

# CURRICULUM VITAE

Assoc. Prof. Dr. Mohamed SOLTANE (Ph.D & HDR)

Married with Four Kids



## I. Office Address:

**Dr. Mohamed SOLTANE (Associate Professor A), Ph.D & HDR**  
RESEARCH PROFESSOR (Research Fellow) in SIGNAL PROCESSING @ FT.YFUM-MESRS  
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Tel: +213-541 255456 & +213-697 127984

## II. Education:

**1995 ENGINEER OF STATE IN ELECTRONICS (CONTROL SYSTEM),  
BADJI MOKHTAR UNIVERSITY OF ANNABA**

**2005 MSc. ELECTRICAL & ELCTRONICS ENGINEERING, UKM -  
MALAYSIA**

**2010 Ph.D ELCTRONICS AND COMPUTER ENGINEERING, BADJI  
MOKHTAR UNIVERSITY OF ANNABA**

**2020 HDR SIGNAL PROCESSING, HCI & QUANTUM COMPUTING @  
YFU MEDEA - MESRS**

## III. Employment History:

1995/1996 Lecturer in High Institute of Computer Science  
1997/1998 Engineer of Programming and Methods in Petroleum  
Company, BRC at Hassi Berkine Site, ALGERIA  
1999/2000 Research Assistant in AUTOMATICS U-MALAYA, MALAYSIA  
2000/2001 Lecturer in L&G Twintech Institute of Technology, MALAYSIA  
2001/2003 System Integration Specialist at R&D in Manufacturing  
Building Automation and Security Access Control System  
Company, Kuala Lumpur – MALAYSIA  
2003/2005 Full Time MSc. In Electrical & Electronics Engineering at  
UKM - MALAYSIA  
2006/2007 Lecturer in University of SKIKDA (Part Time Work)  
2006/2010 Full Time PhD. Researcher in Electronics & Computer  
Engineering, BADJI MOKHTAR UNIVERSITY OF ANNABA  
2010- NOW Full Time Lecturer in the Electrical Engineering and Computing  
Department, Faculty of Science and Technology, YFUM -  
ALGERIA

#### **IV. Previous Teaching Experience:**

##### **1995/1996 AT HIGH INSTITUTE OF COMPUTER SCIENCE**

###### **A. Bachelor Computing Program:**

1. NUMERICAL METHODES lectures with laboratory
2. C PROGRAMMING and OPERATING SYSTEMS

##### **2000 & 2001 AT L&G TWINTECH INSTITUTE OF TECHNOLOGY – KUALA LUMPUR, MALAYSIA (DEMONFORT UNIVERSITY DMU PROGRAMS)**

###### **B. Bachelor Electronics Engineering:**

3. MICROELECTRONICS lectures & laboratory (Implementation on PAL, GAL & CPLD using PALASM Tools), (I was a responsible of the MICRO-ELECTRONICS LAB)
4. MICRO-COMPUTER SYSTEMS lectures, tutorials and Laboratory (8086 & Its Peripherals and C Programming),
5. FUNDAMENTALS ELECTRONICS,

##### **2005/2006 AT SKIKDA UNIVERSITY (PART TIME WORKS)**

###### **C. 5<sup>th</sup> YEAR Bachelor Industrial Computing:**

6. ELEMENTS OF PRODACTICS,
7. TECHNICAL ENGLISH,

#### **V. Current Teaching Experience AT YF-UNIVERSITY OF MEDEA:**

##### **2011 - 2017**

###### **A. Master Telecommunications Systems Program:**

1. RF & MICRO-WAVE (MW) lectures, tutorials and laboratory,

##### **2012 - 2016**

###### **B. Master Intelligent and Communicates Systems Program:**

2. INTELLIGENT SYSTEM ARCHITECTURE (ISA) lectures and tutorials,
3. CRYPTOGRAPHY (CRYPT) lectures and tutorials,

##### **2013 - 2021**

###### **C. MASTER - ELECTRONICS OF EMBEDDED SYSTEMS:**

4. TECHNICAL ENGLISH,
5. MACHINE LEARNING (ML) lectures and tutorials,
6. Human Computer Interaction & ARTIFICIAL VISION lectures and tutorials,

##### **2016–2021**

###### **D. Master Telecommunications Systems Program:**

1. ACTIF & PASSIF DEVICES RF & MICRO-WAVE lectures and tutorials,
2. CODAGE & COMPRESSION lectures and tutorials,
3. TECHNICS OF RADAR lectures,

