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BEYOND SCIENCE MAG



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Know the world beyond

## **Unveiling the Brilliance: January edition**

Dive into a symphony of innovation as we proudly present our latest compilation edition!

From the depths of oceans to the far reaches of the cosmos, join us on a journey through diverse fields of science and technology. This edition brings together brilliant minds, each contributing their unique melody to the grand composition of knowledge.

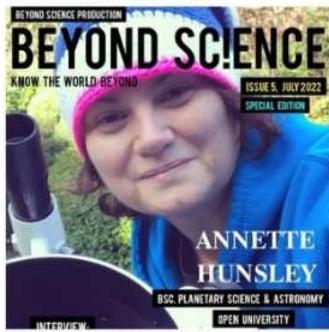
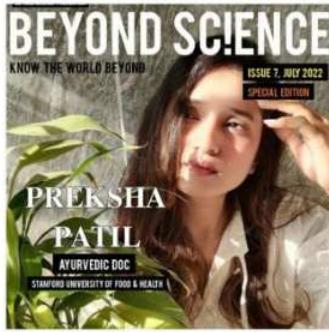
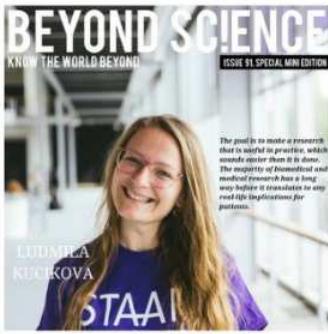
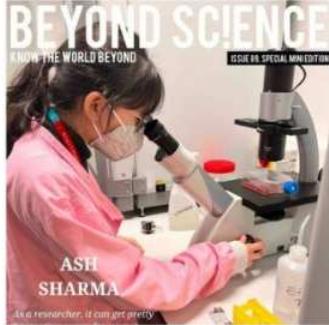
### **Across Continents, Across Disciplines**

Meet the trailblazers, our cover stars throughout the world shaping our future.

### **A Tapestry of Knowledge**

This edition is more than a magazine; it's a tapestry woven with threads of curiosity, passion, and the relentless pursuit of truth.

*Prepare to be inspired, enlightened, and captivated. The journey begins here.*





*My curiosity about finding plant diversity and its molecular mechanism landed me choosing my Ph.D. topic “Molecular investigation for sex determination in *Garcinia indica*”.*

**Cover star**  
**Reshma Patil**  
PhD, plant molecular biology

## ***Why did you get into this field and devote your life to plant molecular biology and what drives you?***

Since my childhood, I dreamt of being a scientist. I'm a nature lover and plants are my favorite. During my final year of graduation, I started with a plant molecular marker project and continued with the same project theme for my post-graduation. My curiosity about finding plant diversity and its molecular mechanism landed me choosing my Ph.D. topic "Molecular investigation for sex determination in Garcinia indica". The complex gene network in woody plants and its gene function drives me crazy to explore more in this field.

## ***What is plant molecular biology all about?***

Plant molecular biology studies plants at DNA, RNA, and protein levels. Using high throughput techniques, plants can be analyzed to elucidate their unique characteristics. It is all about understanding the molecular/genetic mechanism to unravel the gene function for various applications in plant biology.

## ***What is the current research going on in the field and what can we expect in the future?***

Currently scientists have made great contributions to plant science. Many new technologies, such as CRISPR/Cas genome editing and deep sequencing, have been discovered, developed, and applied. Moreover, discoveries such as microRNAs and other epigenetics have been published. Recent work in plant molecular biology focuses on developing biotic/abiotic stress-tolerant crop plants, production of plant YACs (vector) carrying soybean DNA, using antisense technology to study photosynthesis, etc.

## ***What are the future challenges according to you?***

The novel genetic resources, genome modification, and omics technologies generate new solutions for food security under changing environmental conditions however the future challenge would be to improve crop yield and modify the desired plant trait for the agriculture revolution. Being specific with my Ph.D. topic, identifying the phase transition in woody plants and understanding their mechanism is exciting in tree species.



**Cover star**  
**Sona Shahani Shukla**  
Astrophotographer

*This hobby not only  
nourishes the soul, it makes  
you a lifelong learner. Be it  
new equipment, new software  
there's always something to  
learn each day that I am out  
with my telescope.*

## ***How did you get into Astrophotography? What drives you?***

I am an entrepreneur, and quite often we have to undergo coaching sessions, during one of these my coach asked me "what am I doing to nourish my soul?" a deep question indeed.

I thought for a couple of days, and the answer lay in my hidden passion for the night sky, that's what I wanted to do to nourish my soul. I gifted myself a Celestron Astromaster 130EQ motor drive, bought from Amazon in September 2018. A beginner's mistake, I didn't get to use it much, to be honest I had no idea how to use this.

The steps which I should have taken before I embarked on buying the telescope, I did post the purchase. I joined a few Whatsapp groups on astronomy, attended one star party, and understood the mistakes I was making with my scope.

All in all I ended up selling this scope and investing in an 8" Skywatcher Flextube Dobsonian, this was June 2019.

And from the moment it was assembled I was able to use it, observed moon, that's when my daughter pulled out my iphoneXS over eyepiece and showed me a far better detailed image of the moon than what our eyes could see.

That was the turning moment from visual astronomy to astrophotography!

Rest as they say is history, starting with smartphone astrophotography to dslr then to dedicated planetary camera, in span of a year learnt imaging and post processing.

The Night Sky has always fascinated me since I was 2 years old, and after so many years when I took up the passion again, I am just so much involved, always tracing the weather, planning for what I can shoot from my balcony, sometimes I do go out of Delhi's bortle 8 skies.

So the passion and curiosity drives me, the beauty of the cosmos overwhelms me.

## ***What do you think are the future challenges in astrophotography?***

As an astrophotographer the challenges are abundant, its unlike normal photography, we are trying to catch photons which are billions of light years away.

### **- Light Pollution:**

The rampant development of our cities has led to erosion of beautiful night skies. Specifically the introduction of LED lights has caused havoc for our hobby.

The filters designed to combat light pollution weren't designed for the LED lights.

When I image planets, my balcony faces two very strong LED street lights, no matter how much I try to cover using sheets and other materials, the light is a big nuisance.

### **- Satellites**

These are even visible naked eyes from a city like Delhi, sufficient to ruin your long exposure frames.

### **- Weather**

The climate change we are witnessing is unprecedented, and yes it is a challenge for us to find a place which isn't impacted by the same.

I have twice been to bortle 4-5 skies and found clouds/storms at unusual times of the year.

We can't be sure of the existing weather patterns, one has to be vigilant and sheer luck to get rows of clear nights.

- The High demand and supply chain disruption

Due to the pandemic there has been a substantial increase in people opting for this hobby, and to top it our government isn't providing this science based hobby to flourish as all the equipment is to be imported from abroad and attracts a criminal amount of custom duty.

The equipment for astrophotography is usually made in China, Taiwan and the supply chain has been disrupted so frequently that everything you want to buy is in back order. Else the Indian dealers charge a premium on supplying these equipment. I am sure there will be many many more challenges, these are few which I can think of.

## ***What can we expect in the future in terms of astrophotography according to you?***

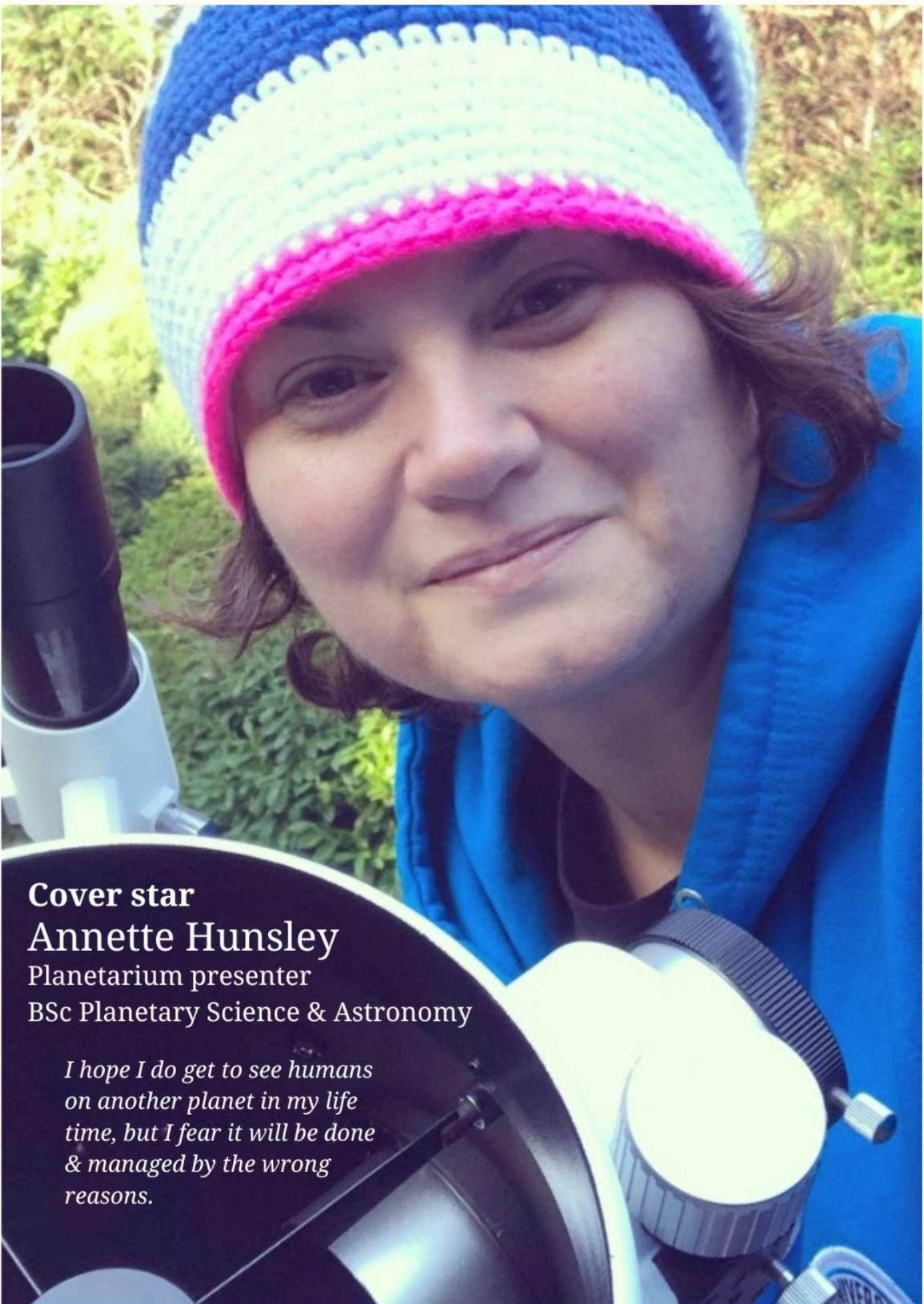
The launch of the James Webb telescope is the new phase for science and for astrophotography, we have been in awe of Hubble images and now can't wait to see what James Webb has to share.

