

# 3-lecture seminar on Neuroscientific Psychiatry

(The talks can be stand-alone for different occasions or grouped together for a workshop)

## **Psychosis schizophrenia and disturbances to brain connectivity**

Many publications demonstrate the correlation between disturbances of neural-network connectivity and schizophrenia psychosis. Clinical phenomena of schizophrenia can be simulated by neuronal network artificial models thus offering insights toward their underlying neurophysiologic mechanisms. Such insights allow us to begin to re-conceptualize schizophrenia and psychosis as neuroscientific disturbances to optimal brain connectivity. In addition to offering a new neuroscientific diagnostic approach these insights open up new strategies for therapeutic interventions. In this lecture we will summarize the evidence for connectivity disturbances in schizophrenia and describe future directions for treatment and diagnosis.

## **Mood & Anxiety disorders; disturbances to neuronal network optimization and dynamics.**

Mood and anxiety have been related to cell death and neuronal atrophy. Antidepressant and anxiolytic effects have been linked to neurogenesis and synapto-genesis. How do these findings explain mood regulation? Introduction of knowledge about complex-system behaviors such as optimization dynamics "Free-energy" and "Matching dynamics" can provide insights to answer this question. In this session we will overview the theoretical constructs that may underlie mood and anxiety disorders and explain new diagnostic and therapeutic approaches.

## **Personality disorders and disturbances of the default mode network in the brain.**

The idea that the brain develops as a network organization and structure is a century old idea. The fact that neuronal network structures can embed and represent information is also well known. The idea that personality is related to the way internal representations of the psychosocial environment guide our reactions and behavior has been formulated by "Object-Relationship Psychologists." The fact that neuronal networks can embed memories and presentations (Hebbian algorithms) is well recognized. Combining these insights one can conceive how personality can be defined by neuronal-network organization. Recently the network organization and structure of the brain has been described as a default-mode-network (DMN). In this talk personality disorders will be reconceptualized as disturbances to the development and organization of the DMN and the relevance to diagnosis and treatment will be explained.

*[These lectures are intended to generate interest and create a scientific community that will develop and validate a neuroscientific psychiatric diagnosis]*