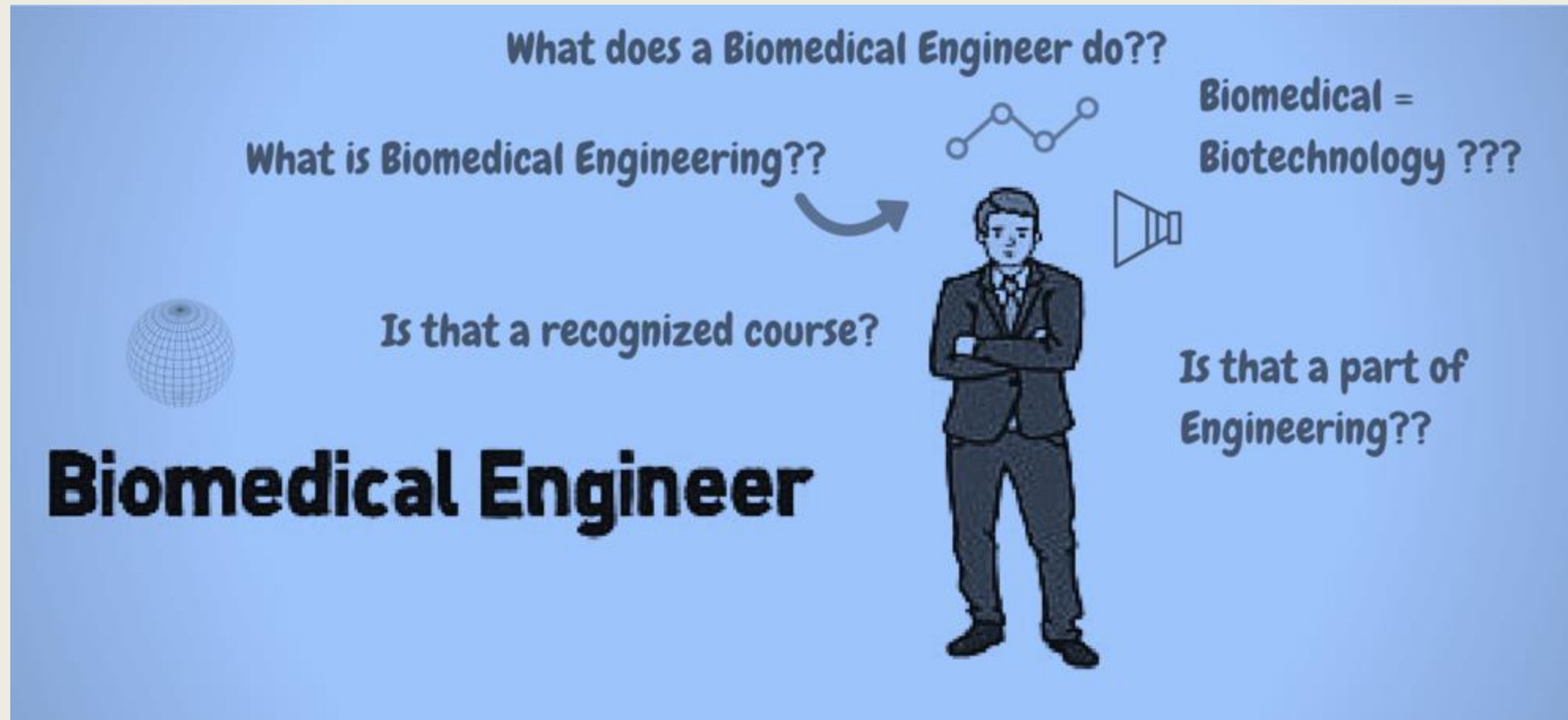


HEALTHCARE ENGINEERING AND MANAGEMENT (HEM)

Based on Credit Hours System (CHS)

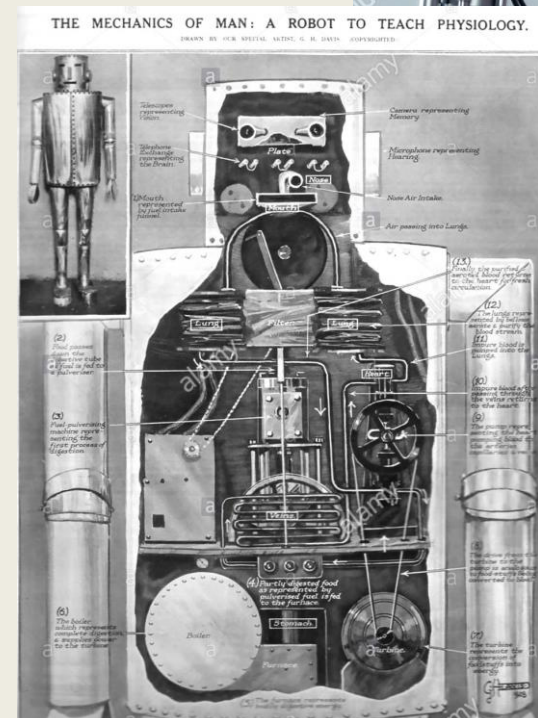
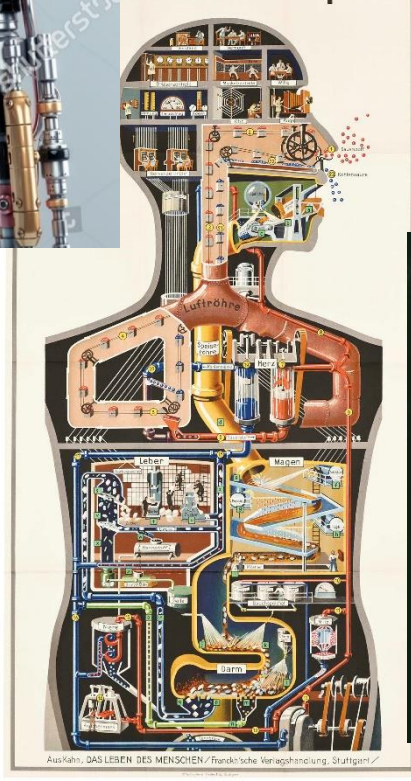
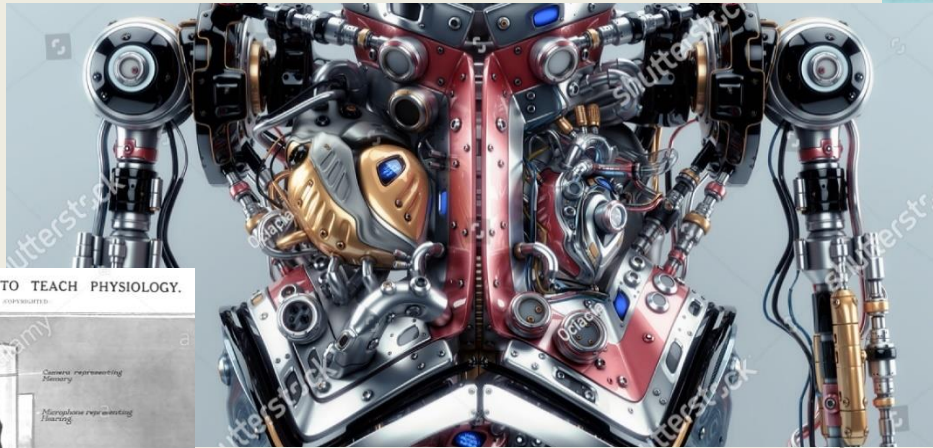
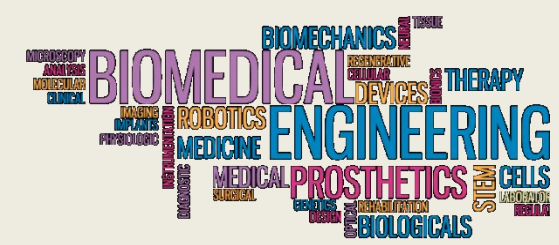
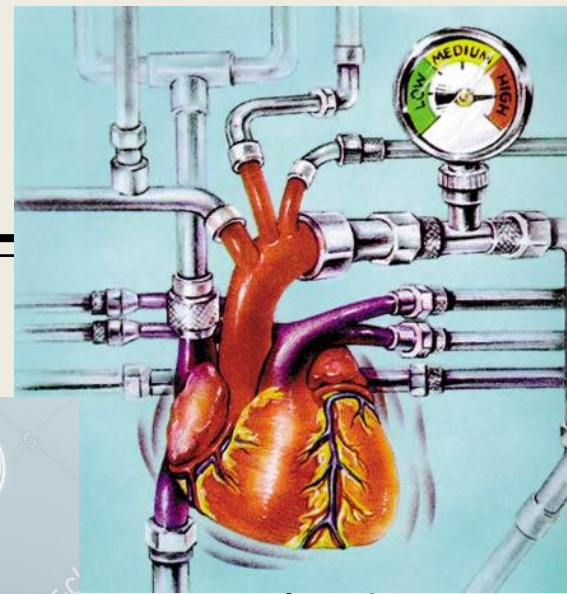


Biomedical Engineering?!!!



