



# Postgraduate Diploma Biomedical Image Analysis and Big Data in E-Health

» Modality: online» Duration: 6 months

» Certificate: TECH Global University

» Credits: 18 ECTS

» Schedule: at your own pace

» Exams: online

Target Group: Graduates, Diploma graduates and University graduates who have previously completed any of the qualifications in the field of Social and Legal, Administrative and Business Sciences

Website: www.techtitute.com/us/school-of-business/postgraduate-diploma/biomedical-image-analysis-big-data-ehealth

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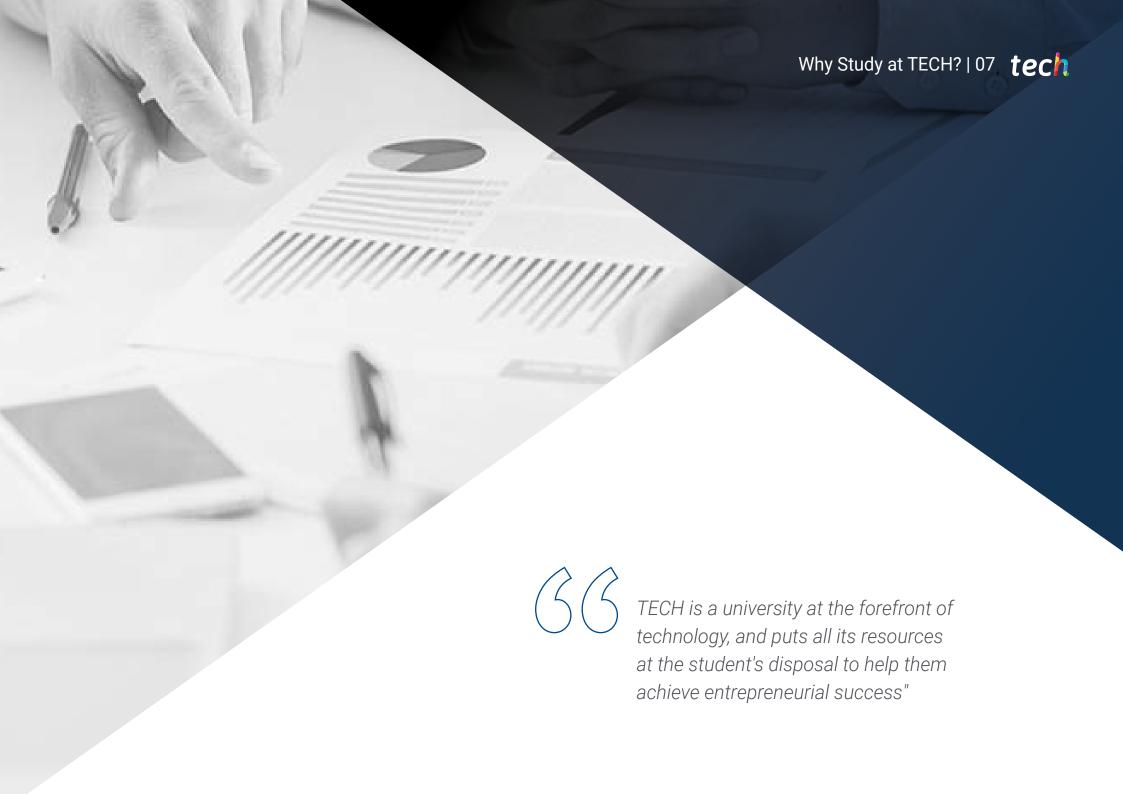
## 01 **Welcome**

The development of eHealth fostered by the evolution of technology and the growth of the Internet of Things (IoT) has made it possible to personalize health care through the use of the most innovative and effective strategies of the moment. An example of this is the application of *Big Data* in the Analysis of Biomedical Images, which has generated important business opportunities. Therefore, having a specialized degree in this field can be, for the graduate, a unique opportunity to expand their job possibilities. For this reason, TECH Global University has deemed it appropriate to develop this 100% online program, thanks to which you will be able to work on perfecting your professional skills, and invest your time in a highly training, versatile and multidisciplinary degree.









