



**TRACER 9**  
TRACERS AND TRACING METHODS  
..... Spain 2024

**9<sup>TH</sup> INTERNATIONAL CONFERENCE  
ON TRACERS AND TRACING METHODS**

**14-16 May, 2024**  
**Benicàssim, Spain**



# SCIENTIFIC PROGRAM

*from Tuesday 14<sup>th</sup> May, 2024 to Thursday 16<sup>th</sup> May 2024, in Benicàssim, Spain*

## CONFERENCE VENUE

### INTUR ORANGE HOTEL

The Intur Orange Hotel is specially designed to meet the expectations of the conference organizer and his attendees, offering the perfect combination of features and services to ensure the success of any professional event. With its spacious multi-purpose spaces and equipped with the latest technology, the establishment provides the ideal setting for conferences, workshops and presentations. What's more, with a privileged location close to the beach and refined catering facilities, the hotel sets an inspiring and pleasant backdrop for breaks and social activities, helping participants to relax and network in a friendly environment conducive to productivity.

The conference will take place in 3 rooms:

- Sal3n Benic3ssim for the different sessions
- Sal3n Social for coffee breaks
- Sal3n Columbretes for the poster exhibition

More information: <https://www.intur.com/en/orange-benicassim-hotel/>



### DISCOVER BENIC3SSIM!

Benic3ssim is a dynamic town where music has shaped the open, welcoming nature of its people. Its strategic location in the heart of the Coast of Azahar, where sea and mountains meet to form long white sandy beaches, makes it an ideal destination for vacation.

Futhermore, Benic3ssim enjoys a warm climate all year round, a large number and variety of interesting places to visit, excellent gastronomy and an extensive calendar of events, meaning there's always a good excuse to visit it.

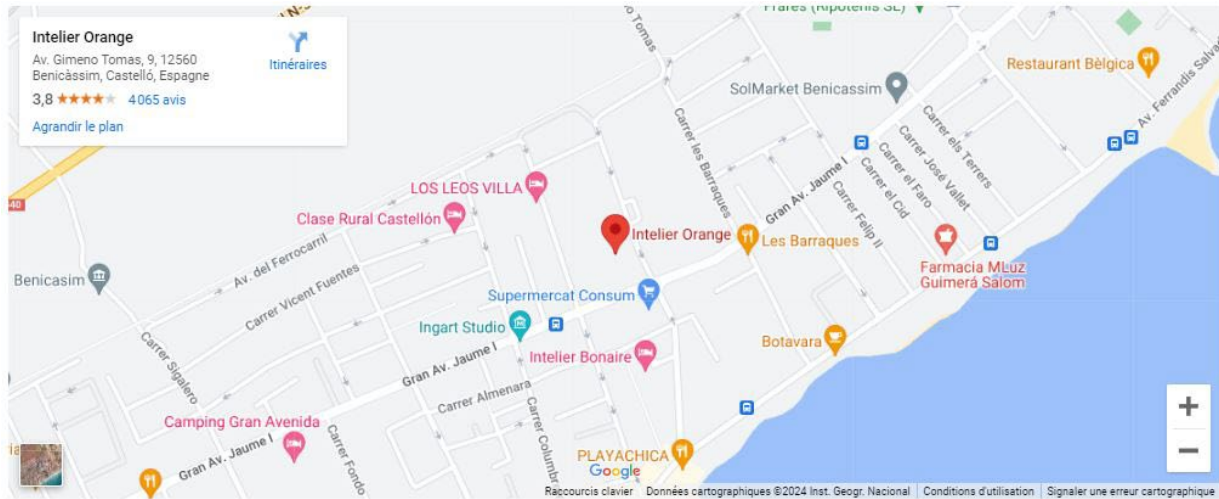
This city of over 19,000 inhabitants features over 6 kilometers of beautiful beaches. The Las Palmas Desert Natural park is a magnificent place, covered in palm trees, ideal for walks.



## HOW TO GET TO BENICÀSSIM?

You can get to Benicàssim by plane. The two nearest airports are Castellón de la Plana and Valencia, 36 km and 90 km away respectively. For those landing elsewhere (in Barcelona or Madrid, for example), you can finish your trip by train, thanks to RENFE, the Spanish transport network:

<https://www.renfe.com/es/en>.



Find an itinary via Google Maps: <https://maps.app.goo.gl/ouYtTcq1ekL8yuWK8>

## ACCOMMODATION

Hotel Intur Orange is known for its privileged location near the beach, offering guests easy access to seaside activities and a pleasant view of the Mediterranean. It offers a range of comfortable, well-equipped rooms, some of them even offering a sea view for an immersive experience.

The hotel also offers modern facilities to meet travelers' needs, including an outdoor swimming pool, a restaurant serving local and international food, and a bar where guests can relax and enjoy refreshments after a busy day. In addition to its attractive seaside setting, Hotel Intur Orange frequently organizes activities and entertainment to keep guests entertained, creating a friendly and lively atmosphere.



**Address:** Avenida Gimeno Tomás 9, 12560 Benicàssim, Castellón

- **Phone:** +34 964 39 44 00
- **Mail:** orange@intur.com
- **Reception hours:** check-in from 16:00 and check-out before 12:00
- **Website:** <https://www.intur.com/en/>
- **Single room:** 60€/night breakfast included
- **Double or twin room:** 64€/night breakfast included
- We have negotiated room rates, but you are free to book your accommodation wherever you prefer.

If you are interested in a room at the Orange Intur Hotel, which is also the conference venue, for the 3 nights from 13 to 16 May, you have two possibilities:

- 1- You can do this at the same time as you register, by selecting the option at the end of the form.
- 2- First register for the conference, then book your room by selecting "Accommodation pack only (3 nights from 13 to 16 May)".

If you want to book extra nights, you can specify it when filling in the form.

Book your room at Orange Intur Hotel : <https://ul-propuls.events/Tracer9/accueil/166-participant-registration.html>

## REMINDER OF INSTRUCTIONS

	Sessions	Flash poster session	Coffee Break
Room	Salón Benicàssim	Salón Columbretes	Salón Social

## GALA DINNER

The gala dinner will be held on **Wednesday May, 15<sup>th</sup>** at the MAYA restaurant.

MAYA Restaurant invites you to discover a welcoming blend of local flavors and Mexican influences. Whether you're a regular or a new friend, our space offers much more than delicious meals: it's a celebration of life, where fine dining, live entertainment and a vast outdoor terrace combine to create a unique atmosphere. Come and share laughter, lively music and unforgettable moments over dishes that delight the taste buds and the soul.

