



Making Digital Twins  
for a Changing World

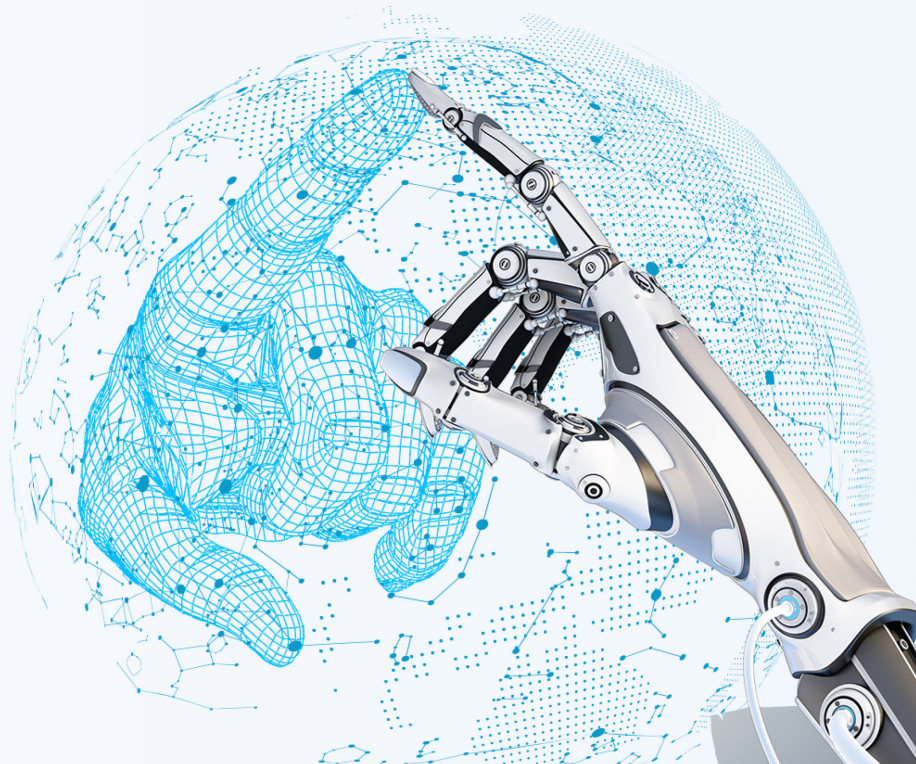


# DigiTwin 2023 Program

The 3rd Digital Twin  
International Conference

 11<sup>th</sup>-13<sup>th</sup> October, 2023

 Gif-sur-Yvette, France



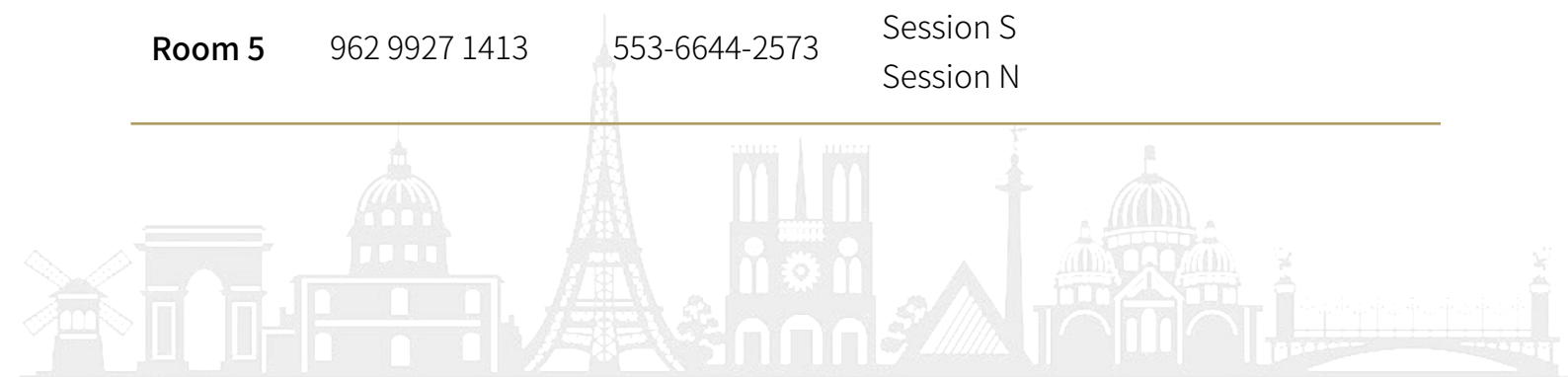


# Online Room ID List

**Please check your registered email box for password.**

If you've registered for the conference but have not received Zoom and Tencent online room password, please contact: [jiaolei@seu.edu.cn](mailto:jiaolei@seu.edu.cn) [ru.wang13@bit.edu.cn](mailto:ru.wang13@bit.edu.cn)

No.	Zoom ID	Tencent ID	Items
Room 1	951 3395 7516	865-6014-8565	Opening Ceremony Awards and Closing Ceremony Keynote 1-6 Session CAF Session AP1- AP9 Session MS-1
Room 2	913 6804 0930	558-3473-8731	Session MS-2 Session H Session AP10 - AP13 Session RM
Room 3	914 8080 9511	779-9597-5313	Session T Session E Session AM Session ADV
Room 4	935 8413 8771	543-4058-7725	Session CC Session R
Room 5	962 9927 1413	553-6644-2573	Session S Session N





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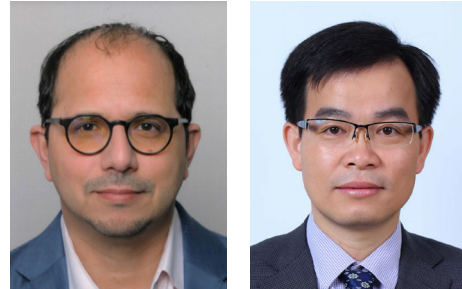


## The 3<sup>rd</sup> Digital Twin International Conference (DigiTwin 2023)

# Welcome

***Dear Distinguished Guests, Colleagues, and Friends,***

*On behalf of the Digital Twin International Scientific Committee (DTIAC) and the Conference Organizing Committee, we cordially welcome each of you to the 3<sup>rd</sup> Digital Twin International Conference (DigiTwin 2023).*



*The Digital Twin is a digital representation of an asset, with connections that allow convergence and synchronization between the asset and its digital counterpart at a specified frequency and fidelity. The significance of the digital twin in the digital economy and society has been increasingly acknowledged in various applications in recent years.*

*DigiTwin 2023 aims to provide an international platform for scientists, researchers, engineers, students, and beyond to exchange the latest developments, research findings, and industrial applications on digital twin. The theme of DigiTwin 2023 is “Making Digital Twins for a Changing World” . We believe that digital twins are instrumental in adapting to and shaping our evolving industrial, economic, and societal landscapes.*

*Prof. Fei Tao first envisioned this international conference in 2018. While our original intention was to host a face-to-face conference, the unpredictable repercussions of the post-COVID-19 landscape compelled us to transition to a fully virtual format. Interestingly, this shift mirrors the cyber-physical essence of the digital twin.*

*In the aftermath of the pandemic and the new world order, we eagerly anticipate the opportunity to convene with our colleagues in person at upcoming digital twin international conferences. We are committed to nurturing and sustaining this conference for many more decades ahead.*

*We are grateful to all our colleagues, especially the organizers and session chairs. Their collective efforts have resulted in a comprehensive conference program featuring 6 keynote speeches, 14 scientific sessions, 95 presentations, and multiple awards.*

*We are pleased to note that over 1500 participants from 20 different countries and regions have registered for the conference, and we hope that this conference will build an international platform for fostering international collaboration on digital twins.*

*To conclude, we expect a resounding success for the conference, and we send our best wishes to all participants. Should you have any recommendations for improving the conference experience, we warmly invite you to share your ideas and suggestions with us.*

**Nabil Anwer      and      Fei Tao**

*Nabil Anwer      Fei Tao*

**General Chairs of the 3<sup>rd</sup> Digital Twin International Conference (DigiTwin 2023)**

**Paris and Beijing, October 11th, 2023**

# Acknowledgement

We would like to extend our most sincere thanks to all members of the organizing committee, the Digital Twin International Advisory Board, and volunteers for their support, without which, DigiTwin 2023 would not have been possible.

