

European Network of Fourier-Transform Ion- Cyclotron-Resonance Mass Spectrometry Centers

Grant Agreement n° 731077

Deliverable D1.2 Annual activity report of the EU_FT-ICR_MS network

Start date of the project: 1st January 2018

Duration: 48 months

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Document Classification

Title	Annual activity report of the EU_FT-ICR_MS network
Authors	P7 FC-LISB – Carlos Cordeiro P7 FC-LISB – Marta Sousa Silva
Work package	WP1 - TNA – TransNational Access
Dissemination	PU = Public
Nature	R: Document, report
Doc ID Code	20190325_EU_FT-ICR_MS_D1.2
Keywords	EU_FT-ICR_MS, network, transnational access

Document History

Name	Date	Comment
P7 FC-LISB – Carlos Cordeiro P7 FC-LISB – Marta Sousa Silva	2019-03-25	First version (draft)
P7 FC-LISB – Carlos Cordeiro P7 FC-LISB – Marta Sousa Silva	2019-06-03	Final version

Document Validation

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Neutral Reviewer	Date	E-mail



Document Abstract

The deliverable D1.2 “Annual activity report of the EU_FT-ICR_MS network” is part of WP1, dedicated to the trans-national access activities of the Consortium. This deliverable reports the networking activities of the Consortium during the first year of the project (2018), including trans-national accesses, staff-exchange, the first round-robin test, short courses and the first end-user and advanced user schools.

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Abbreviations

AUS	Advanced Users School
EUS	End-Users School
TNA	Trans-national access

1 INTRODUCTION

Networking activities are a fundamental pillar of the EU_FT-ICR_MS Consortium. These are centered on trans-national access to the FT-ICR-MS technology by academic, SME and industrial communities, staff exchange between the Consortium Centers, joint research activities between the Consortium Centers and advanced training through the organization of short courses and end-users and advanced schools.

2 TRANS-NATIONAL ACCESS

TNA is a key point of the EU FT-ICR MS network and is part of the Objective 1 of the Consortium: "Provide the EU academic, SME and industrial communities with access to world-class FT-ICR MS centers". All Centers agreed to offer the same number of TNA days (100 days for each of the Center).

During the first year of the project, trans-national access (TNA) started after May. Within the entire EU FT-ICR MS Centers there were 26 accesses (with an average of 3 per Center), from a total of 26 proposals, corresponding to a 100% success rate. The TNA distribution among the different Centers is presented in Figure 1.

TNAs 2018

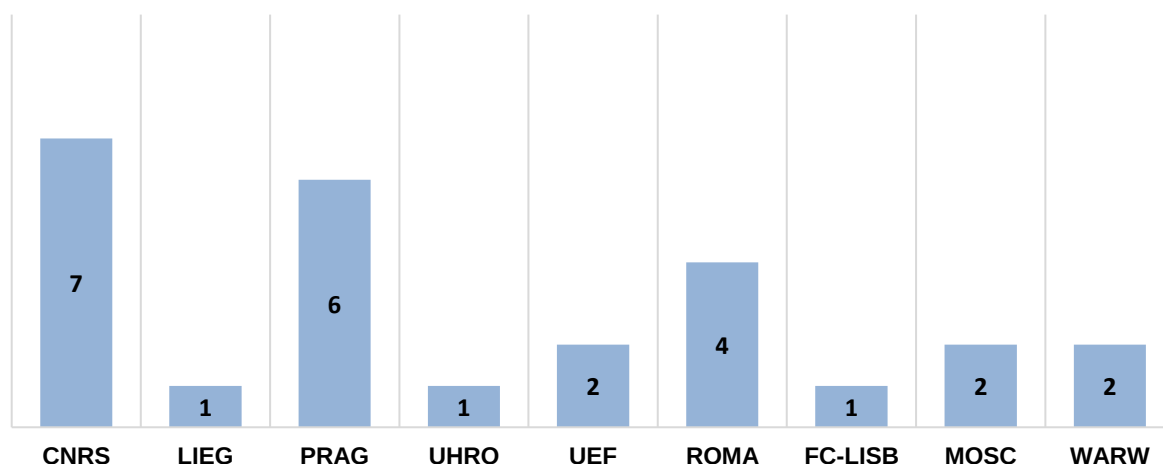


Figure 1: Trans-national accesses during the year of 2018 at the different Centers of the EU FT-ICR MS Consortium.