###### **E. Bachelor Program: L3 Telecommunications**

1. DIGITAL COMMUNICATIONS lectures and tutorials,

## VI. Research Profile Motivations & Projects:

- i. *Parallel Distributed Systems & Multi-agent Modeling,...*
  - ii. *Artificial Intelligence (Artificial Neural Networks, fuzzy Logic and Genetic Algorithms), DNA & Quantum Artificial Intelligence (QAI).*
  - iii. *Computer Control Systems (Microprocessor and its Peripherals).*
  - iv. *Automation and Machine Vision, Simulation & Concept System.*
  - v. *Advanced Signal, Image Processing & Biometrics Authentication*
  - vi. *System Integration of Smart Card and Biometric (Finger Print & Retina Scan) Technology for Building Automation and Security Access Control Systems.*
  - vii. *Able to Design any types of systems based any types of Processors ( $\mu$ PU,  $\mu$ CU & DSP ) 32 bits and less,...for any types of Applications using any types of real time development tools,...*
- *I AM A RESEARCH PROJECT LEADER (CNEPRU) January 2013 – December 2015, "3D MEDICAL IMAGING MODELLING, DETECTION & RECOGNITION BASED QUANTUM ARTIFICIAL INTELLIGENCE PROCESSING",...*
- *I AM A LEADER OF A GROUP OF RESEARCH, "TRAITEMENT DU SIGNAL ET BIOMÉTRIQUES (TSB)", IN THE RESEARCH LABORATORY "LABORATOIRE DES SYSTÈMES ÉLECTRONIQUES AVANCÉES (LSEA-MEDEA)",...*

## VII. International Journal Publications:

- [1] Mohamed SOLTANE, Lotfi MESSIKH and Abdelhalim ZAOUI, A Review Regarding the Biometrics Cryptography Challenging Design and Strategies, BRAIN. Broad Research in Artificial Intelligence and Neuroscience, Issue (4) volume (8) (December 2017) ISSN 2067-3957, [Emerging Sources Citation Index \(ESCI\) Thomson Reuters Web of Science](http://mjl.clarivate.com/cgi-bin/jrnlst/jlresults.cgi?PC=MASTER&ISSN=2067-3957).  
<http://mjl.clarivate.com/cgi-bin/jrnlst/jlresults.cgi?PC=MASTER&ISSN=2067-3957>
- [2] Mohamed SOLTANE, Product of Likelihood Ratio Scores Fusion of Face, Speech and Signature Based FJ-GMM for Biometrics Authentication Application Systems, Mathematics and Computer Science, Science Publishing Group, USA Vol. 2, No. 5, Sep. 2017, pp. 51-65. doi: 10.11648/j.mcs.20170205.11  
<http://www.sciencepublishinggroup.com/journal/paperinfo?journalid=247&doi=10.11648/j.mcs.20170205.11>
- [3] Mohamed SOLTANE, "Pattern Recognition versus Verification Systems Analysis Studies for Biometrics Face Based Independent Component Analysis" , Machine Learning Research, Science Publishing Group, USA, Volume 2, Issue 1, Mar. 03, 2017, pp. 35-50. doi: 10.11648/j.ml.r.20170201.15  
<http://www.sciencepublishinggroup.com/journal/paperinfo?journalid=604&doi=10.11648/j.ml.r.20170201.15>
- [4] Mohamed SOLTANE, "State of the Art of finite GMM Based Biometrics Face Authentication Systems", International Journal of Security and Its Applications – IJSIA, Vol.9\_No.11, pp. 187-200, AUSTRALIA (November, 2015). [Emerging Sources Citation Index \(ESCI\) Thomson Reuters Web of Science \(ISI\) & SCOPUS \(ISI\) indexing](http://mjl.clarivate.com/cgi-bin/jrnlst/jlresults.cgi?PC=MASTER&ISSN=*1738-9976).  
[http://mjl.clarivate.com/cgi-bin/jrnlst/jlresults.cgi?PC=MASTER&ISSN=\\*1738-9976](http://mjl.clarivate.com/cgi-bin/jrnlst/jlresults.cgi?PC=MASTER&ISSN=*1738-9976)  
**SCOPUS**  
<http://www.scimagojr.com/journalsearch.php?q=21100199112&tip=sid> **SJR: 0.25; H Index: 18.**  
Publishing Year: 2015 PP. 187-200; ISSN: 1738-9976.