Furthermore, we are most grateful for the generous and continued support from all the sponsors.

## Organizers

- LURPA (Automated Production Research Laboratory)
- Paris-Saclay University, France
- École Normale Supérieure Paris-Saclay, France
- Digital Twin (<https://digitaltwin1.org>)
- Taylor & Francis Group

## Co-Organizer

- Digital Twin International Research Center, Beihang University
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- SAGIP
- GDR MACS
- IRT SystemX

## Sponsors





# The Digital Twin International Advisory Committee

Based upon Digital Twin (<https://digitaltwin1.org>), this conference is organized under the scientific guidance of the Digital Twin International Advisory Committee (DTIAC) (<https://digitaltwin1.org/advisors>). The DTIAC is composed of 97 world-renowned domain experts who are advisors and ambassadors of Digital Twin.

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# Additional Information

## 1. Secretary Contact

If you have any questions about conference logistics, please feel free to contact us.

- **Qinglin Qi** (China): [kylin3366@buaa.edu.cn](mailto:kylin3366@buaa.edu.cn)
- **Yifan Qie** (France): [yifan.qie@ens-paris-saclay.fr](mailto:yifan.qie@ens-paris-saclay.fr)
- **Zhiping Wang** (France): [zhiping.wang@univ-tln.fr](mailto:zhiping.wang@univ-tln.fr)
- **Li Yi** (Germany): [li.yi@mv.uni-kl.de](mailto:li.yi@mv.uni-kl.de)

## 2. Website

The complete conference program, together with additional information, can be found on the conference websites as follows.

<http://www.dtiac.com/>    <https://digitwin2023.sciencesconf.org/>

## 3. Call for Papers

The conference participants are welcomed to submit manuscripts to the open-access journal, Digital Twin, at <https://digitaltwin1.org/>. More information about Digital Twin, especially regarding the submission procedure, can be found at <https://digitaltwin1.org/for-authors/article-guidelines>. The articles will be published online with a valid DOI at the soonest 14 days since submission, followed by open peer review.



# General Program

Paris Time (CET)	Beijing time	Oct. 11 <sup>th</sup>					Oct. 12 <sup>th</sup>					Oct. 13 <sup>th</sup>			
9:00-9:30	15:00-15:30	Opening Ceremony					Keynote 3 Dr. Moubarak Gado and Dr. Lama Itani (Mathworks)					Keynote 5 Prof. Zhiguo Zeng			
9:30-10:00	15:30-16:00	Keynote 1 Prof. S. K. Ong					CAF6	H1	AM1	R1	N1	MS1-1	RM1	ADV1	
10:00-10:30	16:00-16:30	CAF1	MS2-1	T1	CC1	S1	CAF7	H2	AM2	R2	N2	MS1-2	RM2	ADV2	
10:30-11:00	16:30-17:00	CAF2	MS2-2	T2	CC2	S2	CAF8	H3	AM3	R3	N3	MS1-3	RM3	ADV3	
11:00-11:30	17:00-17:30	CAF2	MS2-2	T2	CC2	S2	CAF8	H3	AM3	R3	N3	MS1-3	RM3	ADV3	
11:30-12:00	17:30-18:00	CAF3	MS2-3	T3	CC3	S3	CAF9	H4	AM4	R4	N4	MS1-4	RM4	ADV4	
12:00-12:30	18:00-18:30	CAF4	MS2-4	T4	CC4	S4	LUNCH BREAK			N5	MS1-5		ADV5		
12:30-13:00	18:30-19:00	CAF5		T5	CC5	S5	LUNCH BREAK			N6	LUNCH BREAK				
13:00-13:30	19:00-19:30	LUNCH BREAK					Keynote 4 Dr. Zhen Xiang					MS1-6			
13:30-14:00	19:30-20:00	LUNCH BREAK					Keynote 4 Dr. Zhen Xiang					MS1-7			
14:00-14:30	20:00-20:30	Keynote 2 Prof. Alain Bernard					AP6	AP10	AM5	R5	Keynote 6 Prof. Tianliang Hu				
14:30-15:00	20:30-21:00	Keynote 2 Prof. Alain Bernard					AP7	AP11	AM6	R6	Keynote 6 Prof. Tianliang Hu				
15:00-15:30	21:00-21:30	AP1	MS2-5	E1	CC6		AP8	AP12	AM7	R7	Awards and Closing Ceremony				
15:30-16:00	21:30-22:00	AP2	MS2-6	E2	CC7		AP9	AP13	AM8	R8	Awards and Closing Ceremony				
16:00-16:30	22:00-22:30	AP3	MS2-7	E3	CC8							Awards and Closing Ceremony			
16:30-17:00	22:30-23:00	AP4	MS2-8	E4								Awards and Closing Ceremony			
17:00-17:30	23:00-23:30	AP5		E5								Awards and Closing Ceremony			

## Abbreviation:

**Session CAF:** Digital twin concept, architecture, and framework

**Session T:** Digital twin theory, method, key technologies and tools

**Session R:** Reliability Digital Twin

**Session AM:** Digital twin and additive manufacturing

**Session MS-1:** Digital twin-driven manufacturing system

**Session MS-2:** Digital twin driven manufacturing system

**Session CC:** Smart Construction and City

**Session ADV:** Advanced Manufacturing

**Session RM:** Digital twin for remanufacturing

**Session S:** Digital Twin Services Innovation

**Session N:** Digital Twin Network

**Session E:** Propulsion and Energy Systems

**Session H:** Digital Twin for Health Care

**Session AP:** Novel applications of digital twin



# Time Zone Conversion Table

Paris Time(CET)	Beijing Time	London Summer Time	Delhi Time	Sydney Time	Wellington Time	Seattle Time	New York Time
9:00-9:30	15:00-15:30	8:00-8:30	12:30-13:00	17:00-17:30	19:00-19:30	00:00-00:30	03:00-03:30
9:30-10:00	15:30-16:00	8:30-9:00	13:00-13:30	17:30-18:00	19:30-20:00	00:30-01:00	03:30-04:00
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10:30-11:00	16:30-17:00	9:30-10:00	14:00-14:30	18:30-19:00	20:30-21:00	01:30-02:00	04:30-05:00
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16:30-17:00	22:30-23:00	15:30-16:00	20:00-20:30	00:30-01:00	02:30-03:00	07:30-08:00	10:30-11:00
17:00-17:30	23:00-23:30	16:00-16:30	20:30-21:00	01:00-01:30	03:00-03:30	08:00-08:30	11:00-11:30