## tech 08 | Why Study at TECH?

#### At TECH Global University



#### **Innovation**

The university offers an online learning model that balances the latest educational technology with the most rigorous teaching methods. A unique method with the highest international recognition that will provide students with the keys to develop in a rapidly-evolving world, where innovation must be every entrepreneur's focus.

"Microsoft Europe Success Story", for integrating the innovative, interactive multi-video system.



#### The Highest Standards

Admissions criteria at TECH are not economic. Students don't need to make a large investment to study at this university. However, in order to obtain a qualification from TECH, the student's intelligence and ability will be tested to their limits. The institution's academic standards are exceptionally high...

95%

of TECH students successfully complete their studies



#### Networking

Professionals from countries all over the world attend TECH, allowing students to establish a large network of contacts that may prove useful to them in the future.

+100000

+200

executives prepared each year

different nationalities



#### **Empowerment**

Students will grow hand in hand with the best companies and highly regarded and influential professionals. TECH has developed strategic partnerships and a valuable network of contacts with major economic players in 7 continents.

+500

collaborative agreements with leading companies



#### **Talent**

This program is a unique initiative to allow students to showcase their talent in the business world. An opportunity that will allow them to voice their concerns and share their business vision.

After completing this program, TECH helps students show the world their talent.



#### **Multicultural Context**

While studying at TECH, students will enjoy a unique experience. Study in a multicultural context. In a program with a global vision, through which students can learn about the operating methods in different parts of the world, and gather the latest information that best adapts to their business idea.

TECH students represent more than 200 different nationalities.





#### Learn with the best

In the classroom, TECH's teaching staff discuss how they have achieved success in their companies, working in a real, lively, and dynamic context. Teachers who are fully committed to offering a quality specialization that will allow students to advance in their career and stand out in the business world.

Teachers representing 20 different nationalities.



At TECH, you will have access to the most rigorous and up-to-date case analyses in academia"

### Why Study at TECH? | 09 tech

TECH strives for excellence and, to this end, boasts a series of characteristics that make this university unique:



#### **Analysis**

TECH explores the student's critical side, their ability to question things, their problem-solving skills, as well as their interpersonal skills.



#### **Academic Excellence**

TECH offers students the best online learning methodology. The university combines the *Relearning* methodology (the most internationally recognized postgraduate learning methodology) with Harvard Business School case studies. A complex balance of traditional and state-of-the-art methods, within the most demanding academic framework.



#### **Economy of Scale**

TECH is the world's largest online university. It currently boasts a portfolio of more than 10,000 university postgraduate programs. And in today's new economy, **volume + technology = a ground-breaking price**. This way, TECH ensures that studying is not as expensive for students as it would be at another university.





## tech 12 | Why Our Program?

This program will provide you with a multitude of professional and personal advantages, among which we highlight the following:



#### A Strong Boost to Your Career

By studying at TECH, students will be able to take control of their future and develop their full potential. By completing this program, students will acquire the skills required to make a positive change in their career in a short period of time.

70% of students achieve positive career development in less than 2 years.



## Develop a strategic and global vision of the company

TECH offers an in-depth overview of general management to understand how each decision affects each of the company's different functional fields.

Our global vision of companies will improve your strategic vision.



#### Consolidate the student's senior management skills

Studying at TECH means opening the doors to a wide range of professional opportunities for students to position themselves as senior executives, with a broad vision of the international environment.

You will work on more than 100 real senior management cases.



#### You will take on new responsibilities

The program will cover the latest trends, advances and strategies, so that students can carry out their professional work in a changing environment.

45% of graduates are promoted internally.



#### Access to a powerful network of contacts

TECH connects its students to maximize opportunities. Students with the same concerns and desire to grow. Therefore, partnerships, customers or suppliers can be shared.

You will find a network of contacts that will be instrumental for professional development.



#### Thoroughly develop business projects

Students will acquire a deep strategic vision that will help them develop their own project, taking into account the different fields in companies.

20% of our students develop their own business idea.



#### Improve soft skills and management skills

TECH helps students apply and develop the knowledge they have acquired, while improving their interpersonal skills in order to become leaders who make a difference.

Improve your communication and leadership skills and enhance your career.



#### You will be part of an exclusive community

Students will be part of a community of elite executives, large companies, renowned institutions, and qualified teachers from the most prestigious universities in the world: the TECH Global University community.

