



## Progress Report Submission for C. J. Taylor

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### **A**greed Upon

- Experiment further with model-based objective function and discover causes for the current weaknesses. Produce figures that reflect on the optimisation and try simpler warps. More specific details are given in the next section.
- Change of the presentation abstract according to suggestions made throughout the meeting.
- Form 3 needs to be submitted to Shelagh.
- The project presentation will be looked at during the next meeting.
- Feedback on the contents of the literature report will be brought in next meeting.

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Electronic version: <http://www.danielsorogon.com/Webmaster/Research/Progress>

- Implementation and code need to be discussed in greater depth in future meetings.

# **P**rogress Made

## **Presentation**

- **January Presentation Abstract** has been modified.

[http://www.danielsorogon.com/Webmaster/Research/2004\\_Abstract](http://www.danielsorogon.com/Webmaster/Research/2004_Abstract)

The modifications were very small – mainly riddance of inadequate phrasing and minor compensation for the way ideas were expressed in the previous revision.

- The presentation has been updated at its own volition to show illustrative structural figures at the end.

[http://www.danielsorogon.com/Webmaster/Research/January\\_Presentation\\_Concise](http://www.danielsorogon.com/Webmaster/Research/January_Presentation_Concise)

## **Experiments**

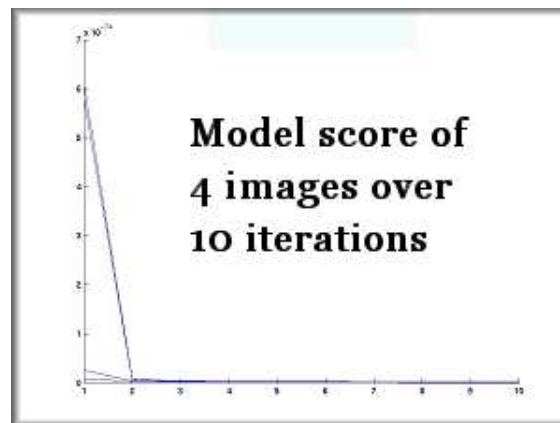
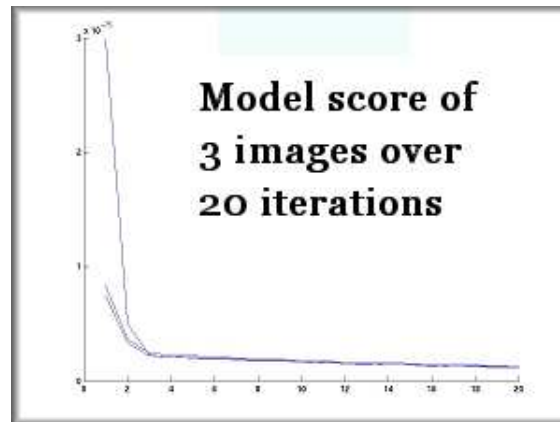
- The MATLAB code was largely extended and made more sophisticated.
- Newer images and videos are available under:

