



Innovation and Networking for Fatigue and  
Reliability Analysis of Structures – Training for  
Assessment of Risk



# INFRASTAR Project

## Implementation day #2

Eiffage – 12th October 2018

This project has received funding from the  
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Odile ABRAHAM – Project Coordinator  
Hakim FERRIA – Project Manager



# INFRASTAR

## H2020 - MSCA - ITN - ETN

- Innovation and **N**etworking for **F**atigue and **R**eliability **A**nalysis of **S**tructure – **T**raining for **A**ssessment of **R**isk

– 4 years: 01 May 2016 - 30 April 2020

– Budget: 3 161 113 €

- **H**orizon **2020**

European research programme started in 2014 for 7 years  
Calls with open topics

- **M**arie **S**kłodowska **C**urie **A**ctions

Provide grants for all stages of researchers' careers

- **I**nnovative **T**raining **N**etworks

- **E**uropean **T**raining **N**etworks

Participants implement a joint research training programme



# The ESRs

## Early Stage Researchers



The map shows 12 locations across Europe, each with an arrow pointing to an ESR's profile. The profiles include the researcher's name, a small portrait, a national flag, and their institutional logo.

- ESR9 Amol Mankar**: Aalborg Universitet (Denmark)
- ESR11 Sima Rastayesh**: Aalborg Universitet (Denmark)
- ESR8 Joey Velarde**: COWI (Philippines)
- ESR1 Xin Wang**: BAM (China)
- ESR12 Lijia Long**: BAM (China)
- ESR7 Gianluca Zorzi**: CERST (Italy)
- ESR3 Joyraj Chakraborty**: NeoStrain (Bangladesh)
- ESR5 Bartłomiej Sawicki**: EPFL (Poland)
- ESR4 Imane Bayane**: EPFL (Algeria)
- ESR10 Morteza AhmadiVala**: PHIMECA (Iran)
- ESR2 Antoine Bassil**: IFSTAR (Lebanon)
- ESR6 Mariia Nesterova**: IFSTAR (Russia)



Develop knowledge, expertise and skill  
for optimal and reliable management of structures



Fatigue  
of  
concrete



Civil infrastructures are the basis of socio-economic wealth for modern societies.



## FATIGUE ↔ CONCRETE

### Limitations:

#### #1 Concrete structures are subjected to fatigue.

- Where: bridge structures, tower/skyscraper, offshore structures, machine foundation, ...
- Relevance: Traffic increase, slender structures, offshore wind energy (foundation, grouting), reduce design and life cost

#### #2 Current technological means to measure fatigue are outdated, imprecise, and inappropriate.

#### #3 There is a lack of theoretical and practical developments of probabilistic methods.

Develop knowledge, expertise and skill  
for optimal and reliable management of structures

## 3 major challenges

- To develop **new relevant auscultation and monitoring systems**
- To **reduce and optimize the safety margin** encountered in wind turbine and bridge design **in the assessment of remaining strength**
- To **optimize design and life cycle costs**



