JC JUICE

MAR'23

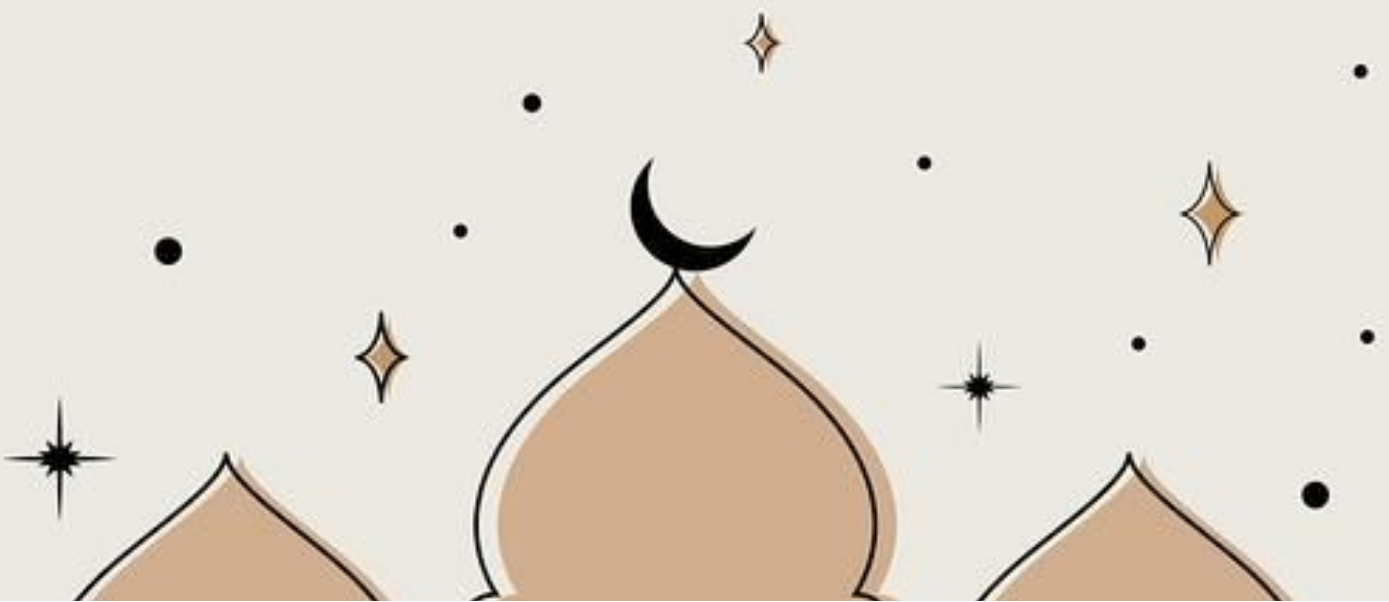

TABLE OF CONTENTS

Maryam Fayyaz
Editor in Chief
Shazene Hussain
Lead Editor

The James Webb Telescope: Our Eyes to the Universe

Ridhan Mahanty

The universe is a wondrous place filled with galaxies containing numerous things such as planets, asteroid belts, comets and lots more. Not only that, but it is the starting point for everything. What exactly do I mean? I'm referring to how the big bang occurred and how the most basic elements were created. Then there was gravity. It was the force which not only kept us on the ground but also created the first stars and galaxies. Now that we live on Earth, we have technology like probes, satellites, etc. But all we've discovered with what we have are the planets of the solar system. Aren't we going to go further and explore different galaxies? Well, there was an opportunity when the James Webb telescope was launched into space and tasked to take pictures of other galaxies such as Andromeda. But how did this happen?

The James Webb telescope is an Infrared observatory which is orbiting the sun about 1 million miles away from Earth to find the first galaxies which formed in the early universe and to see stars forming planetary systems. It is the largest and most powerful telescope ever built. It allows scientists to look at the universe as it was 200 million years ago. It is as tall as a 3-story building and as long as a tennis court. It is so big that it has to fold origami-style to fit inside the rocket to launch into space. It uses its golden-coated mirrors to see the universe by collecting and focusing on light from distant stars. Now we know this telescope can do wonders, but why was it built and launched into space?

