



পদার্থ বিজ্ঞান বিভাগ

DEPARTMENT OF PHYSICS
PHYSICA
NANDA NATH SAIKIA COLLEGE

E-Magazine 2

2024-2025

"I have no special talents. I am only passionately curious"

- Albert Einstein

Departmental Annual Magazine

Department of Physics

Nanda Nath Saikia College

Titabar, Assam

Editor: Dr. Prathana Borah

Editorial

In an era of constantly evolving scientific discoveries and environmental challenges, we stand at the juncture of discovery and responsibility. Humans have long been fascinated by the universe. From the first celestial observations to the present era of space travel, the stars have inspired, stimulated interest, and fuelled ambition. We also have to face the pressing necessity to safeguard the environment. While astrophysics demonstrates the vast and interrelated nature of the universe, global warming serves as a stark reminder of the profound repercussions of human actions on Earth. The more we learn about the universe, the more we appreciate how special and vulnerable our planet is.

The threat created by global warming is no longer hypothetical. Earth's climate is changing dramatically, as seen by rising temperatures, melting polar ice caps, and more extreme weather patterns. The greenhouse effect has been amplified as a result of human activity pushing atmospheric CO₂ levels to record highs, especially through the burning of fossil fuels. The repercussions are severe: rising sea levels, loss of habitat, and extensive extinction of animals, including human beings.

The universe keeps unveiling its most mysterious truths even as Earth deals with existential issues. Albert Einstein predicted a century ago that there would be ripples in space-time, and the discovery of gravitational waves has revealed a whole new perspective on the universe. These waves, which were first observed in 14 September, 2015, are the result of some of the universe's most dramatic and destructive events, such the collision of neutron stars or black holes. Quasars, bright objects driven by material accretion into supermassive black holes, are even more spectacular. With their ability to outshine entire galaxies, quasars offer important clues about the early cosmos. Astrophysicists are gaining knowledge about the processes that formed galaxies billions of years ago by examining these cosmic powerhouses, which is providing insight into the origins of our universe.

Science and technology are being revolutionized by the fields of plasma physics and metamaterials. With their artificially created qualities, metamaterials show great potential for a variety of uses, from super lenses that perceive objects smaller than light wavelengths to invisibility cloaks. These materials are poised to revolutionize a variety of industries, including medical imaging and telecommunications, by bending electromagnetic waves in new and inventive ways.

In the meantime, new avenues for space exploration and energy production are being made possible by the study of plasma physics, or the fourth state of matter. 99% of the visible cosmos is made up of plasma, which is essential to comprehending events like solar flares, fusion energy, and star behavior. In particular, the quest for nuclear fusion may yield an almost infinite supply of clean energy, solving one of the most urgent issues of our day: the production of power that is sustainable.

The fate of our planet and our future lies in the balance. As we continue to explore the cosmos, we must also care for the fragile world beneath our feet. Humanity needs to take on this challenge as it navigates the fine line between discovery and management. We can create a future in which environmental preservation and scientific growth coexist by accepting our dual roles as explorers of the cosmos and stewards of the planet.

Wish you a happy reading!

Dr. Prathana Borah
Asst. Professor
Department of Physics,
N. N. Saikia College, Titabar

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Global Warming and Indian Summer Monsoon

Climate change is certainly the most significant issue in the scientific community today. The IPCC's sixth report (2022) highlights that global temperatures are rising and are projected to increase by 1.5°C over the next twenty years. This warming trend is expected to alter both the timing and intensity of monsoon rains in India. Some regions may face more severe short-term heavy rains, while others might experience a decline in overall precipitation. Additionally, climate change is affecting the timing of the monsoon season, causing it to start later or end sooner than usual in certain areas. These shifts can have significant consequences for India's agriculture, as farmers depend on the monsoonal rains for irrigation and often struggle to adapt to changes in their timing.

The Indian monsoon is a seasonal weather pattern that typically delivers rainfall to India from June to September each year. Recently, however, global climate changes have made the monsoon season increasingly unpredictable and erratic. Rainfall has started occurring later than usual, with some areas experiencing heavier and more intense downpours, while others face reduced or no rainfall. This inconsistency has led to flooding in some regions and droughts in others.

Under global warming scenarios, one would expect the monsoon drivers to strengthen and lead to more rainfall. A key driver of the monsoon is the temperature difference between land and sea during summer, which influences monsoon circulation towards the Indian subcontinent. Past research indicated that land areas in the northern hemisphere are warming faster than the oceans, suggesting that this temperature contrast should intensify. Additionally, rising ocean surface temperatures increase atmospheric moisture due to enhanced evaporation and greater moisture-holding capacity of air. This should ideally result in increased monsoon rainfall. However, this is not occurring with the Indian monsoon.

Despite expectations that global warming should strengthen monsoon drivers like the land-sea temperature contrast, recent findings show the opposite. The Indian Ocean has warmed significantly by 1.2°C during the last century, especially in the western regions, reducing the land-sea temperature difference that typically drives the monsoon. This warming trend is also evident in the upper atmosphere, as the heat from the ocean surface is transferred upward through convective processes. Additionally, the decrease in land-sea temperature contrast may be partly due to less warming over the Indian landmass, potentially influenced by increased aerosols or other unexplained factors.

The warming of the Indian Ocean also contributes to the weakening of the monsoon circulation. As the ocean warms, it enhances the upward movement of warm, moist air over the equator. This increased upward motion over the ocean is balanced by the sinking of dry air over the Indian subcontinent, which suppresses convection and rainfall over land. Consequently, while the Indian Ocean experiences increased rainfall, the Indian subcontinent suffers from reduced monsoon rains and more dryness.

This shift disrupts the monsoon's predictability and intensity, impacting agriculture and food security in India. As the Indian Ocean continues to warm, the future of the monsoon and its effects on the region remain uncertain.

