



1506  
UNIVERSITÀ  
DEGLI STUDI  
DI URBINO  
CARLO BO

# SMARTPHONE BASED POSTURAL STABILITY MONITORING SYSTEM FOR FALLS PREVENTION IN THE ELDERLY

**Speaker:**

**Mr. Gioele Bigini**

Ph.D. Student @ University of Urbino

**Supervisor:**

**Prof. Emanuele Lattanzi**

Associate Professor @ University of Urbino

# The Project

**“SMARTPHONE BASED POSTURAL STABILITY MONITORING SYSTEM  
FOR FALLS PREVENTION IN THE ELDERLY”**

## R&D Partners



UNIVERSITÀ  
POLITECNICA  
DELLE MARCHE



TECHNISCHE  
UNIVERSITÄT  
WIEN  
Vienna | Austria



# Agenda

## Present

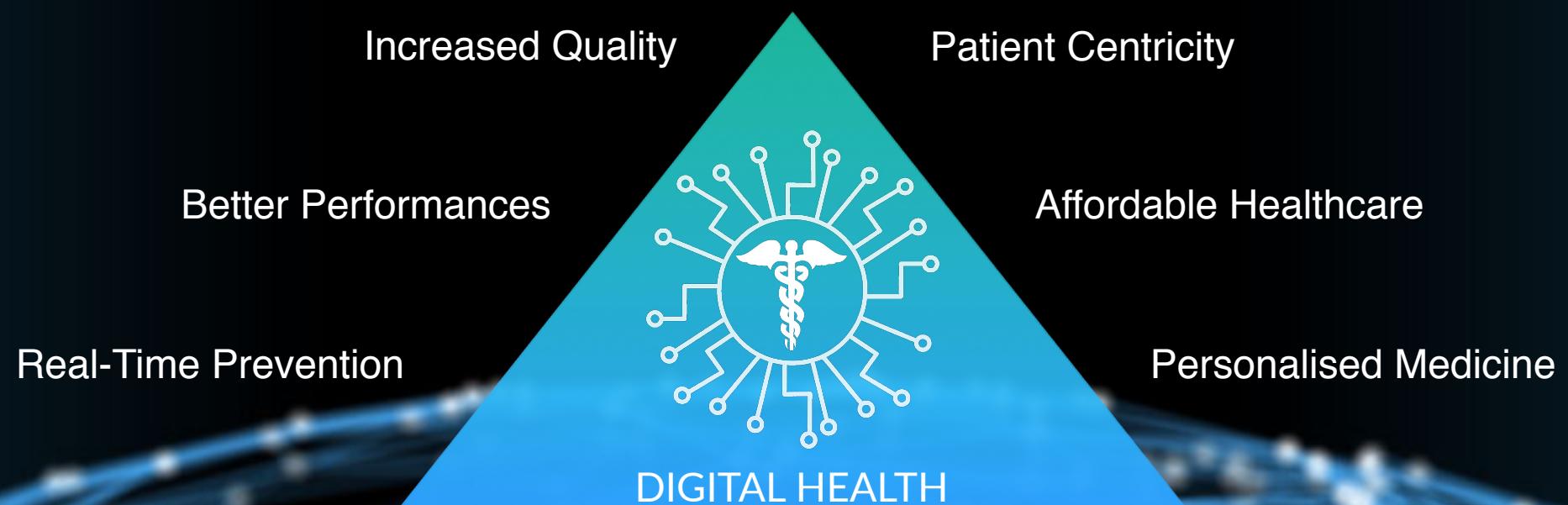
- **Introduction to Digital Health**
- **Research Investigations and Outcomes**
- **First Year Summary**

## Plans

- **Product Overview and Challenges**
- **State of the Research**
- **R&D Roadmap**

