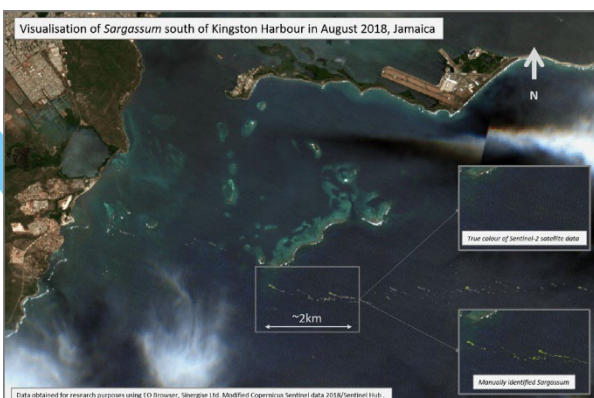
Sargassum. Credit: Amy Pilsbury



The Great Atlantic Sargassum Belt. Credit: Amy Pilsbury

The vast increase in growth every year is thought to be caused by fertiliser run-off from farmland in North America and the Amazon basin, as well as seasonal upwelling from the deep sea off Africa's west coast, bringing nutrients to the area. Changes in the climate and ocean currents are also making the conditions perfect for Sargassum to grow quickly. Studies show that in the last 40 years, the sea surface temperature has increased by 1°C and the summer has extended by almost a month. It is feared that the large blooms of seaweed leave behind seeding patches which can survive through the winter and restart the bloom the following summer.

We can observe the Sargassum blooms using satellites. This species has a chlorophyll pigment which reflects infrared light more strongly than the surrounding seawater. To satellites which detect infrared, Sargassum looks like a blazing fire and can be mapped.



Satellite visualisation of Sargassum. Credit: Sien Van Der Plank, SARTRAC

At sea, the seaweed mats provide havens for many marine species and create ocean ecosystems. In fact, there is even a Sargassum fish which lives in the seaweed, changing colour to camouflage with its surroundings. The frogfish species can survive out of the water on top of the mats for some time when threatened. Other fish and marine turtle species use the raft for shelter and nursery grounds. Reports have also identified over 30 species of cetacean either resting or feeding in the Sargasso Sea. The area is often referred to as the 'golden jungle,' because of the large number of species. However, once washed ashore in excessive amounts, the seaweed can have the opposite effect, suffocating coral reefs, seagrass beds and turtle nesting sites, as well as having a long-term impact on the tourism industry. In 2018, there was an estimated \$3.5 billion loss due to the lack of tourists visiting Mexico alone because of the problems associated with rotting seaweed on the beach. Millions of dollars are also spent each year collecting and removing the seaweed from the beach. Some countries have set up nets at sea to try and block the incoming seaweed, but it does not work.



Sargassum on the Mexican shoreline. Credit: Rebecca Dowell

Scientists all over the world are working to improve the tracking of Sargassum blooms, preventing it reaching the shore and researching sustainable processes which

can use the seaweed that washes up on beaches as a useful resource. So far, people have used it to make shoes, stationary and even bricks which have been used to build local houses.

PhycoMExUK is a group of researchers from universities, scientific organisations and industrial partners in both the UK and Mexico who have teamed up to tackle the crisis using new processing techniques to turn the seaweed into useful products. The process is called Hydrothermal liquefaction (HTL) and uses high temperatures (about 350°C) and pressures (about 200 bar – the same as the pressure at 2500m deep below the sea) The HTL process takes place in an enclosed bioreactor. It breaks down the seaweed into other products. After 15-30 minutes, the reaction is complete and four different fractions are collected. The carbon dioxide gas is released and can be used to re-heat the reaction system.

The remaining solution is filtered, and a solid powder often referred to as char is collected.

This char contains lots of carbon and is also where all the toxic heavy metals, which are absorbed by the seaweed, end up. The char powder can be used to return carbon to soils and provide extraction opportunities for heavy metals. The remaining liquid is separated into two fractions: bio-crude and aqueous. The aqueous fraction contains lots of

ammonia and phosphate so can be used as a natural fertiliser for crops in the local agriculture industry.

The bio-crude is treated and then can be used in the production of biofuels. The process is beneficial because it can cope with wet and salty biomass so there is no

need for expensive and time-consuming washing and drying processes.

Perhaps even better, the process can deal with plastic pollution, removing it from the ocean and recycling it into products along with the seaweed.

Changing the temperature, pressure and reaction time changes the amount of each fraction which is produced. The group are working to find the perfect reaction conditions to produce the highest yield of each product so that the conditions can be changed to meet product demand. The aim of the project is to create a sustainable biorefinery which can collect and process the seaweed straight from the sea before it reaches the shore which will protect inshore ecosystems and encourage tourists to return to the Caribbean regions easing the economic impact of the seaweed influx.

Additional information

The project is funded by the Global Challenges Research Fund and the Newton Fund.

Glossary

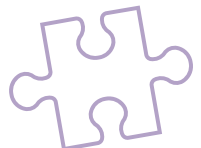
Algae – photosynthetic organisms that grow in water. Some are macroscopic and anchored in the seabed (seaweeds) others are free floating and microscopic.

Biomass – the mass of living material in each area. The biomass is calculated by drying the material to remove the water and then weighing it.

Bioreactor – a vessel, container, or system where a biological reaction is carried out, usually as part of an industrial process.

Cetacean – a marine mammal – whales, dolphins and porpoises.

GASB – Great Atlantic Sargassum Belt.



HTL – Hydrothermal Liquefaction

Macroalgae – algae that are visible to the naked eye i.e. photosynthetic seaweeds

Upwelling – a process where cold water from deep in the ocean flows up to the ocean surface, bringing dissolved nutrients with it

Char – the solid material that remains after light gases and tar have been released from a carbonaceous material during combustion, which is known as carbonization, charring, devolatilization or pyrolysis.