Also the improvement in the sensors of the astro dedicated cameras has added so much quality to the amateur telescopes capability.

So in future the high tech cameras, telescopes and filters will contribute to quality imaging.

Also the capturing softwares like NINA, have contributed to the ease of use.

The future is very exciting and promising, personally i have been buying equipment for my DSO rig, the availability has led to the delay but I am half way there, so very excited to be able to image beyond the Sun, Moon & planets. Be it new equipment, new software there's always something to learn each day that I am out with my telescope.



**Cover star**  
**Annette Hunsley**  
Planetarium presenter  
BSc Planetary Science & Astronomy

*I hope I do get to see humans  
on another planet in my life  
time, but I fear it will be done  
& managed by the wrong  
reasons.*



## ***Why did you decide to study planetary science and astronomy and what drives you?***

I decided to study Planetary Science & Astronomy a few years ago when I felt like I needed to do something for me. I have two young girls, and it's true what they say parenthood is hard & consuming. I've always had a passion for space, but wasn't until I started to study it did I realise how much!

Juggling life & study can be difficult but I continue to push forward because of my girls. Showing them that you can study & pursue a career in something you're passionate about is everything.

## ***When do you think humans will explore other planetary systems?***

We're a long way off humans being able to explore other planetary systems. Lets not forget the fact that technology can currently only get us to Mars, and not back; that the only object to have left our own system is a probe launched back in the 1970s. The timescales for such a mission would be phenomenal. Those humans who launched would not be the humans who arrived at the exoplanet systems as the nearest will take about 6000 years to get to. Our best bet is for humans to fully explore our own system more thoroughly before we consider others.

## ***Do you think there is life, beyond the solar system?***

This is the million dollar question. And I'll admit I keep swinging from one side of the fence to the other. I believe there is the potential for some form of life outside our Solar System. With the number of exoplanet systems discovered increasing every day and the view that every star has at least one planet orbiting it, the odds are life has found a way somewhere else. However, whether that life is human I doubt. Our own planet's history is so nuanced with specific events which changed the path of life & its development that I feel, regardless of the thousands of planets out there, there most likely will not be one which has experienced the same path as ourselves. Which then raises the question, does a planet have to follow the same path to get to the same outcome? This is something we don't know yet.

## ***Till when do you think humans will become a multiplanetary species?***

Becoming a multiplanetary species however is not far away. The US has a mandate they're currently working to land humans on Mars in the 2030s. And I believe technology & enthusiasm will get us there. How viable humans on Mars will be in the long term remains to be resolved. There are so many challenges to not only colonise another body (governance, rights, privilege) but also make it a habitable place for human life (food, water, habitat). And that's not considering whether we should even have the right to do it. I hope I do get to see humans on another planet in my life time, but I fear it will be done & managed by the wrong reasons.

## ***What are the future challenges you consider in astronomy?***

The challenges for astronomy - and any space related discipline - will increase over the coming years. The key will be ensuring the justification of spend. People are becoming acutely aware of budgets required to achieve results reflecting our now capabilities. If there is no understanding of how these can benefit humans (and our planet) in their every day lives the work will consistently be called into question.

That said, with the JWST launch, Artemis program and of course the hype around space travel created by the 'space barons' hopefully an appreciation of understanding and experiencing space will be more welcomed the more it happens.





## ***How were you attracted towards physics ?***

I was drawn towards science since a very young age after watching the picture of Kalpana Chawla in one of our books. At that time she was the first woman astronaut who I had seen till then and to me that was a big inspiration. So naturally I was drawn to science as I dreamt becoming like her. Later on my interest shifted towards becoming a researcher and physics was the subject that spoke to me the most merely because of the numerous applications with which you interact on a daily basis. I wanted to go behind the reason how that was happening.

Even today I enjoy doing experiments and things which involves manual work more than theory because that's the thing where theory becomes tangible and this is also what drives me to study physics.

## ***What do you think is the role of physics in the development of humankind?***

Like I said that some of the applications of physics are so common that you interact with them on a daily basis starting from working of home appliances to understanding complex things like basis of origin of universe. Apart from this, physics comes handy in medical field as well like the use of X-rays and accelerators in treatments. All of this came from physics experiments. So definitely the life quality of humankind is being improved via physics. There is an interdisciplinary approach when it comes to the development and the demarcation of subjects is no longer needed then.

## ***Can you tell us about the current research going on in the field?***

A lot of things are happening in various disciplines of physics as well. We are trying to study how already known phenomenons change or behave at extremely low temperatures and this is of great interest to people working in Solid State physics as well in concepts of superconductivity etc. and this finds applications to working of huge accelerators at CERN as well where magnets are kept at low temperatures. Also the field of plasma physics is also active in trying to harness the power of fusion energy and plasma and use it as an alternative source of energy in the future so that we can reduce dependence on non renewable sources. Machine learning and AI are also being applied in various fields so as to make analysis of huge amount of data a bit convenient. After supercomputers, we are stepping into quantum domain. Recent launch of telescopes like JWST are helping us to probe deeper and clearer into secrets of space and our satellites are reaching farther planets.

## ***What do you think are the future challenges in physics?***

We have a lot of unsolved problems even right now like unification of gravity in standard model trying to get a theory of everything, confinement of plasma for a long time, climate change which will impact other spheres inevitably like weather which will impact study of astronomy and astrophysics later but progress is being made little by little. Once we overcome these and venture further then problems are sure to creep in but that's the thing about physics and life in general. It is not a smooth path but it's worth it!



*Let's trust Ayurveda more and rather relying only on western medicine let's give a warm hug to Ayurveda so that people can live their lives with minimum side effects and long term life.*

**Cover star**  
**Preksha Patil**  
*Ayurvedic Doctor*  
*Stanford university of*  
*food & health*

## ***What motivated you to become an ayurvedic doctor?***

I decided to become an Ayurvedic doctor the day I could see how allopathic medicines were affecting my dad suffering from DM and HTN. Certain medications have worst Side effects which cannot be ignored and hence instead of opting for MBBS , i decided to go in a traditional way and keeping up with my roots.

## ***Is ayurveda declining with respect to western medicine or how is it competing?***

Ayurveda is not declining. It is just avoided kept inattentive with respect to treating certain diseases. Ayurveda is not like western medicine which works within 5mins or 1hr but it works and treat diseases right from their roots. In today's hustle life, if a person has fever , he will directly take Dolo 650 as he needs an instant relief to go on with his respective work but nidaan parivarjan is extremely

important. Person suffering from Cancer has to take Chemo along with medications but Ayurveda works like a miracle in treating it's side effects.

## ***Can you enlighten us about some ongoing current research?***

There are many topics on which research is taking place and most interesting one is anti-hyperglycemic, anti-hyperlipidemic, and anti-inflammatory effect of the drug Guggulutiktaka ghrita on high-fat diet-induced.

## ***Future challenges you consider in ayurveda?***

Future challenges are more as we go in depth. But if we decide to take one step at a time then trust is an important factor. Let's trust Ayurveda more and rather relying only on Western medicine let's give a warm hug to Ayurveda so that people can live their lives with minimum side effects and long term life.



*I'm driven by challenge, whether it be addressing global challenges like climate change or the energy crisis, or by personal challenge. I have a strong intellectual curiosity and am compelled to seek solutions to problems I encounter.*

**Cover star**  
**Chirag Patel**  
***PhD researcher working  
on Li ion batteries for EV's***

## *How chemical engineering field pulled you?*

I've been interested in how things work from a young age, from the nanoscale to the macroscopic. I also wanted to study something with plenty of practical applications, so I chose chemistry as a degree, I graduated with an integrated masters in 2019. I decided I wanted to pursue research, so a PhD was the natural way forward. I wanted to apply chemical concepts to real world applications, so I chose to pursue my PhD in a chemical engineering department. I'm driven by challenge, whether it be addressing global challenges like climate change or the energy crisis, or by personal challenge. I have a strong intellectual curiosity and am compelled to seek solutions to problems I encounter.

## *How does a typical day in your life looks like?*

A typical day for me starts by going over a work plan. On some days I have a meeting with my supervisor. I'll spend some time going through literature or going over relevant scientific concepts. I'll then begin my lab work, which usually starts with preparing a suspension or a cathode slurry, then some analytical techniques, recently DLS and microscopy, to name a few. On some days, I'll have meetings with other researchers from the consortium I'm part of. I'll leave work in the late afternoon/evening (I typically work better late in the day), then will go and do a physical activity e.g. running, rock climbing etc.

## *Can you brief us about current research taking place in your field?*

My field of research is Li ion batteries for electric vehicles, specifically the cathode. There's lots of research being done into new types of cathode materials, focusing on different chemistries and structures. Both can affect battery capacity and longevity over repeated charge/discharge cycles. New nickel-rich layered materials are being explored, as nickel contributes to higher capacities, resulting in more powerful batteries. Cathodes with little to no cobalt are being researched, due to supply chain concerns with cobalt. My research investigates more eco-friendly and cheaper ways of cathode processing are being looked at, particularly to eliminate the use of expensive and toxic solvents currently used. This requires the use of surfactants to disperse the conductive filler and the choice of binder material needs to be considered.