We give you the opportunity to study with a team of world-renowned teachers.





## tech 16 | Objectives

TECH makes the goals of their students their own goals too. Working together to achieve them.

The Postgraduate Diploma in Biomedical Image Analysis and Big Data in E-Health will enable the student to:



Examine the fundamentals of medical imaging technologies



Delve into tomography, computed and emission tomography, clinical applications and physical fundamentals



Develop expertise in radiology, clinical applications and physical fundamentals



03

Analyze ultrasound, clinical applications and physical fundamentals



Determine how to manage magnetic resonance imaging, clinical applications and physical fundamentals



Generate advanced knowledge of nuclear medicine, differences between PET and SPECT, clinical applications and physical fundamentals



Present image segmentation technologies and explain their usefulness



09

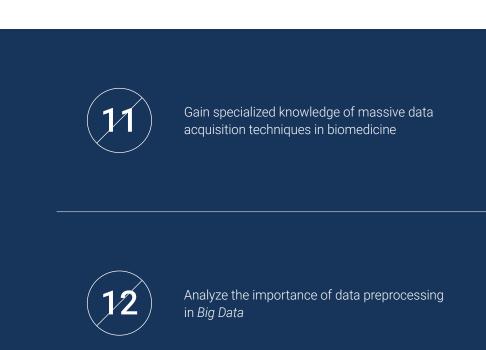
Gain a deeper understanding of the direct relationship between surgical interventions and imaging techniques



Discriminate noise in the image, reasons for it and image processing techniques to reduce it



Establish the possibilities offered by artificial intelligence in recognizing patterns in medical images, and thus deepen innovation in the field





Provide ways of interpreting results from massive

data analysis

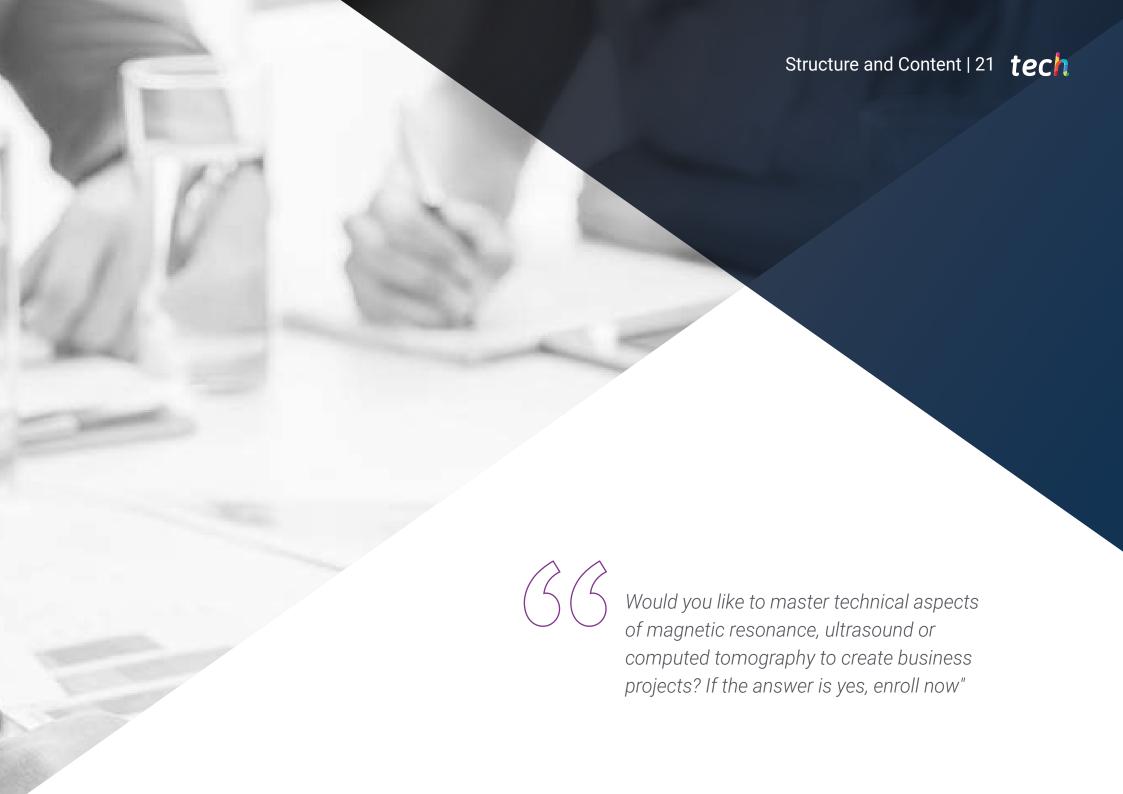
Determine the differences between the data derived from different massive data collection techniques, as well as their special characteristics in terms of pre-processing and handling



