Tunisian-Algerian Joint Laboratory of Scientific Excellence

University of Sfax
TUNISIA

RESEARCH LABORATORY ON DEVELOPMENT AND CONTROLL OF DISTRIBUTED APPLICATIONS

LIRE
Laboratoire d'Informatique REpartie

TACC 2025

5th Tunisian-Algerian Conference on Applied Computing

AI4SE 2025

1st Tunisian-Algerian Winter School on Artificial Intelligence for Software Engineering

Welcome Message

On behalf of the Organizing Committee, it is our great pleasure to welcome you to the 5th Tunisian-Algerian Conference on Applied Computing (TACC 2025), held from November 20 to 22, 2025, in the beautiful city of Sousse, Tunisia.

Since its inception, TACC has become a prominent scientific event that brings together researchers, academics, and practitioners from Tunisia, Algeria, and other countries to share advances and foster collaboration in the broad field of applied computing.

The fifth edition of TACC continues its mission of strengthening scientific cooperation between Tunisian and Algerian institutions, promoting interdisciplinary research, and encouraging the dissemination of high-quality contributions that bridge theory and practice in computer science and engineering.

We would like to express our sincere gratitude to all the authors, reviewers, keynote speakers, and committee members for their dedication and contribution to ensuring the scientific quality of this event. Our appreciation also goes to the organizing partners and sponsors whose support makes TACC 2025 possible.

TACC 2025 Organizing Committee

LABEX-TA Laboratory: MeFoGL

TACC 2025 is organized within the framework of the Tunisian-Algerian Joint Laboratory of Scientific Excellence (Labex-TA), a bilateral research initiative established between the two laboratories:

- Research Laboratory on Development and Control of Distributed Applications (ReDCAD)
  https:// www.redcad.tn
- Research Laboratory on Distributed Computing (LIRE)
  https://www.lire-lab.com

The LABEX-TA laboratory is co-directed by:

- Prof. Faiza Belala, University of Constantine 2, Algeria
- Prof. Ahmed Hadj Kacem, University of Sfax, Tunisia

The main topic of this project is Formal Methods for Software Engineering (MeFoGL). This project aims to propose approaches for verifying and developing systems-of-systems (SoS). Systems-of-Systems technology represents a major advancement for the effective implementation and analysis of large-scale, complex, independent, and heterogeneous systems that operate cooperatively. In essence, a System of Systems consists of a system composed of a set of interdependent sub-systems that interact with one another, forming a unified and complex whole.

AI4SE Winter School

The **Winter School on Artificial Intelligence for Software Engineering** (AI4SE) offers a focused one-day program dedicated to exploring how recent advances in AI are reshaping the foundations , methods, and tools of modern software development. As software systems continue to grow in complexity, scale, and societal impact, engineering reliable, efficient, and secure solutions has become increasingly challenging.

This winter school aims to provide researchers, PhD and Master students, with state-of-the-art insights into the ways AI can enhance software engineering processes, from system design and quality assessment to maintenance and intelligent automation.

The program features in-depth tutorials delivered by recognized experts working at the intersection of artificial intelligence and software engineering. Each session combines conceptual foundations with practical case studies, illustrating how AI-driven techniques are applied to real-world software projects.

Planned Lectures

- **Tutorial 1**
  Title: Improving Software Quality: Research-Driven Industrial Case Studies
  Presenter: Dr. Mohamed Wiem Mkaouar
- **Tutorial 2**
  Title: The Agents Among Us! A First Look into How AI Agents Are Reshaping Software Development
  Presenter: Dr. Mohamed Wiem Mkaouar
- **Tutorial 3**
  Title: Empowering Financial Systems with Artificial Intelligence: From Predictive Models to Generative Intelligence
  Presenter: Dr. Takoua Abdelatif

Conference Committee

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Prof. Mohamed Benmohammed, University of Constantine 2, Algeria

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Prof. Faiza Belala, University of Constantine 2, Algeria

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Prof. Meriem Belguidoum, University of Constantine 2, Algeria

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Program Committee

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Afef	Mdhaffar	University of Sfax, Tunisia
Chaker	Mezioud	University of Constantine 2, Algeria
Mouna	Rekik	University of Sfax, Tunisia
Sahar	Smaali	University of Constantine 2, Algeria
Bechir	Zalila	University of Sfax, Tunisia

