



## SINAPSE PhD

Name of Primary Research Base:

Lillian Sutton Building, University of Radiology

Name of Secondary Research Base:

School of Psychology, University of St. Andrews

First Discipline:

Radiology

Second Discipline:

Developmental neuroscience

SINAPSE Centre Lead:

Aberdeen

---

### PROJECT

Title:

Combining structural and functional neuroimaging techniques to study typical developmental patterns of emotion processing.

### SUPERVISORS

1. *Supervisor 1 Name:*

Gordon D Waiter

*Supervisor 1 Email address:*

Godon.waiter@abdn.ac.uk

2. *Supervisor 2 Name:*

Justin H G Williams

*Supervisor 2 email address:*

Justin.williams@abdn.ac.uk

Planned start date (year of intake):

October, 2007

**Summary (approximately 200 words):**

Whilst functional magnetic resonance imaging (fMRI) has provided huge scope for understanding brain functioning within adults, the extent to which this knowledge can be applied in childhood populations is not well known. Nevertheless, understanding the neural basis for developmental psychopathology in young people using magnetic resonance imaging is an important goal for child psychiatric research. This applies to studies of facial emotion processing that have revealed differences in amygdala activity across age groups. The origins of these differences are unclear, and may reflect age-related differences in grey matter development or white matter connectivity, that we have demonstrated in autism. This PhD will study the neural correlates of facial emotion processing in a group of typical young people of different ages, whilst also collecting detailed structural data using diffusion tensor imaging (DTI) and voxel-based morphometry (VBM). The second aim will be to study how changes in patterns of activity can be related to structural changes with age, sex and IQ. Region of interest analyses will focus on the anterior cingulate, amygdala, temporal pole and orbitofrontal cortex. The project will be a collaboration drawing on facial processing expertise at St. Andrews and neuroimaging expertise in Aberdeen.

**Key references (up to five):**

- |  |
|--|
| Perrett, D.I., Penton-Voak, I.S., Little, A.C., Tiddeman, B.P., Burt, D.M., Schmidt, N., Oxley, R., Kinloch, N., and Barrett, L. 2002. Facial attractiveness judgements reflect learning of parental age characteristics. <i>Proceedings of the Royal Society of London Series B-Biological Sciences</i> 269, 873-880. |
| Thomas, K.M., Drevets, W.C., Dahl, R.E., Ryan, N.D., Birmaher, B., Eccard, C.H., Axelson, D., Whalen, P.J., and Casey, B.J. 2001a. Amygdala response to fearful faces in anxious and depressed children. <i>Archives of General Psychiatry</i> 58, 1057-1063.  |
| Thomas, K.M., Drevets, W.C., Whalen, P.J., Eccard, C.H., Dahl, R.E., Ryan, N.D., and Casey, B.J. 2001b. Amygdala response to facial expressions in children and adults. <i>Biological Psychiatry</i> 49, 309-316.  |
| Waiter, G.D., Williams, J.H.G., Murray, A.D., Gilchrist, A., Perrett, D.I., and Whiten, A. 2004. A voxel-based investigation of brain structure in male adolescents with autistic spectrum disorder. <i>Neuroimage</i> 22, 619-625.  |
| Williams, J.H.G., Perrett, D.I., Waiter, G.D., and Pechey, S. 2007. Differential effects of tryptophan depletion on emotion processing according to face direction. <i>Social Cognitive and Affective Neuroscience</i> . doi: 10.1093/scan/nsm021  |