Examine the applications and future trends in the field of *Big Data* in biomedical research and public health







### tech 22 | Structure and Content

#### **Syllabus**

The Postgraduate Diploma in Biomedical Image Analysis and Big Data in E-Health offered by TECH Global University is an intensive and multidisciplinary program that will prepare the graduate to face the labor market and the most ambitious and complex projects in as bioinformatics and the telemedicine sector, with the guarantee of having the most up-to-date and complete knowledge.

The content of the program is designed to broaden the student's professional skills, through the mastery of the tools that are currently being used, both for research in the health sciences and for data management.

This is a program in which you will have 450 hours of the best theoretical, practical and additional material, with which you will be able to delve into the applications of this area and adapt your profile to the labor demand that currently exists in the professional sector.

This Postgraduate Diploma takes place over 6 months and is divided into 3 modules:

Techniques, Recognition and Intervention using Biomedical Module 1. Imaging Module 2. Big Data in Medicine: Massive Medical Data Processing Applications of Artificial Intelligence and the Internet of Things Module 3.

(IoT) in Telemedicine



#### Where, When and How is it Taught?

TECH offers the possibility of developing this Postgraduate Diploma in Biomedical Image Analysis and Big Data in E-Health completely online. Over the course of 6 months, you will be able to access all the contents of this program at any time, allowing you to self-manage your study time.

A unique educational experience, key and decisive to boost your professional development and make the definitive leap.

## tech 24 | Structure and Content

Module 1. Techniques, Recognition and Intervention using Biomedical Imaging									
<b>1.1.</b> 1.1.1. 1.1.2. 1.1.3.	Medical Imaging Modalities in Medical Imaging Objectives in Medical Imaging Systems Medical Imaging Storage Systems	<ul><li>1.2. Radiology</li><li>1.2.1. Imaging Method</li><li>1.2.2. Radiology Interpreta</li><li>1.2.3. Clinical Applications</li></ul>		Computed Tomography (CT)  Principle of Operation Image Generation and Acquisition Computerized Tomography. Typology Clinical Applications	Principle of Operation     Image Generation and Acquisition				
1.5.1 1.5.2 1.5.3 1.5.4	Typology	<ul> <li>1.6. Nuclear medicir</li> <li>1.6.1. Physiological Basis Radiopharmaceutics</li> <li>1.6.2. Image Generation at Types of Tests</li> <li>1.6.3.1. Gammagrap</li> <li>1.6.3.2. SPECT</li> <li>1.6.3.3. PET</li> <li>1.6.3.4. Clinical Appl</li> </ul>	in Nuclear Studies. 1.7.1. als and Nuclear Medicine 1.7.2. nd Acquisition 1.7.3. 1.7.4.	Image-Guided Interventions1.8Interventional Radiology1.8.Interventional Radiology Objectives1.8.Procedures1.8.Advantages and Disadvantages.1.8.1.8.1.8.	I. Technique 2. Contrast 3. Resolution 4. Noise				
<b>1.9.</b> 1.9.1. 1.9.2.	Medical Imaging Tests. Biomedicine Creating 3D Images Biomodels 1.9.2.1. DICOM Standard 1.9.2.2. Clinical Applications	1.10. Radiological Pro 1.10.1. European Legislation to Radiology Service 1.10.2. Safety and Action Pr 1.10.3. Radiological Waste 1.10.4. Radiological Protect 1.10.5. Care and Characteri	n Applicable es rotocols Management tion						