**Address:** Plaça, Polígono 7, 217, 12560 Benicàssim, Castellón, Espagne

**Phone:** +34 653 62 11 65



## CONTACT

You can contact us by filling in this form online, by email or by phone.

- **Email:** [tracer-conference@ul-propuls.fr](mailto:tracer-conference@ul-propuls.fr)
- **Phone:** +33(0)3 72 74 37 14

Tuesday 14		Wednesday 15		Thursday 16	
	<b>Welcome</b> 8:00-9:00		<b>Welcome</b> 8:30 -9:00		<b>Welcome</b> 8:30 -9:00
	<b>Opening talks (15')</b> 9:00 -9:15		<b>Keynote lecture 3 (40')</b> 518158 - Harish PANT 9:00 -9:40		<b>Keynote lecture 5 (40')</b> 517673 - Ferenc DITROI 9:00 -9:40
	<b>Keynote lecture 1 (40')</b> 518273 - Javier CLEMENT 9:15-9:55		<b>Oral Session 6 (15')</b> Oil field evaluations and production 09:45 - 10:30		<b>Oral Session 11 (15')</b> Radiotracers: regulatory, standardization, accreditation, certification and safety aspects 09:45 -10 :15
	<b>Oral Session 8 - part 1 (15')</b> Environmental applications 10:00 -11 :00	09:45	<b>Oral 19 - 518301 - ELKHIAR</b>	09 :45	<b>Oral 30 - 513461 - JENTSCH</b>
10:00	<b>Oral 1 - 520517 - LAURENT</b>	10:00	<b>Oral 20 - 513028 - NGUYEN HUU</b>	10 :00	<b>Oral 31 - 531218 - MOHD YUNOS</b>
10:15	<b>Oral 2 - 513031 - HUYNH THI THU</b>	10:15	<b>Oral 21 - 513033 - OUTAYAD</b>		<b>Coffee break (30')</b> 10:15-10:45
10:30	<b>Oral 3 - 518192 - SAADAOU</b>		<b>Coffee break (30')</b> 10:30 - 11:00		<b>Oral Session 7 (15')</b> 10:45 -11:45
10 :45	<b>Oral 4 - 518169 - BRISSET</b>		<b>Oral Session 4 (15')</b> Mining and metallurgy 11:00 -11:30	10 :45	<b>Oral 32 - 513037 - OUTAYAD</b>
	<b>Coffee break (30')</b> 11:00-11:30	11:00	<b>Oral 22 - 511542 - DIAZ</b>	11:00	<b>Oral 33 - 513089 - SAXENA</b>
	<b>Oral Session 8 - part 2 (15')</b> 11:30 - 12:30	11:15	<b>Oral 23 - 512661 - SMOLINSKI</b>	11 :15	<b>Oral 34 - 518305 - ZYCH</b>
11:30	<b>Oral 5 - 516929 - KLINKA</b>		<b>Presentation Flash Poster</b> 5"/per poster (13 posters) 11:30-12:40	11 :30	<b>Oral 35 - 507771 - THERESKA</b>
11:45	<b>Oral 6 - 518234 - KILEL</b>		<b>Lunch (1:30)</b> 12:40 - 14:10	11 :45	
12 :00	<b>Oral 7 - 513115 - LE ROUX</b>				
	<b>Lunch (1:30)</b> 12:15 - 14:00				
	<b>Keynote lecture 2 (40')</b> Hanna Affum 14:00 -14:40		<b>Keynote lecture 4 (40')</b> Chmielewski Andrej 14:10 -14:50		
	<b>Oral Session 2 - Part 1 (15')</b> Modelling and simulation 14:45 - 16:00		<b>Oral Session 1 - Part 1 (15')</b> New tracers, techniques and equipment 14:55 -15:40		
14:45	<b>Oral 9 - 511008 - EBRAHIM</b>	14:55	<b>Oral 24 -518278 - KILEL</b>		<b>Workshop 1:</b> Applications of virtual tracers to the CFD modeling of WWTPs: a practical approach with ANSYS
15:00	<b>Oral 10 - 518257 - OUARDI</b>		<b>Oral 25 - 518157 - PANT</b>		<b>Workshop 2:</b> How hydrodynamics and layout of reactors influence the Residence Time Distribution (RTD) curves
15:15	<b>Oral 11</b> 513071 - DANG NGUYEN THE	15:10	<b>Oral 26 - 517977 - LOHVITHEE</b>		
15:30	<b>Oral 12 - 513229 - ALJUWAYA</b>	15:25	<b>Coffee break (30')</b> 15:40 - 16:10		
15:45	<b>Oral 13 - 522813 - LUIS-GOMEZ</b>		<b>Oral Session 1 - part 2 (15')</b> 16:10 - 16:55		
	<b>Coffee break (30')</b> 16:00 - 16:30		<b>Oral 27 - 513221 - ALJUWAYA</b>		
	<b>Oral Session 2 - part 2 (15')</b> 16:30 - 17:30	16:10	<b>Oral 28 - 516548 - MARSTEAU</b>		
16:30	<b>Oral 14</b> 513132 - DO NASCIMENTO ARRAIS	16:25	<b>Oral 29 - 512501 - BEZUIDENHOUT</b>		
16:45	<b>Oral 15 - 513072 - CHANDRA</b>	16:40			
17:00	<b>Oral 16 - 522705 - MACIAS</b>	16:55			
17:15	<b>Oral 17 - 518262 - ARNAU</b>				
17:30	<b>Oral 18 - 513067 - JIN</b>				
18:00		8:00	<b>Gala dinner</b> Start at 8:00 PM		



# DETAILED SCIENTIFIC PROGRAM

## DETAILED PROGRAM



### Session 1:

New tracers, techniques and equipment



### Session 2:

Modelling and simulation



### Session 4:

Mining and metallurgy



### Session 6:

Oil field evaluations and production



### Session 7:

Industrial applications



### Session 8:

Environmental applications



### Session 11:

Radiotracers: regulatory, standardization, accreditation, certification and safety aspects



### Présentation Flash Poster



### Workshop 1:

Applications of virtual tracers to the CFD modeling of WWTPs: a practical approach with ANSYS

### Workshop 2:

How hydrodynamics and layout of reactors influence the Residence Time Distribution (RTD) curves

# REMINDER OF INSTRUCTIONS

## For all oral conferences



- Your presentation must be in English.
- Your presentation support must be saved as PowerPoint or PDF format on a USB key.
- If you want to use particular formats such as video, sending your presentation in advance is mandatory. We invite you to load your presentation before the beginning of your session, half a day before your presentation on the computer of your conference room.
- To avoid any technical bug and too long installation time, it is mandatory to use only the computer at your disposal. It will not be possible to use your personal computer.
- A remote control with laser pointer will be at your disposal.