Construction on the James Webb telescope started in 2004. In 2005, the European Space Agency's Centre Spatial Guyanais (CSG) spaceport in French Guiana was the launch site, and an Ariane 5 rocket was the launch vehicle. By 2011, all 18 mirror segments were made and proven through testing to meet the required specifications. After the James Webb telescope was made, it was then transported to the Paricabo harbour in the French Guiana and stored in the Ariane 5 Transport rocket, waiting for launch. Finally, on December 25, 2021, at 4:20 PM the JWST was launched into space. NASA's James Webb Space Telescope was built and launched to be the agency's successor to the famous Hubble telescope. It launched on Dec. 25, 2021, and was on a mission to study the earliest stars and peer back farther into the universe's past than ever before.

While the James Webb telescope was peering out into space, it captured an unexpected image. The telescope revealed six massive galaxies formed 500 and 700 million years after the big bang. They have also captured a photo of our very first exoplanet, which is rocky and almost the same size as Earth. Also, Webb has discovered what is known as a dusty disk swirling near a dwarf star. The Webb telescope has confirmed that this is the first-ever disk captured in infrared wavelengths of light and lots more! All these photos were shared in the American Astronomical Society meetings in Seattle.

In conclusion, on 24 January 2022: JWST will arrive at its final orbit around the second Sun-Earth Lagrange point, or L2, nearly 1 million miles (1.51 million kilometres) away from the Earth and on the 11th July 2022, the JWST will have completed its commissioning activities and is ready to begin scientific operations. In the future (not too far into the future), the JWST will be ready for scientific research.

Sport: Business or Game?

Muhammad Salahuddin

Since prehistoric times, man has loved sport: a compelling distraction from reality played with others that also incorporates physical activity and skill. The perfect blend of socializing, competing and exercising for some. The oldest sport was wrestling, evident through a set of famous cave paintings in Lascaux, France, dating back 15,300 years ago. Although sport has evolved from the primitive, barbaric era to feature more rules and regulations to keep athletes safe and investors happy. Some grow increasingly displeased with sport as simple yet skilful sports mutate and deform into amalgamations with increasingly complex and abundant rules, metamorphosing into a completely different entity. Others worry about the numerous headlines of corruption and cheating plaguing the sporting world. And one can only wonder, where did it all go wrong?

50 years ago, the 1970s saw the first million-dollar sporting contract signed. In 1972, NHL player Bobby Hull made a deal with the Winnipeg Jets, signing a 10-year deal worth $1 million. This was huge at the time, although sports had always been fairly big and a source of enjoyment for many; few would look at sport and see it as a ‘business’ but after headlines of Bobby Hull soared across the globe, investors took notice. People that had

only touched a ball in PE class suddenly became engrossed by sport, enthralled by the idea of becoming rich and thus vigorously studying which sports to invest in. The 1980s saw the rapid commercialization of sports: fashion, tv shows, movies, video games, live broadcasts etc, all came out of the floodgates, and they were all about sports, and people loved it. I mean, why wouldn't they? Fun to play and watch, dramatic and challenging, and potentially a lot of money (if you're good). Of Course, the sport had been successful before the 70s as well, but this was the first time it started to be viewed as a business.

To be blunt, business is said to be 'trade considered in terms of its volume or profitability', whilst sport is 'an activity involving physical exertion and skill for one's entertainment and potentially the amusement of others'. Entertainment and fun, at the end of the day, were the ethos of sport. It was the reason most played in the first place. However, it was great that these people were now able to earn a living from what they loved. Right? Wherever there's big money, there's corruption, and sport is and was no exception. Boxing. One of the biggest sports ever. It taps into our primal desire to fight or watch people fight. Much like the gladiator arenas of ancient Rome, many would gather to watch two athletes beat the ever-loving life out of each other. And in 1983, they got exactly what they wanted. The undefeated junior middleweight Billy Collins Jr. took on journeyman Luis Resto at Madison Square Garden, and the result was stunning.

Resto, known as a light puncher, completely beat up Collins, punching his eyes until they were swollen shut. The punches tore one of Collins' irises, resulting in blurred vision that ended his boxing career. At the end of the fight, the referee held Resto's hand up and felt his hands were light, too light... He alerted the WBA and an investigation took place. It turns out that Resto's gloves had padding removed and replaced with chalk. He was placed in prison, but the damage was done, Collin died in a car accident a year later, thought to be due to his blurred vision.

