Vision: A premier Science and Technology university for the formation of a world class and virtuous human resource for sustainable development in Bohol and the Country.
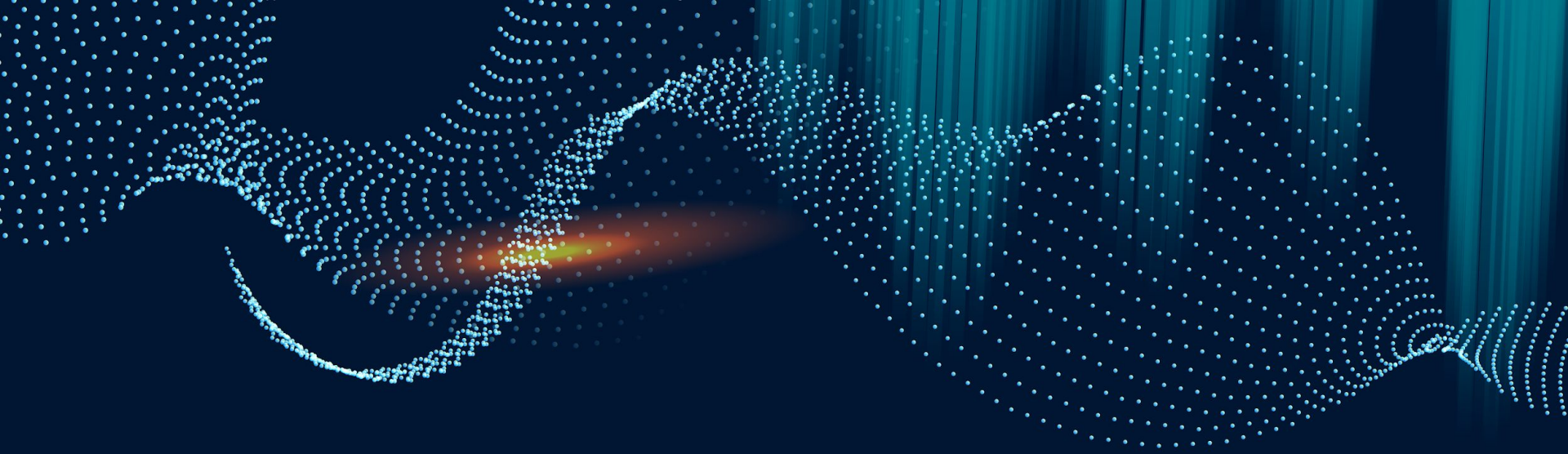
Mission: Committed to provide quality and innovative education in strategic sectors for the development of Bohol and the Country.

OTHER EMERGING TECHNOLOGY

01

What is Nanotechnology?

Nanotechnology is science, engineering, and technology conducted at the nanoscale, which is about 1 to 100 nanometers. Nanoscience and nanotechnology are the study and application of extremely small things and can be used across all the other science fields, such as chemistry, biology, physics, materials science, and engineering
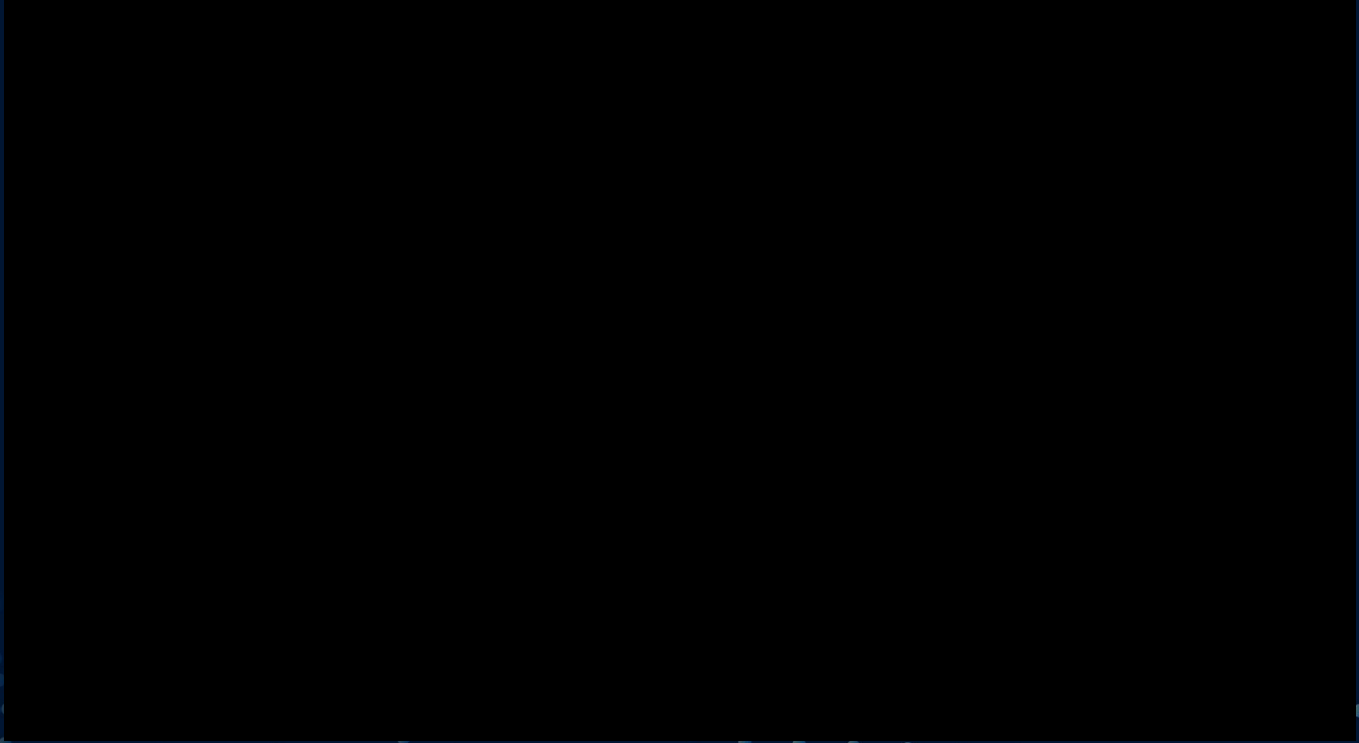
In a lecture called "Small Wonders: The World of Nanoscience," Nobel Prize winner Dr. Horst Störmer said that the nanoscale is more interesting than the atomic scale because the nanoscale is the first point where we can assemble something -- it's not until we start putting atoms together that we can make anything useful.

