









Introduction

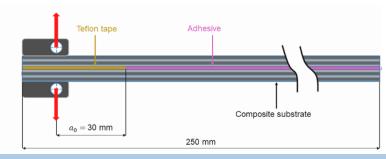
3° Benelux Network Meeting and Workshop on Damage and **Fracture Mechanics** 

How does "listening" help fracture understanding

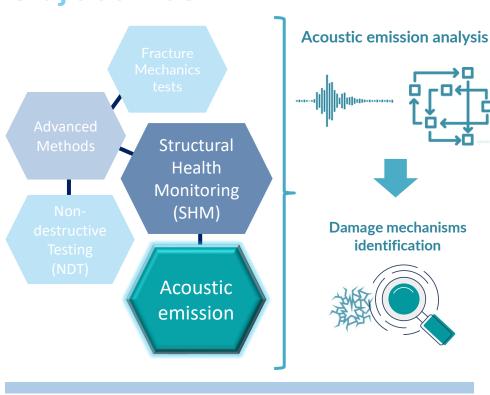
Rosemere de A. A. Lima, Ran Tao, Andrea Bernasconi, Michele Carboni, Nicolas Carrere and Sofia Teixeira de Freitas

Understanding the relationship between the sensors' outputs and the damage evolution within the joints is becoming very important to improve structural health monitoring systems and collect information to improve the joint's design. Aim:

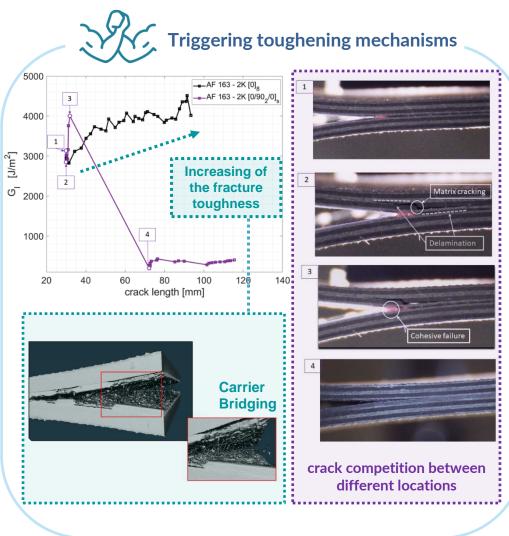
> acoustic Associate emission features with visual fracture evaluation to have insights into the toughening of composite bonded joints.

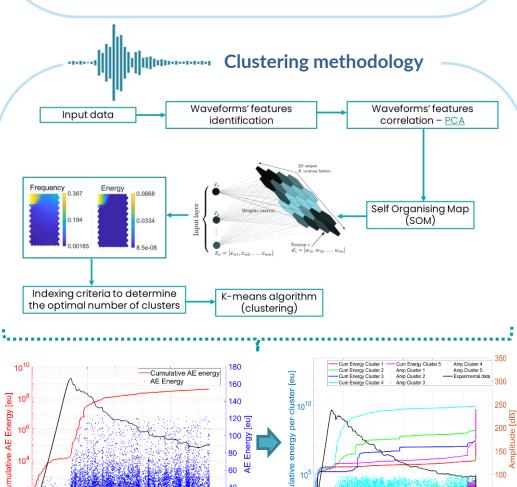


## **Objectives**



## Results





80

60

40

20

## **Acoustic emission (AE)** 140 Cumulative energy per cluster [eu] 120 100 Road [N] 60 Force-Time 40 Cluster1 Cluster2 Cluster3 Cluster4 Cluster5 Displacement [mm] Cluster1 Cluster2 Cluster3 90 Cluster4 Cluster5 Average Amplitude [dB] 70 Micro-cracking Delamination Matrix-cracking Fibre pull-out Fibre breakage 50 40 200 400 600 800 1000 0 Frequency [kHz] (KHZ) ें 400 0.1 0.05 800 1000 200 400 600 0.15 (KHZ) 0.1 Frequency ( 0.05 200 400 600 800 1000 Time (ms)

## Conclusions

- Identification of carrier bridging and crack deflection and competition as main mechanisms involved in the toughening of the joints
- Development of a methodology and trained data-set to furtherly be used in supervised artificial neural networks in bonded structures.



More about research

Displacement [mm]

100

50

30

Displacement [mm]