# World Statistics Day

University of Glasgow

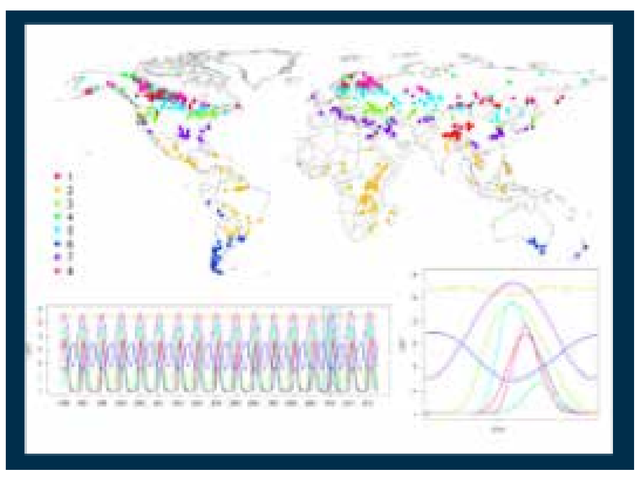
As part of the celebration of World Statistics Day, 2015 "better data, better lives", we have selected three examples of projects, where Glasgow statisticians are making a difference by providing insight into some of the grand planetary challenges, round people and environment.

## Helping Clinicians Deal with Obesity in Infancy

Does it matter if babies are very overweight?
Can we predict which babies will be obese by the time they reach school?
Which measurements are most reliable in predicting which children will be obese?

These are some of the questions we are trying to answer in a project funded by the Chief Scientist Office in the Scottish Government, and conducted with colleagues in the Department for Child Health at the University of Glasgow, University College London and the University of Tampere (Finland). Using five longitudinal growth datasets and various modelling techniques we have already looked at whether children's growth patterns have changed over the last fifty years: results suggest that, whilst children are increasingly being born heavier, this pattern does not continue beyond the age of six months. We have also explored pathways to overweight and obesity between birth and age eight and we are now looking at which measurements best predict which children will be obese by the time they reach school. We hope that the results from this project will better inform health professionals and parents about the emergence of childhood obesity and when to worry (or not!) about a young child's weight.

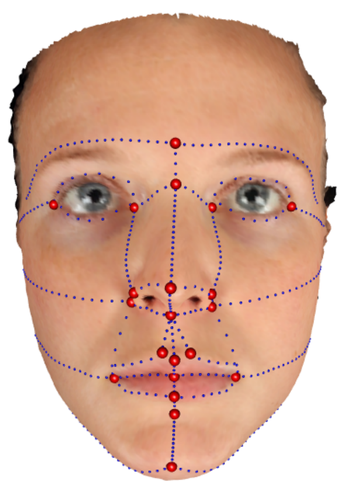
## Environmental Statistics - Global Coherence of Average Lake Surface Water Temperature



Remotely-sensed data are invaluable for understanding the spatial context of environmental impacts. They are often 'BIG' and our statistical models are designed to be computationally efficient.

This work is being conducted as part of the Globolakes project, investigating the state of lakes and their response to climatic and other environmental drivers of change at a global scale through the realisation of a near-real time satellite based observatory with archive data processing to produce a 20-year time series of observed ecological parameters and lake temperature supported by linked auxiliary data on catchment land-use and meteorological forcing. The image shows global coherence of average lake surface water temperature based on 20 years of bi-monthly data from the AATSR satellite (ArcLakes, ESA). It shows how statistical modelling of remote sensing data can be used to create a global picture of similarity in the status of 700 water bodies. Only 8 groups were identified to capture the underlying variability in the coherence of LSWT. Statistics enabled a computationally efficient analysis of coherence informed by the patterns in the curves over time, based on both trends and seasonal patterns, rather than simple summary statistics.

## Facial Shape Analysis - Aiding Children with Facial Deformities



How can we help children and adults suffering from facial deformities receive more accurate and more successful care from surgical physicians?

3-dimensional facial images are captured from both healthy non-surgical control subjects and patients pre/post surgical intervention in order to compare the success and failures of reconstructive surgery with the aim to improve the overall outcomes for these individuals. A baby with cleft lip/palate can be forced to undertake up to 10 surgeries pre-puberty in order to look 'normal'. Our aim is to not only make each surgery have a more positive outcome, but also hope to greatly reduce the number of necessary surgeries. Through various modelling techniques, we have created a reproducible facial mask that can be created for every single facial image based upon the inherent characteristics and curvature of facial shape. This can help us answer questions on the change of facial shape with aging, sexual dimorphism, and the possible corrections needed for surgical intervention.

For more information please contact Louise.Marryat@glasgow.ac.uk, Marian.Scott@glasgow.ac.uk, or Liberty.Vittert@glasgow.ac.uk, respectively.