

The Higher Normal School of Tetouan- Abdelmalik
Esaadi University organise

The 1st edition of the

International Conference on Mathematics Artificial
Intelligence and its Applications

MAIA 2025

OVERVIEW

The main goal of this conference is to promote, encourage and provide a platform for the academic exchange of ideas and recent research in all areas of Mathematics and Artificial Intelligence. It will feature new results and address future challenges through a series of keynote lectures and contributed short talks. The conference will be held in a hybrid format, allowing for both in-person and remote participation. The in-person sessions will take place in Martil, a coastal town in the Tetouan region of northern Morocco, near the Mediterranean Sea.



 18 - 19 - 20 December 2025



Higher Normal School
Tetouan, Morocco



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The **Higher Normal School** of Tetouan, Abdelmalek Essaâdi University,
organises the:

1st International Conference on Mathematics, Artificial Intelligence, and Its Applications
"MAIA2025"

Context

The main objective of this conference is to promote and strengthen the academic exchange of ideas, knowledge, and recent research developments in all fields related to Mathematics and Artificial Intelligence. It aims to bring together researchers, academics, and practitioners to discuss innovative approaches, share cutting-edge results, and explore emerging challenges at the intersection of these rapidly evolving disciplines.

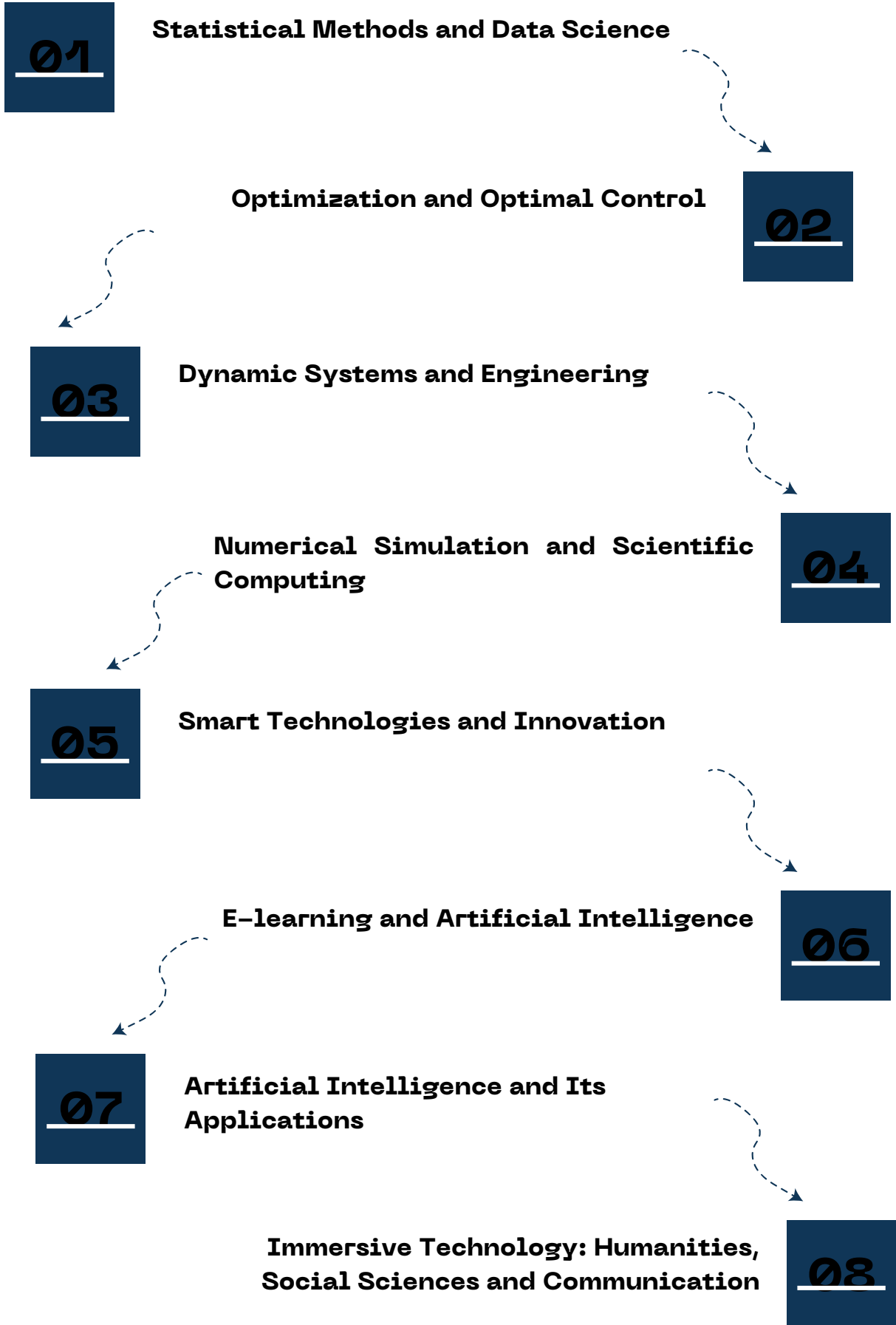
The scientific program will feature a series of keynote lectures delivered by distinguished experts, along with contributed short talks highlighting ongoing research, novel methodologies, and promising applications. This event offers participants a unique opportunity to engage in high-level discussions, establish collaborations, and contribute to the advancement of mathematical and AI-driven solutions.