- [5] Mohamed SOLTANE, "FACE, VOICE AND SIGNATURE MULTI-MODAL BIOMETRIC VERIFICATION FUSION SYSTEMS", the ANNALS OF FACULTY ENGINEERING HUNEDOARA – INTERNATIONAL JOURNAL OF ENGINEERING, ROMANIA [Fascicule 4 \(November/2015\)](#), ISSN: 1584 – 2665 (PRINT), ISSN 1584 – 2673 (ONLINE), <http://annals.fih.upt.ro/index.html>, [INDEX COPERNICUS – JOURNAL MASTER LIST](#) <http://annals.fih.upt.ro/pdf-full/2015/ANNALS-2015-4-23.pdf> pp. 139-150, 2015
- [6] Mohamed SOLTANE, "Product of Likelihood Ratio Scores Fusion of Dynamic Face, Text Independent Speech and On-line Signature Based Biometrics Verification Application Systems", Mediterranean Journal of Modeling and Simulation (MJMS) ISSN: 2335-1357, Volume 4, Issue 1 (2015), ALGERIA (September, 2015). [INDEX-COPERNICUS.SIS, I2OR, DAIJ, OAJI.net, General Impact Factor \(GIF\), Advanced Science Index \(ISI\) indexing.](#) <https://sites.google.com/site/lesimjms/all-volumes-issues/volume-4-issue-1-2015> <http://www.webreview.dz/IMG/pdf/ge-20150612.pdf>
- [7] Mohamed SOLTANE, "Dynamics Faces Based Independent Component Analysis Studies for Biometrics Verifications Systems Applications", Journal of Basic and Applied Research International, International Knowledge Press (IKP), <http://www.ikpress.org/>, Volume 12 [Issue 3] United Kingdom (September, 2015) PP. 149-163. (ISI) [indexing.](#) <http://www.ikpress.org/>, ISSN: 2395-3438 (Print), ISSN: 2395-3446 (Online) <http://www.ikpress.org/index.php/JOBARI/issue/view/411> <http://www.ikpress.org/index.php/JOBARI/article/view/3728>
- [8] Mohamed SOLTANE, "Product of Likelihood Ratio Scores Fusion of Dynamic Face and On-Line Signature Based Biometrics Verification Application Systems", International Journal of Database Theory and Application (IJDTA), Vol.8, No. 4, AUSTRALIA (August 2015), pp. 91-106. ISSN: 2005-4270 [http://article.nadiapub.com/IJDTA/vol8\\_no4/10.pdf](http://article.nadiapub.com/IJDTA/vol8_no4/10.pdf) [SCOPUS \(ISI\) indexing.](#) <https://www.scimagojr.com/journalsearch.php?q=21100423920&tip=sid&clean=0>
- [9] Mohamed SOLTANE, "Greedy Expectation Maximization Tuning Algorithm of finite GMM Based Face, Voice and Signature Multi-Modal Biometric Verification Fusion Systems", International Journal of Engineering & Technology (IJET) / International Journals of Engineering and Sciences (IJENS) PUBLISHER, ISSN 2077-1185 (Online) & ISSN 2227-2712 (Print) in Volume 15: Issue 3 June, 2015. **(IF: 1.819)** <http://www.ijens.org> - [IJENS Publisher indexed in SCOPUS](#)
- [10] Mohamed SOLTANE, "Likelihood Ratio Fusion within scores of Independent Component Analysis Features Based Face Biometrics Verification Systems", International Journal of Scientific Knowledge (Computing and Information Technology) IJSK with ISSN 2305-1493 in Volume 6: Issue 3 June, 2015. <http://www.ijsk.org/> - [indexed in SCOPUS](#)
- [11] Mohamed SOLTANE, "Figueiredo-Jain (FJ) Tune Algorithm for Gaussian mixture modal (GMM) Based Face and Signature Multi-Modal Biometric Verification Fusion Systems", Journal of Computational Intelligence and Electronic Systems Vol. 4, No.1, 1–10, 2015 Copyright © 2015 American Scientific Publishers. doi:10.1166/jcies.2015.11103 <http://www.aspbs.com/journals/>
- [12] Mohamed SOLTANE, Soft Decision Level Fusion Approach to a Combined Behavioral Speech-Signature Biometrics Verification, International Journal of Signal Processing, Image Processing and Pattern Recognition – IJSIP, Vol.6, No. 1 AUSTRALIA (February 2013). pp. 75-90, ISSN: 2005-4254, 2207-970X [SCOPUS \(ISI\) indexing.](#) <https://www.scimagojr.com/journalsearch.php?q=21100853970&tip=sid&clean=0> [http://article.nadiapub.com/IJSIP/vol6\\_no1/6.pdf](http://article.nadiapub.com/IJSIP/vol6_no1/6.pdf)