## ***What is the future of electric vehicles according to you?***

That's a good question. Currently, electric vehicles are becoming more popular with consumers. At the moment we have brands such as Nissan and Tesla whose electric cars are quite popular - I've seen a lot of them on the road recently. As the UK government intends to stop the sale of new internal combustion engined vehicles by 2030, we'll be seeing a lot more electric cars on the road. It's not just cars - some cities over here are trialling electric buses. Goods vehicles too - my university uses a fleet of electric vans. As battery technology develops, electric vehicles will become more powerful and operate over a longer range. The company Britishvolt is building a giant gigafactory for batteries; mass production will drive down prices and make electric vehicles more affordable to consumers.

## *What are the future challenges you consider?*

One of the main challenges is supply of raw materials. Lithium is not considered rare, but isn't super common either. Much of it comes from China, but can be mined here in the UK, though developing the infrastructure will be expensive, as well as lithium being a finite resource. Cobalt is mostly mined in the D.R.Congo, where there are ethical concerns about child labour. As a consequence of supply issues, recycling of batteries must be addressed. Another set of challenges are presented by existing infrastructure for electric vehicles, there needs to be a sufficient network of charging points. Which leads onto another issue - where is all this grid power coming from? Electric vehicles can't be seen as environmentally friendly if the power used for charging is generated by fossil fuels, so more reliable renewable sources of mains energy need to be implemented for the environmental impact.



Go beyond the "reduce, reuse, recycle" method---consider the other "R's". Repair your broken electronic devices and mend your clothes. Rot away your food waste by composting. Refuse plastic on a daily basis, especially when it's unnecessary. Use what you already have. Tell others about your efforts to conserve!

**Cover star**  
**Jessi**  
Science communicator,  
conservation ecologist

## ***How did you start your career to become conservation ecologist?***

I actually started in the field of marine biology before migrating over to a more sustainability-based career. I grew up around the ocean, so I've always been very interested in its creatures and spooky depths. More recently I have found a new passion in conserving our ecosystems because the need for ecological protection is at an all time high. Seeing the small impacts that I can make in societal sustainability and conservation efforts drives me to do better each day!

## ***How does a day in your life looks like?***

I spend a good majority of my day in front of my work computer--researching the latest news in sustainability, writing curriculum to teach the local community on waste-reducing efforts, or working on my master's thesis. On occasion, I do get some time in the field where I can help my colleagues with various research projects. Our lab focuses on the conservation and restoration efforts of marshes and surrounding areas here in the Gulf of Mexico, so we still spend a lot of time out on the water.

## ***What's your take on climate change and plastic pollution?***

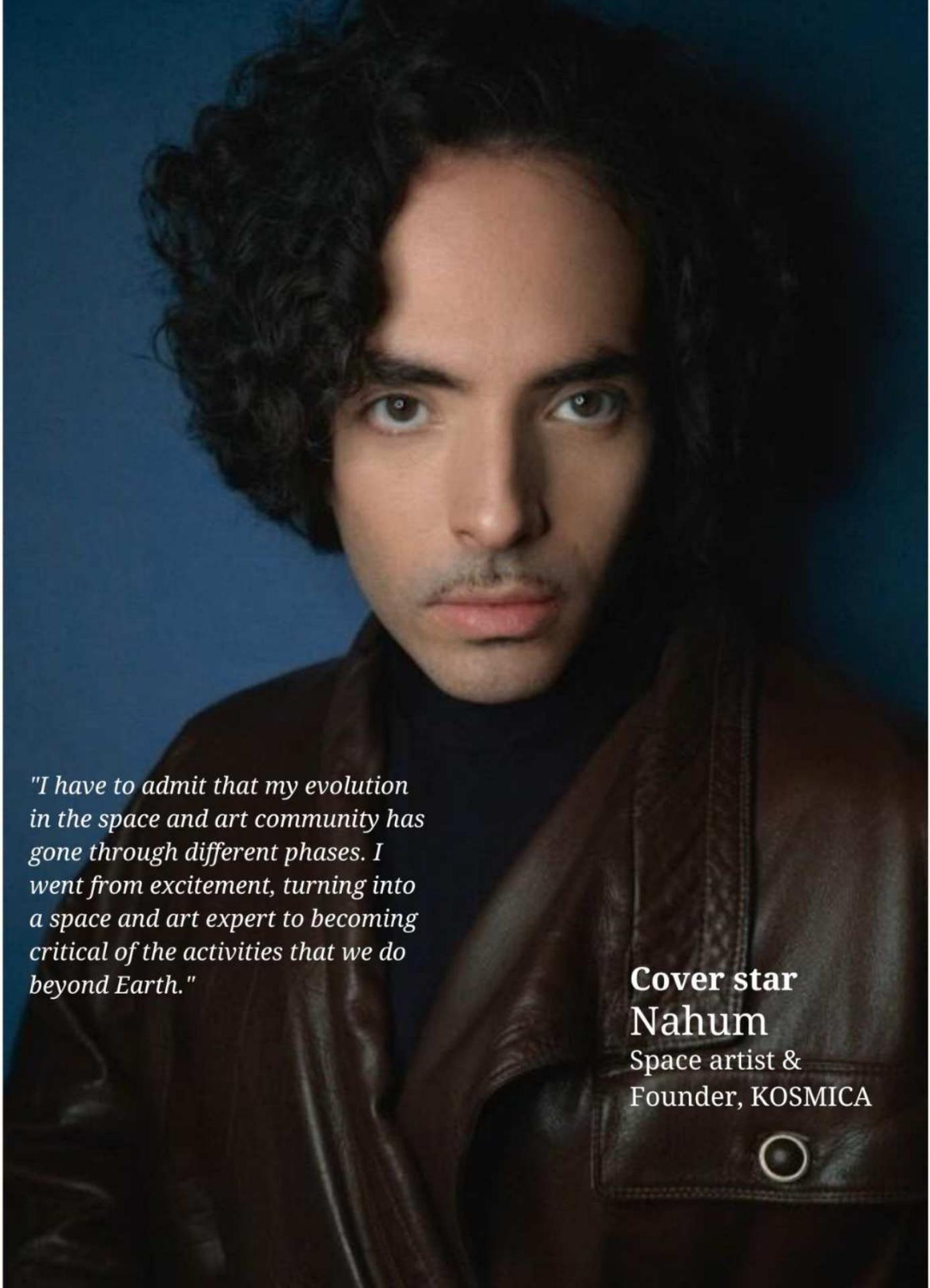
Climate change is a highly complex topic that needs to be taken more seriously, especially in the United States. While I am not a climate scientist, I know its effects directly influence every aspect of my life. Plastic pollution is another multifaceted topic that needs more attention. In my opinion, plastic is a necessary evil that provides a great durability and efficiency to things such as sterile medical supplies, transportation, electronics, etc. However, we have grown too comfortable with using this material for almost everything and the system of removing plastic from our waste stream is hugely flawed and unreliable. We need to focus our attention on the prevention of plastic waste rather than the disposal!

## ***What are the ways, we can conserve our planet?***

Go beyond the "reduce, reuse, recycle" method---consider the other "R's". Repair your broken electronic devices and mend your clothes. Rot away your food waste by composting. Refuse plastic on a daily basis, especially when it's unnecessary. Use what you already have. Tell others about your efforts to conserve!

## ***What are the other future challenges that you consider in the field?***

I think we will continue to see new challenges appear as the world continues to warm and the seas rise. Unless we act quickly, the effects of climate change will push us further into emergency and cause more stress in the STEM field. There are many great scientists across all fields actively working on solutions, and I hope to be a part of them one day.

A close-up portrait of Nahum, a man with dark, curly hair and a mustache, looking directly at the camera with a neutral expression. He is wearing a dark, zippered jacket. The background is a solid blue.

*"I have to admit that my evolution in the space and art community has gone through different phases. I went from excitement, turning into a space and art expert to becoming critical of the activities that we do beyond Earth."*

**Cover star**  
**Nahum**  
Space artist &  
Founder, KOSMICA



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***What inspired your journey into the realms of space and artistic expression, and what fuels your passion in this unique field?***

In 2008 I was curating an underground venue in London called Shunt Lounge. We opened at night and hosted the most daring and wild performances in the city at the time. We were only open at night and our endless labyrinth of corridors and underground chambers could fit a whole football stadium. Through my work there I met many artists, some of whom were already working at the intersection of space and art. I later met Nicola Triscott and Rob La Frenais from the Arts Catalyst, who later introduced me to the International Astronautical Federation as they were opening a committee on arts and culture in space. I raised my hand and offered to help. It made sense to me to work underground in my theatre and above ground in space. The rest is history!

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I have to admit that my evolution in the space and

art community has gone through different phases. I went from excitement, turning into a space and art expert to becoming critical of the activities that we do beyond Earth. I am in this stage at the moment. While I am still in awe of the core of space activities, I see signs and patterns that I find problematic. From the normalisation of colonisation in space, the use of the capitalist template for space resources to the alarming lack of diversity in astronautical crews. Historically art has asked difficult questions and I think that today is no exception when it comes to space activities.

## ***How would you define the intersection of space and art?***

I don't like to see space and art as a specific category of the arts as I find it quite claustrophobic. Instead, I think space and art are about pretty much everything and anything. Surely, there are specific kinds of artworks that deal directly with the cosmos or that employ space technology. While I have done both, I am more interested in the stories that space and art can tell us about ourselves.

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I am particularly interested in using the space perspective to look at us from a different vantage point. At the same time, it offers us an opportunity to value Earth and find some excitement in the strangeness of existence.