The duration of the TNAs varied between 3 and 12 days. In most of them, the samples were shipped to the Consortium Center, but in some cases, the researcher or student took the opportunity to visit the site and follow in the analysis. During the reporting period, the portal for TNA project management and evaluation was not fully functional and the projects were approved without external revision. They were reviewed and approved by the project coordinator or by the WP leader.

3 TRAINING, EDUCATION AND NETWORKING ACTIVITIES

3.1 Staff-exchange

Staff exchange between the different Centers of the network promotes sharing of specific skills and competences. This network activity is particularly valuable for young students and young members of each team. One week of staff exchange per partner per year was predicted.

During the first year of the project, there was 1 staff exchange, from ROMA to FC-LISB. From this interaction, emerged one poster in an international conference, a joint publication in press, and another one in preparation.

3.2 Courses and schools

During the first year of the project, two short courses and one end-user school were organized. One of the organized short courses took place in Rostock, from 5-7 March 2018 and was focused on atmospheric pressure ionization techniques for high resolution mass spectrometry of complex samples (Figure 2). The other one was organized in Orsay, from 5-7 November 2018 and covered FT-ICR for gas phase ion spectroscopy and structural characterization (Figure 2). The 1st End-User School (EUS) was organized in from 20-24 August 2018 in Joensuu (Figure 3).

**FIRST SHORT COURSE OF
THE EU FT-ICR MS
NETWORK**

ATMOSPHERIC PRESSURE
IONIZATION TECHNIQUES FOR HIGH
RESOLUTION MASS SPECTROMETRY
OF COMPLEX SAMPLES

When?
5-7 March 2018

Where?
University of Rostock
Research building LL&M
Albert-Einstein-Strasse 25
18059 Rostock





Overview of the program

-  **Tutorial Lectures**
Basics of FT-ICR MS
using atmospheric
pressure ionization
-  **Instrument demos**

Hands-On Exercises
Electrospray
ionization (ESI) and
Atmospheric
pressure chemical
ionization (APCI)
-  **Data analysis**
Comparison of
ionization features
of ESI, APCI and
GC- APCI/
Atmospheric
pressure photo
ionization (APPI)
samples;
In parallel: running
GC – APCI/APPI
measurements

Schedule for the first short course

Atmospheric pressure ionization
techniques for high resolution mass
spectrometry of complex samples

Tuesday 6.3. 9:00 – 11:00	Welcome and start with tutorial lecture (basics of FT-ICR MS using atmospheric pressure ionization)
11:00 – 12:00	Lab tour (2 groups)
12:00 – 13:00	Lunch
13:00 – 15:00	Hands on – Electrospray ionization (direct infusion)
15:30 – 17:00	Hands on – Atmospheric pressure chemical ionization
18:30 – 22:00	Social event (guided tour downtown Rostock) and dinner
Wednesday 7.3. 9:00 – 12:00	Data analysis of ESI, APCI and GC- APCI/APPI samples – comparison of ionization features In parallel: running GC – APCI/APPI measurements
12:00 – 13:00	Lunch
13:00 – 14:00	Closing meeting and wrap up



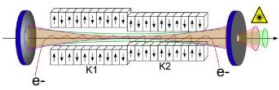
 Second short course of the EU_FT-ICR_MS network <i>FT-ICR for gas phase ion spectroscopy and structural characterization</i> November 5 – 7, 2018 Université Paris Sud Building 201 P2 Orsay, France  Location : The Université Paris Sud science campus is located 25 km southwest of Paris. It can be reached by local train from both of Paris major airports as well as from the main line train stations (30 min to 1h30 travel time). 	Main features of the program Tutorial lectures - Principles of action spectroscopy for ion structures in FT-ICR instruments - Applications for the structural characterization of ions - Selecting conformers or isomers through ion mobility  Hands on experiments - Ion activation with a IR free electron laser - Ion activation with OPO/OPA table-top laser Data processing and analysis - Data processing of action spectra measurements, comparison with simulations. <i>Attendants are encouraged to suggest the type of samples for which they would like to have hands on training.</i>	 Registration and accomodation: The attendance to the short course is free for selected participants! The EU_FT-ICR_MS will cover accomodation, registration and most travel fees. Download the application form on the EU_FT-ICR_MS web site (eu-fticr-ms.eu) and send it by email to: guillaume.van-der-rest@u-psud.fr Extended deadline for application starting on October 8th, on the basis of a first come first served. Application is open until the course is fully registered!  This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731077 .
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Figure 2: Flyers of the two short courses organized during 2018, in Rostock and in Orsay.

