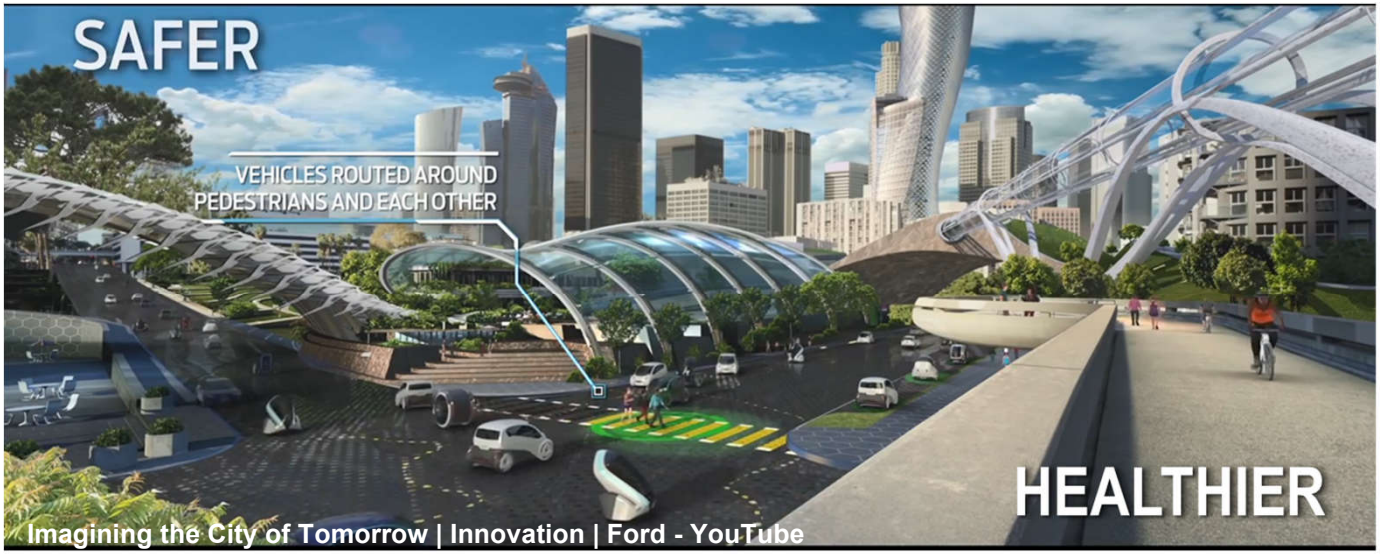
University of Salerno | April 2018

Automotive Powertrain NVH (Noise, Vibration & Harshness)

"Providing the Transformational Means to a New Era of Sustainability and Mobility "



The automotive engineering community is now confronting the largest technological transformation since its inception. These having to do with the electrification of powertrains for more efficient consumption and cleaner emissions, the reinvention of the battery with fast wireless charging capabilities to fully replace the current fuel driven vehicles. Finally the advent of self-driving full autonomous vehicles.

The car as we know it today will totally change! It will have a so called "SOUL" and will be an extension of your personality which you can talk to, can read your face and lips and would know your MOOD and FEELINGS as it transports you from point A to B. The whole concept of passenger transportation is being transformed for a Safer, Healthier and Smarter Environment.

So, the challenges to the automotive engineers are enormous! NVH refinement is one of the key enabler in delivering the requirements for Sustainability and Mobility. This course will cover Basic Principles of NVH Design and Simulation as applied to the next generation vehicles.

COURSE OUTLINE

This course will cover the listed NVH phenomena as they relate to Powertrain excitation.

Topics over the 3 days include:

DAY 1

- Presentation: *Providing the Transformational Means to a new era of Sustainability and Mobility*
- Description of Sustainability and Mobility
- Understanding Powertrain Design (Engine, Transmission, Driveline)
- Vibratory Motion and SDOF Systems
- Basic principles of Powertrain NVH

DAY 2

- Characterization of Sound
- Psychoacoustics & Sound Quality
- Review Powertrain NVH Error States and Failure Modes
- NVH Diagnosis and Control

DAY 3

- The importance of Virtual Simulation
- Description of Hybrid (Test+CAE) Simulation Methods and Examples
- Discuss use of Multi-Discipline and Multi-Physics CAE methods for high frequency NVH prediction
- Technologies for evaluating high frequency impulsive vibration and noise
- Summary / Open discussion on Technology challenges for NVH assessment

BIOGRAPHY:

Mr. Mario J. Felice is Global Manager of Powertrain NVH CAE engineering at Ford Motor Company. He heads a large team of well over 100 CAE engineers located in North America, Europe, Australia, India and South America.

He's responsible for all the analytical support of Ford's global powertrain development programs with the goal of delivering best NVH refinement with respect to Smoothness, Quietness and Sound Quality.

He has published and presented at many international symposiums and conferences. Mr. Felice is an active member of NAFEMS Americas Steering Committee and elected member of the NAFEMS Council (Board of Directors) in 2017. *(NAFEMS is the largest International Society for Simulation Engineering).*