# OPENING CEREMONY



**Wednesday, 11<sup>th</sup> October, 2023**

(Paris Time) 9:00 - 9:30 (Beijing Time) 15:00 - 15:30



**Zoom ID: 951 3395 7516**

**Tencent ID: 865-6014-8565**

Paris Time	Beijing Time	Agendas
9:00	15:00	<b>Welcome Address</b> Prof. Nabil Anwer
9:05	15:05	<b>Digital Twin International Advisory Committee (DTIAC) Address</b> Prof. Andrew Y C Nee
9:10	15:10	<b>Congratulatory Address</b> Eng Guan Ang (Managing Director of Taylor & Francis Group China)
9:15	15:15	<b>Welcome Address</b> Prof. Fei Tao

# AWARDS AND CLOSING CEREMONY



**Friday, 13<sup>th</sup> October, 2023**

(Paris Time) 15:00 - 16:00 (Beijing Time) 21:00 - 22:00



**Zoom ID: 951 3395 7516**

**Tencent ID: 865-6014-8565**

Paris Time	Beijing Time	Agendas
15:30	21:30	<b>Introduction of award selection process for DigiTwin 2023</b> Prof. Xiaojun Liu
15:35	21:35	<b>Announcement of award recipients</b> Prof. Vincent Cheutet
16:05	22:05	<b>Introduction of award settings for DigiTwin 2024</b> Prof. Xiaojun Liu
16:10	22:10	<b>Introduction of the Digital Twin international journal</b> Guillaume Wright
16:20	22:20	<b>Announcement of the 4<sup>th</sup> Digital Twin International Conference (DigiTwin 2024)</b> Prof. Andrea Matta
16:25	22:25	<b>Acknowledgement</b> Prof. Nabil Anwer

# Keynote List

Zoom ID: 951 3395 7516

Tencent ID : 865-6014-8565

Password: Check your registered email box  
for password

<p><b>Keynote 1</b></p>	<p><b>Enabling Tools for Human-Machine Interaction</b>  <b>Professor S. K. Ong</b>          Fellow, International Academy for Production Engineering CIRP          Mechanical Engineering Department          College of Design &amp; Engineering          National University of Singapore</p>
<p><b>Keynote 2</b></p>	<p><b>Foundations of Digital Twin concept and applications</b>  <b>Professor Alain Bernard</b>          Fellow, French Academy of Technologies          Fellow, International Academy for Production Engineering CIRP          Digital Sciences Laboratory LS2N UMR CNRS 6004          Ecole Centrale de Nantes, Nantes Université</p>
<p><b>Keynote 3</b></p>	<p><b>Designing and Implementing Digital Twins</b>  <b>Dr. Lama Itani and Dr. Moubarak Gado</b>          Application engineer,          MathWorks</p>
<p><b>Keynote 4</b></p>	<p><b>Ensuring Trustworthiness of Downstream Machine Learning Models against Unsecured Data for Digital Twins</b>  <b>Dr. Zhen Xiang</b>          Postdoctoral Research Associate, Secure Learning Lab,          University of Illinois Urbana-Champaign, US</p>
<p><b>Keynote 5</b></p>	<p><b>Why PHM has HM? And how to achieve that through digital twin?</b>  <b>Professor Zhiguo Zeng</b>          Associate Professor HDR          CentraleSupélec, Université Paris-Saclay</p>
<p><b>Keynote 6</b></p>	<p><b>Digital Twin for Machine Tools: from concept to application</b>  <b>Professor Tianliang Hu</b>          Professor          School of Mechanical Engineering,          Shandong University, China</p>



# KEYNOTE 1



## Professor S. K. Ong

Fellow, International Academy for Production Engineering CIRP  
Mechanical Engineering Department  
College of Design & Engineering  
National University of Singapore

### Biography

SK Ong lectures at National University of Singapore, and her research interests are virtual and augmented reality applications in manufacturing, ubiquitous manufacturing, assistive technology and rehabilitation engineering. She is a pioneer in the research and development of augmented reality technologies application in product design and manufacturing. As a firm believer that research outcomes should benefit the general population, she leads the laboratory to apply these augmented reality technologies that have been developed for manufacturing in the assistive technology area. She is a Fellow of the International Academy for Production Engineering CIRP, where she was the 1st from the Asia region and the 4th female fellow in the world to be elected in 2012. She received the 2004 Outstanding Young Manufacturing Engineer Award, US Society of Manufacturing Engineers and the 2009 Emerging Leaders Award in Academia (US Society for Women Engineers). She has published 8 books and over 300 international refereed journal and conference papers, with a google citation of more than 12,449, and a H-index of 62.

### Title: Enabling Tools for Human-Machine Interaction

#### Abstract

Human-machine interaction (HMI) has been widely researched and reported, with approaches ranging from co-existence to collaboration and human-machine symbiosis. Many research and applications of HMI in human-robot collaboration and human-robot cooperation have been reported. Augmented Reality and Digital Twins have been applied in HMI. This presentation aims to provide an overview of the technical features and characteristics of various HMI approaches. The presentation will summarize the enabling tools for achieving human-machine symbiosis. The current limitation factors and future trends of human-machine symbiosis will also be discussed.

Wednesday, October 11<sup>th</sup> 2023

(Paris Time) 9:30 -10:30

(Beijing Time) 15:30-16:30

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# KEYNOTE 2



## Professor Alain Bernard

Fellow, French Academy of Technologies  
Fellow, International Academy for Production Engineering CIRP  
Digital Sciences Laboratory LS2N UMR CNRS 6004  
Ecole Centrale de Nantes, Nantes Université

### Biography

Emeritus Professor Alain Bernard, graduated in 1982, with a PhD achieved in 1989. He worked as Associate-Professor from 1990 to 1996 at Centrale Paris. From 1996 to 2001, he was appointed as a Full Professor in CRAN, Nancy I, and led the “Integrated Design and Manufacturing” team. Since 2001, he worked as a Full Professor at Centrale Nantes and was Dean for Research from 2007 to 2012. He was a Researcher at LS2N Laboratory (UMR CNRS 6004), and former head of the “Systems Engineering –Products-Processes-Performances” team. Prof. Bernard’ s research topics include Knowledge Management (KM), Product Lifecycle Management (PLM), information system modelling, enterprise modelling, systems performance assessment, virtual engineering and additive manufacturing. He has supervised more than 40 PhD students and published more than 150 papers in refereed international journals and books. Prof. Bernard has been the Vice President of France Additive (French Association on Additive Manufacturing) from 1993 to 2003. He renewed and chaired the WG5.1 of IFIP (Global Product Development for the whole product lifecycle) until 2020. He is Fellow Emeritus of CIRP (International Academy for Production Engineering). In 2018, he was elected as Fellow of the Academy of Technologies of France (Académie des technologies). From 2004 to 2021, he has been Scientific Advisor at the French Ministry for Higher Education, Research and Innovation.

### Title: Foundations of Digital Twin concept and applications

### Abstract

Digital Twin concept is relatively new. During the last 30 years, different evolutions of digital representation of objects and systems allowed enlarging the capabilities of interactions between real and digital worlds, with a new positioning and interaction with humans. More recently, industry 4.0 accelerated the development of Digital Twin from concepts to operational level. At the same time and in many sectors, the concept has been adapted and is to be adopted for various applications and usages. This keynote will try to introduce and illustrate such fundamentals, evolutions and applications.