Now, two decades later in 2023, the sport is still kicking strong, specifically kicking checkered white and black balls. The sport of football has always been large but has grown exponentially. The 2022 world cup in Qatar astonished the world, almost movie-like in essence. Lionel Messi shocked the world, as he sprinted across our screens and won his last world cup. That aside, the 2022 world cup may be the most criticized sporting event on the planet right now. From countless allegations of bribery and corruption to ‘sports washing’ to dangerous working conditions during the construction of the stadium. It has it all.

Whilst on the topic of sports involving kicking, we have the pejoration of combat sports. Specifically taekwondo and karate.

Being allowed into the Olympics for the first time, both sports had a lot of eyes on them for being potential money-makers. Yet, they both flopped. Athletes bounced up and down between rounds, waiting for a safe move that never came, resulting in a boring experience. But it wasn't always like this; taekwondo and karate used to be considered great sports, enthralling and entertaining athletes and common folk alike. Kicks and punches would soar and BAM across, sweat would pour and drip from athletes, and spectators would grip their seats in excitement. However, this changed because both sports were technically supposed to teach self-defence, and the rules changed. Flashy and dangerous kicks were no longer allowed, heavy body gear had to be worn at all times and kicks (or punches for karate) that were too powerful could result in disqualification, as ‘the goal was not to injure your opponent but to score points’. Resulting in two grown fighters eyeing each other down, waiting for any opportunity to score a point which rarely came. Controversially, the finals of the Olympics (karate) saw the disqualification of a fighter for kicking too hard, however, experts claim that the other fighter had recklessly run into his kick, however wanting to appear safe and non-violent for investors, the win was given to the reckless fighter.

The ethos of sports has and always will be to have fun and the ethos of business has and always will be to make money. As the two worlds combine, we have good and bad but it's interesting to see what the future holds for sports...

The Science of Getting Good Sleep

Ahmed Dogar

Sleep is an enigmatic activity we engage in every day, during which the average adult spends about one-third of their lifetime asleep, transitioning from a lively, thoughtful and active state to a quiet, hibernation-like one. Despite its ubiquitous nature, the precise nature of sleep and its restorative effects on our bodies and minds remain elusive. It is therefore important to investigate how sleep deprivation affects our physical and mental performance.

To this end, researchers from the University of Pennsylvania and Washington State University recruited 48 healthy men and women who typically slept seven to eight hours per night for an experiment. The participants were divided into four groups, with one group being kept awake for three days straight, while the others were allowed 4, 6, or 8 hours of sleep per night for two weeks. Throughout the experiment, the participant's physical and mental performance was assessed.

The results showed that sleep debt is a cumulative problem that incurs a neurobiological cost over time. The group that slept only 6 hours per night experienced a 25% increase in random sleep episodes during the day after just one week of the experiment, and after two weeks, their performance was comparable to someone who had stayed awake for two days

straight. Notably, participants were unaware of their declining performance, even as it continued to worsen each day.

The sleep-wake cycle comprises two crucial phases: slow wave sleep (also known as deep sleep) and REM sleep (which stands for Rapid Eye Movement). During slow-wave sleep, the body relaxes, blood pressure decreases, and the brain becomes less responsive to external stimuli, making it harder to wake up. This stage is essential for body renewal and repair, during which the pituitary gland secretes growth hormone that aids tissue growth and muscle repair. Furthermore, it's believed that the immune system also rejuvenates during this phase, making it particularly important for athletes who often sleep for extended periods of time.

On the other hand, REM sleep is vital for the mind, much like slow-wave sleep is for the body. During this phase, the brain becomes active, and you experience vivid dreams while the brain reorganizes information. This process includes clearing out irrelevant data, enhancing memory by linking experiences of the previous day with past ones, and promoting learning and neural growth. Although there's increased activity in the brain, the body remains still, and body temperature, blood pressure, and heart rate all increase. Usually, REM sleep happens in brief spurts, around 3-5 times each night.

Without both slow-wave sleep and REM sleep, the body cannot function properly, and physical recovery becomes difficult. Sleep deprivation leads to an increased risk of viral infections, weight gain, diabetes, high blood pressure, heart disease, mental illness, and even mortality. In conclusion, slow-wave sleep facilitates physical recovery, while REM sleep helps with mental recovery.

Many people struggle to get enough sleep at night, despite knowing its numerous benefits. The reason for this is our modern, highly structured lifestyles that are dictated by technology and schedules. However, by aligning our sleep and wake times with our natural sleep cycles, we can wake up feeling more refreshed and energized.