## Keynote

- The time granted will be of 40 minutes (Including setting up)
- 30 minutes of presentation + 10 minutes of question



## Oral communication

- The time granted will be of 15 minutes. (Including setting up)
- 12 minutes of presentation + 3 minutes of question

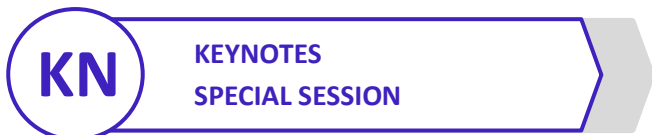
## Poster (display and flash oral presentation)



- Your poster will be presented in two different ways:
  - A classic poster displayed for the duration of the congress.
  - A flash oral presentation of your poster will be given during the conference. You will have 5 minutes (3 minutes for the presentation + 2 minutes for questions). You will have the possibility to prepare a powerpoint of maximum 4 slides to accompany your presentation. The presentation must be in English.
- Your poster should be printed in A0 format (84.1 cm x 118.9 cm).
- With a portrait orientation (in English).
- It is not possible to print your poster on site.
- Thank you for hanging your poster the first morning of the conference, Tuesday, May 14th, as soon as you arrive at the congress. Thus, everyone will be able to watch it during the breaks and the poster session.
- Please pick up your poster on the last day of the conference, Friday June 16th, the remaining posters will not be retained.



# SCIENTIFIC PROGRAM – KEYNOTES LECTURES



KEYNOTES LECTURES	Reference	Start time	Duration	Oral communication
	K1 518273	<b>Tuesday 14</b> 9:15 AM	40'	<b><i>WWTP Retrofitting and optimization using Tracer tests and CFD Modelling</i></b> <i>Javier Climent</i> <i>Hydrodynamic and Environmental Services (HYDRENS), Spain</i>
	K2	<b>Tuesday 14</b> 2:00 PM	40'	<i>Hanna Affum</i> <i>The title of the presentation will be confirmed shortly International Atomic Energy Agency (IAEA)</i>
	K3 518158	<b>Wednesday 15</b> 9:00 AM	40'	<b><i>Residence Time Distribution Analysis: An Excellent Approach to visualise Flows in Industrial Process Systems</i></b> <i>Harish J. Pant</i> <i>Isotope and Radiation Application Division, Bhabha Atomic Research Centre, Mumbai-400085, India</i>
	K4	<b>Wednesday 15</b> 2:10 PM	40'	<i>Chmielewski Andrej</i> <i>The title of the presentation will be confirmed shortly Institute of Nuclear Chemistry and Technology, Poland</i>
	K5 517673	<b>Thursday 16</b> 9:00 AM	40'	<b><i>Tribometry of Machine Parts and Material Samples by Using Radioactive Tracers</i></b> <i>Ferenc Ditroi</i> <i>Institute for Nuclear Research (Atomki), Hungary</i>

	Reference	Duration	Oral communication
ORAL SESSION 8 – partie 1	Oral 1 520517 10:00 AM	15'	<b>Virtual and physical tracer experiments on a raceway pond</b> <b>Julien LAURENT<sup>1</sup>, Denis FUNFSCHILLING<sup>1</sup>, Rainier HREIZ<sup>2</sup>, Julie FARINACCI<sup>1</sup> and Guilhem DELLINGER<sup>1</sup></b> <sup>1</sup> Université de Strasbourg, ENGEES, CNRS, ICube UMR 7357, France <sup>2</sup> Laboratoire Réactions et Génie des Procédés, Université de Lorraine, CNRS, LRGP, France
	Oral 2 513031 10:15 AM	15'	<b>Determination of underground salt tracer concentration by self-potential Measurement</b> <b>Huong Huynh Thi Thu<sup>1</sup>, Quang Nguyen Huu<sup>1</sup>, Hai Lai Viet<sup>1</sup>, Hieu Tran Trong<sup>1</sup>, Son Le Van<sup>1</sup></b> <sup>1</sup> Centre for Application of Nuclear Technique in Industry, Viet Nam
	Oral 3 518192 10:30 AM	15'	<b>Development of a new software for mapping by combining the density, depth and GPS positions obtained by the X-ray density Profiler Gauge XDP30</b> <b>Abdelaziz SAADAOU<sup>1</sup>, Abdessamad BANANE<sup>2</sup> and Jaber TOUJANE<sup>2</sup></b> <sup>1</sup> Unité techniques radiométriques, CNESTEN (Centre National de l'Énergie, des Sciences & des Techniques Nucléaires), Morocco <sup>2</sup> Département de Génie Électrique, Ecole Nationale Supérieure des Arts et Métiers, Morocco
	Oral 4 518169 10:45 AM	15'	<b>SEDIMENT PROFILER FOR OPTIMISING DREDGING WORKS AND DETERMINING THE NAUTICAL DEPTH</b> <b>Patrick BRISSET<sup>1</sup>, C. COEFFIER<sup>2</sup>, Y. GACHET<sup>2</sup>, Ph. VALETTE<sup>2</sup>, S. DAHERON<sup>2</sup></b> <sup>1</sup> International Society for Tracers and Radiation Application (ISTRA), Austria <sup>2</sup> Grand Port Maritime de Nantes Saint Nazaire (GPMSN), France
ORAL SESSION 8 – Partie 2	Oral 5 516929 11:30 AM	15'	<b>Estimation of hydrodispersive characteristics of the alluvium aquifer of the Loiret river</b> <b>Thomas KLINKA<sup>1</sup>, Alexis GUTIERREZ<sup>1</sup>, Nevila Jozja<sup>2</sup>, Christian Défarge<sup>2,3</sup>, Chrystelle Auterives<sup>1</sup></b> <sup>1</sup> BRGM, Orléans, France <sup>2</sup> CETRAHE, Université d'Orléans, France <sup>3</sup> ISTO, Université d'Orléans, France
	Oral 6 513259 11:45 AM	15'	<b>Fluorescent tracers, a prime and affordable tool in hydrology</b> <b>Philippe MEUS<sup>1</sup> and Nevila JOZJA<sup>2</sup></b> <sup>1</sup> European Water Tracing Services & Tetraedre Solutions SRLs, Belgium <sup>2</sup> CETRAHE, Ecole Polytechnique, Université d'Orléans, France
	Oral 7 518234 12:00 AM	15'	<b>Radioelement mapping of the natural radionuclides on the Coast of Angola</b> <b>Kennedy Kile<sup>1,3</sup> and Jacques Bezuidenhout<sup>2</sup></b> <sup>1</sup> Electrical and Information Engineering, University of Nairobi, Kenya <sup>2</sup> Faculty of Military Sciences Stellenbosch University, South Africa <sup>3</sup> School of Environment and Agricultural Sciences, Kenyatta University, Kenya
	Oral 8 513115 12:15 AM	15'	<b>Natural Radionuclides as tracers for investigating beach erosion and deposition patterns of Saldanha Bay, South Africa</b> <b>Rikus LE ROUX<sup>1</sup>, Jacques BEZUIDENHOUT<sup>1</sup> and Alfred SEHONE<sup>1</sup></b> <sup>1</sup> Faculty of Military Science, Stellenbosch University, Saldanha

