

*Biomedical Engineering*  
*Workshop*

*The First*  
*Engineering*

**A Tweak to Have it  
On the Right Track**

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Blue Brain Project, EPFL

December 2012

**WHAT IS**

**BIOMEDICAL  
ENGINEERING**

# BIOMEDICAL ENGINEERING



**WHAT IS  
BIOMEDICAL  
ENGINEERING !**





انا سعيد انك  
سالت السؤال دة

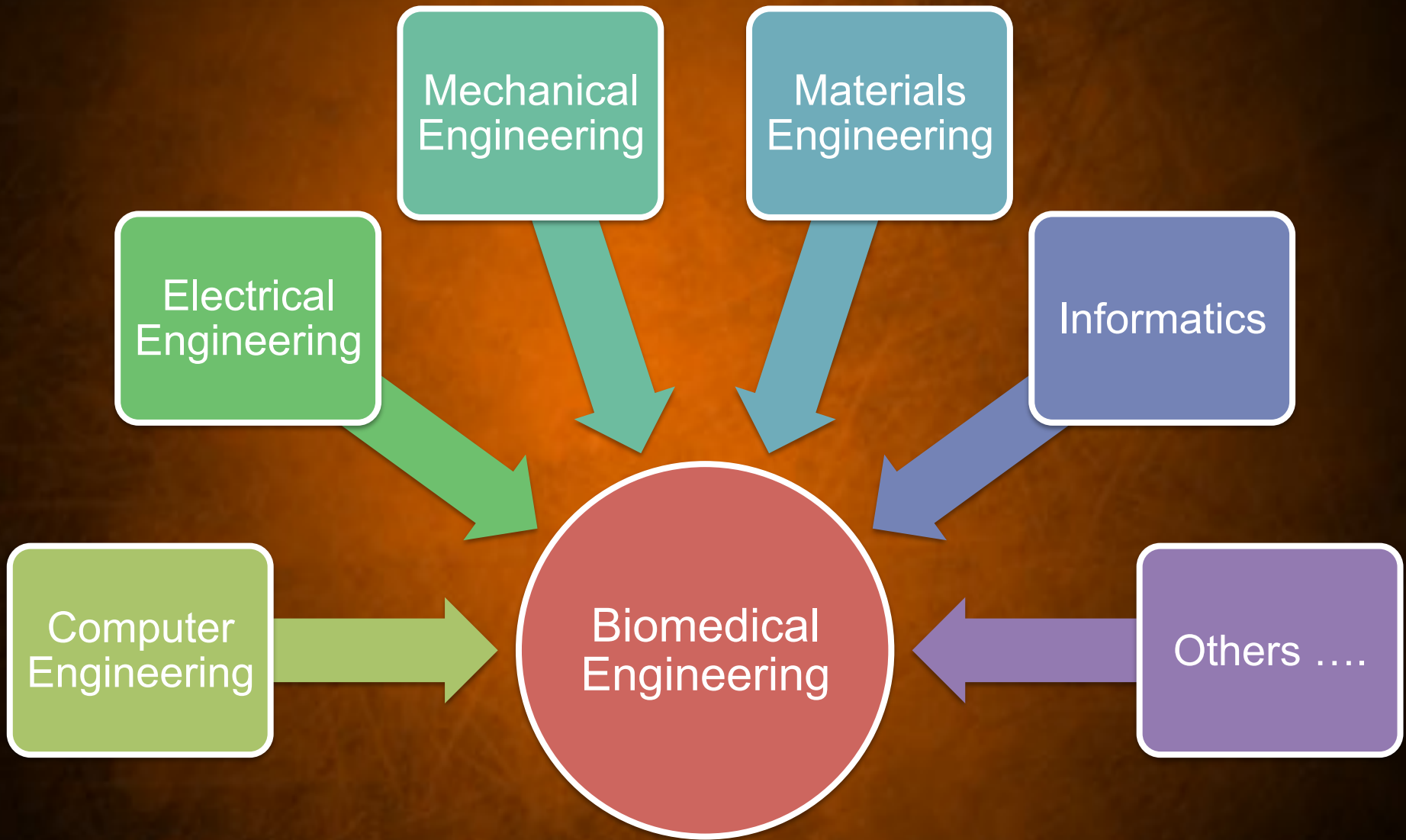


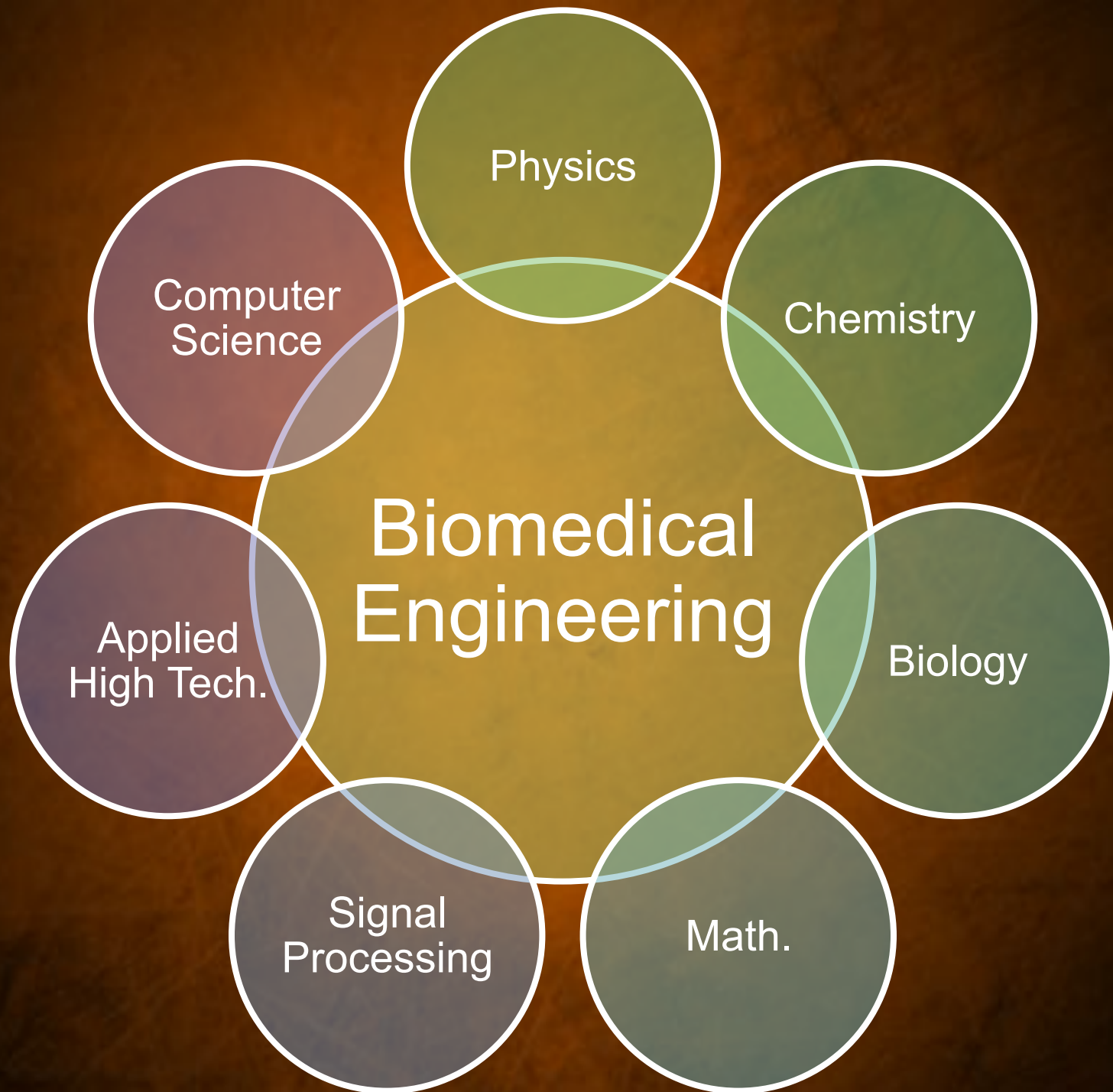
**LET ME THINK**

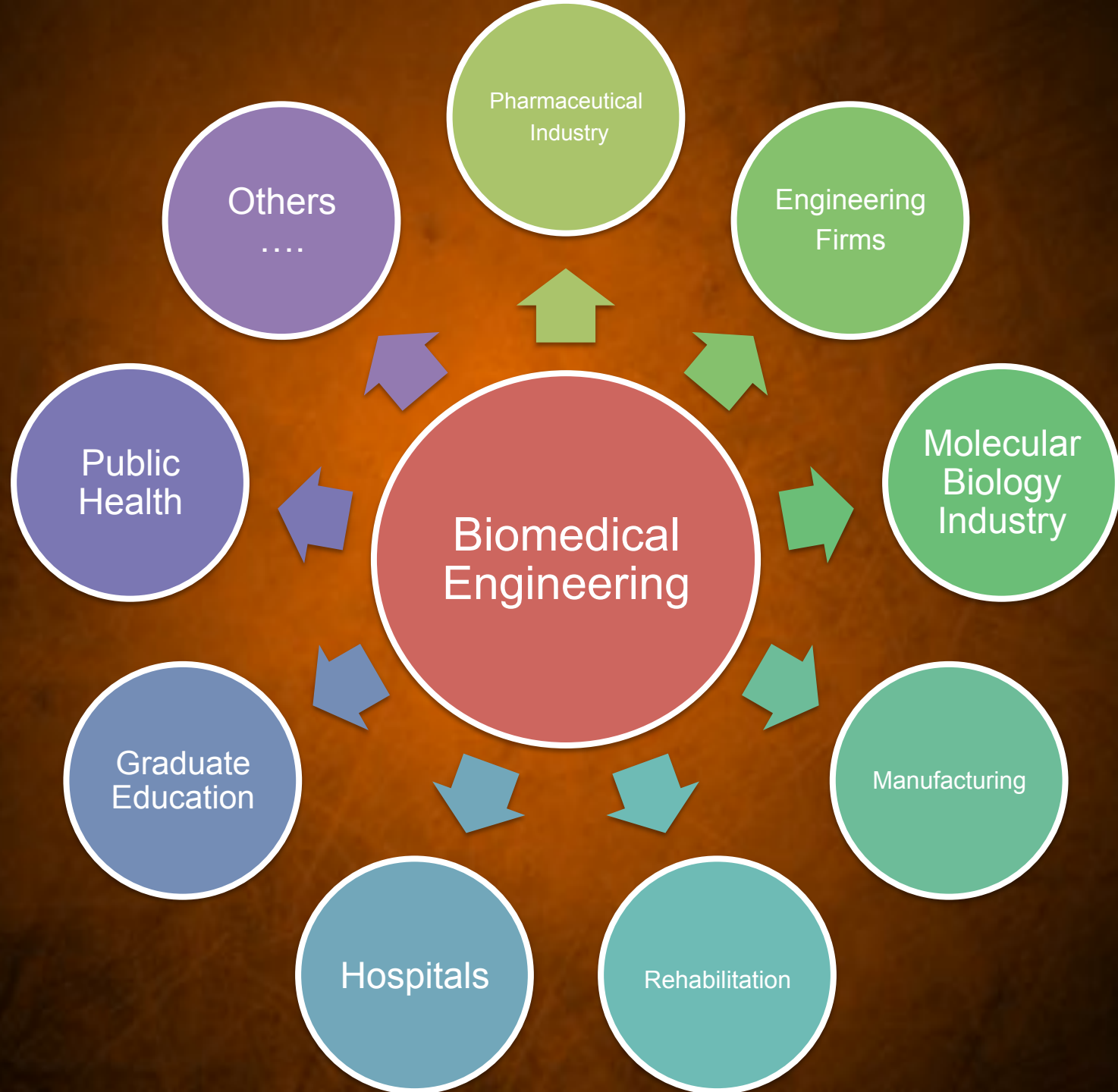


الحقيقة الواحد مش عارف يبدأ منين









**Waves & Fields**

**Statistics**

**Bio-Electronics**      **Signal Processing**

**Math**      **Physics**      **Histology**

**Chemistry**      **Electronics**      **Stochastic**

