European Training Network on Electromagnetic Risks in Medical Technology

Deliverable: D.5.2– ETERNITY NWE1

Start date of the project: 1st March 2021

Duration: 48 months

Deliverable: summary Progress Report

The aim of this document is to provide an overview on ETERNITY's first Network Wide Event

D.5.2. – ETERNITY NWE1

Due date of deliverable: M13
Organization name of lead contractor for this deliverable: KU Leuven
Main author(s): KU Leuven -TU/e
Validated by: UPC and PLUX
Version number: V. FINAL
Submission Date: 31.03.2022

Type:	Report
Dissemination Level:	Public

Revision history

Revision	Date	Description	Author (Organization)
V. 0.1	23/03/2022	Table of content + complete draft of the deliverable	Lisa Seravalle (Tu/e)
V. 0.2	23/03/2022	Improvement of the draft of the deliverable	Davy Pissoort (KU Leuven)
V. 1 UPC and PLUX	25/03/2022	Peer- review of the deliverable	Mireya Fernandez (UPC) Silvia Reis (PLUX)
V. FINAL	29/03/2022	Creating the final version of the deliverable	Lisa Seravalle (TU/e)

This project has received funding from the European Union's EU Framework Programme for Research and Innovation Horizon 2020 under Grant Agreement No. 955.816.

Acronyms

EC	European Commission
PO	Project Officer European Commission
CA	Consortium Agreement
GA	Grant Agreement
DoA	Description of the Action
PCDP	Personal Career development plan
NWE	Network Wide Event
SB	Supervisory Board
MT	Management Team
PM	Project manager
RC	Recruiting Committee
NWE	Network Wide Event

Beneficiaries' short names

TU/e	Technische Universiteit Eindhoven
UT	Universiteit Twente
PMS	Philips Medical System Nederland B.V.
KUL	Katholieke Universiteit Leuven
UPC	Universitat Politècnica de Catalunya
IDNEO	Idneo Technologies SAU
PLUX	Plux -Wireless Biosignals S.A.

Partner Organizations' short names

PMC	Plasmacure
UMCU	Universitair Medisch Centrum Utrecht
EUF	Eurofins
BARCO	Barco
FCT	Faculdade de Ciências e Tecnologia
MST	Medisch Spectrum Centrum
ASEPEYO	Asepeyo hospital

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Table of Contents

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1. ETERNITY NWE1

ETERNITY NWE1 took place in Bruges on 14th-17th March 2022.

The event was very successful given the high number of attendees and their active participation, showing great interest for the topics discussed.

1.1. First day: Mid-Term check review meeting with the REA Project Officer

On the first day there was held ETERNITY mid-term check review meeting, in which all the ETERNITY ESRs, the REA Project Officer, all the Beneficiaries and Partners Organization introduced themselves and detailed their activities for the project.

The REA Project Officer provided relevant information on best practices for the monitoring of the project implementation and reporting and explained the purpose of the mid-term check review meeting.

The coordinator, referring to the progress report, summarised in a presentation all the activities performed from the beginning of the project, with specific focus on how the ETERNITY consortium complies with the MSCA ITN principles and rules.

After a confidential discussion with the ESRs, the REA Project Officer provided feedback to the Consortium, which was overall quite positive.

The day ended with a really nice social event and dinner.

Annex 1 details the meeting agendas of the 4 days.

Annex 2 reflects partially the presentations introduced in the first day (for confidentiality reasons some parts have been removed).

1.2. Second day: Meeting Day with conclusions on 1st day + lecture

The SB-MT meeting and the ESR Council meetings were held separately during the morning of the second day. Both meetings were confidential therefore their contents are not shared in this public deliverable.

The second part of the day was devoted to the lecture "*EMC Aware design within Barco",* given by Dr. Ronnie Deseine, who is representative of Barco (one of ETERNITY's Partner Organizations) The lecture, which had an active audience participation, was very interesting and very well received by the ESRs. Dr Deseine presented clear and concrete solutions to complex EMC problems that the company faced in the last 20 years. The day finished with KU Leuven's lab and campus visit.

1.3. Third day: "*S/T training*" and "*Immersive Training*"

The third day was devoted to training with two different sessions followed by all ESRs.

The first session was a "*S/T training*" held by Prof, Davy Pissoort (from KU Leuven) on *"Introducing Risk Analysis and Functional Safety"*, explaining the difference, complementarity and links between EMC for CE compliance, risk-based EMC and EM resilience.

The second one was an "*Immersive Training*" held by Joeri Wielandts (from KU Leuven) on "*How to do brainstorming".*

The day ended with a nice boat trip on the Bruges canals.

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1.4. Fourth day: "*S/T training*" and "Immersive training"– part 2 (practice training)

The fourth day was also devoted to training activities, with two different sessions.

The first session, held by Prof. Hans Hallez (from KU Leuven), was a "*S/T Training*" on "*Sensors and Internet-of-Things in the Medical Sector".*

In the second training session, ESR's applied the "immersive training" tools learnt the day before in practical cases. This training session was held by Prof. Davy Pissoort and Dr. Anne Roch' (from Tu/e). At the end of the afternoon, the ETERNITY ESRs presented the results of their brainstorm to Prof. Davy Pissoort and Dr. Anne Roch' and got advice on how to proceed with this in the coming months.

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2. Annex 1 (4-day event agendas)

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European Training Network on Electromagnetic Risks in Medical Technology

MSCA ETN ETERNITY Network-Wide Event 1 +

Mid-term Check Review Meeting EC REA Project Officer

Bruges (Belgium), 14-17.03.2022

Detailed AGENDA

Location: **Crowne Plaza Bruges**, Burg 10, 8000 Bruges (Belgium)

Hotel accommodation link: https://book.passkey.com/go/Eternity

MONDAY 14.03.2022 – Day 1
ESRs + Supervisors & their colleagues + representatives of the Partner Organizations + Management Support Team + **Project Officer (Mid-term check review meeting)**

Time (CET)	Crowne Plaza, Bruges Meeting room: Burg 4+5	Teams-Link
9:00 – 9:15	Welcome with coffee and refreshments	
9:15 – 9:20	**Welcome by REA Project Officer and Project Coordinator**	Meeting link
9:20 – 9:50	Tour de table: Introduction of the beneficiaries and partner organizations, their research team and role within the project	
9:50 – 10:10	REA Project Officer presentation: presentation on the monitoring of project implementation, reporting and purpose of the mid-term check	
10:10 – 10:20	Coffee break	
10:20 – 11:00	Coordinator's report: presentation of the Consortium & Mid-term progress report (scientific, training and management)	
11:00 – 12:00	Individual ESRs presentations (about 3-4 min per ESR, in total around 1h)	
12:00 – 13:00	Lunch break	
13:00 – 14:00	Confidential discussions with PO and all the ESRs Meeting room: Prinses Judith	Separate link
14:00 – 14:15	Confidential discussion between PO and coordinator	Separate link
14:15 – 14:45	Feed-back and Q&A between Project Coordinator / MST / Partners / ESRs, and Project Officer	Meeting link
15:00 – 15:30	Walking to Brewery Brugse Zot in Bruges (appr. 15' walking)	
15:30 – 17:00	Start Visit Brewery Brugse Zot – XL tour (1h30)	
19:00 – 21:00	Official project dinner Crowne Plaza, Bruges	

TUESDAY 15.03.2022 – Day 2
ESRs + Supervisors & their colleagues + representatives of the Partner Organizations + Management Support Team

Time (CET)	Crowne Plaza, Bruges Meeting room: Burg 4+5	Teams-Link
9:15 – 11:30	Meeting with MT/SB (only for beneficiaries and partner organizations)	Meeting link
9:15 – 11:30	ESR council (only for ESRs) Meeting room: Prinses Judith	
12:00 – 13:30	Lunch break	
13:30 – 14:00	Conclusions of the meeting + project next steps	Meeting link
14:00 – 15:30	**Guest lecture on "*EMC Aware design within Barco*" given by Ronny Deseine (Barco)**	
16:00 – 17:00	Walk from Crowne Plaza to Bruges Campus through the city of Bruges	
17:00 – 18:30	**Bruges Campus and lab visit**	

WEDNESDAY 16.03.2022 – Day 3: S/T Training and Immersive Training
ESRs + Optional: Management Support Team + Supervisors & their colleagues

Time (CET)	Crowne Plaza, Bruges Meeting room: Burg 4+5
10:00 – 12:00	S/T Training: *"Introducing Risk Analysis and Functional Safety"* (Prof. Davy Pissoort, KU Leuven)
12:00 – 13:30	Lunch break
13:30 – 16:30	**Immersive training – part 1** by Joeri Wielandts (KU Leuven) Title: "*How to do brainstorming"*
17:00 – 17:45	Boat trip on the Bruges canals: "Venice of the North"

THURSDAY 17.03.2022 – Day 4: S/T Training and Immersive Training
ESRs + Optional: Management Support Team + Supervisors & their colleagues

Time (CET)	**Crowne Plaza, Bruges Meeting room: Burg 4+5**
10:00 – 12:00	S/T Training: "*Sensors and Internet-of-Things in the Medical Sector*" (Prof. Hans Hallez, KU Leuven)
12:00 – 13:00	Lunch break
13:00 – 16:30	**Immersive training – part 2** by Davy Pissoort (KU Leuven), and Anne Roc'h (TUEindhoven) [13:00-13:15]: Introduction by Anne Roc'h and forming of the groups [13:15-14:45]: Exercise in the selected groups [14:45-15:00]: Break [15:00-15:45]: Preparation of the presentation [15:45-16:30]: Presentation and Q&A of the brainstorming results by the respective groups

(Drinks, lunches, dinner mentioned in the agenda as well as the training and the two indicated social events will be covered by ETERNITY central budget. In particular are covered for 1st day: coffee and refreshments, lunch, brewery visit and official dinner, for day 2nd; coffee and refreshments, lunch, for day 3rd lunch break and boat trip, and for day 4th lunch).