	Reference	Duration	Oral communication
ORAL SESSION 2 – partie 1	Oral 9 511008 14:45 PM	15'	<b>Detection of Foaming in Distillation Column using Gamma Ray Techniques Coupled with Graphical User Interface</b> <b>Shaker Ebrahim<sup>1</sup>, Omar Al-Boloushi<sup>2</sup>, Meshare Al-Qallaf<sup>3</sup> and Hamza Albazzaz</b> <sup>1</sup> Optimization of Petroleum Refining Process, Petroleum Research Center, Kuwait Institute for Scientific Research-Kuwait. <sup>2</sup> Environmental and Science Life Research Center, Kuwait Institute for Scientific Research <sup>3</sup> Science and Technology Sector-Kuwait Institute for Scientific Research
	Oral 10 518257 15:00 PM	15'	<b>Effect of Sediment Size Distribution on the Accuracy of the Gamma Density Guage: Measurement validation.</b> <b>Afaf Ouardi<sup>1</sup>, Amina bouzermine<sup>2</sup> Oussama elkhia<sup>2</sup>, , and Driss Bencheroun<sup>2</sup>, Azzouz Benkdad<sup>1</sup></b> <sup>1</sup> Centre National de l'Energie des Sciences et des Techniques Nucléaires-Rabat, Morocco <sup>2</sup> Laboratory of High Energy Physics and Scientific Computing (PHENIS) HASSAN II University - Faculty of Sciences Ain Chock, Morocco.
	Oral 11 513071 15:15 PM	15'	<b>gCOMET - a state-of-the-art 3rd generation gamma CT scanner for flow dynamic model study</b> <b>Duy Dang Nguyen The<sup>1</sup>, Chuan Nguyen Van<sup>1</sup>, Chau Nguyen Thanh<sup>1</sup>, Hai Trinh Dinh<sup>1</sup>, Giang Le Thao Huong<sup>1</sup></b> <sup>1</sup> Centre for Application of Nuclear Technique in Industry, Viet Nam
	Oral 12 513229 15:30 PM	15'	<b>Optimization of Radioactive Particle Tracking (RPT) Technique calibration process using GEANT4 simulation coupled with a semi-empirical model.</b> <b>Thaar ALJUWAYA<sup>1</sup> and Ahmed ALGHAMDI<sup>1</sup></b> <sup>1</sup> Nuclear Technologies Institute (NTI), King Abdulaziz City for Science and Technology (KACST), Saudi Arabia
	Oral 13 522813 15:45 PM	15'	<b>Position optimization of impeller in stirred tank using Machine Learning model trained with CFD simulations</b> <b>Jaume Luis-Gómez<sup>1</sup>, Alejandro González<sup>1</sup>, Raúl Martínez-Cuenca<sup>1</sup> and Sergio Chiva<sup>1</sup></b> <sup>1</sup> Department of Mechanical Engineering and Construction, Universitat Jaume I, Spain
ORAL SESSION 2 – Partie 2	Oral 14 513132 16:30 PM	15'	<b>Prediction of residence time distribution on monolith reactors to determine the effect of gas-liquid maldistribution</b> <b>Murilo Ricardo DO NASCIMENTO ARRAIS<sup>1</sup>, Hélène CHAUMAT<sup>1</sup>, Audrey DEVATINE<sup>1</sup>, Carine JULCOUR<sup>1</sup>, and Anne-Marie BILLET<sup>1</sup></b> <sup>1</sup> Laboratoire de Génie Chimique, Université de Toulouse, CNRS, INPT, UPS, France
	Oral 15 513072 16:45 PM	15'	<b>Thermal Characteristics of an Unconfined Porous Semi-Circular Cylinder in a Hybrid Nanofluid Environment</b> <b>Rajvinder Kaur<sup>1</sup>, Avinash Chandra<sup>2</sup>, Sapna Sharma<sup>3</sup> and Arvind Kumar Gautam<sup>4</sup></b> <sup>1</sup> Amity School of Business Administration, Amity University Punjab, India <sup>2</sup> Department of Chemical Engineering, Thapar Institute of Engineering and Technology, India. <sup>3</sup> School of Mathematics, Thapar Institute of Engineering and Technology, India. <sup>4</sup> Chemical Engineering Department, National Institute of Technology Hamirpur, India

<b>Oral 16</b> <b>522705</b> 17:00 PM	15'	<b>THREE-DIMENSIONAL NEAR-FIELD DISPERSION OF ODOURS RELATED TO EMISSIONS FROM A WASTEWATER TREATMENT PLANT OPERATING IN A URBAN ENVIRONMENT</b> <b>Aina Macias<sup>1</sup>, Raheem Nabi<sup>1</sup>, Raúl Martínez<sup>1</sup>, Pablo Carratalá<sup>2</sup>, Javier Climent<sup>2</sup> and Sergio Chiva<sup>2</sup></b> <sup>1</sup> Department of Mechanical Engineering and Construction, Universitat Jaume I, Spain <sup>2</sup> Hydrens, Spain
<b>Oral 17</b> <b>518262</b> 17:15 PM	15'	<b>Tracer tests and CFD Modelling for a comparative study of mixing systems in Anaerobic Digestion</b> <b>Rosario ARNAU<sup>1</sup>, Javier CLIMENT<sup>1</sup>, Mairena GARCÍA-VENTOSO<sup>2</sup> and David MIGUEL-SEISDEDOS<sup>2</sup></b> <sup>1</sup> HYDRODYNAMIC AND ENVIRONMENTAL SERVICES (HYDRENS), Spain <sup>2</sup> SOCIEDAD DE FOMENTO AGRÍCOLA CASTELLONENSE, S.A (FACSA), Spain
<b>Oral 18</b> <b>513067</b> 17:30 PM	15'	<b>Uncertainty Evaluation of Mean Residence Time Measured Using Radiotracer</b> <b>Joonha JIN<sup>1</sup></b> <sup>1</sup> EYL, Inc., Republic of Korea