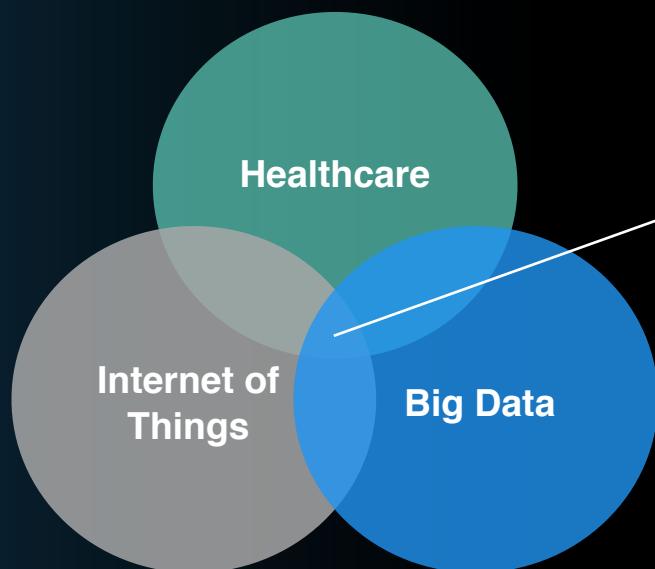
# Introduction to Digital Health

Digital Health is the **use of information and communications technologies to improve human health, healthcare services, and wellness for individuals and across populations.**



# Research Investigations

Investigating the Domain



## • **Internet of Medical Things**

### OPPORTUNITIES

- Personalised Medicine
- Self-Monitoring

### ISSUES

- Security & Privacy Regulations
- Data Management
- Data Ownership

# Research Investigations

Investigating Available Solutions

## Centralised Systems

- Central Authority
- Providers have the Power
- Providers Dependent
- **Mature**



