

Title: Multimodal biomarkers to predict the onset and prognosis of neuropsychiatric illnesses.

Synopsis:

Keywords. Genetics, neuroimaging, environment, clinical biomarkers, schizophrenia, autism, Alzheimer's, Parkinson's.

Context. Psychiatry and, to a lesser extent, neurology are still fields of medicine that take very little advantage of quantitative, biological and objective measurements – with a lot of trial-and-error and one-size-fits-all therapeutics. This may be why diagnosis, prediction of prognosis and response to treatment are relatively inaccurate, late and expensive. For example, about a third of Alzheimer's cases go on mis- or under-diagnosed; it is still undetected which one third of people with at-risk symptoms for schizophrenia go on to develop this chronic illness, and about one quarter of schizophrenia patients do not respond to their first line of treatment. Can we capitalize on the existing information in brain scans and other quantitative measurements to assist clinicians in deciding on patients' diagnosis or prognosis, earlier and more accurately than currently – so that the correct treatment can start as soon as possible?

Tools. We are developing pattern recognition algorithms that can statistically predict the level of personalized risk of each new patient. To train these algorithms, we use pre-existing samples (free online or our own) containing neuroimaging and also genetic, psychological, environmental and clinical data. We use mainly MATLAB and machine learning tools.

Collaborations. King's College London (UK), IBEB-FCUL (Portugal), Radboud University Nijmegen (The Netherlands), University College London (UK).

A specific MSc project will spin-off from the above larger project depending on MSc candidate's background and preferences.

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Webpage of the group: <https://imm.medicina.ulisboa.pt/en/investigacao/labs/prata-diana-lab/>

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