School Committee

Honorary Chairs

Prof. Mohamed Jmaiel, University of Sfax, Tunisia
Prof. Mohamed Benmohammed, University of Constantine 2, Algeria

General Chairs

Prof. Ahmed Hadj Kacem, University of Sfax, Tunisia
Prof. Faiza Belala, University of Constantine 2, Algeria

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Steering Committee

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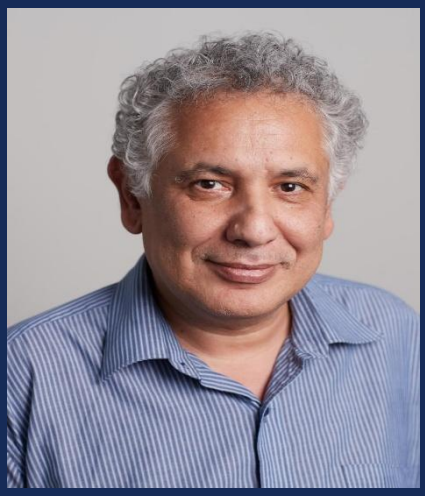
Dr. Zakaria Benzadri, University of Constantine 2, Algeria
Prof. Meriem Belguidoum, University of Constantine 2, Algeria

The program

	Winter School	TACC Conference	
	Thursday 20.11.2025	Friday 21.11.2025	Saturday 22.11.2025
08:30 - 09:00	Registration	Registration	
09:00 - 10:00		Invited talk Prof. Boualem Benatallah	Invited talk Prof. Brahim Hnich
10:00 - 10:30	Welcoming Cocktail		
10:30 - 11:00	Opening	Coffee Break	
11:00 - 13:00	**Tutorial 1** Dr. Mohamed Wiem Mkaour	**Session 1** AI & Machine Learning for Software and Security	**Session 3** Data Integration, Personalization & IoT
13:00 - 14:30	Lunch		
14:30 - 16:00	**Tutorial 2** Dr. Mohamed Wiem Mkaour	**Session 2** Healthcare, Mental Health & Cyber-Physical Systems	Closing
16:00 - 17:30	**Tutorial 3** Dr. Takoua Abdellatif		

Keynote Speaker



Boualem Benatallah
Full Professor
Dublin City University, Ireland

Biography: Prof. Boualem Benatallah is a Full Professor of Computing at Dublin City University (Ireland) since January 2022. Before joining DCU, he spent over two decades at UNSW Sydney (Australia), where he progressed from Senior Lecturer to Scientia Professor. He has also served as a visiting professor at leading institutions such as INRIA-LORIA, Trento University, Clermont-Ferrand, University of Lyon, and Paris Dauphine University. His research interests encompass service-oriented and web services middleware, business process automation, process mining, crowdsourcing quality control, automated and AI-augmented data curation, and conversational AI. He has authored over 350 peer-reviewed publications, including more than 100 journal papers, in top-tier venues, and has attracted significant competitive research funding. Prof. Benatallah is a frequent keynote speaker, conference chair, and guest editor for leading journals. He has served on the steering committees of major conferences such as BPM and ICSOC, and currently co-chairs the CoopIS conference series. He is also on the editorial boards of prestigious journals including *ACM Computing Surveys*, *ACM Transactions on the Web*, and *IEEE Transactions on Services Computing*. In addition to his research leadership, he has supervised over 38 research students (33 PhDs and 5 Masters) to completion and contributed to large-scale collaborative initiatives such as the Smart Services CRC and Data to Decisions CRC. Prof. Benatallah is a Fellow of IEEE, AIIA, and EAI, recognizing his outstanding contributions to computer science and service computing.

Title : LLM-based agents : From Digital Services to Cognitive Agents

Abstract: AI enabled augmentation promises to transform services through data-driven automation and insights. The entire service economy is rapidly shifting to AI enabled augmentation, embracing deep changes that are required for increased productivity and effectiveness. Nonetheless, despite the early adoption, AI augmented service technologies are still only in their preliminary stages of development, with several unsolved challenges stemming from lack of computational abstractions and models to reason about ambiguity and uncertainty that are inherent in data-driven processes. We will revisit abstractions, concepts, and techniques in data-driven service models and middleware. A key challenge also lies the synergy between human and machine, and AI – augmentation will seek to achieve bridging the gap between disparate systems and processes, and between human and machine We will discuss synergies between intent-based composition, composition synthesis, quality control and other technologies as step forward to scale AI augmented services enablement.

