

# ITN FINESSE

## YEARLY REPORT 2

### Oct 2017 - Sept 2018



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## FINESSE in numbers

**4** years (Oct 2016 - Sept 2020)

**3.88 M€** Budget

**26** partners

**8** European countries

**15** ESR fellows

**5** Training Events

## ITN FINESSE

The objective behind FINESSE (**F**ibre **N**ervous **S**ensing **S**ys-**t**ems) is to mimic the nervous system of living bodies by turning man-made and natural structures into objects that are sensitive to external stimuli owing to advanced distributed fibre-optic sensor technology, with the objective to either give early warning in case of possible danger or occurrence of damage, or to optimise the operation of the structure to allow for a sustainable use of natural resources and assets. Enabling such functionalities will greatly contribute to realizing a safe, secure and energy efficient Europe, which is an identified societal concern.

To turn this ambitious concept into reality, 26 European universities, research centers and industrial partners have teamed up to set up this Innovative Training Network, with the common objective of educating and training 15 Early Stage Researchers (ESRs) in the development of a set of disruptive new optical ‘artificial nervous systems’ and to boost the industrial uptake of these sensors by technology transfer from academic research to the European optical fibre sensor industry.

We are also engaged in stimulating awareness of this technology to other scientists and a wider public to encourage research in this field and improve societal acceptance on distributed fibre sensing systems through various training events, opened to other early career researchers, and outreach activities.

ITN FINESSE is funded by the European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska Curie grant agreement n°722509.

# FINESSE Consortium

## Coordinator:

Ecole Polytechnique Fédérale de Lausanne (EPFL)

## Other Beneficiaries:

- Universidad de Alcala (UAH)
- Vrije Universiteit Brussels (VUB)
- Universitat Politècnica de Valencia (UPV)
- Leibniz Institute of Photonic Technology (IPHT)
- Tel-Aviv University (TAU)
- Fibercore (FIB)
- University of Cambridge (UCAM)
- RISE (RISE)
- Agence Nationale pour la gestion des Déchets Radioactifs (ANDRA)

## Non-funded partners:

- Omnisens (OMNI)
- PERFOS, R&D Platform of Photonics Bretagne (PERFOS)
- Fluves (FLUV)
- Asociación Industriail Textil (AITEK)
- FBGS International (FBGS)
- Geosense Limited (GEOS)
- Cálculo y Estructuras Sensadas, SL (CAL)
- CommScope (COMM)
- Solifos (previously BRUGG)
- FAST Laser GROUP Ltd (FAST)
- ADIF (ADIF)
- BECSA (BECSA)
- THALES Research and Technology (TRT)
- Université de Nantes
- ORC University of Southampton (ORC)
- Laing O'Rourke



## FINESSE EB Members



**Prof. Luc Thévenaz**  
**Network Coordinator (NC)**



**Prof. Salvador Sales (UPVLC)**  
**Deputy Coordinator (DC)**



**Prof. Miguel González Herráez**  
**(UAH), Training coordinator (TC)**



**Prof. Francis Berghmans (VUB)**  
**Recruitment & Equal Opportunities**  
**Coordinator (REOC)**

## FINESSE Management

A 3-level organisation is implemented in the network: (i) work level in which research work packages in FINESSE are led by a beneficiary partner; (ii) management level (Executive Board) and (iii) a decision making and advisory level, ensured by the Supervisory Board of FINESSE.

Meetings are planned during all common network activities. The meetings were successively held in Brussels (M9: June 2017), Alcala de Henares (M12: Sept 2017) and Jena (M19: April 2018) during our training events.

## Supervisory Board

FINESSE's Supervisory Board (SB) is the ultimate decision-making body of the consortium. It is composed of representatives from each beneficiary institutions, up to two representatives from non-funded partner organisations present during the meetings and two elected representatives of the ESRs (elected amongst them after the appointment of all ESRs). Chaired by the Network coordinator, its mission is to oversee the on-going research efforts by ensuring that the complementary strength of the network partners is optimally exploited.

