

# **First Year: Conclusions**

Summary of conclusions drawn from 1-D registration and 2-D automatic landmark selection.

**Incomplete Draft**

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## Registration Experiments - Overview

- Registration of *bumps*, which is guided by their model, is indeed possible.
- Eigen-analysis consumes most of the time that is required for model-based registration.
- On a modern machine, sensible registration of 'normal' 1-D sets takes about 10 minutes.

## Registration Experiments - Overview - Ctd.

- A suitable warp that is always diffeomorphic is the single-point clamped-plate spline.
- Specificity appears unaffected before and after model-based registration. Its mean remains the same while its range decreases.
- Mean-squared-differences among bumps decreases after model-based registration, as expected.
- Generalisation ability is not changed after model-based registration.

## Registration - Sets and Subsets

- Stochastic choice of data subsets can be used to infer data variability. Uncertainty is related to the change in determinant value.
- Subset-based registration appears slow. This is yet inconclusive.
- The model-based objective function is less effective when the set to register is large.

## Registration - Comparisons

- Model-based registration is slower than MSD-based registration.

## Registration - Correctness

- Data drifts away as registration proceeds. Registration goes below target as a result.
- Discrepancies must be taken into account.

## Shapes - General

- Use of subsets in selection of landmarks is slower. Quality of selection is also poorer.
- Tolerance of optimiser must not be chosen arbitrarily.
- Without use of proper integral (of the covariance matrix) term, the optimisation will not work as expected.

## **Shapes - General - Ctd.**

In the case of brick-and-bump, varying the height of bumps affects quality of selection. Therefore, arguments about robustness can come up.