## DAY 2: Wednesday 15<sup>th</sup>

S6

ORAL SESSION 6:  
DAY 2: Wednesday 15<sup>th</sup>

Oil field evaluations and production

ORAL SESSION 6	Reference	Duration	Oral communication
	<b>Oral 19</b> <b>518301</b> 09:45 AM	15'	<b>Prediction of scale deposit thickness in oil pipelines using gamma spectrometry and Artificial Intelligence.</b> <b>Oussama Elkhia<sup>1</sup>, Driss Benchekroun<sup>1</sup> and Afaf Ouardi<sup>2</sup></b> <sup>1</sup> Department of Physics, Laboratory of High Energy Physics and Condensed Matter (PHEMAC), HASSAN II University - Faculty of Sciences Ain Chock, Morocco <sup>2</sup> Department of Studies and Scientific Research, National Center for Nuclear Energy, Science and Technology (CNESTEN), Morocco
	<b>Oral 20</b> <b>513028</b> 10:00 AM	15'	<b>Alkylphenols as Natural Petroleum Reservoir Tracers</b> <b>Quang Nguyen Huu<sup>1</sup>, Huong Huynh Thi Thu<sup>1</sup></b> 1- Centre for Application of Nuclear Technique in Industry, Viet Nam
	<b>Oral 21</b> <b>513033</b> 10:15 AM	15'	<b>Determination of the moisture and density of compacted soils in the foundations of petroleum and hydrocarbon storage tanks by the neutron back scattering technique in comparison with Monte Carlo simulations.</b> <b>Rabie OUTAYAD<sup>1</sup>, Yousra BEN LAZRAK<sup>2</sup>, Tarek ELBARDOUNI<sup>2</sup>, Abdelaziz SAADAOU<sup>1</sup>, Alaa JAINIJA<sup>1</sup> and Abdelghafour EZZAHRI<sup>1</sup></b> <sup>1</sup> Direction études et recherche scientifique. Division Applications Industrielles, Unité techniques radiométriques, CNESTEN (Centre National de l'Energie, des Sciences & des Techniques Nucléaires), Morocco. <sup>2</sup> Abdelmalek Essaâdi University, Université Abdelmalek Essâdi Faculté des Sciences de Tétouan Département de Physique, Morocco

ORAL SESSION 2	Reference	Duration	Oral communication
	Oral 22 511542 11:00 AM	15'	<b>Determining the residence time distribution in the industrial heap leaching of copper by means of radiotracers.</b> <b>Francisco DIAZ<sup>1</sup></b> , Nelson BARRIENTOS <sup>2</sup> <sup>1</sup> General Management, Trazado Nuclear, Chile <sup>2</sup> Research and Development, Trazado Nuclear, Chile
	Oral 23 512661 11:15 AM	15'	<b>Radiotracers for investigation of the hydrometallurgical processes – INCT experience</b> <b>Tomasz SMOLINSKI<sup>1</sup></b> , Andrzej CHMIELEWSKI <sup>1</sup> <sup>1</sup> Institute of Nuclear Chemistry and Technology, Poland

ORAL SESSION 1 – partie 1	Reference	Duration	Oral communication
	Oral 24 518278 14:55 PM	15'	<b>DUGS as a Tool for Measuring Natural Radionuclides as Tracers for Sediment Transport Studies</b> <b>Kennedy Kilel<sup>1,3</sup></b> , Jacques Bezuidenhout <sup>2</sup> , Ian Kaniu <sup>4</sup> , Michael Gatari <sup>1</sup> , Rikus Le Roux <sup>2</sup> <sup>1</sup> Electrical and Information Engineering, University of Nairobi, Kenya <sup>2</sup> Faculty of Military Sciences Stellenbosch University, South Africa <sup>3</sup> School of Environment and Agricultural Sciences, Kenyatta University, Kenya <sup>4</sup> Department of Physics, University of Nairobi, Kenya
	Oral 25 518157 15:10 PM	15'	<b>Flow Characterization in a Cross Flow Reactor (CFR) Using Radiotracer Technique</b> <b>S.Goswami<sup>1</sup></b> , J.Biswal <sup>1</sup> , V.Kumar <sup>2</sup> , A.Quiyoom <sup>2</sup> , V.K Sharma <sup>2</sup> , P.K Rakshit <sup>2</sup> , V.Ravi Kumar <sup>2</sup> and <b>H.J Pant<sup>1*</sup></b> <sup>1</sup> Isotope and Radiation Application Division, Bhabha Atomic Research Centre, Mumbai, 40085, India <sup>2</sup> Corporate R&D Centre, Bharat Petroleum Corporation Limited, Greater Noida 201306, India <sup>*</sup> Corresponding Author: hjpant@barc.gov.in
	Oral 26 517977 15:25 PM	15'	<b>In-Situ Neutron Activated Radiotracers</b> <b>Kamontip PLOYKRACHANG<sup>1</sup></b> , <b>Manasavee LOHVITHEE<sup>1</sup></b> and Nares CHANKOW <sup>1</sup> <sup>1</sup> Department of Nuclear Engineering, Chulalongkorn University, Thailand
ORAL SESSION 1 – partie 2	Oral 27 513221 16:10 PM	15'	<b>Development of a novel design of Gamma-Ray Densitometry (GRD) technique for multiphase flow systems</b> <b>Ahmed ALGHAMDI<sup>1</sup></b> , Hassan NIAZ <sup>2</sup> and Thaar <b>ALJUWAYA<sup>1</sup></b> <sup>1</sup> Nuclear Technologies Institute (NTI), King Abdulaziz City for Science and Technology (KACST), Saudi Arabia <sup>2</sup> Future Energy Technology Institute, King Abdulaziz City for Science and Technology (KACST), Saudi Arabia