<ul> <li>2.1. Big Data in Biomedical Research</li> <li>2.1.1. Data Generation in Biomedicine</li> <li>2.1.2. High-Throughput Technology</li> <li>2.1.3. Uses of High-Throughput Data. Hypotheses in the Age of Big Data</li> </ul>	<ul> <li>2.2. Data Pre-Processing in Big Data</li> <li>2.2.1. Data Pre-Processing</li> <li>2.2.2. Methods and Approaches</li> <li>2.2.3. Problems with Data Pre-Processing in Big Data</li> </ul>	<ul><li>2.3. Structural Genomics</li><li>2.3.1. Sequencing the Human Genome</li><li>2.3.2. Sequencing vs. Chips</li><li>2.3.3. Variant Discovery</li></ul>	<ul><li>2.4. Functional Genomics</li><li>2.4.1. Functional Notation</li><li>2.4.2. Mutation Risk Predictors</li><li>2.4.3. Association Studies in Genomics</li></ul>
2.5. Transcriptomics 2.5.1. Techniques to Obtain Massive Data in Transcriptomics: RNA-seq 2.5.2. Data Normalization in Transcriptomics 2.5.3. Differential Expression Studies	<ul> <li>2.6. Interactomics and Epigenomics</li> <li>2.6.1. The Role of Cromatine in Gene Expression</li> <li>2.6.2. High-Throughput Studies in Interactomics</li> <li>2.6.3. High-Throughput Studies in Epigenetics</li> </ul>	<ul><li>2.7. Proteomics</li><li>2.7.1. Analysis of Mass Spectrometry Data</li><li>2.7.2. Post-Translational Modifications Study</li><li>2.7.3. Quantitative Proteomics</li></ul>	<ul> <li>2.8. Enrichment and Clustering Techniques</li> <li>2.8.1. Contextualizing Results</li> <li>2.8.2. Clustering Algorithms in Omics Techniques</li> <li>2.8.3. Repositories for Enrichment: Gene Ontology and KEGG</li> </ul>
2.9. Applying <i>Big Data</i> to Public Health 2.9.1. Discovery of New Biomarkers and Therapeutic Targets 2.9.2. Risk Predictors 2.9.3. Personalized Medicine	<ul> <li>2.10. Big Data Applied to Medicine</li> <li>2.10.1. Potential for Diagnostic and Preventive Assistance</li> <li>2.10.2. Use of Machine Learning Algorithms in Public Health</li> <li>2.10.3. The Problem of Privacy</li> </ul>		

### tech 26 | Structure and Content

Module 3. Applications of Artificial Intelligence and the Internet of Things (IoT) in Telemedicine										
3.1.1 3.1.2 3.1.3	. Resources for E-Health Platforms	Artificial Intelligence in Healthcare I: New Solutions in Computer  Applications  Remote Analysis of Results Chatbox Prevention and Real-Time Monitoring Preventive and Personalized Medicine in Oncology  Artificial Intelligence in Healthcare II: Monitoring and Ethical Challenges  3.3. Artificial Intelligence in Healthcare II: Monitoring and Ethical Challenges  3.4. Artificial Intelligence of Image Process for Image Process 4.3.1. Artificial Intelligence Al for Image Handling 3.3.2. Cardiac Monitoring, Diabetes, Asthma 3.3.3.1. Health and Wellness Apps 3.3.3.1. Heart Rate Monitors 3.3.3.2. Blood Pressure Bracelets 3.4.2. Image Diagnosis and Nonitoring and Ethical Use of Al in the Medical Field. Data Protection  3.4.2. Limitations and Challer Processing in Telemed	cing gorithms  Monitoring gnosis nges in Image							
3.5.1 3.5.2 3.5.3	Graphics Processing Units (GPU) in Medicine  Program Parallelization  GPU Operations	Natural Language Processing (NLP) in Telemedicine  Text Processing in the Medical Field. Methodology Natural Language Processing in Therapy and Medical Records Addical Records Limitations and Challenges in Natural Language Processing in Telemedicine  3.7.1. The Internet of Things (IoT) and Care  3.7.1. Monitoring Vital Signs. Wearables 3.7.1. Blood Pressure, Temperature, and Heart Rate 3.8.1. The IT Applications for 3.8.2. The Internet of Things in 3.8.3. Artificial Intelligence Su Recognition and Rescut 3.7.2. The IT and Cloud Technology 3.7.2.1. Data Transmission to the Cloud Language Processing in Telemedicine 3.7.3. Self-Service Terminals	Emergency Detection Patient Rehabilitation pport in Victim							
<b>3.9.</b> 3.9.1 3.9.2	3,	Artificial Intelligence in COVID-19 Control Covid- 19 and Telemedicine Management and Communication of Breakthroughs and Outbreaks Outbreak Prediction in Artificial Intelligence								