- [13] Mohamed SOLTANE, "MULTI-MODAL BIOMETRIC AUTHENTICATIONS: CONCEPT ISSUES AND APPLICATIONS STRATEGIES", International Journal of Advanced Science and Technology – IJAST, Vol.48, pp.23-60, AUSTRALIA (December 2012).  
ISSN: 2207-6360 & 2005-4238  
<http://article.nadiapub.com/IJAST/vol48/3.pdf>  
SCOPUS (ISI) [indexing](#).  
<https://www.scimagojr.com/journalsearch.php?q=21100829147&tip=sid&clean=0> Hindex: 4
- [14] M. SOLTANE, "Speech and Signature Based Multi-Modal Biometrics Verification". Acta Technica Napocensis – Electronics and Telecommunications, V51N3 Romania (October. 2010). <http://user.sutcluj.ro/~atn/Numbers.htm> pISSN: 1221-6542 ICV: 4.19  
ProQuest ([http://www.csa.com/ids70/serials\\_source\\_list.php?db=hightech-set-c](http://www.csa.com/ids70/serials_source_list.php?db=hightech-set-c))  
IndexCopernicus (<http://journals.indexcopernicus.com/masterlist.php?litera=a&start=0&skok=30>)  
EBSCO (<https://www.ebsco.com/products/research-databases/applied-science-technology-source-ultimate>)
- [15] Mohamed SOLTANE, N. DOGHMANE, N. GUERSI. "State of the Art Speech Biometrics Verification", Journal of Information Technology Review Volume: 1, Issue: 3 (August 2010). <http://www.dline.info/jitr/v1n3.php>
- [16] M. SOLTANE, N. DOGHMANE, N. GUERSI, FACE & SPEECH BASED MULTI-MODAL BIOMETRICS AUTHENTICATION, International Journal of Advanced Science and Technology – IJAST, Vol.21, pp. 23-60. AUSTRALIA (August 2010).  
ISSN: 2207-6360 & 2005-4238  
<https://pdfs.semanticscholar.org/8e60/8ebd80c59c4a5231aeba5bcb9d60c82e0b7e.pdf>  
SCOPUS (ISI) [indexing](#).  
<https://www.scimagojr.com/journalsearch.php?q=21100829147&tip=sid&clean=0> Hindex :4
- [17] M. SOLTANE, N. DOGHMANE, N. GUERSI. "TEXT-INDEPENDENT SPEAKER VERIFICATION: A COMPARATIVE ANALYSIS STUDY". Acta Technica Napocensis – Electronics and Telecommunications, V51N1 Romania 2010. **(ICV: 4.19)**  
<http://user.sutcluj.ro/~atn/Numbers.htm>  
ProQuest ([http://www.csa.com/ids70/serials\\_source\\_list.php?db=hightech-set-c](http://www.csa.com/ids70/serials_source_list.php?db=hightech-set-c))  
IndexCopernicus (<http://journals.indexcopernicus.com/masterlist.php?litera=a&start=0&skok=30>)  
EBSCO (<https://www.ebsco.com/products/research-databases/applied-science-technology-source-ultimate>)
- [18] M. SOLTANE, N. DOGHMANE, N. GUERSI. "State of the Art: Signature Biometrics Verification", BRAIN. Broad Research in Artificial Intelligence and Neuroscience. Vol 1, N 2, Romania 2010. [Emerging Sources Citation Index \(ESCI\) Thomson Reuters Web of Science.](http://mjl.clarivate.com/cgi-bin/jrnlst/jlresults.cgi?PC=MASTER&ISSN=2067-3957)  
<http://mjl.clarivate.com/cgi-bin/jrnlst/jlresults.cgi?PC=MASTER&ISSN=2067-3957>
- [19] M. SOLTANE, M. ISMAIL, Z. ABD ERRACHID. "Artificial Neural Networks (ANN) Approach to PPG Signal Classification": International Journal for Computing and Information System (IJCIS) Canada 2005 vol. [2] N. [2]; <http://www.ijcis.info/>  
[IEEE](#) (INS PEC Database, UK), **CNRS** (FRANCE).

### VIII. International Conference Papers:

- [1] Mohamed SOLTANE, "Multi-modal Biometric Authentications: Concept Issues and Applications Strategies", a research presentation, 14 & 15 January 2015 at 2<sup>nd</sup> LCPTS 2015 Laboratory days, LCPTS-FEI@USTHB.  
<http://www.lcpts.usthb.dz/Proceedings%20LCPTS%202015/appele%20et%20booklet/Programme+r%C3%A9sum%C3%A9s.pdf>
- [2] Mohamed SOLTANE, "Soft Decision level Fusion Approach to a Combined Behavioral Speech Signature Biometrics Verification", a poster presentation, 14 & 15 January 2015 at 2<sup>nd</sup> LCPTS 2015 Laboratory days, LCPTS-FEI@USTHB.  
<http://www.lcpts.usthb.dz/Proceedings%20LCPTS%202015/session%20posters.html>