***Could you share insights into the artwork you've created for the International Space Station (ISS)?***

A few years ago I was offered to come up with an art project that would use a new technology onboard the International Space Station to have a real-time interaction with something there. With the support of the International Space University and Space Applications Systems, we started devising the possibilities. In the end, I came up with the idea of sending people's pulses to a flashing light inside a box in the ISS. This box has some cameras so people can see their hearts beating in real-time in a different time and a different space. This project is called the Contour of Presence and in a few weeks, the artwork will come back to Earth.

## ***How do you envision the future relationship between space and art unfolding?***

I prefer not to predict and just be surprised by the new works and ideas coming from the arts. If anything, I hope to see more visions that bring kindness and care to this planet and the universe we live in. It's tragic to see that we are developing the latest science and technology to learn more about the cosmos and to venture beyond Earth's atmosphere to perpetuate ideas that are 500 years old. I do hope that space travel will be an opportunity to find new systems and alternatives to all those things that aren't working on Earth - and artists are key in imagining these futures.

# BEYOND SCIENCE

## EXCLUSIVE

# LYRA GLASS

## STEREOSCOPIC ARTIST

*Dive deep into  
stereoscopy with  
journey of Lyra Glass*

by Sona S.

"My name is Lyra Glass! I am a self taught homeschool student and I have spent most of my life studying astronomy & physics. I also make stereoscopic art using real cosmic symmetries".

## ***Can you tell us more on what is stereoscopy?***

Stereoscopy is a kind of 3D illusion technique that uses the science of the eyes to create the appearance of depth using 2D images. Cross-eye stereoscopy is a specific kind of stereoscopy that allows you to cross your eyes over two separate images to create depth, with each image an alternate angle for the respective eye.

As a toddler I learned how to do this with the Magic Eye series; Illusion books with stereo 3D shape information hiding within noise that can only be seen using cross-eye stereo. With 20+ years experience of this my eyes are adapted for it and it's now second nature for me to use as a measurement tool.

For those who are unable to view stereographs, I have also developed a composite process that simulates the pseudo-depth symmetry of my art but in 2D form.

## ***What are these "cosmic symmetries"?***

They are naturally occurring symmetries of gravity affected objects, especially gravitational lensing; light warped by the invisible tug of gravity and dark matter creating multiple duplicates of the same galaxies. Hamilton's Object, the inspiration for this project, is one such visual distortion caused by gravitational lensing.

## ***Why did you begin this project?***

Hamilton's Object was of particular interest to me as it is a natural mirror image. Due to mirror logic, the Object can be thought of and viewed as a natural stereograph; one must simply take the image of the Object and flip/mirror a second copy next to the original to create a full, natural

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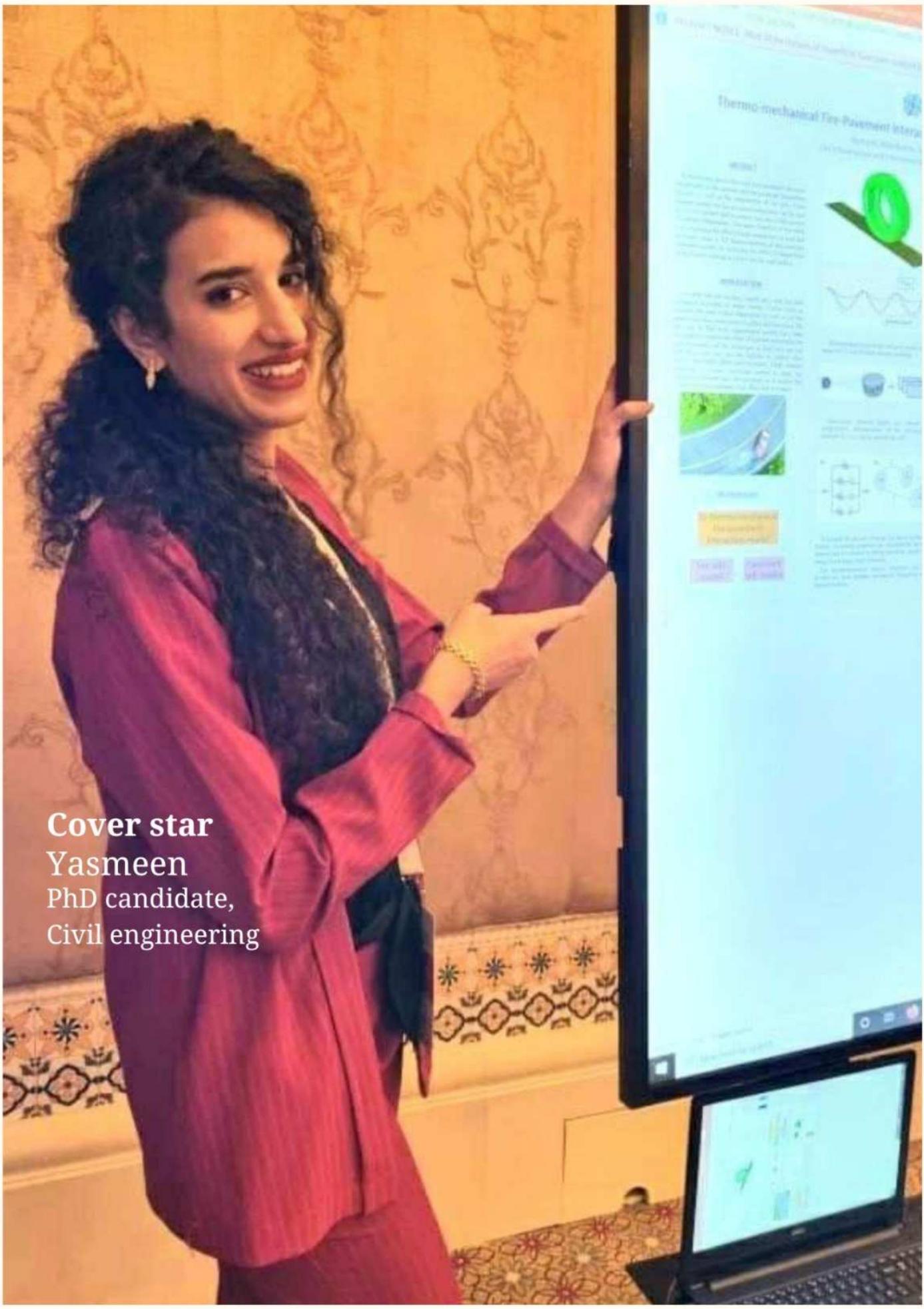
stereograph. This appeared to show a kind of coherent pseudo-depth that my eyes could follow.

This was surprising. Among other things, it revealed a 3D caustic that I had no knowledge of prior, and I verified later that the rippled caustic did in fact exist within the research paper. I didn't even know these kinds of caustics existed but there it was. This, as well as further observations, have lead me to question whether stereoscopic analysis of gravitational lensing could have more scientific applications.

I am working on this project to hopefully get enough attention for it to be researched in the future. While I can't say anything scientifically, I am qualified to say that my observations have been intriguing and beautiful. However I am not qualified for any further speculation. So, for now I make stereoscopic art using real cosmic symmetries. Why this works I shall leave to the experts.

(Join Lyra @emergeholographic on instagram)

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**Cover star**  
**Yasmeen**  
PhD candidate,  
Civil engineering

## ***What motivated your decision to pursue a PhD in civil engineering?***

I have spent couple of years in industry and I thought it's not for me and I do prefer academic life! so I made a decision to prepare my self for PhD applications.

## ***Could you elaborate on a fascinating aspect within the realm of civil engineering that captivates your attention?***

It is the most ancient engineering discipline! It's the knowledge behind having cities!

Every building, bridge, substructure, highway or railway, water and wastewater facility you see is designed by a civil engineer!

It fills the gap between artistic architecture and the science of mechanics and structures.

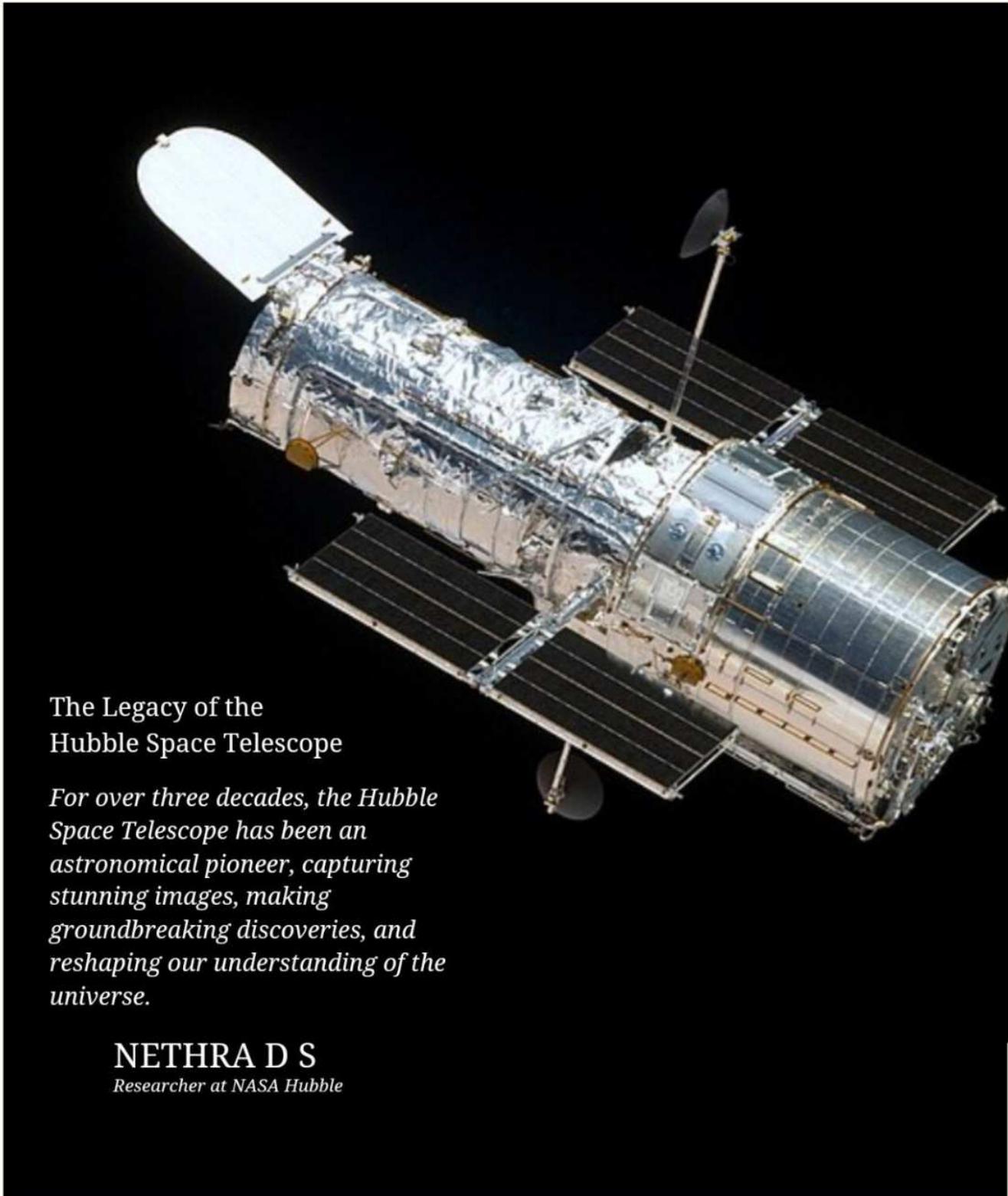
## ***Could you provide insights into the focus of your ongoing research?***