Biomedical Engineering

- Human body as an Engine



Biomedical Engineering Aims

- It's all about human body as an engine for the aim of:

Diagnosis



Biomedical Engineering Aims

- It's all about human body as an engine for the aim of:

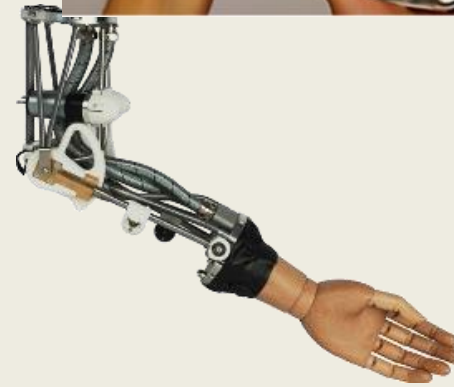
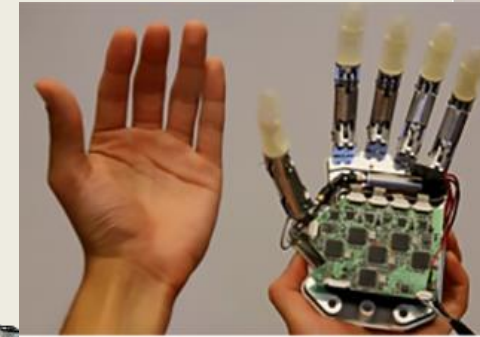
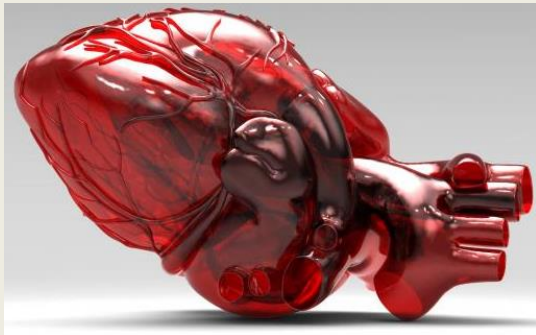
Helping with solutions



Biomedical Engineering Aims

- It's all about human body as an engine for the aim of:

Providing replacements
(imitate...imitate)



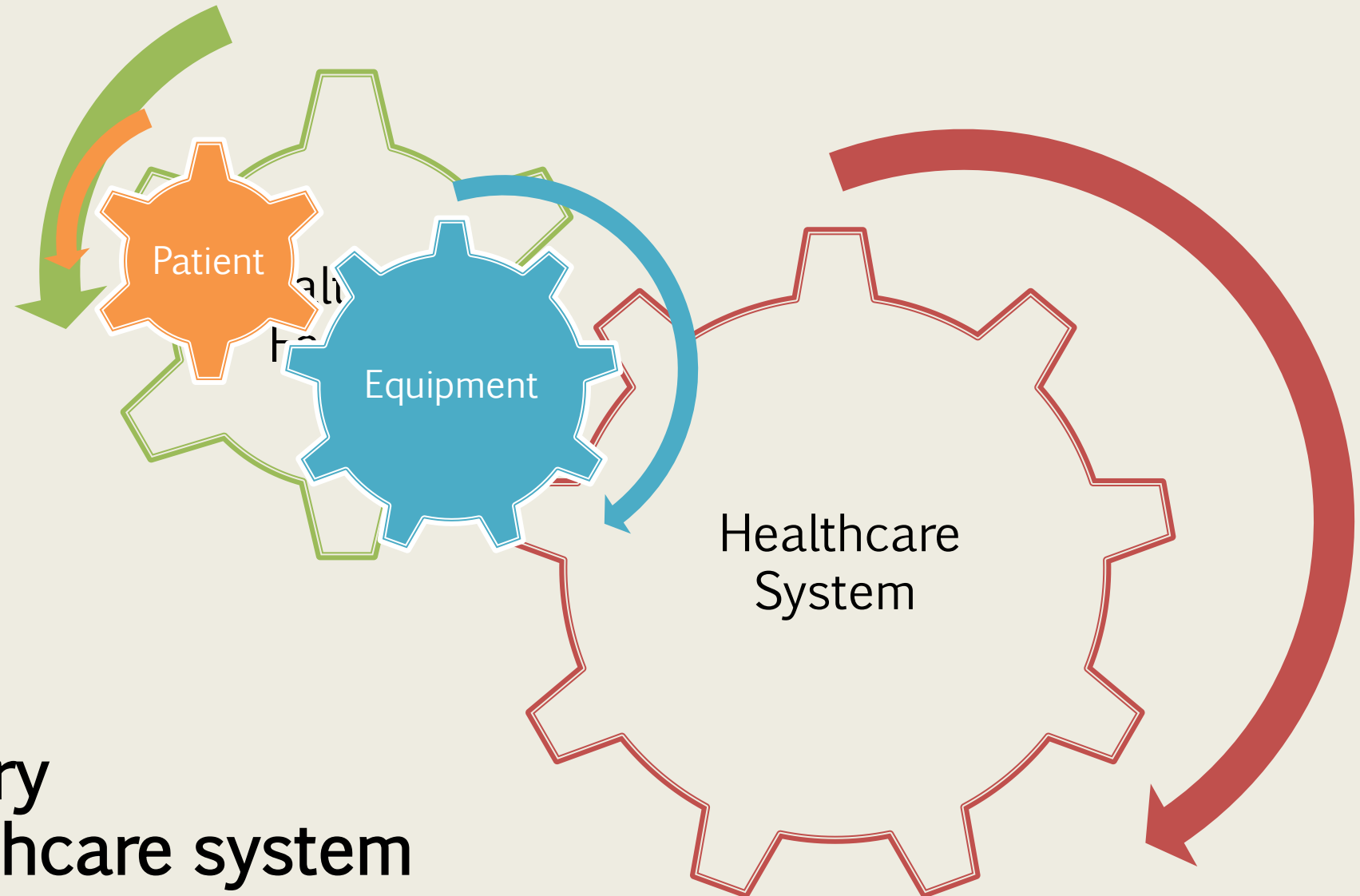
Biomedical Engineering

- It's all about human body as an engine for the aim of:

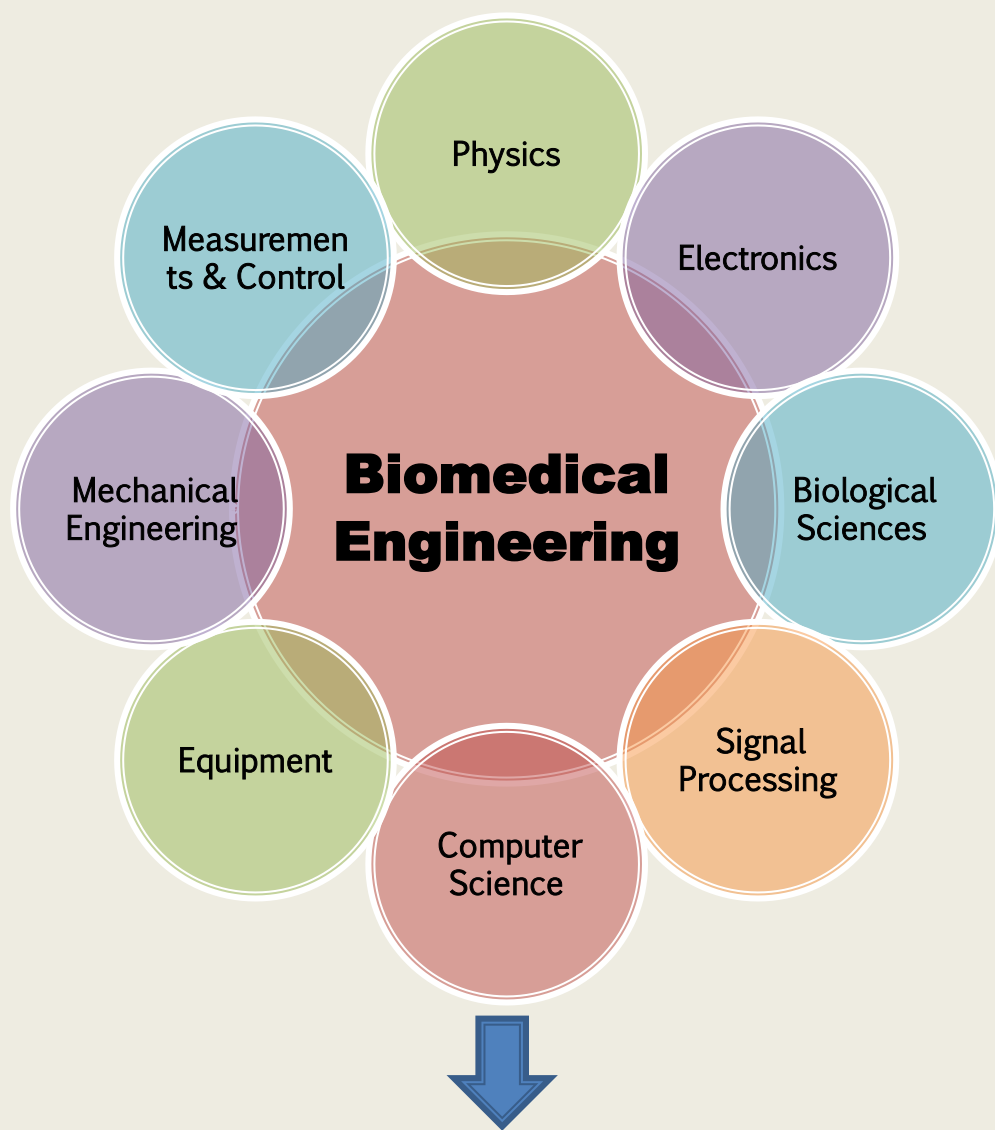
Proper workshop



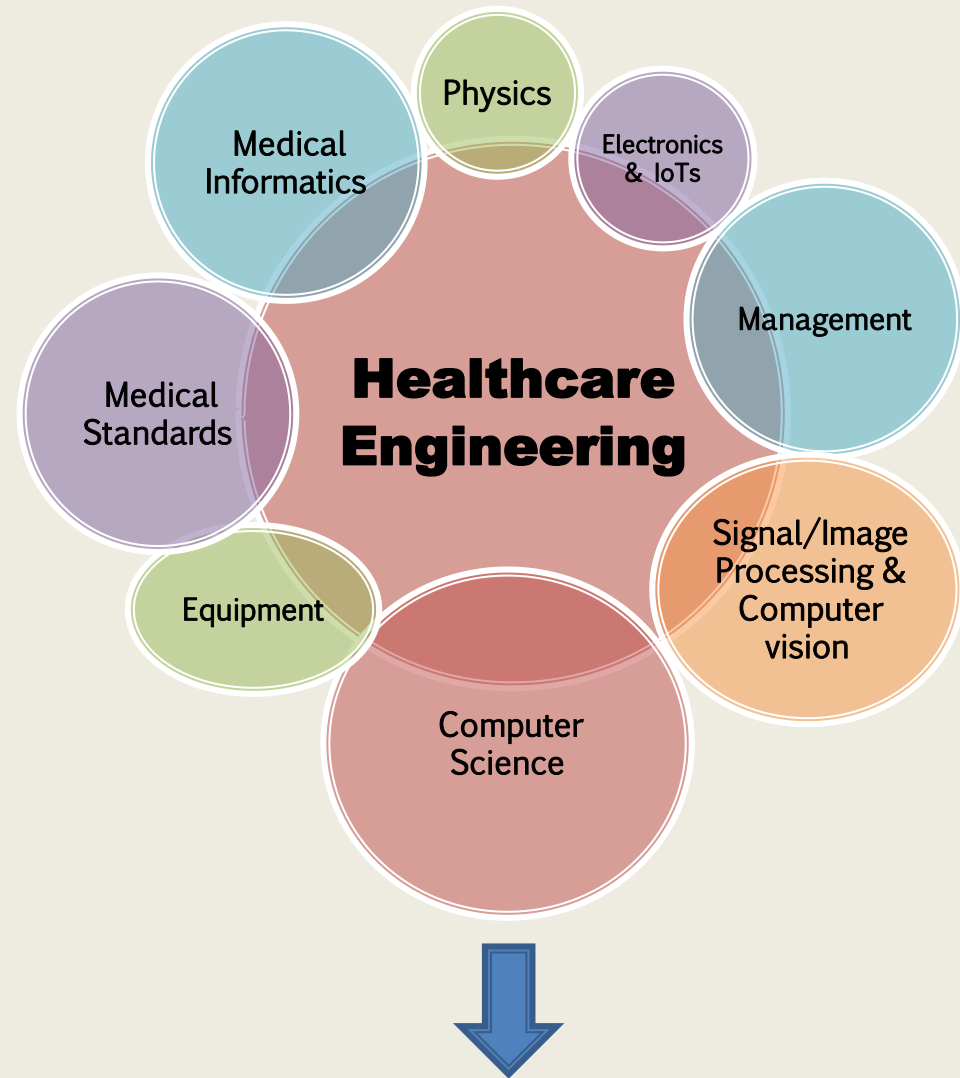
Biomedical Eng. & Healthcare Eng.



Focus on machinery
Focus on the healthcare system



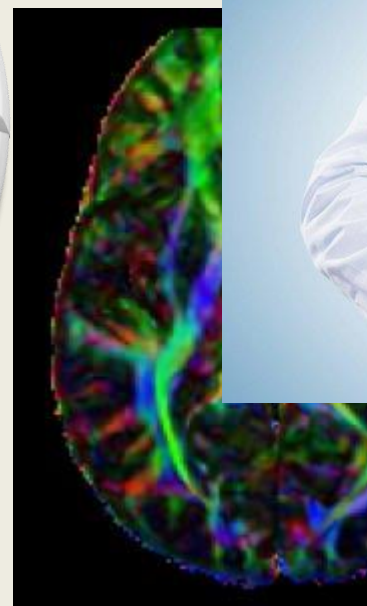
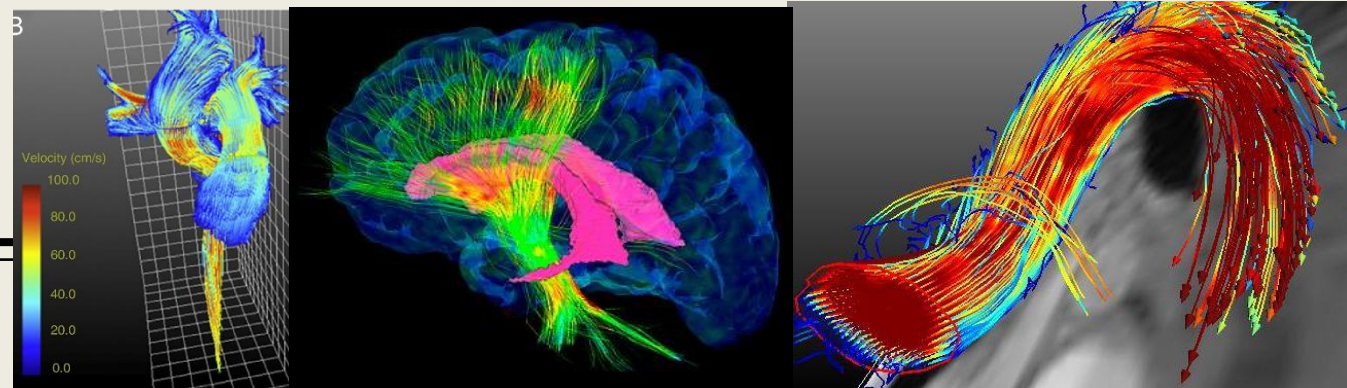
**Medical
Equipment**



**Healthcare Facilities
& Healthcare System**

HEM graduates

Jobs



National Market

- National development
 - Startups & Outsourcing





التأمين الصحي الشامل
UNIVERSAL HEALTH INSURANCE

National Market

- Healthcare system reform plan



قانون التأمين الصحي الشامل

الاشتراك إلزامي
وليس اختياري

١300
جنيه سنوياً

٦٠٠
مليار جنيه
إجمالي تكلفة المشروع

يغطي القانون الجديد جميع الأمراض

هيئات معنية بتطبيق القانون
هيئة الرعاية الصحية
هيئة الجودة والاعتماد
هيئة التأمين الصحي

سيتم الإلغاء التدريجي للعلاج على نفقة الدولة

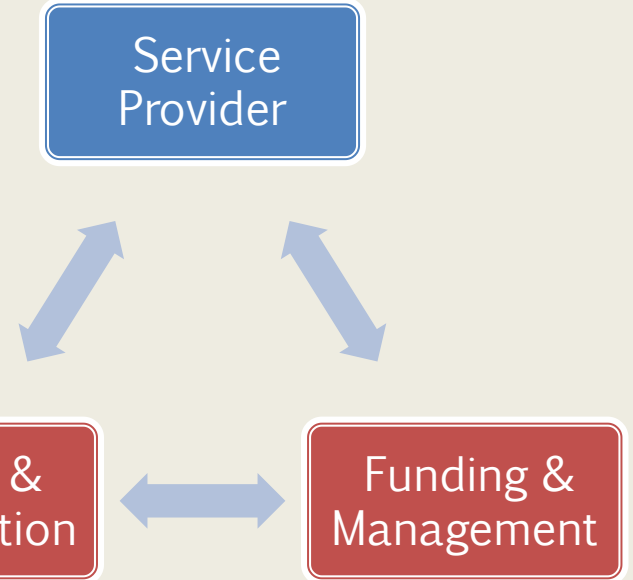
المرحلة الأولى 2020 - 2018	المرحلة الثانية 2023 - 2021	المرحلة الثالثة 2026 - 2024
بورسعيد جنوب سيناء شمال سيناء	الأقصر البحر الأحمر أسوان	الإسكندرية دمياط كفر الشيخ
بورسعيد جنوب سيناء شمال سيناء	الأقصر البحر الأحمر أسوان	الإسكندرية دمياط كفر الشيخ
المرحلة الرابعة 2028 - 2027	المرحلة الخامسة 2030 - 2029	المرحلة السادسة 2032 - 2031
بنى سويف المنيا الفيوم	الدقهلية الغربية المنوفية	القاهرة الجيزة القليوبية



التأمين الصحي الشامل
UNIVERSAL HEALTH INSURANCE

National Market

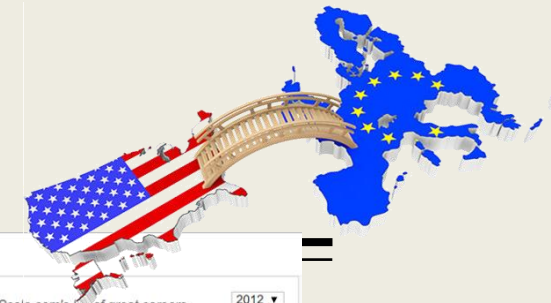
- Healthcare system reform plan
 - Clinical engineering,
 - Healthcare facilities designing & planning,
 - Medical standards,
 - Medical software,
 - Healthcare management,
 - Healthcare information systems.



6- ثلاث هيئات معنية بتطبيق القانون، وهى هيئة الرعاية الصحية، وتكون معنية بمنافذ تقديم الخدمة، وهيئة الجودة والاعتماد، وتمنح المستشفيات الاعتماد وفق معايير الجودة المعمول بها، وهيئة التأمين الصحى، وتتولى إدارة وتمويل التأمين الصحى.



Regional & International Market



14 مليار دولار حجم مشاريع الرعاية الصحية بالسعودية

السبت 23 جمادى الأولى 1435 هـ - 22 مارس 2014م



Gulf countries offering international investment opportunities in health care

N.P. Krishna Kumar

Dubai

A shortage of hospitals, clinics and related infrastructure, along with an increasing population and official push to promote medical tourism, makes the health care sector in the Gulf region a promising area for investment.

The increasing emphasis on health care as part of economic plans is exemplified in the UAE Vision 2021 and Saudi Vision 2030. Both countries are promoting public-private partnerships to finance health-care projects.

"Dubai needs 1,000 hospital beds in the next five years just to keep pace with the growing population growth, which translates to seven hospitals, at around 150 beds per hospital," said Craig Plumb, head of research at Jones Lang LaSalle MENA.