- [3] Mohamed SOLTANE, N. DOGHMANE, N. GUERSI. "State of the Art Speech Biometrics Verification", The Third International Conference on the Applications of Digital Information and Web Technologies (ICADIWT 2010), July 12-14, 2010, University of el Fatih Turkey. <http://www.dirf.org/diwt2010>
- [4] M. SOLTANE, M. ISMAIL, Z. ABD ERRACHID. "Artificial Neural Networks (ANN) Approach to PPG Signal Classification": International Conference of Informatics (ICI-2004) September 01-04, 2004, Çesme, Izmir Turkey, THE INTERNATIONAL KNOWLEDGE SOCIETIES- IKS <http://www.iks.org/>
- [5] INVITED PROFESSOR RESEARCHER TO THE 10<sup>th</sup> CONFERENCE OF ELECTRICAL ENGINEERING (CGE'10) APRIL 17-18 2017 MILITARY POLYTECHNICS SCHOOL EMP-ALGIERS, ALGERIA
- [6] First Spring School HUMAN-COMPUTER INTERACTION Virtual & Augmented Reality IVAR-School 2017, From April 23<sup>th</sup> to 25<sup>th</sup>, 2017 CIREST- DGRSDT\_ALGIERS, ALGERIA.

## **Supervision of BACHELOR and MASTER Students:**

### **2006 ENGINEER OF STATE PROJECTS AT SKIKDA UNIVERSITY**

1. *ARTIFICIAL NEURAL NETWORKS (ANNS) BASED BIO-OPTICAL TIME SERIES SIGNAL CLASSIFICATION,...*
2. *POWER QUALITY DISTURBANCES CLASSIFICATION USING ARTIFICIAL NEURAL NETWORKS (ANNS),...*

### **2011 BACHELOR PROJECT AT MEDEA UNIVERSITY**

1. *BIOMETRICS SPEAKER VERIFICATION,...*

### **2012 MASTER PROJECTS AT MEDEA UNIVERSITY**

1. *BIOMETRICS FINGER PRINT RECOGNITION SYSTEM BASED FAST FOURIER TRANSFORM,...*
2. *BIOMETRICS FACE RECOGNITION USING PRINCIPALS COMPONENTS ANALYSIS,...*

### **2013 MASTER PROJECTS AT MEDEA UNIVERSITY**

1. *FACE RECOGNITION FOR MOBILE DEVICES BASED INDEPENDENT COMPONENT ANALYSIS (ICA),...*
2. *FACE RECOGNITION FOR MOBILE DEVICES BASED SUPPORT VECTOR MACHINES (SVM),...*
3. *NON-SUPERVISED ARTIFICIAL NEURAL NETWORKS FOR BIOMETRICS FINGER PRINT IDENTIFICATION SYSTEM,...*
4. *BIOMETRICS IRIS RECOGNITION SYSTEM,...*
5. *SPEECH TEMPLATE SECURITY,...*
6. *STUDING AND VISUALISING OF HIGH-DIMENSIONAL DATA SETS, COMPARING THREE WELL KNOWN ALGORITHMS (PCA, FLDA & ICA),...*
7. *TEMPLATE PROTECTION AND ITS IMPLEMENTATION IN BIOMETRICS FACE RECOGNITION SYSTEMS,...*

### **MASTER PROJECTS ENTITLED THEMES 2017-2021,...**

- 1- *SEGMENTATION AND CLASSIFICATION OF 3D MRI USING GENETIC ALGORITHMS.*
- 2- *SEGMENTATION AND CLASSIFICATION OF 3D MRI USING FUZZY NEURAL NETWORKS ALGORITHMS.*
- 3- *TEMPLATE PROTECTION AND ITS IMPLEMENTATION BASED HELPER DATA SCHEME AND AES-256 ALGORITHM CODING IN BIOMETRICS IRIS RECOGNITION SYSTEMS.*

**4- TEMPLATE PROTECTION AND ITS IMPLEMENTATION BASED HELPER DATA SCHEME AND AES-256 ALGORITHM CODING IN BIOMETRICS FINGER-PRINT RECOGNITION SYSTEMS.**

**5- 3D MAGNETIC RESONANCE IMAGING OF PROTEINS FOLDING FOR HUMAN BRAIN TUMOR DETECTION AND CLASSIFICATION.**

**6- SECURE SPEECH CRYPTOGRAPHIC KEY GENERATION FOR MOBILE APPLICATIONS BASED AUTHENTICATION SYSTEMS.**

**7- BIOMETRICS FINGER-PRINT RECOGNITION BASED SELF-ORGANIZING MAPS OF ARTIFICIAL NEURAL NETWORKS.**

## **BACHELOR PROJECTS ENTITLED THEMES 2016-2017,...**

- 1. Etude des Modèles de Markov cachés (HMM) paramétriques pour la reconnaissance de Parole Continue.**
- 2. Reconnaissance de Caractères Manuscrits ARAB par Réseau de Neurones Artificielles pour la Classification des Documents.**

