



# BIOTECH GAZETTE

## February 2025 Edition

**An Initiative by the students of Centre for Molecular Biology (C.U.J.)**

Guided by the motto 'बुद्धिज्ञानेन शुद्ध्यती' (Knowledge refines, purifies, and sharpens the mind), Central University of Jammu celebrates a decade of academic excellence. Embracing NEP 2020, we prioritize high-quality teaching, impactful research, and community engagement to bridge the student-institution gap. Central University of Jammu empowers students with knowledge and skills to become critical thinkers, ethical leaders, and responsible citizens, contributing to a brighter future for India.



**Prof. (Dr.) Sanjeev Jain**  
**Hon'ble Vice Chancellor**

We are immensely proud to have Prof. Sanjeev Jain at the helm of our institution. Under his visionary leadership, we have witnessed remarkable growth and progress in both academic and research excellence. His unwavering dedication to fostering a culture of innovation and inclusivity has significantly enriched our community. The Hon'ble Vice-Chancellor's commitment to nurturing young minds and promoting collaborative endeavors has set a high standard for all of us to aspire.

We are delighted to recognize the exceptional leadership of our esteemed Head of Department, Dr Narendra K Bairwa. His dedication to academic excellence and unwavering commitment to advancing our field have been truly inspiring. Through his innovative approaches and collaborative spirit, he has fostered a vibrant learning environment that encourages growth and discovery.



**Dr Narendra K Bairwa**  
**Director CMB**

## MENTORS



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(Professor)



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We are deeply grateful for the invaluable guidance and unwavering support provided by our esteemed faculty mentors. Their commitment to sharing knowledge, offering encouragement, and inspiring the next generation has left an indelible mark on our community.

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• **Karanjot Singh**



• **Aditri Dixit**



• **Kumari Satya**



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• **Anushka Dobhal**



• **Siya Sharma**



• **Chesta Madan**



• **Smriti Sharma**



• **Isha Sharma**



We are incredibly proud of the outstanding work done by our dedicated editorial team, Genetic Guild. Their passion for excellence and commitment to delivering high-quality content have been instrumental in shaping our newsletter. Through their meticulous attention to detail and unwavering dedication, they have ensured that every issue is both informative and engaging for our readers.

# INTERNATIONAL DAY OF WOMEN AND GIRLS IN SCIENCE

11th FEBRUARY, 2025



On December 22, 2015, the United Nations General Assembly proclaimed an annual observance to recognize the important contributions of women and girls in science and technology, as stated in Resolution A/RES/70/212. Celebrated on February 11, the International Day of Women and Girls in Science is led by UNESCO and UN Women, working together with numerous institutions and civil society groups committed to advancing women and girls in STEM (science, technology, engineering, and mathematics).

## Unpacking STEM Careers: Her Voice in Science



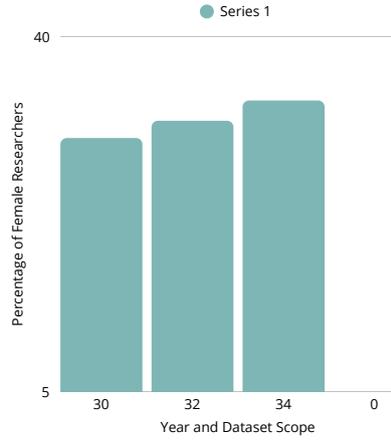
**Date:** 11 February 2025  
**Location:** UNESCO Headquarters, Paris, France  
**Event type:** Hybrid  
To mark the IDWGS' 10th anniversary, the special hybrid brings together Member States, stakeholders from the public and private sectors, journalists, as well as students among others to reflect the expansive reach of science and celebrate the contributions of women in science worldwide.

**“On the tenth anniversary of this important day, and as we reflect on 30 years since the Beijing Declaration, let’s help pave a path to STEM careers that women and girls deserve – and our world needs.**

-UN Secretary-General António Guterres

## TO CLOSE THE GENDER GAP IN SCIENCE,

We must actively dismantle stereotypes, highlight inspiring role models for girls, promote women's progress through focused initiatives, and foster inclusive spaces with policies and measures that uphold diversity and fairness. The gender gap in STEM fields continues to be a major global issue, but we remain dedicated to overcoming it. Gender equality is a core priority for the United Nations, and empowering women and girls is essential not only for global economic growth but also for advancing all objectives and targets of the 2030 Sustainable Development Agenda.



