



# Artificial intelligence in tissue engineering and regenerative medicine



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**From the point of view of all religions, life is  
the highest divine gift**

**You see**

**You hear**

**You feel**

**You think**

**You love**

**You are alive**





**In all religions, preservation of life is an important and basic task.**

**Basically, all sciences were created to preserve life.**

كُلُّ نَفْسٍ ذَائِقَةُ الْمَوْتِ ثُمَّ إِلَيْنَا تُرْجَعُونَ

هر نفسی (شهد ناگوار) مرگ را خواهد چشید و پس از مرگ همه رجوع بما خواهند کرد  
Every soul must taste of then to Us you shall be ,death brought back

**Can we have a world where death is far away and people feel the gift of life to the fullest?**



**Every minute, 35 people die due to cardiovascular diseases in the world (18 million people per year).**

**By the end of this speech, 1000 people will be deprived of this divine gift.**



**Every minute, 21 people die from kidney diseases in the world (11 million people per year).**

**By the end of this speech, 600 people will die.**



**Every minute, 8 people die from lung diseases in the world (4 million people per year).**

**By the end of this speech, 240 people will die.**



**Every minute, 3 people die due to liver diseases in the world (1.5 million people per year).**

**By the end of this speech, 90 people will be deprived of their lives.**

**During my 30-minute speech, about 2,000 people die from cardiovascular, kidney, lung, and liver diseases.**

**(4 important goals in tissue engineering and regenerative medicine)**

**Furthermore:**

**Every minute 2000 people in the world affected by nervous system problems.**

**Not see**

**Not hear**

**Not feel**

**Not think**

**Not love**

**Not alive!!!**

Every minute **850** people in the world suffer from **digestive system** problems. which makes them face a decrease in the quality and quantity of life.

**Therefore, during my 30-minute speech, 85,000 people will be excluded from the circle of ordinary people in the society and will not be able to benefit from the gift that has been given to them.**

**What is the solution? How can you keep the flame of life burning in the whirlwind of events?**

**When a person fully uses the gift of her life, she/he reaches the goal of creation and the creator.**

A photograph of a male doctor in a white lab coat and blue stethoscope. He is looking down with his hands clasped in front of his face, appearing thoughtful or stressed. The background is a bright yellow.

**Medical science was created to stand at the forefront of life preservation.**

**Despite all the remarkable advances in medicine and many successes in preserving and promoting life, many diseases and health problems cannot be solved by conventional medicine.**