 People are interested in the nanoscale – because it is at this scale that the properties of materials can be very different from those at a larger scale. We define nanoscience as the study of phenomena and manipulation of materials at atomic, molecular and macromolecular scales, where properties differ significantly from those at a larger scale; and nanotechnologies as the design, characterization, production, and application of structures, devices, and systems by controlling shape and size at the nanometer scale

HISTORY

☐   The ideas and concepts behind nanoscience and nanotechnology started with a talk entitled "There's plenty of room at the bottom" by physicist Richard Feynman at an American Physical Society meeting at the California Institute of Technology (CalTech) on December 29, 1959, long 109 before the term nanotechnology was used. In his talk, Feynman described a process in which scientists would be able to manipulate and control individual atoms and molecules. Over a decade later, in his explorations of ultraprecision machining, Professor Norio Taniguchi coined the term nanotechnology. It wasn't until 1981, with the development of the scanning tunneling microscope that could "see" individual atoms, that modern nanotechnology began.
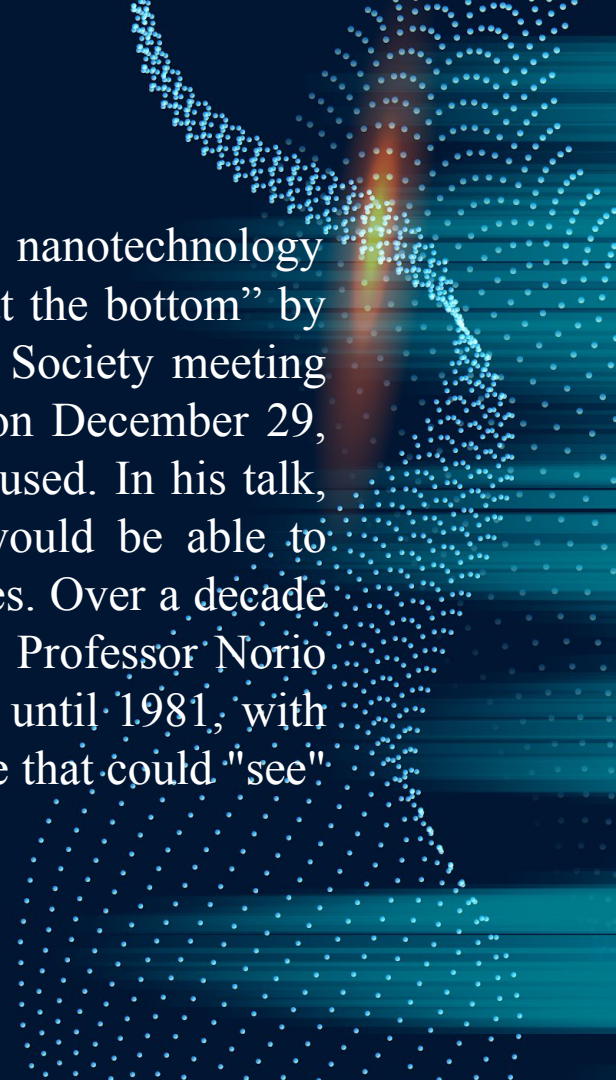
Applications of nanotechnology:

➢ Medicine: customized nanoparticles the size of molecules that can deliver drugs directly to diseased cells in your body. When it's perfected, this method should greatly reduce the damage treatment such as chemotherapy does to a patient's healthy cells.

➢ Electronics: it has some answers for how we might increase the capabilities of electronics devices while we reduce their weight and power consumption.