Promising sector. Official opening of King College Hospital London's new Medical Centre in Jumeirah. (Dubai King's College Hospital UAE)



TVM Capital plans \$200 mln investment in UAE healthcare portfolio

CNN Money

BEST JOBS IN AMERICA

CNNMoney/PayScale.com's list of great careers

2012

1. Biomedical Engineer

1 of 100

BACK NEXT

Like 6.8K

Tweet

Share

G+

Email Print

Median pay: \$79,500

Top pay: \$124,000

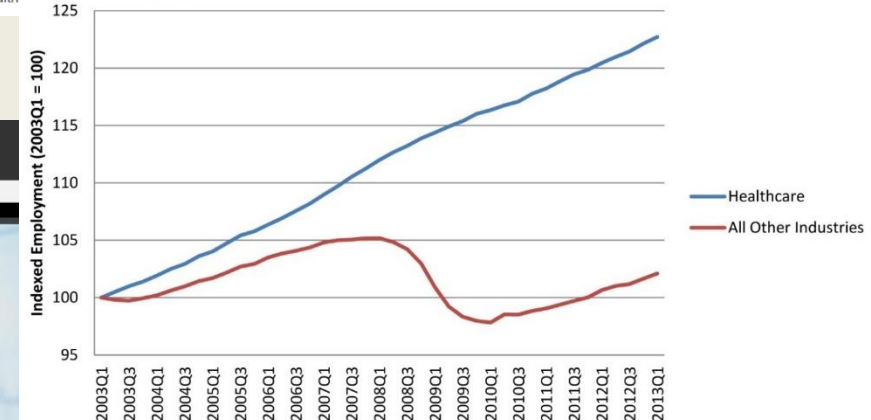
10-year job growth: 61.7%

Total jobs*: 15,700

What they do all day? Science fiction is a little less fictional in the day-to-day work of biomedical engineers, who design prosthetic limbs and artificial organs or regenerate tissue. They also create drug formulations, develop pharmaceuticals or collect and analyze biological data, among other work. In this field lies the intersection of biology and engineering skills, which helps health