The conference will be organized in a hybrid format, allowing both in-person and remote participation. The on-site sessions will take place in Martil, located in the Tetouan region in northern Morocco, a coastal area known for its proximity to the Mediterranean Sea and its pleasant academic and cultural environment.



Tracks

MAIA 2025 is designed to inspire dialogue and promote the dissemination of cutting-edge research. We invite you to submit your contributions and join us in exploring the following thematic topics:



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Pr. ZUAZUA Enrique – Deusto University, Bilbao, Spain

GUEST SPEAKERS



EL AFIA ABDELLATIF

National School of Computer Science
and Systems Analysis Mohammed V
University, Morocco



ENRIQUE ZUAZUA

University of Deusto, Spain



HACHIMI HANAA

National School of Applied Sciences
Kenitra Ibn Tofail University, Morocco



LUCIANO SANCHEZ RAMOS

University of Oviedo, Spain

GUEST SPEAKERS



ADLY SAMIR
University of Limoges, France



ERDAL KARAPINAR
Atilim University, Turkey



MUDASIR YOUNIS
Sakarya University, Türkiye

1st Day : December 18, 2025

Reception and registration of participants

8:00AM - 9:30AM

OPENING

10:00AM - 11:00AM

Moderator: Pr. ACHTOUN Youssef

- President of Abdelmalek Essaadi University, Tetouan, Morocco
- Director of Higher Normal School, Abdelmalik Esaadi University, Tetouan, Morocco
- Conference Chair -MAIA 2025

Coffee Break

Planary Conference 1 : "Presentiel"

11:30 AM - 12:30 PM

Fixed Points with Purpose: Recent Applications of Metric Fixed Point Theory

**Dr. Mudasir Younis, Sakarya University,
Turkey**

Planary Conference 2 : "Remotly"

12:45 PM - 14:00 PM

Recent advances in fixed point theory?

**Dr. Erdal Karapinar, Atilim University,
Turkey**

Lunch break

Session of communication (S01) - In person

15:00 PM - 18:30 PM

- Room: N°61

Chairs: Pr. Tahiri Ismail, Pr. LAAROUSSI ALAMI Adil

Dynamical analysis of a stochastic SEIR model with half-saturated incidence rate influenced by non-linear Lévy jumps

AGHOUTANE NAFIA, BEN SAID MOHAMED, AZRAR LAHCEN

Existence of solutions for some degenerated unilateral elliptic problem with weighted Hardy potential

Oualid AKKAR, Hassane HJIAJ, Ismail JAMIAI

Validation of the Attitudes Toward Mathematics Inventory (ATMI) in the Moroccan Context

EL MNOUAR OTHMANE , EL ALEM WAFAE , RIH FADWA

Existence and Uniqueness of Renormalized Solutions for Anisotropic Elliptic Non-Coercive Problem Under Neumann Boundary Conditions

HAYAT BENKHALOU, FRANCISCO ORTEGON GALLEGO, HASSANE HJIAJ

Approche par scénarios appliquée sur un SVM probabiliste

El Afia Sarah, El Afia Abdelatif , Lamarti Mohammed Sefian , Achtoun Youssef

Graph Neural Network-Enhanced Student Modeling for Interpretable Learning Path Personalization