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3. Annex 2 (first day's presentations)

This project has received funding from the European Union's EU Framework Programme for Research and Innovation Horizon 2020 under Grant Agreement No. 955.816.

eTERNITY

EUROPEAN TRAINING NETWORK ON ELECTROMAGNETIC RISKS IN MEDICAL TECHNOLOGY

FROM CARE TO PREVENTION
QUALITY OF CARE
SAFE TRAVEL

This project has received funding from the European Union's EU Framework Programme for Research and Innovation Horizon 2020 under Grant Agreement No. 955.816

Mid term check review meeting agenda 14.03.2022

Time (CET)	Crowne Plaza, Bruges
9:00 – 9:15	Welcome with coffee and refreshments
9:15 – 9:20	**Welcome by REA Project Officer and Project Coordinator**
9:20 – 9:50	Tour de table: Introduction of the beneficiaries and partner organizations, their research team and role within the project
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14:00 – 14:15	Confidential discussion between PO and coordinator
14:15 – 14:45	Feed-back and Q&A between Project Coordinator / MST / Partners / ESRs, and Project Officer

Beneficiaires

1 TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY [TU/e]

2 UNIVERSITY OF TWENTE. [UTwente]

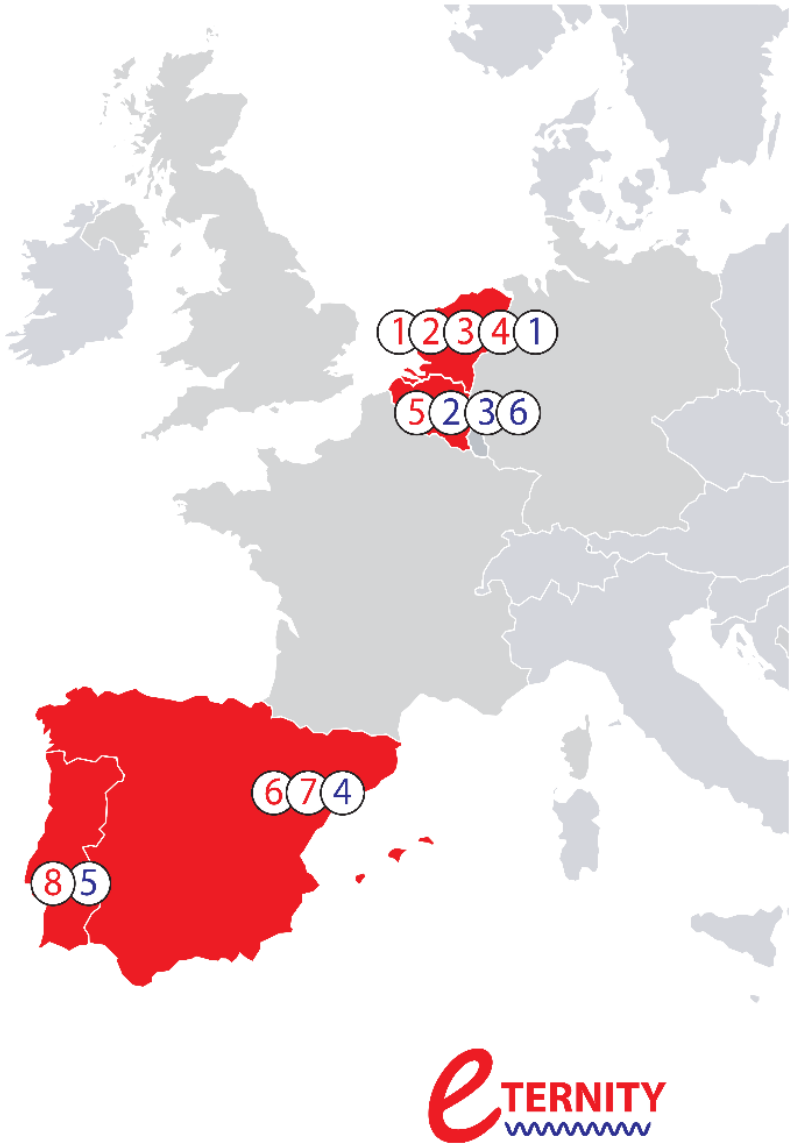
3 4 PHILIPS [PHC]

5 KU LEUVEN [KU Leuven]

6 UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH [UPC]

7 idneo [IDNEO]

8 plux [PLUX]



eTERNITY

Partner Organisations

1 Plasmacure [PMC]

2 UMC Utrecht [UMCU]

3 eurofins [EUF]

4 ASEPEYO [ASEPEYO]

7 MST [MST]

5 FCT FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE NOVA DE LISBOA [FCT]

6 BARCO Visibly yours [BARCO]

Network-wide events

Eindhoven M7(NL) - Kick off
Bruges M16 (BE)
Lisbon M25 (PT)
Barcelona M34 (ES)
Eindhoven M36 (NL)
Twente M42 (NL)

1–8 Beneficiaries | 1–6 Partner Organisations | Academic Participants | Non-academic participants | Hospital

TU/e

Tour des Pays

The Netherlands

North Brabant

- Eindhoven University of Technology (TU/e)
- Philips Medical Systems Nederland B.V. (PMS)
- Plasmacure (PMC)
- Hospital Utrecht (UMCU)-more precisely Randstad-

Overijssel

- University of Twente (UT)
- Medisch Spectrum Twente (MST)

Eindhoven University of Technology

1200 BSc and MSc students
80 scientific staff members
>250 PhD students

Intense cooperation with High-tech industry and research institutes (e.g., Philips, NXP, ASML, DAF, VDL, TNO, ASTRON, Prodrive, …..)

Three Research Centers to support focus areas for applied research with industry

eTERNITY
European Training Network on Electromagnetic Risks in Medical Technology

Coordination : *Dr.ir. Anne Roc'h*
Supervision of ESR1 and ESR7
Co-supervision ESR11
(with Philips Medical)

Program Manager:
Lisa Seravalle

Dr. Ir. Sander Bronckers
Co-supervision ESR11
(with Philips Medical)

People involved in ETERNITY

IGT Systems Electronics

Rob Kleihorst
Sr Electrical Designer

- ESR 11 Supervisor
- ESR 3 Co-supervisor

Nadun Senevirathna
Early-Stage Researcher 11

PD MR R&D Collaboration Office

Mark van Heelvort
Manager External Partnerships

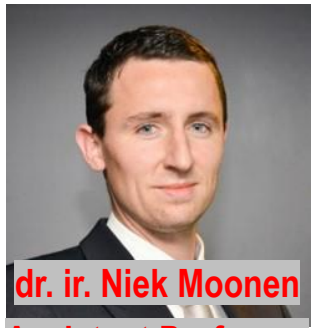
- ESR 10 Supervisor
- ESR 2 Co-supervisor

Simon Rendon Velez
Early-Stage Researcher 10

Power Electronics and EMC

Prof. dr. ir. Frank Leferink

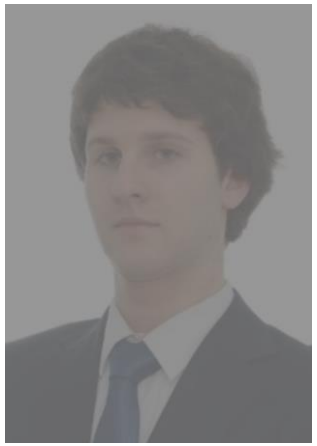
Full Professor, 0.4fte



dr. ir. Niek Moonen

dr. ir. Robert Vogt-Ardat jew

Assistant Professor



~~Lukasz Guziczak (UT)~~

Simon Rendon Velez (Philips)

patients

528 bedden

26.408 klinische opnamen

124.302 Aantal unieke patiënten

professionals

Medewerkers in dienst

3.590

250 Medisch Specialisten

1.208 Verpleegkundigen

education

97 Artsen in opleiding tot specialist (aios)

60 Artsen niet in opleiding tot specialist (anios)

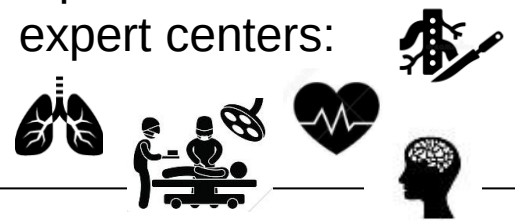
8 Hoogleraren

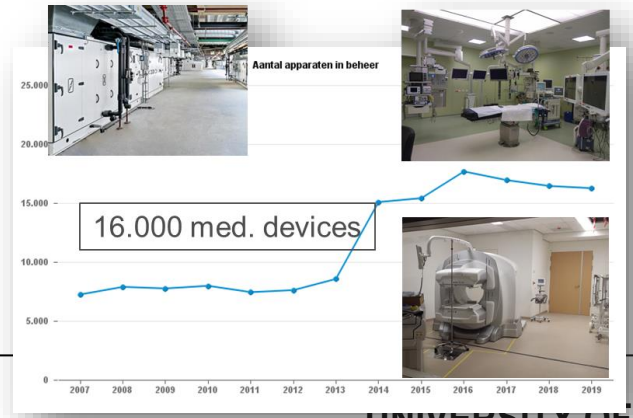
Medisch Spectrum Twente
een santeon ziekenhuis

96 Helikopter-landingen

Ambulanceritten 8.320

- large teaching hospital
- top clinical care
- expert centers:





Tour des Pays

Belgium

- KATHOLIEKE UNIVERSITEIT LEUVEN (KU Leuven)
- Eurofins (EUF)
- Barco NV (BARCO)