During the night, our bodies go through four distinct sleep cycles, including REM sleep which is characterized by increased brain activity. The first stage of sleep is a brief period of light sleep, where the brain produces alpha and theta waves. Stage two is also light sleep but is characterized by the appearance of sleep spindles in the brain. Stages three and four are characterized by slow delta waves and deep muscle relaxation. During this time, the body repairs muscles, conserves energy and performs vital functions such as immune function and growth. REM Sleep: About 70-90 minutes into sleep, we reach the stage where dreaming occurs. Your brain lights up with activity, your eyes begin jerking around, and your heart and breath rate increase.

The Trick: 90-Minute Cycles

Numerous studies have demonstrated that a lack of deep sleep can lead to daytime fatigue and negative emotions. Furthermore, disrupting REM cycles by awakening during them can interfere with our ability to consolidate memories. To ensure that you wake up during light sleep, it is recommended that you schedule your sleep in 90-minute intervals.

The Sleep Cycle Phenomena is why most people report experiencing grogginess and brain fog even after long hours of sleep and sometimes even feeling more alert when having less

sleep. The key to maximising the quality of your sleep is waking up at the end of a 90-minute sleep cycle, not in the middle of it. For instance, if you need to wake up at 6 AM, you should aim to fall asleep by midnight or 10:30 PM(5 Cycles or 7 and a Half Hours of Sleep (or 9 PM, 6 Cycles or 9 Hours of Sleep). However, you must consider how long it usually takes you to fall asleep, whether it's 10, 30, or 60 minutes.

To facilitate this adjustment, here are some holistic strategies to enhance the quality of your sleep or even decrease the time it takes you to fall asleep:

- Increase exposure to bright light during the day
- Reduce exposure to blue light in the evening
- Avoid consuming caffeine late in the day
- Limit irregular or lengthy naps during the day
- Strive for consistent sleep and wake times
- Take a melatonin supplement
- Optimise the environment in your bedroom
- Regulate the temperature in your sleeping space
- Refrain from eating late at night
- Relax and clear your mind in the evening
- Take a relaxing bath or shower
- Invest in a comfortable bed, mattress, and pillow
- Exercise regularly, but not right before bedtime

Cumulative sleep debt is a barrier between you and optimal performance. If you want to know how to sleep better, the answer is simple but remarkably underrated in our productivity-obsessed culture: **get more sleep.**

UAE - Into Space

Ansh Mandal

Overview

In this month's article, we will be discussing the UAE's mission to space, and many other aspects involving the UAE and space.

How did the UAE's connection with Space begin?

The UAE had already been responsible for launching satellites in the past and had established an Observation Space Center in Abu Dhabi. However, in 2014, the UAE's Space Agency was established. This is said to have marked the beginning of the United Arab Emirates' huge contribution to space exploration.

UAE's First Mission

We also can't forget to provide the context of the UAE's Mars Mission back in 2020. This was the mission that made the UAE the first Arab country and the fifth-ever country to reach Mars. The event also made them the second country that was successful in entering Mars' orbit (on their first try too!).

The most significant part of this was that the rocket was launched less than a decade after production began. This event showed how advanced the UAE was with their technology in the space field.

Sultan Al Neyadi

Before we begin, let's talk about the background of the UAE's Emirati astronaut, Sultan Al Neyadi. Al Neyadi was born on May 23, 1981, and he worked as an engineer in the UAE Armed Forces before joining the space program. After many years of hard work, he was assigned a mission that would make history for the UAE. In March 2023, he arrived at the International Space Station (ISS) as part of NASA's SpaceX Crew-6 Mission. He is set to spend six months onboard the orbiting ISS science laboratory, marking the Arab world's first long-duration space mission and the UAE's second mission to the ISS.

Al Neyadi's main task in space is to undertake many science experiments. These experiments are mostly related to how your body acts in space. For example, quoted by himself, Al Neyadi claims that one of his most interesting missions will be to "test heart tissue and how it structures in the microgravity of space".

However, other tests can also include testing the materials in space to see how they react. Overall, these are used for research purposes so that scientists can conduct more straightforward missions for astronauts in the future and know about what should and shouldn't be done.

It's said that Al Neyadi has set up around 20 different experiments coming from UAE universities. Not only that, but he has also been set to do maintenance on the ISS, as has every other astronaut who has ever been on the space station.