Keynote Speaker

Biography: Brahim Hnich is currently a Professor of Computer Science at the department of Computer Science at Monastir University and the director of its research Masters programme. He holds a Bachelor of Science degree in Computer Engineering from Bilkent University (1997, Turkey), a PhD in Computer Science from Uppsala University (2003, Sweden), Docentship in CS from Uppsala University (2004, Sweden), as well as a HDR in Computer Science from Montpellier II University (2008, France). He was an associate editor of the Artificial Intelligence Journal (2009-2015). Two of his research papers have been selected among the best papers at the European Conference on Artificial Intelligence in 2004 and at the International Joint Conference on Artificial Intelligence in 2005. In 2004, Hnich has been nominated by University College Cork and has been shortlisted (among the 8 finalists out of 41 nominees worldwide) for the President of Ireland Young Researcher Award 2005. In 2003, Hnich's PhD Thesis was nominated for the European Coordinating Committee for Artificial Intelligence's best theses award. His research interests include, among others, artificial intelligence, machine learning, and constraint programming

Brahim Hnich
Full Professor
Monastir University, Tunisia

Title : TRewriting Code, Rethinking Engineers: The Future of Software Engineering in the Age of Generative AI

Abstract: Software engineering is undergoing a profound transformation with the rise of generative AI. Tools like large language models and code assistants are not only accelerating development but redefining how we design, build, and reason about software. This keynote explores the evolving role of the developer in an era where AI acts as a collaborator—generating code, tests, documentation, and even entire system designs. Beyond technical disruption, we'll examine shifts in required skills, team dynamics, and the ethical and organizational challenges of AI-augmented development. By blending industry trends, academic insight, and future-facing scenarios, this talk reimagines the future of software engineering—not just as faster code production, but as a fundamental rethink of the engineering discipline itself.

Winter School Lecturer

Biography: Mohamed Wiem Mkaouer is currently an Associate Professor in the College of Innovation & Technology at the University of Michigan-Flint. He is the Graduate Director of the Master's in Software Engineering and the Master's in Artificial Intelligence. His research interests are at the intersection of Software Engineering and Artificial Intelligence. It includes software quality assurance, and systems refactoring, and he has co-authored over 140 peer-reviewed papers, including works appearing in top venues like TSE, TOSEM, EMSE, CHI, and ASE. Dr. Mkaouer has been PI/Co-PI on $4.5 Million in federally funded projects. He is the recipient of 6 best-paper / presentation awards, and he is the recipient of the Rochester Institute of Technology 2020 GCCIS best-emerging scholar award.

Mohamed Wiem Mkaour
Associate Professor
University of Michigan-Flint, USA

Tutorial 1 : Improving Software Quality: Research-Driven Industrial Case Studies

Abstract: Software quality is essential for maintaining our digital society. It forms the foundation of software systems to grow and meet our society's technical and organizational needs. However, the expansion of software systems and their integration with intelligent algorithms introduces new challenges related to quality, maintenance, and privacy. In this tutorial, I will explore the challenges developers face in enhancing the quality of their software systems. Additionally, I will highlight some of my recent industry collaborations that created automated and human-in-the-loop techniques to reorganize software.

Tutorial 2 : The Agents among us! A first look into how AI Agents are reshaping software development

Abstract: AI coding agents are rapidly transforming the landscape of software engineering by automating critical tasks such as feature development, debugging, and testing. Given their growing impact, the research community needs a comprehensive analysis of how these agents are deployed and used in live software projects. In this context, we present an initial large-scale exploration of Agent-Authored Pull Requests (Agentic-PRs) within real-world GitHub repositories. Our exploration reports on 932,791 Agentic-PRs generated by five prominent agents—OpenAI Codex, Devin, GitHub Copilot, Cursor, and Claude Code—spanning 116,211 distinct repositories and involving 72,189 developers. Furthermore, we curate the AIDev subset, consisting of 33,596 Agentic-PRs from 2,807 repositories with over 100 stars, enriching the data with crucial information like comments, reviews, commits, and related issues.

Winter School Lecturer

Biography: Prof. Takoua Abdellatif is an Associate Professor of Computer Science at ENISO – University of Sousse and Co-founder of Horizon University. She holds a Ph.D. in Computer Science from INPG (Grenoble, France) and serves as an NVIDIA Ambassador in AI and Big Data. Her research focuses on AI-driven analytics, scalable and secure systems, and privacy-preserving data architectures.