Tarik Tous, Souhaib Aammou

Toward Adaptive Knowledge Assessment in E-Learning Environments: A Literature Review (2020-2024)

BENKHAYAT Sara , ELHADDIOUI Ismail

- **Room: N°63**

Chairs: Pr. ACHTOUN Youssef , Pr. LAMNI Abdellah

Support Vector Machines (SVMs) : Theoretical Foundations, Recent Developments, and Applications

Laila AJANA, Mohammed Arrazaki, Adnan SOURI

AI-Driven Analysis of Safe-Haven Behavior During Financial Crises: Evidence from Traditional and Digital Currencies

Hajar Errahmani, Asmaa Faris, Mohamed Dakkon

Bayesian PINNs for extended SEIR models with unreported cases

Mariam REDOUANE, Aadil LAHROUZ, Omar ZAKARY

Best Proximity Point Theorems in G-Menger Spaces with Application to Image Processing

Lahcen OUMERTOU, Mohammed LAMARTI SEFIAN, Ismail TAHIRI, Zahra BERRADI

HUMAN VOICE RECOGNITION AND DETECTION

HOUDA MESBAHI, AMAL DOUARA, ADIL ENAANAI, YOUSSEF ZAZ

K-means for managing AI tools for optimal territorial management of educational offer : study case Tetouan

Sanae OULAD LGHARS, Abderrafik LAAKEL HEMDANOU, Nouredine EL HAIEK

L'impact et les avantages du Journal Intégré de Gestion – Entrées Dépenses Restes ou JIG-EDR pour la gestion des associations et des services administratifs publics

Zainab Benhsain ,Ghizlane Benazzouz

- **Room: N°64**

Chairs: Pr. AAMMOU Souhaib, Pr. EL HAKKI Ismail

Comparative Analysis of Transformer-Based Architectures versus Traditional Statistical Models for Multivariate Stock Price Forecasting in the Casablanca Stock Exchange

Youssef ACHTOUN, Abderrafik LAAKEL HEMDANOU

A survey on Arabic Question Answering Systems for Detecting Learning Difficulties in Higher Education

Chaimae Khadiri, Outman El Hichami, Adnan Sourì

Approche intelligente pour un système de recommandation des ressources pédagogiques en e-learning adaptatif

Hafsa Tahni, Ismail El Haddioui

Using a Markovian Probabilistic Framework to Infer Students' Cognitive States and Optimize Pedagogical Interventions in the Learning Process

Mohammed MAHRAOUI , Ismail TAHIRI, Abdellatif EL AFIA

A RFE-Fisher-Binary Galaxy Swarm Optimisation for Feature Selection in Cancer classification

Saad Oumama, Mohamed Ouzineb , Badreddine Benyacoub

Construction de portefeuille sous contrainte de liquidité une approche par intelligence artificielle :Cas de la Caisse Marocaine des Retraites

BOUGHAIT Kaoutar, MADKOUR Jaouad, KABIRI Slimane, DAKKON Mohamed

AI and Generative Modeling for Crisis-Period Safe-Haven Analysis in Fiat and Cryptocurrency Markets

Hajar Errahmani, Asmaa Faris, Mohamed Dakkon

2nd Day: December 19, 2025

Planary Conference 1: "Presentiel"

10:00 AM - 13:00 PM

Moderators: Pr. BOUZELMATE Arij, Pr. AAMMOU Souhaib

Bio-Inspired Algorithms: Mathematical Optimization on Engineering Applications and Perspectives

Dr. Hachimi Hanaa, National School of Applied Sciences Kenitra Ibn Tofail University, Morocco

Planary Conference 2: "Presentiel"

Learning from Low-Quality Data Set-Valued Machine Learning for Prognostics & Health Management (PHM) and Survival Analysis

Dr. Luciano Sanchez Ramos, University of Oviedo, Spain

Planary Conference 3: "Remotly"

Title of Talk

Dr. ADLY Samir, University of Limoges, France

Lunch Break

Session of communication (S02)- Online

15:00 PM – 18:30 PM

- Room: N°61

Chairs: Pr. BAHBAH Asmae , Pr. Yekhlef Fatima

A Fully Homomorphic Encryption by Offloading Bootstrapping to Trusted Execution Environments