## **IX. International Journals Reviewer and Editorial Board Member:**

- 1) Journal of Intelligent & Fuzzy Systems (JIFS), <https://www.editorialmanager.com/jifs/>
- 2) IET Signal Processing, <http://digital-library.theiet.org/content/journals/iet-spr>
- 3) Arabian Journal for Science and Engineering (AJSE), <http://ajse.kfupm.edu.sa/index.htm>

## **Currently Research Directions Abstract and Motivations:**

- I. Multi-classifiers fusion** (PCA, FLDA, ICA, SVM and EBGM based Likelihood Fusion for dynamic Faces Applications),...
- II. Biometrics Template security** (Face, Speech, Finger and Iris) based Helper Data Scheme and fuzzy vault shames,...
- III. Quantum Biology & Quantum Artificial Intelligence Tools for the Target (4D) space-time visualization of Magnetic Resonance Imaging (MRI) based Computer Graphics Challenging Design,....**

# **A CENTER OF EXCELLENCE FOR INTER-UNIVERSITY INSTITUTIONS DEVELOPMENT. 2021 – 2026 @ MESRS**

## **DOCTORAL SCHOOL COLLABORATION PROFIL**

### ***QUANTUM BIOLOGY & QUANTUM ARTIFICIAL INTELLIGENCE TOOLS FOR THE TARGET (4D) SPACE-TIME VISUALIZATION OF MAGNETIC RESONANCE IMAGING (MRI) BASED COMPUTER GRAPHICS CHALLENGING DESIGN***

**Dr. Mohamed SOLTANE** (Associate Professor A) Ph.D & HDR leader for Doctoral schools Project research collaboration preparing to launch a collaborations with Research Professors between Research Laboratories @ The Following Universities, Research Centers & Research Units: [YFUM, USTHB, University of BLIDA, University of BOUMERDES, BADJI MOKHTAR UNIVERSITY OF ANNABA, CDTA, CERIST & LaMOS Research Unit @ Bejaïa].

The target DOCTORAL SCHOOL research project is in biomedical fields, that Combine Quantum Computing and Artificial Intelligence in modeling DNA-Chromosomes Mutations in Cancer Healing from the VR-Virtual Reality point of view,

### **QUANTUM BIOLOGY & QUANTUM ARTIFICIAL INTELLIGENCE TOOLS FOR THE TARGET (4D) SPACE-TIME VISUALIZATION OF MAGNETIC RESONANCE IMAGING (MRI) BASED COMPUTER GRAPHICS CHALLENGING DESIGN**

The research hypotheses of the target DOCTORAL SCHOOLS are tumors that attack and destroy human being body tissues without long terms symptoms; Deciphering genetic code which translates DNA's information into proteins will be a challenging task in building Data Expertise; (4D) space-time visualization of Magnetic Resonance Imaging (MRI) based Computer Graphics are a Challenging Design and will be a target revolution in the system of visualization;

The target objective finding from that DOCTORAL SCHOOLS research Project should be at two-dimension levels:

1. The first level should be at a computer graphics simulation design, I would like that when the DOCTOR in Hospital suggests a medicine for a target patient, he should estimate the molecules damages at the cell level and could be predict and visualizing the rebuilding of the molecules rates in the beginning stages at the computer graphics simulation challenging.



2. The second level should be at the sensor level of the system of visualization of the MRI scanners technologies, ... I am thinking beyond the **Femto scale**, I am dreaming to see the systems of visualization could provide the visualization of the rebuilding body tissues at the level of DNA, cells and molecules...Combining Quantum Computing and Artificial Intelligence in modeling DNA-Chromosomes Mutations in Cancer Healing from VR-Virtual Reality VR-MODELING point of view.

Therefore :

In the context of GENE EDITING TO CURING DISEASE, one of the works as promising cornerstones for the upcoming DOCTORAL SCHOOLS research Project for DATA expertise. Are the achievements targets works performed by the Nobel laureates in chemistry 2020: Professor Jennifer A. Doudna @ University of California, Berkeley, USA and Professor Emmanuelle charpentier, chancellor @ the Max Planck Unit for the Science of PATHOGENS, MAX PLANCK INSTITUTE FOR INFECTION BIOLOGY IN BERLIN.

The collaboration between Jennifer Doudna's laboratory and Emmanuelle Charpentier's laboratory showed that Cas9 could be used to make cuts in any DNA sequence desired. The method they developed involved the combination of Cas9 with easily created synthetic "guide RNA" molecules. Synthetic guide RNA is a chimera of crRNA and tracrRNA; therefore, this discovery demonstrated that the CRISPR-Cas9 technology could be used to edit the genome with relative ease.