KU Leuven Bruges Campus

m·group

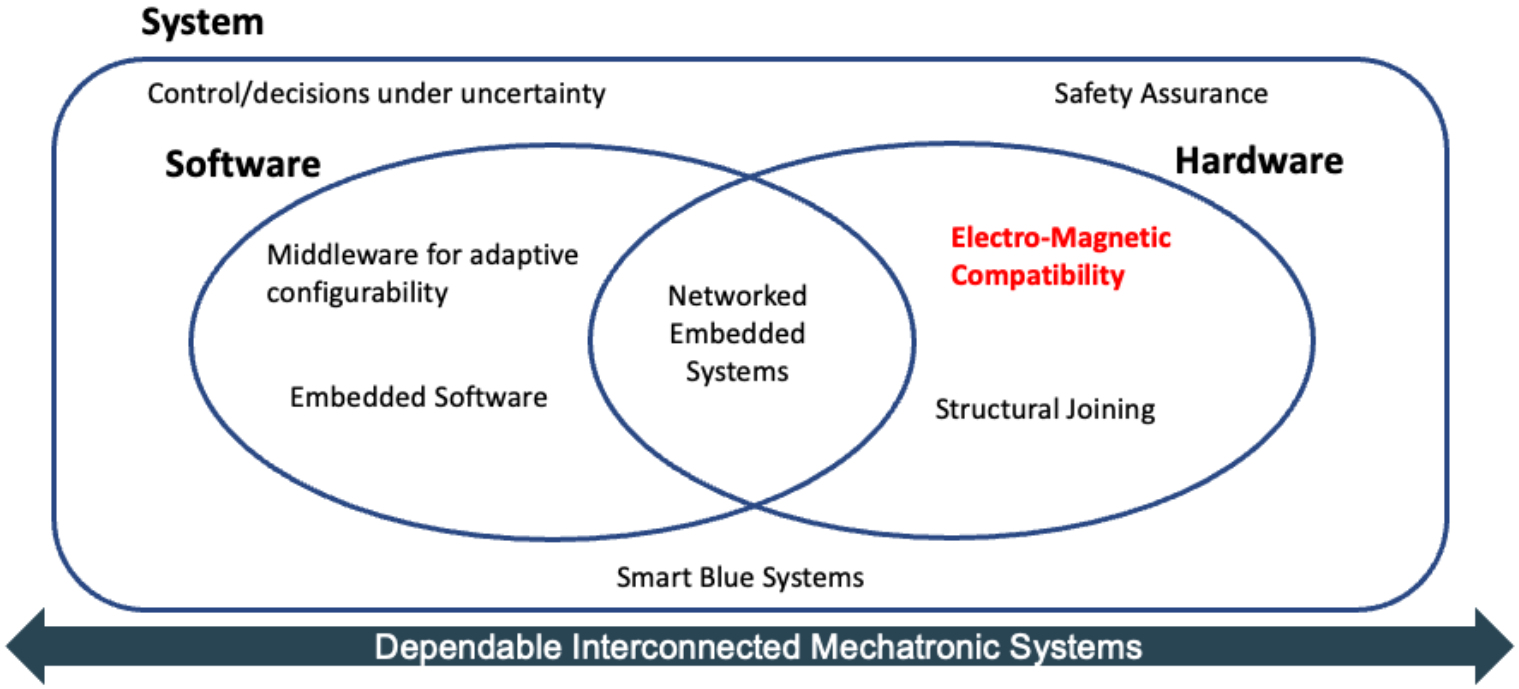
Department of Mechanical Engineering

Department of Electrical Engineering

Department of Computer Science

"True to the mechatronic approach"

eTERNITY

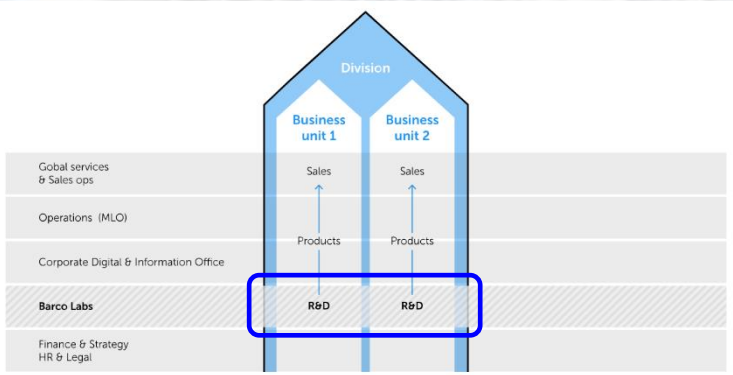


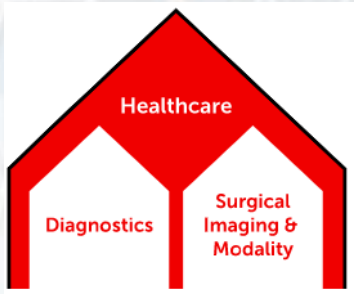
Prof. D. Pissoort

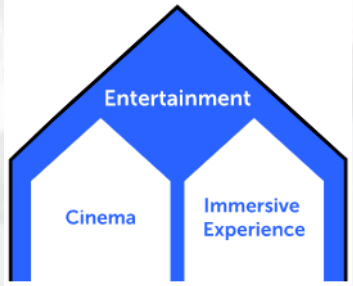
Dr. T. Claeys

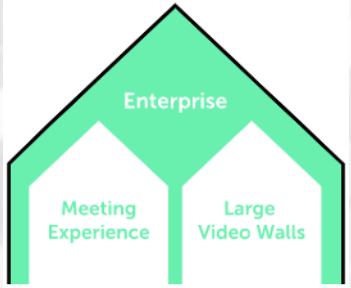
Dr. D. Vanoost

ETERNITY NWE1: BARCO INTRODUCTION









Barco: Partner organisation
Ronny Deseine: EMC Expert Engineer Healthcare
Industrial assessor of ESR14 - Vikas Ghatge


Radiology


Mammography


Dermatology


Surgery

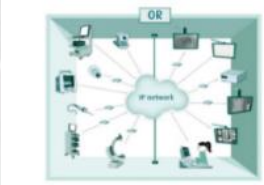

Modality


Oncology


Pathology


Dentistry


Medical display systems



Nexxis for the operating room


Skin imaging systems


Healthcare services


Custom medical solutions

Tour des Pays

Spain

- Universitat Politècnica de Catalunya (UPC)
- Idneo Technologies S.A.U. (IDNEO)
- ASEPEYO

Grup de Compatibilitat Electromagnètica
UNIVERSITAT POLITÈCNICA DE CATALUNYA

ETERNITY

Mireya Fernández Chimeno

Project Manager
Senior Supervisor

Ferran Silva

GCEM Director
Senior Supervisor

Ukiwo Anya

ESR 2

Marc Pous

Supervisor

Asif Ali

ESR 5

Alex Chaves

Administrative Support

Marco Azpúrua

Supervisor

Marcos Quílez

Supervisor

Nathalia Batista

ESR 8

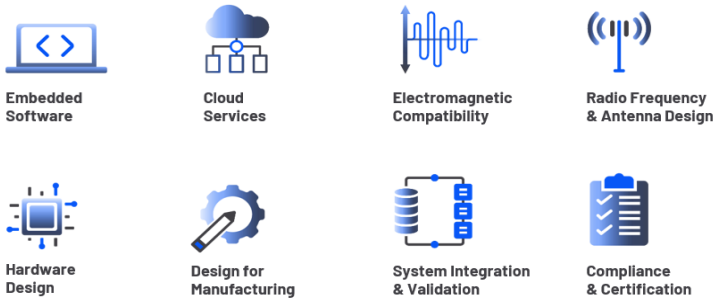
UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

Scope and Team

› Team that brings **20 years of expertise** in **automotive industry.**

› Our talent comes from **Ficosa Panasonic** Advanced Communications & In-Cabin Monitoring Business Units.

› **Strong background** in multi-disciplinary fields, such as radiofrequency, HW, SW, system validation, global certification, design for manufacturing.



› **Projects:** "Electromagnetic interference from connected, autonomous and electric vehicles on driver-monitoring systems".

An evaluation of the effect of the cumulative EMI in monitoring systems will be made and based on that, tests will be developed to check the correct operation and to ensure the reliability of the future automotive driver-monitoring systems.

› **WP 6 Leader:** Exploitation, dissemination and communication.

Disseminate the results of ETERNITY to the academic, teaching, industrial and public communities in Europe. Establish and deploy a solid exploitation plan for the future introduction of risk-based EMC. All partners involved.