Wednesday, October 11<sup>th</sup> 2023

(Paris Time) 14:00 -15:00

(Beijing Time) 20:00-21:00

Zoom ID: 951 3395 7516

Tencent ID: 865-6014-8565



# KEYNOTE 3



**Dr. Lama Itani**

Application engineer,  
MathWorks

**Dr. Moubarak Gado**

Application engineer,  
MathWorks

Thursday, October 12<sup>th</sup> 2023

(Paris Time) 9:00 -10:00

(Beijing Time) 15:00-16:00

Zoom ID: 951 3395 7516

Tencent ID: 865-6014-8565

## Biography

**Lama Itani** is an Application Engineer with the Academia Group at MathWorks. She holds an MSc in Mechanical Engineering and a PhD in Applied Optical Diagnostics from CentraleSupélec, France. Prior to joining MathWorks, she worked as Engine Optimization Engineer at Renault Group. At MathWorks, Lama supports instructors and researchers in integrating MATLAB/Simulink for AI applications.

**Moubarak Gado** is an application engineer at MathWorks since 2019 focusing on AI, digital twins, parallel computing and algorithm deployment. He holds a PhD in computational mechanics from University of Bordeaux (France) and University of the Basque country (Spain), a MSc in materials and processes from University of Lorraine & Arts et Métiers ParisTech & ENIM, and an Engineering Degree from ENIM. Prior to joining MathWorks, he was R&D engineer at CT Engineering Group where he worked on developing AI and simulation tools for predictive maintenance, anomaly detection, mechanical analysis, and structural optimization.

## Title: Designing and Implementing Digital Twins

### Abstract

In this talk on digital twins, we will address their significance, emphasizing the enhancement of design processes, acquiring pre-production technical insights, and operational optimization. We will explore various modeling methods, from physics-based to AI-driven representations, while addressing prevalent implementation challenges. Through real-world examples from our industry partners, we will discuss choices in twin construction, continuous updates, scalability concerns, and requisite skillsets. Practical applications on how MATLAB/Simulink were leveraged for designing and implementing digital twins will be highlighted through showcasing Atlas Copco's cost optimization and Nio's battery estimation pipeline for electrical vehicles.

# KEYNOTE 4



## Dr. Zhen Xiang

Postdoctoral Research Associate, Secure Learning Lab  
University of Illinois Urbana-Champaign  
USA

Thursday, October 12<sup>th</sup> 2023

(Paris Time) 13:00 -14:00

(Beijing Time) 19:00-20:00

Zoom ID: 951 3395 7516

Tencent ID: 865-6014-8565

### Biography

Zhen Xiang is a postdoc from Secure Learning Lab, University of Illinois Urbana-Champaign. He earned his PhD from Pennsylvania State University in 2022. Zhen Xiang's research interests cover many aspects of trustworthy machine learning, with a main focus on the robustness of machine learning models. He serves as the PC member for conferences such as ICLR, NeurIPS, and ICASSP, and reviewer for journals including TPAMI, TNNLS, and TIFS. Zhen Xiang is also the organizer of the first Trojan Removal Competition and the second Trojan Detection Challenge.

### Title: Ensuring Trustworthiness of Downstream Machine Learning Models against Unsecured Data for Digital Twins

#### Abstract

Digital twins have found extensive application across various domains, including smart manufacturing, health management, power and energy systems, vehicles and transportation, and smart cities. They play a pivotal role in boosting the performance of the machine learning models involved in these domains through data enrichment. However, the flourish of data representation also poses new threats on machine learning models. With careful data poisoning, the learned model may easily carry a backdoor such that the model output may be altered targetedly when the input is embedded with a specific trigger pattern. This presentation shows how machine learning models fail against backdoor attacks on 2D and 3D data that are popular for digital twins. Moreover, two categories of defenses based on training set cleansing and model inspection, respectively, are discussed.



# KEYNOTE 5



## Professor Zhiguo Zeng

CentraleSupélec, Université Paris-Saclay  
France

Friday, October 13<sup>th</sup> 2023

(Paris Time) 9:00 -10:00

(Beijing Time) 15:00-16:00

Zoom ID: 951 3395 7516

Tencent ID: 865-6014-8565

### Biography

Zhiguo ZENG received the Ph.D. degree in reliability engineering from Beihang university in 2016. After that, he joined CentraleSupélec, Université Paris-Saclay, and became a full professor in 2023. His research focuses on the characterization and modeling of the failure/repair/maintenance behavior of components, complex systems and their reliability, maintainability, prognostics, safety, vulnerability and security. Dr. ZENG is an author/co-author of more than 100 papers in highly recognized international journals and conferences. His research has been funded by important government funding agencies like ANR and ERC, and also important industrial companies like EDF, SNCF, Orange and GE Healthcare. He is editorial board member of International Journal of Data Analysis Techniques and Strategies, and the leading guest editor of the special issue on “Dependent failure modeling” of the journal Applied Science. He is the co-holder of industrial chair Risk and Resilience of Complex Systems and co-head of the master program “Risk, Resilience and Engineering Management” in Université Paris Saclay.

**Title: Why PHM has HM? And how to achieve that through digital twin?**

### Abstract

Prognostics and Health Management (PHM) has been a hot topic in academia and industry for many years. However, most of the research effort is on developing more accurate and efficient algorithms for remaining useful life (RUL) prediction. How to make use of the predicted RUL to support health management is not well studied as compared to the RUL prediction problem. One of the most important use case for health management is maintenance planning, i.e., making decisions regarding when to do replace a component/system preventively. In this talk, we show some of our recent works on this topic. In particular, we present an use case of predictive maintenance of aircraft engine, i.e., maintenance planning based on the predicted RUL. Both single-component-level and fleet-level planning are discussed. Then, we discuss the potential benefits digital twin techniques can bring to the PHM community. A detailed research roadmap, as well as an open-source experimental platform developed for demonstrating digital twins for predictive maintenance will be discussed.



# KEYNOTE 6



## Professor Tianliang Hu

Professor  
School of Mechanical Engineering,  
Shandong University, China

Friday, October 13<sup>th</sup> 2023

(Paris Time) 14:00 -15:00

(Beijing Time) 20:00-21:00

Zoom ID: 951 3395 7516

Tencent ID: 865-6014-8565

### Biography

Tianliang Hu received his BS and PhD in Mechanical Engineering in 2003 and 2009 from Shandong University. He was a visiting Ph. D student in IMS Lab, University of California, Davis, from Feb. 2007 to Feb. 2008 supported by CSC. He began his career in the School of Mechanical Engineering, Shandong University from Jan. 2009. In Jan. 2020, he was awarded as the Qilu Young Scholar Professor in Shandong University. He also was awarded as the Taishan Scholar (Young Expert) of Shandong Province in Jan. 2021. He now serves as the Director of Shandong Provincial Engineering Research Center for Intelligent Manufacturing and Control System. Prof. Hu's research interests include intelligent manufacturing, digital twin, CNC technology, and robotics. His research has been funded by many important national and provincial research projects. Prof. Hu is also very active in the standardization work of manufacturing industry. He serves as the Vice Secretary of SAC/TC159/SC1 and the working group convener of IEC/TC44/MT60204-34 and SAC/TC22/IWG4. He was/is involved in the developments of many international standards and national standards related to manufacturing industry.