**Conventional Medicine is Failing at Chronic**

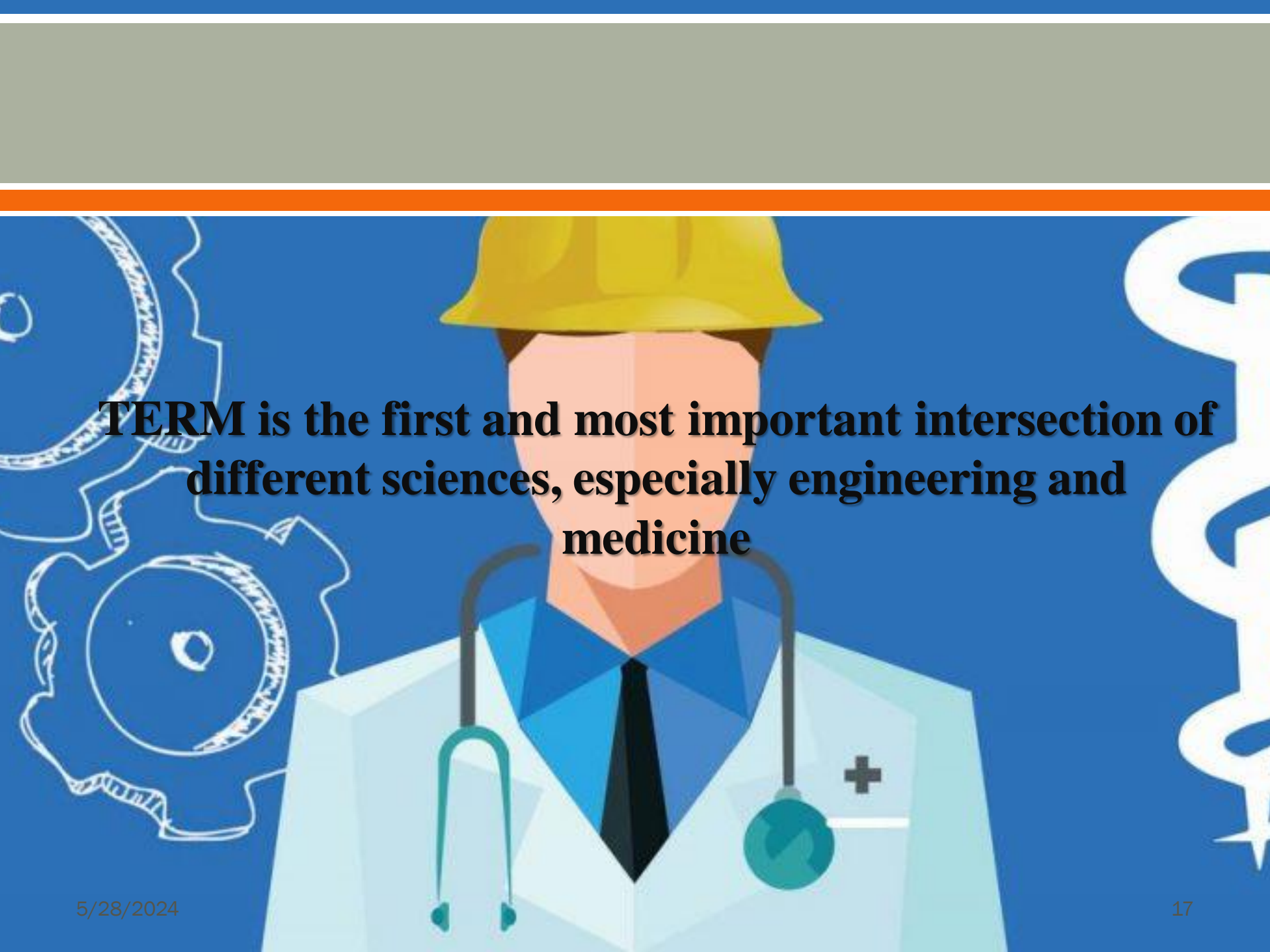
A row of four robotic arms, each holding a different organ. From left to right: a red heart, a teal lung, an orange kidney, and a brown liver. The background is a light brown, textured surface.

**Tissue engineering and regenerative medicine (TERM) started a new era in medicine.**

**The ultimate goal in this science is to produce all parts of the body to be available like acetaminophen tablets on the shelves of the most distant pharmacies in the world.**

**On the way to reach this final goal, there have been many side achievements.**





**TERM is the first and most important intersection of different sciences, especially engineering and medicine**

- ✓ **TERM in disease screening and prevention!**
- ✓ **TERM in diagnosis of diseases!**
- ✓ **TERM in new drug development, drug delivery and treatment!**
- ✓ **TERM in monitoring and controlling diseases!**
- ✓ **TERM in reducing disease complications!**
- ✓ **TERM in the complete treatment of diseases!**

About **32,000 articles** have been produced in the search with the two words **cardiovascular** and tissue engineering, cardiovascular and regenerative medicine in 2024.

There are **33 million** articles about the word **cardiovascular** itself.

About **26,000 articles** have been produced in the search with the two words **kidney** and tissue engineering, kidney and regenerative medicine in 2024.

There are **49 million** articles about the word kidney itself.