[Catalyst Magazine Issue 40](#)

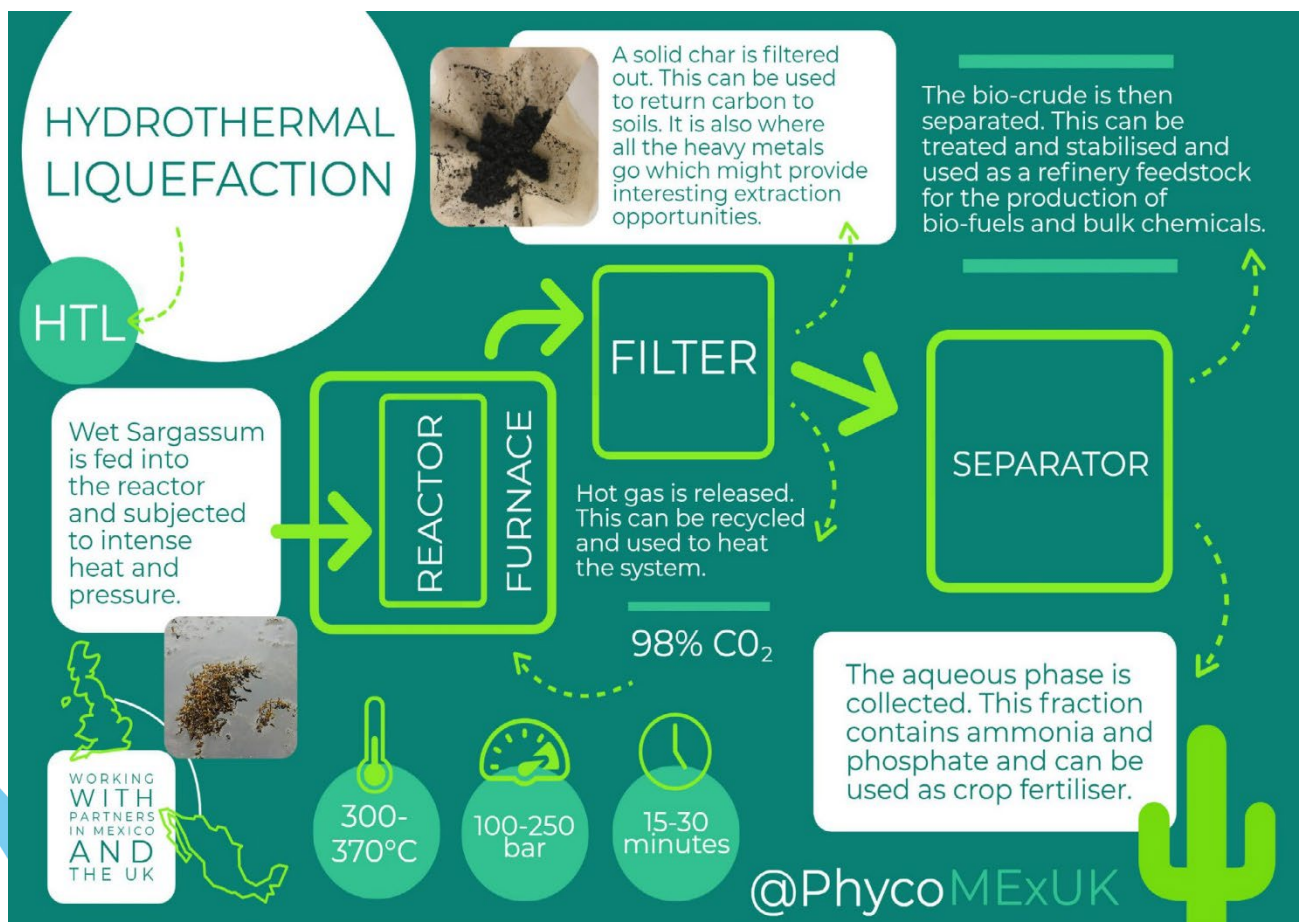
About the author

My career revolves around sharing and communicating science with the public. I love the challenge of writing long complicated papers in more simple language for people to engage with. My current role is great as I get to do this all whilst finding sustainable solutions to problems that have devastating impacts across the world.

Article links

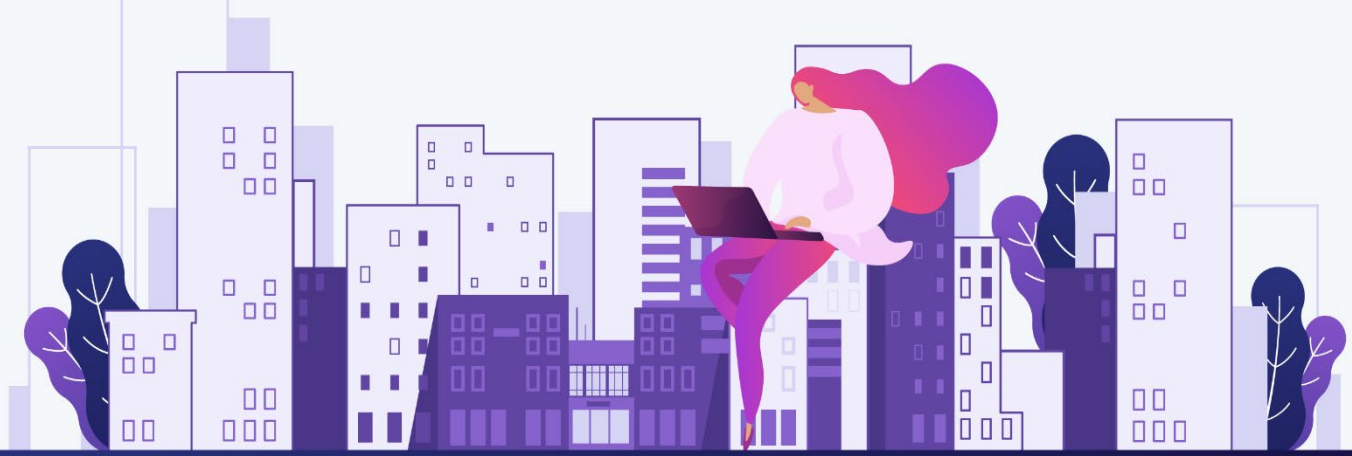
Follow the project here: www.phycomex.uk

We are a member of the SSC, a collection of organisations working to conserve the area: www.sargassoseacommission.org/index.php



The HTL process. Credit: Amy Pilsbury





My life and work in the UK: exploring air quality through the eyes of a young graduate engineer.