## Distributed Systems

- Flexible Authority
- Decentralised Power
- Peers Dependent
- **Stable**



## Fully Decentralised Systems

- No Central Authority
- Peers have the Power
- Peers Dependent
- **Recent**



# Research Investigations

Forward a User Centric Data Management System Approach for Healthcare

*“Peers have the Power!!!”, Patty Smith, 1988*



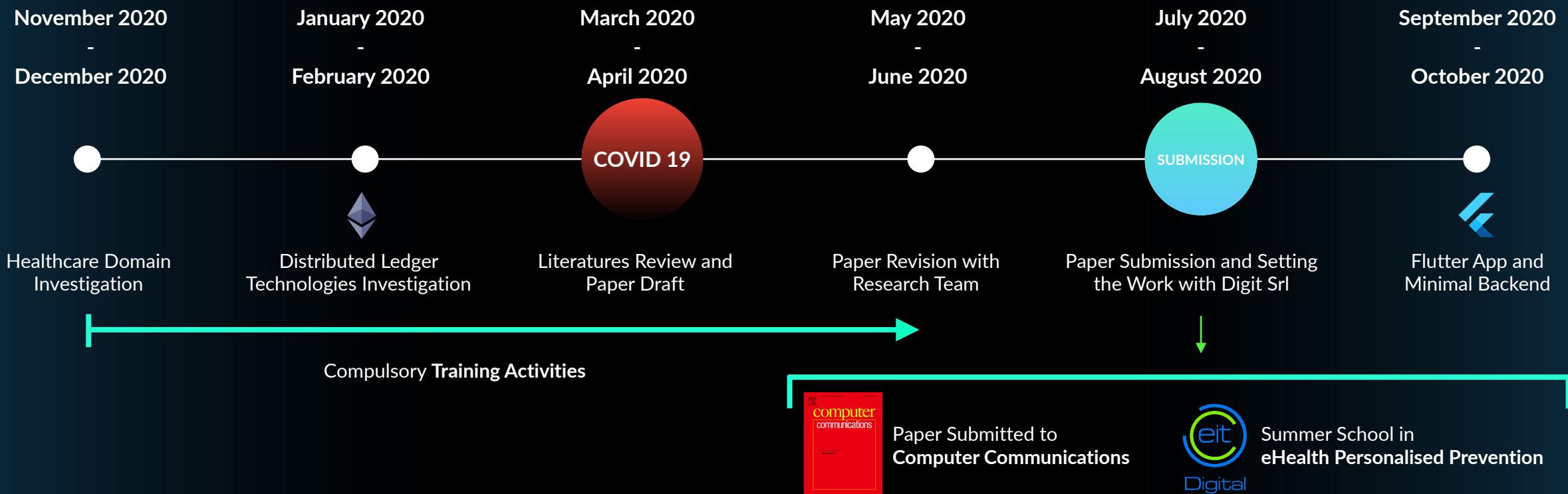
Sound easy? Well, It is not



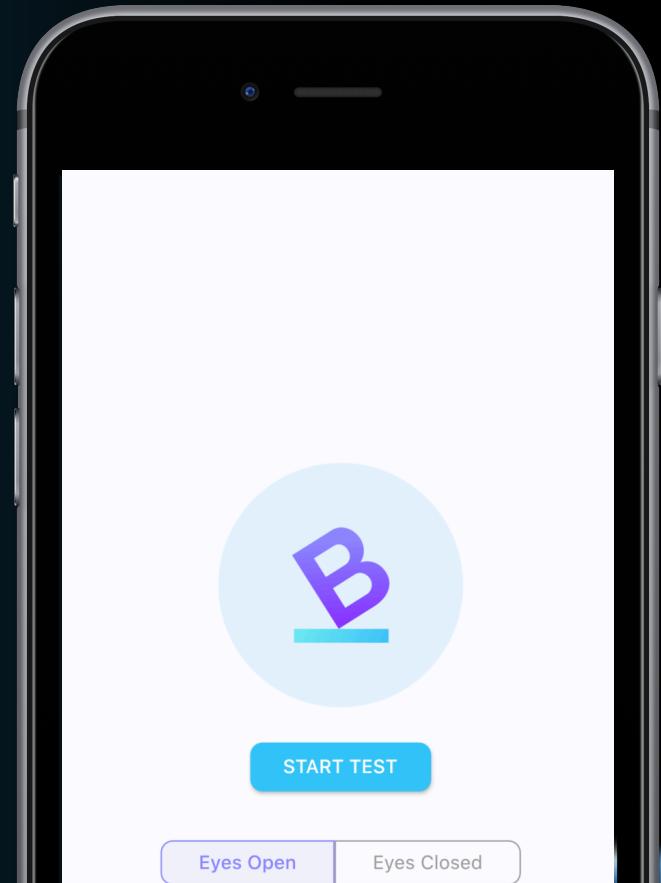
A Review on Blockchain for the Internet of Medical Things:  
Definitions, Challenges, Applications, and Vision

Authors: Bigini G., Freschi V., Lattanzi E.

# First Year Summary



# Product Overview and Challenges



## Balance

Fostering your healthy posture behaviours while enjoying life

- Real-Time Recommendations
- Progress Statistics
- Privacy Safe
- Personalised Intervention



**Fast.**

Download it from the App Stores



**Easy.**

One button to press



**On your smartphone.**

Always with you

# Product Overview and Challenges

## The Data Management Issue

	Free Data	Reducing Features	Leverage the National Healthcare System	Decentralised Solution
Pro/Cons	Easy	Less Features	Relentless	New
Data Ownership	Anyone	Anyone	Service Provider	Creator
Privacy Risk	No Privacy	Low	Low	Privacy Focused

# Product Overview and Challenges

## The Learning Issue

	Machine Learning	Federated Learning Google	Federated Learning + Blockchain
Privacy	At Risk	Safe	Safe
Authority	✓	✓	✗