## Executive Board

In order to oversee the planned activities and management of the FINESSE network, an Executive Board (EB) has been chosen within the FINESSE consortium. It is composed of seven coordinators, with specific roles for horizontal task, to ensure a smooth functioning of the network. Each one will be responsible for one specific project's component and will regularly report to the Supervisory Board. The composition of the EB was validated amongst the beneficiaries on the 31<sup>st</sup> of May 2016.

## FINESSE coordinators

### Network Coordinator (NC)

Prof. Luc Thévenaz, from EPFL, is the FINESSE Network Coordinator. He is the legal entity acting as the intermediary between the FINESSE partners and the European Commission (EC) / Project Officer (PO). His main functions include chairing the SB and the EB, coordinating and stimulating the FINESSE network activities and advising on administrative matters. He is also responsible for annual and final reports, deliverables and coordinating financial and contractual issues, towards the EC and the project partners, including data collection from project partners.

### Deputy Coordinator (DC)

Acting as Deputy Coordinator, Prof. Salvador Sales from UPVLC will be the NC's substitute when the latter cannot materially be present and act as a secretary in the SB and in the EB.

### Administrative Coordinator (AC) / Project Manager

The NC and DC are assisted in the management of the FINESSE network by the Administrative Coordinator Dr. Can Yao (EPFL). She has taking over this position from June 2018 from the previous AC Dr. Kenny Hey Tow who has joined another position with higher responsibilities. Her tasks and duties include:

- managing the day-to-day operational tasks: organisation of project meetings, training events, secondments for the ESRs,
- monitoring the project's deliverables, milestones, periodic reports and schedule, to ensure a proper coordination among partners and timely deliveries,
- ensuring the link and facilitating exchanges and cooperation between the 15 ESRs, etc.
- contributing to the dissemination and outreach activities in FINESSE.

### **Recruitment & Equal Opportunities Coordinator (REOC)**

Prof. Francis Berghmans, from VUB, has been assigned as REOC in FINESSE. He is in charge of implementing the centralised recruitment of young researchers and providing advice and information on recruitment, for overseeing the gender balance policy and for advising ESRs on their rights and obligations.

### **Training coordinator (TC)**

Prof. Miguel González Herráez (UAH) is the FINESSE training coordinator. His main responsibilities include the supervision all training activities and organise the training events (TE) together with the local organisers, detailing the topics to be lectured at the network TEs and ensure a logical connection between the schools at basic, advanced and expert levels. Moreover, he will evaluate the career development plans for each ESRs and monitor their progress as well as ensuring the correct recognition of training and research activities performed during scientific visits and secondments of ESRs to other nodes and of the network meetings and schools (accreditation of credit points to ESRs).

### **Communications Coordinator (CC)**

Dr Sylvie Lesoille (ANDRA), our Communication Coordinator, is responsible of coordinating and managing all the outreach and dissemination activities through media contact and public relations planned in FINESSE.

### **Science & Relations with Industry Coordinator (SRIC)**

Prof. Thomas Crispeels (VUB-BUTO) is FINESSE's SRIC. He is in charge of fostering communication between the participating groups by monitoring and stimulating transfer of knowledge, ideas and experience between the partners. He also ensures active collaboration between the academic and private sector partners and deals with intellectual property rights (IPR) issues as well as the identification of potentially exploitable IP. He ensures that all researchers are aware of the need for IPR protection and of the opportunities available for exploitation and entrepreneurship. Finally, his role is also to verify that the interests of the consortium members are not exposed by uncontrolled exploitable results diffusion.

## **ESR representatives**

The ESRs re-nominated their two representatives (ESR 7 – Angeliki Zafeiropoulou and ESR 15 – Marie Gruber) during the ESR meeting in April 2018, for another one-year term. The ESR representatives attend the SB meetings and act as a point of contact for the Executive Board and Project Manager to address all the ESRs.

### **FINESSE EB Members**



**Dr. Can Yao (EPFL)**  
**Administrative coordinator (AC)**



**Dr. Sylvie Lesoille (ANDRA)**  
**Communication Coordinator**



**Prof. Thomas Crispeels (VUB)**  
**Science & Relations with Industry  
Coordinator (SRIC)**

## FINESSE ESRs

ESR 1: Malak Galal (Egypt), EPFL.

ESR 2: Li Zhang (China), EPFL.

ESR 3: Hari Bhatta (Nepal), TAU.