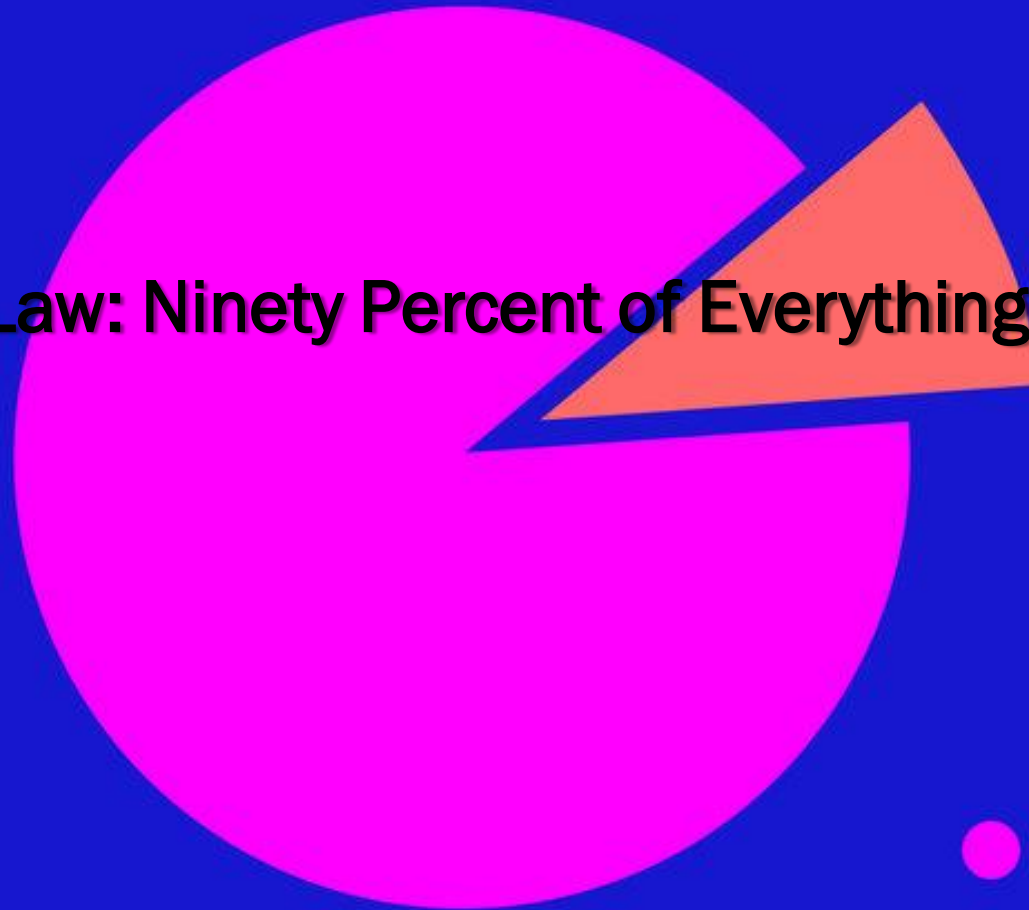
About **32,000** articles have been produced in the search with the two words **liver** and tissue engineering, liver and regenerative medicine in 2024.

There are **46 million** articles about the word Liver itself.

About **28,000** articles have been produced in the search with the two words **lung** and tissue engineering, lung and regenerative medicine in 2024.

There are **5.5 million** articles about the word lung itself.

