Faculty of Medicine, Dentistry, Nursing and Pharmacy
MEDICINE GRADUATE PROGRAMME

| **Thesis Meeting** |

Form 12: Thesis Meeting (30 Months)

Name: Roy Schestowitz   **Supervisor:** Chris Taylor

Date of meeting: March 14ᵗʰ, 2006

PROGRESS REPORT – to be filled in by the Student prior to the meeting, after consultation with the Supervisor and made available to Supervisor and Advisor prior to meeting.
(NB: This report is for the guidance of the Student in the planning of his/her thesis)

The past two and a half years were spent investigating an innate relationship between two techniques, both of which have become rather fundamental in the field of computer vision. The first among these techniques is non-rigid registration, which is the method used to align two or more images into a common frame of reference, thereby annulling pose, shape, and lighting variations. This process simplifies subsequent analysis of groups of images. The latter technique is modelling of the appearance of imaged objects. Resultant models are used to learn groups of images, based on statistical analysis.

Our initial view on the project was covered in great depth in the Continuation Report. We were motivated by the observation that modelling methodologies complement the process of non-rigid registration and could become an integral part of it. The first year of the program was spent investigating how models can be exploited by guiding and refining non-rigid registration. In the second year, focus began to shift towards a different aspect of the problem at hand. We undertook the task of evaluating appearance model using a Monte-Carlo methods. The method involved taking a large collection of image examples that were generated by the model, then comparing all these examples against the training set, from which such a model was derived. In turn, this made the assessment of the quality of non-rigid registration possible.

An important part of the work was based on a parallel development – that which concentrated on successfully building appearance models directly from a registration process. Essentially, this obviated the need for human intervention with raw data, making the method invaluable for practical applications. This approach to evaluation was shown to be on par with (if not better than) one 'gold standard' equivalent, which is based on overlap between anatomical labels.

In the third year, key concepts were expanded as to make the methodology more principled. Entropic measures, which serve as good surrogates for *complexity*, were adopted and used to evaluate models. They replaced a more *ad hoc* technique, which was to derive measures of generalisation and specificity from distributions in a high-dimensional space. The stage where the work currently stands involves refinement of the basic concepts, extensions, and a variety of experiments, which help us better understand the strengths and weaknesses of the approach as a whole. We believe that a key goal has truly been attained.

- **Draft outline of thesis structure** *(continue on a separate sheet if required)*: Draft to be submitted with report form, including detail of chapter headings.

See the enclosed document titled "Thesis Summary". The document contains a detailed breakdown into sections, subsections, as well as prospective content for each.