ESR 4: Regina Magalhaes (Portugal), UAH.

ESR 5: Luis Costa (Portugal), UAH.

ESR 6: Sergei Mikhailov (Russia), VUB, Belgium.

ESR 7: Angeliki Zafeiropoulou (Greece), Fibercore.

ESR 8: Joao Pereira (Brasil), RISE.

ESR 9: Ravil Idrisov (Russia), IPHT.

ESR 10: Beatriz Silveira (Portugal), IPHT.

ESR 11: Demetrio Sartiano (Italy), UPV.

ESR 12: Arianna Piccolo (Italy), ANDRA.

ESR 13: Ignazio Floris (Italy), UPV.

ESR 14: Qianchen Sun (China), UCAM.

ESR 15: Marie Gruber (Germany), VUB.

## FINESSE Work Packages (WP)

### WP1: Advanced techniques for distributed sensing

ESR 1: Malak Galal

ESR 2: Li Zhang

ESR 3: Hari Bhatta

ESR 4: Regina Magalhães

ESR 5: Luis Costa

### WP2: New fibers for distributed sensing

ESR 6: Sergei Mikhailov

ESR 7: Angeliki Zafeiropoulou

ESR 8: Joao Pereira

ESR 9: Ravil Idrisov

ESR 10: Beatriz Silveira

### WP3: Field validation and new applications

ESR 11: Demetrio Sartiano

ESR 12: Arianna Piccolo

ESR 13: Ignazio Floris

ESR 14: Qianchen Sun

### WP4: (D)OFS Technology Transfer Research

ESR 15: Marie Gruber

## FINESSE Early Stage Researchers (ESRs)

In FINESSE, 15 ESRs undertake different roles in 4 different yet collaborating workpackages, from new fiber design, fabrication and advanced distributed sensing techniques, to field validation and new applications, completed by specific knowledge in technology transfer within this high-tech domain.

Through the FINESSE network, the whole process from basic research in optical fibre sensing to its applications and commercial development is aimed at being highly accelerated to benefit the society. At the same time, the 15 FINESSE ESRs gain an extensive knowledge thanks to the network, through training events and secondments hosted by other FINESSE partners. A quality control is carried out to ensure that the ESRs make qualified work within FINESSE, by a regular progress reporting about each ESR during training events. Since each ESR is registered as regular student for a PhD course, they are also affiliated to an academic institution delivering PhD degrees and they are subject to the specific regulations of their PhD school.

The original ESR1 & ESR10 did not find their way in this specific scheme and decided to redirect their career in a different framework. ESR1 and ESR 10 have been promptly replaced by 2 new motivated students, presented hereafter, who are smoothly merging in the FINESSE family and activities.

The bio of all our ESRs are available on our website: <http://itn-finesse.eu/esrprofiles/>

## ESR 1



*New ESR1 Malak Galal (Egypt).*

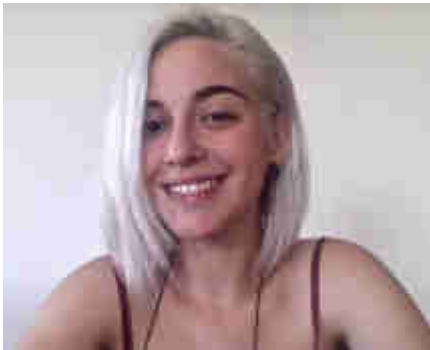
Malak Galal is Egyptian and grew up studying in a German school which made her fascinated by the difference in cultures and traditions between the Egyptian and foreign communities. She joined the Group for Fibre Optics at EPFL during Summer 2018.

Learning various languages at school has aided her to travel abroad, go through new experiences and acclimate quickly to new societies. After successfully completing her Abitur – the German school leaving certificate – she decided to study Electronics Engineering at the German University in Cairo (GUC). During my

studies at the GUC she took some very interesting Optics and Photonics courses, which ignited her passion for this field.

Her research project in the FINESSE network is focused on establishing a distributed optical fiber sensing system based on continuous faint long gratings (FLOGs) inscribed into the fiber aiming to sense parameters such as temperature and strain. She is very enthusiastic about her project and about collaborating with her fellow ESRs from whom she is certain to learn a lot and with whom she is ready to share her thoughts and knowledge.