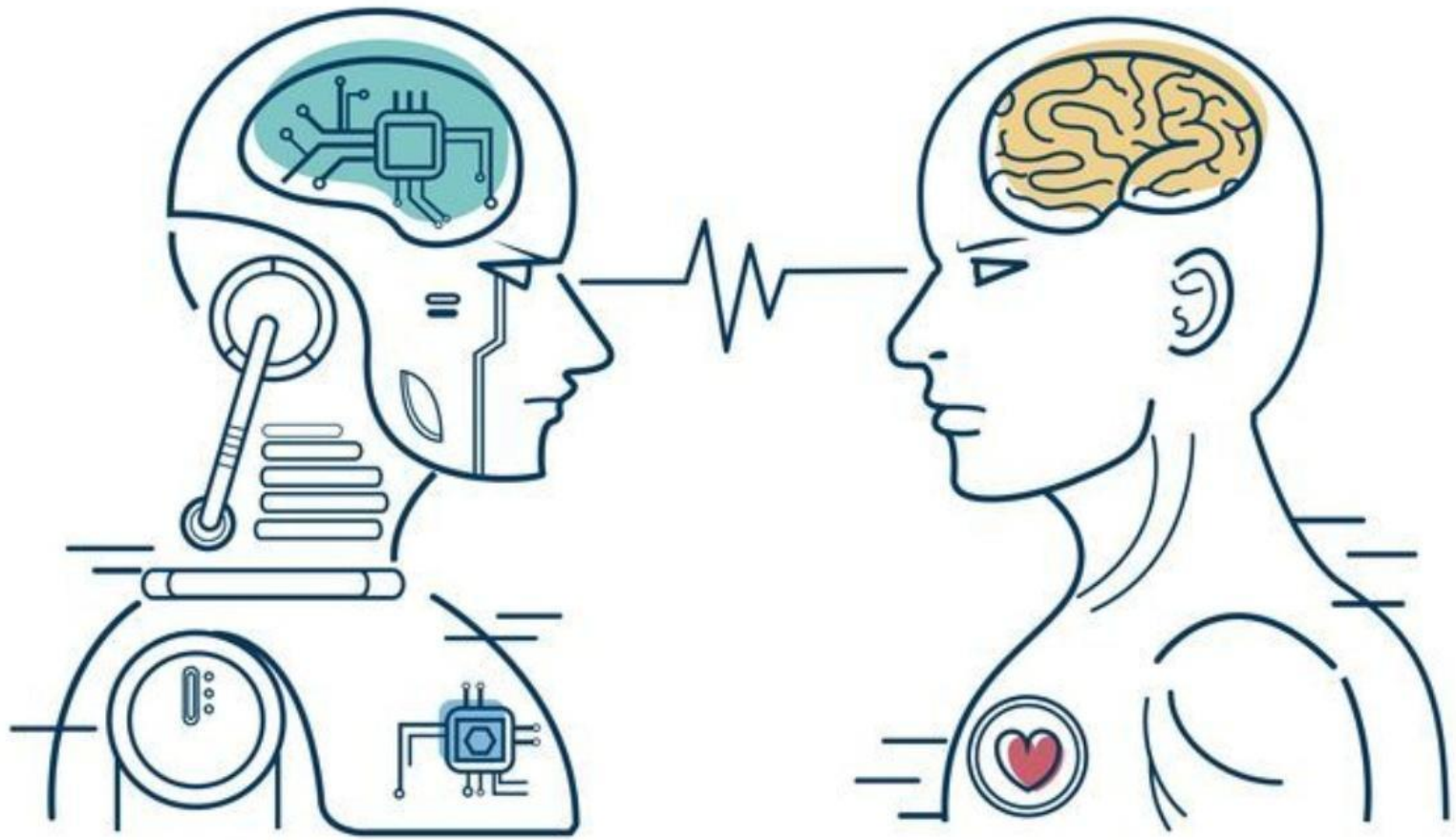
# Sturgeon's Law: Ninety Percent of Everything is Crap



● **CRAP**  
● **NOT CRA**

- ∞ **The interdisciplinary nature of TERM and the need to accurately integrate the findings of different sciences with each other,**
- ∞ **The large number of scientific productions has increased the need for artificial intelligence in this field.**

**Effective development of TERM requires the ability to analyze large amounts of complex data, which is where artificial intelligence comes in.**



- ∞ **Artificial intelligence refers to the development of computer systems that can perform tasks that normally require human intelligence, such as learning, reasoning, perception, and problem solving.**
- ∞ **Artificial intelligence systems are designed to mimic human cognition and autonomous work, learning from data and previous experiences to improve their performance over time.**

- ∞ **The concept of artificial intelligence has been around for decades. However, recent advances in machine learning (ML), deep learning, and natural language processing have enabled the development of more advanced artificial intelligence systems.**

## **Machine learning enables researchers to**

- ∞ analyze large amounts of data,**
- ∞ recognize patterns, and make predictions based on that data.**

## Deep learning (DL)

- Uses artificial neural networks to learn from data.
- Mimic the structure and function of the human brain, allowing them to recognize more complex patterns and make decisions based on the data they've been trained with.

**DL has revolutionized the field of artificial intelligence, enabling machines to do things that were once thought impossible. One of the key advantages of DL is its ability to handle large and complex data sets.**