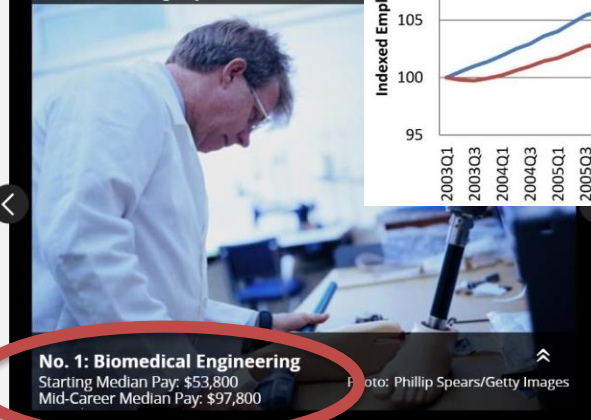


U.S. Employment Growth in Healthcare and All Other Industries, 2003Q1-2013Q1



Forbes

15 Most Valuable College Majors



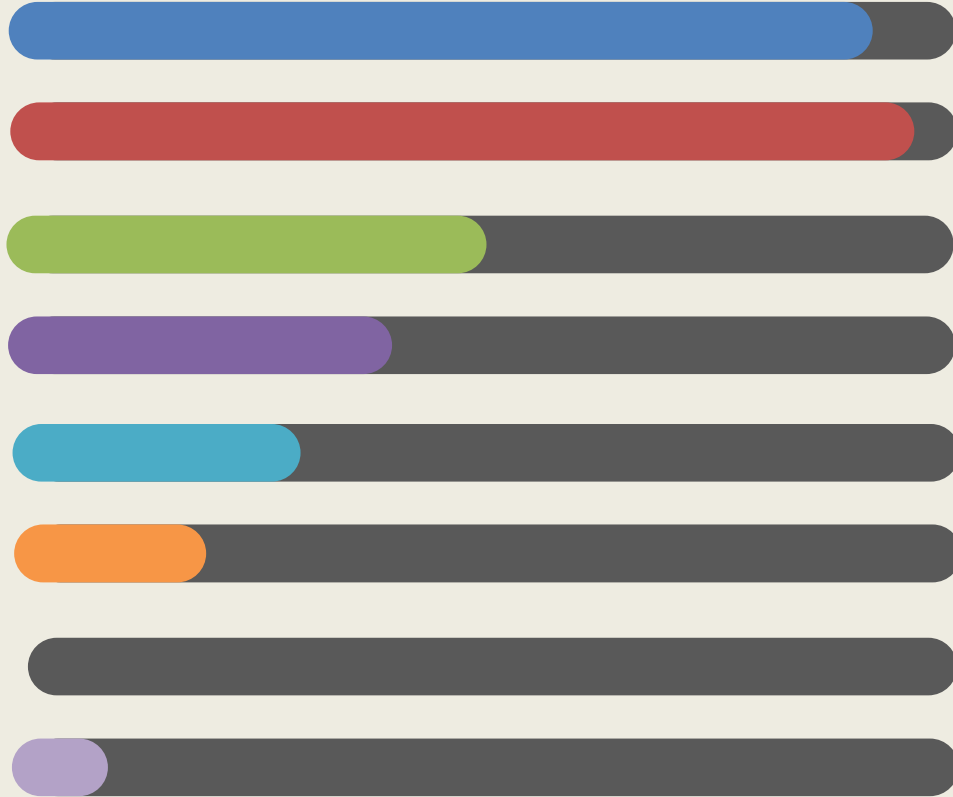
No. 1: Biomedical Engineering

Starting Median Pay: \$53,800

Mid-Career Median Pay: \$97,800

Photo: Phillip Spears/Getty Images

BME



Circuits & Electronics

Signals, Measurements
& Control

Biological Science

Mechanical Engineering

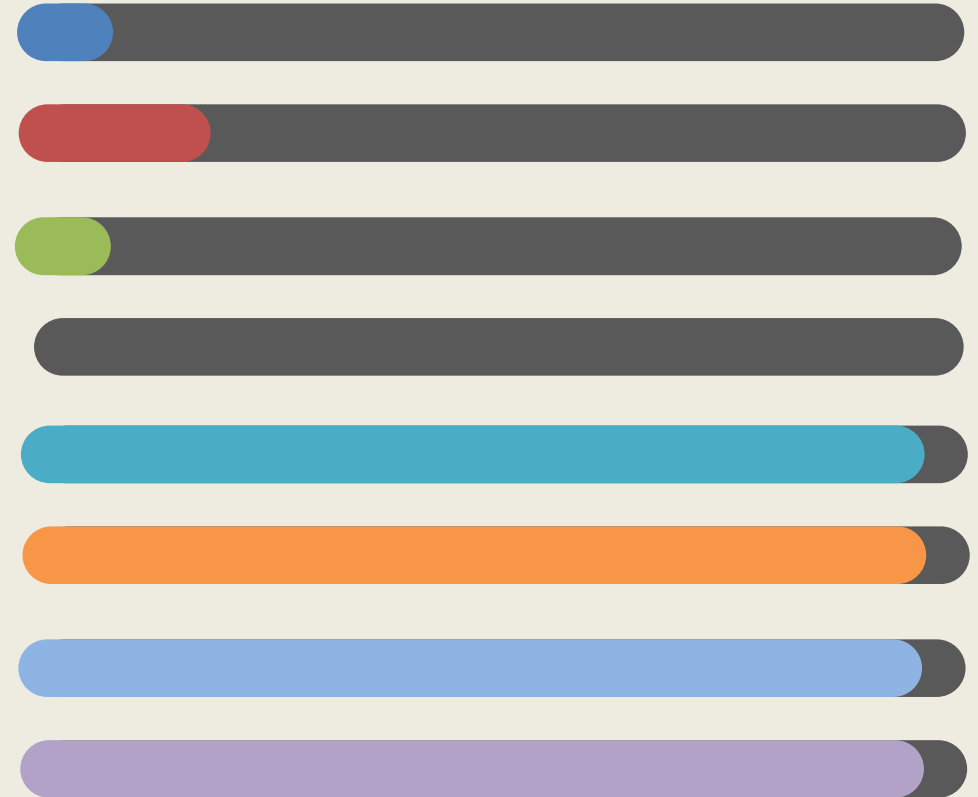
Medical Software

Medical Informatics

Medical Standards

Management

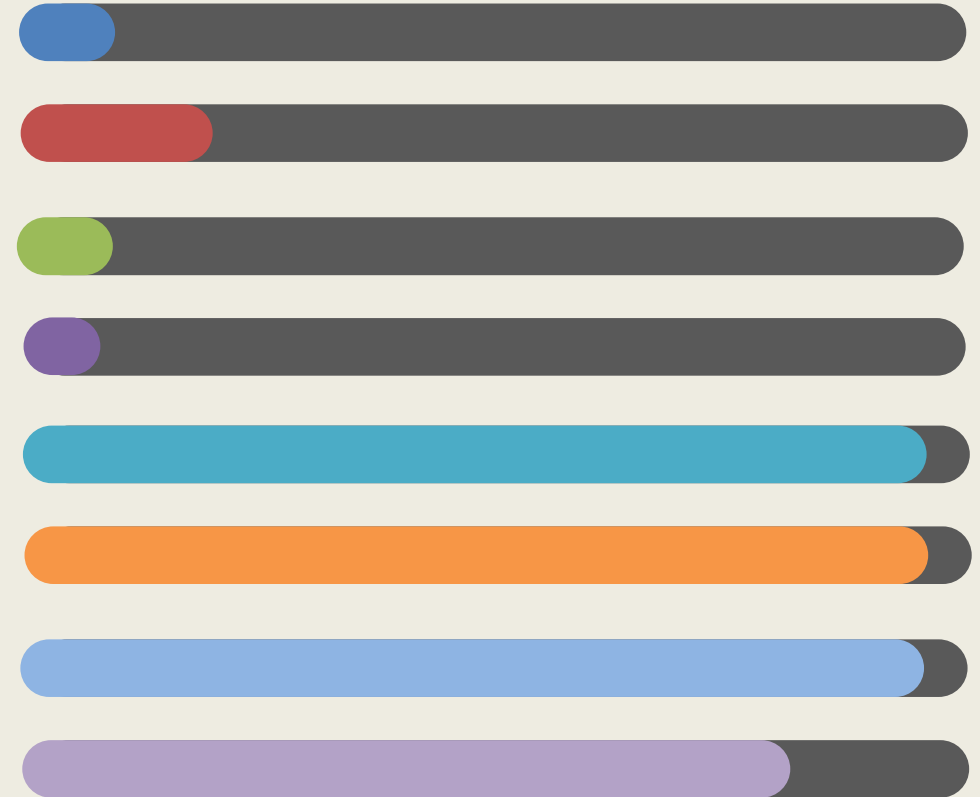
HEM



CCE-C



HEM

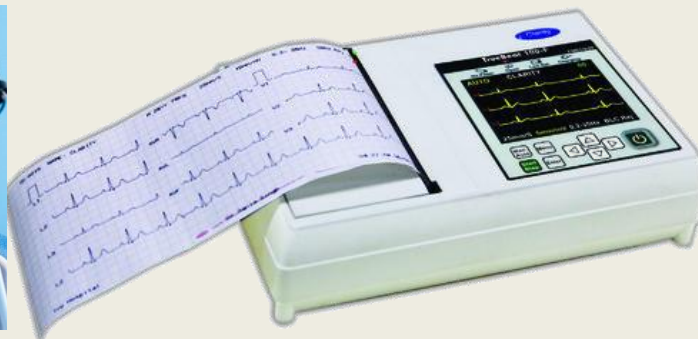




BIOMEDICAL ENGINEERING AREAS

Measurement Devices

■ Monitoring



■ Basic tools



■ Labs



Radiological Devices

■ X-Ray



■ Ultrasound

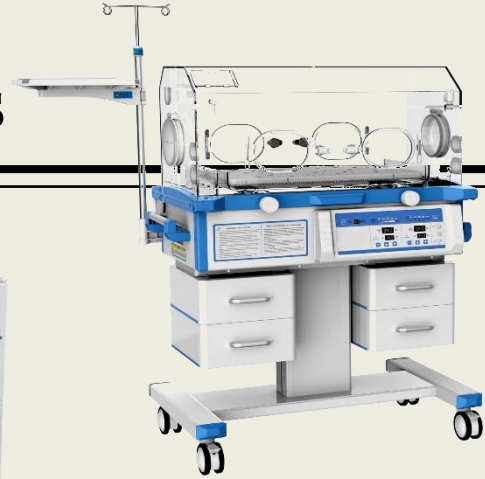


■ Magnetic Resonance Imaging



Assisting Devices

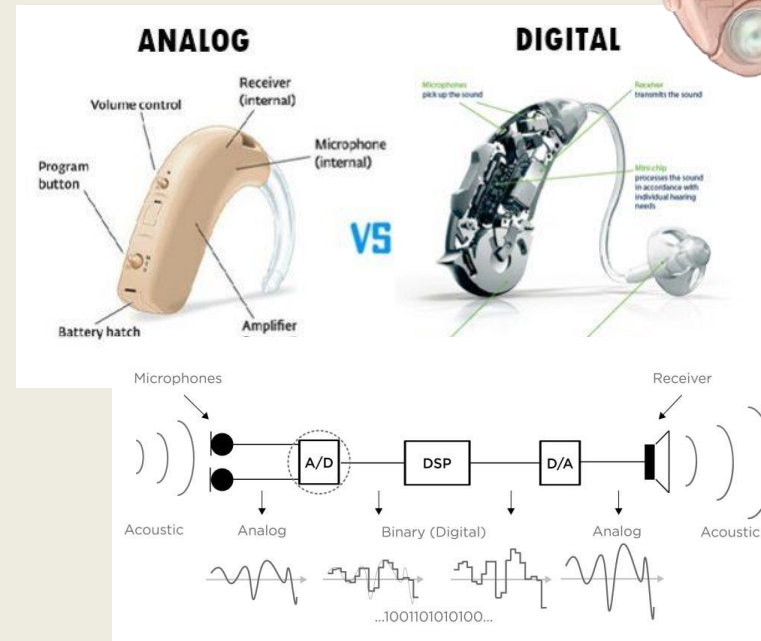
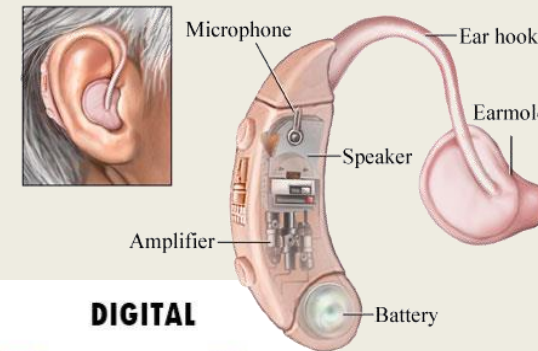
■ Incubators



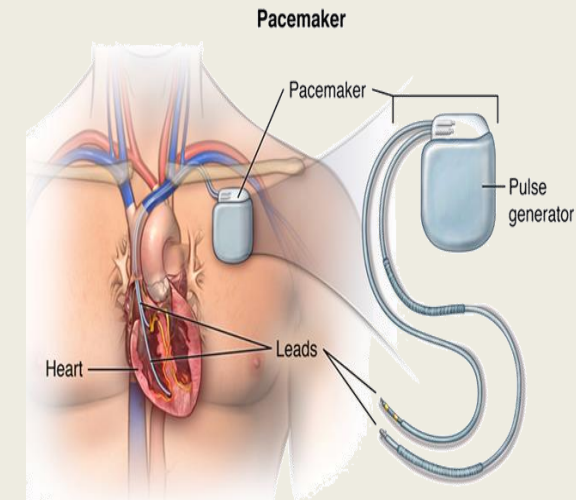
■ Ventilators



Hearing-aid

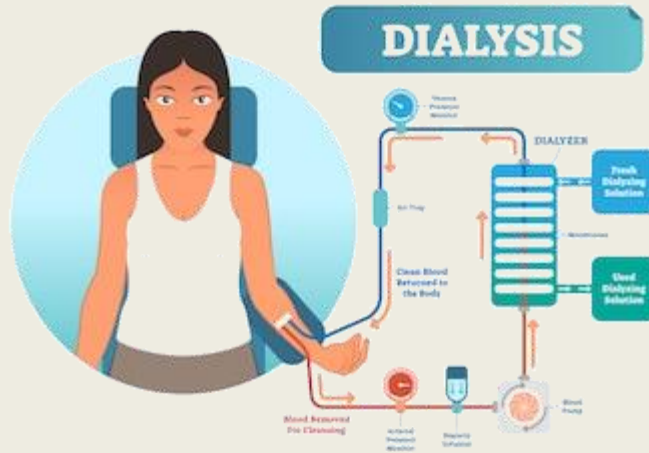


Pacemaker & ICD

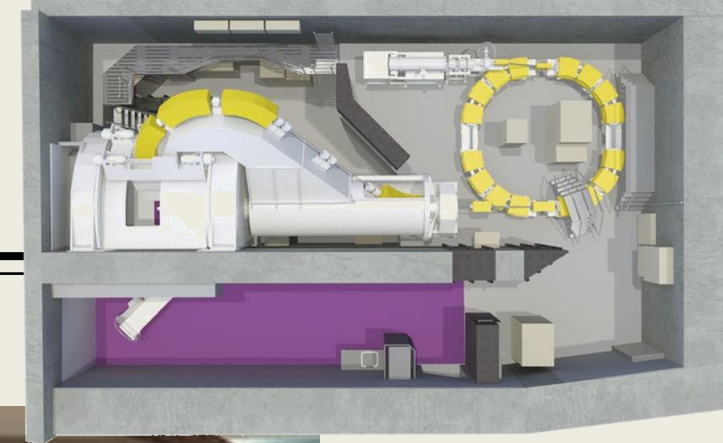


Treatment Devices

- Dialysis



- Radio-Therapy



Signal Processing

- ECG (heart waves)
- EEG (brain waves)
- EMG (muscles waves)