In the virtual classroom you will find research articles, complementary readings, detailed videos and dynamic summaries to delve into each section of the agenda"





This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.** 

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.



## tech 30 | Methodology

## TECH Business School uses the Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.





This program prepares you to face business challenges in uncertain environments and achieve business success.



Our program prepares you to face new challenges in uncertain environments and achieve success in your career.

#### A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch to present executives with challenges and business decisions at the highest level, whether at the national or international level. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and business reality is taken into account.



You will learn, through collaborative activities and real cases, how to solve complex situations in real business environments"

The case method has been the most widely used learning system among the world's leading business schools for as long as they have existed. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question we face in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They must integrate all their knowledge, research, argue and defend their ideas and decisions.

## tech 32 | Methodology

#### Relearning Methodology

TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

Our online system will allow you to organize your time and learning pace, adapting it to your schedule. You will be able to access the contents from any device with an internet connection.

At TECH you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our online business school is the only one in the world licensed to incorporate this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



### Methodology | 33 tech

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically. With this methodology we have trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, markets, and financial instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.

This program offers the best educational material, prepared with professionals in mind:



#### **Study Material**

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



#### Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



#### **Management Skills Exercises**

They will carry out activities to develop specific executive competencies in each thematic area. Practices and dynamics to acquire and develop the skills and abilities that a high-level manager needs to develop in the context of the globalization we live in.



#### **Additional Reading**

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best senior management specialists in the world.



#### **Interactive Summaries**

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.



This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

#### **Testing & Retesting**

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.





30%

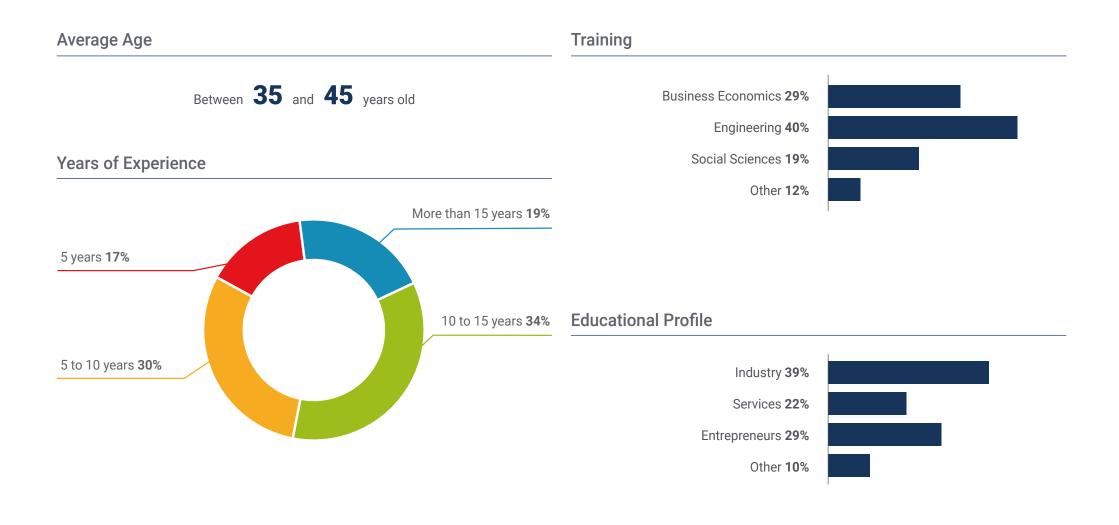


The diversity of participants with different academic profiles and from multiple nationalities makes up the multidisciplinary approach of this program.