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I am studying tires and pavement interaction, specifically the high temperature effect on skid resistance between asphalt pavement and car tires. countries like UAE are very hot and this would affect the amount of friction between the tire and the road which would affect a driver's safety!

## ***What are the upcoming challenges you foresee?***

My research is quite challenging already because it requires very advanced finite element analysis knowledge, which takes relatively long time to master it.



## The Legacy of the Hubble Space Telescope

*For over three decades, the Hubble Space Telescope has been an astronomical pioneer, capturing stunning images, making groundbreaking discoveries, and reshaping our understanding of the universe.*

**NETHRA D S**  
*Researcher at NASA Hubble*

## *A Glimpse into History*

The story of the Hubble Telescope began in 1990 when it was launched into low Earth orbit. Despite an initial setback due to a misshaped mirror, subsequent servicing missions by astronauts helped correct its vision. The telescope quickly became a beloved icon of space exploration, earning a place in the hearts and minds of scientists and the public alike. Its journey has been marked by resilience and adaptability, exemplifying humanity's ability to overcome challenges and persevere in the pursuit of knowledge. The Hubble Space Telescope's voyage is a testament to the indomitable human spirit, as it navigated not only the depths of space but also the challenges that arose during its mission.

## *Unveiling the Cosmos*

One of Hubble's most profound contributions lies in its ability to capture the beauty of the universe. From the mesmerizing Pillars of Creation in the Eagle Nebula to the hauntingly surreal image of the Hubble Deep Field, the telescope's images have ignited a sense of wonder and curiosity in people around the world. These images have transcended the boundaries of scientific data, becoming works of art that inspire and captivate. Hubble's ability to transform raw data into breathtaking visuals has brought the cosmos closer to home and made the universe accessible to all. Through its lens, we've seen galaxies in all their splendor, gas clouds that birth stars, and the distant past of our universe. Its images have made the incomprehensible beauty of the cosmos a part of our collective consciousness.

## ***Revolutionizing Astronomy***

Hubble's scientific impact extends beyond its visual appeal. The telescope has provided key measurements for the Hubble constant, which describes the rate of the universe's expansion. It has also played a crucial role in unraveling the mysteries of dark matter and dark energy, two enigmatic components that dominate the cosmos. Its precise observations have allowed astronomers to refine their understanding of the fundamental forces at play in the universe. Hubble's legacy lies in its contributions to the very fabric of astrophysics, providing valuable insights into the evolution of the cosmos. Its scientific contributions have not only enriched our knowledge but have also raised profound questions about the nature of the universe and the forces governing its expansion.

## *Peering into the Past*

Hubble's deep-space observations have allowed us to peer billions of years into the past. Through its lens, we've witnessed galaxies in their infancy, gazed at the formation of stars, and discovered distant exoplanets. The ability to study the early universe has been a hallmark of the telescope's legacy, offering a time machine that takes us back to the universe's formative years. It has raised profound questions about the origins of galaxies and the conditions that allowed life to emerge, sparking a relentless pursuit of answers. Hubble's deep field observations, in particular, have redefined our understanding of the universe's history, showing us that even the tiniest patch of sky holds a treasure trove of ancient galaxies.

## *Influencing Space Exploration*

The Hubble Telescope has not only impacted our understanding of the cosmos but has also shaped the future of space exploration. Its successes have inspired the development of new observatories, such as the upcoming James Webb Space Telescope (JWST), which will continue Hubble's mission and expand our horizons. The legacy of Hubble extends beyond the confines of its own lifespan, as its lessons and achievements have become the foundation upon which future space telescopes and missions are built. It has set the standard for what we can achieve in the realm of space exploration and observation. The technological and operational innovations developed for Hubble have become valuable assets for the space community, ensuring that the pursuit of knowledge in the cosmos continues with ever-increasing sophistication.

## *Educational and Inspirational*

Hubble's influence extends beyond the scientific community. It has served as an educational tool, bringing the wonders of the universe into classrooms, planetariums, and living rooms. The telescope's images have fostered an appreciation for science and exploration, inspiring future generations of astronomers and space enthusiasts. Its legacy in education and outreach has kindled a passion for the cosmos in countless individuals, encouraging young minds to pursue careers in STEM fields and fostering a deep respect for the natural world. Hubble has been a catalyst for the public's engagement with science, proving that the beauty of the universe is not confined to textbooks but can be a tangible experience for all. Its outreach initiatives have brought the cosmos closer to the public, sparking curiosity and a desire to explore the unknown.

## *A Lasting Legacy*

As we celebrate the legacy of the Hubble Space Telescope, we recognize its enduring impact on our understanding of the universe and its ability to ignite the imagination. With its successor, the JWST, on the horizon, the legacy of Hubble continues to evolve, promising even more remarkable discoveries and a deeper understanding of our place in the cosmos. Hubble's journey is far from over, and its legacy remains an enduring testament to the human spirit of exploration, innovation, and the unrelenting pursuit of knowledge. In its remarkable journey, the Hubble Space Telescope has not only captured breathtaking images but has fundamentally altered the course of astronomy. Its legacy is a testament to human ingenuity and our unending quest to unveil the mysteries of the universe, leaving an indelible mark on the cosmos and in the hearts of all who have been touched by its celestial wonders. Hubble's legacy is a testament to the enduring human spirit of curiosity, exploration, and the relentless pursuit of knowledge.



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*You learn so much about yourself  
and about others in analog  
environments and the bonds you  
create are tight.*

**Cover star**  
**Martina Dimoska**  
Analog astronaut



First female Balkan &  
Macedonian analog astronaut

## ***Can you share your journey into becoming an analog astronaut, and how did your Balkan and Macedonian background influence your passion for space exploration?***

In the Balkans, we never really had a Space Industry, no Space Agencies, No Space History or Space Culture. The learning curve was pretty much a trial-and-error and the path to belonging in the Space Sector was and still is quite a challenging one. You have an unfavorable starting point but my passion was evident and I am not a quitter. I started by obtaining a NAUI Diving Certification. Then I completed the 'Analog Mission Basic Training' or AMBT by the Austrian Space Forum (OeWF) and I worked on the SHEE Habitat while pursuing my Masters of Space Studies at the International Space University. I became the first Macedonian Analog Astronaut and the first Balkan Female Analog Astronaut by serving on the UND ILMAH 14 (Integrated Lunar Martian Analog Habitat) supported by NASA, CSA, Simon Fraiser,

and the University of North Dakota, as a part of their 14th mission as a Science Officer. Two research experiments were flown on the ISS, for which the Analog was a test bed: CardioBreath and Exolab. My second Analog Astronaut Mission was the APICES (Astroland Project Inside Caves for Earth-based Space Exploration) organized by ICEE Space x Astroland Interplanetary Agency, My primary role was a Crew Engineer, and my secondary role was Crew Outreach Lead. The mission was held in a National Protected Park, deep down within a cave in Santander, Cantabria, Spain, where our Mission Commander was ESA Astronaut Reservist Ales Svoboda. My third Analog Astronaut Mission was as a Mission Commander on the mission called SELENE at LunAres where I climbed through the ranks with hard work and perseverance and deserved my commander slot, leading a magnificent team. It's really important to note that I am also NASTAR Center Suborbital Space Flight Certified and the first NASTAR Senior Ambassador. The main difference between orbital

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and suborbital flight is the speed at which a vehicle is traveling. An orbital spacecraft must achieve what is known as orbital velocity, whereas a suborbital rocket flies at a speed below that.

ETC's National Aerospace Training and Research (NASTAR) Center is the first (and so far to my knowledge \*only\* within the US) Federal Aviation Administration (FAA) approved center able to meet the training requirements for commercial human spaceflight (14 CFR § 460.5).

It is recognized as the leader in orbital and suborbital spaceflight training and is known for its Upset Prevention and Recovery Training (UPRT) program for commercial aviators. Through their facilities, they train Astronauts from the likes of SpaceX, Axiom Space, and Virgin Galactic.

## ***How does a typical day in your life look like?***

When you're on a Mission as an Analog Astronaut you follow a strict mission plan and an extremely structured schedule with a lot of pre-planned activities, surveys meant to gather as much precise data, one conducts experiments, Extra-Vehicular Activities (EVAs), briefings, writing reports and summaries of the scope of work, there are essential crew activities or crew time, as well as maintenance of the habitat. When you're not on a mission, you're a published researcher whose life is focused on conducting research in collaboration with laboratories carrying out those experiments further and doing post-mission analysis of gathered data, a lot of paper reading, writing, and citing, publishing your work, attending conferences, seminars, giving talks, masterclasses and presentations, in a nomad-like life in a suitcase traveling all around the world. It's an exhausting lifestyle that would have been lonely if I didn't have my supportive space family, where aside from incredible friends they double as remarkable colleagues involved in that same research work, all around the globe in each corner of the world.