Air pollution and climate change have always been a hot topic in news and science classes. We are increasingly interested in learning about the concentration of a chemical present in the air we breathe. Have you ever wondered what it's like to work as an air quality scientist?

Written by: Leticia Campello
Project Engineer, RWDI



Hi! I'm Leticia, a mechanical engineer from Brazil currently living and working in the UK. I've been living in the UK for the past 5 years and last year, after finishing my postgraduate degree, I joined RWDI as an Air Quality Engineer.

RWDI is a wind engineering and environmental engineering consulting firm. It has offered services for the world's tallest skyscrapers and landmark structures, such as Petronas Towers in Malaysia, Shanghai Tower, London Millennium Bridge, and the Burj Khalifa in Dubai.

RWDI is well known for its expertise in engineering modelling and analysis, and it also has in-house model shops, where scaled down models of the most exciting

Tell us about yourself and what you do

I grew up in Brazil and I moved to the UK in 2015 to complete my bachelor's degree. I had always wanted to study medicine, but my passion for maths and physics made me change my mind when I was 15 years old, and I chose to study engineering.

My academic journey started in 2012 in my hometown. In 2015 I decided to study at an English university, for 1 year, to improve my language and technical skills. The University of Sheffield offered me an unconditional offer and informed me I was also eligible for a Latin America Merit Scholarship. This scholarship was offered to only 3 students from all Latin America. I had little hope I would get it, but I applied anyway.

A few months later, I got the news the scholarship was mine! At that moment, I had to decide whether to stick to my initial plan or to move to Sheffield for the next three years. In the end, I decided to start this new chapter in the UK.

I had some great experiences during my undergraduate degree. In summer 2017, I undertook a research internship in which I was able to be part of a team while conducting academic research and learning new modelling techniques. I also joined many students' societies like the Event Management Society, Women in Engineering Society and Sheffield Market Society.

The latter was founded by some friends and I, and our aim was to promote and support Sheffield's local food economy by bringing local farmers to the Student's Union. After one year of successfully running many student markets, we won the New Society of the Year and Most Enterprising Society of the Year awards. It was an amazing experience!

After completing my bachelor's degree, I decided to continue my education; I wanted to expand my knowledge on biomechanics as well as improve my computational modelling skills. For my post-graduate degree, I decided to stay in Sheffield and by then I had got the hang of university life and had one of the best years of my life.

However, things started not to look so promising for me when looking for jobs. Although I had outstanding grades as well as an amazing research topic for my dissertation, I had chosen a very specialised area that unfortunately didn't open too many doors for me, especially for an international student requiring work visa. However, I did not let this put an end to my plans.

I had always been connected to mechanical engineering, so I decided to look for opportunities in this field. After a busy year of exams, dissertation, lots of

coffee and job applications, I was offered a full-time job at RWDI! This job role got my attention immediately because I was going to apply engineering concepts and use modelling skills to predict chemical concentrations in the air; how exciting is this?

Since day one I have been fascinated with air quality and I could not have ended up in a better role. I work in a dynamic environment constantly facing new and exciting challenges where I can put my problem-solving skills into practice.

An air quality engineer ensures buildings and industries meet air quality goals.

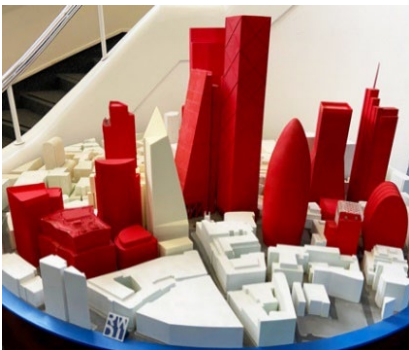


Tell us about RWDI, who they are and what do they do.

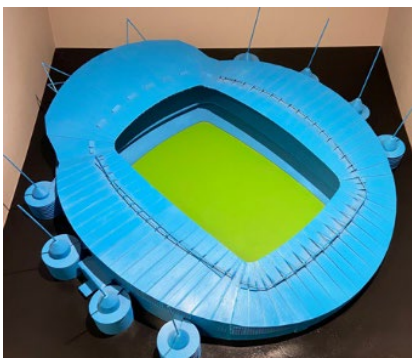
RWDI is a specialty consulting company, mainly in the civil engineering industry, focused on wind and environmental engineering offering services in a variety of areas, such as:

- Microclimate & pedestrian wind comfort – it is important to consider the environmental impact of new building on the surrounding area of busy cities. One crucial factor is pedestrian comfort and safety as a result of the change in wind microclimate. It is vital to ensure people will not feel any discomfort while sitting, standing, strolling, or walking;
- Air quality – Ensure building and industries meet air quality goals. Air quality is linked to the wellbeing of humans and ecosystems. Air quality issues can cause issues from mild

- public annoyance to serious health concerns;
- Acoustics – Design spaces inside buildings that provide a comfortable environment for listening and free from distraction;
- Noise and vibrations – to help design and maintain buildings free of unwanted sound and oscillations. Unwanted noise in workplaces or meeting venues can be very disruptive leading to reduced productive. Vibrations play an important role in large structures like bridges – if not investigated it can lead to dangerous motion in the structure.
- Building performance – use of engineering modelling and analysis to create buildings that are more efficient, sustainable, comfortable to inhabit and resilient to natural disasters.