	<b>Oral 28</b> <b>516548</b> 16:25 PM	15'	<i>Krypton (84Kr) as a new tracer gas for standardization test: When theoretical principles of tracer selection are not enough</i> <i>Elise CABASET<sup>1</sup>, Mathieu MARCHAL<sup>1</sup>, Audrey SANTANDREA<sup>1</sup>, Olivier HERBINET<sup>2</sup>, Emmanuel BELUT<sup>1</sup>, Sullivan LECHÊNE<sup>1</sup>, Stéphanie MARSTEAU<sup>1</sup>, and Jean-Pierre LECLERC<sup>1</sup></i> <sup>1</sup> INRS, Département d'Ingénierie des Procédés, France <sup>2</sup> Université de Lorraine, CNRS, LRGP, France
	<b>Oral 29</b> <b>512501</b> 16:40 PM	15'	<i>Investigating the distribution of sediment using natural radionuclides through insitu measurements on the Kilindini Harbor, Mombasa Kenya</i> <i>Jacques BEZUIDENHOUT<sup>1</sup>, Kgomotso BOTLHOLO<sup>1</sup>, Babalwa MTSRAWU<sup>1</sup></i> <sup>1</sup> Faculty of Military Science, Stellenbosch University, South Africa

## DAY 3: Thursday 16<sup>th</sup>

# S11

ORAL SESSION 11:  
DAY 3: Thursday 16<sup>th</sup>

Radiotracers: regulatory, standardization, accreditation, certification and safety aspects

ORAL SESSION 11	Reference	Duration	Oral communication
	<b>Oral 30</b> <b>513461</b> 09:45 AM	15'	<i>International Standardization of Basic Industrial Radiotracer and Radiation Applications – Current Status</i> <i>Thorsten JENTSCH<sup>1</sup>, Jovan Thereska<sup>2</sup>, Patrick BRISSET<sup>3</sup> and Joon-Ha JIN<sup>4</sup></i> <sup>1</sup> Occupational Safety and Radiation Protection Department, HZDR, Germany <sup>2</sup> International Society for Tracer and Radiation Applications (ISTRA), Austria <sup>3</sup> Centre CEA de Saclay, France <sup>4</sup> EYL, Inc., South Korea
	<b>Oral 31</b> <b>531218</b> 10:00 AM	15'	<i>Verification of Underground Pipe Leakage for Fire Hydrant System Using Industrial Radiotracer Tc-99m</i> <i>Mohd Amirul Syafiq MOHD YUNOS<sup>1</sup>, Lahasen Normanshah DAHING<sup>1</sup>, Sriraam SUBRAMANIAM<sup>2</sup>, Wan Hamirul Bahrin WAN KAMAL<sup>3</sup> and Mohd Fitri ABDUL RAHMAN<sup>1</sup></i> <sup>1</sup> Industrial Technology Division, Malaysian Nuclear Agency, MALAYSIA <sup>2</sup> Department of Chemistry Malaysia, Perak Branch, MALAYSIA <sup>3</sup> Medical Technology Division, Malaysian Nuclear Agency, MALAYSIA

# S7

ORAL SESSION 7:  
DAY 3: Thursday 16<sup>th</sup>

Industrial applications

ORAL SESSION 7	Reference	Duration	Oral communication
	<b>Oral 32</b> <b>513037</b> 10:45 AM	15'	<i>Application of the Neutron Back-Scattering technique to the analysis of humidity in the raw material of the paper industry and cartoon: Measurements and Monte Carlo Simulation</i> <i>Rabie OUTAYAD<sup>1</sup>, EL Hassan MESSAOUDI<sup>2</sup>, Tarek ELBARDOUNI<sup>2</sup>, Abdelaziz SAADAOU<sup>1</sup>, Alaa JAINIJA<sup>1</sup> and Abdelghafour EZZAHRI<sup>1</sup></i> <sup>1</sup> Direction études et recherche scientifique. Division Applications Industrielles, Unité techniques radiométriques, CNESTEN (Centre National de l'Énergie, des Sciences & des Techniques Nucléaires), Morocco. <sup>2</sup> Abdelmalek Essaâdi University, Université Abdelmalek Essâadi Faculté des Sciences de Tétouan Département de Physique, Morocco.

	<p><b>Oral 33</b> <b>513089</b> 11:00 AM</p>	<p>15'</p>	<p><b><i>Axial Dispersion Model Prediction for Continuous Pulp Digester Using Machine Learning</i></b>  <b>Vibhuti Sharma<sup>1</sup>, Sharad Saxena<sup>1</sup>, Avinash Chandra,<sup>2</sup> and Anu Bajaj<sup>1</sup></b>  <sup>1</sup> Department of Computer Science and Engineering, Thapar Institute of Engineering and Technology, India  <sup>2</sup> Department of Chemical Engineering, Thapar Institute of Engineering and Technology, India.</p>
	<p><b>Oral 34</b> <b>518305</b> 11:15 AM</p>	<p>15'</p>	<p><b><i>Comprehensive signal analysis in radioisotope measurements of two-phase flows</i></b>  <b>Marcin ZYCH<sup>1</sup>, Robert HANUS<sup>2</sup>, Anna GOLIJANEK-JĘDRZEJCZYK<sup>3</sup>, Artur ANDRUSZKIEWICZ<sup>4</sup>, Marek JASZCZUR<sup>5</sup>, Volodymyr MOSOROV<sup>6</sup> and Andrzej MROWIEC<sup>7</sup></b>  <sup>1</sup> Faculty of Geology, Geophysics and Environmental Protection, AGH University of Krakow, Poland  <sup>2</sup> Faculty of Electrical and Computer Engineering, Rzeszów University of Technology, Poland  <sup>3</sup> Faculty of Electrical and Control Engineering, Gdańsk University of Technology, Poland  <sup>4</sup> Faculty of Mechanical and Power Engineering, Wrocław University of Science and Technology, Poland  <sup>5</sup> Faculty of Energy and Fuels, AGH University of Krakow, Poland  <sup>6</sup> Faculty of Electrical, Electronic, Computer and Control Engineering, Łódź University of Technology, Poland  <sup>7</sup> Polytechnic Faculty, Calisia University, Poland</p>
	<p><b>Oral 35</b> <b>507771</b> 11:30 AM</p>	<p>15'</p>	<p><b><i>Residence Time Distribution formulation and applications using radioactive tracers</i></b>  <b>Jovan Thereska<sup>1</sup>, Patrick Brisset<sup>1</sup></b>  <sup>1</sup> ISTR, Jochen Rindt-Str. 33, 1230 Vienna, Austria</p>