Geon George Bastian
Doctoral researcher,
Biometrics & iCM at Nextium
ESR 12

Jordi Vila-Planas
Innovation Supervisor,
Biometrics & iCM at Nextium
ESR 12 Supervisor

Noelia Rodríguez
Innovation Leader,
Biometrics & iCM at Nextium
WP6 leader

Tour des Pays

Portugal

- Plux - Wireless Biosignals, S.A (PLUX)
- Universidade NOVA de Lisboa (FCT)

PLUX Team Project

Hugo Silva
Chief Innovation Officer

Co-Supervisor of ESR 4, 7, 8, **13**

Sílvia Reis
Project Manager

Tiago Nunes
ESR 13: EMI Risk assessment in Medical Device Innovation Process - from design to production

NOVA SCHOOL OF SCIENCE & TECHNOLOGY

Dr. Hugo Gamboa

Associate Professor at NOVA School of Science and Technology

Academic Supervisor of ESR13

Tiago Nunes

ESR13 – PhD Candidate in Biomedical Engineering

REA presentation

- About monitoring of the project implementation
- Reporting and purpose of the mid-term check

Coordinator's report agenda

- Recruitment of ESRs
  - Researcher's declaration
  - ESR’s awareness on his/her rights and obligations
  - PCDPs
  - ESR’s courses
- Deliverables submitted and deviations
- Milestones flagged and deviations
- Other deviation from DoA
- Management meetings
  - Meetings with ESRs
- Critical implementation risks and mitigation actions
- Secondments and deviations

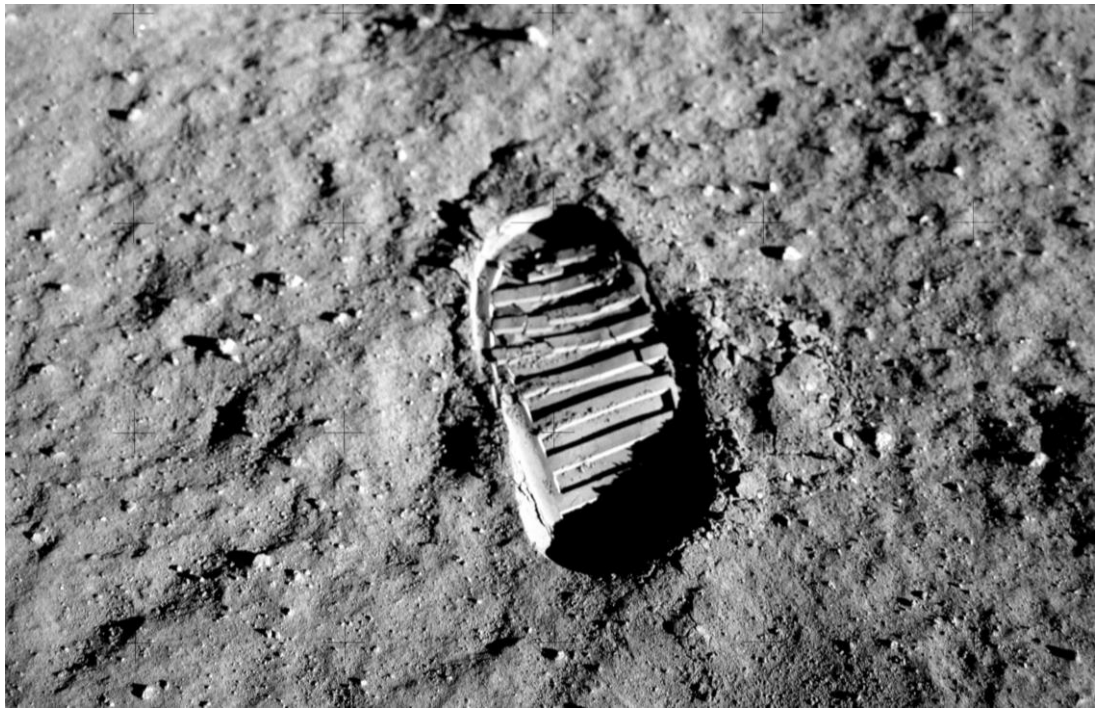
Presentation of: Marc Kopf

Mid-term check meeting 14th March 2022

About Marc Kopf

- Name: Marc Kopf (email: m.kopf@tue.nl)
- Origin: Hamburg, Germany
- Affiliation: Eindhoven University of Technology (TU/e), Eindhoven (NL)
- Project: "EMI Footprint Characterization of Medical Devices"
- Project Start: July 2021
- B.Sc. and M.Sc. in Electrical Engineering from Hamburg University of Technology (TUHH) in 2017 and 2020
- Industry: Worked at a Startup as a Hardware Developer, developed IoT AIS Receivers for greener shipping

EMI Footprint Characterization of Medical Devices



Source: Footprint of 'Buzz' Aldrin, Image according to NASA Document AS11-40-5877 (OF300)

- Footprint = Environment + Profile => Research Question: How to quantify both?
- Tools: Statistical Analysis, Reverberation Chambers
- Vision: Digital Type Plate with connection to EMI database
- Upcoming Key Events (selection):
  - June 2022: Participation at Knowledge Market of the Dutch EMC-ESD Association (an academia – industry networking event)
  - Summer 2022: Secondment at Philips
  - August and September 2022: Workshop Organization at EMC+SIPI 2022 and EMC Europe 2022 on risk-based EMC
  - Autumn 2022: Training, Open Science (by TU/e)
  - Whole period: Various teaching and supervising of Students (Master's Project, ERASMUS Student Project, Bachelor's Design Based Learning Project)

Presentation of: Ukiwo Anya (ESR2 @ UPC)

Mid-term check meeting 14th March 2022

My Background

2011

BEng

Electronic Engineering after **5 yrs** of studies

University of Nigeria
to restore the dignity of man

2012

NYSC

Compulsory **1 yr** national service completed

2013

Support Engineer

My first job; Location: Port Harcourt (Nigeria); Duration: **2yrs 6 mos**

FN CL

2015

MSc Management

Start of management studies; Graduated in **Feb. 2018**

2017

Intern

Sales & Marketing; Location: Munich (Germany); Duration: **11 mos**

intel

2018

MSc SMARTNET

Erasmus Mundus MSc: Smart Telecom and Sensing Networks; Graduated in **Sept. 2020**

SmartNet
The Smart Telecom And Sensing Networks
TELECOM SudParis
INSTITUT POLYTECHNIQUE DE PARIS
HELLENIC REPUBLIC
National and Kapodistrian University of Athens
EST. 1837

2020

Research Intern

Master Thesis internship; Location: Athens (Greece); Duration: **6 mos**

OTE
GROUP OF COMPANIES

2021

Early Stage Researcher

ETERNITY Project; Host: UPC; Secondments: PHC, IDN; Duration: **3 yrs**

UPC UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

PHILIPS

idneo Mobility

Inputs

Experience
of GCEM-UPC staff in time-domain measurement & testing techniques

Resources
available at GCEM-UPC labs

Training
courses provided by ETERNITY, UPC, and external sources

Skills

Electronic Instrumentation

Electromagnetic Compatibility

Telecommunication

Risk Analysis

Tools

Instrumentation:
Oscilloscopes, Antennas, Field Probes, SDR.

Analysis:
MATLAB.

Meas. software:
TEMPS

Project

Characterization of Medical Electromagnetic Environments for the Use of Digital Communication Systems

Partnerships

UPC:
ESR5 & ESR8

PHC:
ESR1, ESR3, ESR4, & ESR14

FIC:
ESR7 & ESR14

Objectives

Analyze the statistical characteristics of EM environments using time-domain measurement techniques

Provide quantitative specifications for EMEs & figures of merit for DCSs

Outputs

Characterize medical EMEs in multiple domains

Make recommendations based on quantitative evidence to improve the EMI risk assessment for medical equipment

Presentation of: Miriam González

Mid-term check meeting 14th March 2022

My background

- Born in 1998 in Granada, Spain.
- **2016-2020:** BSc in Telecommunications Engineering at UGR.
- **2020-2021:** (Student) researcher at Dept. of Signal Theory, Telematic and Communications at UGR.
- **2020-2021:** MSc in Physics and Mathematics (FisyMat) at UGR.
- **From October 2021:** MSCA Early-Stage Researcher of Eternity**. KU Leuven, M-group, Campus Brugge (Belgium).**

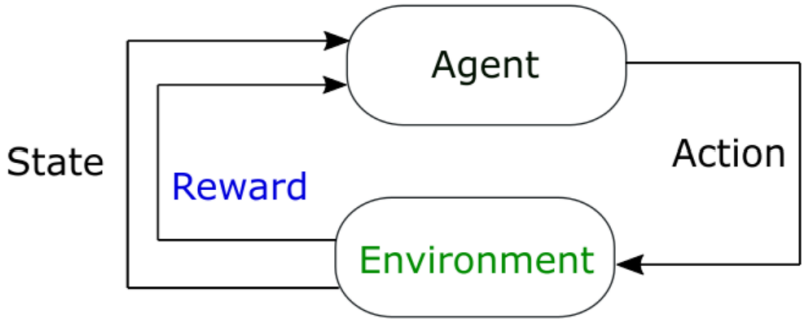
Research topic

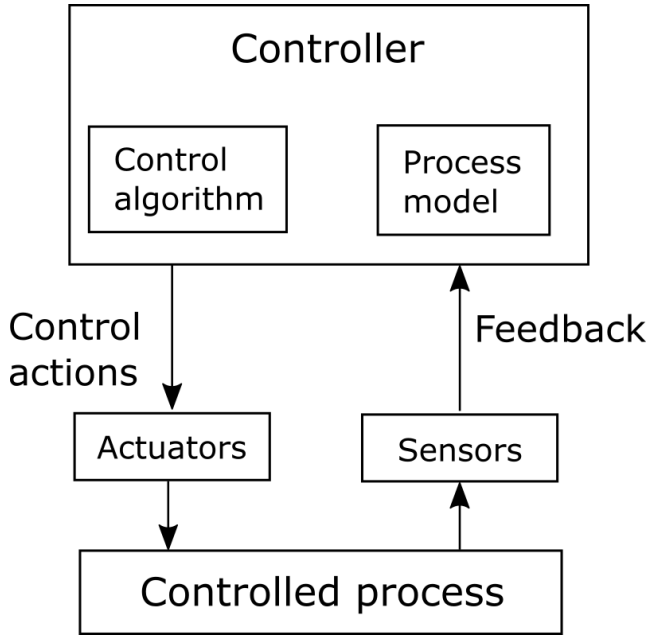
ESR3: Application of system thinking and system safety to EMI risk assessment of medical applications.

- Research divided in two parts:

1. **EMI-aware hazard-and-risk-analyis based on STPA (System-Theoretic Process Analysis)** applied to X-Ray dose control system provided by Philips.

2. **Decision algorithm** based on Markov Decision Processes to deal with EMI-induced errors in crucial communication links and determine most optimal control actions.





STPA general control structure

Thank you for your attention!