RWDI models for 22 Bishopsgate located in the City of London and the Etihad Stadium in



Offices are situated all over the world (i.e. Canada, USA, India, China, Australia, etc.) with the headquarters located in Guelph, Ontario. RWDI combines professional expertise, advanced computer modelling capabilities (Computational Fluid Dynamics

and Air Dispersion Modelling) and boundary layer wind tunnels to investigate a variety of environmental factors related to buildings/infrastructure and industry.

What does an average day look like for you?

My day usually starts at 9am. Most of the air quality team is in Canada and the time difference, 5 to 8 hours behind, means that the Canadian part of the team are just going to bed when my day is starting, so my morning tends to be calmer. I start with catching up with emails and continuing any tasks from the day before.

A typical project starts with gathering the information collected at the site and creating the computer model based on this. The design might need to be reviewed and additional information collected. This part can be time consuming, but I really enjoy it because it's like an investigative job where you must go through drawings and documents, recording all the information you have or that you need. Once this is done, you can proceed with the modelling and simulation. Analysis of results will follow.

This part is probably where your problem-solving skills as an engineer come in most, because you need to analyse your outcomes and see if they make sense. My activities are spread through the day. In the office, most of us have lunch breaks around 1:30 pm as we like to say the afternoon feels shorter! When I'm done with my lunch my colleagues in Canada are starting their day, so my afternoons are usually filled with calls and chats about on-going projects and new findings or issues I have encountered. My day usually ends around 5:30 pm, if there isn't anything that came up last minute!

What sort of personality or passions do you need to have to pursue your career and are there particular subjects you need to study or essential skills to have?

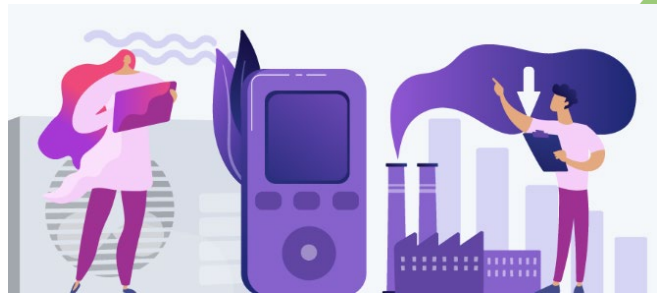
I think to be an air quality scientist you need to have a passion for problem-solving. This will happen in any field in engineering, obviously, but what I find most interesting about being an air quality scientist and in consulting is that you are working closely with project managers, seniors, and clients to reach a common goal. You will need to be friendly, organised, and responsible. From day one you are given the huge role of being a project coordinator where you may have one project manager and/or one senior engineer helping you.

I would say having had experience in computational modelling helped me a lot. It doesn't matter if you never used a specific software because you can always learn with practice, but it is being used to teach yourself how to absorb that kind of knowledge that helps.

How does your work impact on the world around us?

Air quality has gained a lot of attention lately due to the need for cleaner air. Countries are working together to reduce carbon emissions and slow down the rapid pollution of the environment caused by industries, traffic, and residential buildings. So much work is being done to invest in more renewable energy sources with the intent to reduce pollution and preserve our natural resources.

Air quality scientists are doing an incredible job by making sure new and old developments and industries can operate without causing too much harm to the environment. In the UK, for example, for any new development you will have to investigate if it needs a simple or detailed air quality assessment. Depending on the size of the development, local councils may require companies to prove this new development does not adversely affect local air quality.



What inspired you to work at RWDI?

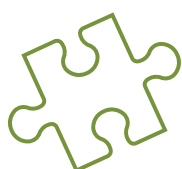
I had always been interested in working in consultancy because of the known fast-paced area it is, but RWDI got my attention when I saw the variety of work the company is involved with. The company is well-acknowledged for pushing boundaries of what can be built focusing on sustainable innovation. The projects the companies take on are complex problems which require rigorous analysis and critical thinking.

The company has been part of exceptional projects such as 432 Park Avenue in Manhattan, the third tallest building in the US, Grand Canyon Skywalk, Etihad Stadium in Manchester, and 22 Bishopsgate located in the City of London set to stand 278m tall.

Specifically, in terms of air quality, the amount of technical work and training opportunities RWDI provides to its employee was what resonated with me. The kind of work RWDI has delivered state-of-art approaches to clients' projects whilst working for a sustainable world and therefore a sustainable future for all of us.

What cool and exciting projects are you involved with?

As I explained before, my work involves air quality. I have been involved in projects in Ontario (Canada) and here in the UK. In Canada, I have worked in a broader range of projects such as facilities with welding stations, laboratory fume hoods, paint booths including university campuses and even a theatre!



In the UK, my projects are a bit more different; here I worked with projects that are yet to be built, so they need planning permission.

To obtain this planning permission, clients need to prove their development does not cause adverse effects on local air quality. It has been great to work with so many different facilities and I never thought I would enjoy working with cooling towers and generators this much!

What's next for you and RWDI?

My team in the UK has been looking for more opportunities involving not only environmental air quality but also building air quality. We are excited to take on new challenges working on projects that have never been worked on before. I plan to improve my dispersion modelling skills as well as communication and problem-solving skills.

What has been the biggest challenge of your career to date?

I think the biggest challenge to date has been coordinating a project from the start in an area that I was not particularly used to. What I like about RWDI is that there is a level of confidence put on us, project engineers, when it comes to delivering work. Some might say it can be stressful when people expect you to complete the work on budget and on time, but it is exhilarating. I love the fact that you have the freedom to do the work on your own whilst asking for help whenever you need it.