Reference	Duration	Oral communication
FP1 513196 11:30	5'	<b>A Laboratory Test Loop for Developing Multiphase Flow Regimes</b> <b>Javad KARIMI-SABET<sup>1</sup>, Mina RESHTEBAR<sup>2,3</sup> and Ali TAHERI<sup>1,2</sup></b> <sup>1</sup> Nuclear Science and Technology Research Institute (NSTRI), Tehran, Iran <sup>2</sup> Iran Radiation Application Development Company (IRAD Co), Tehran, Iran <sup>3</sup> Department of Chemical Engineering, Sharif University of Technology, Tehran, Iran
FP2 513076 11:35	5'	<b>Arduino-Based Control System for Enhanced Flexibility and Automation in X-ray Detection Units</b> <b>Myo Nyunt<sup>1</sup>, Myo Zaw Htut<sup>1</sup>, Win Myo Tun<sup>1</sup>, Aung Lin<sup>1</sup>, Khing Thazin Than<sup>1</sup>, Htoo Nwe Nwe Aung<sup>1</sup></b> <sup>1</sup> Department of Nuclear Physics, Defence Services Academy, Myanmar
FP3 516565 11:40	5'	<b>Cobalt as Hazardous Pollutant: Adsorption Kinetics and Thermodynamics by Dolomite</b> <b>Ayse Nur ESEN, Oguzhan SACKIRAN, Sevilay HACIYAKUPOGLU</b> Energy Institute, Istanbul Technical University, Türkiye
FP4 522897 11:45	5'	<b>Computational model of the transport of the compound HFE-7200 as a downscaled atmospheric tracer</b> <b>Marcos Granell<sup>1</sup>, Sergio Chiva<sup>2</sup>, Aina Macias<sup>2</sup>, Tania Portolés<sup>1</sup>, Joaquín Beltrán<sup>1</sup></b> <sup>1</sup> Research Institute for Pesticides and Water (IUPA), Universitat Jaume I, Castellón, 12071, Spain <sup>2</sup> Department of Mechanical Engineering and Construction, Universitat Jaume I, Castellón, 12071, Spain
FP5 513189 11:50	5'	<b>Development of a Gamma-Ray Multiphase Flow Monitoring System utilizing Machine Learning</b> <b>Ali TAHERI<sup>1,2</sup>, Javad KARIMI-SABET<sup>1</sup> and Mina RESHTEBAR<sup>2,3</sup></b> <sup>1</sup> Nuclear Science and Technology Research Institute, Tehran, Iran <sup>2</sup> Iran Radiation Application Development Company, Tehran, Iran <sup>3</sup> Department of Chemical Engineering, Sharif University of Technology, Tehran, Iran
FP6 513095 11:55	5'	<b>Direction Finding and Detection System of Gamma Radiation Source using NaI(Tl) Detector</b> <b>Tay Zar Htein Win<sup>1</sup>, Zaw Htun Aung<sup>2</sup>, Myo Zaw Htut<sup>3</sup>, Naing Win<sup>4</sup> and Aung Lin<sup>5</sup></b> <sup>1</sup> Department of Physics, Higher Education Center, Myanmar <sup>2</sup> Department of Nuclear Physics, Higher Education Center, Myanmar <sup>3</sup> Department of Nuclear Physics, Higher Education Center, Myanmar <sup>4</sup> Department of Physics, Higher Education Center, Myanmar <sup>5</sup> Department of Physics, DSSTRC, Myanmar
FP7 513073 12:00	5'	<b>Dose Monitoring Solutions in Medical Diagnosis: A Comprehensive Implementation Study</b> <b>Khaing Thazin Than<sup>1</sup>, Myo Zaw Htut<sup>1</sup>, Nyan Win<sup>1</sup>, Win Htet<sup>1</sup>, Myo Nyunt<sup>1</sup></b> <sup>1</sup> Department of Nuclear Physics, Defence Services Academy, Myanmar
FP8 513070 12:05	5'	<b>Estimation of the Risk Value of an X-ray Inspection Process Using Probabilistic Safety Assessment</b> <b>Win Htet<sup>1</sup>, Myo Zaw Htut<sup>1</sup>, Aung Htut Win<sup>1</sup>, Khaing Thazin Than<sup>1</sup>, Zin Bo Oo<sup>1</sup></b> <sup>1</sup> Department of Nuclear Physics, Defence Services Academy, Myanmar



	<p><b>FP9</b> <b>513081</b> 12:10</p>	<p>5'</p>	<p><b>Identification and Exploration of Rare Earth Elements from Mining Activities by EDXRF Method</b> <i>Htoo Nwe Nwe Aung<sup>1</sup>, Khin Su Su Han<sup>2</sup>, Myo Zaw Htut<sup>3</sup>, Kyaw Win<sup>4</sup>, Myo Nyunt<sup>5</sup></i> <sup>1</sup> Department of Physics, Defence Services Academy, Pyin Oo Lwin, Myanmar <sup>2</sup> Department of Physics, University of Computer Studies, Mandalay, Myanmar <sup>3</sup> Department of Nuclear Physics, Defence Services Academy, Pyin Oo Lwin, Myanmar <sup>4</sup> Department of Physics, Defence Services Academy, Pyin Oo Lwin, Myanmar <sup>5</sup> Department of Nuclear Physics, Defence Services Academy, Pyin Oo Lwin, Myanmar</p>
	<p><b>FP10</b> <b>527675</b> 12:15</p>	<p>5'</p>	<p><b>Numerical experiments by Computational Fluid Dynamics to model the different geometries of activated sludge anoxic reactors</b> <b>David VAURIS, Nouceiba ADOUANI, Olivier POTIER</b> <i>Université de Lorraine, CNRS, LRGP, F-54001 Nancy, France</i></p>
	<p><b>FP11</b> <b>513318</b> 12:20</p>	<p>5'</p>	<p><b>RTD Modeling of Flow-rig Column Using DTS-pro</b> <i>Louisa BOUNEMIA<sup>1</sup>, Naila Bouchera BOUCHELIT<sup>2</sup>, Amina AMHIS<sup>2</sup>, Khelifa BOUKEFFOUSSA<sup>1</sup></i> <sup>1</sup> Department Application of Nuclear Technique, Algiers Nuclear Research Center, Algeria <sup>2</sup> Department of Chemical Engineering, National Polytechnic School, Algier, Algeria</p>
	<p><b>FP12</b> <b>527681</b> 12:25</p>	<p>5'</p>	<p><b>Study of the influence of activated sludge reactor hydrodynamics on antibiotic resistance development</b> <b>Miguel FLÓREZ<sup>1,2</sup>, Christophe MERLIN<sup>2</sup> and Olivier POTIER<sup>1</sup></b> <sup>1</sup> Université de Lorraine, CNRS, LRGP, F-54001 Nancy, France <sup>2</sup> Université de Lorraine, CNRS, LCPME, F-54000 Nancy, France</p>
	<p><b>FP13</b> <b>518291</b> 12:30</p>	<p>5'</p>	<p><b>Utilizing Natural Radionuclides to Trace Sediment Sources in Kilindini Harbour, Mombasa, Kenya</b> <i>Loise Mbae<sup>1</sup>, Kennedy Kilel<sup>2</sup>, Elijah Mwangi<sup>3</sup>, Michael Gatari<sup>4</sup>, Ian Kaniu<sup>5</sup> and Jacques Bezuidenhout<sup>6</sup></i> <sup>1</sup> Institute of Nuclear Science and Technology, University of Nairobi, Kenya <sup>2</sup> Department of Chemistry, Kenyatta University, Kenya <sup>3</sup> Institute of Nuclear Science and Technology, University of Nairobi, Kenya <sup>4</sup> Department of Engineering, University of Nairobi, Kenya <sup>5</sup> Department of Physics, University of Nairobi, Kenya <sup>6</sup> Department of Physics, Stellenbosch University, South Africa</p>