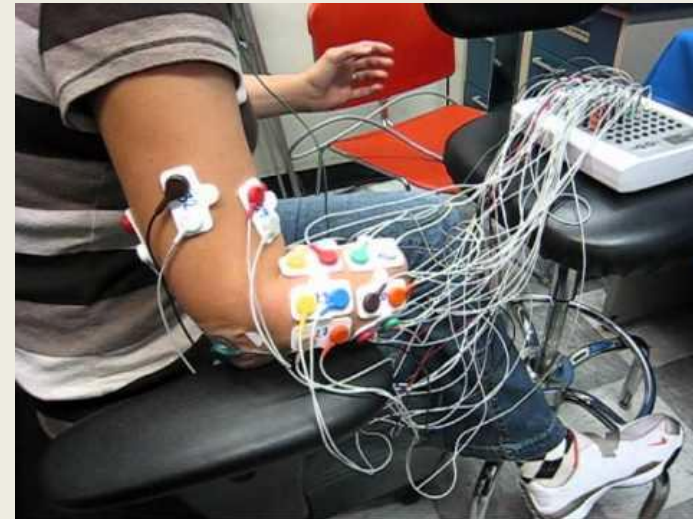
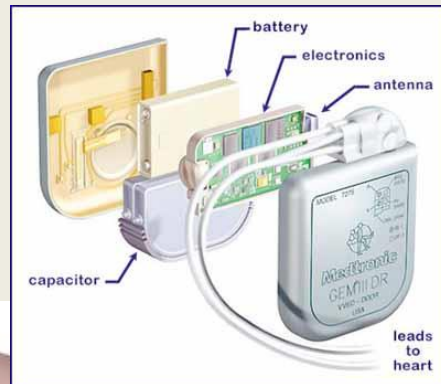
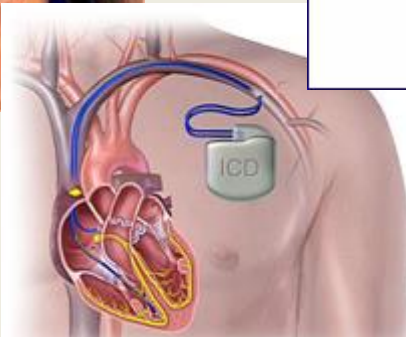
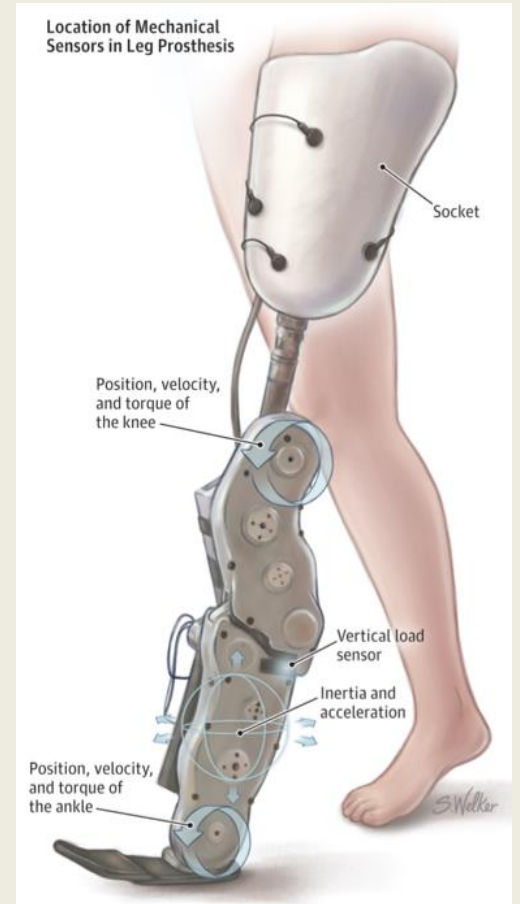
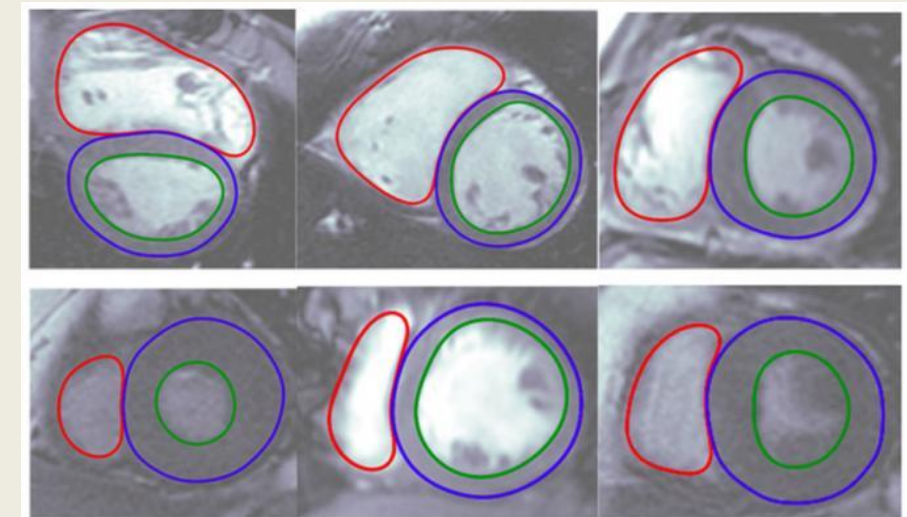
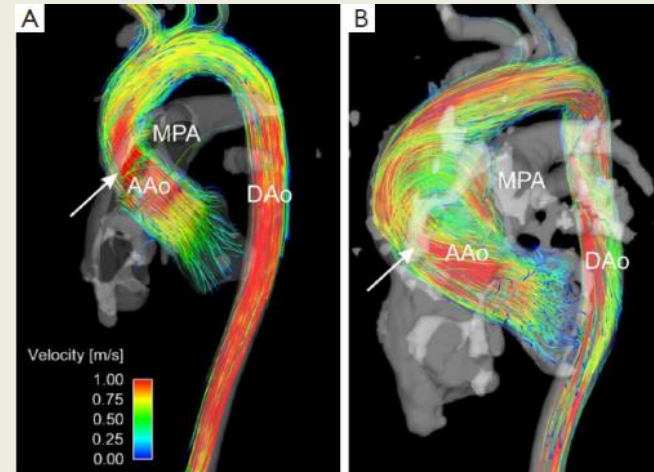
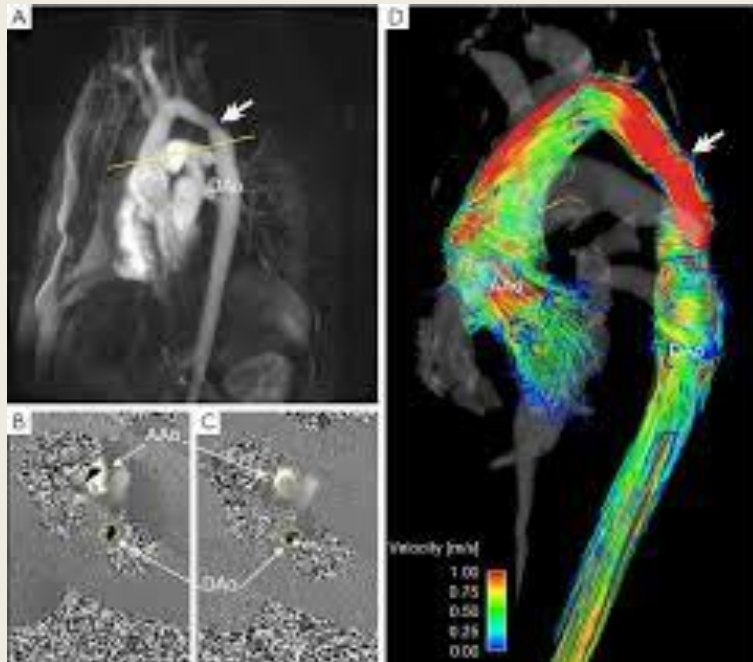
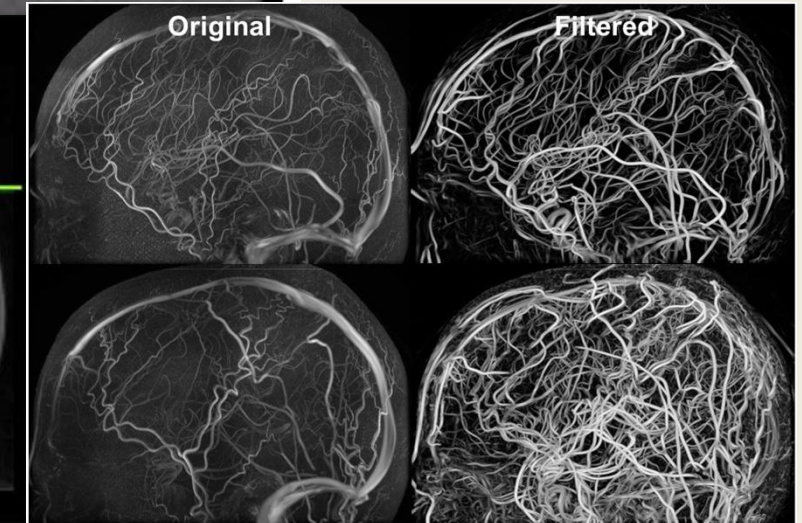
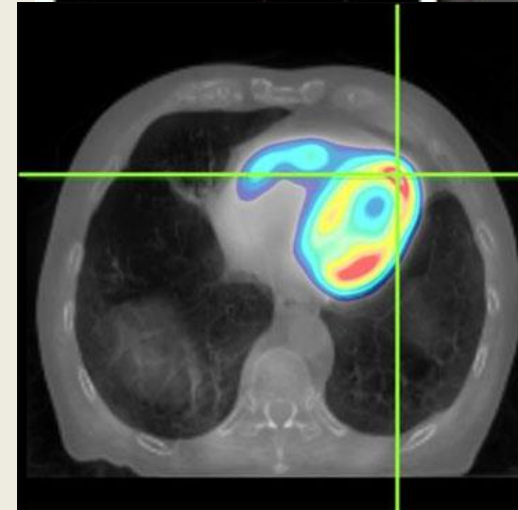
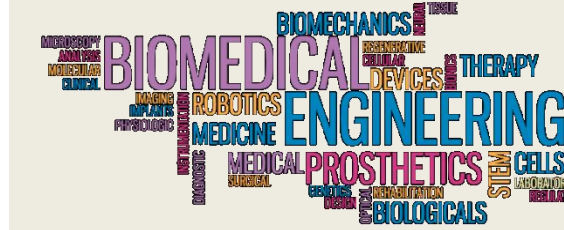
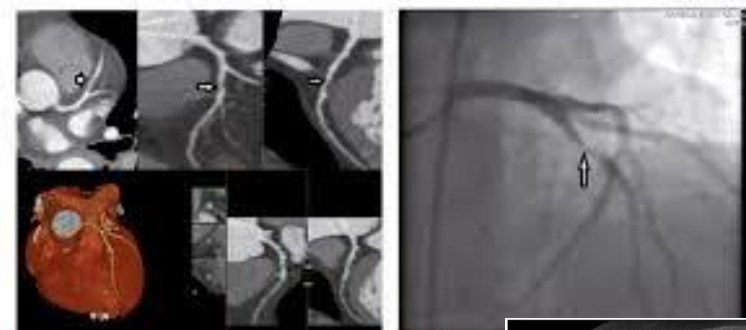
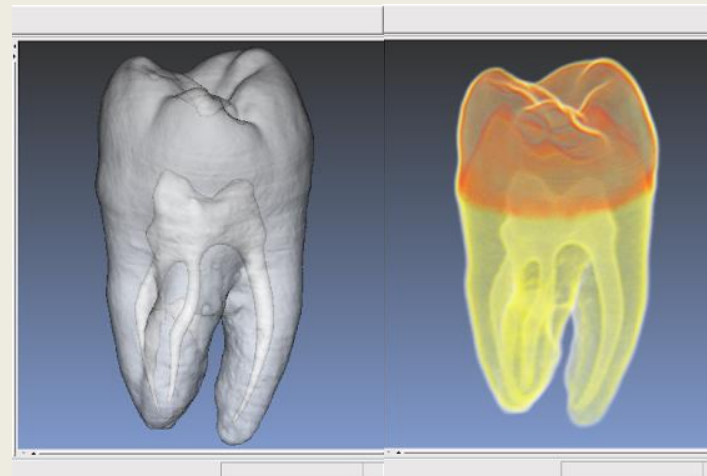
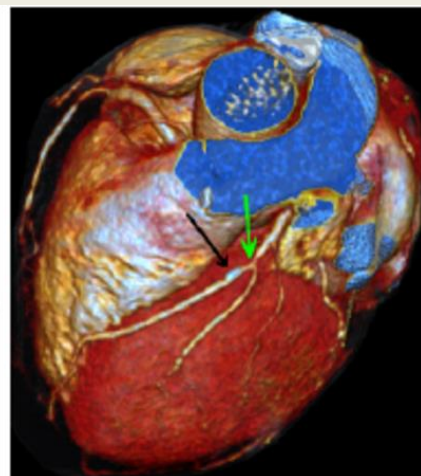
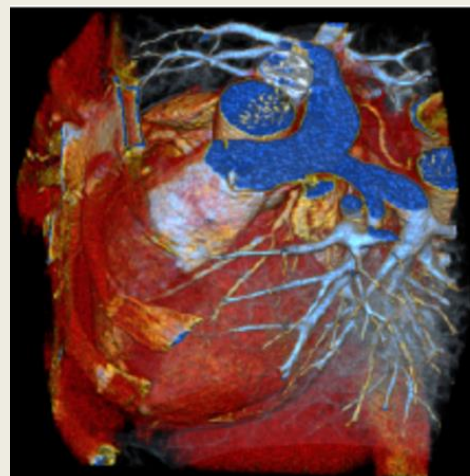
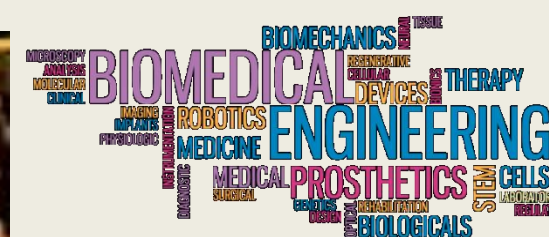