What advice, hints and tips would you offer someone looking to have a STEM related career?

I'd say that before everything else you must be willing to learn. In any company

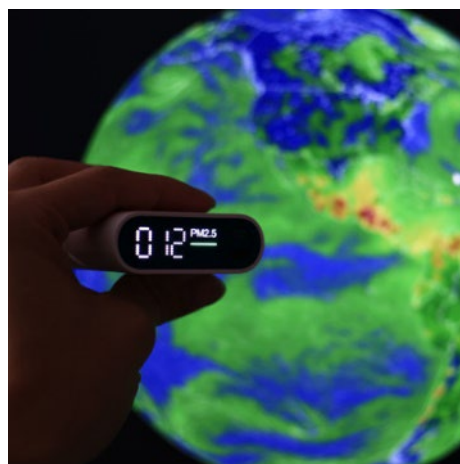
or job role, you will be constantly learning new things and facing different challenges daily. Frustration can be more common than you think but never let it discourage you. Teamwork is an essential skill in any job too. You might be working on a project alone but there will be other people indirectly/directly involved in it such as project managers, clients, and even your senior. Knowing how to work with others is vital hence being friendly, professional, and respectful is very important.

Air quality might not be the most popular area of engineering, but it is meaningful and important! As for RWDI, if you are goal-driven, willing to tackle complex challenges and are a truly collaborative person, it might be the place to start your career!

Look at what we do and see what you think: https://rwdi.com/en_ca/people/careers

Article Links

- More projects are available on [the RWDI website](#)
- The [432 Park Avenue project](#)
- [Burj Khalifa project](#)
- [Grand Canyon Skywalk](#)
- [Shanghai Tower](#)
- [RWDI video for 22 bishopsgate](#)
- [22bishopsgate website](#)
- [Etihad stadium picture](#)



Air quality measuring sensor.

[Catalyst Magazine Issue 38](#)



Protecting a Scottish town, its businesses and residents from river

The risk of flooding is on the increase across the world because of climate change, which can cause more frequent intense rainfall and higher sea levels. In Scotland, the town of Grangemouth and the areas surrounding it are affected by both tidal and river flooding, making it unique.

Written by: Alan McGowan
CEng BEng (Hons) MICE, Senior
Associate Director at Jacobs



Over the past few years, occurrences of flooding have increased because of climate change. On the east coast of Scotland, the town of Grangemouth and six surrounding communities are at risk of flooding from both rivers and sea.

The company I work for, Jacobs, helps solve some of the world's toughest challenges like water scarcity, climate change resiliency and aging infrastructure – and we're working with the local

authority, Falkirk Council, to protect homes, business and residents by addressing the flood risk in Grangemouth and six nearby areas.

The Grangemouth Flood Protection Scheme is not only the highest priority flood protection scheme in Scotland but also the largest in Scotland and one of the most significant in the UK. When it's complete it will be made up of 27km of river and coastal flood defence walls and embankments, flood gates and surface water management measures. The scheme is unique because it covers both coastal flooding from the estuary of the River Forth which flows into the North Sea, and flooding from three rivers – the River Carron, River Avon and the Grange Burn.

The scheme will not only protect homes, businesses and livelihoods across Grangemouth and the surrounding communities, but also road and rail transport infrastructure and the port and nearby refinery. These are key pieces of national infrastructure in Scotland and important to the local, Scottish and UK economy. By

keeping transport links open during flood events, goods can still move through the Port of Grangemouth with limited impact.

When completed the Grangemouth Flood Protection Scheme will be made up of 27km of flood defences.

I've spent nearly 25 years working on water and environment-related projects in Scotland. As a flood risk management expert, I co-ordinate the planning and development of the flood protection scheme, leading a team of around 40 engineers and scientists. We ensure everyone who lives and works locally has a chance to have their say on the flood defences. My team is designing, planning and managing the implementation of the new flood defences and has been working with Falkirk Council on the project since 2012.

This flood protection scheme is very complicated because of its scale, geographic spread, and the complex urban and industrial setting. Protecting local communities is at the heart of the scheme. We want to help improve the resilience of the communities in the areas at risk of flooding, so they can cope with the threats posed by severe weather events more often in future.

To effectively defend Grangemouth and the other communities, we're planning to install 27km of flood defences, averaging around 1.5 metres in height. These vary in design and include embankments, walls, floodgates and pumping stations. They need to effectively manage river, coastal and surface water and cope with flooding from three rivers and the Forth Estuary, which impact many different environments from private gardens and public open spaces to major industrial complexes. There are also many significant environmental factors that we need to consider, like the Firth of Forth Special

Protected Area which is a habitat for large numbers of birds. There are also lots of opportunities to enhance the environment through this scheme, for example by creating rich and diverse habitats for animals, fish and birds.

The scheme aims to deliver other significant benefits, such as creating new job opportunities, improving access, improving habitats and biodiversity.

Projects of this nature are very varied and exciting and involve most engineering disciplines from ground engineering to hydraulic design to structural design. There are many non-engineering disciplines working on the scheme too, like ecology, landscape, communications and economics. This means that my daily workload can change frequently from discussions on finance, planning workload for the team and discussing complex ground conditions through to client and stakeholder meetings.



Alan being interviewed about the scheme, photo courtesy of Jacobs

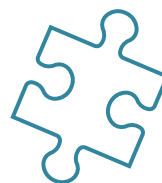
The flood protection scheme will have a uniquely developed STEM education programme for local schools to look at flooding and its effects, as well as gathering ideas from young people on the project. This is important so that young people from all of the communities affected can input to the scheme. The STEM programme will develop lessons for teachers to deliver to young people in both primary and secondary schools and will also enable them to meet virtually with a flooding expert who can answer any questions they may have.