El Hassane LAAJI, and Abdelmaek AZIZI

Monthly Prediction of Photovoltaic Power Using Artificial Intelligence Techniques in Marrakech, Morocco

Salma Riad, Naoual Bekkioui, Hamid Ez-zahraouy

Deepfake Video Detection through Feature Folding

Achraf Ibnouzaher, Nouredine Moumkine

Entrepreneurial legitimacy in the age of artificial intelligence: towards digital legitimacy for Moroccan women entrepreneurs

Kobi Hajar, Allal Zouhair, Elmenzhi Zenab, El Fassi Samia

A Hybrid Framework for Enhancing AI Risk Management in Banking Systems

Jahjah Ayman

- Room: N°63

Chairs: Pr. EL HICHAMI Outman, Pr. BENDAHMANE Ahmed

Optimization method for convolutional neural networks for face recognition resistant to variations and occlusions

Hicham Benradi, Maryem Ait Moulay, Hamza Natek, Rachid Karra, Abdelali Lasfar

Towards an Intelligent Logistic Digital Twin Architecture for production logistics optimization

Hanae ZARKTI, ABDELFETTAH SEDQUI

Assessing the Effectiveness of Caching Mechanisms in Supporting Consumer Mobility in NDN

BELLAJ Mohammed

Deep Learning in Macroeconomic Forecasting: A literature Review with Applications to Morocco's Economic Growth

Zineb OTMANI, Radouane RAOUF

A Conceptual IoT and AI-Driven Framework for Smart and Access Service Management in Logistics Zones

Ghizlane ELOUALIDI, Mostafa DERRHI, Zineb CABRANE

NLP-Based Conceptual Framework for Knowledge Management in Quality Problem Solving within the Manufacturing Industry

Kaoutar Bakkali Tahiri, Abderrazak Boumane, Youness CHATER

- Room: N°64

Chairs: Pr. MOURADI Abderrahman, Pr. NINIS Ouafae

Tiny machine learning for processing big medical data

NAJJAR Mohammed, NAHID Mohammed, BOUYGHF Hamid

Hybrid Neural Network-based Modeling of Crowd Dynamics with Mobility and Emotional Contagion

Rachida Bouchkara, Aissam Jebrane, Oumayma Banouar, Abdelilah Hakim

Theoretical and Experimental Study of Common Imputation Methods for AI

Tarik El Mouddeh, Bahaa Eddine Elbaghazaoui, Mohamed Amnai

Modeling Learner Performance through Multi-Class Deep Classification in Adaptive Learning Environments

Ikram Amzil, Souhaib Aammou, Zakaria Tagdimi, Hicham Er-radi

Development of an Embedded Smart Glove System for Hand Gesture Recognition

Nourdine Herbaz, Hassan El Idrissi, Hamza Sabir, Abdelmajid Badri

Coffee Break

3rd Day: December 20, 2025

Planary Conference 1: "Presentiel"

10:00 AM - 11:30 PM

Moderator: Pr. Lamarti Sefian Mohammed, Pr. LAMNI Abdellah

Revolutionizing Healthcare: Harnessing the Power of Machine Learning for a Healthier Tomorrow

**Dr. El Afia Abdellatif, National School of Computer Science and Systems Analysis
Mohammed V University, Morocco**

Planary Conference 2: "Remotly"

11:45 AM - 13:00 PM

Machine Learning: A Mathematician's Perspective

**Dr. Enrique Zuazua, University of Deusto,
Spain**

Coffee Break

PROGRAM

Posters session

13:00 PM - 14:00 PM

From Stochastic Parrots to Pedagogical Partners: A Conceptual Framework for Designing Trustworthy AI in Instructional Engineering

Abdelmounaim AZINDA, Mohamed Khaldi

Perceptions, uses, and challenges related to Artificial Intelligence among Moroccan University Students: An Exploratory Study

Kaoutar Cheddadi, Hajar Zekeik, Abd Rafik Laakel Hemdanou, Abdelfettah Maouni, Anouar Aidoun, Mohammed Lamarti Sefian, Abdellah Mellouki

Limitations of Traditional Models in Immersive and Adaptive Learning Environments