Although data indicates that girls and boys perform similarly in science and mathematics, deep-rooted gender stereotypes continue to persist. As a result, many girls receive less support in pursuing STEM fields and often face restricted opportunities when it comes to education and career growth.



Although there has been progress in recent years, women still hold only a small fraction of leadership roles in science, and to date, just 22 women have received a Nobel Prize in a scientific field.



Although some countries have achieved equal representation of men and women in research roles, they still face major obstacles to true gender equality, due to ongoing issues like hierarchical (vertical) and disciplinary (horizontal) segregation.



Even in countries that have achieved gender parity among researchers, significant challenges remain in fully realizing equality, as both vertical and horizontal segregation continue to act as barriers.

# DARWIN DAY

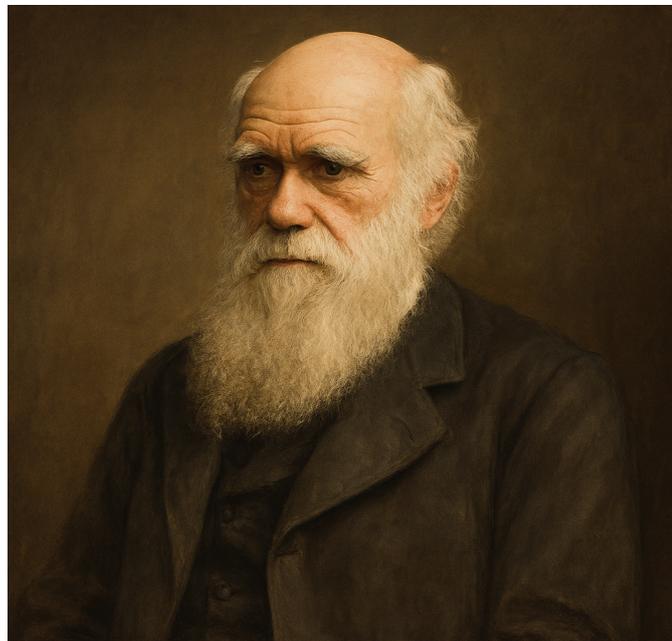
## February 12, 2025

The theme for 2025 is “Religion and Science: Living in Awe”

Charles Darwin, an English naturalist, developed the theory of evolution by natural selection, forming the foundation of modern evolutionary studies. His birthday, 12 February 1809, is celebrated annually as Darwin Day or International Darwin Day to honor his contributions to science and promote scientific awareness.

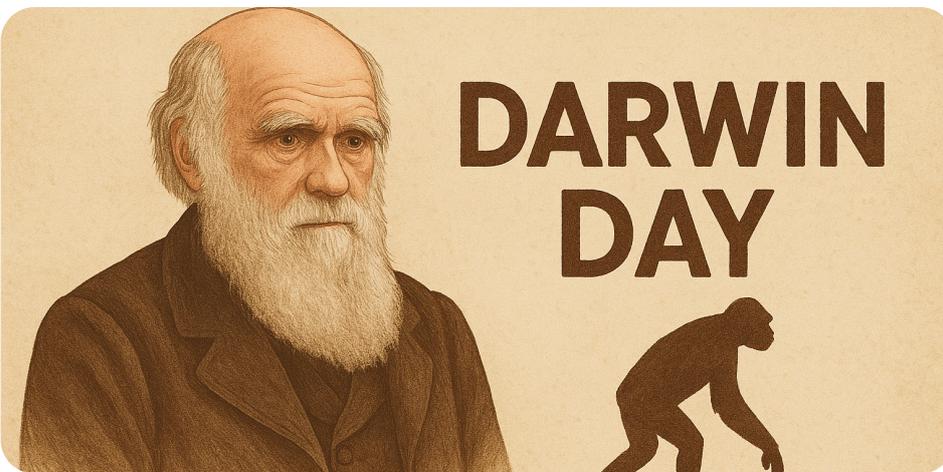
### Significance of Darwin day:

1. Embracing curiosity, critical thinking, and discovery
2. Understanding Evolution Impact
3. Recognizing the Power of ideas



**It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change.**

– CHARLES DARWIN



### **The Development of Evolutionary Theory**

In 1831, Darwin began a five-year voyage aboard the HMS Beagle. The expedition took him to South America, the Galapagos Islands, and other regions, where he collected extensive data on plants, animals, fossils, and geological formations. His observations of the Galapagos finches played a key role in his theory of evolution. Upon his return to England in 1836, Darwin spent several years analyzing his findings, inspired by the work of Thomas Malthus, he formulated the concept of natural selection – The idea that species evolve based on their ability to adapt and survive changing conditions. In 1859 Darwin published “On the origin of species,” which revolutionized our understanding of the life sciences.