## ESR 10



*New ESR10 Beatriz Silveira (Portugal).*

Beatriz Silveira is a PhD in Leibniz-IPHT in the Holographic Endoscopy group since Summer 2018. She comes from Portugal and graduated in Physical Engineering from the University of Porto.

During her studies, she was enrolled in programmes at INESC-TEC, which inspired her to pursue a career in Optics. After her Master course, she took part in a project where she developed optical fibre sensors for Health Monitoring. Holographic endoscopy now allows converting a single multimode fibre into a minimally-invasive imaging element. However, any bending of the probe

can severely degrade the imaging quality.

Within the FINESSE network, she will aim at combining holographic endoscopy with the concept of distributed sensing to provide feedback for active compensation of distortion caused by bending and to enable fully flexible operation.

She believes FINESSE is giving her the opportunity to connect with young researchers from various European institutions, and to grow at an academic and personal level. She hopes to share a lot of ideas and good times with her fellow FINESSE colleagues.

# FINESSE Training Event 3: BRAIN STORMING!

## PhD school on Specialty Fibres

Organiser: IPHT

Location: Jena, Germany (April 9-11, 2018)

**Purpose:** to offer the participants the opportunity to attend a series of key lectures given by experts in the field of Specialty Fibres.

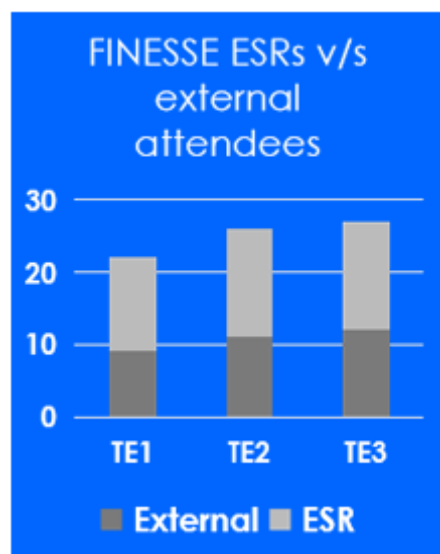
This TE has been complemented by practical demonstrations on preform, fibre and sensor fabrication as well as characterization.

27 young scientists from 9 countries were trained during TE3.

More than 1/4 of the lectures were given by lecturers from Industry.



*The TE3 kick-off lecture given by Laurent Bigot from University of Lille.*



*All TE3 participants, like Kenny Hey Tow and Thomas Crispeels, visited the IPHT draw tower facility to better know how specialty glass fibers are drawn.*

During TE3, each ESR has practiced his/her writing of an abstract, followed by an oral presentation of the work in front of the whole consortium. Critical feedback was given right after each presentation.



*ESR 8 Joao and ESR 10 Arsenii are giving presentations in front of the whole FINESSE consortium.*

## FINESSE Training Event 4:

### PhD school on Entrepreneurship in Photonics

Organiser: VUB

Location: Commscope, Leuven, Belgium  
(December 10-14, 2018)

This Winter School aims to provide junior photonics researchers with an overview of the photonics markets and some key business aspects associated with these markets and photonics entrepreneurship.

Highlight: the participants will learn how to refine a business concept and prepare an investor pitch.




**PhD Winter School on  
Entrepreneurship in Photonics**

**10-14 December 2018**



[Visit Online](#)