Hind Tahir, Najoua Hrich, Mohamed Khaldi

Towards Cognitive Resource Indexing: Proposing a Correspondence Matrix between Multimedia Formats and Learning Styles in Adaptive Systems

YAQINE Kawtar, LAMARTI Sefian Mohammed, KHALDI Mohamed

IoT-enabled urban green spaces for water-scarce cities: Tetouan case

Yassin Meklach, Mohamed Lamarti Sefien

Educational Artificial Intelligence and Intelligent Tutoring Systems: Foundations, Evolution, and Contributions to Adaptive Learning

Al-cheikh Chayma, Tahiri Ismail, Khaldi Mohamed

Lunch Break

Session of communication (S03) - Online

15:00 PM - 18:30 PM

- Room: N°61

Chairs: Pr. DAKKON Mohamed, Pr. EL MAROUFI Abdelouahed

Predictive Modeling of Moroccan Students' PISA Performance Using Machine Learning Approaches

Mohamed Latifi, Abdelouahed El Maroufi

Optimisation multi-objectifs pour un contrôle de gestion durable : Arbitrage entre performance économique et critères ESG dans l'industrie aéronautique

RHALI Najoua , SAID Youssef

Comparative Analysis of NLP Feature Extraction Techniques for Fraud Detection in Banking Communications

Rabab Cherkaoui, El Mokhtar En-Naimi, Mohamed Kouissi

Digital Inspection System for Heavy Vehicles Using YOLO-Based Automatic License Plate Recognition

TOUZANI Kawthar, YOUSSEFI Abdelkader

Pull and Push Entrepreneurial Motivations: Literature Review, Theoretical Positions, and Limitations of the Dichotomous Model

Naima SALLE, Abdelmonaim Tlidi

Relevant performance indicators for small businesses

Naima SALLE, Abdelmonaim TLIDI

- Room: N°63

Chairs: Pr. NUINO Ahmed, Pr. EL HOUDNA Youssef

Integration of AI-Driven Augmented Reality into Intelligent Tutoring Systems: Enhancing Adaptive Learning Environments

Salma EL BOUJNANI, Mohamed KHALDI, Zekeik Hajar

Prévision du PIB : Comparaison des approches économétriques, de Machine Learning et hybrides Cas du maroc

Hafsa Amanchar , Mohamed Dakkon

A Context-Aware TPACK Framework for Designing Technopedagogical Curriculum Experiences Using MOOCs and E-Portfolios in Pre-Service Teacher Education

HOUDA AMGARNI, AMEL NEJJARI, MOHAMED KHALDI

A Decentralized Federated Learning Architecture for Vehicle Inspection Centers Using Blockchain

Rachid abibou, Youssef Zaz, Saad Motahhir

• **Room: N°64**

Chairs: Pr. EL AMRANI Hamid, Pr. CHRAYAH Mohamed

Optimizing Telemedicine with Federated Learning: A Systematic Review of Recent Works

Hanaa EL AFIA ,Said Ohamouddou , Raddouane Chiheb, Abdellatif El Afia

Deep Learning and Tree-Based Models for Option Pricing: Beyond Black-Scholes

Mohamed Hedi Riahi, Youssef Mejri, Bechir Mannoubi

Facilities, equipment, basic services, and their role in the territorial framework of the city of Tetouan

Ibrahim EL MEDYDY , Naima SALLE, Abdelmonaim TLIDI

Prévision de la demande en services publics à l'aide des techniques de Machine Learning : Cas Amendis Tétouan

LAMIAA FARES, CHAOUNI Mohamed, DAKKON Mohamed

Closing

CONCLUSION

This conference promises to be a dynamic platform for sharing innovative ideas and advancing research in Mathematics and Artificial Intelligence. Through its diverse scientific program, it fosters meaningful exchanges, encourages interdisciplinary collaboration, and supports the development of forward-looking solutions to contemporary challenges. It also reflects our commitment to openness, inclusivity, and scientific excellence by welcoming both on-site and remote participants.



We thank all contributors to this event, including the scientific committee, the organizing committee, the sponsors, and all participants whose efforts and engagement have made this conference possible and meaningful.

We look forward to welcoming you to Martil for a fruitful and enriching experience.

With our sincere thanks,
The MAIA Organizing Committee

WE EXTEND OUR SINCERE APPRECIATION TO OUR PARTNERS



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