*-Dr. Monisha Chetia
Assistant Professor
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Gravitational Waves

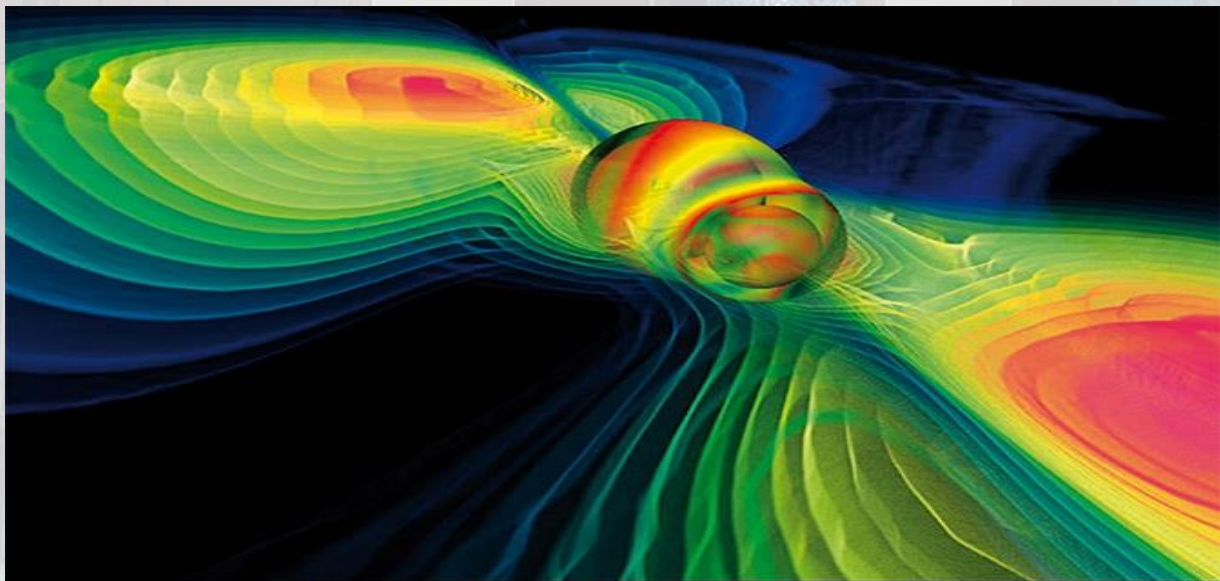
Gravitational waves are fluctuations in the fabric of space-time caused by the acceleration of massive objects. They propagate outward like waves, carrying energy and momentum, but unlike light or sound waves, they are distortions in the geometry of space-time itself. These waves are extremely faint and difficult to detect because they interact very weakly with matter. They provide a new way for scientists to study the universe, revealing insights into cataclysmic events such as the collision of black holes or neutron stars.

Gravitational waves were predicted by Albert Einstein in his theory of general relativity, published in 1915. The direct detection of gravitational waves was achieved by scientists at the Laser Interferometer Gravitational-Wave Observatory (LIGO) in 2015, confirming Einstein's theoretical predictions about these waves propagating through space-time.

Simply, we say Gravitational waves are tiny ripples in space and time caused by the movement of massive objects, like when black holes or neutron stars collide. Imagine dropping a stone in a pond; the ripples that spread out are like gravitational waves, but they move through space instead of water. These waves are very hard to detect because they are so small, but they help scientists learn about big, violent events in the universe and understand space and time better.

Gravitational waves, subtle ripples in the fabric of space-time, offer astronomers a revolutionary window into the cosmos. By detecting these faint signals, scientists can explore cataclysmic cosmic events and delve into the origins of the universe itself, ushering in a new era of exploration and understanding in astrophysics.

- *Partha Protim Borah*
B. Sc. 5th Semester
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(Image credit: MPI for Gravitational Physics/W.Benger-Zib)

Plasma Physics

Plasma science, the investigation of ionized gases and their interactions with materials, is a remarkably far-reaching discipline that is solving problems in space physics and astrophysics, materials science and engineering, atomic, molecular and optical physics, chemistry, biology, medicine, and even agriculture.

Plasma physics studies are making exciting advances in fusion energy research, which may be the key for humanity to produce abundant, safe, carbon-free electricity. Plasma research is leading to profound new insights on the inner workings of the Sun and other stars, and fascinating astrophysical objects such as black holes and neutron stars. The study of plasma is enabling prediction of space weather, medical treatments, and even water purification.

Plasma Physics study leads to some fascinating researches on following topics:

- * Properties of waves
- * The structure of matter
- * Electric and magnetic field interactions with plasma
- * The electromagnetic spectrum
- * Fusion processes in stars and the laboratory, etc.

- *Mridu Paban Das*
B. Sc. 5th Semester
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Image credit: Google

Astrophysics

Astrophysics is the branch of science to study of the physical nature of celestial objects and phenomena. Some important features in astrophysics are:

Big bang Theory: -The leading explanation for the origin and evolution of the universe, proposing that the universe began as a singularity and expanded rapidly around 13.8 billion years ago.

Black Holes: - Regions of space time where gravity is so strong that nothing, including light, can escape, characterized by their mass, charge and spin.

Exoplanets: - Planets outside our solar system, orbiting other stars, with diverse characteristics and potential for hosting life.

Galaxy Types: -Spiral, elliptical and irregular galaxies each with unique structures and features, such as spiral arms, bulges and active galactic nuclei.

Gravitational Waves: -Ripples in space time produced by massive cosmic events, like black hole mergers which were first detected directly in 2015.

Dark matter and dark energy: -Invisible forms of matter and energy that make up about 95% of the universe, influencing its large-scale structure and expansions.

- *Plabita Priyam Bora*

B. Sc. 3rd Semester

Department of Physics

N.N. Saikia College, Titabar

Some amazing facts about space

1. *One million Earths could fit inside the Sun and the Sun is considered an average-size star.*
2. *You wouldn't be able to walk on Jupiter, Saturn, Uranus or Neptune because they have no solid surface!*
3. *There are more stars in the universe than grains of sand on all the beaches on Earth. That's at least a billion trillion!*
4. *The sunset on Mars appears blue.*
5. *Space is completely silent.*
6. *The International Space Station (ISS) is the size of a football field.*
7. *It would take nine years to walk to the moon.*
8. *And in around 4.5 billion years, the Milky Way is expected to collide with the Andromeda galaxy, our closest galactic neighbour, to form a giant elliptical galaxy.*

- *Priyakshi Mahanta*

B. Sc. 3rd Semester

Department of Physics

N.N. Saikia College, Titabar

Black holes

Black holes are among the most mysterious and awe-inspiring objects in the universe. Here are some fascinating facts about black holes:

A black hole is a region in space where the gravitational pull is so strong that nothing, including light, can escape. Black holes are formed when a massive star collapses in on itself and its gravity becomes so strong that it warps the fabric of spacetime. The point of no return around a black hole is called the event horizon. Any matter or energy that crosses the event horizon is trapped by the black hole's gravity. The centre of a black hole is called a singularity, where the density and gravity are infinite. There are four types of black holes, each with different properties and origins: stellar, intermediate, supermassive, and miniature. Black holes have three main characteristics: mass, charge, and angular momentum (spin). Black holes can bend and distort light around them, creating gravitational lensing effects. Since black holes don't emit light, they're difficult to detect directly. Scientists use indirect methods like X-rays, gamma rays, and radio waves to detect them. Contrary to popular belief, black holes don't "suck in" matter from the surrounding space, and they don't have any physical surface.