### Title: Digital Twin for Machine Tools: from concept to application

#### Abstract

Machine tool is the “mother machine” of the industry. It's digitalization is the basis of the intelligent manufacturing system. Therefore, how to improve the intelligence of the machine tool becomes a hot topic. Digital Twin, with its advantages from concept to application, gives an effective way for the digitalization of complex equipments. In this talk, the background of the machine tool digitalization work will be reviewed. Then the concept of the Digital Twin for Machine Tool will be proposed. With the analysis of the characteristic of the machine tool, the roadmap for the implementation of Digital Twin for Machine Tool will be discussed and the key issues will be addressed. The application of Digital Twin for Machine Tool will be presented as case studies in this talk as well.

# Sessions List

Abbrs.	Topic	Chairs	
<b>Session CAF</b>	Digital twin concept, architecture, and framework	<b>Prof. Benoit Eynard</b> Université de Technologie de Compiègne, France <b>Prof. Vincent Cheutet</b> INSA Lyon, France	Zoom ID: <b>951 3395 7516</b> Tencent ID : <b>865-6014-8565</b>
<b>Session T</b>	Digital twin theory, method, key technologies and tools	<b>Prof. Bernard Riera</b> Université de Reims Champagne-Ardenne, France	Zoom ID: <b>914 8080 9511</b> Tencent ID : <b>779-9597-5313</b>
<b>Session R</b>	Reliability Digital Twin	<b>Prof. Yi Ren</b> Beihang University, China <b>Dr. Cheng Qian</b> Beihang University, China <b>Dr. Jiajie Fan</b> Fudan University, China	Zoom ID: <b>935 8413 8771</b> Tencent ID : <b>543-4058-7725</b>
<b>Session AM</b>	Digital twin and additive manufacturing	<b>Dr. Yicha ZHANG</b> Belfort-Montbéliard University of Technology, France <b>Dr. Yunlong TANG</b> Monash University, Australia <b>Dr. Yang SHENG</b> University of Guelph, Canada	Zoom ID: <b>914 8080 9511</b> Tencent ID : <b>779-9597-5313</b>
<b>Session MS-1</b>	Digital twin-driven manufacturing system	<b>Dr. Shimin Liu</b> The Hong Kong Polytechnic University, China <b>Prof. Pai Zheng</b> The Hong Kong Polytechnic University, China	Zoom ID: <b>951 3395 7516</b> Tencent ID : <b>865-6014-8565</b>
<b>Session MS-2</b>	Digital twin-driven manufacturing system	<b>Prof. Mamadou Kaba Traore</b> Université de Bordeaux, France <b>Dr. Zhiguo Zeng</b> CentraleSupélec, France	Zoom ID: <b>913 6804 0930</b> Tencent ID : <b>558-3473-8731</b>
<b>Session CC</b>	Smart Construction and City	<b>Mr. Yishuo Jiang</b> The University of Hong Kong, China <b>Dr. Ray Y. Zhong</b> The University of Hong Kong, China <b>Prof. Xiqiang Wu</b> Southeast University, China <b>Dr. Yantao Yu</b> Hong Kong University of Science and Technology, China	Zoom ID: <b>935 8413 8771</b> Tencent ID : <b>543-4058-7725</b>

(To be continued)

## The 3<sup>rd</sup> Digital Twin International Conference (DigiTwin 2023)

(Continued from the previous page)

Abbrs.	Topic	Chairs	Meeting ID
Session ADV	Advanced Manufacturing	<b>Prof. Hongyu Zheng</b> Shandong University of Technology, China <b>Prof. Yingchun Guan</b> Beihang University, China	Zoom ID: <b>914 8080 9511</b> Tencent ID : <b>779-9597-5313</b>
Session RM	Digital twin for remanufacturing	<b>Prof. Jinhua Xiao</b> Wuhan University of Technology, China <b>Prof. Eujin Pei</b> Brunel University London, UK	Zoom ID: <b>913 6804 0930</b> Tencent ID : <b>558-3473-8731</b>
Session S	Digital Twin Services Innovation	<b>Prof. Ying Cheng</b> Beihang University, China <b>Prof. Feng Xiang</b> Wuhan University of Science and Technology, China <b>Prof. Lei Wang</b> Wuhan University of Technology, China	Zoom ID: <b>962 9927 1413</b> Tencent ID : <b>553-6644-2573</b>
Session N	Digital Twin Network	<b>Dr. Tao Sun</b> China Mobile Research Institute, China <b>Dr. Diego Lopez</b> Telefonica I+D, Spain	Zoom ID: <b>962 9927 1413</b> Tencent ID : <b>553-6644-2573</b>
Session E	Propulsion and Energy Systems	<b>Prof. Bosen Wang</b> Beihang University, China <b>Prof. Yihao Tang</b> Beihang University, China <b>Prof. Wang Han</b> Beihang University, China	Zoom ID: <b>914 8080 9511</b> Tencent ID : <b>779-9597-5313</b>
Session H	Digital Twin for Health Care	<b>Prof. Songhua Ma</b> Shandong University, China <b>Prof. Dedong Ma</b> Qilu Hospital of Shandong University, China <b>Dr. Yongli Wei</b> University of Health and Rehabilitation Sciences, China	Zoom ID: <b>913 6804 0930</b> Tencent ID : <b>558-3473-8731</b>
Session AP	Novel applications of digital twin	<b>Dr. Makhlof Hadji</b> IRT SystemX, France <b>Prof. Grégory Faraut</b> ENS Paris-Saclay, France <b>Prof. Nabil Anwer</b> University Paris-Saclay, France	<b>AP1-AP9</b> Zoom ID: <b>951 3395 7516</b> Tencent ID : <b>865-6014-8565</b>
			<b>AP10-AP13</b> Zoom ID: <b>913 6804 0930</b> Tencent ID : <b>558-3473-8731</b>



The 3<sup>rd</sup> Digital Twin International Conference (DigiTwin 2023)

Session on  
**Digital twin concept,  
architecture, and framework  
(CAF)**

**Session chairs:**

**Prof. Benoit Eynard**

Université de Technologie de Compiègne, France

**Prof. Vincent Cheutet**

INSA Lyon, France

Wednesday, October 11<sup>th</sup>-12<sup>th</sup> 2023

Zoom ID: 951 3395 7516

Tencent ID: 865-6014-8565

Date	Paris Time	Beijing Time	Agendas
October 11 <sup>th</sup>	10:30	16:30	<b>CAF-1 An Industrial Digital Twin classification framework</b> E. Abisset-Chavanne, T. Coupaye, F. R. Golra, D. Lamy, A. Piel, O. Scart and P. Vicat-Blanc
	11:00	17:00	<b>CAF-2 From Concept to Deployment: A 5C CPS Architecture-Based Methodology for Streamlined Development and Application</b> Nathalie Julien and Mohammed Adel HAMZAOU
	11:30	17:30	<b>CAF-3 Digital Twinning of an Engineering Manufacturing Environments at the Local Level</b> Keenan Granland, Zijue Chen and Yunlong Tang
	12:00	18:00	<b>CAF-4 Principles governing development and usage of Digital Twins</b> Jean-Luc Garnier
	12:30	18:30	<b>CAF-5 A high Level Architecture for Digital Twin Interoperability: Composing Digital Twins into Systems of Twins</b> Mamadou Kaba TRAORE
October 12 <sup>th</sup>	10:00	16:00	<b>CAF-6 Objective-driven digital twin development</b> Thomas ROUSSELOT, Christian KOUMLAH MBEY, Jean-Luc GARNIER and Pascal HUBERT
	10:30	16:30	<b>CAF-7 Digital Twin Framework for Use Case Definition, Selection, and Implementation</b> Till Böttjer and Sara Blasco Román
	11:00	17:00	<b>CAF-8 Painting of the digital twin to better understand and implement it in manufacturing</b> Renard Dimitri, Saddam Ramla, Annebicque David, Riera Bernard
	11:30	17:30	<b>CAF-9 Digital Twin Architecture Design through Data Lifecycle Modelling</b> Nathalie Julien and Mohammed Adel HAMZAOU





