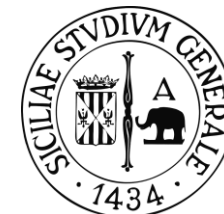




FSE FONDO SOCIALE EUROPEO  
**SICILIA 2020**  
PROGRAMMA OPERATIVO



# Ph.D. Brainstorming Day

*29<sup>th</sup> October, 2019*

CONCETTA BARCELLONA

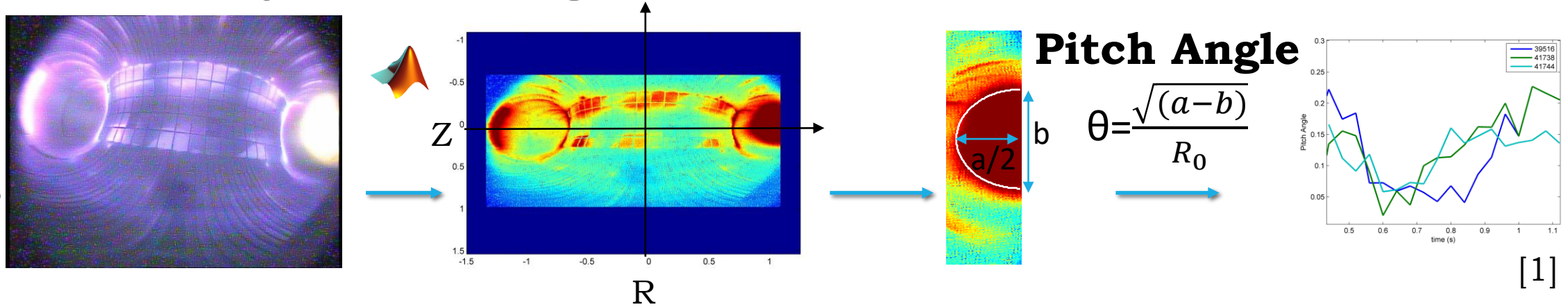
BORSA DI DOTTORATO REGIONALE IN INGEGNERIA DEI SISTEMI, ENERGETICA,  
INFORMATICA E DELLE TELECOMUNICAZIONI, FINANZIATO NELL'AMBITO DEL PO  
FSE 2014/2020 DELLA REGIONE SICILIANA

DIEEI, UNIVERSITY OF CATANIA, CATANIA, ITALY

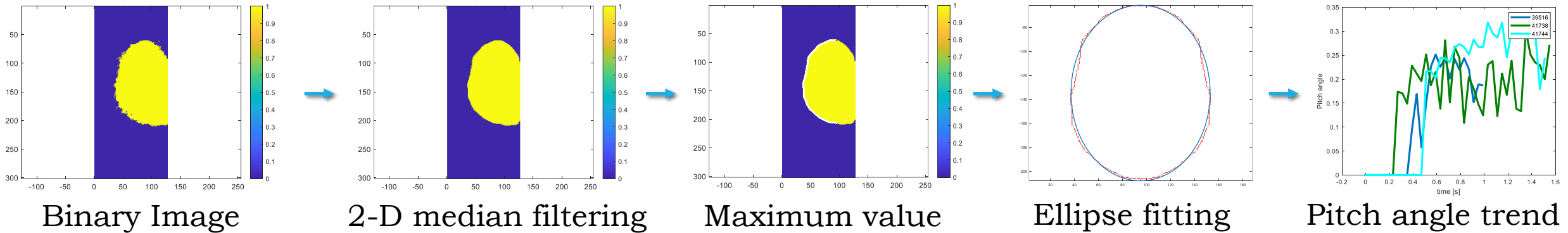
SUPERVISOR:  
PROF. LUIGI FORTUNA  
ENG. ARTURO BUSCARINO

# REIS Project – Image elaboration

FTU  
Port 3  
#41738  
image 28

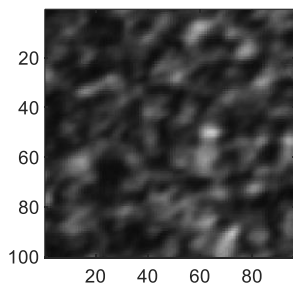
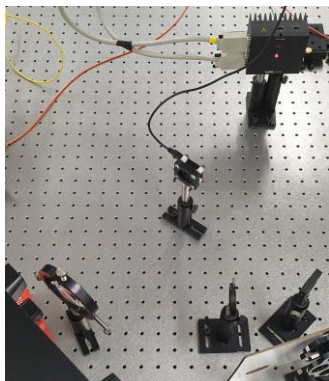
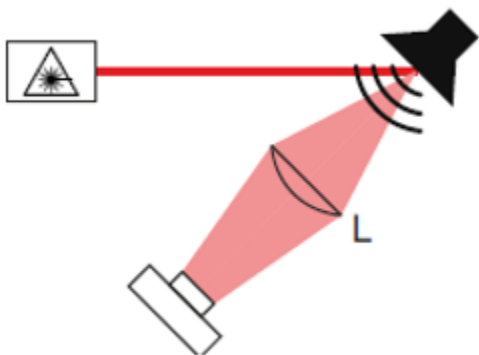