Flood protection schemes like Grangemouth can take a long time from start to finish – we expect this one to take around 10 years to build. By designing a scheme that's flexible, we can help the area withstand possible future increases in rainfall and sea level rises, as well as more severe and frequent storm surges that might occur because of climate change – helping the local community to be more resilient in years to come.



Article links

You can find out more at: grangemouthfloodscheme.com and follow the scheme on [Twitter](#) and [Facebook](#)





Plant Health Heroes – keeping UK plants healthy

Across the world pests have a devastating impact on plants causing economic, social and environmental damage. In the UK the health of plants is safeguarded by an army of people, the plant health service. They work to prevent new pests from entering the country keeping plants free from additional harm.

Written by: Dr Rachel Yale
Department for Environment
Food & Rural Affairs

Plants produce 98% of the oxygen we breathe, make up 80% of the food we eat and support over half a million jobs in the UK. However, plants are under continuous threat from quarantine pests*.

Worldwide plant pests and diseases cause the loss of up to 40% of food crops annually. To feed a growing population, the health of plants must be preserved, not only must losses be avoided but yields need to be enhanced. It is estimated that agricultural production will need to increase by 60% by 2050 to feed everyone.

The UK faces threats from hundreds of pests such as the Colorado potato beetle which can decimate potato crops, the Emerald Ash Borer which is killing Ash trees in America and *Xylella*, bacteria

which have caused devastation in the olive growing regions of Italy.

How biologists approach them and how they stumble upon answers stretching from common sense to complicated regulatory mechanisms?

In the UK control of our most recent pest outbreaks such as the Oak Processionary Moth and Tomato Brown Rugose Fruit Virus has relied on co-operation between an army of individuals which form the plant health service. These include plant health and seed inspectors who find pests, diagnosticians at Fera that identify them, scientific advisors who provide technical advice on the organism and policy makers that decide whether new laws are needed against the pest.

In the interviews, a member of each of these groups explains a little bit about their contribution to keeping UK plants healthy.

**A quarantine pest is a bacterium, fungi, insect, mite, nematode, parasitic plant, virus or weed which is absent from all or part of a country but which would cause damage if it spread into areas where it doesn't occur at the moment. To prevent quarantine pests causing damage, plant health authorities try to stop them spreading. Pest will be referred to in the remainder of the article.*

Plant Health and Seed Inspector (PHSI): Laura Chapman



Describe your job.

My role is to identify and control pests, to prevent their introduction and spread within the UK.

How did you get your job?

I have always enjoyed being outside and knew that I didn't want a 9 to 5 office job. So I went to the University of Nottingham to study Agricultural Science. My friend who already worked for the animal and plant health agency (APHA) recommended I apply for the PHSI and my degree provided me with the background I needed. Working at a cattle station in Australia provided me with experience of lone working, decision making and planning.

What is your favourite part of your job?

The role is so varied, I am constantly learning new things, so I never get bored! I am also currently undertaking a Post

Graduate Certificate in Plant Health and Biosecurity at Harper Adams University.

Describe an average day.

I visit plant nurseries, garden centres, growers and other agricultural businesses checking their plants for pests. If I find a pest I collect and send a sample off to the diagnosticians, disinfect my tools/boots/hands afterwards so I don't spread the pest and stop the infected plants being moved. Once the diagnostician has identified the pest I may need to ask the grower to destroy their plants to prevent the pest spreading elsewhere.

What skills do you need for your job?

I have to be adaptable to change, organised and a confident communicator.

Diagnostician: Adam Bryning



Describe your job.

I'm like a bacteria detective working out what's causing the symptoms seen on plants. I use a range of methods to isolate and identify the bacteria from the plant and then inform the customer (the PHSI / farmers / nurseries / landscapers), what the problem is.

Did you always want to do your job?

After I finished my degree I knew I didn't want a job in research and was more attracted to applied science roles. Fera was just up the road from where I studied so I applied for an Assistant Diagnostician post. I

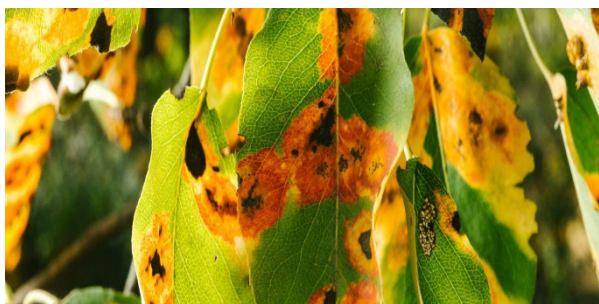
didn't know this job existed until I applied, as plant health or plant pathology wasn't really taught at school or university.

What has been your career highlight?

I went to San Francisco as part of a project which aims to help the UK prepare for an outbreak of the devastating bacterial pathogen *Xylella fastidiosa*. The trip included meeting researchers and field visits.

What is your favourite pest?

Xanthomonas hortorum pathovar *pelargonii* (bacterial blight) which is straightforward to isolate and grow in the laboratory. It's a bacteria that attacks geranium flowers and causes really distinctive sectorial wilt on the leaves, which you can see in the picture below. As with most bacterial diseases there isn't really a treatment for curing the plants, so in this case our general advice would be to remove infected plants so the pathogen doesn't spread disease to others.



Any advice for someone wanting to get into this as a career?

Say yes! I interviewed for an assistant scientist post and was instead offered a short term post. I kept saying yes to helping with different teams and learning new skills and different microbiological and molecular methods, 6 years later I'm still here!

Scientific advisor: Laura Stevens



What do you love about plants?

Plants have to adapt to their environments as they cannot just get up and move. They generally cope with whatever nature throws at them, whilst producing the oxygen necessary for life on our planet.

Describe your job.