Session on  
**Digital twin theory, method,  
key technologies and tools (T)**

**Session chairs:**

**Prof. Bernard Riera**

Université de Reims Champagne-Ardenne, France

Wednesday, October 11<sup>th</sup> 2023

Zoom ID: 914 8080 9511

Tencent ID: 779-9597-5313

Paris Time	Beijing Time	Agendas
10:30	16:30	<b>T-1 Online Validation of Manufacturing System Digital Twins</b> Giovanni Lugaresi and Andrea Matta
11:00	17:00	<b>T-2 Mechanism data fusion modeling digital twin method and application practice in spacecraft systems</b> HUANG Lei,ZHOU Fanli,WANG Wei,SHANG Shuai and ZHOU Haocheng
11:30	17:30	<b>T-3 Progressive learning of a hybrid model for improved adaptability in the classification of motor fault diagnosis</b> Morgane Suhas Emmanuelle Abisset-Chavanne Pierre-André Rey
12:00	18:00	<b>T-4 Digital Twinning Method of the Whole Wellbore Temperature-Pressure Field for Random Monitoring Locations within Oil and Gas Wells</b> Maliang Wang,Wenlan Wei and Yue Hu
12:30	18:30	<b>T-5 No Code Environments and Digital Twin Trust</b> Matthew S. Bonney



## Session on **Reliability Digital Twin (R)**

### Session chairs:

**Prof. Yi Ren**

Beihang University, China

**Dr. Cheng Qian**

Beihang University, China

**Dr. Jiajie Fan**

Fudan University, China

Thursday, October 12<sup>th</sup> 2023

Zoom ID: 935 8413 8771

Tencent ID: 543-4058-7725

Paris Time	Beijing Time	Agendas
10:00	16:00	<b>R-1 Combining reliability and process optimisation with the support of digital twin for higher availability and efficiency</b> Dariusz Mazurkiewicz, Poland
10:30	16:30	<b>R-2 The novel tendency of uncertainty quantification metrics in model updating and sensitivity analysis</b> Sifeng Bi, UK
11:00	17:00	<b>R-3 Digital Twin for mission critical electronics</b> Jiajie Fan, China
11:30	17:30	<b>R-4 From Rigid to Reliable: Leveraging Digital Twin for Region-Centred Medical Image Alignment</b> Jakub Mitura, Poland
14:00	20:00	<b>R-5 AI-based Adaptive Surrogate Modeling Framework for In-service Performance Prediction with Validation by the UV-LED Modules</b> Cadmus Yuan, China
14:30	20:30	<b>R-6 A Conceptual Framework for the Reliability Assessment of LED Lighting Products Using Digital Twin</b> Mesfin Ibrahim, China
15:00	21:00	<b>R-7 Causal Influences Based Multiple Degradation Features Modeling Oriented to Reliability Digital Twin</b> Zeyu Wu, China
15:30	21:30	<b>R-8 Digital Twin-Driven Reliability Method of Lithium-ion Battery Packs</b> Quan Xia, China

Session on  
**Digital Twin and Additive  
Manufacturing (AM)**

**Session chairs:**

**Dr. Yicha ZHANG**

Belfort-Montbéliard University of Technology, France

**Dr. Yunlong TANG**

Monash University, Australia

**Dr. Yang SHENG**

University of Guelph, Canada

Thursday, October 12<sup>th</sup> 2023

Zoom ID: 914 8080 9511

Tencent ID: 779-9597-5313

Paris Time	Beijing Time	Agendas
10:00	16:00	<b>AM-1</b> Challenges of Digital Twins in Predicting Multi-Physical Additive Manufacturing Yancheng Zhang, France
10:30	16:30	<b>AM-2</b> Towards a system of digital twin for additive manufacturing Yunlong Tang, Australia
11:00	17:00	<b>AM-3</b> Field-driven toolpath-oriented constructive design method for additive manufacturing for medical digital twin application Zhiping Wang, France
11:30	17:30	<b>AM-4</b> A use case for the development of a digital twin of a 3D-printed bionic hand Li Yi, Germany
14:00	20:00	<b>AM-5</b> Digital Twin driven smart manufacturing based on multimodal data Zhiqiang Wang, France
14:30	20:30	<b>AM-6</b> Efficient macroscopic and mesoscopic numerical methods based on finite element method for predicting temperature distribution during additive manufacturing processes Yabo JIA, France
15:00	21:00	<b>AM-7</b> A paradigm of DT & toolpath-driven Hybrid platform for functional AM Yicha Zhang, France
15:30	21:30	<b>AM-8</b> A Digital Twin-Driven Framework for Quality Improvement of FDM Process Sheng Yang, Canada



Session on  
**Digital Twin-driven  
Manufacturing System(MS-1)**

**Session chairs:**

**Dr. Shimin Liu**

The Hong Kong Polytechnic University, China

**Prof. Pai Zheng**

The Hong Kong Polytechnic University, China

Friday, October 13<sup>th</sup> 2023

Zoom ID: 951 3395 7516

Tencent ID: 865-6014-8565

Paris Time	Beijing Time	Agendas
10:00	16:00	<b>MS1-1</b> Human-centric manufacturing system: A digital twin perspective Dr. Yuqian Lu, New Zealand
10:30	16:30	<b>MS1-2</b> Intelligence Monitoring, Diagnosis & Prognosis for Remanufacturing of Industrial Equipment Dr. Ming Zhang, UK
11:00	17:00	<b>MS1-3</b> Ensemble learning with a genetic algorithm for surface roughness prediction in multi-jet polishing Dr. Ruoxin Wang, China
11:30	17:30	<b>MS1-4</b> Development of Smart Manufacturing for Ultra-Precision Machining Technology Dr. Zhicheng Xu, China
13:00	19:00	<b>MS1-5</b> An introduction to Identity for Digital Twins for the manufacturing domain Mr. Shuo Su, UK
13:30	19:30	<b>MS1-6</b> Convolutional Neural Networks for Automatic Virtual Metrology Ms. Suiyan Shang, China
14:00	20:00	<b>MS1-7</b> Digital Twins in Human-robot Collaborative Interaction: An investigation Mr. Jianhao Lv, China