Miriam González

Mid-term check meeting 14th March 2022

Presentation of: **Asif Ali** ESR5 @ UPC

Mid-term check meeting 14th March 2022

Reading, Traveling, watching web series, music, cocking

B.E → MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY JAMSHORO → **Telecommunication Engineering**

M.E → MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY JAMSHORO → POLITECNICO MILANO 1863 → **Telecommunication Engineering and Management**

Ph.D. → UPC UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH → **Electronic Engineering Cont'**

GCEM UPC
Grup de Compatibilitat Electromagnètica
UNIVERSITAT POLITÈCNICA DE CATALUNYA

Expected Research Area: Communication Engineering, Microwave Engineering and Digital Communication.

Optimal Digital Communication Systems in Electromagnetically Noisy Medical Environments

Project Overview/Objectives

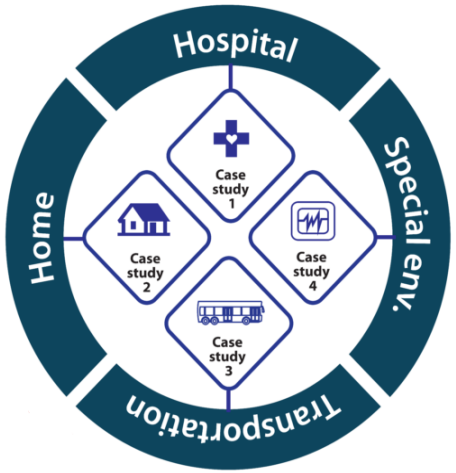
- Create the radio link in a harsh EM environment
- Impact of inband interference in comm: system
- Protect the comm: system from interfering devices?
- Selection and Configuration of DCS
- Validate the EMI in real-time scenarios and improve the immunity of medical devices

Problem statement

EMI risk in an electromagnetically noisy medical environment

Project Expectation

Reduce the EMI for following scenarios



Secondment#01-KUL
Select the DCS algorithm to improve immunity.

Secondment#02-PMC
To test algorithms on cold plasma.

(When you have an opportunity, get the benefit from it, so at the end, you don't blame yourself)

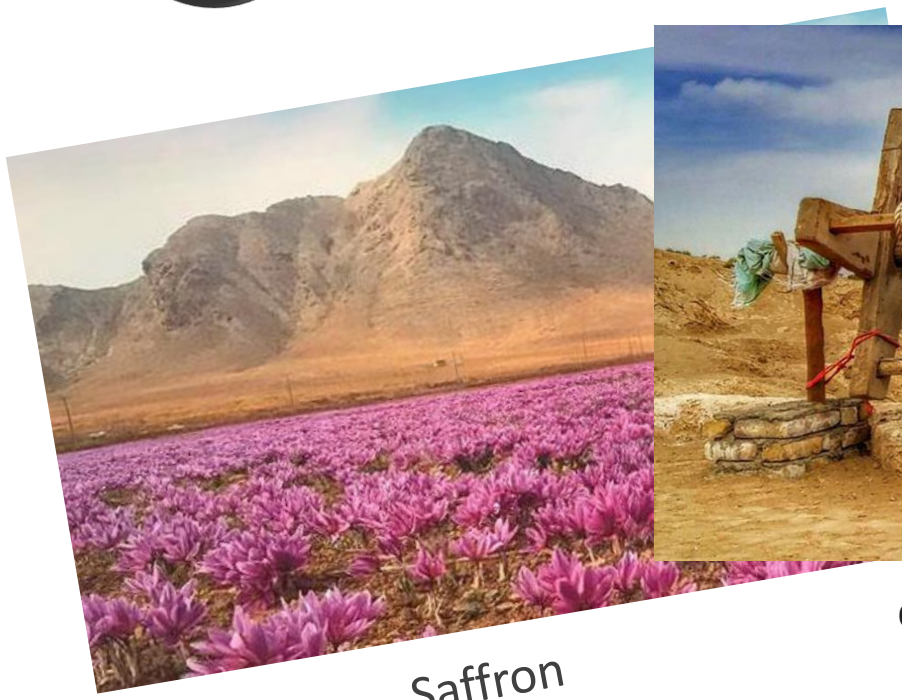
Asif Ali

Mid-term check meeting 14th March 2022

My personal introduction

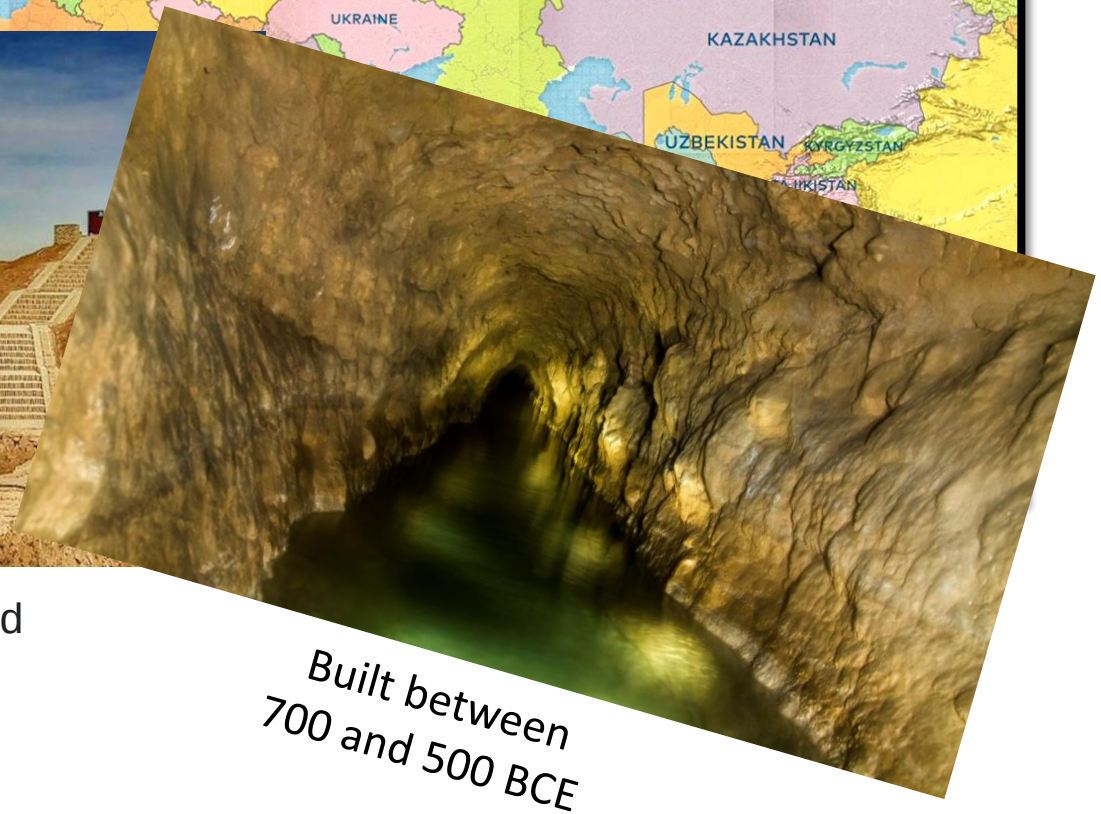
Mohammad Kameli

Born in Gonabad, Iran



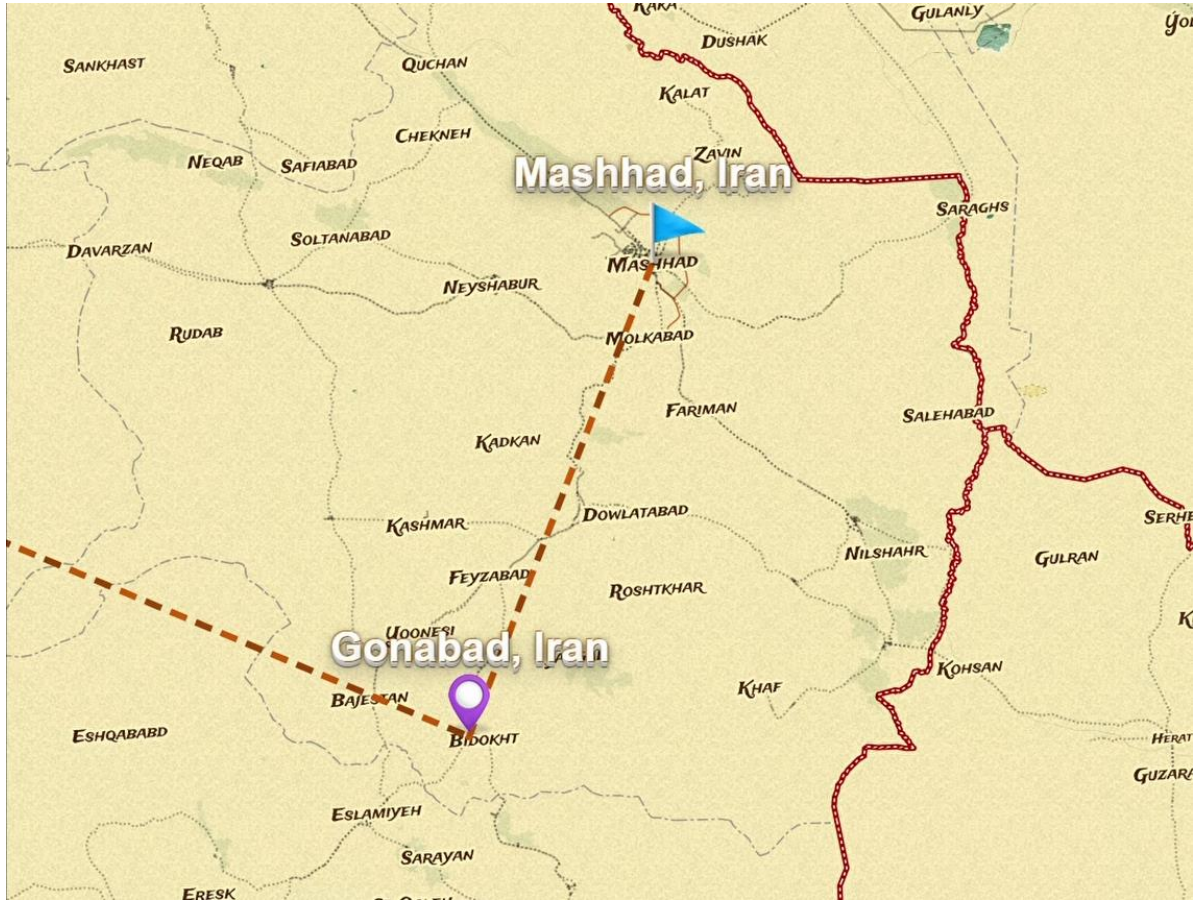
Saffron

one of the world's oldest and largest networks of Qanat



Built between 700 and 500 BCE

My Background



2017-2020

M.Sc. student in ICT, University of Padoa, Italy

M.Sc. thesis at the deutsche Telekom Chair of Communication Networks, TU-Dresden, Germany.