EU FT-ICR MS End User School 1 <i>Want to learn theory, practise and the most prominent applications of Fourier transform ion cyclotron resonance mass spectrometry?</i> When? 20–24 August, 2018 Where? University of Eastern Finland Department of Chemistry Joensuu – Finland 62° 36' 3.924" N 29° 45' 48.708" E  	Course overview Topics - Fundamentals of FT-ICR MS FT-ICR hardware & instrumentation - Basic data acquisition and signal processing - Data post-processing and quality evaluation - Applications of FT-ICR MS in proteomics, metabolomics, petroleomics, structural biology and many more... Content - Tutorial lectures, short talks, poster session Social activities - A boat cruise with onboard refreshments - A midnight smoke sauna and lake swimming experience <i>Instructors include world renowned experts in the field of FT-ICR mass spectrometry</i> <i>Organized by EU FT-ICR MS – A European Network funded by EU Horizon 2020 Programme</i>	For more information & application to the course: www.eu-fticr-ms.eu To navigate to the site, use the QR code below  More information about the venue: www.uef.fi Further enquiries: janne.janis@uef.fi NO PARTICIPATION FEE! Also, complimentary accommodation, meals and social program are offered! Up to 50 attendees will be selected to the course by the scientific committee on the basis of applications. THE DEADLINE FOR APPLICATIONS IS JULY 1ST 
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Figure3: Flyer of the 1st End-User School (EUS) organized in Joensuu.

4.1 The proposal for the organization of the European Fourier Transform Mass Spectrometry Conference in 2020

An important contribution for networking is the organization of high profile international conferences in the field, targeting the European FT-ICR users' community. One highly relevant conference is the European Fourier Transform Mass Spectrometry conference (EFTMS), already organized or co-organized in the past by members of this Consortium (E. Nikolaev: Moscow, 2008; P. O'Connor: Warwick, 2012; G. van der Rest: Paris, 2014).

The proposal for the organization of the 14th EFTMS conference, placed during the 13th EFTMS in Freising by FC-LISB (on behalf of the EU FT-ICR MS Consortium), was successful. Lisbon will organize the 14th EFTMS in 2020, with the confirmed participation of Alan Marshall, Alexander Makarov, Jonathan Amster, Neil Kelleher, Philippe Schmitt-Kopplin, Julia Chamot-Rooke and Roman Zubarev.

This task is crucial for the visibility of the EU FT-ICR MS network among the FT-ICR MS community. Despite its title, the European FTMS conference is attended also by non-European Union scientists (mainly European scientists from outside the European Union, scientists from Canada and the United States) and will lead to a broader diffusion of the EU FT-ICR MS network concept and of its results. It will be an outstanding opportunity to engineers, PhD students and post-docs to present their work in collaboration with the end-users of the EU FT-ICR MS Centers.

4 JOINT RESEARCH ACTIONS

4.2 The first round-robin test

The first Round-robin test performed within the EU_FT-ICR_MS network aimed to provide information on the different equipment performance among the network centers, as well as the consistency of data including mass accuracy, sensitivity and MSMS performance. This test was performed in August / September 2018 and the chosen sample was the peptide Leucine-enkephalin (Sigma), shipped from FC-LISB to all EU FT-ICR MS Centers. The minimum requirements for the analysis were the determination of the exact mass of the molecular ion in positive and negative ionization modes, the measurement of the relative intensities of the molecular ion and the two first isotopes in positive and negative ionization modes, and the measurement of the exact mass of the MS/MS spectra also in positive and negative ion modes.

5 CONCLUSION AND PERSPECTIVES

The first year of the project was extremely well successful concerning dissemination and training activities. As an example, all courses and schools had more applicants than available seats, showing the high interest that the project is generating in the European Scientific community, laying the foundation for new generations of FT-ICR-MS scientists and experts. Staff exchanging will increase from a modest base, as normal in a starting community project, taking advantage of all different skills and instrumentation available in all centers. Concerning TNA, the number of accesses were below the expected ones but the duration of each was in general higher than foreseen (5 days) calling for a redefinition of the TNA access metrics, that should be focused on access duration.