### **The legacy of Darwin: More Than Just Evolution**

Every year on February 12, the world celebrates International Darwin day – A tribute to Charles Darwin, the legendary scientist who reshaped biology with his ground breaking theory of evolution by natural selection, Born in 1809, and his ideas continue to shape how we understand life on Earth. In 1825 Darwin enrolled in medical college, but he did not find it interesting. His father then sent him to Christ College, Cambridge, to study to become a clergyman. However, his passion for natural science led him to associate with botanists, geologist, and zoologists who shaped his future research.

Charles Darwin (February 12, 1809 – April 19, 1882) was an English naturalist who developed the theory of evolution by natural selection, forming the cornerstone of modern evolutionary science. Born in Shrewsbury, England, and passing away in Downe, Kent, his groundbreaking work revolutionized our understanding of the natural world.

[https://www.instagram.com/simats\\_saveetha/p/DF9Sva8KF1s/](https://www.instagram.com/simats_saveetha/p/DF9Sva8KF1s/)

<https://currentaffairs.adda247.com/international-darwin-day-date-theme-significance-celebrations/>

# WORLD RARE DISEASE DAY 2025



"More Than You Can Imagine"



This year's theme is a call to action, shedding light on:

- **The Hidden Struggles** – Patients endure not just physical symptoms but also emotional and financial burdens.
- **The Resilience of Warriors** – Despite uncertainty, individuals living with rare diseases push forward with courage and determination.
- **The Power of Science** – Advances in genomics, biotechnology, and personalized medicine are unlocking new possibilities for diagnosis and treatment.
- **The Role of Community** – Families, doctors, researchers, and advocates are driving change, fighting for better policies, awareness, and funding.

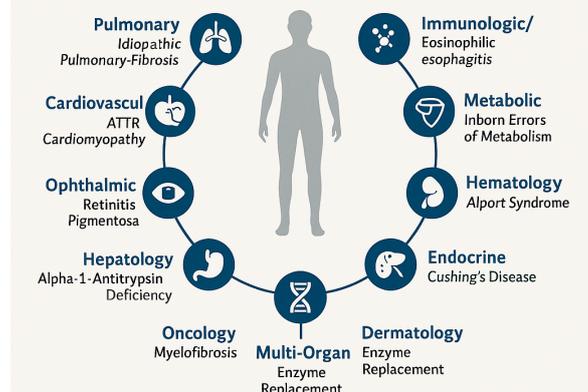
## What Makes a Disease "Rare"?

A disease is classified as rare when it affects a small percentage of the population—but don't be fooled by the numbers. With over 7,000 rare diseases worldwide, more than 300 million people face daily challenges, from delayed diagnoses to unaffordable treatments. Many of these conditions are genetic, chronic, and life-threatening, yet 95% of rare diseases have no approved treatment.

## How Can You Make a Difference?

- **Use Your Voice** – Share stories, raise awareness, and break the stigma on social media with #RareDiseaseDay and #MoreThanYouCanImagine.
- **Join the Movement** – Participate in charity walks, awareness campaigns, and fundraising events.
- **Support Research** – Donate to foundations working to find cures for rare diseases.
- **Push for Change** – Advocate for policies that ensure better access to treatment and research funding.

## Broad Experience in Rare Disease Indication Examples



Rare diseases span across various medical fields, affecting nearly every organ and system in the body. Some, like cystic fibrosis, are widely recognized, while others, such as cat eye syndrome, are less known. Most types of cancer fall under the category of rare diseases, alongside neurological, metabolic, chromosomal, skin, skeletal, and cardiovascular disorders.

Many rare diseases are named after the physicians who discovered them, while others derive their names from patients or hospitals where they were first identified. Despite their rarity, these diseases collectively impact millions worldwide and often pose significant challenges in diagnosis and treatment.

# NATIONAL SCIENCE DAY

"Empowering Indian Youth for Global Leadership in Science & Innovation for Viksit Bharat."

THEME

2025



NATIONAL  
SCIENCE DAY  
2025

The essence of science is independent thinking, hard work, and not equipment. When I got my Nobel Prize, I had spent hardly 200 rupees on my equipment.

by: CV Raman

You may know that February 28 is celebrated as National Science Day in India, but

**Do you know the reason behind this significant day?**

It commemorates the groundbreaking discovery of the Raman Effect by the eminent Indian physicist Sir Chandrasekhara Venkata Raman on this very day in 1928. This phenomenon, which explains the scattering of light and its interaction with matter, revolutionized the field of spectroscopy.