**Organised by:**  
Vrije Universiteit Brussel, Belgium

**Location:**  
**COMMSCOPE**  
Diestsesteenweg 692, 3010 Leuven, Belgium

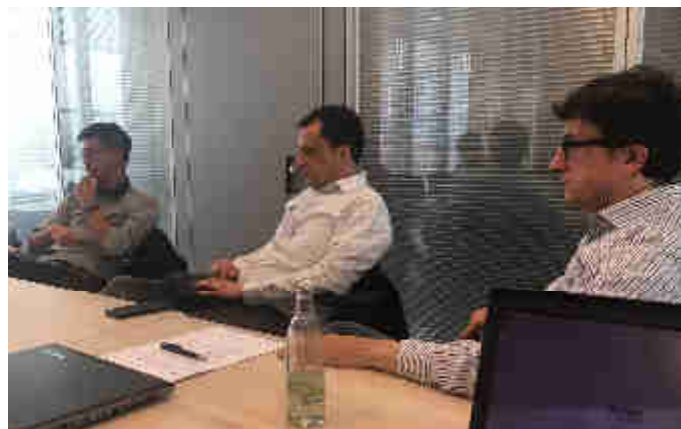



# FINESSE Executive Board (EB) and Supervisory Board (SB) Meeting



*The 3rd EB meeting held during the TE3 in Jena, Germany.*

FINESSE EB and SB meetings were held during the TE3 in Jena, Germany, in presence of all EB and SB members, to discuss important matters such as FINESSE mitigation plan, consortium agreement, ESR secondment plan, the opportunity of a FINESSE workshop during an international conference, etc.



## FINESSE Mid-Term Meeting (MTM)

Date: 18-19, June 2018

Location: EPFL, Lausanne, Switzerland

During the Mid-term meeting (MTM), the project coordinator Luc Thévenaz presented the progress achieved in FINESSE (M1-M21) during the first half of the project. All ESRs presented their personal career development plans and scientific achievements, as well as their future plans.

The FINESSE REA representative Ms. Célia Rodrigues had a closed-door meeting with all the ESRs and later with the project coordinator, separately. In parallel took place an informal supervisory board meeting among FINESSE

scientists-in-charge, and later future Secondment planning (ESRs and scientists-in-charge).

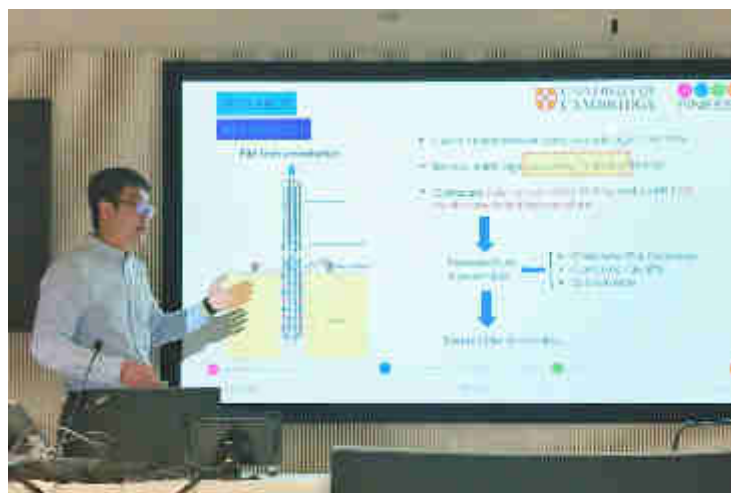
Finally the REA Project Officer gave her general feedback consolidated by the External Expert Dr. Lorna Everall (University of Coventry). A constructive discussion was carried out on the output of the Network so far, on possible training areas for future exploitation and on the impact on fellows' future careers development.



*The entire consortium, including all ESRs, all academic supervisors and a representative of FINESSE industrial partners (Omnisens), attended the FINESSE MTM, monitored by the EU project officer Mrs. Célia Rodrigues.*



*Project Coordinator Luc Thévenaz is presenting FINESSE achievements during the MTM.*



*ESR 14 QianChen is giving presentation during the MTM.*

A summary of the MTM has been sent to all MTM attendees, including the whole MTM participation list and the agenda, addressing important discussion points, and including an action plan for the participants.

The REA project officer shortly gave her positive evaluation about the whole FINESSE project progress, labeling the ITN as a success story, and encouraged all FINESSE members to continue working hard to secure the impact of FINESSE on the society.

# FINESSE @ OFS-26: BIG SUCCESS!



A special workshop - « **Fibre optic sensors: from the lab to the field** » was organised in the framework of the 26th international conference on optical fiber sensors (OFS26), held on 24-28 September, 2018 at EPFL campus in Lausanne.

The FINESSE partner EPFL was the Organiser, and the FINESSE Coordinator Prof. Luc Thévenaz was General Chairman. Prof. Moshe Tur from TAU and Prof. Miguel Gonzalez Herraiez from UAH co-chaired

the conference, showing a strong preeminence of the FINESSE community in the domain. More than 300 participants attended this FINESSE workshop, in which all lectures were given by experts within FINESSE consortium.