-Washima Wasif Ahmed

B. Sc. 3rd Semester

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Image credit: Google

Quasar

Quasars are the brightest object in the universe and possibly the most distant detected so far. The name is short for quasi-stellar radio sources and they are believed to be disk of matter swirling around black hole. Quasars are form when an event causes a huge amount of gas to pile onto the central supermassive black hole in a galaxy. Quasars were first identified in 1962 by Marten Schmidt at California institute of technology. They appear as star like points but they lie at enormous distance.

By the 1980s, quasar prodigious Xray and radio emissions led most astronomers to believe those objects contain black holes in their centers. In 1990s scientists increasingly viewed quasars. As young galactic cores where gas, dust and stars fed a central black hole.

For years quasars provided the only way astronomers could get a glimpse of the early cosmos. Astronomers' assumption that quasars were linked to the formation of galaxies was key to understanding how everything in the early universe found.

The closest biggest quasar called 3C273 is even visible to amateur astronomers with at least an 8-inch telescope, or astro images, as it shines at magnitude 12.9 in the constellation of Virgo. Quasars sizes can also be measured by tracking how the quasars energy released change with time. If a quasar takes more time to change how much energy it releases, it accretion disk should be larger. By contrast, if a quasars energy release changes quickly, it must be smaller.

- Priti Priyomi Rajkhowa

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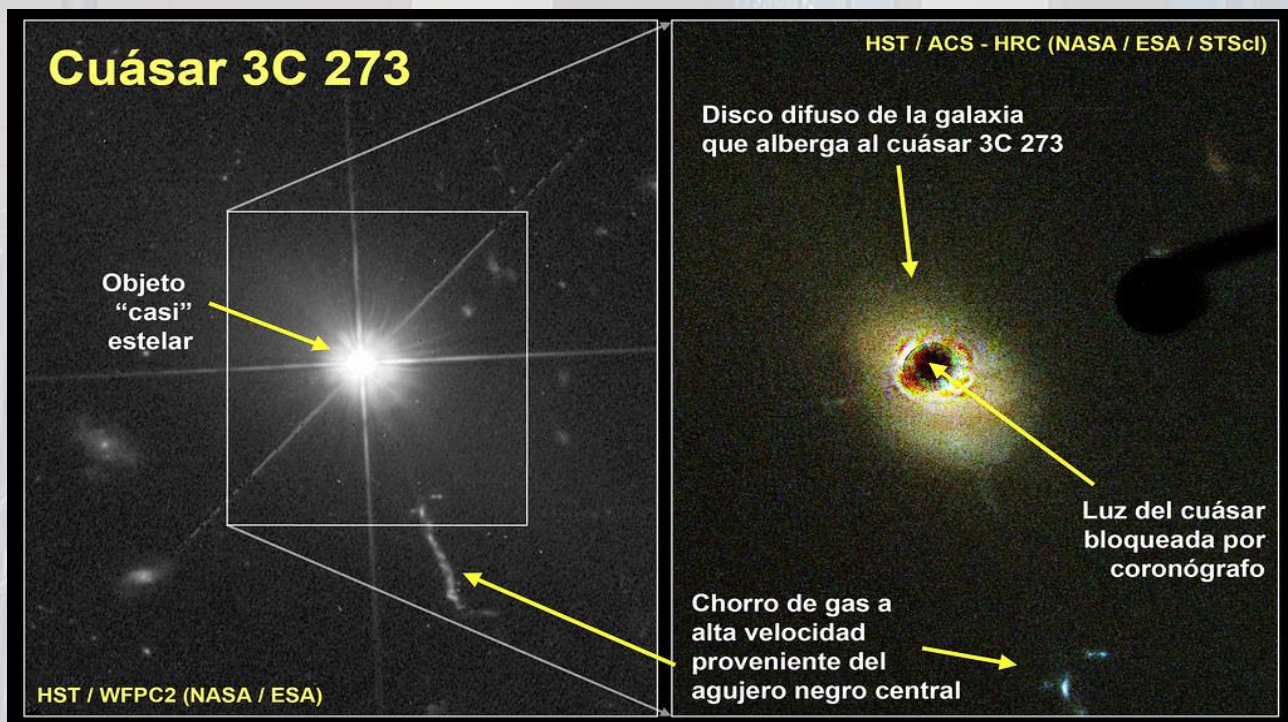


Image credit: NASA

Metamaterials

Metamaterials are artificial materials engineered to have properties not found in nature. They are designed to interact with electromagnetic waves, sound, and other forms of energy in unique ways, allowing for unprecedented capabilities such as- Invisibility cloaks, Perfect lenses, Soundproofing Super-strength.

Metamaterials are created by arranging individual elements, such as metals, plastics, or other materials, in specific patterns and shapes to achieve desired properties. They have potential applications in: - Medical imaging, Energy, Defense, Consumer products.

Metamaterials hold great promise for revolutionary applications in optics, electronics, acoustics, robotics, and more. The future of metamaterials holds immense potential and promise. Some potential developments and applications include:

1. **Advanced Optics:** Perfect lenses, invisibility cloaks, and ultra-high refractive index materials.
2. **Energy Harvesting:** Efficient solar cells, thermoelectric devices, and advanced biosensors.
3. **Medical Breakthroughs:** Implantable devices, biosensors, and targeted drug delivery systems.
4. **Quantum Computing:** Metamaterials-based quantum processors and ultra-secure communication.
5. **Aerospace and Defense:** Lightweight, high-strength materials for aircraft and spacecraft.

