Future EDUCATION
WIDE ANGLE LEARNING

Issue 8 | 2023

ACUITY

A Newsletter of Basic Sciences and Humanities

Future Institute of Engineering and Management

Celebrating World Water Day

" The science of today is the technology of tomorrow."
- Edward Teller

Future Institute of Engineering and Management

Issue: 8

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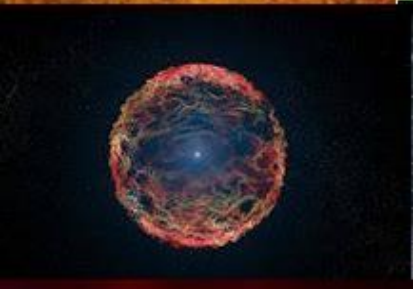
Acuity Newsletter

Department of Basic Sciences & Humanities



Message from Executive Director

It gives me immense pleasure to pen a few words for our in- house Basic Sciences and Humanities departmental newsletter "ACUITY" exclusively meant for enriching the knowledge of the budding technologists in various fields and I believe such departmental newsletter will be beneficial for all.

I congratulate the efforts of the members of The Editorial Board that they have brought out this issue of the newsletter in such a beautiful form. It is because of their selfless and untiring efforts that we see the newsletter enriched with variety of articles.

Once again, I extend my hearty congratulations to the entire team and wish the newsletter a great success.

Dr. Aloke Kumar Ghosh

From the Principal's Desk

It is a matter of pride and satisfaction to preface [Put issue number] issue of the newsletter 'ACUITY' released by Basic Science and Humanities department (BSH). This newsletter is meant for apprising all stakeholders about department events, student and faculty achievements and recent trends of technology. I congratulate the contributors for their inspired and vibrant thoughts in articles contributed by them. The wide range of articles in different sections is creative, appealing and engrossing as it provides a platform for students, alumni members and industry experts to share their insights on recent trends of technology and college memories. I congratulate the editorial team and HOD of BSH department for their admirable effort and enterprise in releasing this issue of newsletter within stipulated time.

Dr.Anirban Chakrabarty

Message from the Head of the Department

'A journey of thousand miles begins with a single step': With this conviction we decide to initiate this venture to progress in our pursuit of knowledge and excellence in academia. The task, we know, is not simple and requires united endeavour for accomplishment. I hope that your enthusiastic cooperation will lead us to light.
তমসো মা জ্যোতির্গময়ঃ

Arunav Chakraborty

Future Institute of Engineering and Management

Chemistry & Environment

Infection Biology Inspired by Engineering, Nanotechnology and Micro fluidics

ArunavChakrabarty[#]and Arunava Bandyopadhaya[# #]

[#]Future Institute of Engineering and Management, Kolkata, India; [# #]Harvard Medical School and Massachusetts General Hospital, Harvard University, Boston, USA

Infectious diseases are one of the preliminary causes of death worldwide each year. Emerging and reemerging diseases and drug resistant pathogens have made the problem more serious for human beings. Pathogens cross protective barriers (skin, epithelial or endothelial layer), get access to internal tissues in humans and manipulate the immune system in order to disrupt human health and physiology, leading to infections. Unlike the traditional approach of considering the human physiology or pathogen separately, a systems-level approach, considering the human (tissues /cells) and pathogen interaction (HPI) system as a whole is indispensable to elucidate the mechanisms of infection. Systems biology is an interdisciplinary research field in modern biology focusing on the study of non-linear interactions among biology entities through the integration and combination of biomolecular and medical sciences with mathematical, computational, constructing, probing, modulating and modeling engineered biological circuits[1]. By modeling biological phenomena, systems biology provides more holistic approach based on "omics" (genomics, proteomics or metabolomics) data, generates multi scale HPI models and predicts susceptibility for infection[2].