2013-2015

ETANIR:
Electrical Engineer – Project Assistant

2015-2017

Electrosazeh Razhan:
Electrical Engineer – Project Assistant

The Team

ESR-6:
Mohammad Kameli

Co-supervisor:
Dr. Tim Claeys

Supervisor:
Professor Davy Pissoort

Research Project

ESR6: EMI- Resilient Sensor and Communication Networks for complex medical systems-of-systems

Guarantee the connectivity's robustness

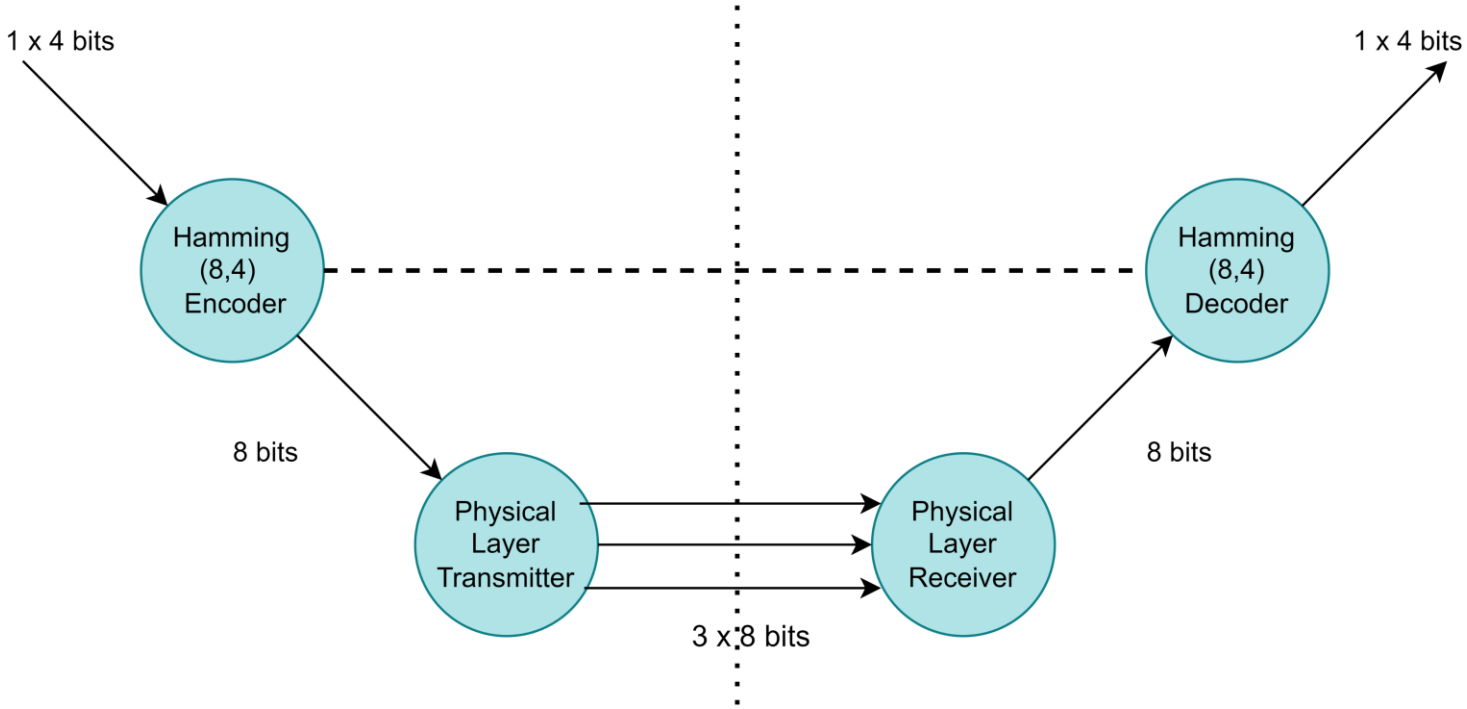
- ❑ Environmental conditions
- ❑ EM disturbance

Multi-layer coding techniques

- ❑ 2oo3 Voting
- ❑ Hamming codes

Combining layers

- ❑ Safety → decrease False Negative
- ❑ Availability → Improve BER
  - ❑ Double-error correction



Presentation of: Sebastian Mauricio Salas Laurens

Mid-term check meeting 14th March 2022

Personal introduction

Barranquilla, Colombia
B.Sc. from Universidad del Norte in Electronics Engineering
Control engineer for PLCs

Hamburg, Germany
M.Sc. from Technical University of Hamburg in Microelectronics and Microsystems
Web development teacher

Eindhoven, Netherlands
Eternity Project in Technical University of Eindhoven

Individual research project

Behavioural EMI Risk-based testing of medical devices

Target: Simulate in-situ scenarios for medical devices.

Proposed solution: Reconfigurable structures to reproduce key couplings as seen from DUT.

Goal: help with the validation of medical devices before deploying.

Problems to solve/foreseen research: creating a simple design that can be reproduced, identifying and reproducing key couplings, typical scenarios or risks that devices are exposed to.

Training and Secondments:

- Utrecht Hospital (UMCU)
- PLUX - Wireless Biosignals, S.A

Thanks for listening!

Mid-term check meeting 14th March 2022

Nathalia Alves Rocha Batista

MSCA ETN ETERNITY Network-Wide Event
Mid-Term Check Review Meeting

My personal Introduction

Academic Journey

- B.Tech in Telematics at IFPB (2011-2016)
- Sandwich Degree in IT Technologies at Gateway Community College (Phoenix AZ - United States) (2013-2014)
- Master's Degree in Electrical Engineering at UNICAMP (2016-2018)

Job Experiences

- IT Business Analyst at IBM Brazil - (2017 - 2021)
- Software Developer at Accenture Brazil - (2014 - 2016)

PhD at University Polytechnic of Catalunya

➔ ESR8 - Improvement of digital communication systems immunity tests to include complex electromagnetic disturbances

◆ **Thesis Title: Approach to Electromagnetic Compatibility Immunity Testing for Medical Equipment within Complex Interference Environments**

Supervisors: Marcos Quílez (UPC), Ferran Silva (UPC), Mark Van Helvoort (PHC – Netherlands)

- Reproducible and Repeatable approach to perform immunity test taking into account digital signals generated by wireless communication systems that can degrade or affect medical devices performance in a very complex scenario of communication.

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Presentation of: Xinting Xue

Mid-term check meeting 14th March 2022

Personal introduction of ESR9

- **Name:** Xinting Xue
- **Nationality:** China
- **Hometown:** Xi’an City, Shaanxi Province
- **Hobbies:**
  - Badminton
  - Cycling
  - Photography
  - Video games

My background

- **Bachelor of Engineering:** Electronic Engineering
  - 2015-2017: Xi'an Jiao-tong Liverpool University.
  - 2017-2019: The University of Liverpool.
- **Master of Science:** Electrical Power Systems Engineering
  - 2019-2020: The University of Manchester.
- **Researches:**
  - Gliding arc plasma for energy applications.
  - Contribution of demand side management to transmission networks.
  - Power factor correction using ARM microcontrollers.

Individual research project

Figure 1: RTL-SDR

- Research subject: Development of EMI Sensors
- Foreseen research:
  - Software:
    - Spectrum sensing algorithm deployed in SDRs to detect anomalies in the EM environment of medical apparatus.
    - Appropriate algorithms are expected to sense in accurate and efficient manners.
    - Continuous monitoring on weak spots of apparatus is necessary?
  - Hardware:
    - SDR based, but necessary “add-ons” are expected.
    - The hardware of fast spectrum sweeping will be investigated and designed for different types of EMI.
    - Multi sensors and coarse frequency selectiveness to increase chance of detection is to be expected.

Individual research project

- Secondment:
  - University of Twente (M18-M20):
    - Previous experience of EMI sensors design, and field strength measurement.
  - PLUX (M29-M30):
    - Prototype design and fabrication at PLUX.

Thank you for your time

Xinting Xue

Mid-term check meeting 14th March 2022

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Presentation of **Simon Rendon Velez**

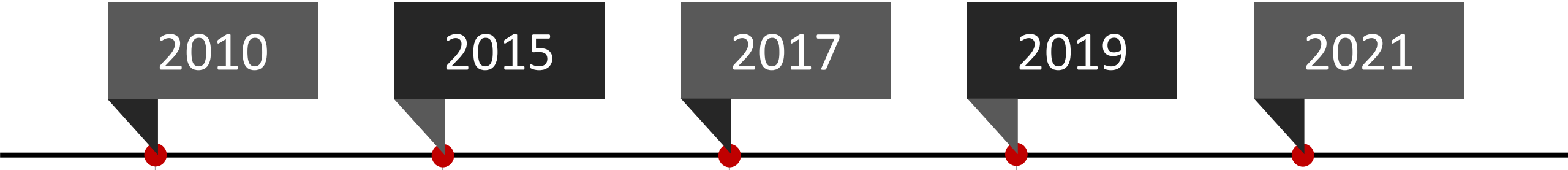
Mid-term check meeting 14th March 2022

Agenda

1. Personal Background.
2. Technical Background.
3. Research Project

Personal background

- From **Medellin**, the city of eternal Spring, to **Barcelona**, “la ciutat condal”.
- **Healthy lifestyle**. Travel and Outdoors recreation.
- **Martial Arts.** Taekwondo and BJJ.
- Always interested in technology, **how things work.**



SISTEL - UPC.