- *Rajdeep Borkakoty*
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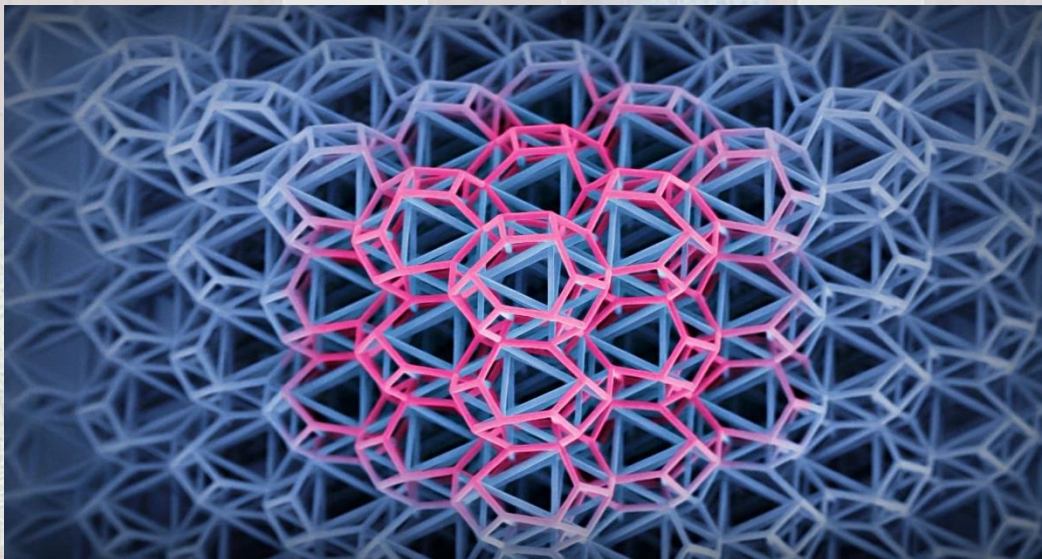


Image credit: Jens Bauer and Cameron Crook

Artificial Intelligence (AI)

Artificial Intelligence refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term “Artificial Intelligence” was coined in 1956. According to the father of AI, John McCarthy, it is “the science and engineering of making intelligent machines, especially intelligent computer programs”. It encompasses various subfields such as machine learning, natural language processing, computer vision, and robotics. These subfields enable AI to perform various tasks, such as learning, understanding language, recognising image, and interacting with the physical world. It has the potential to revolutionize industries like healthcare, finance and education etc., improving efficiency and accuracy. AI also raises ethical concerns, such as job displacement due to automation, biases in algorithms etc. Responsible AI development is crucial to ensure benefits for all. Over all, AI represents a transformative technology that continues to evolve, promising both opportunities and challenges as it reshapes the way we live, work and interact with machines in the 21st century. By understanding its potential and limitations, we can harness its power to create a better future for all.

-Lucky Gogoi

B. Sc. 3rd Semester

Department of Physics

N.N. Saikia College, Titabar

Life after death: what happens after death

When someone dies, we say, “This person is no more.” That is not true. The person is no more the way you know them, but they still very much exist. The physical body will fall apart, but the mental and panic body go on, depending upon the strength of the karma. To find another womb, the intensity of this karmic structure should come down, it should become passive. If the karmic structure has become weak because it has run its course, then it finds another body very easily. When one completes his allotted karma for this life, he will die just like that – without disease, accident or injury. That person may find another body within hours.

After death, discernment is completely absent, even more than in a child. Then, whatever quality you put into the mind; it will multiply a million-fold. This is what is being referred to as heaven and hell. If you go into a pleasant state of existence, it is called heaven. If you go into an unpleasant state of existence, it is called hell. These are not geographical locations but experiential realities that a life which has become disembodied is going through.

-Arup Gogoi

B. Sc. 3rd Semester

Department of Physics

N.N. Saikia College, Titabar

The alien mystery: time travel, conspiracy, and quantum mysteries

The enigma of UFOs and extraterrestrial life has captivated humanity for decades. From mysterious sightings to elaborate theories, the subject of aliens continues to spark curiosity and debate. In this article, we'll explore the origins of aliens, their speculated power sources, the conspiracies surrounding them, and the scientific theories that attempt to unravel their existence.

The Origin of Aliens: Where Do They Come From? The origins of aliens have been a topic of fascination and speculation for centuries. Some theorists believe that extraterrestrial beings come from distant star systems, traveling across galaxies in advanced spacecraft. Others propose that aliens might be interdimensional beings, existing in parallel universes and occasionally slipping into our reality.

Power Sources: What Fuels Alien Technology? One of the most intriguing aspects of UFO sightings is the apparent advanced technology that powers these mysterious crafts. Some speculate that aliens harness energy sources beyond our current understanding, possibly tapping into quantum energy, dark matter, or even the fabric of spacetime itself. This has led to theories that alien civilizations are far more advanced, possessing knowledge that could revolutionize our understanding of physics and energy.

The Conspiracy Theories: UFOs, Time Slips, and Government Secrets: Conspiracy theories abound when it comes to UFOs and aliens. One popular theory suggests that governments around the world are hiding evidence of extraterrestrial contact, possibly in collaboration with alien species. The concept of "time slips" has also gained traction, with some believing that UFO sightings are linked to time travel, where these crafts slip through the folds of time, offering glimpses into the past or future.

The idea of time travel is further connected to the possibility that aliens are not just visitors from another planet but could be superhuman species, perhaps an evolved version of humanity from a distant future. This ties into the theory of evolution, where advanced human species might have developed the ability to traverse time and space.

Quantum Theory and the Existence of Aliens: Quantum theory, with its strange and counterintuitive principles, offers a possible explanation for the existence of aliens. The idea that multiple realities or dimensions exist simultaneously suggests that aliens could be living among us in a different quantum state, invisible to our current means of detection. This theory challenges our traditional understanding of reality and opens the door to new possibilities in the search for extraterrestrial life.

Cultural References: Mirages in the Desert and Ancient Indian Texts: Throughout history, various cultures have documented encounters with mysterious beings. In the deserts of the Middle East, tales of mirages have been linked to the appearance of UFOs, with some interpreting these phenomena as evidence of extraterrestrial presence. Ancient Indian texts also describe flying machines called "Vimanas," which some believe could be early references to alien technology.

Currency of UFOs: A Speculative Economy: An interesting yet speculative concept is the idea of a currency used by aliens or within their civilizations. This "currency" might not be physical money

as we know it but could involve exchanges of energy, knowledge, or advanced technology. The concept challenges our understanding of economy and value, pushing us to think beyond Earth-bound systems.

Confirming the Existence of Aliens: A Challenge for Humanity: Despite countless sightings and testimonies, the existence of aliens remains unconfirmed by mainstream science. To truly confirm the presence of extraterrestrial life, we would need undeniable evidence—whether in the form of physical artifacts, direct communication, or irrefutable scientific data. Until then, the mystery of UFOs and aliens continues to inspire wonder, debate, and endless speculation.

As we explore these theories and cultural references, one thing remains clear: the mystery of UFOs and aliens is a complex and fascinating puzzle that challenges our understanding of reality, time, and the universe itself. Whether through science, philosophy, or imagination, humanity's quest to uncover the truth about extraterrestrial life is far from over.