She has coordinated and contributed to projects such as *Big Data Audit for Privacy Protection*, *Scalable Telemedicine Systems*, and *Drone-Based Surveillance Platforms*. Prof. Abdellatif collaborates with many industrial actors like Proxym Group and the National Military Research Center (CRM) on research and innovation initiatives bridging academia and industry. She has published in more 40 international conferences and than 14 international journals such as IEEE Access and Concurrency and Computation, co-chaired IEEE AICCSA 2024, and organized the Women in STEM Symposium 2025. Her recent work explores Generative AI and trustworthy large-scale data pipelines for intelligent decision-making.

Takoua Abdellatif
Associate Professor
University of Sousse, Tunisia

Tutorial 3 : Empowering Financial Systems with Artificial Intelligence: From Predictive Models to Generative Intelligence

Abstract: This tutorial explores how Artificial Intelligence (AI) and Generative AI (GenAI) are transforming financial systems through intelligent data-driven automation and enhanced decision-making. The first part provides an overview of AI contributions in the financial domain, including credit scoring, fraud detection, customer analytics, and risk modeling, emphasizing scalability, security, and trustworthiness. The second part focuses on Generative AI and Retrieval-Augmented Generation (RAG) architectures for financial applications. Using Bankerise, an AI-powered financial platform developed by Proxym Group, as a case study, we demonstrate how domain-adapted LLMs, knowledge graphs, and RAG pipelines can empower digital banking and financial advisory services with explainability and accuracy. The tutorial combines conceptual insights, practical design examples, and research perspectives on integrating GenAI into secure, high-stakes financial ecosystems.

Winter School Program
Thursday, 20.11. 2025

09:00 - 10:00	**Registration**
10:00 - 10:30	**Welcoming Cocktail**
10:30 - 11:00	**Opening**
11:00 - 13:00	**Tutorial 1: Improving Software Quality: Research-Driven Industrial Case Studies** **Lecturer: Dr. Mohamed Wiem Mkaour** **Abstract**. Software quality is essential for maintaining our digital society. It forms the foundation of software systems to grow and meet our society's technical and organizational needs. However, the expansion of software systems and their integration with intelligent algorithms introduces new challenges related to quality, maintenance, and privacy. In this tutorial, I will explore the challenges developers face in enhancing the quality of their software systems. Additionally, I will highlight some of my recent industry collaborations that created automated and human-in-the-loop techniques to reorganize software.
13:00 - 14:30	**Lunch**
14:30 - 16:00	**Tutorial 2: Improving Software Quality: Research-Driven Industrial Case Studies** **Lecturer: Dr. Mohamed Wiem Mkaour** **Abstract**. AI coding agents are rapidly transforming the landscape of software engineering by automating critical tasks such as feature development, debugging, and testing. Given their growing impact, the research community needs a comprehensive analysis of how these agents are deployed and used in live software projects. In this context, we present an initial large-scale exploration of Agent-Authored Pull Requests (Agentic-PRs) within real-world GitHub repositories. Our exploration reports on 932,791 Agentic-PRs generated by five prominent agents—OpenAI Codex, Devin, GitHub Copilot, Cursor, and Claude Code—spanning 116,211 distinct repositories and involving 72,189 developers. Furthermore, we curate the AIDev subset, consisting of 33,596 Agentic-PRs from 2,807 repositories with over 100 stars, enriching the data with crucial information like comments, reviews, commits, and related issues. This comprehensive exploration offers data-driven insights into the dynamics of AI adoption, its immediate impact on developer productivity, and the evolving nature of human-AI collaboration in the new era of software development.
16:00 - 17:30	**Tutorial 3: Empowering Financial Systems with Artificial Intelligence: From Predictive Models to Generative Intelligence** **Lecturer: Dr. Takoua Abdellatif** **Abstract**. This tutorial explores how Artificial Intelligence (AI) and Generative AI (GenAI) are transforming financial systems through intelligent data-driven automation and enhanced decision-making. The first part provides an overview of AI contributions in the financial domain, including credit scoring, fraud detection, customer analytics, and risk modeling, emphasizing scalability, security, and trustworthiness. The second part focuses on Generative AI and Retrieval-Augmented Generation (RAG) architectures for financial applications. Using Bankerise, an AI-powered financial platform developed by Proxym Group, as a case study, we demonstrate how domain-adapted LLMs, knowledge graphs, and RAG pipelines can empower digital banking and financial advisory services with explainability and accuracy. The tutorial combines conceptual insights, practical design examples, and research perspectives on integrating GenAI into secure, high-stakes financial ecosystems.