<http://www2.cs.man.ac.uk/~schestr0>

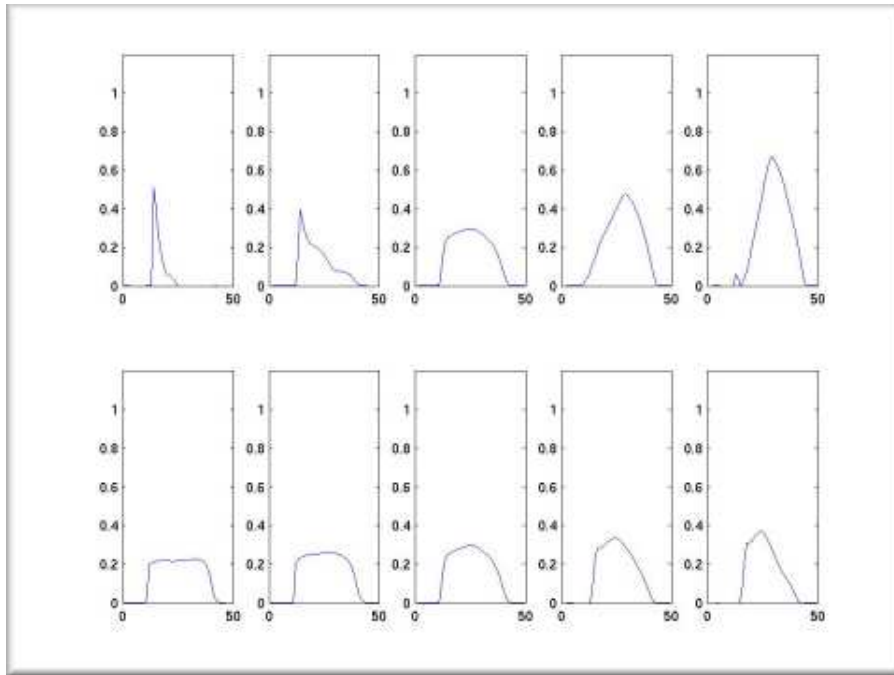
Some results from experiments are available under the results page.

<http://www.danielsorogon.com/Webmaster/Research/NRR/Results>

- The optimisation for the model-based case possesses some mysteriously bad characteristics. The functions were investigated in great depth and the following observations made.



The figures above clearly indicate that the optimisation extent quickly becomes futile as the dataset size grows. For sets greater than 3 in size, only the first iteration entails an improvement and the optimisation's nature is even more radically discouraging if the set is of a realistic size, e.g. 10 or 30.



The figure shows the modes of variation for a combined model of only 4 bumps aligned over 10 iterations. The 2 most significant modes of variation show that the model created is poor indeed.

- Work still attempts to show that there is a fundamental problem with the way in which a model is constructed or evaluated because iterative improvements are surprisingly disappointing. For 2 images, little improvement is made after about 5 iterations or in some cases 10. For sets of greater size, results are horrible regardless of the (1) objective function; (2) knot-point placement method; (3) the warp complexity. New alternatives to these three components will be attempted.
- Important details and issues raised in the meeting with Stephen Marsland have been put in a separate document. The document is *still* worth having a glance at during one of the next meetings.

<http://www.danielsorogon.com/Webmaster/Research/NRR/Marsland>

## Journals

- Addition to journals list: *Medical Image Analysis* from Elsevier Science (accessible from SwetsWise). It was included in Prof. Noble's site and it appears to include plenty of papers on registration.

- Access to IJCV was very recently made available through JRULM. It was therefore added to the list journals to be regularly browsed *on-line*. All of the 11 journals initially targeted, plus the aforementioned 12th journal, are now available electronically.
- Major overhaul of journals page makes access to papers even easier and quicker.

<http://www.danielsorogon.com/Webmaster/Research/Links/journals.htm>

## Organisational

- Form 3 and a copy of the literature report have been handed in to Shelagh.
- Miscellaneous meetings<sup>1</sup> are recorded at:

<http://www.danielsorogon.com/Webmaster/Research/Meetings/>

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## Implementation

- Critically evaluate the MATLAB experiments and results to agree on the next step/s. Find out the differences between the MATLAB code and TFC's C++ implementation which has been more successful.
- Have a look at the suggestions made by Stephen. Implementation can benefit greatly from discussions stemming from these notes.
- Properties of the generated bumps will be tweaked to perfection only once the model-based objective function behaves sensibly.
- Consider the implementation prospects of MDL as a metric, especially as a substitute for the determinant of the covariance matrix.

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<sup>1</sup>All meetings apart from the weekly meetings with the supervisor.

## **Others**

- (Possibly) Read the revised abstract.
- Review the more concise presentation slides.
- Have a closer look at parts of the literature report which indicate possible misconceptions.