- *Sunsun Das*

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Image credit: NASA

Transform your life: the power of personality development

Personality is set of behavioural, cognitive and emotional patterns formed from biological and environmental factors and which change over time. While there is no generally agreed definition of personality most theories focus on motivation and psychological interaction with the environment that surrounds on.

WHAT IS PERSONALITY DEVELOPMENT?

The study of the psychology of personality called personality psychology, attempts to explain the tendencies that underline differences in behaviour. Personality development refers to the process of developing, enhancing, changing one's personality over time. Such development occurs naturally over the course of life, but it can also be modified through intentional efforts.

Our personality starts with things we get from our family, like being quite or friendly. But as we meet new people and go through different experiences, we change and develop. For example, if we face a problem and we learn how to solve it, then we become more confident. This is how our personality develops over time. Everyone's personality journey is different. Each of us has our own special way of growing and becoming who we are. It is important to adapt to challenges and discoveries that make us the wonderful individuals we are. Psychologists have taken many different approaches to the study of personality, including biological, cognitive, learning and trait-based theories, as well as psychodynamic, humanistic approaches.

IMPORTANCE OF PERSONALITY DEVELOPMENT

Personality development improves our leadership abilities. It can help a student social and emotional wellbeing, improve communication and interpersonal skill, lead to greater success in personal and professional life, make decisions with confidence, inspire and motivate others.

The importance of personality development in our life:

1.SELF CONFIDENCE:

Self-confidence means believing in yourself, having complete faith in anything you do and letting go of the fear of failure. Self-confidence is the biggest secret of success. Those who believe in themselves they know that what they do will surely succeed in the end. Self-confidence is very important for living a stressful and fulfilling life. This confidence help up to speak our mind, have meaningful conversation and pursue our dreams with determination. It's like having a torch that guides us in the dark.

2.INTERPERSONAL RELATIONSHIP: Interpersonal relationship is must have for meaningful connection. In social psychology, an interpersonal relationship describes a social association connection between two or more persons. Such relationship is necessary to live in society. Interpersonal relationship develop trust, understanding and connection. It makes relationship that are not enduring but also deeply fulfilling.

3.CAREER GROWTH: Career growth is the important thing that helps a person to grow with a strong personality. It helps to developing our skills, knowledge and expertise to stay relevant. It is crucial for personal and professional development. Career growth provides financial stability by opening up opportunities for higher paying positions. It is essential for long term success and happiness the workplace.

4.ADAPTABILITY: When we develop our personality, we cultivate the skill of adaptability. This skill helps us to face changes and challenges without any fear. We become more open to new ideas, different ways of doing things and even unexpected turns in our path. It helps us to stand our own feet and find solutions when things don't go as planned and help us to survive in this ever- evolving space.

PERSONALITY DEVELOPMENT TIPS

Personality development tips help us to move forward and achieve our goals. It gives self-confidence and makes the mind interested in doing different things. It helps to face various problem and eliminates Overthinking.

1. Identify your values: We need to identify our important values. Values can be identified and acted upon by thinking about them. This makes it easier to choose our goal and achieve them.

2. Set a daily personal development Goal: Set a small, clear goal each day. This could be like reading books, learning new technique or accomplishing a particular task. Set a time for development every day at any time in morning or evening. Healthy habits like regular exercise, yoga, healthy eating and overall development. Everyday spend some time for meditating or concentrating mind. This will bring peace of mind and clarity. At the end of each day review the works and develop a plan for the days ahead.

3. Keep a positive mindset: Instead of negative thinking, develop positive and fundamental thinking. Try to look for the good in any situation. Make a list of what you know you are going to be thankful for and focus on it. At the end of everyday focus on successes and think about what you can do to improve yourself. Spend time with family, friends and positive thinkers. Reading books and literature that promote positive thinking and creativity.

4. Confidence: First of all, believe in yourself. Believe in your abilities and strength. Sometimes take of self-confidence can lead to many problems. Be honest and truthful. Other people can trust you if you are always honest and truthful. Patience and empathy are need to build any faith. Learn from mistakes and successes. Never make hasty decision.

We all want to build our life successfully in all aspects physically, mentally and spiritually. Personality development can give us a beautiful and successful life. So, we should always try to make our lives the way we want them to be.

-Dipsikha Saikia

B. Sc. 3rd Semester

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Departmental Activities (2023-2024)

1. Celebrating Mental Awareness programme: An awareness programme on Mental Health and its Management was organized by the Department of Physics and Physical Society, Nanda Nath Saikia College, Titabar on the 15th of September, 2023. The special day “R U OKAY Day” was realized with the theme of the year 2023 being “I am here to hear you.” The programme was joined by two speakers Dr. Sanjib Baruah, Psychiatrist, and Mrs. Alpana Baruah, Clinical psychologist of Brisbane, Australia. Mental well-being is necessary to cope with the daily stresses of life and to work effectively.



2. An interactive session on "Innovation and Entrepreneurship: Role of Incubator in Startup Ecosystem" will be held by the Department of Physics and Chemistry of NNSC on September 22, 2023, at Conference Hall, NNSC.
3. National Science Day celebration on 28th February, 2024



4. Educational Tour to Doyang Hydroelectric Project on 11st March, 2024



DEPARTMENT OF PHYSICS

NANDA NATH SAIKIA COLLEGE

5. Visit to Kaziranga University for Intellectual Properties Right on 28th March, 2024.



6. A Memorandum of Understanding (MoU) was signed between Department of Physics, Nanda Nath Saikia College and Department of Physics, Devicharan Barua Girls' college on June 3, 2024 at Nanda Nath Saikia College.