What's next for the UAE?

In 2024, the UAE will be launching the Emirati Lunar Mission. In this, the UAE aims to send a lunar rover to the moon. The goal of this mission is to study the various aspects of the planet. This may include studying soil, and its formation, components, properties, etc., or even minerals and how they are extracted from the surface.

Conclusion

After all that has been discussed, it is reasonable to conclude that the UAE's involvement in space exploration has been quite significant for the region and the world for that matter. We all hope that the United Arab Emirates will accomplish even more in the future, especially with the Lunar Mission.

Vertical Farming: What Is It & How Can It Change The World?

Tanishqa Garg

What is vertical farming?

Vertical farming is the practice of growing produce in vertically stacked layers. The practice can use soil, **hydroponic** or **aeroponic** growing methods. Vertical farms seek to produce food in tough circumstances, especially where arable land is limited or unavailable. Now you may be wondering what vertical farming does for the world - as vertical farms don't require fertilizers and pesticides, it reduces greenhouse gas emissions and potential pesticide run-offs. As it uses less space and does not harm the land or soil like traditional farming does, it can also increase biodiversity.

Vertical farming in UAE:

Japan, China, Singapore, South Korea, Taiwan, and Thailand are currently the top producers in Asia. However, the UAE has introduced the largest vertical farm in the world, and here's why. In Europe, vertical farms can be found, among other places, in Germany, France, the UK, and the Netherlands. Due to their severe water shortage, the UAE has found vertical farming to be a blessing in disguise. This procedure is "seasonless" and is available all year long. Here, a nutrient solution rather than soil is used to feed the plants. In a regulated container, temperatures and humidity are controlled. Not only this but, in order to produce local food,

the complex comprises 11 "biodome" greenhouses, 3.000 square meters of outdoor urban farms, as well as small-scale garden farms. All year long, fruits and vegetables are produced in the vertical greenhouses, which are solar-powered.

What are hydroponic and aeroponic methods of growing?

A method of growing plants without soil and in nutrient-rich water is called hydroponics, which is why the roots of the plants are exposed to the nutrient-rich water, whereas, a method of growing plants without soil in which the roots are exposed to the air is called aeroponics, the plant's roots are in contact with nutrient-rich mist.

Can you do Vertical Farming at home?

The appeal of vertical gardening in the home is how little room it requires. A vertical farm could be started in a closet, a nook in the kitchen, or an unfinished basement. You must be able to regulate the temperature and humidity in addition to supplying artificial light, water, and fertilizer.

The US Banking Crisis: Explained in Regular Terms

Wiktoria Blazik

Normally, we think of banks as trustworthy institutions. Surely, their actions are logical, and the banks hardly ever fail - right? While this is true most of the time, we have to remember that banks are run by people, and people are always fallible. Just this month, two important US banks have closed down. This is an extraneous event that rarely happens, so there's no need to declare the end of the (economic) world just yet. However, the story is pretty interesting.

To understand what happened, we have to first introduce the key characters in this story. Silicon Valley Bank (SVB) was an incredibly important bank in the US tech sphere. Around half of the American venture-backed startups were customers of SVB. Signature Bank, another key player, was a commercial bank famous in the crypto world because 30% of its deposits were from cryptocurrency firms. Finally, we have Silvergate Bank, another bank that was heavily involved in cryptocurrency.

Our story starts with a KPMG audit report of SVB Financial, the company that is in charge of Silicon Valley Bank. This essentially means that KPMG, a big four accounting firm, checked the financial statements of SVB Financial and internal managing operations. During the audit, KPMG determined that everything was running smoothly at SVB

Financial and that all would go well in the coming weeks.

Surprisingly, all did not go well. First, however, we have to divert to another part of the story: Silvergate Bank announced that it would be closing (undergoing “voluntary liquidation”). This was because they invested much of their money in bonds whose values correlated with interest rates. Silvergate Bank assumed that interest rates would remain low, which would mean that their bond prices would remain high. However, interest rates increased due to high inflation rates. Therefore the prices of bonds fell, and Silvergate Bank essentially lost a lot of money. As well as this, the bankruptcy of FTX, a crypto exchange, worried the bank’s customers, so they started pulling their money from the bank. Because of the fall in the value of bonds, it could not pay off these withdrawals and had to sell some of its assets at a loss. Though at first, Silvergate said it was solvent (able to pay off debts), on March 8th, the bank stated that it would not be able to continue operating and would return the money people had deposited.