➢ Food: it has an impact on several aspects of food science, from how food is grown to how it is packaged. Companies are developing nanomaterials that will make a difference not only in the taste of food but also in food safety and the health benefits that food delivery.
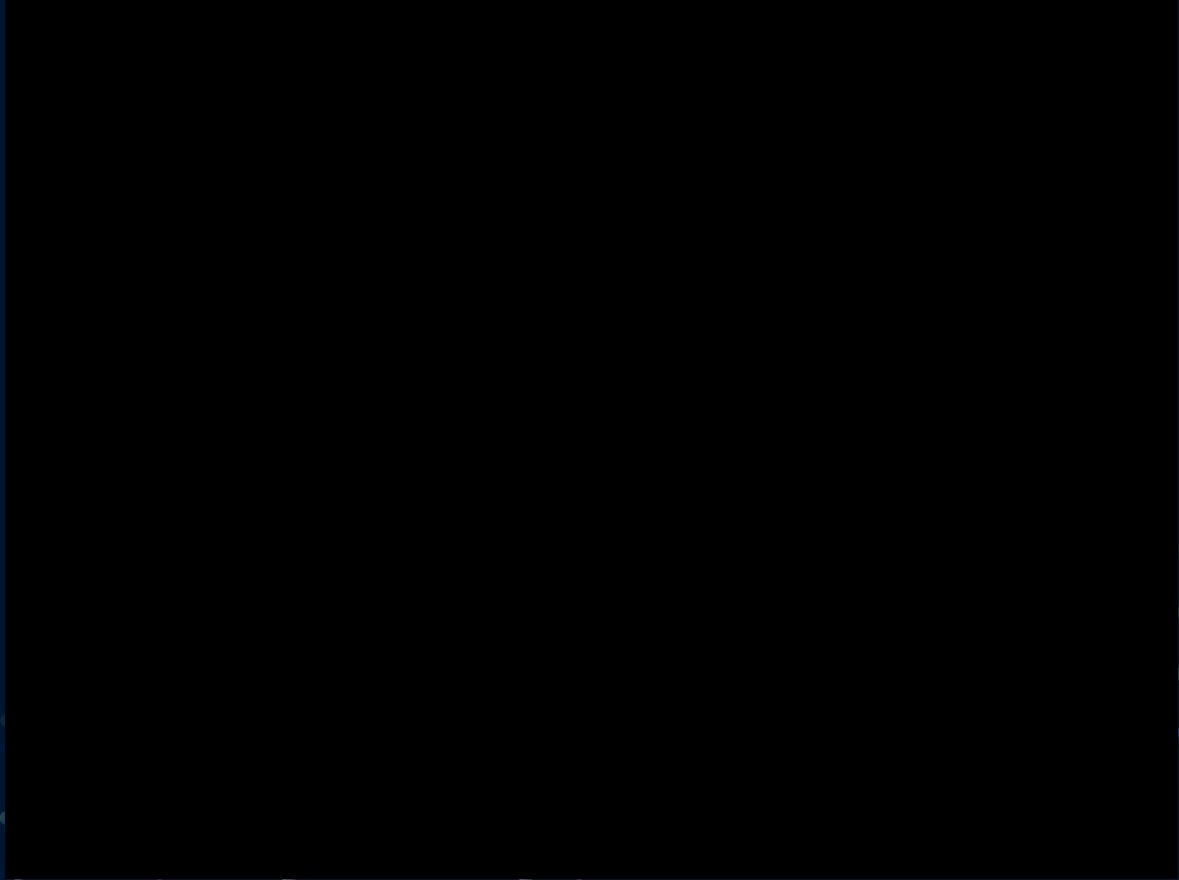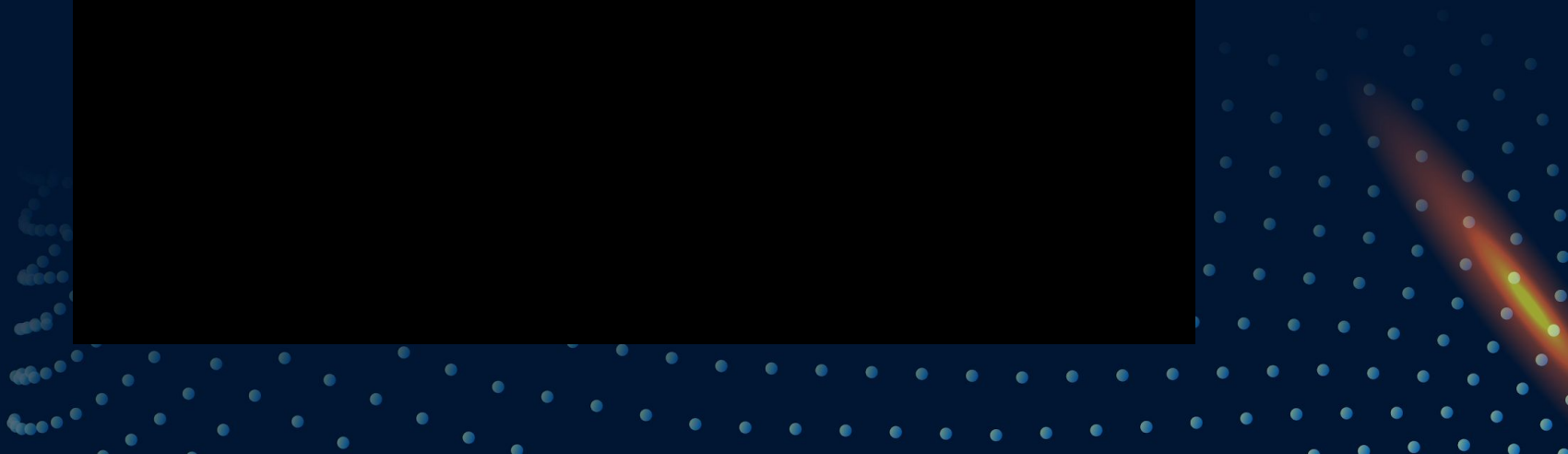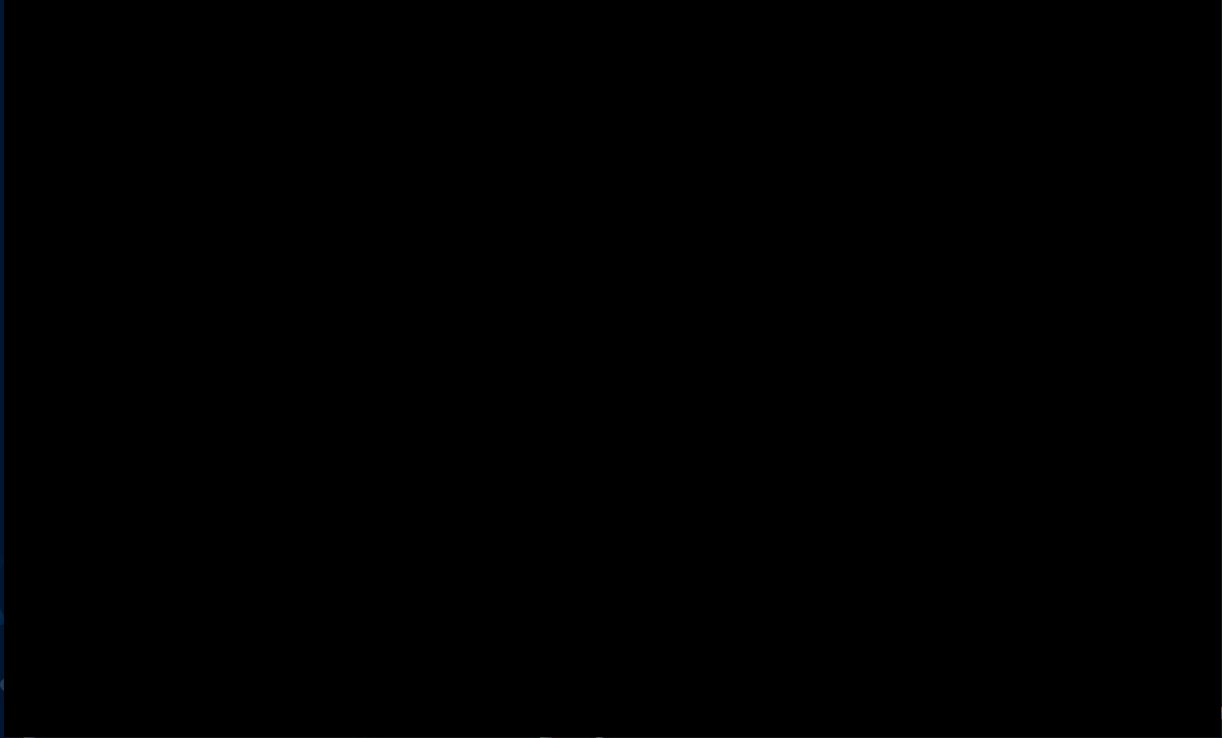
➢ **Agriculture: Nanotechnology can possibly change the whole agriculture part and nourishment industry anchor from generation to preservation, handling, bundling, transportation, and even waste treatment.**