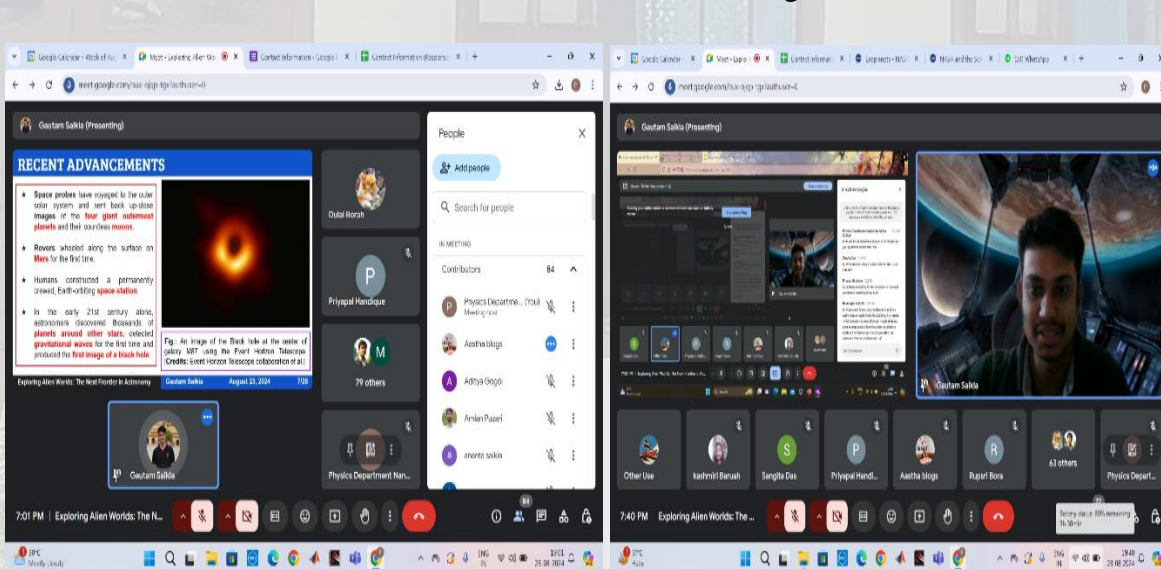


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7. On the occasion of World Environment Day, an awareness programme was organised by the Physical Society and Department of Physics of Nanda Nath Saikia College on June 5, 2024. The programme was exercised as an extension activity at "Melamati Govt. Junior Basic School". Dr. Rajanish Saikia delivered an informative and student-friendly talk on the theme of World Environment Day 2024: "Our land, our future".

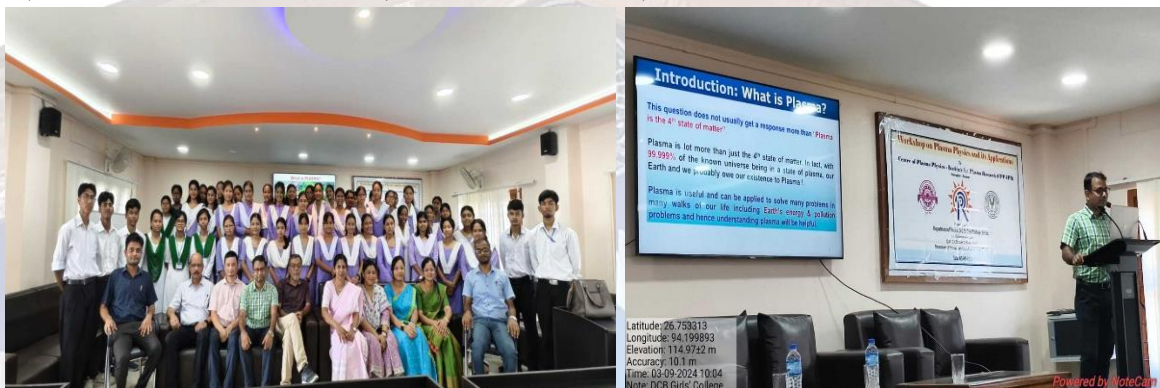


8. In honour of the Chandrayaan 3 Mission's incredible accomplishment, the union government has declared August 23 to be National Space Day. The Department of Physics of Nanda Nath Saikia College, in collaboration with the Department of Physics of Devicharan Barua Girls' College, is set to celebrate the first National Space Day on August 23, 2024. A talk will be arranged on "Exploring Alien Worlds: The Next Frontier in Astronomy" by esteemed speaker Dr. Gautam Saikia, Assistant Professor, North Gauhati College, Assam.



9. On September 3, 2024, the Department of Physics, DCB Girls' College, Jorhat, organised a workshop on "Plasma Physics and its Application" in collaboration with the Department of Physics, NNS College, Titabar, at DCB Girls' College, Jorhat. A team of three eminent speakers from the Centre of Plasma Physics- Institute for Plasma Research (CPP-IPR) delivered talks on basic plasma physics and its applications in various fields of science. The

speakers were: Dr. BJ Saikia, (Scientific Officer F), Dr. Ngangom Aomoa, (Scientific Officer D) and Dr. Rakesh Moulick, (Scientific Officer D).



10. Parent-teacher meeting was organised on September 13, 2024, at 1pm, in the General Lab of the Department of Physics, NNSC.



11. Vishwakarma Puja Celebration on 17-09-2024 at Department of Physics, Nanda Nath Saikia College, Titabar



Department Achievement

We are immensely proud to share the news that our student team placed third in the poster presentation competition organized on the occasion of National Space Day' 2024. Their hard work, creativity, and passion for science have brought pride to both our department and the college. This achievement is a testament to dedication and teamwork.



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The Future of Healthcare Delivery: Telemedicine

Sadanta Hazarika, Bobbit Gogoi
Department of Physics, Nando Nahi Taluk College, Thibra, Jorhat, Assam

Abstract

Telemedicine, the practice of delivering healthcare services remotely via digital platforms, has rapidly evolved from a niche technology into a cornerstone of modern healthcare. This transformation has been accelerated by advancements in communication technologies, the widespread adoption of smartphones, and the urgent need for accessible healthcare solutions, especially in the context of global challenges such as the COVID-19 pandemic. As healthcare systems worldwide face increasing pressure to become more efficient and patient-centered, telemedicine has emerged as a critical tool in overcoming barriers to care and enhancing the quality of healthcare delivery. National Aeronautics and Space Administration (NASA) and Indian Space Research Organization (ISRO) has taken various initiatives on Telemedicine.

Introduction

Telemedicine integrates Communication Technology, Information Technology, Biomedical Engineering, and Medical Sciences to deliver healthcare when distance is critical. It enables healthcare professionals to use technology for diagnosing, treating, and preventing disease, conducting research, and providing continuing education, all aimed at improving individual and community health. Particularly valuable for post-surgery follow-ups, telemedicine reduces unnecessary travel, saving time and money, and expands healthcare access through Information and Communication Technology.

Methodology

- The Telemedicine system uses customized hardware and software at both the patient's and specialist's locations, including diagnostic tools like ECG, X-ray, and pathology cameras.
- These tools are connected via a Very Small Aperture Terminal (VSAT) and managed by ISRO's Network Hub Station.
- Medical images and patient data are sent as digital packets to specialists either ahead of time or in real-time through a satellite link.
- Specialists receive and reconstruct the data, enabling them to diagnose, interpret, and recommend treatment via video conferencing.
- This system allows effective communication between doctors and patients, even over vast distances, for accurate assessments and treatment suggestions.