Now, back to Silicon Valley Bank. SVB had the same problem as Silvergate Bank: they purchased US government bonds. Because of increased interest rates, they lost a lot of their value. As well as this, some of SVB’s customers had to withdraw money from their accounts as they needed to have liquidity (essentially, they needed access to cash). As a result, SVB had to sell some of its assets and borrow money. This announcement panicked customers, which started a bank run: when a large number of customers rapidly withdraw their money from a bank. Because of this, US federal

regulators seized the bank and are now operating it as a “bridge bank” - regulators are running the bank until a buyer can be found.

Finally, we have Signature Bank. This was another bank which was given a “clean bill of health” following external audits. Since Signature Bank was also involved in cryptocurrency, they were negatively affected by the aforementioned FTX bankruptcy. The issues in the crypto world troubled bank managers, so Signature Bank aimed to decrease crypto deposits from 23.5% to under 20%. Prompted by the failure of Silicon Valley Bank, customers withdrew their money from Signature Bank, causing another bank run. Once again, regulators seized the bank and created a bridge bank while looking for a buyer.

And so ends the story of the US banking crisis. The failures of Silicon Valley Bank and Signature Bank were the 2nd and 3rd largest bank failures since Washington Mutual Bank’s closure in 2008. Most of the recent bank failures were caused by the banks over-investing money in bonds, which backfired after interest rates rose. As well as this, their client bases were often too niche, and they were easily affected by events such as the FTX bankruptcy. However, one of the scariest parts of all of these failures was KPMG’s reports that these banks were good to go mere days before their closures.

What Caused The Cold War?

Krish Khakharia

The Cold War began in 1945 and ended in 1991, with the fall of the Soviet Union and the Eastern Bloc. It was a struggle between the USA and the USSR for world domination, and a battle between Communist and Capitalist ideologies. This article will inform you what caused this period of hostility between the East and the West.

Spread of Communism

One of the main causes of the tension between the USSR and the USA was due to America's fear that Communism would spread across the world. To curb the spread of Soviet influence, the Americans adopted the Truman Doctrine. The Truman Doctrine, created by President Harry S. Truman was the American Foreign Policy to contain Soviet expansionism by intervention. Notable examples of this include the Korean War and the Vietnam War.

Nuclear Arms Race

Another reason for the Cold War was the invention of nuclear arms at the end of WW2. The USA was, at the time, the only country with nuclear capabilities, however after the Soviets developed atomic weapons, both did not trust each other. For this reason, most of the early decades of the Cold War were spent with each country developing their own atomic arsenal. Ironically, these destructive weapons kept the peace between the East and the West; neither side would directly attack the other for fear of retaliation in the form of nukes.

Ideological Differences

The final reason for the cold war was the ideological differences between the USA and the USSR. The USA was a Capitalist society, however, the USSR was a Communist State. In a Capitalist country, the economy is not completely controlled completely by the government, however in a Communist society, the government controls the economy. Both ideologies were incompatible with each other, and both nations tried to spread their beliefs and contain the others.

In conclusion, the main causes of the cold war were the nuclear arms race, American fear of communism and the ideological conflict between the East and the West. Ultimately, the USA and the Western bloc emerged victorious from this period of tension on December 26th 1991, when the USSR was dissolved.

EDITOR'S NOTE

Hi JC! We at the JC Juice team hope you've enjoyed reading this month's edition. Our writers and editors worked extremely hard to research and discuss relevant and interesting topics for you to enjoy!

If you have any suggestions or topics you would like to see in next month's article - or you would like to write an article yourself - please send us an email at jcjuice@jumeirahcollege.com and we will be in touch with you.

- Maryam Fayyaz and Shazene Hussain, Editor-in-Chief and Lead Editor

Thank you...

- To Mr Simpson, for all the support and advice!
- To this months writers: Ansh Mandal, Tanishqa Garg, Ridhan Mahanty, Muhammad Salahuddin, Krish Khakharia, Wiktoria Blazik, Ahmed Dogar
- To our editors: Shazene Hussain, Samaira Bhattacharya, Maryam Fayyaz, Hana Rizvi, Aditi Karode, Natalia Mubashir

And lastly and most importantly to our readers, because without you, there would be no magazine.