➢ **Vehicle manufacturers: Much like aviation, lighter and stronger materials will be valuable for making vehicles that are both quicker and more secure. Burning motors will likewise profit from parts that are all the more hardwearing and higher temperature safe**
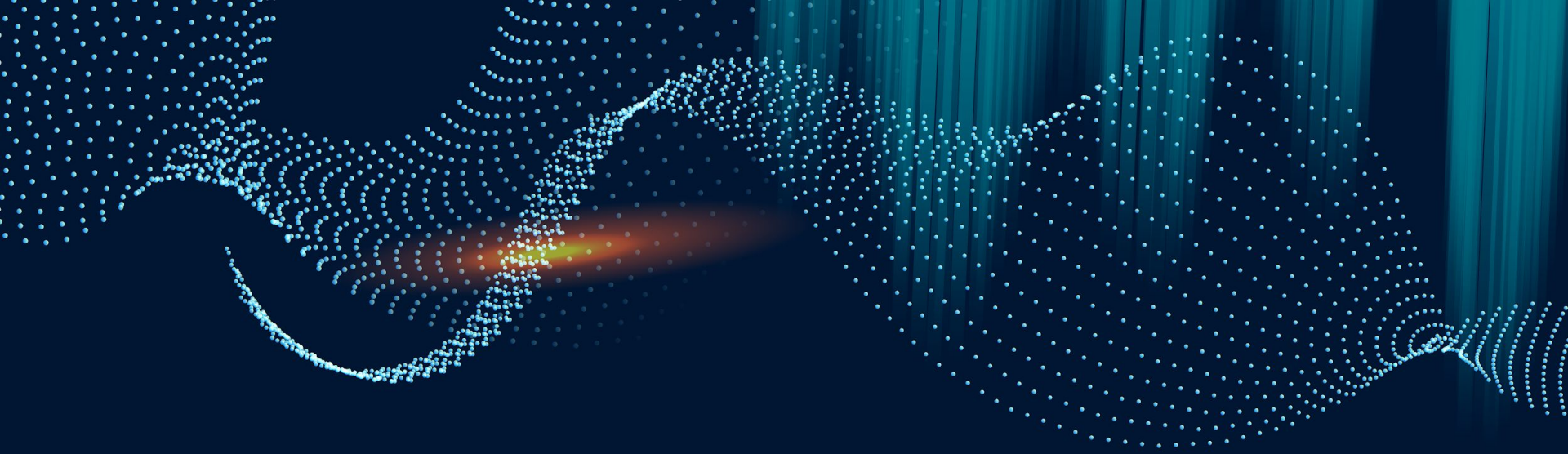
02

What is Biotechnology?

Biotechnology is technology based on biology - biotechnology harnesses cellular and biomolecular processes to develop technologies and products that help improve our lives and the health of our planet. We have used the biological processes of microorganisms for more than 6,000 years to make useful food products, such as bread and cheese, and to preserve dairy products.

Today, biotechnology covers many different disciplines (e.g. genetics, biochemistry, molecular biology, etc.). New technologies and products are developed every year within the areas of e.g. Medicine (development of new medicines and therapies), agriculture (development of genetically modified plants, biofuels, biological treatment) or industrial biotechnology (production of chemicals, paper, textiles, and food).
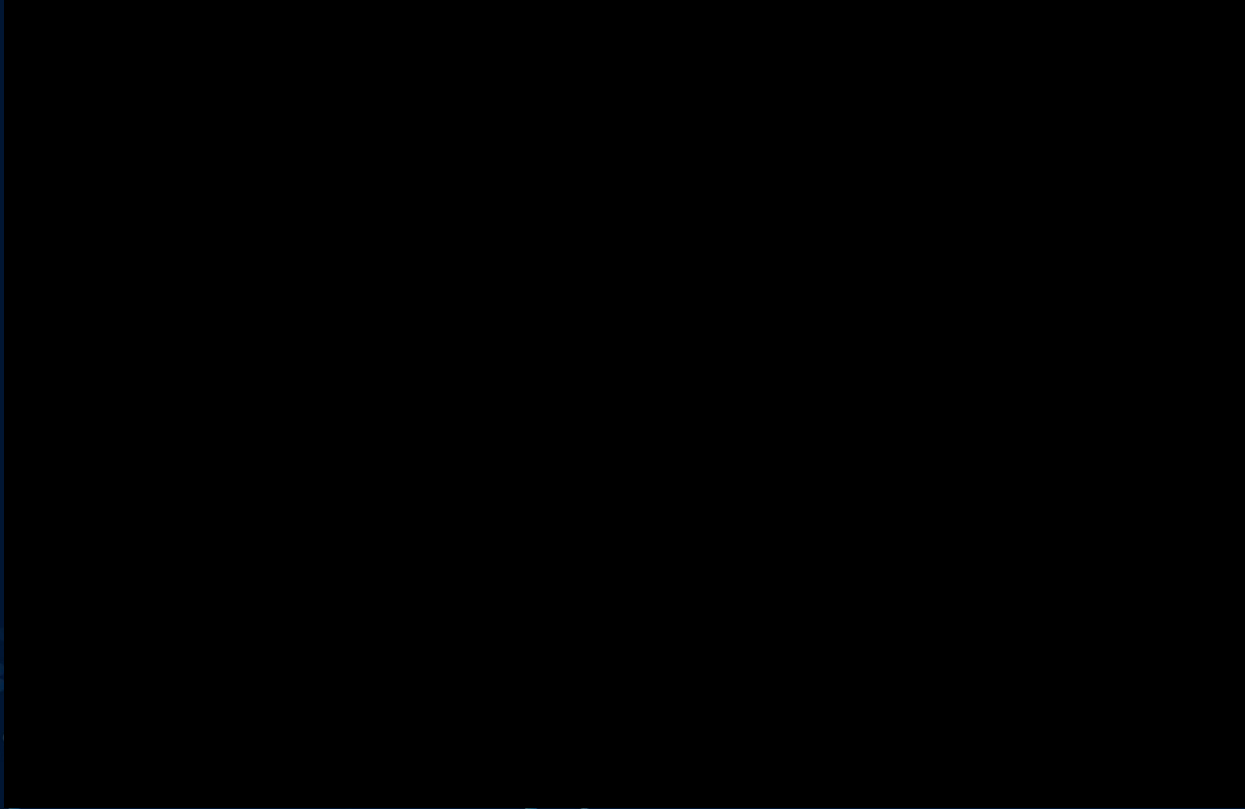
HISTORY