**Psychology**      **Processes**

**Clinical**      **Anatomy**

**Engineering**      **Biology**      **Physiology**

**Mechanics**      **Biochemistry**      **Computer**

**Mechanics**      **Architecture**

**Control Systems**      **Systems Engineering**

Waves & Fields

Statistics

Bio-Electronics

Math

Phy

Chemistry

Psychology

Clinical

Engineering

Mechanics

Biochemistry Computer

Mechanics Architecture

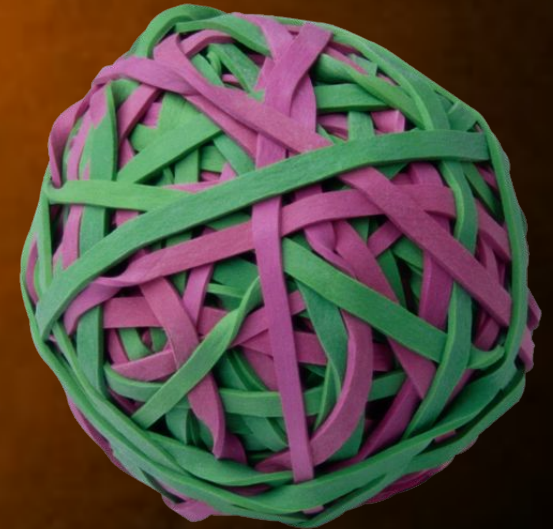
Control Systems

Systems Engineerin



**Biomedical Engineering**  
**is**  
**INTERDISCIPLINARY**  
**Field**

.....



# Objectives

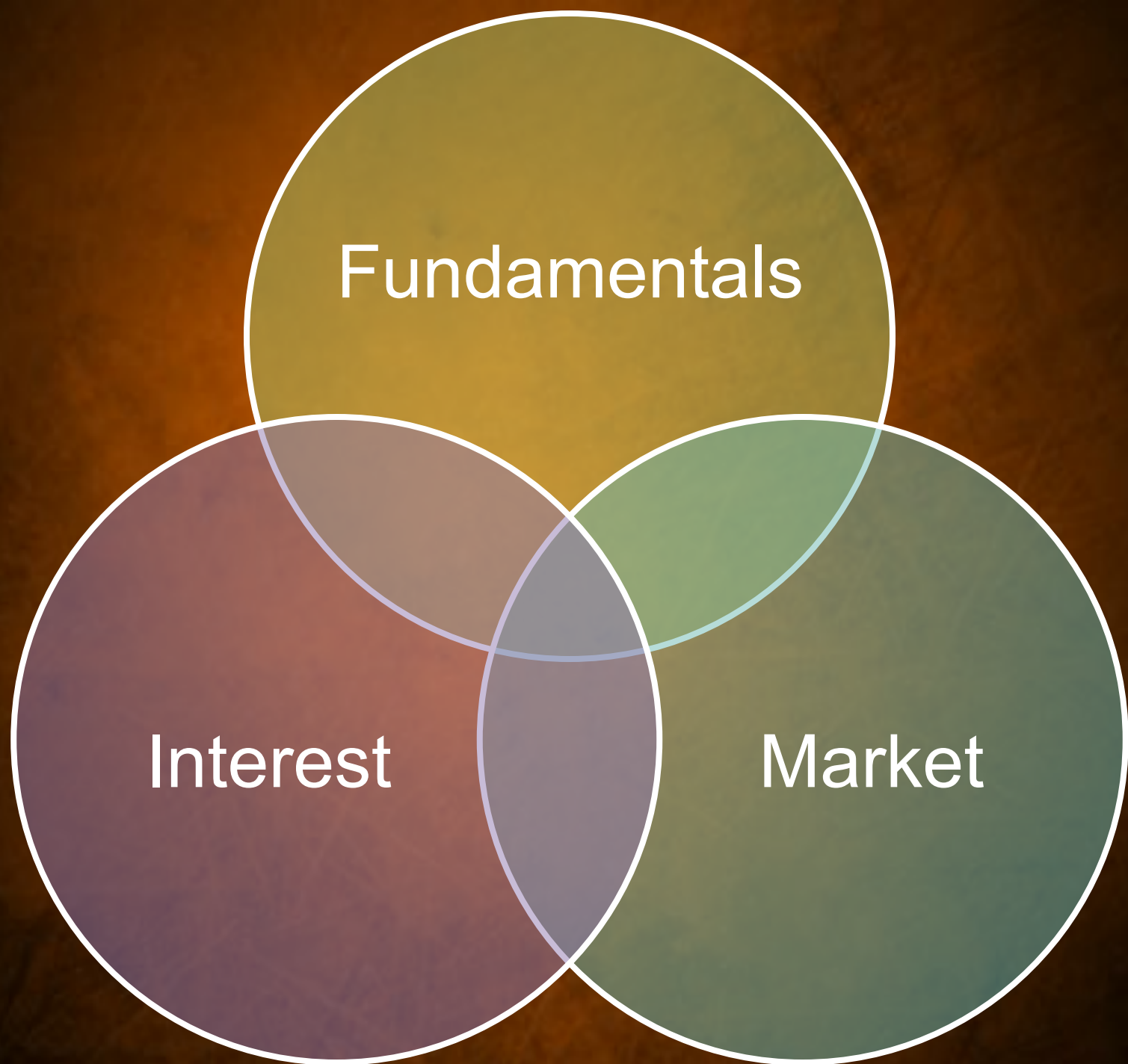
- Build an in-breadth layer
- Dig into an in-depth point
- Linking disciplines
- Sharing knowledge