“  
Objective

## Raman Effect

In 1928, Sir C. V. Raman discovered that when a beam of coloured light passed through a liquid, a small portion of the scattered light changed in colour. He demonstrated that this colour shift depended on the nature of the substance, revealing valuable insights about its molecular composition. Recognizing its significance as a powerful analytical and research tool, scientists named this phenomenon the Raman Effect

## History of National Science Day

The first celebration took place on February 28, 1987, marking the beginning of an annual tradition. In 1986, the National Council for Science and Technology urged the Government of India to declare February 28 as National Science Day, which was promptly accepted honouring scientific progress.

## Nobel Prize due to Raman Effect Discovery

Sir C.V. Raman's remarkable discovery earned him the Nobel Prize in Physics in 1930, making him the first Indian scientist to receive this prestigious honour. His work not only placed India on the global scientific map but also paved the way for numerous advancements in optical physics. To honour his invaluable contribution to science and inspire future generations, National Science Day is observed across India every year on February 28, with events, exhibitions, and discussions that celebrate scientific innovation and progress.

- The primary objective of National Science Day is to promote awareness about the importance of science and its applications in daily life. Celebrated as one of India's key science festivals, it serves multiple purposes:
- Highlighting the role of scientific advancements in everyday life.
  - Showcasing achievements and innovations in science for human welfare.
  - Discussing challenges and implementing new technologies for scientific progress.
  - Providing a platform for scientific-minded individuals to contribute and engage.
  - Encouraging public interest and enthusiasm for science and technology.

On the occasion of **National Science Day 2025**, the **Centre for Molecular Biology, Central University of Jammu**, organized a departmental activity to celebrate scientific research and innovation. As part of this initiative, we conducted interviews with PhD scholars to gain insights into their research, experiences, and contributions to the field of molecular biology. These interviews provided a platform for scholars to share their knowledge, challenges, and inspirations. The discussions offered valuable perspectives on various scientific advancements and the journey of a researcher. Below, we have documented the interviews, highlighting key takeaways from each scholar's experience.



INTERVIEW - 1

PhD. SCHOLAR  
CENTRE FOR MOLECULAR BIOLOGY  
CENTRAL UNIVERSITY OF JAMMU

## MS. DIVYA SHARMA

Supervisor- Prof. Mushtaq Ahmed  
(Professor)

My research work is aimed at exploring the advancing and emerging realm of technology in relation to the betterment of mankind. The core area of research is related to bioinformatics and computational methodologies as well as its application in combating emerging issues related to climate change, environmental sustainability, and disease management.



### • **STARTUP THAT FASCINATES YOU THE MOST**

Startup that fascinates me the most (Also the motivation to take up STEM): The Role of STEM in Environmental Conservation and a Sustainable Future. With optimum use of resource flow we can make STEM as eco-friendly, budget-friendly and human-friendly.

What fascinates me the most is the transformative role of STEM in environmental conservation—how science, technology, engineering, and mathematics drive sustainable solutions to safeguard our planet. Through innovative advancements, we contribute to preserving ecosystems, combating climate change, and ensuring that Earth remains a habitable place for future generations. Additionally, technological progress has revolutionized scientific research, accelerating discoveries, enhancing data-driven decision-making, and enabling more effective environmental protection

# MR. MANISH KUMAR MISHRA

Supervisor

Dr. Shelly Sehgal  
(Associate Professor)



My research focuses on head and neck cancer, delving into its intricate molecular mechanisms, underlying causes, and potential therapeutic advancements. Despite extensive research, many aspects of its pathogenesis remain elusive, driving the need for innovative approaches to diagnosis, treatment, and prevention

## • • What inspired you to pursue career in science and innovation?

Curiosity about the intricacies of science, particularly in unravelling the underlying causes of cancer, continues to drive relentless research. Despite over 150 years of scientific exploration, the complex molecular mechanisms of cancer remain only partially understood, and a definitive cure is yet to be discovered. This ongoing pursuit underscores the depth of the challenge and the need for innovative breakthroughs in medical science.