My role involves using my scientific training to provide advice on issues affecting plant health. For example, if a new pest is detected in England and Wales, my team provides advice on how to either eradicate, contain or minimise the impact that the pest could have in the UK. Recently for findings of Tomato Brown Rugose Fruit Virus my team advised on how to stop the virus spreading to other glasshouses, by recommending hygiene practices and how to deal with infected plants.

Did you always want to do your job?

No, I had no idea that this job existed, but I have always loved science, particularly biology and after completing my PhD I knew that I wanted to put my scientific training to use in real-world applications.

Any advice for someone wanting to get into this as a career?

Get as much experience as possible, as it could lead to previously unimagined career opportunities. Many people working in plant health are happy to share their knowledge

so you could contact them to ask about work shadowing days.

Policy maker: Matthew Casey



Describe your job and your favourite part of it

Plant health laws are in place to protect UK plants from pests, whilst enabling plants to be moved into and out of the UK. My role is to ensure that changes to the laws are applied correctly, but that the burden on businesses (e.g., plant nurseries) is minimised.

I do this by meeting with the PHSI, lawyers, businesses and scientific advisors.

My favourite part is making policy digestible, so that we can all understand it and explaining to the public the purpose of the laws and why they matter

How did you get into your job?

I did a BSc in Plant Science and then a PhD in Plant Molecular Biology, in my final year I applied for the Civil Service Fast Stream (their graduate scheme). I didn't make the final cut for the scheme, but was offered a job as a result of applying.

Did you always want to do your job?

I have always wanted to work in something that helps plants, animals and the wider environment, although I didn't have a specific job in mind.

Any advice for someone wanting to get into this as a career?

Get a good grounding in biology, problem solving and communicating. Having technical knowledge is great, but equally important is being able to share that knowledge so other people can understand it.

As the interviews above have shown protecting plant health in the UK is essential work which requires an army of individuals from the UK plant health service as well as collaboration with other countries, academia, industry and the general public. It also offers plenty of career opportunities to individuals with a wide range of personalities, interests and skills, from those that love working outdoors, to people that like team working or others that enjoy problem solving. If you are interested in pursuing a job in plant health or want to find out more, further information can be found in the links below:

- planthealthportal.defra.gov.uk
- www.rsb.org.uk/careers-and-cpd/careers/career-resources
- www.rsb.org.uk/get-involved/grants/plant-health-ug-studentships
- www.fera.co.uk/
- www.civilservicejobs.service.gov.uk/csr/index.cgi
- www.faststream.gov.uk/



[Catalyst Magazine Issue 37](#)



Who are we?

The STEM Challenge is led by a team of Civil Service Fast Streamers who wish to promote Science, Technology, Engineering and Maths (STEM) interest in schools. Fast Streamers work across the Civil Service in the hope of becoming future Civil Service leaders.

What is the challenge?

2024's challenge will be 'A Vision of a Carbon Neutral Day in 2050': imagine yourself as a scientist and policy maker in 2050, responsible for ensuring that resources are managed in a sustainable and carbon neutral way. Choose one of the following four exciting and innovative topics to explore and build your carbon neutral world: (1) Sustainable Food Production, (2) Sustainable Transport, (3) Homes of the Future, or (4) Humans in Space. Create a poster or report explaining your team's vision for 2050, focusing on your chosen topic. Each team member will also be expected to complete a reflection log.

Students will submit their poster or report in groups of 4-6 which will be judged by a panel of policy experts, with prizes awarded to the top entries. We expect the challenge to take 4 to 6 hours to complete. We will provide links to reference materials and full guidance so students can work on the challenge independently with just a little support from a teacher.

Please note that we have a limited number of spaces for teams available and suggest signing up as soon as possible to avoid disappointment!

Benefits of participating

The challenge has been tailored to target key skills in the Skills Building Partnership Framework and Gatsby benchmarks 4, 5 and 6. Students will develop problem solving, creativity and teamwork skills. Schools that participate in the challenge will also receive educational and careers resources, such as access to a virtual STEM Careers workshop, and a slide pack to introduce the challenge.

Who can participate?

Students don't necessarily need to be passionate about STEM subjects – the aim of the challenge is to promote STEM subjects and careers to students who may not have previously considered such a route. The challenge is aimed at year 9 and 10 students but is open to all KS3 and KS4 students. For more information, please contact us at:

stemchallenge@faststream.civilservice.gov.uk

You can also visit our 2023 blog post here for more information: [STEM CHALLENGE: 2023 - Government Science and Engineering \(blog.gov.uk\)](https://www.blog.gov.uk/2023/04/26/STEM-CHALLENGE-2023-Government-Science-and-Engineering/)

Sign-up to the challenge

Sign-up opens on 6th November 2023, with information being distributed on 4th December 2023. We ask that all submissions are returned by 5pm 26th April 2024.

If you would like to sign-up to the STEM Challenge, please follow this link to complete our Google Form:

<https://forms.gle/cEbURAVK3KfDEPjh8>

Further information and resources

STEM Learning Green Careers:

Lots of information including a digital green career fair. A Day in the life activity booklet, Green careers videos and resources. Find out more:

<https://www.stem.org.uk/secondary/careers/green-careers>

STEM Learning Business Breakfast

Future Proofing Young People for Green Careers

When: 30 November 09.00 to 11.00

As we work towards a greener society we need to equip our young people with the necessary skills to take up the new roles to achieve that. Despite wanting jobs to combat climate change – and increasing employer demand for green skills – young people do not understand fully what ‘green skills’ and ‘green jobs’ are. Join us as we discuss these issues and work towards solutions. Book tickets at:

<https://www.eventbrite.co.uk/e/future-proofing-young-people-for-green-careers-business-breakfast-tickets-749037059007?aff=oddtcreator>

Protecting our Planet Day

When: 30 November 2023 09.00 to 1630

Live-stream schools event with sessions & class activities from passionate people working to protect our planet both on Earth & Space. Join us for a world full of experts and leading researchers - passionate people working to protect our planet from here on Earth and from space - into your classroom.