10 out of our 15 ESRs have contributed to at least one paper, showing the very fruitful presence of FINESSE.



*Prof. Geernaert talks about B-PHOT's fibre optic sensing in composite materials.*



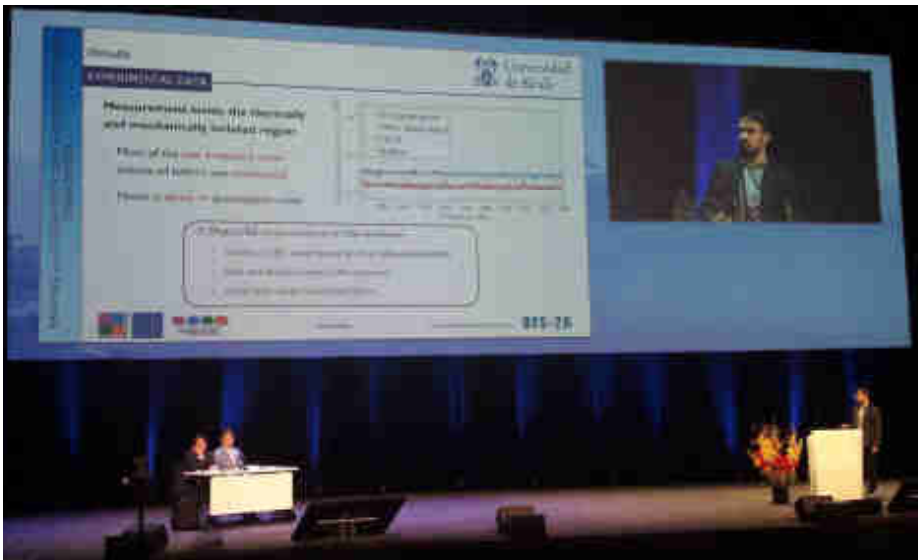
*Prof. Margulis demonstrates flow cytometry using optical fibres*