- **Timetable for thesis writing:**

- **Timetable for completion of remaining work:**
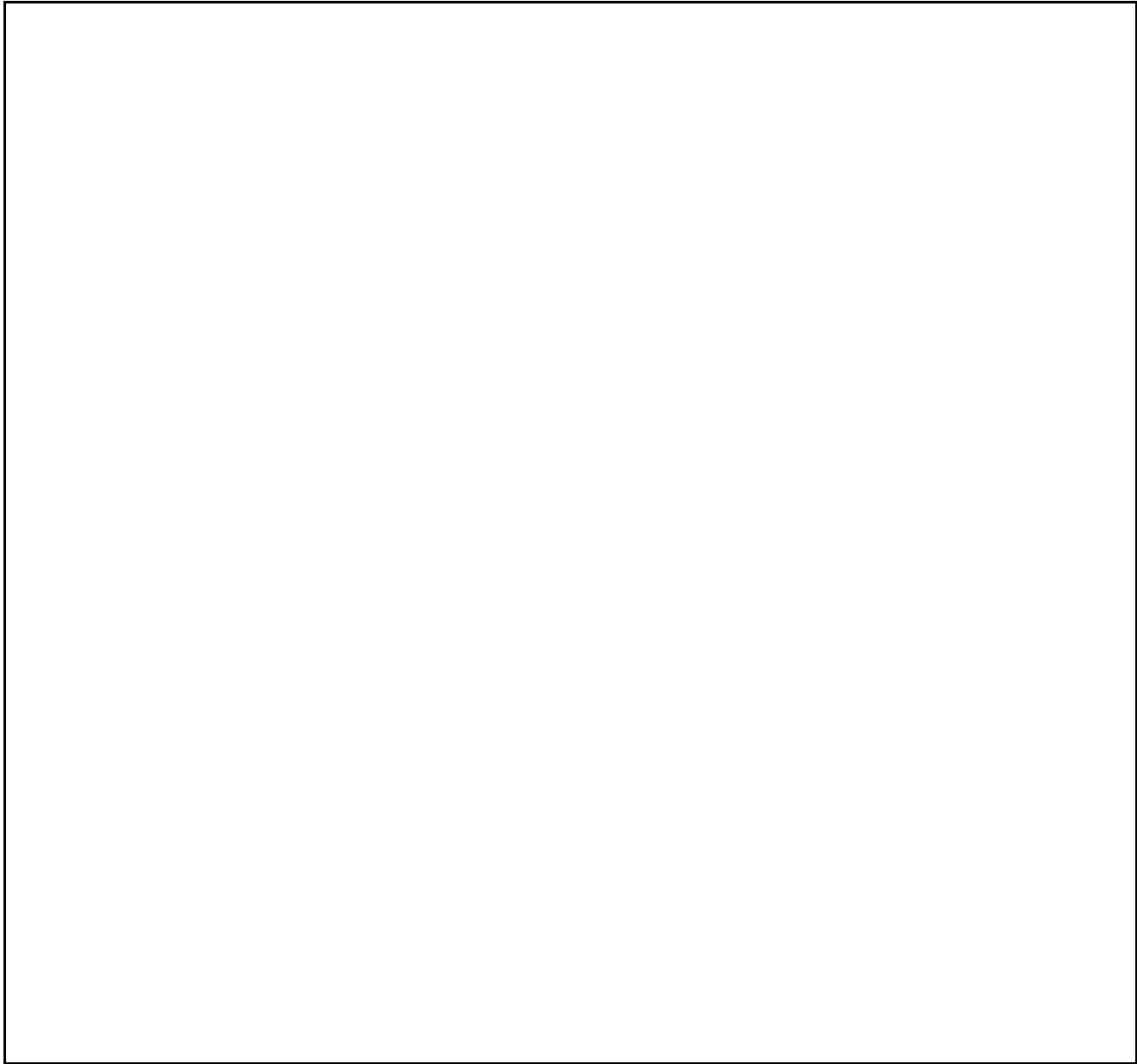
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It is also important that a record is kept of your attendance at the units listed below. Please tick accordingly. Records of attendance will be held in the Graduate Office.

Description	Attended
Workshops	
Year 3 Workshop (Your thesis and beyond)	**X**
Symposia/ Meetings	
Graduate Student Presentation or local symposia	✔
MIAS-IRC plenary meeting, Oxford	✔
MIAS-IRC plenary meeting, Manchester	✔
Seminars	
Thesis writing seminar	✔
Structure and Function plenary meeting, UCL	✔

Ph.D. Workshop	✔
EPSRC Summer School, Surrey	✔
Structure and Function workshop, Gordon Museum, London	✔
MIUA Summer School, Imperial College London	✔
MIAS-IRC plenary meeting, UCL	✔
MIAS-IRC plenary meeting, Manchester	✔
MIAS-IRC plenary meeting, UCL	✔
2nd Year Ph.D. Workshop	✔
MIAS-IRC plenary meeting, Oxford	✔
Structure and Function plenary meeting, Oxford	✔
MIAS-IRC plenary meeting, Manchester	✔
IRC-PET Meeting, Manchester	✔

Signature of Supervisor...................................……................   **Date** ....……………

Signature of Advisor...   **Date** ....………

<u>Declaration by Student:</u>
I have discussed my progress with the Advisor and my Supervisor and have read and agreed with the comments made above.

Signature of Student ....   **Date** ....………

<u>Don't forget to send a copy to the Graduate Tutor/Education Office</u>

Photocopy or download further copies of this form when required