Image Processing & Computer Vision

- Pattern recognition,
- Big Data,
- Deep Learning.

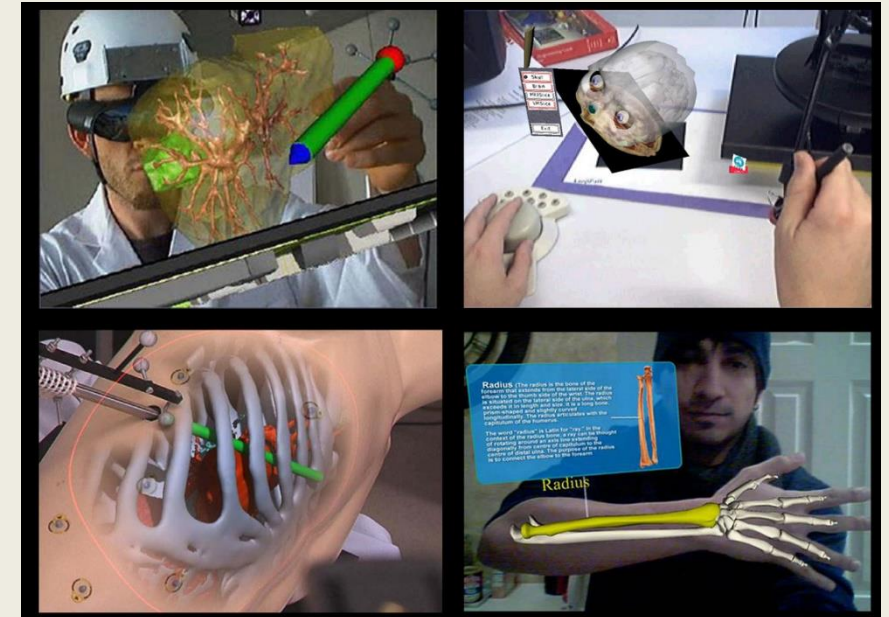



Visualization & Virtual & Augmented Reality

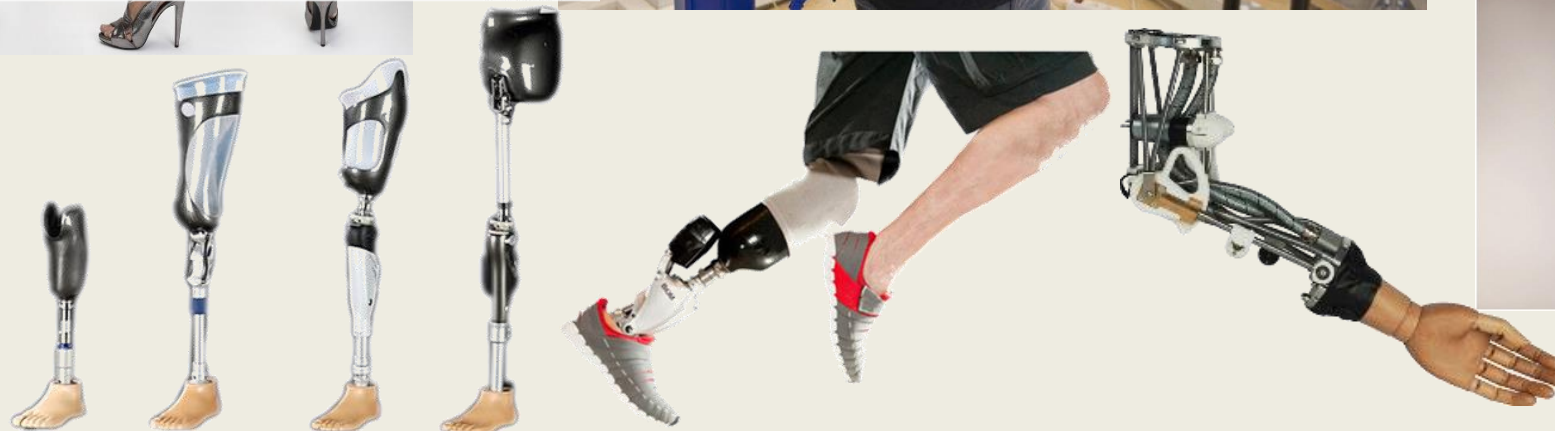
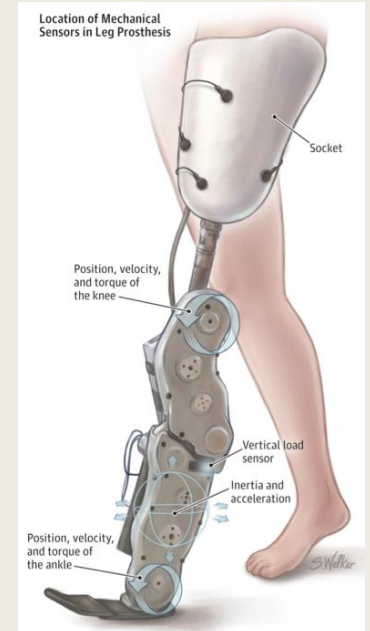


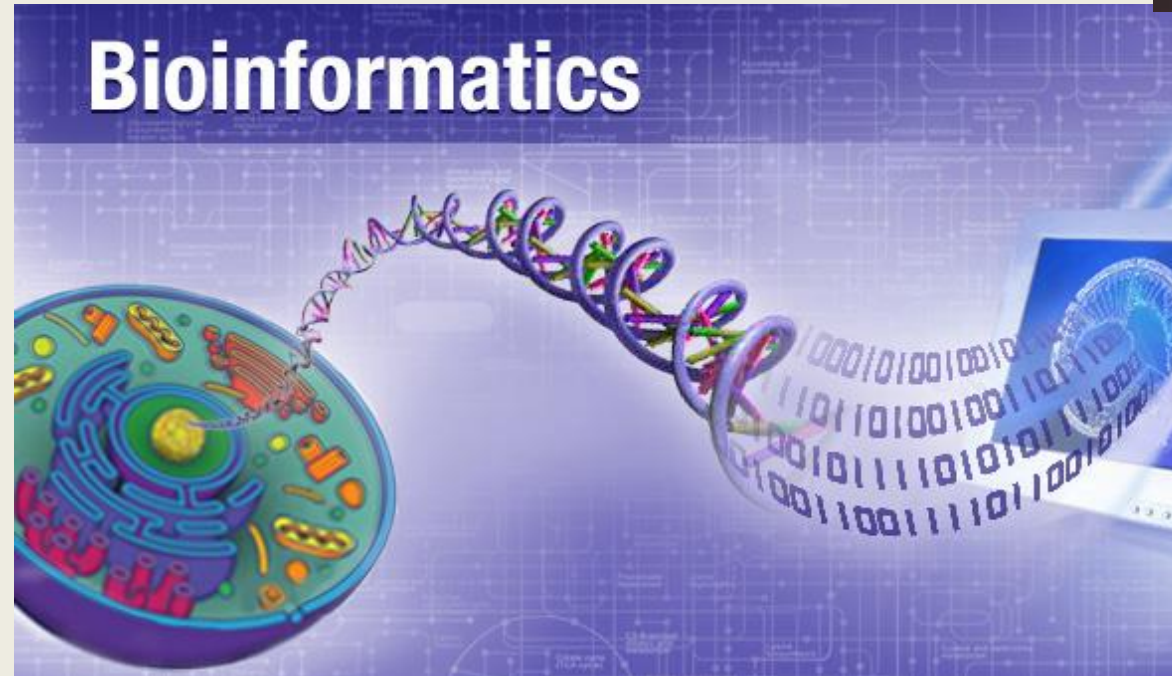
Visualization & Virtual & Augmented Reality

■ Intervention surgeries



- 





CDC-Reported AHD Mortality

Twitter-Predicted AHD Mortality

6/09 – 3/10
 826 million tweets
 146 million geo-located
 Across 1300 counties
 Eval for stress & hostility:
 health, attractiveness,
 job, curse words
 +CDC, US Census data

Eichstaedt JC et al.,
 Psychological Science,
 2015;26:159

10 20 30 40 50 60 70 80 90

AHD Mortality (Percentile)



The screenshot displays a medical simulation interface. At the top, the title bar reads "Handy patients enteric edition". The main window is titled "Digestive" and shows the date "Thursday, 22 Jan 2009".