Present Day Scenario & Scope

Telemedicine has become essential in healthcare, accelerated by COVID-19 for safe, accessible care. It's now widely used in primary care, mental health, and chronic disease management. Advancements in AI, wearable tech, and 5G are expanding telemedicine's scope, enabling advanced remote diagnostics and real-time monitoring.

Main Concept of Telemedicine

Types of Telemedicine

Point-to-Point System

Point-to-Multi-Point System

Multi-Point-to-Multi-Point System

Initiatives in India

Indian Telemedicine Network has treated over 25,000 patients since its inception in 2002 with ISRO's Telemedicine Pilot Project, Chennai. ISRO's telemedicine services cover almost 100 hospitals across the nation, including 73 missions, rural, district, and specialty hospitals as well as health centers connected to 22 large city specialty hospitals.

ISRO's Telemedicine facilities at GE Park Hospital, (NH) Dharmapuri in Puri, Odisha, and Bishop Bakharia Hospital in Cuttack, along with the ISRO Consumer Network across 4 states, were effectively utilized during post-Covid disaster relief to aid the remote population of the Andaman and Nicobar Islands. Plans are underway to establish more Telemedicine centers at primary health centers across various islands in the region.

Conclusion

Telemedicine is revolutionizing healthcare by enhancing access to services, particularly in remote areas. India's efforts, backed by digital technology and organizations like ISRO, demonstrate telemedicine's ability to bridge geographical gaps. While challenges such as regulatory issues and the digital divide persist, telemedicine's growth indicates a promising future. Ongoing innovation and collaboration will further advance a more equitable and efficient healthcare system in India.

References

1. Chhabra, G.S., Tripathi, A.T. and Singh, N., 2018. Telemedicine in India: Then & now. *Journal of Health Systems and Primary Care*, 12(1), pp. 307-309.
2. ISRO. *Telemedicine*. [online]. Available from: <https://www.isro.gov.in/telemedicine>

Coaching Unit of Education (CUE) Institute under ISRO's Telemedicine program give physicists an opportunity to advance their medical knowledge and abilities through collaboration with specialists at specialty hospitals via satellite-based telemedicine.

Department of Space (DOS), Government of India, New Delhi, India.

ISRO has launched pilot programs to integrate telemedicine with Resource Information and Tele-Educator services of Village Resource Centres. Several States initiated the first program, linking isolated villages in these districts to a model center in Chennai run by an NGO.

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Faculty Improvement Programme

Dr. Rajanish Saikia:

1. One week Faculty Improvement Program on “Bio-based Technology for Green Application” (4th March, 2024 - 10th March, 2024) organized by DBT-IBT Hub, Nanda Nath Saikia College, Titabar, Jorhat
2. Short Term Course on NEP Orientation and Sensitization under Malaviya Mission Teacher Training Programme (MM-TTP) of the University Grant Commission (UGC) (20th May, 2024-30th May, 2024) organized by MMTTC, Tezpur University

Mr. Swagatam Deva Nath:

1. Short Term Course on NEP Orientation and Sensitization under Malaviya Mission Teacher Training Programme (MM-TTP) of the University Grant Commission (UGC) (2nd July, 2024-11th July, 2024) organized by MMTTC, Tezpur University

Dr. Prathana Borah:

1. One week Faculty Improvement Program on “Bio-based Technology for Green Application” (4th March, 2024 - 10th March, 2024) organized by DBT-IBT Hub, Nanda Nath Saikia College, Titabar, Jorhat
2. Short Term Course on NEP Orientation and Sensitization under Malaviya Mission Teacher Training Programme (MM-TTP) of the University Grant Commission (UGC) (20th May, 2024-30th May, 2024) organized by MMTTC, Tezpur University

Ms. Kashmiri Baruah:

1. One week Faculty Improvement Program on “Bio-based Technology for Green Application” (4th March, 2024 - 10th March, 2024) organized by DBT-IBT Hub, Nanda Nath Saikia College, Titabar, Jorhat

Dr. Monisha Chetia

1. Faculty Induction/Orientation Programme (21 February, 2024 - 19 March, 2024) organized by TLC, Ramanujan College, University of Delhi
2. Refresher Course in Physics (30th March, 2024-12th April, 2024) organized by TLC, Ramanujan College, University of Delhi
3. One week Faculty Improvement Program on “Bio-based Technology for Green Application” (4th March, 2024 - 10th March, 2024) organized by DBT-IBT Hub, Nanda Nath Saikia College, Titabar, Jorhat
4. Short Term Course on NEP Orientation and Sensitization under Malaviya Mission Teacher Training Programme (MM-TTP) of the University Grant Commission (UGC) (2nd July, 2024-11th July, 2024) organized by MMTTC, Tezpur University

নন্দনাথ শইকীয়া মহাবিদ্যালয়ত মত বিনিময় অনুষ্ঠান



নিম্নশীয়া বাৰ্তা, তিতাবৰ, ১ অক্টোবৰ : তিতাবৰ নন্দনাথ শইকীয়া মহাবিদ্যালয় পদাৰ্থ বিজ্ঞান আৰু ৰসায়ন বিজ্ঞান বিভাগৰ মুটীয়া সহযোগত ছাত্ৰ-ছাত্ৰীসকলৰ ভবিষ্যৎ আয়নিৰ্ভৰশীল হিচাপে গঢ় দিয়াত কিছু দিক নিৰ্ণায়ক হোৱাকৈ 'উদ্ভাৱন আৰু স্ব-নিৰ্ভৰশীলতা' শীৰ্ষক এক বিশেষ মত বিনিময় অনুষ্ঠান অলপতে অনুষ্ঠিত হয়। অনুষ্ঠানৰ আৰম্ভণিতে পদাৰ্থ বিজ্ঞান বিভাগৰ মুৰব্বী অধ্যাপক ড° বাৰ্জনীশ শইকীয়াই প্ৰতিযোগিতাৰ যুগত ছাত্ৰ-ছাত্ৰীসকলক স্ব-নিৰ্ভৰশীল কৰি তুলিবলৈ তেওঁলোকক উদ্ভাবনী প্ৰতিভা বিকাশৰ প্ৰয়োজনীয়তাৰ বিষয়ে বক্তৃতা প্ৰদান কৰে। মত বিনিময় অনুষ্ঠানত মুখ্য অতিথি হিচাপে উপস্থিত থকা যোৰহাটস্থিত অসম কৃষি বিশ্ববিদ্যালয়ৰ North East Agriculture Technology Entrepreneurs Hub [NEATE Hub] ৰ নিবিড় আকাশ বৰুৱা আৰু শিবানী আচাৰ্যই ছাত্ৰ-ছাত্ৰীসকলক উদ্দেশ্যি 'উদ্ভাৱন আৰু স্ব-নিৰ্ভৰশীলতা' সম্পৰ্কে বিতৰ্ত্তাৰে এটি আলোচনা আগবঢ়ায়। আলোচনাৰ অংশ হিচাপে নিবিড় আকাশ বৰুৱাই স্ব-নিৰ্ভৰশীলতা আৰু উদ্য়মিতা কি আৰু ইয়াৰ বাবে প্ৰণয় কৰিব পৰা বিভিন্ন কৃষিভিত্তিক প্ৰকল্পৰ বিষয়ে বিশদভাৱে ব্যাখ্যা আগবঢ়ায়। ইয়াৰ সমান্তৰালভাৱে বিগত সময়ত NEATE Hubৰ সহযোগত অসমৰ বিভিন্ন উদ্যোগীয়ে চলাই থকা কেইবাটাও গুৰুত্বপূৰ্ণ স্ব-নিৰ্ভৰশীল প্ৰকল্পৰ বিষয়ে তেওঁ উপস্থাপন কৰে। অনুষ্ঠানত শিবানী আচাৰ্যই ছাত্ৰ-ছাত্ৰীসকলক বিভিন্ন কৃষিভিত্তিক স্ব-নিৰ্ভৰশীল হ'ব পৰা উদ্যোগত নিজকে নিয়োজিত কৰিব বিচাৰিলে NEATE Hub ৰ তৰফৰ পৰা তেওঁলোকক সকলো ধৰণে সহায়-সহযোগ আগবঢ়োৱাৰ প্ৰতিশ্ৰুতি দিয়ে। শেষত ৰসায়ন বিজ্ঞান বিভাগৰ মুৰব্বী ড° জয়ন্ত মাধৱ বড়াই শলাগৰ শৰাই আগবঢ়ায়।