 When Edward Jenner invented vaccines and when Alexander Fleming discovered antibiotics, they were harnessing the power of biotechnology. And, of course, modern civilization would hardly be imaginable without the fermentation processes that gave us beer, wine, and cheese

 When he coined the term in 1999. Agriculturalist Karl Ereky described 'biotechnology' as "all lines of work by which products are produced from raw materials with the aid of living things."
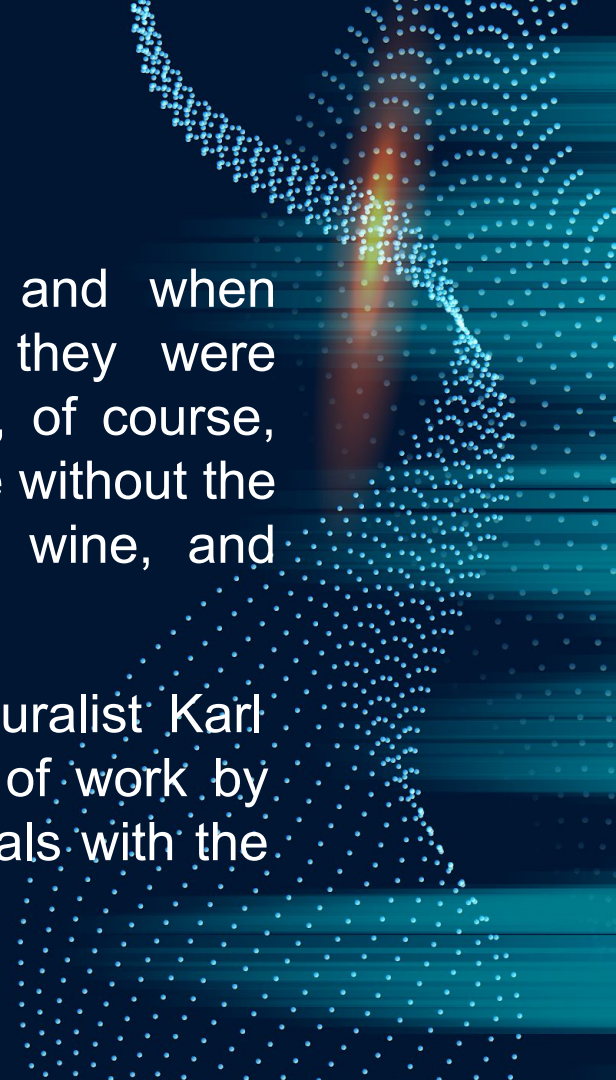
Application of Biotechnology

➢ Agriculture (Green Biotechnology): Biotechnology had contributed a lot to modify the genes of the organism known *as* **Genetically   Modified Organisms** such as Crops, Animals, Plants, Fungi,   Bacteria, etc. Genetically modified crops are formed by the   manipulation of **DNA** to introduce a new trait into the crops. These   manipulations are done to introduce traits such as pest resistance, insect resistance, weed resistance, etc.

Application of Biotechnology

➢ **Aquaculture Fisheries: It helps in improving the quality and quantity of fishes. Through biotechnology, fishes are induced to breed via gonadotropin-releasing hormone.**