The rapid emergence of resistant bacteria is occurring worldwide, endangering the efficacy of antibiotics, which have transformed medicine and saved human society.Nanoparticles, a million times smaller than a millimeter, are proving to be stable, easy to deliver and readily incorporated into cells[3].Once introduced into the body, the quantum dots are activated by visible light source. So far it has focused on topical infections on the skin; deeper inside the body, brighter lights or more nanoparticles may be needed. When activated by light, the quantum dots start generating electrons that attach to dissolved oxygen in the cells, creating radical ions. Those ions interrupt biochemical functions of bacteria and kill very specific bacterial cells that cause illnesses. Beyond the global efforts to limit overuse and abuse of antibiotic drugs, nanomedicine is finding novel ways to attack these bacteria[3].

The underlying physical properties of microfluidic tools have led to the human disease biologyinsights through the development of microsystems that can manipulate mimic and measure biology at a resolution that has not been possible with macroscale tools[4]. An organ of human body which is a complex unit of different tissues, and these tissues are composed of various types of cells with diverse functions can be simulated by microfluidic devices. Microfluidic devices can be used to mimic the organ ("organ on chip") functionality by multi-cellular architecture, interfacing the tissues and physiochemical microenvironments along with perfusion of the body[5].The device lined by living human cells that could revolutionize drug development, disease modeling and personalized medicine.

Significant scientific advances and integration of modern biology with technology are driving the development of modern bio-therapeutic drugs.

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2. Dix A, Vlaic S, Guthke R, Linde J. Use of systems biology to decipher host pathogen interaction networks and predict biomarkers, *Clin Microbiol Infect*. 2016 Jul;22(7):600-6.
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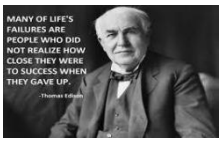
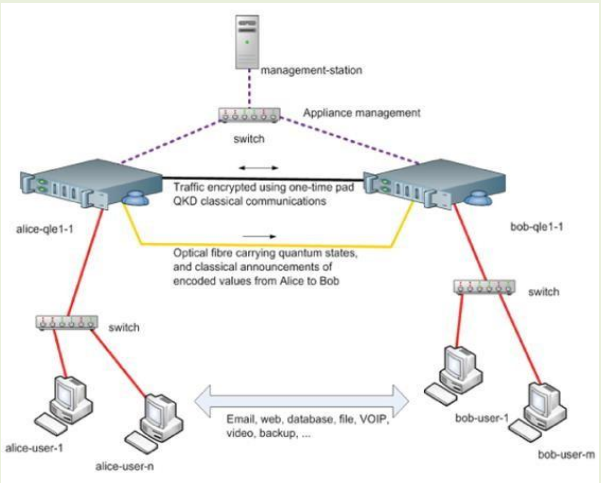
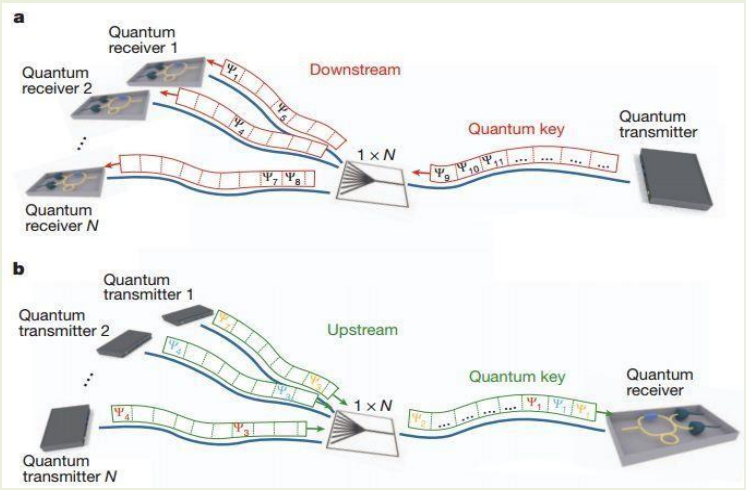


Quantum Ultra secure Communication Now Reaches Space

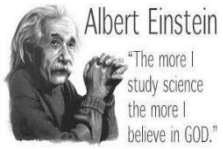
Author: Dr. Bhaskar Roy Bardhan Assistant Professor of Physics (visiting), State University of New York at Geneseo, New York, USA