## • Startup that fascinates you the most

Sustainable Farming for a Healthier Tomorrow  
Minimize Chemical Dependency to revolutionize agriculture by reducing reliance on chemical fertilizers, pesticides, and insecticides, thereby promoting healthier food, soil, and ecosystems while safeguarding human health. The primary focus of modern biotechnology is shifting from merely treating diseases to proactively eliminating their root causes, aiming to prevent their occurrence rather than just finding cures.



## • • How can we encourage young minds to choose STEM?

The government should ensure equal opportunities for all science graduates, fostering a level playing field for innovation and career growth. Additionally, the learning process in schools and colleges should be designed to cultivate curiosity in the younger generation. When students are encouraged to explore, question, and think critically, their natural inquisitiveness drives them to pursue their passions. A curiosity-driven education system will empower them to make informed choices, particularly in Science, Technology, Engineering, and Mathematics (STEM), enabling them to excel and contribute meaningfully to scientific and technological advancements.

## MS. POOJA YADAV

**Supervisor** Dr. Ashok Kumar Yadav  
(Associate Professor)

My research focuses on probiotics and their extracellular vesicles—nano-sized structures released by live microorganisms—as an alternative to live bacteria for therapeutic applications. Since probiotics have storage limitations, these vesicles offer a stable and effective solution.



I study their role in treating acne vulgaris and atopic dermatitis, two common but serious inflammatory skin diseases. Both conditions are caused by microbes—Staphylococcus aureus for atopic dermatitis and Cutibacterium acnes for acne vulgaris. My work involves isolating probiotic-derived extracellular vesicles, inducing disease conditions in epithelial cells using these pathogens, and analysing how the vesicles reduce inflammatory cytokines and provide protective effects. This research aims to develop innovative probiotic-based treatments for skin health.

### • **Inspiration for Research:**

As I mentioned, my research goes beyond addressing specific skin diseases—it also contributes to the development of topical probiotics, which can be formulated into lotions or skincare products. These not only help treat conditions like acne vulgaris and atopic dermatitis but also support mental well-being, as skin health significantly impacts self-confidence and quality of life.

My inspiration for this work stems from a desire to create research with meaningful social impact—advancing innovative, science-backed solutions that improve both physical and mental health.

### **Startup that fascinated you:**

Recently, a Chinese company patented a topical probiotic formulation for treating atopic dermatitis, marking a significant step forward in probiotic-based skincare.

While antibiotics remain a common treatment option, they come with serious drawbacks, including gut microbiome disruption and long-term side effects, often leading to other health complications. In this context, developing safer, probiotic-based alternatives for pharmaceutical and dermatological applications holds immense potential.

What makes this advancement particularly inspiring is how it bridges scientific research with real-world application—transforming probiotic-based innovations into market-ready solutions. This not only enhances treatment efficacy but also reinforces the value of research-driven product development in improving public health.

### **How to encourage young minds to take up STEM?**

Encouraging young minds to pursue STEM begins with curiosity-driven learning. When we were in school, we often asked simple yet profound questions. Engaging students with everyday natural phenomena can spark their curiosity. Once they begin asking how and why, they naturally develop an interest in deeper scientific exploration. The key is to inspire and engage students at an early stage.

Hands-on experiences in classrooms, where students can interact with real-world applications, are essential to sustaining their interest in STEM. Beyond education, funding remains a major challenge in research. Increased funding alternatives, along with better scholarships and stipends,

# MS. SONALI BHAN

Supervisor Dr. Audesh Bhat  
(Assistant Professor)

My research focuses on human genetics and its role in male infertility, exploring genetic factors, mutations, and molecular mechanisms that influence reproductive health.



## • • What inspired you to pursue career in science and innovation?

My research journey began with my master's dissertation, where I first explored R&D and developed a keen interest in scientific discovery. However, it was during my PhD that I became truly fascinated by the field of genetics, recognizing its profound impact on understanding human health and disease.

## • Startup that fascinates you the most

I was particularly fascinated by the mechanism behind diagnostic kits during COVID-19, especially how they rapidly detected the virus with precision. Their innovation and impact on global healthcare further deepened my interest in genetic diagnostics and molecular biology.



## • • How can we encourage young minds to choose STEM?

STEM Needs More Young Minds and Fresh Ideas

Science, Technology, Engineering, and Mathematics (STEM) drive innovation, solve global challenges, and shape the future. However, to continue advancing, STEM needs more young people, fresh perspectives, and creative ideas.