Fatigue  
of  
concrete



## Innovation and Networking for Fatigue and Reliability Analysis of Structures – Training for Assessment of Risk

- 3 scientific Work Packages

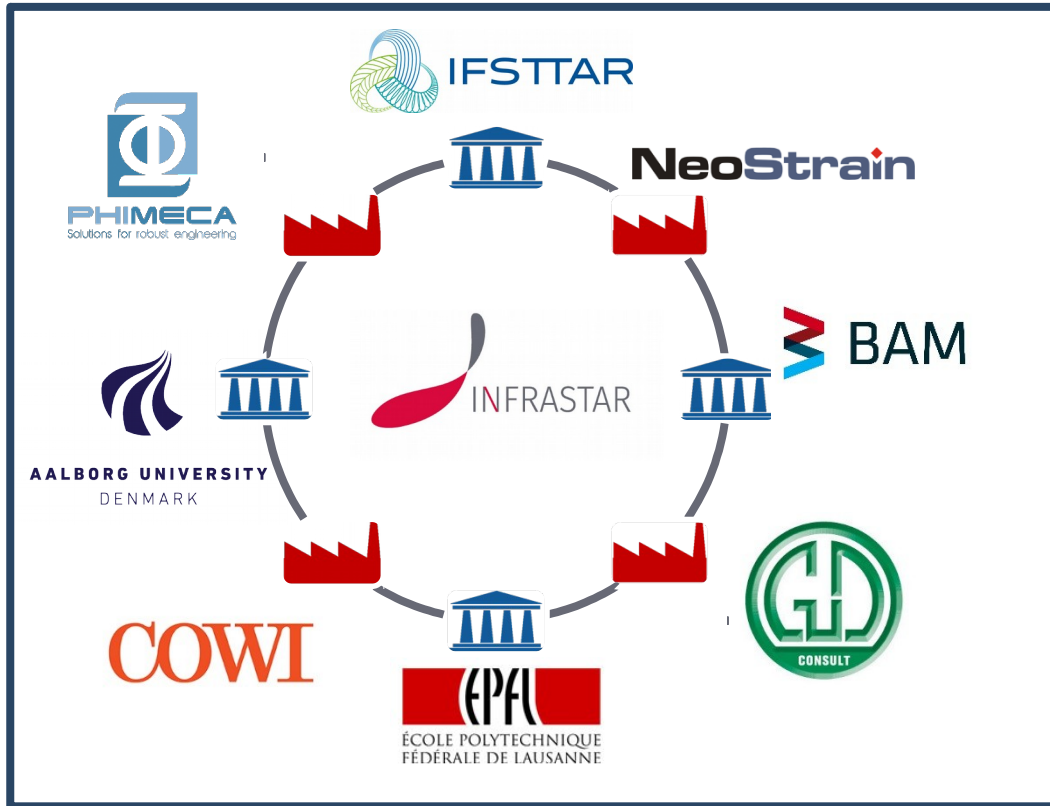
- WP1: Monitoring and auscultation
- **WP2: Structural and action models**
- WP3: Reliability approaches for decision-making



- WP4: Recruitment and training policy

- WP5: Management, dissemination, outreach and business opportunities

# The network



## 8 beneficiaries

- 4 academic institutions
- 4 industries



## 3 partner organisations

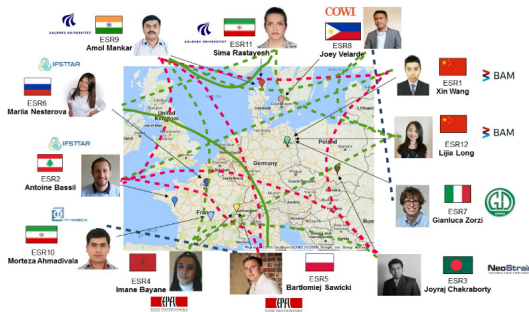
## 1 advisory board with 6 members





For each ESR: to make a personal **contribution to knowledge**

For each of them in **Infrastar**: to benefit of a **multi-disciplinarity** breeding ground to **amplify** their contribution



→ How: the **shared objects**

# On site shared objects



Millau viaduct

To promote collaboration between the Wps  
To boost ESRs collaboration  
To exemplify the inter-sectoral approach