Session on  
**Digital Twin-driven  
Manufacturing System (MS-2)**

**Session chairs:**

**Prof. Mamadou Kaba Traore**

Université de Bordeaux, France

**Dr. Zhiguo Zeng**

CentraleSupélec, France

Wednesday, October 11<sup>th</sup> 2023

Zoom ID: 913 6804 0930

Tencent ID: 558-3473-8731

Paris Time	Beijing Time	Agendas
10:30	16:30	<b>MS2-1 Research on Data Acquisition and Management System for Production Line based on Digital Twin and Cloud-fog-edge Computing Collaboration</b> Zhiyuan Li, Xuesong Mei, Dawei Zhang, Jun Xu, Zheng Sun
11:00	17:00	<b>MS2-2 Digital twins for enhanced efficiency and quality in milling of structural parts for the aerospace industry</b> Albrecht Hänel, Guanchen Gong, Eric Wenkler, Uwe Teicher, André Seidel1 and Steffen Ihlenfeldt
11:30	17:30	<b>MS2-3 Digital Twin Enhanced Agile Design of Ship Pipeline Systems</b> WANG Xin and ZHANG Zhinan
12:00	18:00	<b>MS2-4 A Multi-objective Optimisation for a Data-driven Digital Twin of CNC Machining Processes</b> V. S. Vishnu, Kiran George Varghese, K. Suresh and B. Gurumoorthy
15:00	21:00	<b>MS2-5 Robotic arm path planning system based on digital twin</b> Rui Zhou, Manlu Liu, JinHao Li, Yu Liu
15:30	21:30	<b>MS2-6 Digital twin for quality assurance Needs – Illustration on micro-gear</b> Jean-Yves Dantan, Gisela Lanza, Amir Khezri, Vivian Schiller, Lazhar Homri1, Alain Etienne
16:00	22:00	<b>MS2-7 Software Defined Maintenance using Digital Twin for Manufacturing Optimization</b> Selma Khebbache and Makhlof Hadji
16:30	22:30	<b>MS2-8 Lab-on-a-Cloud A New Pathway Towards Accessible Manufacturing Education</b> Sheng Yang

Session on  
**Digital Twin for Smart  
Construction and Cities(CC)**

**Session chairs:**

**Mr. Yishuo Jiang**

The University of Hong Kong, China

**Dr. Ray Y. Zhong**

The University of Hong Kong, China

**Prof. Xiqiang Wu**

Southeast University, China

**Dr. Yantao Yu**

Hong Kong University of Science and Technology, China

Wednesday, October 11<sup>th</sup> 2023

Zoom ID: 935 8413 8771

Tencent ID: 543-4058-7725

Paris Time	Beijing Time	Agendas
10:30	16:30	<b>CC-1 Digital roads of the future: towards a highway digital twin for road maintenance management</b> Mengtian Yin, UK
11:00	17:00	<b>CC-2 Augmenting construction progress tracking and digital information modeling utilizing computer vision and BIM</b> Wei Wei, China
11:30	17:30	<b>CC-3 Application of Digital Twin in the Building Demolition Waste Trading: A Technical Exploration</b> Shuaiming Su, China
12:00	18:00	<b>CC-4 Artificial-Intelligence Digital Twin Framework for Smart Firefighting</b> Tianhang Zhang, China
12:30	18:30	<b>CC-5 Assessing the resilience of transport infrastructure under climate change: a case study of London rail transit systems</b> Wei Bi, UK
15:00	21:00	<b>CC-6 The sustainable concrete recycling process through smart BIM: a case study in Hong Kong</b> Svetlana Besklubova, China
15:30	21:30	<b>CC-7 Cyber-Physical Internet Framework Based on a Five-Layer Model</b> Chenglin Yu, China
16:00	22:00	<b>CC-8 Exploring the Interplay Between Digital Twins and the Metaverse</b> Junyang Chen, China





Session on  
**Digital Twin for Advanced  
Manufacturing (ADV)**

**Session chairs:**

**Prof. Hongyu Zheng**

Shandong University of Technology, China

**Prof. Yingchun Guan**

Beihang University, China

Friday, October 13<sup>th</sup> 2023

Zoom ID: 914 8080 9511

Tencent ID: 779-9597-5313

Paris Time	Beijing Time	Agendas
10:00	16:00	<b>ADV-1</b> Digital Twin Driven for Tool Wear Monitoring Based on Multi-Sensor Data Fusion and Improved LSTM Network Jiang Guo, China
10:30	16:30	<b>ADV-2</b> Digitization, Sensorization and Machine Learning for Intelligent Hybrid Laser Aided Additive Manufacturing Prof. Guijun Bi, China
11:00	17:00	<b>ADV-3</b> Coherent beam combining of fiber lasers Prof. Pu Zhou, China
11:30	17:30	<b>ADV-4</b> The next generation of 3D printing: multi-materials additive manufacturing Prof. Shoufeng Yang, China
12:00	18:00	<b>ADV-5</b> Development of a Digital Twin Framework for Micro Milling Prof. A. Senthil Kumar, Singapore



Session on  
**Digital Twin  
for Remanufacturing (RM)**

**Session chairs:**

**Prof. Jinhua Xiao**

Wuhan University of Technology, China

**Prof. Eujin Pei**

Brunel University London, UK

Friday, October 13<sup>th</sup> 2023

Zoom ID: 913 6804 0930

Tencent ID: 558-3473-8731

Paris Time	Beijing Time	Agendas
10:00	16:00	<b>RM-1</b> Simulation of Mobile Manipulator Based on Digital Twin Chen Zheng, China
10:30	16:30	<b>RM-2</b> Digital Twin-driven Robotic Disassembly Sequence Dynamic Planning under Uncertain Missing Condition Jiayi Liu, China
11:00	17:00	<b>RM-3</b> Intelligent Process Planning for Additive Manufacturing: Concepts and Applications Yi Xiong, China
11:30	17:30	<b>RM-4</b> Digital twin-assisted multi-agent human and robots disassembly operations towards uncertain remanufacturing Jinhua Xiao, China



## Session on **Digital Twin Services Innovation (S)**

### Session chairs:

**Prof. Ying Cheng**

Beihang University, China

**Prof. Feng Xiang**

Wuhan University of Science and Technology, China

**Prof. Lei Wang**

Wuhan University of Technology, China

Wednesday, October 11<sup>th</sup> 2023

Zoom ID: 962 9927 1413

Tencent ID: 553-6644-2573

Paris Time	Beijing Time	Agendas
10:30	16:30	<b>S-1 Digital Twins: Revolutionizing Decision-Making Processes</b> Prof. Greg Zacharewicz, France
11:00	17:00	<b>S-2 Causal Analysis and Optimization Decision-Making for Digital Twins of Complex Industrial Systems</b> Prof. Wei Qin, China
11:30	17:30	<b>S-3 The Concept, System Structure and Operating of industrial Digital Twin System(iDTS)</b> Prof. Haoqi Wang, China
12:00	18:00	<b>S-4 Mining and optimization of manufacturing service collaboration considering reliability and credibility in industrial cloud environment</b> Prof. Lei Wang, China
12:30	18:30	<b>S-5 Data-driven active perception and optimal allocation of manufacturing resource services</b> Prof. Geng Zhang, China