➢ Medicine (Medicinal Biotechnology): This helps in the formation of genetically modified insulin known as *humulin*. This helps in the treatment of a large number of diabetes patients. It has also given rise to a technique known as gene therapy. Gene therapy is a technique to remove the genetic defect in an embryo or child. This technique involves the transfer of a normal gene that works over the non-functional gene.
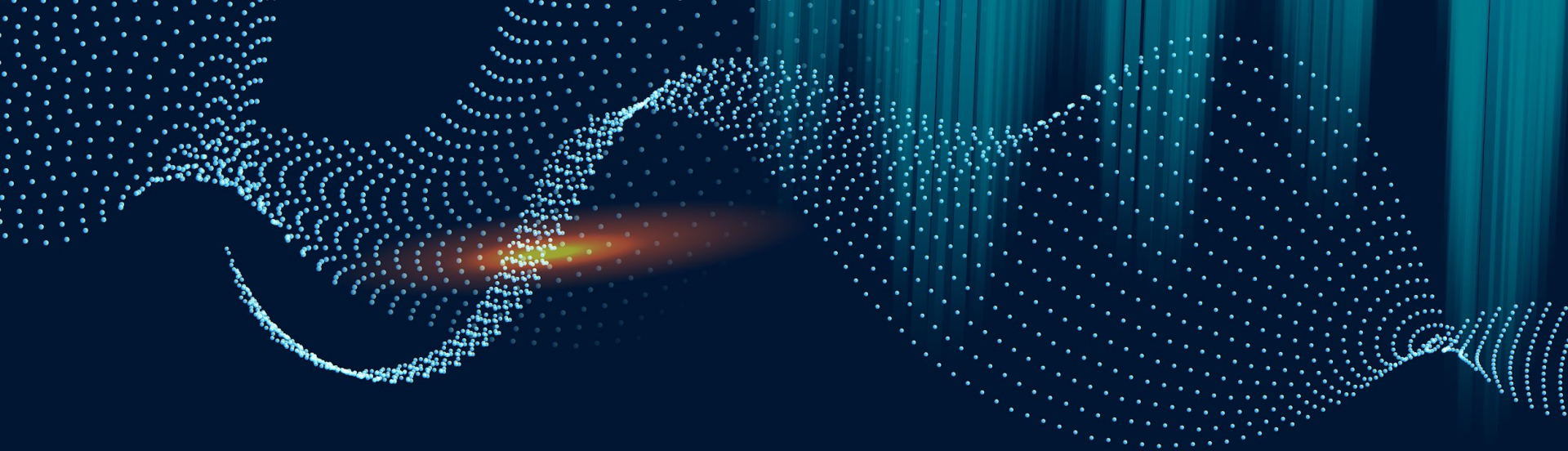
Application of Biotechnology

➢ Environment (Environmental biotechnology): is used in waste treatment and pollution prevention. Environmental biotechnology can more efficiently clean up many wastes than conventional methods and greatly reduce our dependence on methods for land-based disposal.
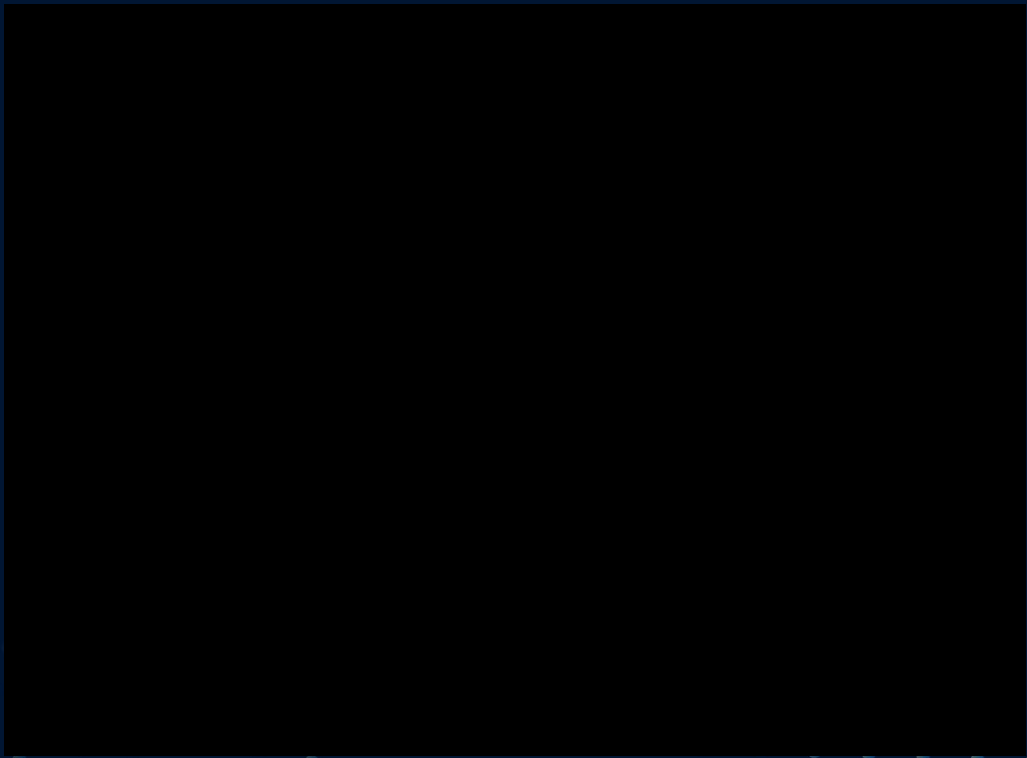
03

