# FUNDAMENTALS AND APPLICATIONS OF ACOUSTICAL HOLOGRAPHY

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*Inés Lopez Arteaga is full-professor at the Marcus Wallenberg Laboratory for Sound and Vibration Research, KTH. She received her degree on Mechanical Engineering at the University of Navarra in San Sebastian (Spain) in 1993, where she obtained her PhD in January 1999 for her work titled "Theoretical and experimental analysis of ring-damped railway wheels". Until January 2001 she was researcher at CEIT (research institute in San Sebastian, Spain) where she mainly worked on noise and vibration reduction in railway applications. Then she moved to The Netherlands to work at DAF Trucks until January 2002 (noise analysis of cabin interiors using Statistical Energy Analysis, source localization using Near-field Acoustic Holography) and later at INNAS BV (reduction of pressure pulsations from pumps). In September 2002 she joined the Dynamics and Control group of the Mechanical Engineering Department at Eindhoven University of Technology (The Netherlands) and from April 2011 to March 2014 she was visiting professor on vibro-acoustics of land transportation systems at MWL, KTH.*

***Credits: 3 / Hours: 12*** ***Dates: 22-24 May 2017***

***Aula MM – Piano Terra, Palazzina ex-DIAS, Via Claudio***

***Schedule and Contents***

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|---|---|---|
| **Day 1**<br>**4 hours** | 1. H1 Introduction to Acoustic Holography | 1.1 Background<br>1.2 Near-field versus far-field<br>1.3 Overview far-field methods: beam forming<br>1.4 Overview near-field methods: near-filed acoustic holography |
| | 2. H2 Introduction to Near-field acoustic holography (NAH) | 2.1 Motivation<br>2.2 General mathematical description<br>2.3 Regularization<br>2.4 Detailed overview of selected methods: ESM and Fourier-based NAH |
| | 3. H3 Equivalent source method (ESM) | 3.1 Background<br>3.2 Theory<br>3.3 Choice of Green's functions<br>3.4 Applications<br>3.5 Distribute group assignments |
| | 4. H4 Fourier-based NAH | 4.1 Background<br>4.2 Theory<br>4.3 Pre-processing and filtering<br>4.4 Applications<br>4.5 Distribute group assignments |
| **Day 2**<br>**4 hours** | 5. Presentation of group assignments ESM<br>6. Computer exercises ESM<br>7. Presentation of group assignments Fourier-based NAH<br>8. Computer exercises Fourier-based PNAH | |
| **Day 3**<br>**4 hours** | 9. NAH in reflective environments | 9.1 Background<br>9.2 Overview of methods<br>9.3 The WRW-based methods<br>9.4 Examples |
| | 10. Computer exercises: NAH in reflective environments | |
| | 11. Introduction to time-domain NAH | 11.1 Background<br>11.2 Overview of methods<br>11.3 FFT-based time-domain NAH<br>11.4 Laplace-based time-domain NAH |
| | 12. Exam | |

*The persons interested in attending are pleased to send a message to Prof. Sergio De Rosa: sergio.derosa@unina.it.*