Conference Program

Friday, 21.11.2025

08:30 - 09:00	**Registration**
09:00 - 10:30	**Keynote Speech by Prof. Boualem Benatallah** **Title: LLM-based agents : From Digital Services to Cognitive Agents** **Session chair : Prof. Mohamed Jmaiel**
10:30 - 11:00	**Coffee Break**
11:00 - 13:00	**Session 1: AI & Machine Learning for Software and Security** **Session Chair : Dr. Hatem Hadj Kacem**
	Nada Hanad, Mehdi Acheli, Mohamed Sellami, Walid Gaaloul, Jean Baptiste Defard, Quentin Fayet and Emmanuel Fusté. ***Between Transparency and Confidentiality: Black-Box Modeling for Security Rating***
	Houwayda Messaoudi, Asma Mâalej and Hatem Hadj-Kacem**.** ***StructBot: An Adaptive Pipeline for Context-Aware BPMN Generation in Healthcare***
	Moatez Ghabri, Imen Chaari and Yessine Hadj Kacem. ***Effort Estimation in Software Engineering Using Attention-Based Autoencoders and Ensemble Learning***
	Mohamed Achraf Zrig, Afef Jmal Maâlej. ***ReentrAI: A Novel Hybrid AI Solution for Reentrancy Vulnerability Detection in Smart Contracts***
	Hadil Hamdi, Mouna Rekik and Ismaël Bouassida Rodriguez. ***Comparative Study of Machine Learning and Deep Learning Algorithms for Anomaly Detection in DevOps Pipelines***
13:00 - 14:30	**Lunch**
14:30 - 16:00	**Session 2: Healthcare, Mental Health & Cyber-Physical Systems** **Session Chair: Dr. Saoussen Cheikhrouhou**
	Riad Helal, Akram Seghiri, Faiza Belala and Nabil Hameurlain. ***A Formal Analysis of Cyber-Physical Systems Requirements***
	Rania Slimen, Mariem Haoues and Nadia Bouacida. ***The Impact of Diet and Lifestyle Habits on Mental Health Status***
	Mohamed Ouassim Labraoui, Zakaria Benzadri, and Naila Marir**.** ***Mapping the Landscape of LLM-Powered Clinical Decision Support Systems: A Bibliometric Analysis***
	Mohammed Bekkouche, Melissa Meski, Yousra Khodja and Sidi Mohammed Benslimane. ***Supervised Machine Learning Approaches for Log-Based Anomaly Detection: A Case Study on the Spirit Dataset***

Conference Program
Saturday, 22.11.2025

09:00 - 10:30	**Keynote Speech by Prof. Brahim Hnich** **Title: TRewriting Code, Rethinking Engineers: The Future of Software Engineering in the Age of Generative AI** **Session Chair: Dr. Slim Kallel**
10:30 - 11:00	**Coffee Break**
11:00 - 13:00	**Session 3: Data Integration, Personalization & IoT** **Session Chair : Yessine Hadj Kacem**
	Abir Masmoudi, Nour Aridhi, and Lamia Hadrich Belguith. ***From Comments to Insight: Sentiment Analysis of Tunisia's Telecom Operators***
	Said Taktak, Zoubair Mabrouk, Slim Kallel and Ahmed Hadj Kacem. ***Integration of Heterogeneous Data using AI Semantic Matching for Decision Support Systems Evolution***
	Rahma Trabelsi, Ghofrane Fersi and Mohamed Jmaiel. ***F-LiBC: Fog-based Lightweight Behavioral Contract Assignment***
	Maha Rammeh, Nizar Omheni, and Ahmed Hadj Kacem. ***A Survey of User Profile Fragmentation in Web Environments: Implications for Personalization and Identity***
	Chaima Bouzeghla, Aya Hassina Bakhouche and Rachida Boucebci. ***TripTrove: An intelligent tourist recommendation system***
13:00 - 14:30	**Lunch**
14:30 - 16:00	**Closing**

Partners

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Association of ACM Tunisia Computer Science and Mathematics

Contact & Information

+216 23 37 47 39

bouassida@redcad.tn

www.redcad.tn/events/tacc2025

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