### How Can We Inspire More Young People to Join STEM?

- Early Exposure to Science – Encouraging curiosity through hands-on experiments, science fairs, and robotics in schools can ignite a passion for discovery.
- Access to Research Opportunities – Universities and industries should provide internships, funding, and mentorship programs to guide aspiring scientists.
- Representation and Motivation – Young students need role models in STEM to inspire them and show them that innovation is achievable at any age.
- By fostering a culture that supports young minds, we can ensure STEM continues to evolve, push boundaries, and create solutions that transform the world.

# MS. SHIVANGI SHAN

Supervisor  
Dr. Shelly Sehgal  
(Associate Professor)



## Area of Research:

During the peak of the pandemic, as the world witnessed an overwhelming number of casualties and countless individuals battling COVID-19, I became deeply intrigued by the variations in disease pathology. Some people succumbed to the virus, while others recovered swiftly. This disparity in immune responses fascinated me—why do individuals react so differently to the same infection?

As I delved deeper, I realized that this phenomenon extends beyond COVID-19 to a wide range of viral diseases. For instance, a simple cold might resolve quickly in one person, whereas another might experience prolonged symptoms. Similarly, infections caused by the hepatitis B and C viruses often follow vastly different trajectories—some individuals recover with minimal complications, while others develop chronic infections that may eventually progress to carcinoma.

This curiosity led me to take on the challenge of understanding the underlying mechanisms behind these varied responses. My research focuses on unravelling the complex interplay between viral genotypes and the host immune response. We analyse these interactions on both the viral and host levels, while also considering environmental factors, as disease outcomes are shaped by the intricate relationship between the pathogen, the immune system, and external influences.

By exploring these dynamics, my goal is to gain deeper insights into disease progression, immune variability, and potential therapeutic interventions, ultimately contributing to the development of more effective strategies for managing viral infections.

## • **Motivation to take up research:**

I initially aspired to pursue a career in teaching, completing my B.Ed. and qualifying for the CTET exam. However, during my master's degree, my perspective shifted. In my final year of masters, while working on my dissertation, I discovered a deep passion for research. The process of selecting a topic, brainstorming ideas, tackling challenges, and finding solutions was incredibly exciting. Those six months of hands-on research became the most enriching phase of my academic journey, ultimately inspiring me to prioritize research over teaching.

## **Startup that fascinated you the most:**

While researching viral hepatitis, I had the opportunity to interact with patients and noticed a critical issue—many were unaware of their infection. Often, they visited hospitals for unrelated concerns, only to be diagnosed with hepatitis B or C without any prior symptoms or knowledge of exposure. In some cases, the disease had progressed to a chronic stage without the patient realizing it.

This highlighted the urgent need for early diagnosis in healthcare. Detecting infections at an early stage can significantly alter disease progression and improve patient outcomes. Additionally, genetic predispositions play a key role in disease susceptibility—some individuals are naturally more prone to certain infections than others.

A promising avenue for innovation lies in biosensor-based early diagnostics and AI-driven genetic profiling. By analysing a patient's genetic predispositions, we can provide personalized health insights, enabling proactive lifestyle adjustments and preventive care. Integrating AI models into genetic assessments could revolutionize early disease detection, ultimately leading to better health management and improved quality of life.

- **One Advice for young minds:**

Always embrace challenges—don't settle for what's easy. Step out of your comfort zone and, at least once, immerse yourself in research. Whether you enjoy it or not is secondary; the key is to explore. Just as you can't judge a fruit without tasting it, you can't truly know your interests without trying new things. While you're in the learning phase, experiment—take short internships, explore various fields, and see what excites you. You might be surprised by what truly captivates you.

Never fear exploration; instead, embrace it. Only by trying different paths will you find where you truly thrive—and once you do, you'll excel beyond measure.

- **How can we encourage young minds to take up STEM?**

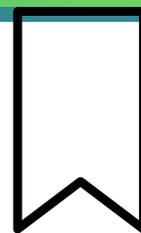
More young people can be inspired to pursue STEM through direct engagement. I remember the first time I heard about DNA—I was amazed. When I share my research, people often see it as extraordinary because many have never been exposed to such concepts.



- To encourage interest in STEM, we must actively talk about it. Engaging with communities, explaining science and research in simple terms, and sharing our passion can leave a lasting impression. People respond instantly, showing curiosity and admiration.

Universities should integrate science outreach into the curriculum. Master's students, beyond exams and dissertations, should be encouraged to interact with the community, explaining STEM concepts and sparking curiosity. Incorporating this into academic programs, even with evaluation, would help bridge the gap between scientific knowledge and public awareness, fostering a new generation of STEM enthusiasts

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