CRISPER-Cas9 (Clustered Regulatory Interspaced Short Palindromic Repeats), and Cas9 is a protein used as a molecular scissor in a precise way.

Emmanuelle Charpentier's investigated how the pathogen STREPTOCOCCUS PNEUMONIAE utilizes mobile genetic elements to alter its genome in different ways.

The target DOCTORAL SCHOOL research project is inspired from the achievements of the works done BY Eric Lander @ Broad Institute of MIT and Harvard, USA.

**Eric Lander** *is president and founding director of the Broad Institute of MIT and Harvard. A geneticist, molecular biologist, and mathematician, he has played a pioneering role in all aspects of the reading, understanding, and biomedical application of the human genome. He was a principal leader of the international Human Genome Project.*

*He has done pioneering work on human genetic variation; human population history; genome evolution; regulatory elements; long non-coding RNAs; three-dimensional folding of the human genome; and genome-wide screens to discover the genes essential for biological processes using CRISPR-based genome editing.*

THE TARGET OBJECTIVES are setup a mechanism of collaborations between research laboratories for the target DOCTORAL SCHOOL research project in biomedical fields, that Combine Quantum Computing and Artificial Intelligence in modeling DNA-Chromosomes Mutations in Cancer Healing from the VR-Virtual Reality point of view,

## **THEMATIC AXIS FOR THE TARGET DOCTORAL SCHOOL RESEARCH PROJECT:**

- a. *Bio-medical Engineering Bio-Inspired Computing, Bioinformatics and Visualizations.*
- b. *Human-Computer Interaction, Computer Graphics and Artificial Vision.*
- c. *DNA sequencing; genome evolution; three-dimensional folding of the human genome; and genome-wide screens to discover the genes essential for biological processes using CRISPR-based genome editing.*
- d. *Quantum Information Systems Computing and VR-Virtual Reality Profiling.*
- e. *Cryptography, Template Security and Quantum Information Security.*

### **NUMBER OF POSTS PAR THEMATIC AXIS:**

- |                        |                         |
|------------------------|-------------------------|
| Thematic a. (5 Posts)  | Thematic d. (3/4 Posts) |
| Thematic b. (7 Posts)  | Thematic e. (5 Posts)   |
| Thematic c. (10 Posts) |                         |

### **NUMBER OF POSTS PER SPECIALITY:**

- Electronics (10 Posts)
- Informatics (15 Posts)
- Mathematics (5 Posts)

## **A. BIO-MEDICAL ENGINEERING BIO-INSPIRED COMPUTING, BIOINFORMATICS AND VISUALIZATIONS.**

1. METHODS FOR CLEANING NOISY GENETIC DATA AND DETERMINING CHROMOSOME MUTATION BASED TUMOR HEALING.
2. DETECTION CHROMOSOME MUTATION IN CANCER HEALING VIA MRI SIGNATURE FOR USE IN IMMUNOTHERAPY AGAINST TUMORS.
3. DNA SEQUENCING BASED IMMUNOTHERAPY MODELING IN CANCERS HEALING AND RELATED METHODS.
4. COGNITIVE COLLABORATION WITH NEUROSYNAPTIC IMAGING NETWORKS AND PARTICLE SWARM OPTIMIZATION FOR THE TARGET OF MEDICAL DATA INTELLIGENCE DIAGNOSIS AND CYBERNETIC WORKFLOW STREAMS EXTRACTIONS.
5. DEEP LEARNING ALGORITHMS BASED MRI DATA PROCESSING USING DNA COMPUTING FOR THE TARGET TUMOR CELL IDENTIFICATION.

## **B. HUMAN-COMPUTER INTERACTION, COMPUTER GRAPHICS AND ARTIFICIAL VISION.**

1. DIAGNOSTIC 3/4 D MRI CANCEROS IMAGES ANALYSIS AND IMAGE QUALITY ASSESSMENT BASED DNA SEQUENCING AND ANALYSING.
2. QUANTUM ARTIFICIAL INTELLIGENCE BASED METHODS FOR GENERATING THREE-DIMENSIONAL IMAGES FROM TWO-DIMENSIONAL BIOLUMINESCENCE IMAGES AND VISUALIZING TUMOR SHAPES DETECTIONS AND LOCALIZATIONS.