Quantum entanglement is one of the most fundamental concepts in quantum physics. This strange quantum phenomenon in physics occurs when particles interact in a way, such that their quantum states cannot be defined independently, even the particles are separated by large distances. Recently in August 2017 China has launched the first quantum satellite, and researchers have reported that photons between the satellite and two ground stations remain in entangled states for a distance as large as 1200 kilometers. This result could be extremely useful in the future to achieve secure networks for quantum communications. The quantum states of entangled particles could, in principle, remain correlated with each other until one of them is measured. When the measurement on one of them is done, it immediately affects the state of the other particle, no matter how far away. The intuitive nature of this idea led to its mockery by Einstein as he called it "spooky action at a distance". In 2015, the most sophisticated of these tests measured electrons 1.3 kilometers apart, and validated the concept. Entangled photons decay rapidly as they pass through air or optical fibers. Until the recent experiment maximum distance travelled by a quantum key was of the order of a hundred kilometers. Quantum repeaters could extend the length of a network, but they have not yet been developed. Satellites would be an effective method to send quantum information acrossthe globe. In the satellite based secure quantum communication, a laser beam was split to generate pairs of photons that share a common quantum state. The entangled photons were fed into two telescopes that sent them at two ground-based stations separated by 1,200 kilometers. The success of this experiment proves that one can perform quantum communications at very large distances. The team also plans to use the satellite to test how gravity affects the quantum state of photons in the future. Furthermore, they want to launch a second, improved, quantum satellite in two years. A major challenge, will be to upgrade the technology so that it can send and receive signals during the day, when there are many more photons around and it is harder to pick out the ones coming from the satellite. Other research teams in the world are now competing to catch up and working very hard to contribute to the development in the potentially game-changing secure communication using quantum physics. In particular, the Raman Research Institute [RRI], Bengaluru and the ISRO Satellite Centre [ISAC], ISRO have recently started a joint work to develop quantum communications technologies using satellites. Many more such collaborative efforts are just round the corner that will change the landscape of communication forever





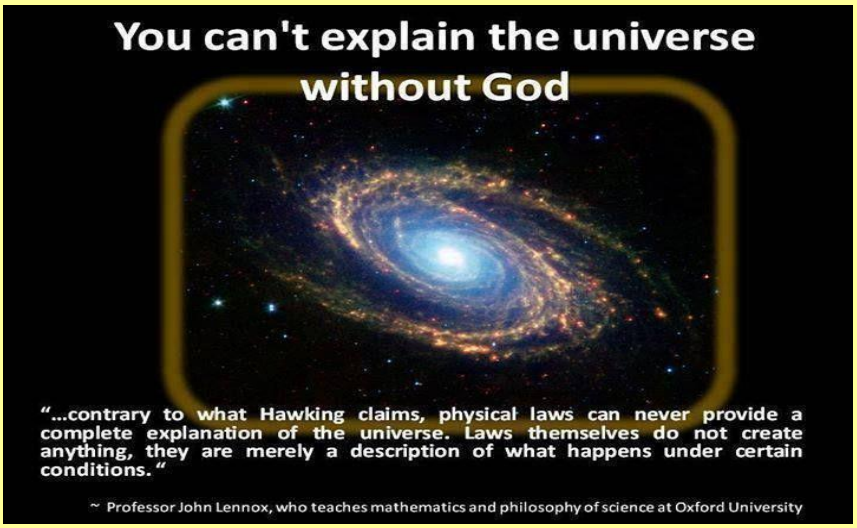
Mathematics



Who has created the Universe ?OMG !!