Science

Tools

Effort



Fundamentals

Interest

Market

# Spark

- Scientific Groups (Linked In)
  - HPC Group
  - Signal Processing Group
  - Image Processing Group
  - Medical Visualization Group
  - Embedded Systems Group
  - Software Development Group
- Contributors (Profs./TA's/RA's/Students)

# Spark

- Seminars on a weekly basis for each group.
- Integrated Environments.
- Summer Projects/Internships.

# Workshop Program

- **Themes**
  - High Performance Computing
  - Medical Visualization
  - Hardware Design
  - Medical Portal Design
  - Software Engineering
  - Computer Vision
  - Presentation Skills Development
  - Scientific Writing

# DAY 1

## High Performance Computing

- **Introduction to HPC**
- **Parallel Programming**
  - Ideas
  - Tools: OpenMP, MPI
- **GPU Programming**
  - Introduction
  - Tools: CUDA, OpenCL
  - Challenges
- **Scientific Computing**

# DAY 2

## Medical Visualization

- **Volumetric Imaging & Medical Applications**
- **Visualization Pipelines**
- **Visualization Pipelines Optimization**
- **Volume Rendering Techniques & Development Tools**

# **DAY 3**

## **Software Engineering**

### **Web Design**

- **Programming Paradigms & Programming Languages**
- **Software Build Systems**
- **Version Control Systems**
- **Medical Portal Design**

# **DAY 4**

## **Hardware Design**

### **Computer Vision**

- **Introduction to Embedded Systems**
- **Micro-Controllers**
- **Embedded Systems Applications**
- **Introduction to Computer Vision**

# **DAY 5**

## **Technical Writing**

### **Presentation Skills Development**

- **Scientific Writing in Latex**
- **Presentation Skills Development**

# Workshop Updates

- **Updates and Materials will be uploaded to the portal**

**[BME-WS.YOLASITE.COM](http://BME-WS.YOLASITE.COM)**

- **Slides will be uploaded on a daily basis.**
- **The sessions will be recorded and uploaded to YouTube.**
- **Your feedback is highly appreciated.**

# Organizers

- **Dr. Yasser Kadah**
- **Dr. Ayman Eldeib**
- **Ahmed Hassan**
- **Ahmed Abdelhadi**
- **Yassen Amer**
- **Marwan Hassan**
- **Ahmed Hussein**
- **Ahmed Yousri**
- **Nada Yahia**
- **Mai Zaki**

# One Last Thing To Keep in Mind