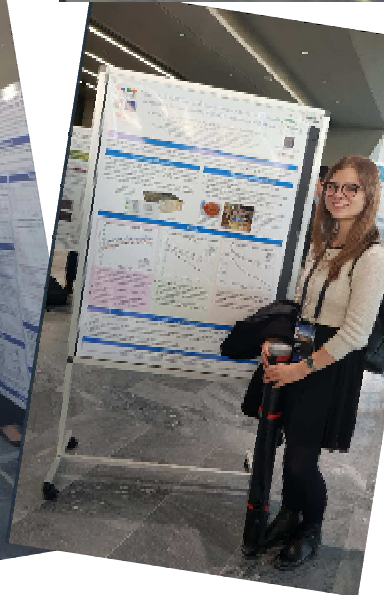
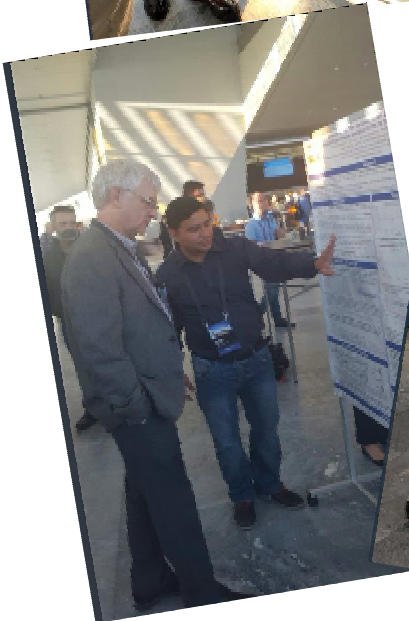
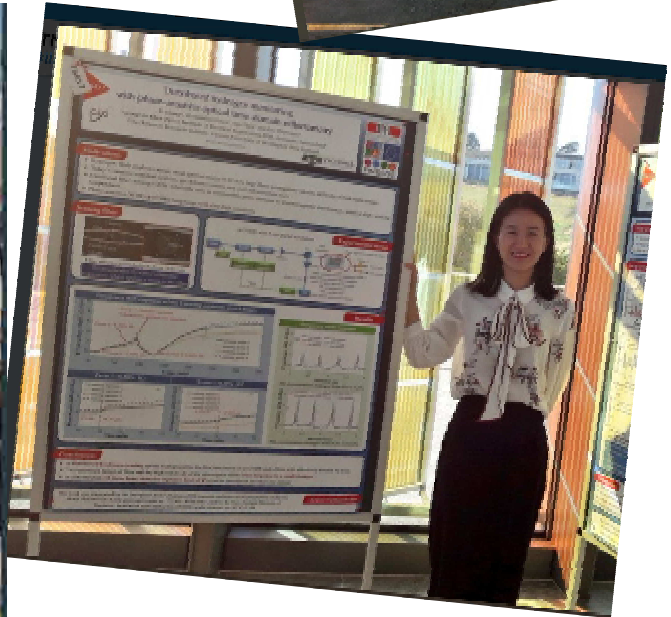
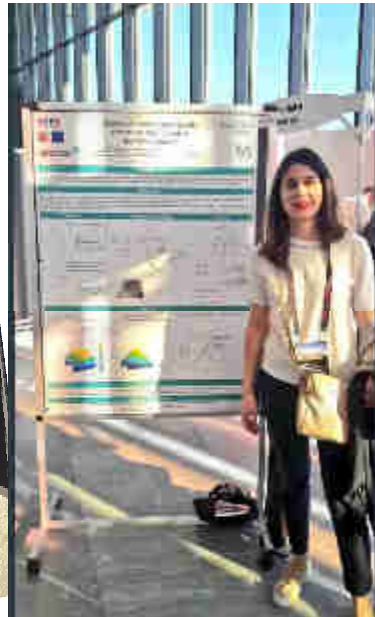
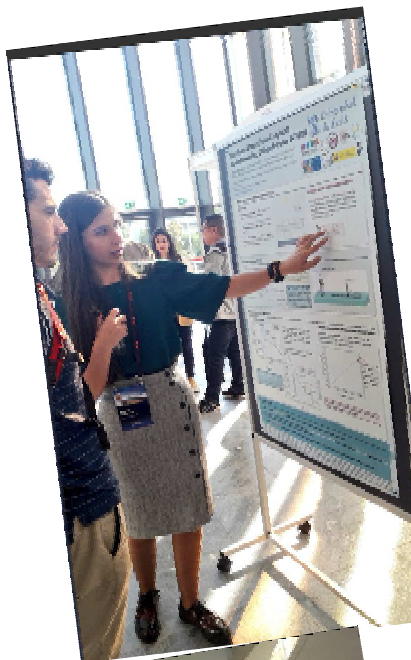
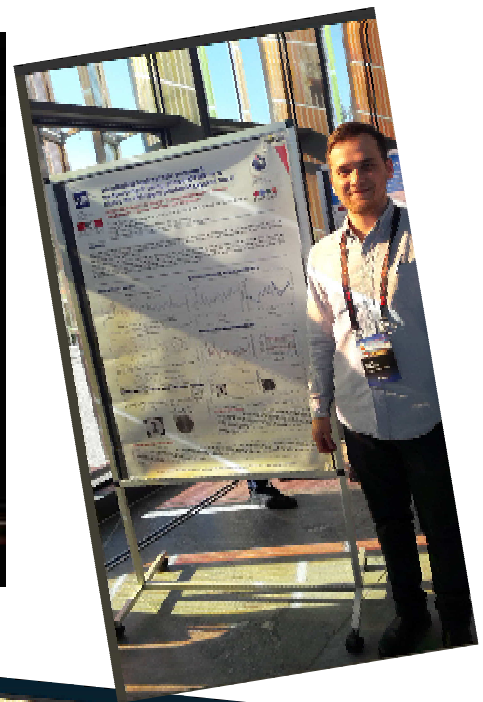
*Dr. Lesolle explains the specificities FO sensing in radioactive environments.*



*Prof. Elshafie convincingly presents the smart realisations of talking tunnels and self-sensing bridges using artificial intelligence.*



ESR 5 Luis won the **best PhD Presentation Award** at OFS 26. Well done Luis!