by Prof. Tanmay Joarder

What does the petal arrangement of a rose, the spiral shape of a mollusk and the shape of the galaxy all have in common? The Golden Ratio is found everywhere! Golden Number Phi is an irrational Mathematical constant that is approximately equal to 1.618. But where does this number come from? The first definition of the Golden Ratio was made by Euclid of Alexandria in about 300 BC. It is presumed that the Egyptians used the Golden Ratio in the construction of the pyramids. The Greeks also based the design of the Parthenon on this proportion. DaVinci called it"SectioAurea" in the 1500's. Leonardo Fibonacci, born in 1175, discovered the unusual properties of the numerical series that bears his name: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144,... How are the terms in Fibonacci's Sequence determined? How does the Fibonacci Series relate to the Golden Ratio? How does the Fibonacci Series relate to the Golden Spiral? Pine cones usually have 5 or 8 spirals turning against one another, but depending on the cone, it may also have 8 or 13. The Golden Ratio is everywhere. Is it the fingerprint of God? Golden Section Divine Proportion does. Being a scientist mean that you cannot believe in God? Richard Dawkins, among other atheists, thinks he has the ultimate proof that God doesn't exist. If God created a complex universe, wouldn't it take an even more complex entity to have created God? However, such logic assumes that time has always existed, rather than being merely a construct of this universe.



Rich Deem, the scientist who has lived by his faith in the power of reason, the story ends like a bad dream. He has scaled the mountains of ignorance; he is about to conquer the highest peak; as he pulls himself over the final rock, heis greeted by a band of theologians who have been sitting there for centuries. Robert Jastrow : "I want to know how God created this world, I am not interested in this or that phenomenon, in the spectrum of this or that element. I want to know His thoughts, the rest are details." Einstein's famous epithet on the "uncertainty principle" was "God doesnot play dice" - and to him this was a real statement about a God in whom he believed. A famous saying of his was "Science without religion is lame, religion without science is blind." In developing the theory of relativity, Einstein realized that the equations led to the conclusion that the universe had a beginning. He didn't like the idea of a beginning, because he thought one would have to conclude that the universe was created by God. So, he added a cosmological constant to the equation to attempt to get rid of the beginning. He said this was one of the worst mistakes of his life. Of course, the results of Edwin Hubble confirmed that the universe was expanding and had a beginning at some point in the past. "I'm not an atheist and I don't think I can call myself a pantheist. We are in the position of a little child entering a huge library filled with books in many languages. The child knows someone must have written those books. It does not know how. It does not understand the languages in which they are written. The child dimly suspects a mysterious order in the arrangements of the books, but doesn't know what it is. That, it seems to me, is the attitude of even the most intelligent human being toward God."

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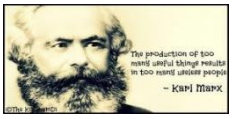


"Importance of Management Education For Individuals" By Rudra Sekhar Mondal

Whatever you do in your professional life, the chances are that it will involve some 'business'. Scientists,engineers, even artists, will inevitably have to understand at least the basics of business, and probably a lot more. Today's management gurus, the people who are forecasting the way we will do business at the beginning of the 21st century, are saying that the companies of the future will consist of groups of specialists who work together on a specific project and then disband. For the next project the composition of the group will almost certainly be different. One of the consequences of this is that many more people will be what we call today 'independent', and will have to understand more about the opportunities and constraints of business. In other words, the combination of specialist qualification and business knowledge will become vital. But it is not just 'knowledge' of business. Before pursuing an MBA, you need to ask yourself a basic question, 'what should a business education give me?' Most subjects that one studies are composed of theory and practice**.**

Management education offers all necessary tools to equip one with the necessary techniques of successfully handling various business and management related issues. Basic tools which will enable you to make contributionsto global economy.

Besides providing the basic management capabilities it also provides :

1. The ability to use the contingency approach to solving business problems.
2. Combining the best parts of several solutions into a unique and better solution.
3. Having a global perspective
4. Working with and learning from others

Management education introduces students to a broader perspective about the role of individuals in growth ofbusiness and society, which is quite evident.

Although the information interfaces such as paper media usually focus on and elaborate the deeds of a few examples of an irresponsible few management leaders, but every one fully understands at large the role of businessin strengthening communities and the world. Awareness of that role can be seen every day around us and is quite evident everywhere.

At the individual level, one study found three of four management education alumni made marvelous andphilanthropic contributions during the recent two years. Thus Management education provides students andworking professionals with an edge that enables them ton strengthen the Connection between business and society.

A recent example that demonstrates the effective impacts of proper management education on individuals in strengthening the connection between society and organization is comes out in recent research. According to this research, in a recent example, CEOs and others, working through their corporations, made a huge contribution of more than 100 million dollars to the tsunami relief effort. This is an example of how the proper management education has not only made better business leaders but also has produced a sense of dedication and affection with the other people in the society. This does not need any further explanation and is self-evident.