# **Artificial Intelligence the new era in TERM**

## **We Also needs AI in TERM to:**

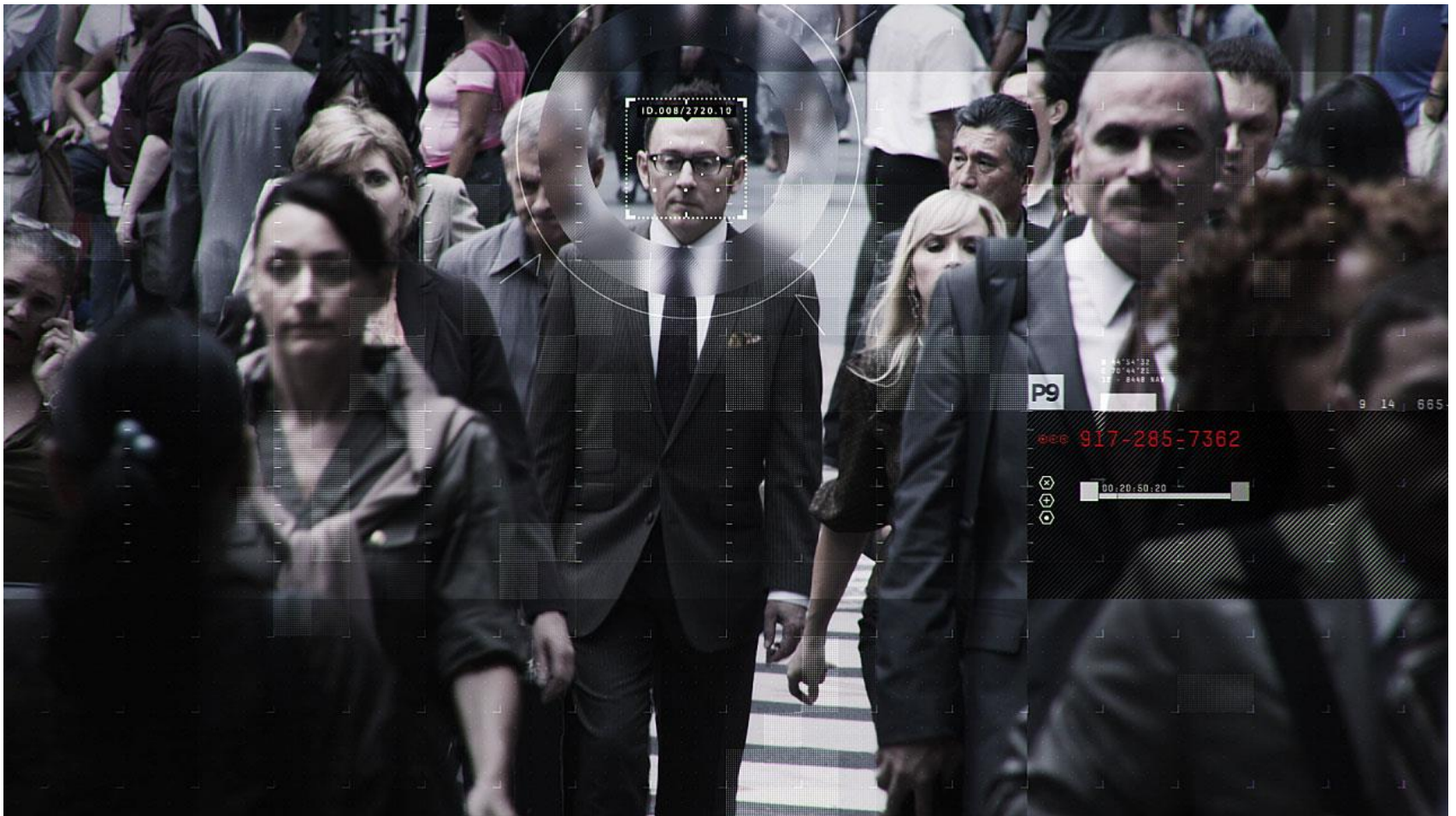
- 🌀 Detailed analysis of biological data**
- 🌀 Single-Cell Analysis**
- 🌀 Material Optimization**
- 🌀 Improving the precision of tissue fabrication processes**
- 🌀 Development of innovative solutions**
- 🌀 Personalized medicine**
- 🌀 Robotic regeneration**
- 🌀 Pushing the boundaries of what is possible in TERM**

## **We expect AI in TERM to:**

- ✓ **to perform better than human intelligence**
- ✓ **to be far from the errors of mind and prejudices of the human mind.**
- ✓ **to be ethical**



**Artificial intelligence under supervision  
of ????????**



**Artificial intelligence in regenerative medicine  
can also be a double-edged sword.**

**∞ If tissue engineering contributes only 10% in saving the lives and this 10% at least doubled with the AI, during my 30-minute lecture, tissue engineering with AI has been able to save at least 400 lives and prevent 1700 people in normal cycle of life.**

**Whoever saves one person's life is like saving the lives of all people.**



وَمَنْ أَحْيَاهَا فَكَأَنَّمَا أَحْيَا النَّاسَ جَمِيعًا

و هر کس نفسی را حیات بخشد (از مرگ نجات دهد)  
مثل آن است که همه مردم را حیات بخشیده است.

مآئده ۳۲

۳ اردیبهشت، روز ملی اهدای عضو

جان آفرینان