## Technical Improvements



# Remote microphone based on speckle

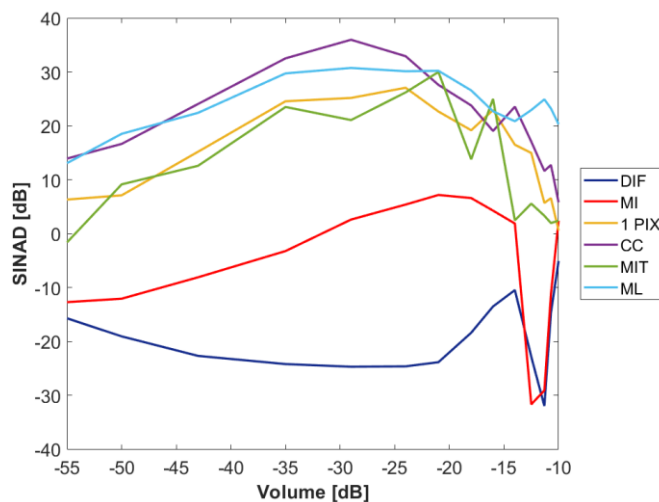
## Experimental setup



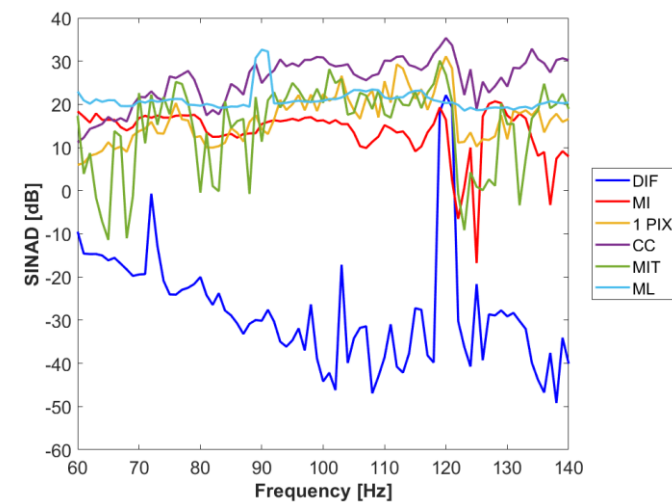
**Target:** Reconstruct remote sounds through images of speckle pattern of semiconductor laser.

*Example of Speckle pattern*

## Comparison among the different methods



*Increasing amplitude for certain frequency (100 Hz)*



*Increasing frequency keeping constant the signal amplitude (-30dB)*

**Best method:** Correlated pixel sum.

# Activities

---

## Publications

- Poster “Hybrid electronic circuits”, C. Barcellona, A. Buscarino, C. Corradino, L. Fortuna, VIII Complexitat Day, May 21, 2019, Barcelona, Spain
- C. Barcellona, A. Buscarino, F. Causa, C. Corradino, B. Esposito, L. Fortuna, M. Gospodarczyk, G. Mazzitelli, G. Rocchi, V. Piergotti and A. Sibio, A procedure to estimate pitch angle for runaway electrons control in fusion reactors, ECC 19 European Control Conference, June 25-28, 2019, Naples, Italy
- Poster “A new platform to infer runaway electrons in fusion plasma phenomena”, C. Barcellona, A. Buscarino, C. Corradino, L. Fortuna, International CAE Conference, October 28-29, 2019, Vicenza, Italy
- Remote microphone based on speckle, work in progress

## Other activities

- 6<sup>th</sup> November 2018 – University of Catania - MATLAB Academic Tour 2018
- 18<sup>th</sup> - 23<sup>th</sup> November 2018 – Brescia - Corso Nazionale Automazione Industriale e Robotica 2018
- From 3<sup>th</sup> March 2019 to 1<sup>st</sup> June 2019 - Universitat Politècnica de Catalunya (UPC), Terrassa, Barcelona – Collaboration period
- 15<sup>th</sup> May 2019 - Universitat Politècnica de Catalunya (UPC), Terrassa, Barcelona – Seminar “Using graphs and statistical physics to build a Bayesian machine scientist”, Lecturer: Roger Guimera, Universitat Rovira i Virgil
- From 9<sup>th</sup> June 2019 to 26<sup>st</sup> June 2019 - Universitat Politècnica de Catalunya (UPC), Terrassa, Barcelona – Collaboration period
- From June 2019 to present – Catania - IV Edition Contamination Lab
- Ph.D Days 2018 - Catania
- 6<sup>th</sup> September – Catania - Seminar “Graphene THz Wireless Communications for Networks-on-Chip and Programmable Metasurfaces”, Lecturer: Prof. Sergi Abadal, Universitat Politècnica de Catalunya (UPC)