- A.B.S.
- L-BAND SAR Front-End.

WorldSensing SLU.

- Technical support engineer.
- R&D engineer - Fastprk.

MET - UPC.

- HP academy.

HP SLU.

- RF Applicator for INK dried applications.
- RFID-based media identification system.

MEE - UPC.

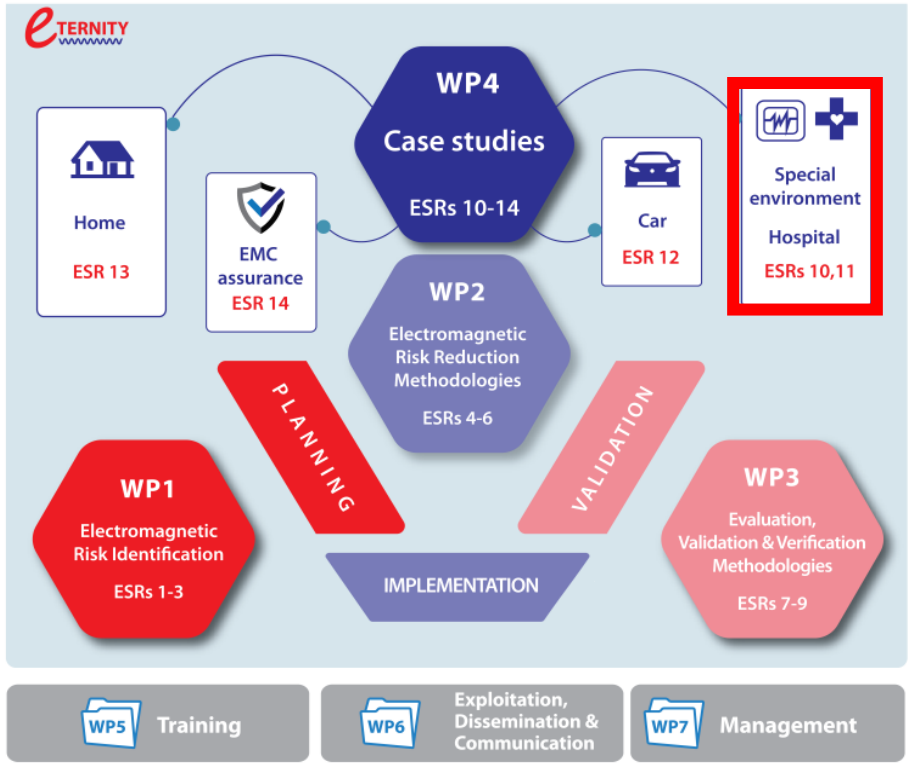
- EMC Intensification.

EGO SLU.

- Product Validation Testing.
- *EMI Measurement System in Time Domain.*

ESR10: Risk-based EMC assessment of collaborative medical systems-of-systems

→ *Integration of MRI*



- Project in collaboration with **Philips** and **University of Twente**.
- **Secondments:** UT (MST), UMCU and KU Leuven.
- **Training**: MRI systems (Philips) and EMC (UT). Also soft skills training!

Thank you!

Mid-term check meeting 14th March 2022

Presenter: **Simon Rendon Velez**

Contact: **simonrendonvelezs@philips.com**

Presentation of: Nandun Senevirathna

Mid-term check meeting 14th March 2022

My personal introduction

- I am Nandun from Sri Lanka.
- ESR 11 at Philips and TU/e in the Netherlands.
- I have lived in the UK, Italy, Spain and Latvia.
- Hobbies/Interests : nature, music, walking, travelling

My Background

- Joint European MSc In Sustainable Power Systems and Transportation, The University of Nottingham ,UK, La Sapienza University of Rome, Italy, The University of Oviedo, Spain
- BSc (Hons.) Science of Engineering , Electrical and Information Engineering, Sri Lanka.
- Telecommunications exchange scholar, Riga Technical University , Latvia.

Individual research project

- **Evidence for quantitative correlation(s) between different room test environments at different hierarchy levels of system integration (ESR11)**
- **Host: Philips Medical Systems Nederland B.V**
- **Supervisors : Rob Kleihorst (Philips) , Anne Roc'h (TU/e), Sanders Bronckers (TU/e)**

- Correlation between EMC test results in an open environment versus EMC test results in a full reflective environment and versus EMC test results in representative use clinical settings.

- Ongoing work: Literature review links between controlled and uncontrolled EM (test) environments (papers submitted to EMC Europe 2022 and URSI Benelux 2022) and use of systems-of-systems in medical technology domain. A measurement campaign in a real clinical environment is being planned in collab with ESR 10.

- Secondments: UMCU , ASEPEYO Barcelona, TU/e

Thank you . Let's do it together towards the collective success

Nandun Senevirathna

Mid-term check meeting 14th March 2022

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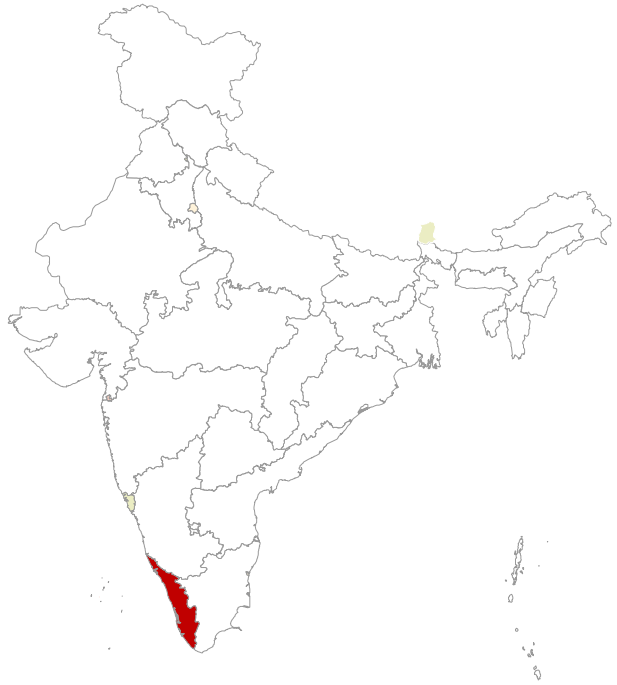
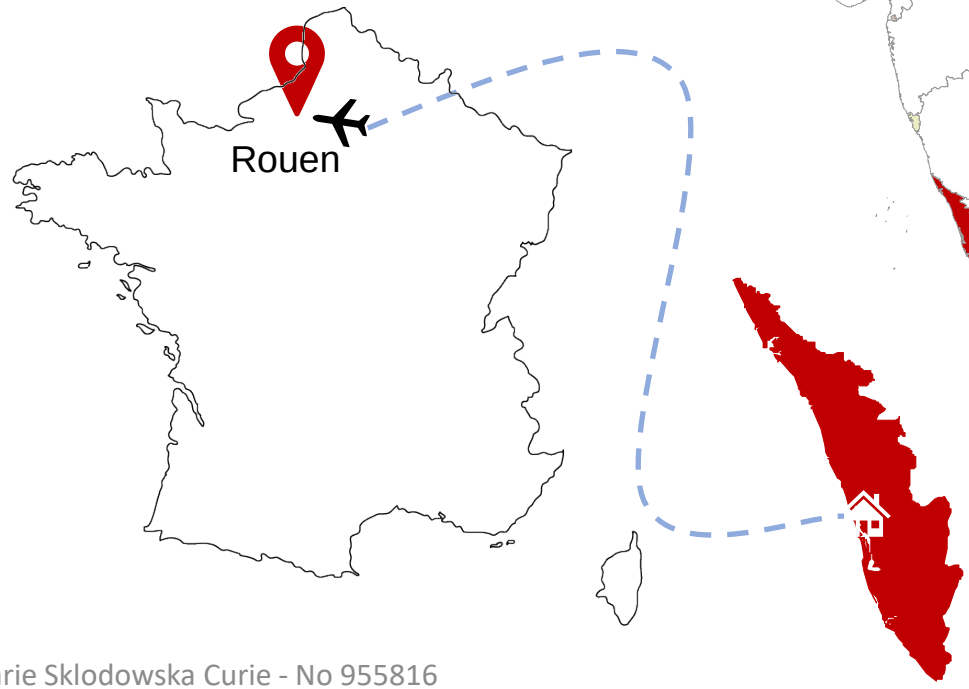
Short Introduction: Geon George Bastian (ESR 12)