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***What challenges have you encountered in advocating for space exploration in your region, and what strategies have you found effective in raising awareness about space science and technology?***

Sadly, not every nation understands the necessity of humanity becoming interplanetary. The scope of such dreams is marked as crazy or even ridiculed. It's a really ignorant perspective to ask 'Why do we have to pursue space exploration' when you don't do the due diligence to find out how that pursuit improved life on Earth with all the innovation it brought that we use in our day-to-day lives. The Balkan region desperately needs something that will serve as a unity, and it needs to be something bigger than the dreams we had thus far, and in my opinion, that's exactly the solution, becoming an emerging space-bearing region. Why? Well because the sector has the ability to grow, educate, and innovate whole regions, as seen from current happenings.

What strategies work for the Balkan region? Definitely succeeding abroad is the only thing that works from what I personally experienced, because first and foremost you're obtaining essential knowledge and you're adopting a novel culture that no one else has back home, so the only way you will get any positive affirmation, without someone ridiculing your dreams when you dream them domestically, is actually leading as an example, paving the path forward and doing the impossible in a distinguished space bearing nation. I am so glad that such endeavors of mine inspired so many and enabled them to dream, no matter how difficult it is to properly belong in and adapt to novel environments.

I've learned that platforming role models from different walks of life, different cultures, and diverse background paths are essential for any leading space-bearing nation standing by the motto 'access for all' in order for Space Exploration to truly become decentralized. It is mutually beneficial to attract talent in your country which can contribute so much in the internal economy and prosperity of the nation, whilst simultaneously influencing and changing a region abroad.

***Could you share a memorable experience from one of your analog missions and the key lessons you learned?***

A memorable experience is always the bond with my crew mates. Being a team player is essential because in isolation you have a really close proximity with others and limited privacy, so you have to troubleshoot and problem-solve whilst working on your people skills on a really tight and demanding schedule. You learn so much about yourself and about others in analog environments and the bonds you create are tight. It's such a privilege for some extremely talented people you've never met before to align with your values and to be called your family. These bonds last forever, and the trust element is incredible.



**Cover star**  
**Rebecca Brown**  
PhD candidate,  
Metastatic breast cancer  
research

*I never really thought anyone would care what I had to say about my PhD journey, but as I followed more and more people, I realised we all have something different to give and maybe someone might find something interesting in a post I make!*

## *How does a typical day in your life looks like ?*

A typical day for me, I get to work at 7am, have some breakfast while dealing with emails and either heating up cell culture media or dewaxing tissues. I'll do some cell culture with my cancer and immune cells to keep them happy. Most days I've got at least one meeting to go to around lunch time. Then in the afternoons most of the time I'll be doing analysis of assays that I've done recently, or writing small sections of a literature review I'm trying to get done. Then I'll head to the gym, then head home to my fiancé and my dog and just relax!

## *Can you throw more light on your research work?*

My work is investigating the role of  $\gamma\delta$  T cells in breast cancer. They're a rare immune cell population, and they've not been as well characterised as  $\alpha\beta$  T cells, which are the major type of T cell. I've been trying to determine exactly how they're acting in breast cancer, in the blood of patients, and in the actual tumour, to learn whether we can use them in the fight against this terribly common cancer.

## ***As you are doing a great job at science communication using your page, how did you start your journey as a sci-commer?***

I really started my page because Shalini Guleria is in my lab! I saw what she was doing with her Instagram (and everyone else I followed at that time) and I thought it would be cool to show what I do in the lab too, because it was very different to what Shalini was doing at the time. I was very lucky to have her around to ask questions when needed. I never really thought anyone would care what I had to say about my PhD journey, but as I followed more and more people, I realised we all have something different to give and maybe someone might find something interesting in a post I make!

## *Future plans and goals you consider for yourself?*

To finish my PhD, haha.

Nah, in terms of work, I'd really like to get a literature review out in the next year. Some of the students further ahead at our institute really feel that getting any paper out during your PhD is incredibly helpful, to have something with your name on it and to have gone through a review process already, before starting your career. I'm also just now starting to really get some meaningful results in the lab, so it's time to buckle down and smash out some experiments.

In terms of large goals and plans, I'm getting married next year, then 6 or 9 months later I'll be handing in my thesis... so both of those events are keeping me well occupied for now!

And as for after my PhD, I have no idea whether I want to stay in academia or move elsewhere... I'll deal with that when I get there!



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*Perseverance would be the key to success. As a researcher, it can get pretty frustrating as results are not always what we would expect. It's all through trial and error and despite all the hardships, it is truly satisfying if you have the passion for it.*

**Cover star**  
**Ash Sharma**  
Physician,  
MSc. Cardiovascular research

## ***Describe a typical day in your life from a medical professional's perspective.***

I currently work in Emergency Medicine and my day to day schedules are pretty busy. I work long hours from 12pm -10pm or 10am to 8pm. Despite the strenuous long hours, I am grateful for all the learning opportunities that I gain from the job. In the AE, each patient we see is a new patient (without follow up / we've never seen them before). Hence we see a wide variety of cases ranging from paediatric cases till trauma calls. This is the most fulfilling part of the job as you have a lot of instances where you can truly put your medical knowledge to use and make decisions on your own. Once I'm done with work, I try my best to maintain a work life balance as much as possible. Working out at the gym is definitely a stress buster.

## ***Could you share insights on your research work?***

I've completed my Masters in Cardiovascular Research at Kings College London. Since med school

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research has been my number one niche. I've published multiple papers during medical school and once I started working with cardiac scientists in London, the passion for research further expanded. My masters project was considered groundbreaking and has also come up in the news. In simple terms, it was a project aimed at trying to reverse the effects of myocardial infarction sim cardiomyocytes with the use of microRNAs. We used the same theory as that of the new COVID vaccines and we did indeed show a result that certain microRNAs potentially could reverse the irreversible effects caused during heart attacks.

## ***What are the future challenges you consider for yourself?***

I wish to become a researcher in the future after pursuing my PhD in due time while managing clinics on the side. More specifically, I am into cardiac research and strongly believe it is a field which has great potential to change the way the medical field works. On the other hand, balancing being a clinician as well as a researcher is one of

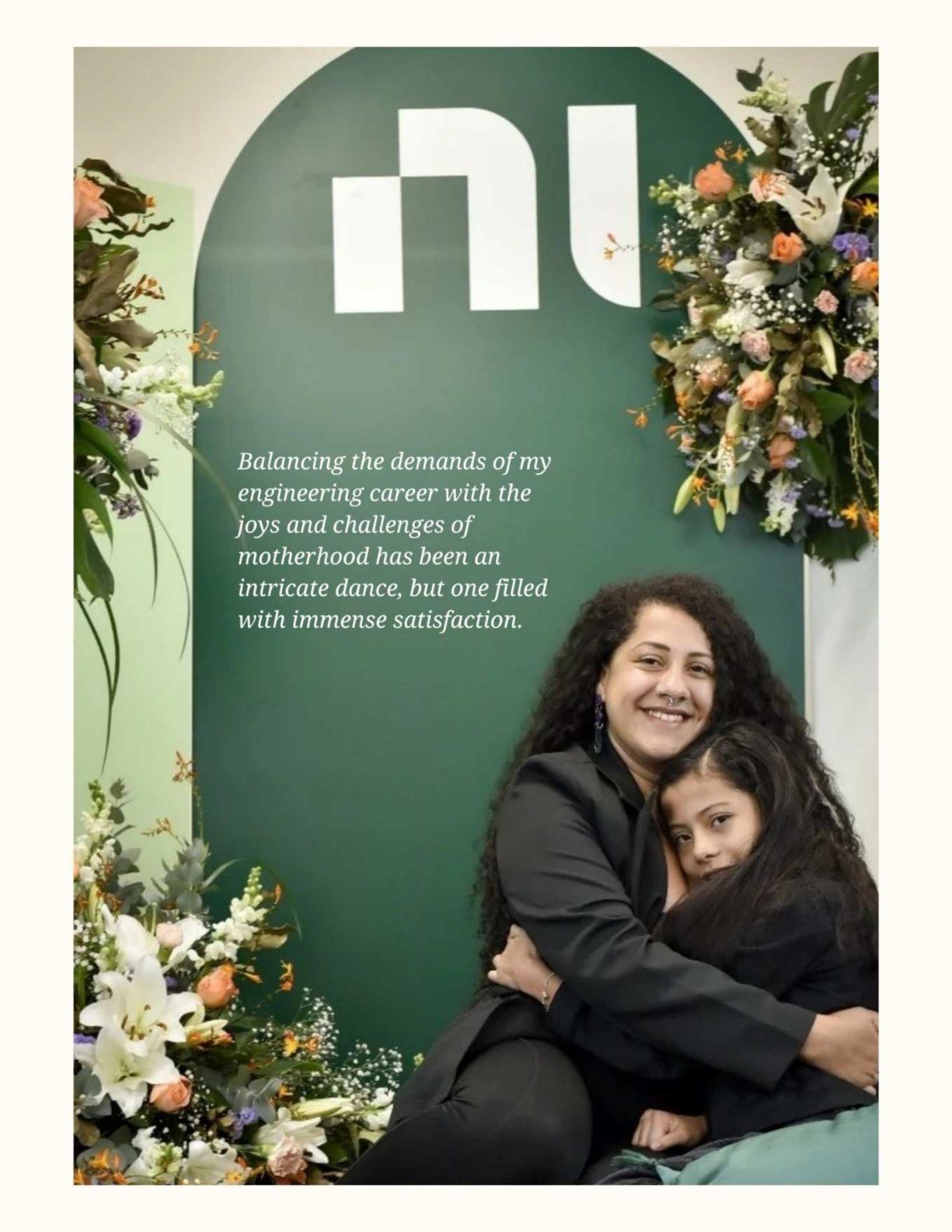
the biggest challenges I think I would be encountering as I progress forward in my career. Both are equally important to me and I aim to have the best of both worlds.