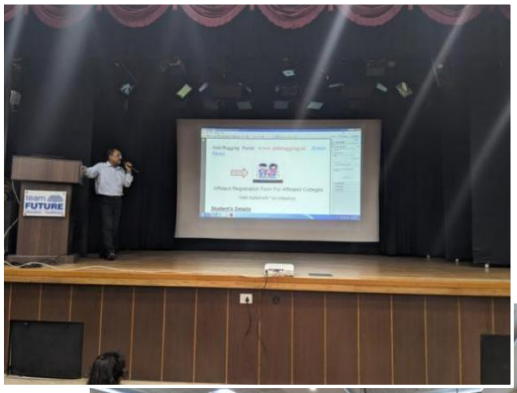
A real manager is the one that is not only able to manage complexities and unpredictable situations of the corporateworld, but also is able to handle the familiar problems and daily life stuff that is common to almost every person's life and is needed to be managed properly in order to live a happy and managed life that bring satisfaction. Management education does exactly that for individuals who wants to live a satisfying and happy lifestyle

Intimation

INDUCTION PROGRAMME

An Induction programme was organized by the BSH Department, from 17th August to 28th August 2023 as part of our commitment to integrate all new B.Tech 1st year students into Team Future. The BSH department organized this programme to provide students with essential information, resources and introduction as per AICTE guidelines.

Founder Director Dr. Mousumi Ghosh, Executive Director Dr. Aloke Kumar Ghosh, Principal Dr.Anirban Chakraborty, Registrar Dr.Sajal Kumar Giri and all the deparmental heads were present in the inauguration ceremony held on 17th August 2023 at the Auditorium.



On 18th August all B.Tech 1st year students met with the college Placement cell led by Prof. Tapas Roy (head of the Placement cell) who elaborated on the chequered placement record of the institute.

On 21st August all B.Tech 1st year students interacted with Dr. Sajal Kumar Giri, Registrar of FIEM. He discussed about Anti-Ragging measures in the college, exam registration, scholarship and state government schemes for educational loans.

The 2nd Session on 21st August comprised hands on demonstration of yoga, meditation and self management programme.

22nd August talk by Dr. Jaydip Nath, OIC of exam cell, about examination and internal evaluation system.

~:ACHIEVEMENTS:~

* The paper "A second order quadratic integral inequality with an application to ordinary differential operators" by Moumita Bhattacharyya (Bhunia) was published online with DOI number 10.1007/s40863-023-00391-7 , in the international scopus journal "São Paulo Journal of Mathematical Sciences" on 28th December, 2023 .

* The Paper "Communication Skills: Effect on Holistic Development of Personality" by Subir Tapaswi was published in the Journal of 'Research and Development' on 31st March, 2023.

* The Paper "Global Communication" by Subir Tapaswi was published in the Journal of Sustainable Development Goals in SAARC countries: Key Issue Opportunity and Challenges ' on 15th June 2023.

* The Paper "Globalization and Literature" by Subir Tapaswi was published in the Journal of 'Education and Society ' on 8th July, 2023.

ACADEMIA INDUSTRY INTERACTION

As part of the Induction programme some gems of the Industry took time out to interact with the new students. Mr Syed Sajid Hussein, AVP Kolkata Centre Head, CTS, Mr Prasanta Biswas, Ex-Country Head, HP and Managing Director, Hemor Industries and Mr Partha Sarkar, Academic Relationship Manager, TCS graced the stage during the schedule.

SEMINAR

BSH department organized a seminar on 22nd August 2023 on “Sustainable Development: The path we should walk on”. The keynote address was given by Dr. Rajarshi Mitra, Associate Professor and Head of the Department of Environmental Science, Vivekananda college.

SEMINAR

BSH Department organized a seminar on "Role of Bio-informatics in the Digital Age” on 26th September 2023. The keynote lecturee was given by Dr.Mainak Sengupta, Assistant Professor, Department of Genetics, University of Calcutta.