Bridge over Kłodnica river



Chillon viaduct

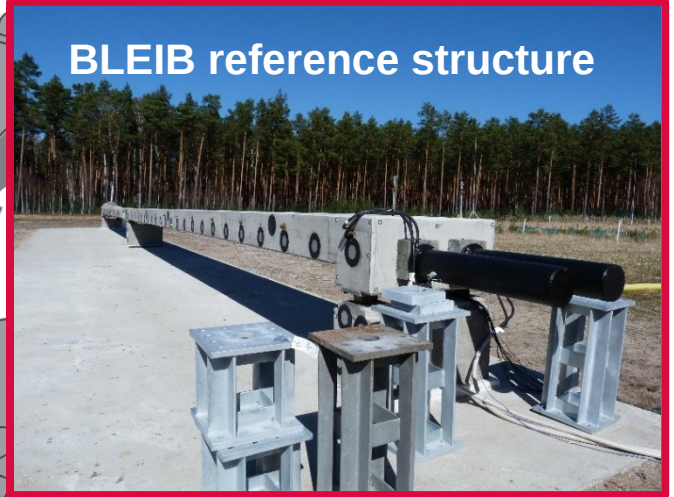
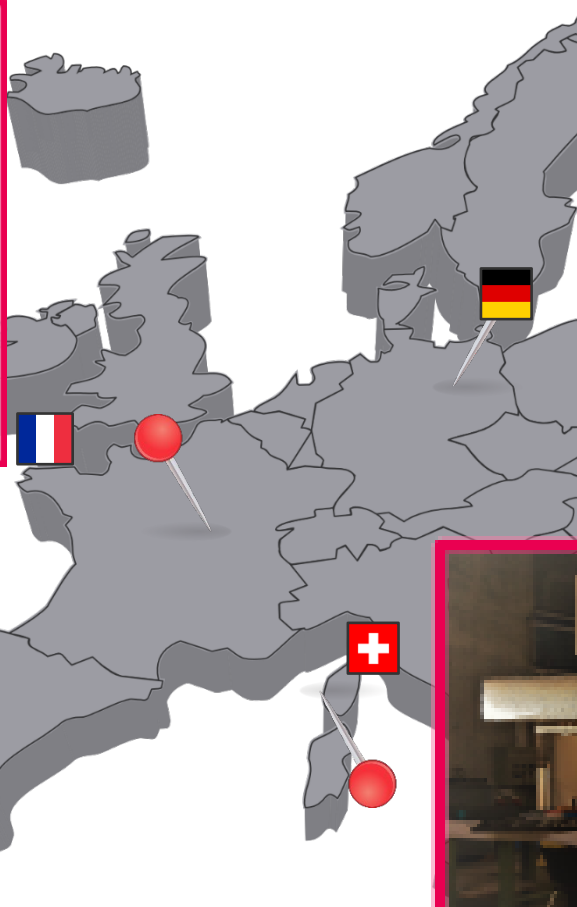
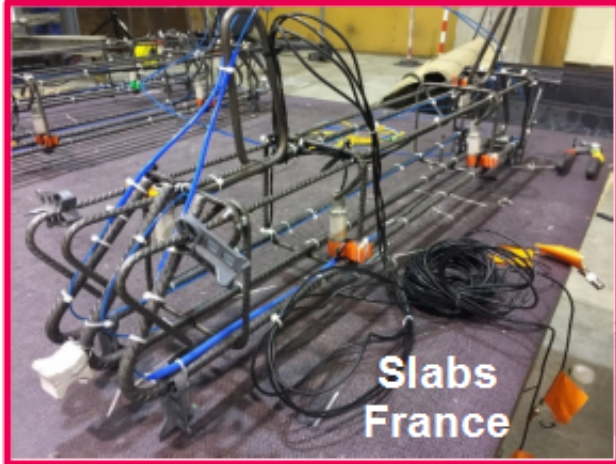