## ***What guidance would you offer to individuals pursuing a career in your field?***

Perseverance would be the key to success. As a researcher, it can get pretty frustrating as results are not always what we would expect. It's all through trial and error and despite all the hardships, it is truly satisfying if you have the passion for it. If you are into research like me, I would advise you to go for a base research degree such as a masters before pursuing research full time as it would give a good hands on training in the lab.



**Cover star**  
**Mileyca Oporta**  
Electronic engineer in  
aerospace sector.



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*Balancing the demands of my engineering career with the joys and challenges of motherhood has been an intricate dance, but one filled with immense satisfaction.*

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***As an Electronic Engineer and a mom, you have a unique combination of professional expertise and personal responsibilities. How do you balance the demands of your engineering career with the joys and challenges of motherhood?***

Balancing the demands of my engineering career with the joys and challenges of motherhood has been an intricate dance, but one filled with immense satisfaction. Becoming a mother at a young age, just as I was stepping into college, meant navigating dual responsibilities from the outset. Joining NI - National Instruments, which has been my professional home for years, was a pivotal moment. The company's support and flexibility allowed me to kickstart my career while tending to my role as a mother.

My family has been an unwavering pillar of support throughout this journey, championing my

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academic pursuits and career ambitions. Their encouragement fueled my determination to continue learning and advancing in my field.

Moreover, I've strived to integrate my daughter into my passion for electronics and science. Engaging her in playful yet educational activities, like introducing her to the wonders of electrical circuits through games and experiments, has been immensely rewarding. Sharing these experiences has not only deepened her understanding but also kindled her curiosity for science.

There have been challenges along the way, but every hurdle has been an opportunity to grow and learn. Balancing work deadlines with school pickups or finding moments to integrate educational fun into our time together has been a continuous learning curve. However, these challenges have also been moments of bonding and shared discovery.

Whenever we had the chance to journey to my

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classes together, it was a delight to see her enthusiasm and curiosity blossom. These shared experiences have not only been enriching for her but have also reinforced my conviction that nurturing a love for science can begin at any age.

In essence, it's been about creating a harmonious blend, a fusion of my professional passion with the joys of motherhood. It's not always seamless, but the rewards, the shared moments of learning and growth, have made this journey immensely fulfilling.

## ***Can you share a bit about what sparked your interest in aerospace?***

My passion for aerospace traces back to my childhood fascination with space exploration, sparked by the influence of astronaut Franklin Chang in my country. As a kid, I dreamed of venturing into space and becoming an astronaut myself. However, during my scholarship years, I encountered academic challenges, particularly in math, which led me to set aside that dream

temporarily.

It was only in 2018, when I had the incredible opportunity to participate in the FIRST LEGO League with the theme 'Into Orbit,' that my dormant passion for aerospace reignited. The competition, centered around space exploration, reignited that spark within me, reminding me of the dream that had once felt unattainable.

As a woman and a single mother, navigating the complexities of pursuing such dreams often comes with its unique set of hurdles. But the support and encouragement I received, notably from my manager, were instrumental in my journey. In 2020, I was promoted to the position of Account Operations Manager, handling key accounts in the aerospace, defense, and government industries.

The ongoing advancements in the space industry, the renewed interest in space exploration, and the current space race have contributed significantly to rekindling my childhood dream. The rapid

developments and innovations in aerospace technology have made the field more accessible and captivating than ever before.

This resurgence of interest in space exploration, combined with my professional growth in the aerospace industry, has brought me closer to fulfilling my childhood aspiration. It's a testament to the fact that with determination, support, and the right opportunities, dreams that once seemed distant can gradually come within reach.

***Being a member of the Society of Women Engineers, you're actively involved in promoting diversity in STEM fields. How do you see your role in fostering inclusivity, and what initiatives or experiences have you found particularly impactful in this regard?***

As a member of the Society of Women Engineers, fostering inclusivity in STEM fields is a cause close

to my heart. My role in promoting diversity involves actively engaging in initiatives that support underrepresented kids, especially those facing socioeconomic challenges. Volunteering has been the cornerstone of this endeavor, igniting a passion within me to bridge the gap and create opportunities for these young minds.

For the past eight years, I've been deeply involved in various STEM initiatives, ranging from organizing STEM camps to facilitating hands-on circuits and robotics competitions. These experiences have not only allowed me to share my expertise but have also provided a platform to inspire and mentor youth who may face similar challenges to those I encountered in my upbringing.

Being the child of immigrant parents, I understand firsthand the different realities faced by underprivileged communities. It's this understanding that drives my commitment to giving back to society. Through these activities, I aim to break barriers, provide access to resources,

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and inspire these young individuals to explore the wonders of STEM without limitations.

One of the most impactful experiences has been witnessing the transformation in these young minds—seeing their curiosity and confidence grow as they engage in hands-on STEM activities. These initiatives not only impart technical skills but also foster critical thinking, problem-solving, and teamwork, empowering these kids to envision a future in STEM that might have seemed out of reach before.

I believe that creating an inclusive environment in STEM begins with early exposure and ongoing support. By offering mentorship, guidance, and resources, we can nurture a diverse pipeline of future scientists, engineers, and innovators. It's not just about teaching technical skills; it's about instilling the belief that regardless of background or circumstance, a career in STEM is within their grasp. Ultimately, my involvement in these initiatives is my way of paying forward the

support and opportunities that have shaped my journey in STEM. It's about paving the way for a more inclusive and diverse future where everyone, regardless of their background, feels empowered to pursue their passion in science and technology.

## ***What are some future goals and aspirations you consider for yourself?***

My future goals align with a multifaceted vision that encompasses both personal and professional aspirations. Foremost, I aim to solidify my position as a prominent figure in the aerospace industry. Through continuous learning, dedication, and contributions to innovative projects, I aspire to become a recognized expert, contributing significantly to the advancements and progress in this field.

Simultaneously, my commitment to supporting NGOs and spearheading STEM activities remains unwavering. I see myself continuing to devote time and resources to initiatives that bridge gaps in STEM education, especially for underprivileged

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youth. Being a catalyst for change, inspiring the next generation of scientists and engineers, will always be a key part of my journey.

Moreover, there's a childhood dream that still glimmers brightly in my heart—to venture into space. It's a dream that has persisted through the years, and I hold onto it with an unwavering hope. As space exploration evolves and opportunities expand, I maintain a fervent aspiration to one day realize this childhood dream.

By combining my expertise in aerospace, my dedication to STEM advocacy, and my steadfast ambition to reach the stars, I hope to create a lasting impact. My ultimate goal is not just personal achievement but also to inspire others—especially young individuals—to reach for their own dreams, no matter how audacious they may seem.



*The goal is to make a research that is useful in practice, which sounds easier than it is done. The majority of biomedical and medical research has a long way before it translates to any real-life implications for patients.*

**Cover star**  
**Ludmila Kuciková**  
Neuroscientist

## *Could you provide a glimpse into a typical day in your life as a neuroscientist?*

Every day is different. If I was to generalise then there would be three main components, first and foremost there is a lot of admin work and emails. Doing a computational neuroscience usually means being part of a bigger project that has multiple other interdisciplinary colleagues and the communication to move projects further are mostly through emails. The next component of my regular day involves working on the analysis. For example, I am currently leading four main projects, so when it comes to the analysis, this part of my day can be hectic. Doing analysis is a broad term that for me involves anything from the data preparation which usually takes the most of my time, through brain images pre-processing and analysis, to data visualisation, which is my favourite step. Many days it involves coding but not everyday. And the last element is writing. I really enjoy writing so you always find me practicing it either by contributing

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to science articles, or by writing abstracts for upcoming conferences or funding applications.

***How has your background in psychology influenced your approach to studying brain connectivity, especially in the context of dementia research?***

I think my background in psychology is crucial to how I approach the analysis. That's because it gives me a different point of view. Many computational neuroscientists who do neuroimaging research come from a technical background, which gives them a technical advantage over me. But my psychology background gives me an advantage of understanding why I am doing my research and how what I observe in the brain, in my case in terms of connectivity, relates to the disorder I am studying. It gives me a broader picture and creating hypotheses that relate to the biology of the brain, underlying mechanisms, and symptoms we observe is a lot easier.

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***How do you envision the practical applications of your work in understanding brain connectivity and its potential impact on dementia diagnosis, treatment, or prevention?***

The goal is to make a research that is useful in practice, which sounds easier than it is done. The majority of biomedical and medical research has a long way before it translates to any real-life implications for patients. In my case, I hope to contribute to the development of a potential early detection biomarker. There are a few neuroimaging biomarkers already standardised in Alzheimer's Disease, such as volumetry which relates to the neuronal loss in patients. But there is so much more that we can see on different neuroimaging modalities. It would be incredible to see a development of a risk prediction score based on several neuroimaging biomarkers including brain connectivity and other risk factor data and medical history data. I hope parts of my research can contribute to this overall aim. Reliably knowing

who has higher chances of developing dementia can then lead to a more effective treatment because we would be targeting the brains that are yet not too damaged.

