



# PhD in BIOINGEGNERIA / BIOENGINEERING - 40th cycle

## THEMATIC Research Field: AI-DRIVEN NEUROSURGERY OUTCOME PREDICTION

### Monthly net income of PhDscholarship (max 36 months)

**€ 1400.0**

In case of a change of the welfare rates during the three-year period, the amount could be modified.

### Context of the research activity

#### Motivation and objectives of the research in this field

The outcome assessment of brain tumor (BT) surgery with clinical scales and patient reported outcome measures (PROMs) has gained paramount importance as well as the identification of predictive factors for the therapeutic decision-making process. The project aims to build a predictive model of outcome after BT surgery and to develop a Decision Support System (DSS) based on ML techniques, for the prediction of both clinical and patient-reported outcome.

#### Methods and techniques that will be developed and used to carry out the research

Clinical scores and measures will be collected in collaboration with a clinical institution and a dedicated database will be created. ML techniques will be investigated to implement the predictive models. Among them, the top scored classifiers such as Artificial Neural Networks (with different architecture and training modalities) as well as Support Vector Machine (SVM) will be investigated. Models will be trained on a reserved part of the database, and then tested on the remaining unseen data. Finally a decision support system will be created relying on dedicated graphical user interfaces.

#### Educational objectives

The PhD student will work in an interdisciplinary environment made up by biomedical engineering, neurosurgeons and neuropsychologists with high educative potentials in the field of AI application in health. Additionally, the PhD student will be involved in educational courses provided by the PhD school of



	Bioengineering at Politecnico di Milano. The PhD Student will also participate in national and international conferences and schools and he/she will be involved in producing manuscripts to be submitted in top-ranked peer-reviewed indexed journals.
<b>Job opportunities</b>	AI experts in health applications SW developers in health application Biomedical engineering in high-ranked research devoted hospitals (I.R.C.C.S.)
<b>Composition of the research group</b>	1 Full Professors 1 Associated Professors 2 Assistant Professors 6 PhD Students
<b>Name of the research directors</b>	Prof. Guido Baroni

<b>Contacts</b>	
Prof. Guido Baroni Contacts Guido.baroni@polimi.it	

<b>Additional support - Financial aid per PhD student per year (gross amount)</b>	
<b>Housing - Foreign Students</b>	--
<b>Housing - Out-of-town residents (more than 80Km out of Milano)</b>	--

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	700.0 €
<b>By number of months</b>	6

<b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information</b>	
<p>Educational activity: The student will be encouraged to attend to courses at POLIMI or abroad 2 /3in International Schools.</p> <p>Teaching assistantship: There are various forms of financial aid for activities of support to theteaching practice. The PhD student is encouraged to take part in these activities, within the limitsallowed by the regulations.</p> <p>Computer and desk availability: the student will be allowed to access facilities of the DEIB.</p>	