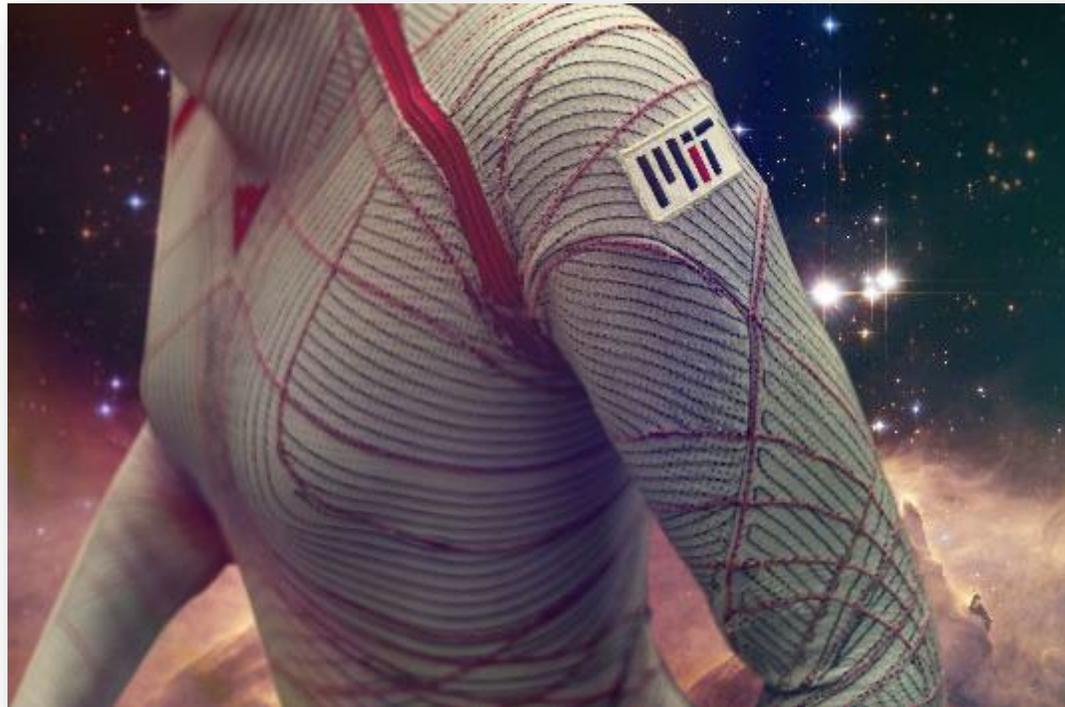


# Development of an Intelligent Actuated Second Skin for Human Empowerment



*Shrink-wrapping spacesuits. Spacesuits of the future may resemble a streamlined second skin*



*Nanosuit from the «Crysis» game series*

## Research group:

Prof. F. Braghin, M. Gandolla  
PhD: E. Bardi

**Description:** When coming to **human empowerment**, such as assistance to frail or motor impaired persons, we are witnessing a technological push starting from more classical rigid wearable exoskeletons to hybrid or soft solutions. None of the current solutions disappear under the cloths towards an **ecological and transparent assistance**.

**Goals:** to study and develop an intelligent **actuated second skin** composed by i) a perception layer able to interact with the wearer, ii) an actuation layer to support the intended motion, iii) a monitoring layer toward a safer lifestyle; iv) a brain layer to supervise and control the whole process.

**Period abroad:** Our candidates are strongly encouraged to spend a research period abroad. The destinations is built and agreed with the candidate.

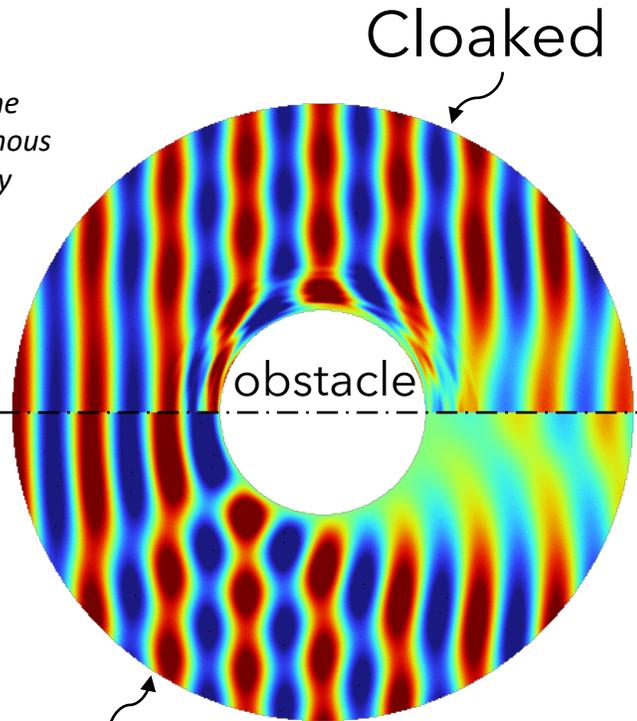
# PDE OPTIMIZATION OF ROBOT SWARMS FOR ACOUSTIC INVISIBILITY CLOAK



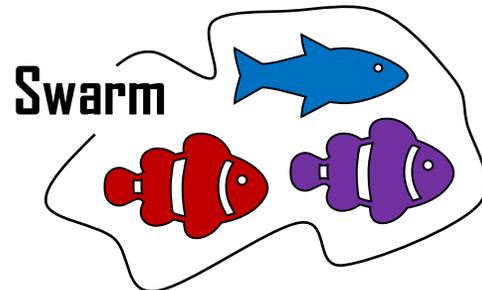
←  
One of the most famous invisibility cloaks



incident wave field



Uncloaked



**Description:** waves impacting on an object create reflections and shadows. The resulting distortions can be captured by radar and sonars to detect the object. The goal of cloaking is to «steer» the waves around the object so that this distortion is greatly reduced or even nullified, making the object virtually «invisible».

**Goals:** replace the classic «cloak» with a swarm of robotic agents, to be deployed around the object to protect in order to steer waves, according to a PDE-based optimal control logic.

**Period abroad:** Our candidates are strongly encouraged to spend a research period abroad. Possible destinations include, but are not limited to, Imperial College (UK), ETH (CH), Besancon (FR), Colorado Boulder (USA).

## Research group:

Prof. F. Braghin, G. Cazzulani

PhD: S. Cominelli, M. Tomasetto



POLITECNICO  
MILANO 1863