Patient Information:

- Age:** 4 years
- Gender:** Female
- Weight:** 16.0 kg
- Height:** 95.0 cm
- Temperature:** 38.0 °C
- Heart Rate:** 100 bpm
- Respiratory Rate:** 20 /min
- Blood Pressure:** 100/60 mmHg
- Saturation:** 98%

History:

- Chief Complaint:** Vomiting
- History of Present Illness:** The patient has been vomiting for the last 24 hours. The vomit is non-bilious and non-feculent. There is no blood or bile. The patient is not eating or drinking. She has had no bowel movements. She is not taking any medications. She has no known allergies. She has no recent travel. She has no recent contact with anyone who is sick.
- Past Medical History:** Epilepsy (Seizures)
- Family History:** No significant family history.
- Review of Systems:**
 - General:** Well
 - Neurological:** No focal deficits. No abnormal reflexes. No abnormal gait.
 - Cardiovascular:** No murmurs. No gallop. No edema.
 - Respiratory:** No wheezes. No crackles. No stridor.
 - Gastrointestinal:** No abdominal pain. No distension. No tenderness. No guarding. No rigidity. No rebound. No Murphy's sign. No McBurney's sign. No Rovsing's sign. No shifting dullness. No fluid thrill. No splashing. No hyperactive bowel sounds. No decreased bowel sounds. No absent bowel sounds.
 - Genitourinary:** No dysuria. No hematuria. No proteinuria. No edema.
 - Endocrine:** No polyuria. No polydipsia. No weight loss. No tremor. No sweating. No heat intolerance. No cold intolerance. No constipation. No diarrhea.
 - Musculoskeletal:** No joint pain. No swelling. No deformity. No weakness. No numbness. No tingling. No paralysis.
 - Skin:** No rash. No lesions. No bruising. No lacerations. No burns. No scars. No tattoos. No piercings. No jewelry.

Physical Exam:

- General:** Well
- Neurological:** No focal deficits. No abnormal reflexes. No abnormal gait.
- Cardiovascular:** No murmurs. No gallop. No edema.
- Respiratory:** No wheezes. No crackles. No stridor.
- Gastrointestinal:** No abdominal pain. No distension. No tenderness. No guarding. No rigidity. No rebound. No Murphy's sign. No McBurney's sign. No Rovsing's sign. No shifting dullness. No fluid thrill. No splashing. No hyperactive bowel sounds. No decreased bowel sounds. No absent bowel sounds.
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- Skin:** No rash. No lesions. No bruising. No lacerations. No burns. No scars. No tattoos. No piercings. No jewelry.

Diagnosis: Acute gastroenteritis

Management:

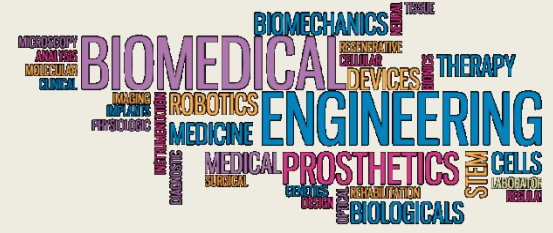
- Fluids:** Oral rehydration solution (ORS) 100 ml/kg over 4 hours.
- Antiemetics:** Ondansetron 4 mg IV.
- Antibiotics:** No antibiotics.
- Follow-up:** Return to clinic if symptoms worsen or if the patient is not eating or drinking after 24 hours.

Discussion:

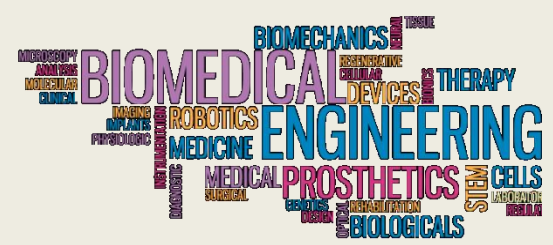
The patient is a 4-year-old female with a history of seizures and a recent episode of vomiting. The physical exam shows a normal abdomen with a red lightning bolt symbol indicating a seizure focus. The simulation is titled "Digestive" and shows the date "Thursday, 22 Jan 2009".



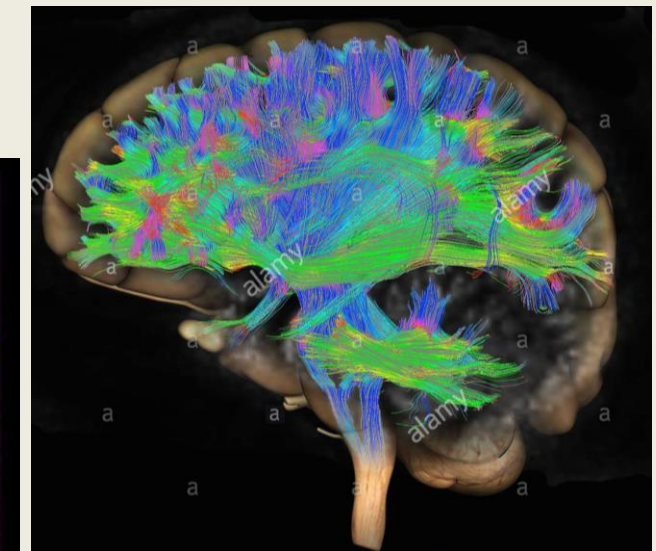
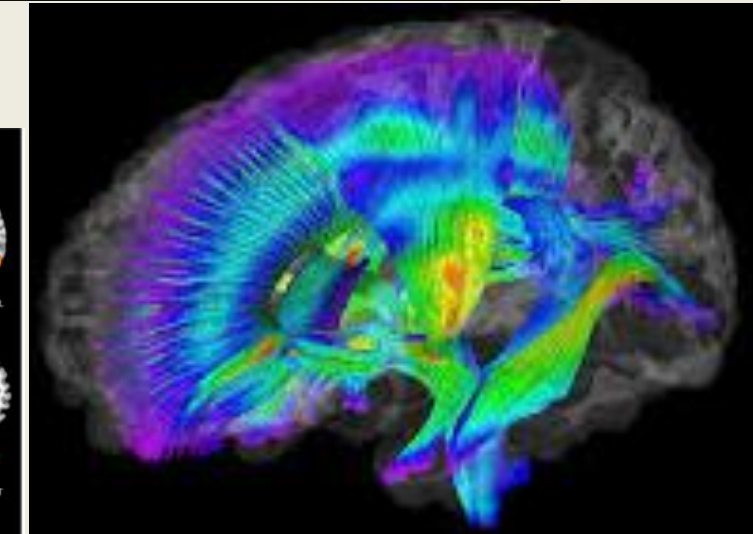
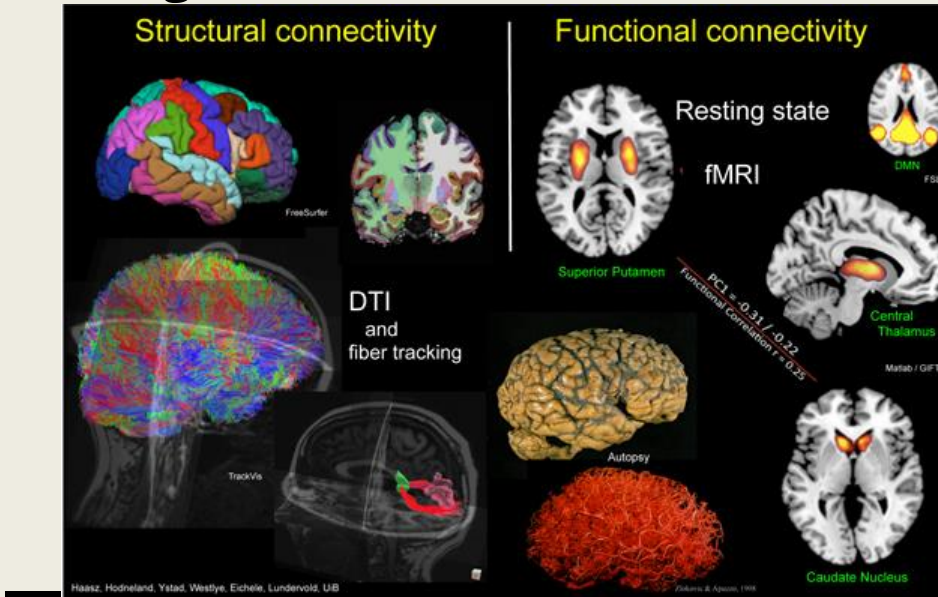
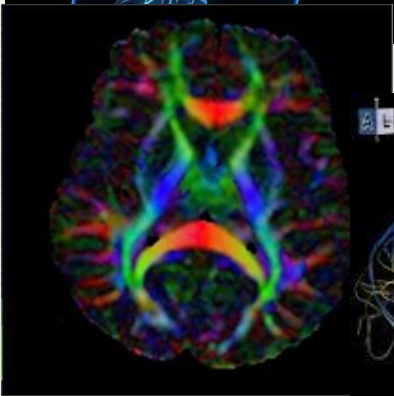
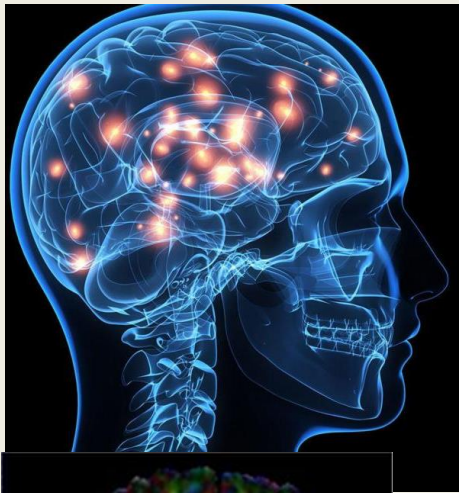
Clinical Engineering



Bio-Inspired Systems



- Systems Physiology (Neural Eng, Neuroscience, Computational modelling)





tamer.basha@eng1.cu.edu.eg

قسم هندسة طبية - الدور الثاني مبني عمارة

THANK YOU

Questions:

iyassine@eng1.cu.edu.eg

tamer.basha@eng1.cu.edu.eg

More on biomedical field:

<https://www.youtube.com/watch?v=T1Win0bdrHw>

<https://www.youtube.com/watch?v=3QP2-bzlull>

<https://www.youtube.com/watch?v=xlUfHBhnjB0>