## How to follow our activities?

FINESSE website:  
[www.itn-finesse.eu](http://www.itn-finesse.eu)



@ItnFINESSE



@ItnFINESSE



ITN-FINESSE group



ITN-FINESSE



[finesse@epfl.ch](mailto:finesse@epfl.ch)

## Communication and Dissemination Activities: WORK AND FUN!

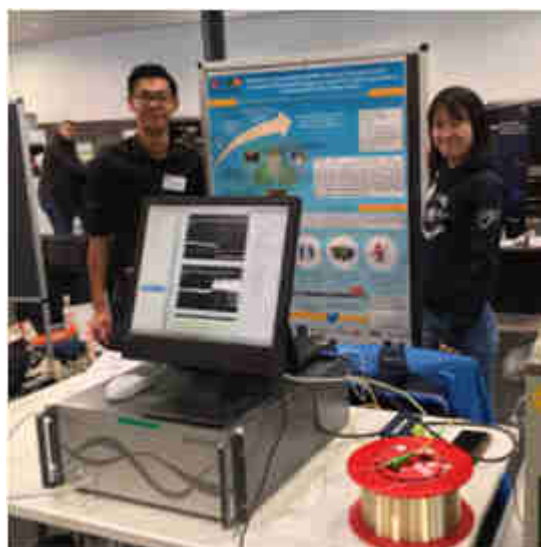
The FINESSE disseminates into the public through various channels:

Online: FINESSE website, Twitter, Facebook, LinkedIn group, YouTube videos, etc.

Offline: In press, or public talks in conferences, seminars and public activities attended by ESRs and other FINESSE consortium members.



*ESR 12 Arianna at MSCA 150th birthday anniversary celebration of Marie Skłodowska-Curie, France*



*Finesse project presented at STIL 2018 event by EPFL team, K. Hey Tow and the ESR 2 Li Zhang*



*ESR1 Pabitra teaching undergraduate students how to characterize optical fibres and sources at EPFL.*

The communication and collaboration among ESRs are steadily consolidated during secondments, training events and conferences, as well as online using WhatsApp and LinkedIn groups, etc.



*Seminar announcement: ITN-FINESSE ESR M. Gruber (VUB) presented a seminar on her research topic and results during her secondment at Valencia*



*Prof. M. González Herráez convincingly demonstrating that "optical fiber distributed sensing is the only viable solution in many applications" during the prestigious Summer School ISLIST.*



*ESR 13 Ignazio during the Summer School at **UniTrento** about Smart Materials and Structures .*



*ESR 15 Marie during her secondment at UPVLC.*



*Demetrio from UPV with Li during his secondment at EPFL, working on oil pressure sensing.*

## Submitted deliverables on EU Portal:

D1.1: Lab validation of current systems

D1.2 Map of performance limits

D2.1 Validation of current fibers

D2.2 New fibre designs

D3.1 Current solutions and expected system performances

D4.1 Opportunity identification, screening and assessment in (D)OFS

D5.1 Personal career development plan (PCDP) for each ESR

D5.2 Report on ESR training follow-up (I)

D6.1 Web page completion

D6.2 Dissemination and outreach activities (I)

D6.3 Dissemination and outreach activities (II)

D7.1 Advertisement for ESR recruitment

D7.2 Consortium agreement

D7.3 Report on recruitment process and declarations of conformity

D7.4 Yearly report of FINESSE (I)

D7.5 Yearly report of FINESSE (II)

D7.8 Supervisory Board of the network

D7.9 Mid-term Meeting

D7.10 Progress report

D8.1 NEC-Requirement No.1

D8.2 EPQ-Requirement No.2

## Conference Papers and Publications:

The 2nd year of FINESSE bears very fruitful results with:

Journal Paper (3)

Journal Paper –submitted (1)

International Conferences with proceedings (23)

International Conferences – submitted (2)

National Conferences (5)

Articles in Journal associated with FINESSE (but without participation of ESRs) (22)

Conference proceedings associated with FINESSE (but without participation of ESRs) (11)

### Contact Person

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15

Early Stage  
Researchers (ESRs)

26

Partners in  
consortium

7

Female  
ESRs



18

Industrial  
Partners



8

Academic  
Institutions

9

ESR  
Nationalities



4

Years  
(10/16-09/20)

8

Countries in  
FINESSE

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