Seminar Series from Visiting Fellow, Frank M. Skidmore, Sept. 2010

'Imaging the brain': this series will present research results and discuss the pearls and pitfalls of the potential use of functional and structural MRI as a diagnostic tool. **All are welcome to attend.** Contact: J.F.Collingwood@warwick.ac.uk

TITLE (abstracts on following page)	DATE & TIME	VENUE	NOTES
Imaging the Brain in the Operating Room: Challenges and Promise	Friday 03 / 09 / 2010 1 pm – 2 pm	Digital Lab Seminar IDL Auditorium	Buffet lunch will be available before the seminar *
Functional Imaging of Behavior: Imaging the Circuits of Goal Oriented Behavior in Parkinson Disease	Monday 06 / 09 / 2010 3 pm – 4 pm	Maths/Stats Zeeman Building, A1.01	Tea and coffee will be provided*
The Resting Brain Is Not Resting: Clinical Utility of Resting State Analysis	Tuesday 07 / 09 / 2010 1 pm – 2 pm	School of Engineering, A401	Buffet lunch will be provided*
Functional and Structural MRI: A Clinician's Perspective on the Promise and Perils of the New Medical "Quants".	Monday 13 / 09 / 2010 3 pm – 4 pm	Maths/Stats Zeeman Building A1.01	Tea and coffee will be provided*

for catering purposes please advise Joanna at J.F.Collingwood@warwick.ac.uk if you plan to attend

Biosketch: Frank M. Skidmore directs the Movement Disorders Center at the North Florida/South Georgia VA Medical Center and is affiliated with the Department of Psychiatry at the University of Florida Medical Center. He is a neurologist and has fellowship training in movement disorders, and his research and publications focus on better understanding circuitry of goal oriented behavior in movement disorders and disorders of motivation such as obsessive compulsive disorder, depression, and addiction. His research has generated a focus in better understanding brain function in disorders that currently are clinically diagnosed and do not have diagnostic tests, including psychiatric disorders and movement disorders such as Parkinson disease and related disorders In the domain of imaging, his research has focused on functional imaging as a tool to understand changes in brain function (alterations in the functional networks) that are clinically visible but may not be structurally apparent. The Warwick lecture series will present research results as well as discuss pearls and pitfalls of potential use of functional and structural imaging as a diagnostic tool.

Seminar 1: "Imaging the Brain in the Operating Room: Challenges and Promise". The original OR imaging technique was direct observation, with maximal exposure. Over time, new techniques have developed to allow less invasive approaches. In this lecture, we will discuss stereotactic surgery, intra-

operative clinical monitoring, and how these techniques have altered the targets that can be selected for neurosurgical intervention. This lecture will discuss successes and pitfalls of current intra-operative monitoring techniques, including discussion of scarring, lesions, and other potential sequelae of current techniques. We will discuss how new imaging methods might improve surgical outcomes. Interactive participation of the audience will be welcome.

Seminar 2: "Functional Imaging of Behavior: Imaging the Circuits of Goal Oriented Behavior in Parkinson Disease". Clinical diagnoses develop as an aggregate of multiple overt and covert judgments culminating in a single judgment (a diagnosis) that is used as a shorthand for communicating with other clinicians. Patients may hold multiple simultaneous clinical diagnoses. In many neurologic diseases (e.g. Parkinson disease, Alzheimer disease) and in psychiatric diseases, diagnoses are clinical and there is often no confirmatory "test". In this lecture, we discuss using functional imaging to evaluate neurologic disease states and internal mood an emotional states. First, we will describe how mood and emotional disorders might be clinically measured, using our study of depression and apathy in Parkinson disease as an example. We further report our findings that resting state fMRI can identify features in the images that reliably and distinctively track with clinical measures of degree of depression or degree of apathy/abulia in the sample. We will finally discuss implications of this research with respect to using functional imaging as a tool to clarify psychiatric or neurologic diagnoses.

Seminar 3: "The Resting Brain Is Not Resting: Clinical Utility of Resting State Analysis". While the foregoing lecture discussed approaching functional imaging from a clinical perspective, in this lecture we will approach clinical study from the perspective of available functional imaging measurement tools. The blood oxygen level dependant (BOLD) signal varies over time and is responsive to both internal and external stimuli. Recently, a number of authors have focused on "resting state" BOLD changes. Depriving the brain of external stimulation enhances internally derived neural and cognitive processes. While difficult to test, resting state analyses of the BOLD signal have shown consistent and reliable features in healthy adults. In this lecture, we discuss various MRI methods that have been used to evaluate the brain's "resting state", and will show data from two experiments and analytic techniques evaluating the resting state in individuals with and without Parkinson disease. Our findings indicate that resting state analyses can reliably identify which individuals in the sample have Parkinson disease. We discuss the clinical and scientific implications of these findings.

Seminar 4: "Functional and Structural MRI: A Clinician's Perspective on the Promise and Perils of the New Medical "Quants". A statistically significant finding is not necessarily a reliable finding. Functional and structural MRI data sets contain large quantities of data related to a signal of interest, however these data sets also contain vast amounts of signal related to random effects (otherwise known as "noise"). Random effects are generated from a variety of sources. For example, "noise" in relation to a signal of interest may be related to the janitor walking down the hall with a metal trashcan, to a loose screw in the MRI manifold, or may be related to individual characteristics of specific patients. In this talk, we will discuss a number of important fMRI sources of noise, from the startling findings of a California group of postmortem brain activity in a salmon to the effects of individual patient variability on fMRI results after scanner effects, motion artifact, and other sources of experimental noise have been accounted for. We will also discuss how incorporating reliability measures into fMRI can counteract the effects of outliers on fMRI datasets. The purpose of this talk is to start a discussion on how fMRI and other MRI techniques can move from a purely speculative to a clinically relevant tool for understanding human brain disease.