

# MICHELE SVANERA PH.D. (he/him)

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## RESEARCH INTERESTS

Experienced and dedicated Lecturer with a passion for cutting-edge research at the intersection of Artificial Intelligence and Neuroscience. Adept in developing advanced 3T and 7T f/MRI analysis techniques to drive breakthroughs in brain imaging and healthcare technologies. Skilled in leading and managing research projects in research and clinical neuroimaging.

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## EXPERIENCE

**Lecturer** January 2022 - Present  
*University of Glasgow (UK)*

Skilled in applying Machine Learning and Deep Learning techniques to advance Neuroscience research. A 10+ years' experience in 3T and 7T f/MRI analysis, elevating brain MRI analysis tools. Research focus also includes clinical studies, ageing neuroimaging, and advancing healthcare assistive technologies.

**Research Associate** July 2019 - December 2021  
*University of Glasgow (UK)*

- ◇ Development of new tools for brain MRI analysis at 3T and 7T; focusing on segmentation, I developed a tool that performs better and faster than any automatic method available. More on the [project website](#).
- ◇ Novel approach for early visual cortex modelling. Challenging DL models and the human brain to solve same (visual) tasks, I obtained a new promising way to compare DL with brain data (see [project website](#)).

**Research Assistant** May 2017 - June 2019  
*University of Glasgow (UK)*

Experimental scientist position to test predicting coding theories with 3T and 7T fMRI. Duties included: Development of experimental procedures, design and programming stimuli, f/MRI data collection at 3T and 7T, developing new multivariate-analysis methods and data analysis, and scientific writing.

### International experiences

*Functional Brain Center, Sourasky center, Tel Aviv (Israel)* June - Sep. 2016  
I spent a few months in Israel opening a new line of research on Deep Learning approaches for fMRI analysis in collaboration with Prof. [Talma Hendler](#). I taught the whole department the basics of Deep Learning.

*Maastricht Brain Imaging Centre, Maastricht (The Netherlands)* June - Dec. 2015  
These six months, in collaboration with Prof. [Rainer Goebel](#), gave me my first immersion in the Neuroscience field. We worked together on the reconstruction of audio-visual features based on fMRI signal using one of the biggest fMRI datasets ever collected.

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## EDUCATION

**Doctoral program (Ph.D.)** Jan. 2014 - May. 2017  
*Machine Learning & Computer Vision* at University of Brescia, Italy.

During my Ph.D., I combined three great passions: AI, neuroscience, and movies. The result of this long journey allowed me to exploit movie representations as *trait d'union* to study AI and Neuroscience. The thesis, titled “*Movies and the brain: learning video content representation for cinema studies and neuroscience*” shows how representation learning can help find suitable numerical representations to use in fMRI data analysis and cinema studies.

**Master of Science (M.Sc. Eng.)** Oct. 2011 - Oct. 2013  
*Telecommunication Engineering* at University of Brescia, Italy.

Master thesis: Methods and models for the synthesis and representation of 3D surfaces.

Relevant courses: information theory, digital modulation and channel coding, system identification and data analysis, image processing and visualisation, digital systems for signal processing, multimedia information coding, digital audio processing, remote sensing data analysis.

### Bachelor of Science (B.Sc. Eng.)

Sep. 2006 - Sep. 2011

*Electronic Engineering* at University of Brescia, Italy.

Bachelor thesis: Development of eye tracking technique software.

Relevant courses: linear algebra, mathematical analysis, analysis of differentiation and integration, statistical methods, probability, multivariable calculus, electromagnetic theory, waves and diffraction, operative systems, informatics, electronic engineering, analogue and digital electronics, communication systems.

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## TEACHING AND MENTORING

### Fundamentals of computer graphics

2014 - 2017

*Master course - T.A.*

Main topics: geometric modelling, rendering and illumination, rasterization, texture mapping, volumetric rendering. Libraries: OpenGL and Unity, in python and C++. SW: Blender.

### Digital image processing

2014 - 2016

*Master course - T.A.*

Main topics: geometric transformations, filtering, edge detection, image segmentation, morphological operators, feature extraction (ex. SIFT), source coding principles. Libraries: OpenCV in python and C++.

### Master thesis supervisions

Here are two examples of supervisions done in my lab:

*Deep learning methods for MRI data analysis*

2019

We adopted a weakly-supervised learning strategy to develop a tool to produce accurate multi-structure segmentation results in only a few seconds. The outcome of the work is “CEREBRuM” published in *Medical Image Analysis* (see below). The former student is now Ph.D. student at Harvard Medical School.

*Hair detection, segmentation, and hairstyle classification in the wild*

2017

In this thesis, we tackled the problem of hair analysis (detection, segmentation, and hairstyle classification) from unconstrained view by relying only on textures. The outcomes is published in *Image and Vision Computing*. The former student is now Senior AI Algorithm Developer at Huawei Technologies.

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## KEY PUBLICATIONS

Bontempi, D., S. Benini, A. Signoroni, **M. Svanera\***, and L. Muckli\*. “CEREBRuM: a fast and fully-volumetric Convolutional Encoder-decodeR for weakly-supervised sEgmentation of BRain strUctures from out-of-the-scanner MRI”. *Medical Image Analysis* ([link](#)).


**Svanera M.**, S. Benini, G. Raz, T. Hendler, R. Goebel, and G. Valente. “Transfer learning of deep neural network representations for fMRI decoding”. *Journal of Neuroscience Methods* ([link](#)).

**Svanera M.**, S. Benini, G. Raz, T. Hendler, R. Goebel, and G. Valente. “Deep driven fMRI decoding of visual categories”. In: *NeuroIPS Workshop (MLINI)* ([link](#)).

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## PROGRAMMING SKILLS

★★★★★

python, bash, 

★★★★☆

Matlab, LaTeX

★★★★☆

C, C++, Java

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PHP, HTML, CSS,  
MySQL, R