# State of Research



**Report: Blockchain Activity at Top Universities  
Increased Since 2018**



**Stanford University**



Pi Coin

**ETH Zurich**



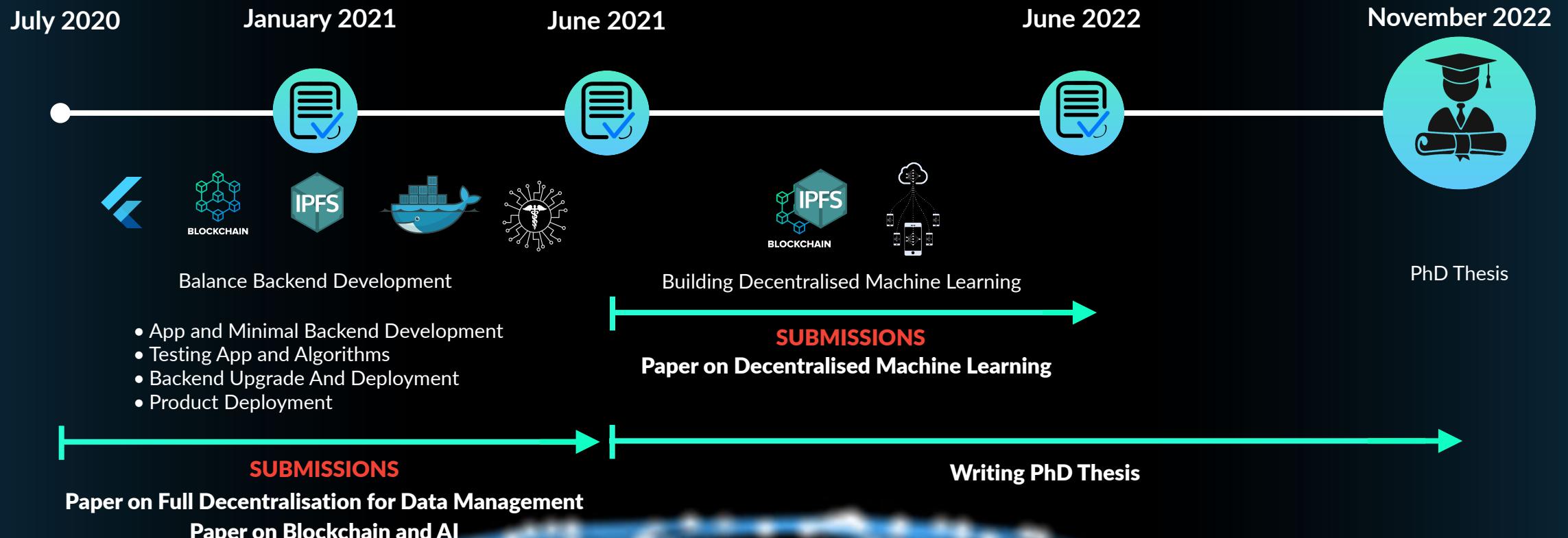
**MIT Cambridge**

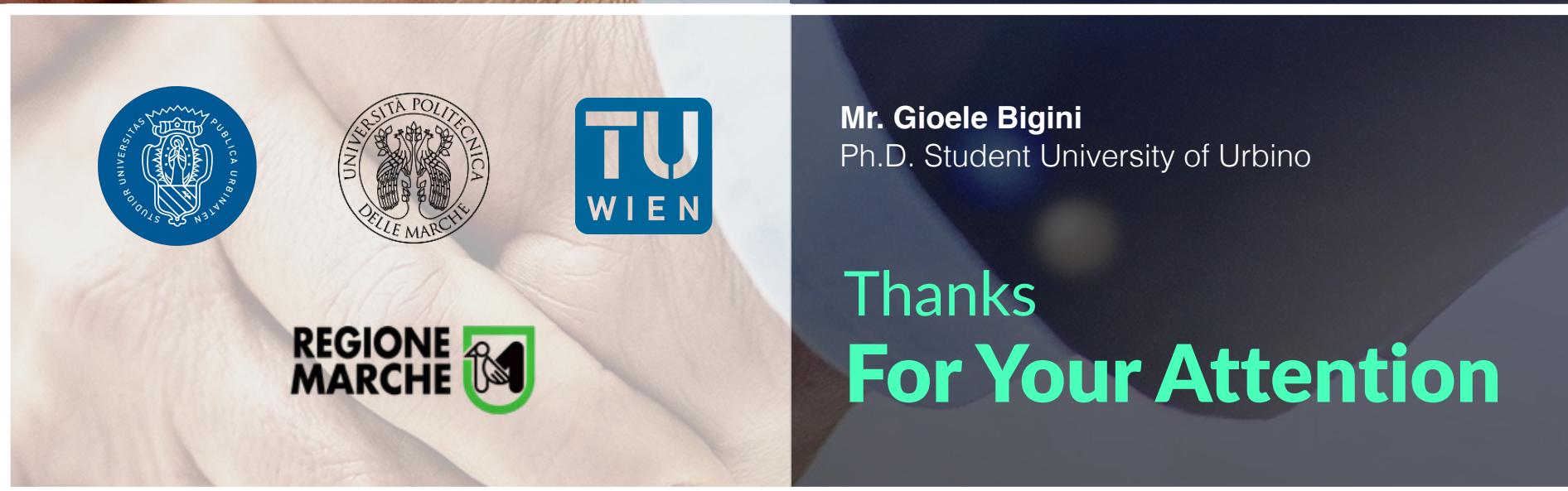


**TU Wien**



# R&D Roadmap





**Mr. Gioele Bigini**  
Ph.D. Student University of Urbino

Thanks  
**For Your Attention**