TO REGISTER FOR A WORKSHOP, PLEASE COMPLETE THIS REGISTRATION FORM :

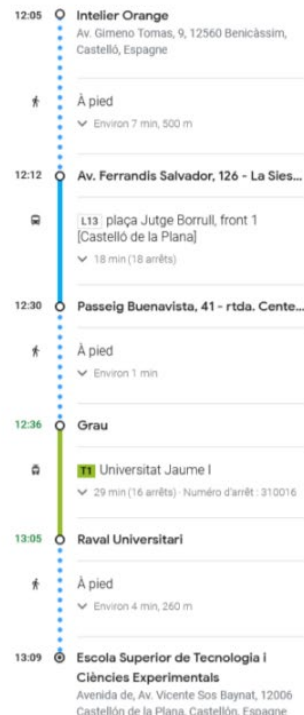
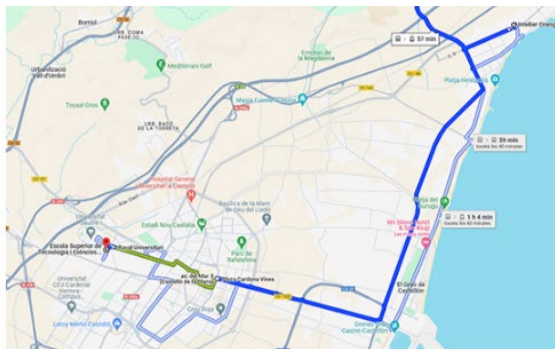
[HTTPS://FORMS.GLE/JBREBXSTRPXX6HHP9](https://forms.gle/JBREBXSTRPXX6HHP9)

On Thursday May, 16<sup>th</sup>, after the end of the conference, you are invited to take part in two workshops to be held at the Escola Superior de Tecnologia i Ciències Experimentals of the Universitat Jaume I, located in Castellón de la Plana.

The address is: [Avinguda de Vicent Sos Baynat, s/n, 12006 Castelló de la Plana, Castelló, Spain.](#)

To get there, you have two options: take a cab for a journey of around 15 minutes, or opt for the bus. Here are two bus routes to get there.

If you prefer to take a cab, you can contact an available cab company to arrange your journey : [just here.](#)



# WORKSHOP 1: Applications of virtual tracers to the CFD modeling of WWTPs: a practical approach with ANSYS

**DATE:** Thursday May 16th, 2024

**CONTRIBUTORS:** Group of Multiphase Flow (Universitat Jaume I) and HYDRENS : Raúl Martínez, Delia Trifi, Jaume Luis, José Vilarroig, Javier Climent, Pablo Carratalá and Rosario Arnau

**LOCATION:**

- Informatics Room TD0130AI,
- Escola Superior de Tecnologies Ciències Experimentals,
- Universitat Jaume I, Castelló

**ABOUT THE WORKSHOP:**

In recent years, there has been a notable increase in scientific production related to modelling applied to wastewater treatment processes using Computational Fluid Dynamics (CFD) techniques, from basic research, through engineering design, even process optimization.

This workshop will provide a brief introduction to the theoretical background underlying CFD and its application to several industrial applications. Special focus will be made for the use of tracers in wastewater treatment plants. Three case studies will be presented, and the assistants will be able to analyze them using the software package ANSYS-CFX:

**1. Troubleshooting mixing conditions through virtual tracer techniques:**

Analysis of different design alternatives of a biological reactor inlet chamber using virtual tracers to achieve a suitable distribution of the inlet flow.

**2. UV disinfection with closed reactors:**

Study on flow reactor size and water quality on the UV disinfection in tertiary treatment.

**3. Air quality at indoors and the ventilation system performance**

Evaluation of ventilation strategies to control the pollutant gas releases of industrial processes.

**TARGET AUDIENCE:**

The workshop will be customized to serve a broad spectrum of participants, encompassing both academics and practitioners from various domains such as process and chemical engineering, consulting, plant management, and administration. Their interests and objectives may range from implementing streamlined and efficient practices in design and operations to enhancing their understanding of plant reactors and the combined use of CFD and tracers for their analysis.

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- javier.climent@hydrens.com

## **WORKSHOP 2: How hydrodynamics and layout of reactors influence the Residence Time Distribution (RTD) curves**

*A comprehensive course using DTS-Pro software. Following by a presentation of aRiStiD, the new RTD software.*

**DATE:** Thursday May 16th, 2024

**CONTRIBUTORS:** Olivier Potier, LRGP-CNRS-Université de Lorraine

**LOCATION:**

- Informatics Room TD0130AI,
- Escola Superior de Tecnologies Ciències Experimentals,
- Universitat Jaume I, Castelló

**ABOUT THE WORKSHOP:**

The workshop is divided in three parts.

### **1. Introduction**

We'll start with an introduction to tracing and Residence Time Distribution method.

### **2. Training of the use of DTS-Pro software**

It will allow to identify systemic models from experimental RTD curves. People will learn the main functions of the software.

### **3. Simulations**

During the third and main part of the workshop, people will use the software to make about fifteen simulations, allowing them to understand the influence of reactor layouts on RTD curves.

Finally, people will realize they became able to qualitatively analyze experimental RTD curves and elaborate first models of studied reactors.

**EMAIL CONTACT:** [olivier.potier@univ-lorraine.fr](mailto:olivier.potier@univ-lorraine.fr)