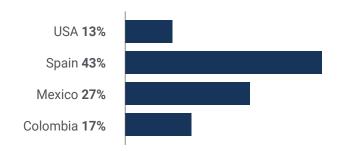
The Postgraduate Diploma can also be taken by professionals who, being university graduates in any field, have two years of work experience in the field of telemedicine.

economics.





## **Geographical Distribution**





## Rocío García

Head of the IT area of a company International Telemedicine in France

"After a long search, I ended up deciding on this Postgraduate Diploma because it was the most complete option I found. And I was not disappointed. I was able to work intensively and from home, perfecting my professional skills, delving into the multiple business opportunities of biomedical images and the application of Big Data in data processing related to the health area. Thanks to this, I was able to demonstrate my true potential and get the position I had been looking for for months"





## tech 42 | Course Management

### Management



## Ms. Sirera Pérez, Ángela

- Biomedical Engineer expert in Nuclear Medicine and exoskeleton design
- Designer of specific parts for 3D printing at Technadi
- Technician in the Nuclear Medicine area of the University Clinic of Navarra
- Degree in Biomedical Engineering from the University of Navarra
- MBA and Leadership in Healthcare and Medical Technology Companies

#### **Professors**

#### Ms. Muñoz Gutiérrez, Rebeca

- Data Scientist at INDITEX
- Firmware Engineer for Clue Technologies
- Graduate in Health Engineering, specializing in Biomedical Engineering, University of Malaga and University of Seville
- Master's Degree in Intelligent Avionics, Clue Technologies, in collaboration with the University of Málaga
- NVIDIA: Fundamentals of Accelerated Computing with CUDA C/C++
- NVIDIA: Accelerating CUDA C++ Applications with Multiple GPUs







The perfect program that will increase your chances of internal promotion, as well as the guarantee of success of any project you want to undertake related to Telemedicine and Big Data.

# Are you ready to take the leap? Excellent professional development awaits you.

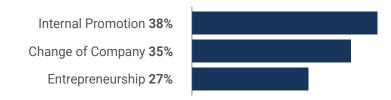
The Postgraduate Diploma in Biomedical Image Analysis and Big Data in E-Health TECH is an intensive program that prepares the student to face challenges and business decisions in the field of Bioinformatics in Medicine. The main objective is to promote the student's personal and professional growth. Helping them achieve success Those who wish to improve themselves, achieve a positive change at a professional level and interact with the best will find their place in this program.

Being able to access more prestigious job positions will increase your chances of getting a significant salary increase.

#### **Time of Change**



#### Type of Change



## Salary Increase

The completion of this program represents a salary increase of more than **28%** for our students.

Salary before

\$55,500

A salary increase of

28%

Salary after

\$71,000





## tech 50 | Benefits for Your Company

Developing and retaining talent in companies is the best long-term investment.



#### Growth of talent and intellectual capital

The professional will introduce the company to new concepts, strategies, and perspectives that can bring about significant changes in the organization.



# Retaining high-potential executives to avoid talent drain

This program strengthens the link between the company and the professional and opens new avenues for professional growth within the company.



## **Building agents of change**

You will be able to make decisions in times of uncertainty and crisis, helping the organization overcome obstacles.



## Increased international expansion possibilities

Thanks to this program, the company will come into contact with the main markets in the world economy.





## **Project Development**

The professional can work on a real project or develop new projects in the field of R & D or business development of your company.



## Increased competitiveness

This program will equip students with the skills to take on new challenges and drive the organization forward.







## tech 54 | Certificate

This program will allow you to obtain your **Postgraduate Diploma in Biomedical Image Analysis and Big Data in E-Health** endorsed by **TECH Global University**, the world's largest online university.

**TECH Global University** is an official European University publicly recognized by the Government of Andorra (*official bulletin*). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: Postgraduate Diploma in Biomedical Image Analysis and Big Data in E-Health

Modality: online

Duration: 6 months

Accreditation: 18 ECTS



## Postgraduate Diploma in Biomedical Image Analysis and Big Data in E-Health

This is a program of 450 hours of duration equivalent to 18 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024



<sup>\*</sup>Apostille Convention. In the event that the student wishes to have their paper Diploma issued with an apostille, TECH Global University will make the necessary arrangements to obtain it, at an additional cost.



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» Certificate: **TECH Global University** 

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» Exams: online