3. GENERATION AND ENHANCING OF ONE OR MORE EDGES OF LUMINOSITY TO FORM THREE-DIMENSIONAL GRAPHIC MODELS OF OBJECTS BASED QUANTUM MATHEMATICAL MODELING.
4. SYNTHESIS OF MOTION ANIMATION MODELING OF VIRTUAL HEADS VIA VOICE PROCESSING.
5. COMPUTER GRAPHICS MODELING FOR PROVIDING OBJECT TRACKING USING TEMPLATE SWITCHING AND FEATURE ADAPTATION.
6. MASSIVELY PARALLEL COMPUTING FOR BRAIN MRI TUMOR SEGMENTATION AND CLASSIFICATION FROM NOISY IMAGES DATA IN TELECOMMUNICATION SYSTEMS.
7. DIAGNOSING AND VISUALISING 3D/4D TUMOR SHAPES FROM TWO-DIMENSIONAL BIOLUMINESCENCE IMAGES BASED A DEVELOPING A DNA SEQUENCING METHODS.

### **C. DNA SEQUENCING; GENOME EVOLUTION; THREE-DIMENSIONAL FOLDING OF THE HUMAN GENOME; AND GENOME-WIDE SCREENS TO DISCOVER THE GENES ESSENTIAL FOR BIOLOGICAL PROCESSES USING CRISPR-BASED GENOME EDITING.**

1. SYSTEMS AND METHODS FOR SAMPLE PREPARATION, DNA DATA GENERATION, AND PROTEIN CANCER ANALYSIS.
2. HYBRID COMPUTATIONAL SYSTEM BASED QUANTUM ARTIFICIAL INTELLIGENCE COMPUTING FOR BRAIN CANCER DISCOVERY AND METHODS.
3. SYSTEMS AND METHODS FOR BRAIN CANCER IDENTIFICATION USING DNA **SEQUENCING** DATA.
4. METHOD OF DETECTING AND/OR IDENTIFYING CANCEROUS CELLS BASED QUANTUM DNA SEQUENCING AND ISOLATING NOVEL SEQUENCES IDENTIFIED THEREBY.
5. MASSIVELY PARALLEL DNA SEQUENCING FOR BRAIN TUMOR IDENTIFICATION AND DETECTING USING QUANTUM CLUSTERING MODELING.
6. CRISPR-CAS ENCODING INSPIRED MODELLING PROTEINS AND SYNTHETIC DNAs, RNAs FOR THE TARGET TUMOR HEALING.
7. FUNCTIONAL GENOMICS USING CRISPR-CAS SYSTEMS, FOR THE TARGET BRAIN TUMOR MODELING DIAGNOSIS.
8. PROTEINS FOLDING STUDDING IN IMMUNOTHERAPY AGAINST BRAIN CANCER DIAGNOSING AND HEALING BASED QUANTUM COMPUTING STRATEGY.
9. PROTEINES SYNTHESIS MODELING FOR THE TARGET OF TUMOR IDENTIFYING AND DIGONISIS.
10. GENETICS DATA SEQUENCING FOR THE TARGET TUMOR MODELING FOR THE TARGET HUMAN IMMUNOTHERAPY ANALYSIS.

## **D. QUANTUM INFORMATION SYSTEMS COMPUTING AND VR-VIRTUAL REALITY PROFILING.**

1. QUANTUM INFORMATION COMPUTING SYSTEM BASED MEDICAL DATA ENCRYPTION.
2. PROTEINS FOLDING IN IMMUNOTHERAPY SYSTEM BASED QUANTUM INFORMATION COMPUTING AND VIRTUAL REALITY PROFILING.
3. DIAGNOSIS AND MONITORING TREATMENT OF BLOOD CANCER CHROMOSOME MUTATION BASED QUANTUM INFORMATION COMPUTING AND VIRTUAL REALITY PROFILING.
4. ENGINEERED CRISPR-CAS9 MODELING BASED QUANTUM INFORMATION COMPUTING AND VIRTUAL REALITY PROFILING.

## **E. CRYPTOGRAPHY, TEMPLATE SECURITY AND QUANTUM INFORMATION SECURITY.**

1. QUANTUM MECHANISM FOR TRANSMISSION DATA PROTECTION SYSTEM, METHODS, AND APPLICATIONS.
2. AUTHENTICATION USING QUANTUM SECURE KEY DISTRIBUTION THROUGH SEGMENTED QUANTUM COMPUTING ENVIRONMENTS.
3. QUANTUM ALGORITHMS BASED BIOMETRIC TEMPLATE SECURITY APPLICATIONS.
4. BIOMETRIC TEMPLATE SECURITY BASED BLOCKCHAIN DATABASE TRANSACTION FOR QUANTUM SECURE APPLICATIONS.
5. QUANTUM ARTIFICIAL INTELLIGENCE DEVELOPMENTS MECHANISMS FOR FACILITATING COMMUNICATIONS APPLICATIONS BETWEEN A QUANTUM COMPUTING SYSTEMS.

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