Crêt de l'Anneau viaduct



Onshore wind turbine

# Lab shared objects



# Network-wide training activities

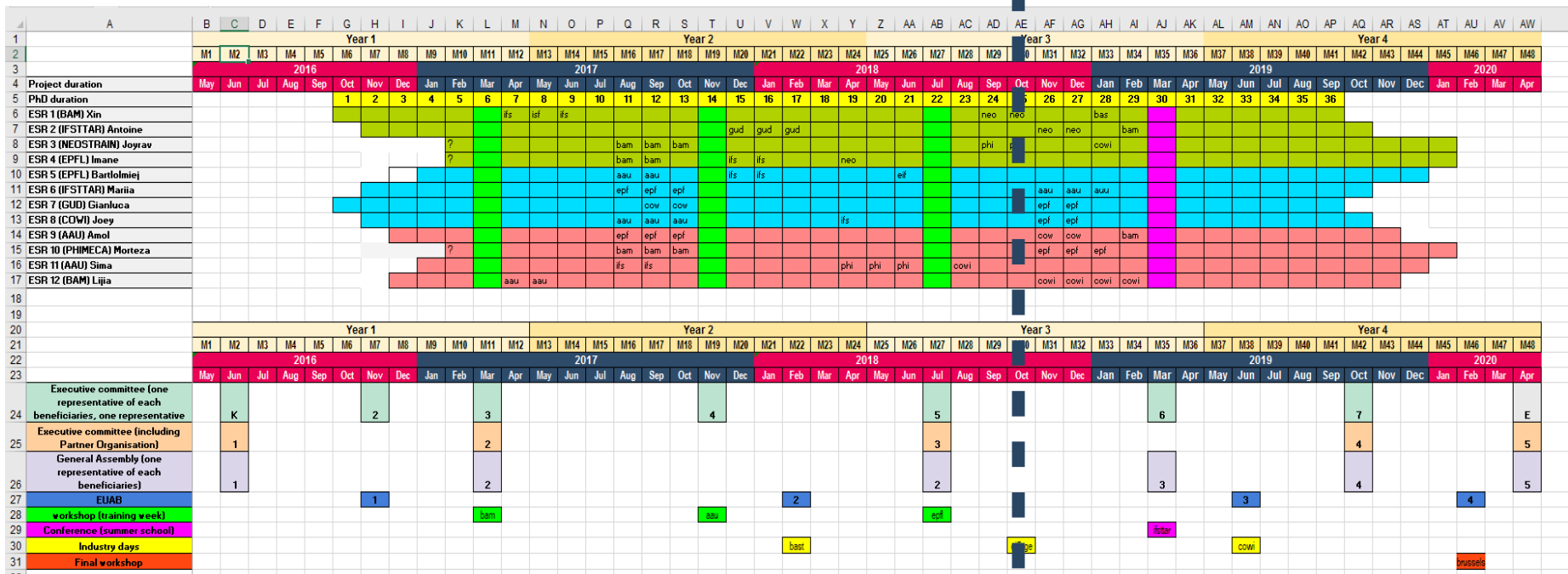
2 to 3 secondments for 2 to 3 months for each ESR.

3 training weeks: BAM (March 2017), EPFL (Nov. 2017), Aalborg (Jul. 2018).

3 implementation days: BAST (Feb. 2018), EIFFAGE (Oct. 2018), COWI (Jun. 2019).

1 winter school: IFSTTAR (Apr. 2019).

1 final workshop: Brussels (Feb. 2020).



- 09:50 – 10:20: Keynote on UHPFRC
  - Dr François Toutlemonde, Ifsttar
- 10:20 – 10:50: Focus on WP2: Structure and action models
  - Prof. Eugen Brühwiler, EPFL
- 10:50 – 11:05: Coffee break
- 11:05 – 12:05: Presentations by the Infrastar PhD students (WP2)
  - Bartek Sawicki, Mariia Nesterova, Gianluca Zorzi, Joey Velarde
- 12:05 – 13:30: Lunch buffet (Hotel Best Western)

- 13:30 – 14:30: Three-Minute Thesis
  - Infrastar PhD students
- 14:30 – 15:10: Poster session
  - Infrastar PhD students
- 15:10 – 15:45: Round tables
  - WP1: Monitoring and auscultation
  - WP2: Structure and action models
  - WP3: Reliability approaches for decision-making
- 15:45 – 16:25: Outcomes of the round tables
  - Moderators of the round tables
- 16:25 – 16:30: Conclusion



# Have a great implementation day



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Stay tuned <http://infrastar.eu>



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