What is Blockchain Technology?
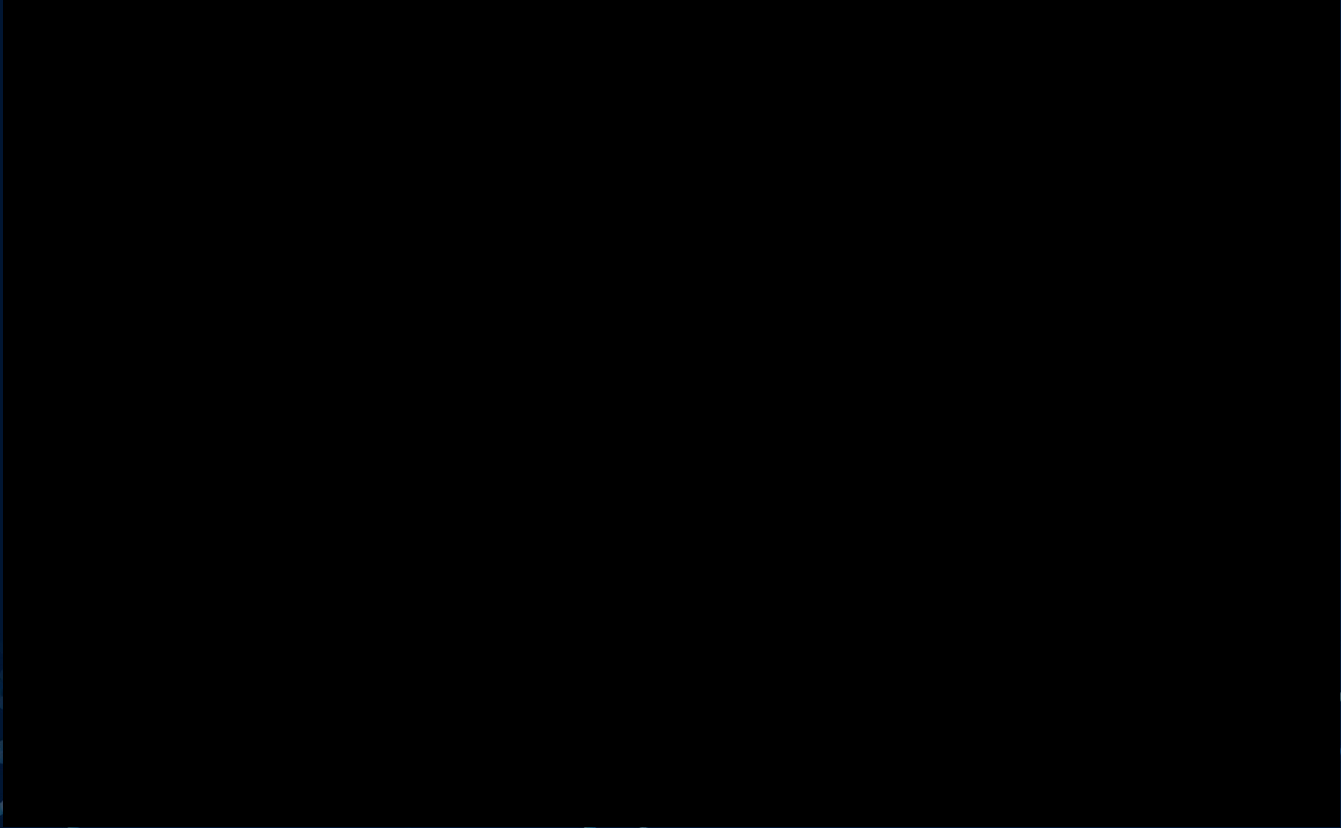
Originally blockchain is a growing list of records, called blocks, that are linked using cryptography. Each block contains a cryptography hash of the previous block, a timestamp, and transaction data (generally represented as a Merkle tree).

A blockchain is, in the simplest of terms, a time-stamped series of immutable records of data that is managed by a cluster of computers not owned by any single entity. Each of these blocks of data (i.e. block) is secured and bound to each other using cryptographic principles (i.e. chain).

"Blocks" on the blockchain are made up of digital pieces of information. Specifically have three parts.

1. Blocks store information about transactions like the date, time, and dollar amount of your most recent purchase from Amazon.
2. Blocks store information about who is participating in transactions. A block for your splurge purchase from Amazon would record your name along with Amazon.com, Inc. Instead of using your actual name, your purchase is recorded without any identifying information using a unique "digital signature," sort of like a username.
3. Blocks store information that distinguishes them from other blocks. Much like you and I have names to distinguish us from one another, each block stores a unique code called a "hash" that allows us to tell it apart from every other block.

In order for a block to be added to the blockchain, four thingd must happen:

1. A transaction must occur.

2. That transaction must verified.

3. **That transaction must be stored in a block .**

4. **That block must be given a hash**

History

- The first work on a cryptographically secured chain of blocks was described in 1991 by Stuart Haber and W. Scott Stornetta. They wanted to implement a system where document timestamps could not be tampered with.
- In 1992, Bayer, Haber, and Stornetta incorporated Merkle trees to the design, which improved its efficiency by allowing several document certificates to be collected into one block.
- The first blockchain was conceptualized by a person (or group of people) known as Satoshi Nakamoto in 2008. Nakamoto improved the design in an important way using the Hash cash like the method to add blocks to the chain without requiring them to be signed by a trusted party.
- In August 2014, the bitcoin blockchain file size, containing records of all transactions that have occurred on the network, reached 20 GB (Gigabyte). In January 2015, the size had grown to almost 30 GB, and from January 2016 to January 2017, the bitcoin blockchain grew from 50 GB to 100 GB in size.
- The words block and chain were used separately in Satoshi Nakamoto's original paper but were eventually popularized as a single word, blockchain, by 2016.

The Three Pillars of Blockchain Technology

1. Decentralization
   ➢ In a decentralized system the information is not stored by one single entity. In fact, everyone in the network owns the information.
   ➢ In a decentralized network ,if you wanted to interact with your friend then you can do so directly without going through a third party. That was the main ideology behind Bitcoins. You and only you alone are in charge of your money. You can send your money to anyone you want without having to go through a bank

2. Transparency
   ➢ One of the most interesting and misunderstood concepts in blockchain technology is "transparency." Some people say that blockchain gives you privacy while some say that it is transparent. Why do you think that happens?
   ➢ A person's identity is hidden via complex cryptography and represented only by their public address. So, if you were to look up a person's transaction history, you will not see "Bob sent 1 BTC" instead you will see "1MF1bhsFLkBzzz9vpFYEmvwT2TbyCt7NZJ sent 1 BTC".

➢ So, while the person's real identity is secure, you will still see all the transactions that were done by their public address. This level of transparency has never existed before within a financial system. It adds that extra, and much needed, level of accountability which is required by some of these biggest institutions.

3. Immutability
➢ Immutability, in the context of the blockchain, means that once something has been entered into the blockchain, it cannot be tampered with.
➢ The reason why the blockchain gets this property is that of the cryptographic hash function.
➢ In simple terms, hashing means taking an input string of any length and giving out an output of a fixed length.