***You have been doing a really great work in sharing your journey and communicating science on instagram, what advice you would like to give to other researchers starting out?***

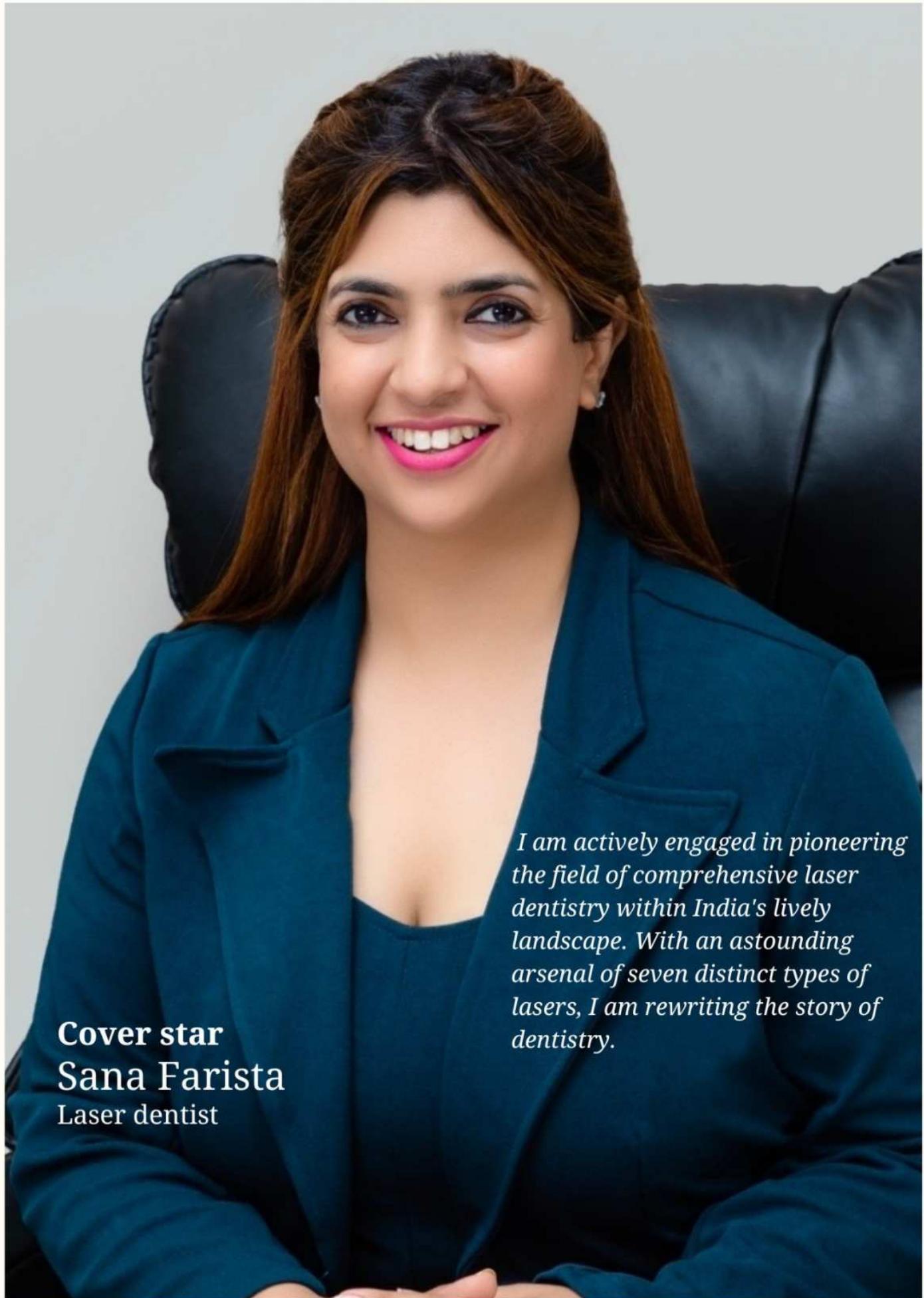
I have two pieces of advice. The best one would be to just start. That is often the most difficult step to take because people tend to overthink things. The second piece of advice would be to manage your expectations, especially if you want to communicate science on social media because that can be very unstable. During my time on instagram I witnessed brilliant people who have so informative accounts and they are not reaching as many people as I wished they were because the quality of their content is incredible. I have also witnessed people who skyrocketed to high numbers of followers in a very short time. Starting is the most important but

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then understanding that social media algorithms are sometimes very random and it in many cases might not reflect the quality of someone's content is also crucial to keep mental sanity in that virtual space.

## ***What are the future goals and aspirations you consider for yourself?***

The biggest goal for me is to find some career aspirations for after the PhD. I have learnt from other scicomers who were sharing their journeys that during the PhD people's goal is to graduate and after they achieve it, they can feel lost. Of course, one of my goals is to graduate, but I think that mentally not putting it on the very top step of my career goals but the second topmost is a smart way to go about it. So, I hope I graduate without any major issues and in the meantime find some type of a role that I will be passionate about applying for. I also want to adopt a dog soon, and just live a life without letting the last year of the PhD consume me. Again, easier said than done. Keep the fingers crossed for me.



**Cover star**  
**Sana Farista**  
Laser dentist

*I am actively engaged in pioneering the field of comprehensive laser dentistry within India's lively landscape. With an astounding arsenal of seven distinct types of lasers, I am rewriting the story of dentistry.*

## ***How does a typical day in your life looks like?***

In my meticulously scheduled life, I maintain an equilibrium. A normal day for me begins with prayer, in which I rise and devoutly offer my prayers to Allah. Following this spiritual start, I have a light breakfast, go to the gym, attend to professional duties at the clinic, conduct business at the boutique, and eventually return home to share a family dinner. Following this shared supper, I go for a peaceful evening stroll. As a responsible person, I schedule time for leisurely reading and praying before retiring for the night. I make an effort to avoid the allure of movies and Netflix, ensuring that my time is used wisely. Such is the rhythm with which I initiate and conclude my day, crafting a disciplined and fulfilling existence.

## ***Could you provide more details about your work and the specific aspects you focus on in your field?***

Indeed, I am actively engaged in pioneering the

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field of comprehensive laser dentistry within India's lively landscape. With an astounding arsenal of seven distinct types of lasers, I am rewriting the story of dentistry. Beyond clinical practice, my major purpose is to change patients' perspectives about dentistry. Recognizing the common anxiety associated with dental appointments, my objective is to create an environment in which patients not only endure but actually enjoy their time at the dentist.

To support this ambition, I am happy to be the Head of the Department at Maharashtra University, where I am in charge of a laser dentistry fellowship program, the only one of its kind in India. This initiative demonstrates our commitment to utilize cutting-edge technology to push boundaries of dental treatment.

In my role, I am excited to share my experience with students and other people interested in learning more about this revolutionary technology. This dedication to excellence and innovation distinguishes me as a dentist as well as a pioneer in

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the industry.

***You have been honoured by Forbes and been awarded as celebrity dentist! Which is a great feat of achievement. Few things you could share about that with us?***

I refuse to consider my honours at Celebrity Dentist and recognition by Forbes India to be my ultimate achievement. My most major achievement, however, was being recognized at the London Parliament for my groundbreaking study on surgical methods with the help of laser. This includes the creation of innovative approaches as well as excellent research on the patented laser handpiece. As a result, my procedures are currently used globally, comprising two to three separate laser surgical methodologies for dental treatment.

***What are the future plans & goals you consider for yourself?***

In terms of my future aspirations, I envision a

scenario where every clinic in India is equipped with at least one laser machine. My goal is to help realize this vision by providing complete dental training. I am passionate about educating, motivating, and enlightening other dentistry professionals. This would surely improve the overall patient experience and streamline their dental treatments. Eventually I want to give my patients painless, stress free, scarless experience.

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**Cover star**  
**Vittoria Cristante**  
Math PhD student

*If I could inspire more people in the future to look more into what math is or at least enjoy their math class through my teaching, then I'll have been successful in my eyes.*

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***Can you share a bit about your personal journey into the world of mathematics and what led you to focus on arithmetic, statistics, and algebraic number theory in your PhD studies?***

As a kid, I was always very good at math and when I went for my Bachelor's, I made math my minor so I could stay connected with it. It wasn't really until the pandemic hit that I discovered pure mathematics and considered an academic career in it.

In the summer before starting my Master's, I spent some time learning Galois theory, just because I had heard other people talk about it and thought it could be interesting. I ended up absolutely falling in love with the theory and eventually found myself super interested in the Inverse Galois Problem, which is a pretty big open problem in number theory. After meeting my advisor and explaining to him my interests, he suggested I look into the problem of counting number fields with a given

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## ***How was your transition from a theater degree to getting PhD in pure math? What was the story behind it?***

The transition from theatre to math was actually pretty out of the blue; it was a little bit of a surprise to a lot of people in my life. Towards the end of my time completing my Bachelor's in Theatre, I started doubting whether or not I actually wanted a career in it. So when the pandemic hit and all theaters closed, I was left feeling pretty lost with where to go with my life. During that summer, I met my now-boyfriend who happened to be taking a Pre-Calc class. He would occasionally ask for help on his homework and one day he just said to me "Why didn't you do math?". I had been asked this in the past, but this was the first time I had stopped to really consider why I hadn't pursued it in the first place. With everything closed, I decided to give it a second shot, and the rest is history!

## ***For those aspiring to pursue a path in mathematics or academia, what***

## ***advice would you give based on your own experiences?***

My greatest piece of advice for someone aspiring to pursue math or academia would be to stay true to yourself and really do what makes you happy. Academia is HARD, and it takes a lot of work to be a part of. If you choose to do research that doesn't excite you, then the experience will not be enjoyable. But if you find what you're really interested in, there is something really magical about getting to spend your time working on it (not many people get to do that!).

Another piece of advice I'd give would be to stay focused on yourself and your success. I've spent a lot of time feeling like I wasn't good enough or "behind" in the math career, comparing myself to the students around me. As a result, I missed out on appreciating everything I have accomplished since starting math. Everyone's academic path, regardless of discipline, will be different, so there's no point wasting time comparing yourself to others!

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(I know it can be hard to stop comparing yourself, but the more practice you get with appreciating yourself, the easier it is to stop!)

## ***What are your future goals and aspiration you consider for yourself?***

My main goal is to become a professor and continue research. Math is truly such a beautiful subject, but few get to see how wonderful it gets. If I could inspire more people in the future to look more into what math is or at least enjoy their math class through my teaching, then I'll have been successful in my eyes.

Researchers are the real truthseekers