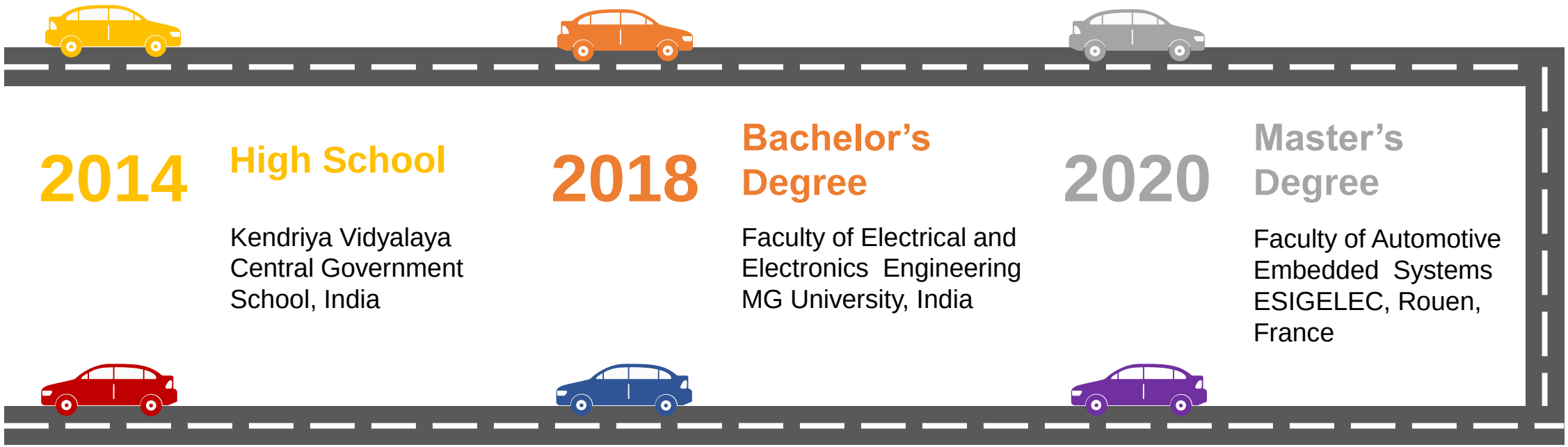
Mid-term check meeting 14th March 2022

1. Personal Introduction

- From Kerala, India
- Came to France for Master's Degree in 2019
- Automotive Enthusiast
- Manchester United fan
- Coffee Lover







2014 — **High School**

Kendriya Vidyalaya Central Government School, India

2018 — **Bachelor's Degree**

Faculty of Electrical and Electronics Engineering MG University, India

2020 — **Master's Degree**

Faculty of Automotive Embedded Systems ESIGELEC, Rouen, France

2021 — **ESR - ETERNITY**

Recruited as the ESR 12 of the ETERNITY ETN at Idneo Technologies

2020 — **iNARTE Acc. EMC Trainings & Certifications**

- EMC Compliant Designing
- EMC Testing Foundations

2020 — **Internship**

EMC Research Intern - IRSEEM Laboratory in collaboration with the Volkswagen Group

2. Individual Research Project

Final objective

- EMI risk-assessment procedure to ensure reliable measurement methodology for in-cabin monitoring systems based on Physiological parameters

Expected Results

- Characterization of Electromagnetic Environment inside a modern vehicle

- Testing Methodology to assess the effect of simultaneous disturbances of different kinds in Drive Monitoring systems and analyze the relationship between the present EMI and the system's behavior

Planned Secondments

- @TU/e, Netherlands (Mentor: Dr. Anne Roc'h): Investigation on EMI accumulation and related uncertainties
- @Eurofins, Belgium (Mentor: Mr. Kamiel Vanderlinden): Investigation of newly defined tests in certification facilities

Thank you all for your attention

Geon George Bastian (ESR 12)

Mid-term check meeting 14th March 2022

Presentation of: **Tiago Nunes**

Mid-term check meeting 14th March 2022

Tiago Nunes

- MEng in Biomedical Engineering
- Master in Technological innovation in Healthcare

Biomedical Engineering Intern at Hôpital Pitié-Salpêtrière, Paris

Hardware & Firmware Engineer Intern at Plux, Lisbon

- **ESR 13 - EMI Risk assessment in Medical Device Innovation Process - from design to production**

  - Novel biosignal's sensors for a new wearable device: evaluation and characterization
  - New methods and techniques shall be used during its development to mitigate EMI
  - Secondments and academic courses will provide the missing knowledge needed to achieve this goal

WIRELESS BIOSIGNALS S.A.

NOVA SCHOOL OF SCIENCE & TECHNOLOGY

Tiago Nunes

Mid-term check meeting 14th March 2022

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Presentation of: Vikas Ghatge (ESR14)

Mid-term check meeting 14th March 2022

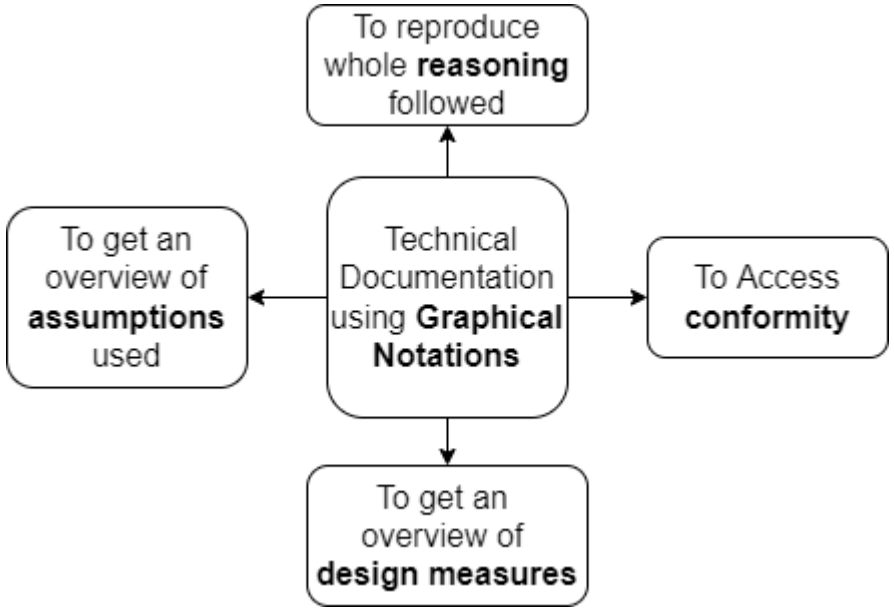
Personal background-ESR14

- Name – Vikas Ashok Ghatge
- Country – India, Mumbai
- Language – English/Hindi/Marathi
- Hobbies – Running, Swimming etc.

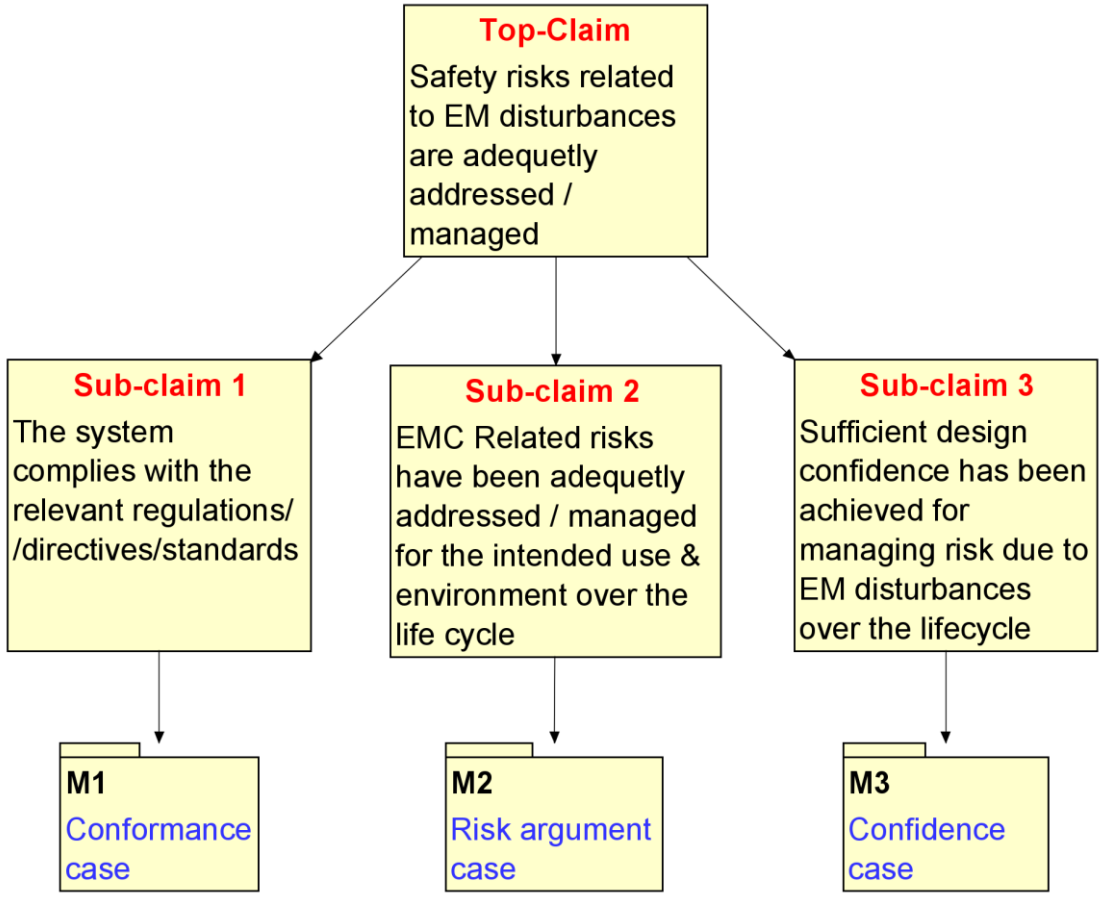
Work Experience

- Hardware design / Simulation
- PCB layout
- Prototype development / Testing

Topic - Towards standardized *EMC assurance case* patterns for the certification of medical equipment



Research objective



Structure of EMC Assurance Case using Goal Structuring Notation (GSN)

Presently working on developing EMC assurance case for medical display inside surgical environment using GSN.

Thank You

Feedback and Q&A

- After Confidential discussion with PO will follow “Feedback and Q&A between Project Coordinator/partners/ESRs and Project Officer (30 min.).

The Consortium

European Training Network
on Electromagnetic Risks
in Medical Technology