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The reason why the blockchain has gained so much admiration is that:
➢ It is not owned by a single entity, hence it is decentralized
➢ The data is cryptographically stored inside 121
➢ The blockchain is immutable, so no one can tamper with the data that is inside the blockchain
➢ The blockchain is transparent so one can track the data if they want to

Peer-to-peer Network
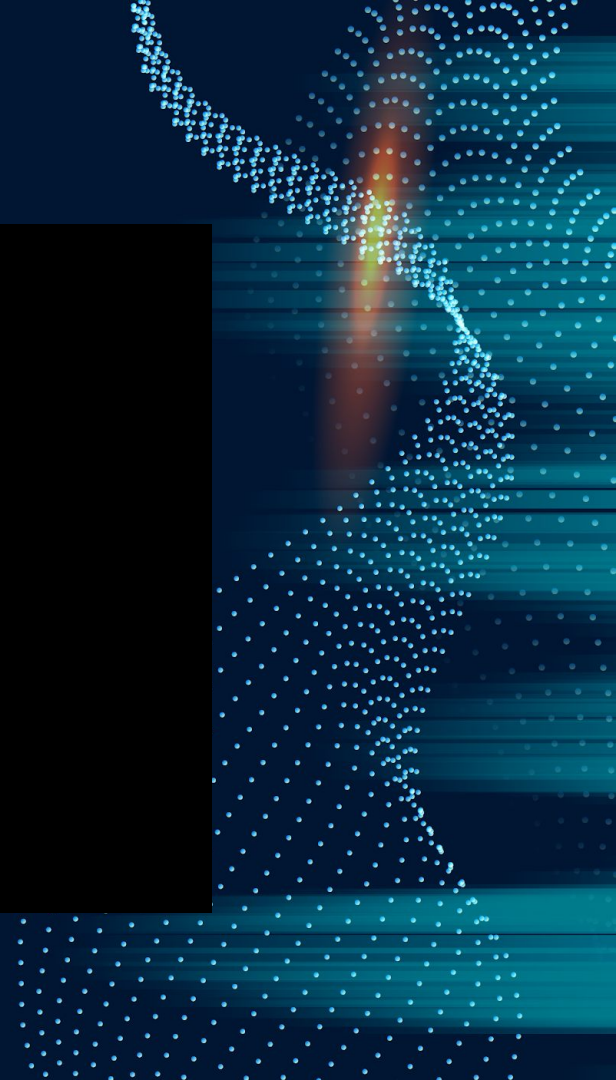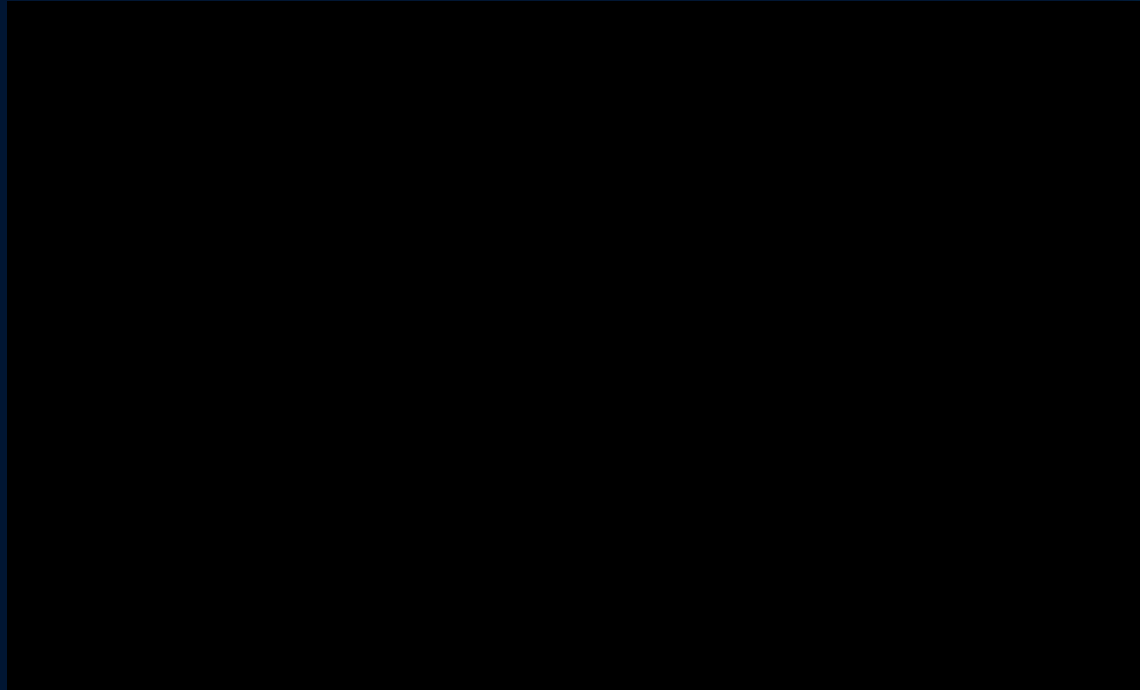
Application of blockchain

- A. The sharing economy
  - ➢ With companies like Uber and Airbnb flourishing, the sharing economy is already a proven success. Currently, however, users who want to hail a ride-sharing service have to rely on an intermediary like Uber. By enabling peer-to-peer payments, the blockchain opens the door to direct interaction between parties a truly decentralized sharing economy results.

B. Crowdfunding
  - ➢ Crowdfunding initiatives like Kickstarter and GoFundMe are doing the advance work for the emerging peer-to-peer economy. The popularity of these sites suggests people want to have a direct say in product development. Blockchains take this interest to the next level, potentially creating crowd-sourced venture capital funds.

C. Governance
  - ➢ By making the results fully transparent and publicly accessible, distributed database technology could bring full transparency to elections or any other kind of poll taking. Ethereum-based smart contracts help to automate the process.

Application of blockchain

- D. Supply chain auditing
- ➢ Consumers increasingly want to know that the ethical claims companies make about their products are real. Distributed ledgers provide an easy way to certify that the backstories of the things we buy are genuine. Transparency comes with blockchain-based timestamping of a date and location — on ethical diamonds, for instance — that corresponds to a product number.

E. File storage
- ➢ Decentralizing file storage on the internet brings clear benefits. Distributing data throughout the network protects files from getting hacked or lost

END