তিতাবৰ নন্দনাথ শইকীয়া কলেজত মত-বিনিময় অনুষ্ঠান

মাৰ্চৰ ১৪, পশ্চিম তিতাবৰ, ২১ ছেপ্টেম্বৰ : তিতাবৰ নন্দনাথ শইকীয়া মহাবিদ্যালয়ৰ ছাত্ৰ-ছাত্ৰীসকলৰ বৌদ্ধিক-মানসিক সৰ্বাংগীণ বৰ্দ্ধন আৰু অধ্যয়নৰ এক সুস্থ পৰিবেশ গঢ় দিয়াৰ লগতে মহাবিদ্যালয়খনৰ মানুহবাৰ্গিক দিশ পৰ্যালোচনা কৰাৰ উদ্দেশ্যে অনুষ্ঠিত কৰা বিভিন্ন বিভাগৰ লগতে মহাবিদ্যালয়খনৰ পদাৰ্থ বিজ্ঞান বিভাগৰ শিক্ষক আৰু অভিভাবকৰ লগতে মত-বিনিময় অনুষ্ঠান বিভাগটোৰ মুৰব্বী অধ্যাপক ড° বাৰ্জনীশ শইকীয়াৰ সঞ্চালনাত অনুষ্ঠিত হয়। মহাবিদ্যালয়খনৰ পদাৰ্থ বিজ্ঞান বিভাগৰ মুৰব্বী অধ্যাপক ড° বাৰ্জনীশ শইকীয়াই ছাত্ৰ-ছাত্ৰীসকলৰ বাবে মহাবিদ্যালয়খনত প্ৰশাসনিক উদ্দেশ্যে 'উদ্ভাৱন আৰু স্ব-নিৰ্ভৰশীলতা' শীৰ্ষক এক বিশেষ মত বিনিময় অনুষ্ঠান অলপতে অনুষ্ঠিত হয়। অনুষ্ঠানৰ আৰম্ভণিতে পদাৰ্থ বিজ্ঞান বিভাগৰ মুৰব্বী অধ্যাপক ড° বাৰ্জনীশ শইকীয়াই প্ৰতিযোগিতাৰ যুগত ছাত্ৰ-ছাত্ৰীসকলক স্ব-নিৰ্ভৰশীল কৰি তুলিবলৈ তেওঁলোকক উদ্ভাবনী প্ৰতিভা বিকাশৰ প্ৰয়োজনীয়তাৰ বিষয়ে বক্তৃতা প্ৰদান কৰে। মত বিনিময় অনুষ্ঠানত মুখ্য অতিথি হিচাপে উপস্থিত থকা যোৰহাটস্থিত অসম কৃষি বিশ্ববিদ্যালয়ৰ North East Agriculture Technology Entrepreneurs Hub [NEATE Hub] ৰ নিবিড় আকাশ বৰুৱা আৰু শিবানী আচাৰ্যই ছাত্ৰ-ছাত্ৰীসকলক উদ্দেশ্যি 'উদ্ভাৱন আৰু স্ব-নিৰ্ভৰশীলতা' সম্পৰ্কে বিতৰ্ত্তাৰে এটি আলোচনা আগবঢ়ায়। আলোচনাৰ অংশ হিচাপে নিবিড় আকাশ বৰুৱাই স্ব-নিৰ্ভৰশীলতা আৰু উদ্য়মিতা কি আৰু ইয়াৰ বাবে প্ৰণয় কৰিব পৰা বিভিন্ন কৃষিভিত্তিক প্ৰকল্পৰ বিষয়ে বিশদভাৱে ব্যাখ্যা আগবঢ়ায়। ইয়াৰ সমান্তৰালভাৱে বিগত সময়ত NEATE Hubৰ সহযোগত অসমৰ বিভিন্ন উদ্যোগীয়ে চলাই থকা কেইবাটাও গুৰুত্বপূৰ্ণ স্ব-নিৰ্ভৰশীল প্ৰকল্পৰ বিষয়ে তেওঁ উপস্থাপন কৰে। অনুষ্ঠানত শিবানী আচাৰ্যই ছাত্ৰ-ছাত্ৰীসকলক বিভিন্ন কৃষিভিত্তিক স্ব-নিৰ্ভৰশীল হ'ব পৰা উদ্যোগত নিজকে নিয়োজিত কৰিব বিচাৰিলে NEATE Hub ৰ তৰফৰ পৰা তেওঁলোকক সকলো ধৰণে সহায়-সহযোগ আগবঢ়োৱাৰ প্ৰতিশ্ৰুতি দিয়ে। শেষত ৰসায়ন বিজ্ঞান বিভাগৰ মুৰব্বী ড° জয়ন্ত মাধৱ বড়াই শলাগৰ শৰাই আগবঢ়ায়।