Session on  
**Digital Twin Network  
(N)**

**Session chairs:**

**Dr. Tao Sun**

China Mobile Research Institute, China

**Dr. Diego Lopez**

Telefonica I+D, Spain

Thursday, October 12<sup>th</sup> 2023

Zoom ID: 962 9927 1413

Tencent ID: 553-6644-2573

Paris Time	Beijing Time	Agendas
10:00	16:00	<b>N-1 Enabling Digital Transformation Through an Intelligent Interconnected Ecosystem of Digital Twins</b> Prof. Ramona Trestian, Middlesex University, UK
10:30	16:30	<b>N-2 6G enabled Future Robotics</b> Dr. Xueli An, Munich Research Center, Huawei Technologies Co. Ltd, Germany
11:00	17:00	<b>N-3 Digital Twin Edge Networks for Intelligent Transportation</b> Prof. Yunlong Lu, Beijing Jiaotong University, China
11:30	17:30	<b>N-4 Digital twin for large-scale radio access network optimization</b> Dr. Wenfeng Hu, AI Technology and Innovation, Ericsson, Sweden
12:00	18:00	<b>N-5 Digital Twin empowered Computation Offloading</b> Prof. Yueyue Dai, Huazhong University of Science and Technology, China
12:30	18:30	<b>N-6 Digital Twin in Optical Networks</b> Dr. Mingyang Lyu, Nokia Shanghai Bell Company, China

Session on  
**Digital Twin Propulsion  
and Energy Systems(E)**

**Session chairs:**

**Prof. Bosen Wang**

Beihang University, China

**Prof. Yihao Tang**

Beihang University, China

**Prof. Wang Han**

Beihang University, China

Wednesday, October 11<sup>th</sup> 2023

Zoom ID: 914 8080 9511

Tencent ID: 779-9597-5313

Paris Time	Beijing Time	Agendas
15:00	21:00	<b>E-1 Effects of droplet evaporation on two-phase rotating detonations</b> Prof. Songbai YAO, China
15:30	21:30	<b>E-2 High-order compact gas-kinetic scheme for compressible flow simulations</b> Dr. Fengxiang ZHAO, China
16:00	22:00	<b>E-3 A study of two-equation soot models in laminar and turbulent non-premixed flames</b> Weitao Liu, Germany
16:30	22:30	<b>E-4 Combustion Intensification Mechanism in a Vortex-Tube Reactive Flow</b> Dr. Shoujun Ren, Canada
17:00	23:00	<b>E-5 Effects of turbulence on variations in early development of hydrogen and iso-octane flame kernels under engine conditions</b> Dr. Hongchao Chu, Germany





Session on  
**Digital Twin for  
Health Care (H)**

**Session chairs:**

**Prof. Songhua Ma**

Shandong University, China

**Prof. Dedong Ma**

Qilu Hospital of Shandong University, China

**Dr. Yongli Wei**

University of Health and Rehabilitation Sciences, China

Thursday, October 12<sup>th</sup> 2023

Zoom ID: 913 6804 0930

Tencent ID: 558-3473-8731

Paris Time	Beijing Time	Agendas
10:00	16:00	<b>H-1 Musculoskeletal Digital Twin for Multiscale Orthopaedic Biomechanics</b> Prof. Liming Shu, China
10:30	16:30	<b>H-2 Towards Digital Twin for Human Skeleton in Smart Manufacturing with Predictive Modelling</b> Mr. Xiwang He, China
11:00	17:00	<b>H-3 Digital twin application for the medical equipment research and development</b> Prof. Dedong Ma, China
11:30	17:30	<b>H-4 Research on diagnosis and treatment of respiratory diseases based on digital twin</b> Mr. Xianhui Lian, China



Session on  
**Novel applications of  
digital twin (AP)**

**Session chairs:**

**Dr. Makhoul Hadji**

IRT SystemX, France

Wednesday, October 11<sup>th</sup> 2023

Zoom ID: 951 3395 7516

Tencent ID: 865-6014-8565

Paris Time	Beijing Time	Agendas
15:00	21:00	<b>AP-1</b> A digital twin approach for intelligent condition monitoring of wind turbines under uncertainties Xiaomo Jiang, Yu Jia, Huaiyu Hui, and Zhicheng Wang
15:30	21:30	<b>AP-2</b> Multi-components and multi-physics field synergetic digital twin architecture in the oil and gas well engineering Wenlan Wei, Yue Hu and Maliang Wang
16:00	22:00	<b>AP-3</b> Digital Twins on Airport Management Carbajal, Eduardo, Goepp, Virginie, Marmier, François and Rasovska, Ivana
16:30	22:30	<b>AP-4</b> Digital Twin Implementation for Predictive Maintenance Anouar Nahi, Makhoul Hadji, Guillaume Denis and Selma Khebbache
17:00	23:00	<b>AP-5</b> Virtual-real Integrated System For Remote-Controlled Ship: Architecture, Design, and Implementation Hengbin Lin



## The 3<sup>rd</sup> Digital Twin International Conference (DigiTwin 2023)

(Continued from the previous page)

### Session chairs:

**Prof. Grégory Faraut**

ENS Paris-Saclay, France

**Prof. Nabil Anwer**

University Paris-Saclay, France

Thursday, October 12<sup>th</sup> 2023

AP6- AP9 Zoom ID: 951 3395 7516  
Tencent ID: 865-6014-8565

AP10- AP13 Zoom ID: 913 6804 0930  
Tencent ID: 558-3473-8731

Paris Time	Beijing Time	Agendas
14:00	20:00	<b>AP-6 A data-driven wireless network precise planning system: digital and intelligent twinning on resource allocation</b> Feng Jiang and Ritao Cheng and Shen Wang
14:30	20:30	<b>AP-7 Digital Twin for Sustainable Intralogistics</b> Adnane Drissi Elbouzidi, Selmen Boubaker, Robert Pellerin, Abdessamad Ait El Cadi and Samir Lamouri
15:00	21:00	<b>AP-8 A Digital Twin System Design of an Intelligent Energy-Efficient Data Center</b> Tianyou Xue, Guice Yao, Dongsheng Wen
15:30	21:30	<b>AP-9 Optimizing Healthcare Resource Allocation through Digital Twins: A Multi-objective Approach for Efficiency, Equity, and Resilience</b> Wenjun Lin, Paul Babyn, Yan Yan, and Wenjun Zhang
14:00	20:00	<b>AP-10 Optimizing Built Asset Management: A Smart Inspection Framework via Digital Twin Technologies</b> Yijun Huang , Jihan Zhang and Ben M. Chen
14:30	20:30	<b>AP-11 Architects' design spaces towards digital twins for design</b> Nader Boutros and Christian Giraud
15:00	21:00	<b>AP-12 Digital Twin of an education modular smart building</b> Julien Berton and Pierre-Antoine Cormier
15:30	21:30	<b>AP-13 Improving the study of noisy X-ray Raman scattering images of cultural heritage objects using a digital twin</b> Laure Cazals, Agnès Desolneux, Alessandro Mirone, Simo Huotari <sup>2</sup> , Christoph Sahle, Lauren Dalecky, Jean-Pascal Rueff, and Loïc Bertrand



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# The 3rd Digital Twin International Conference **DigiTwin 2023**

## Secretary Contact

- Qinglin Qi (China) : [kylin3366@buaa.edu.cn](mailto:kylin3366@buaa.edu.cn)
- Yifan Qie (France): [yifan.qie@ens-paris-saclay.fr](mailto:yifan.qie@ens-paris-saclay.fr)
- Zhiping Wang (France): [zhiping.wang@univ-tln.fr](mailto:zhiping.wang@univ-tln.fr)
- Li Yi (Germany): [li.yi@mv.uni-kl.de](mailto:li.yi@mv.uni-kl.de)

## Website

<http://www.dtiac.com/> (China)

<https://digitwin2023.sciencesconf.org/> (France)