Book tickets at:

<https://www.eventbrite.co.uk/e/protecting-our-planet-day-2023-tickets-713787657097?aff=oddtcreator>

Tomorrow's Engineers Week

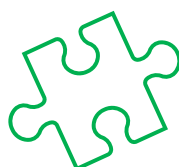
When: 06 to 10 November

Discover information and activities about engineering based careers including green careers.

- Monday – **Live broadcast:** free, live interactive broadcast for schools at 2pm, during which industry experts will share their inspiration and career insights, revealing how engineering is shaping the world of entertainment, technology and the environment today.
- Tuesday – **Turn your passion into a career:** students learn how engineers have turned their passions into a career, helping challenge perceptions that engineering isn't a creative field.
- Wednesday – **Meet the future you:** using the MTFY engineering careers quiz, students explore 3 broad career areas and for each, 3 specific jobs that might be a good match.
- Thursday – **Local career, global impact:** students learn how engineering careers can help solve global challenges by looking at the work of sustainable engineering firms.
- Friday – **Think like an engineer:** students address the problems they care about by getting creative to enter The Big Bang Competition.

Throughout the week, students can complete a journal to log their strengths, ideas and learnings. They will also be prompted to discuss engineering-related issues and send questions to our online panel of careers experts and engineers from a range of sectors. Find out more:

[Tomorrow's Engineers Week - Tomorrow's Engineers \(tomorrowsengineers.org.uk\)](https://tomorrowsengineers.org.uk)



The Green Careers Hub

The Green Careers Hub is a one-stop shop for information on green jobs and skills. Featuring job profiles, career stories and sector insights. They are supporting Green Careers Week by running two webinars, aimed at students aged 14-18:

Sustainability in your future role; an introduction to green careers

Tuesday 7th November 2023

Online: 9 – 9.50 am GMT

Book tickets at:

<https://www.greencareershub.com/developing-your-career/careers-events/green-careers-week-sustainability-in-your-future-role-an-introduction-to-green-careers/>

A day in the life of an environmental apprentice

Thursday 9th November 2023

Online: 10 – 10.45am GMT

Book tickets at:

<https://www.greencareershub.com/developing-your-career/careers-events/a-day-in-the-life-of-an-environmental-apprentice/>

Neon – Brilliant Inspiration

Find out how engineers help solve some of the world's most pressing issues and develop green solutions – from food and transport to energy and how we use things.

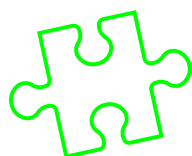
Find out more at:

<https://neonfutures.org.uk/green-engineering-careers-teachers/>

Green Careers Week

Keep track of green careers across all industry sectors during Green Careers Week;

<https://greencareersweek.com/>



CIEEM Chartered Institute of Ecology and Environmental Management

Discover Green Jobs for Nature - So, are you ready to change the world? Then welcome to the Green Jobs for Nature website. Hopefully, you have found us because you want to help create a better world for nature and people, and one way to do that is to think about a career working in a nature-related role. Find out more:

<https://greenjobsfornature.org/>

Amazing Apprenticeships

We've created a Green Apprenticeships Film, featuring amazing apprentices from Amazon, Essex County Council, Leonardo, GEA, Rothamsted Enterprises, Suffolk County Council and more. The film showcases the many ways that apprentices from a wide range of roles are helping to push the green agenda forward, working with a real sense of purpose and driving real change. Find out more:

<https://amazingapprenticeships.com/green-careers-week/>

Catalyst Magazine and Catalyst Magazine Live

Discover exciting STEM related careers, in-depth real world science and fascinating insight into industry research and development. Catalyst Magazine is a free digital science journal for 14-19 year olds covering many topics and themes. Catalyst Magazine Live is a series of live career led webinars. Find out more:

<https://catalyst-magazine.org/>

<https://www.stem.org.uk/secondary/careers/catalyst-magazine>

https://www.youtube.com/playlist?list=PLhgK74tFscGXhOJihK_648lxoSw4LGCf

Message from STEM Learning

There is an urgent need to address the challenges of climate change. The transition to a low carbon economy will be key in ensuring continued economic growth whilst addressing these challenges.

This transition has already begun, in the UK alone there are over 400,000 jobs in low carbon businesses and their supply chains. The number of such jobs is expected to grow, the government has set an ambitious target for two million green jobs in the UK by 2030. The government's green jobs taskforce identified the 'clear pathway into good green careers' as being one of the pillars to a lower carbon economy.

We are supporting student and teachers' awareness of these future careers.

We aim to ensure that young people have the best opportunity to succeed in a chosen profession, and the economy has the skilled and talented future workforce required to successfully transition to a low carbon economy. At STEM Learning, we are committed to the power of STEM education to change lives.

We encourage teachers and students to find out about the many green jobs, roles and careers that exist now and are developing in the next few years.

Destination STEM is dedicated to helping students and teachers build awareness of the many STEM enrichment opportunities available to them. You will find careers information, activities and resources to help students develop new and existing skill sets as well exciting information to prepare young people for the future.

Find out more:

<https://www.stem.org.uk/secondary/enrichment>

If you are looking for in-school careers support or support with STEM activities, then reach out to the STEM Ambassador Programme.

STEM Ambassadors are volunteers from industry and academia who work, study or research in a STEM related industry. STEM Ambassadors support the delivery of effective and engaging careers awareness through a variety of interactions for teachers, careers advisors and young people. Helping to develop knowledge and skills.

Visit:

<https://www.stem.org.uk/stem-ambassadors>



Careers Awareness, led by STEM Learning

Achieving world-leading STEM education for all young people across the UK.

For more information on the programmes, CPD, publications and careers support available from STEM Learning, visit our website www.stem.org.uk

