



## Workshop 21-22 January 2016 – Paal, Belgium

**Do you struggle to decide which variables to extract from your biomechanical data, particularly if you are recording motion data from different joints, 3D force data, or EMG data from various muscles?**

**Do you think that there are better ways to explore your data, but these are probably too complex to use unless if you are an engineer?**

**Now think again!**

**Statistical Parametric Mapping** (SPM) is the analysis technique that allows the statistical analysis of typical biomechanical data e.g. 1D curves and vectors. It allows to avoid subjective analysis decisions. Actually it works like the basic statistical analyses we all know, such as t-tests, ANOVA, and linear regression, but it extends these to one-dimensional profiles of forces or kinematics. Actually, pretty much anyone can use it with a little bit of training, which only requires one to learn the basic principles that underpin the technique, and then apply this through very basic tools.

### Workshop description

In this workshop you will learn to understand the concepts underpinning SPM.

You will conduct SPM analyses in Matlab AND learn how to include SPM in your scientific reporting.

A certificate can be earned at the end of the two-day workshop, based on successfully conducting hypothesis tests on experimental and simulated data. Nobody has failed to do this yet!

### Topics covered during the workshop

- Principles of probability and Random Field Theory
- Temporal data registration and smoothing
- Running a t-test using SPM
- ANOVA using SPM
- Linear regression using SPM
- Writing up SPM results

### Pre-workshop preparation

- Suggest to refresh basic use of Matlab if possible. No problem if no Matlab experience.
- Refresh theory on t-test, ANOVA and regression if possible

## Tutors



**Todd C. Pataky** is an Associate Professor in Bioengineering at Shinshu University. He has published over 45 articles in peer-reviewed journals, approximately 30 of which pertain directly to theoretical and applied aspects of SPM. His 2004-2006 postdoctoral training in functional brain analysis alerted him to the utility of the SPM methodology, and he has since been adopting SPM procedures for analyses of 1D, 2D, and 3D biomechanical continua.



**Mark A. Robinson** is a Lecturer in Biomechanics at Liverpool John Moores University. He is an early career academic with 15 publications in international journals and contributions to two book chapters. His research spans clinical and sports biomechanics and he uses SPM methodology increasingly for the analysis of complex biomechanical data. He is also interested in the pedagogy of statistics and how complex ideas can be best taught in both an applied and theoretical context.



**Jos Vanrenterghem** is a Lecturer in Biomechanics at Liverpool John Moores University. He has published over 30 articles in peer-reviewed journals. He teaches biomechanics across undergraduate and postgraduate levels, providing him with a good insight in the common issues that students face when analysing biomechanical data. He has also delivered a series of workshops on research practise in Biomechanics, and devotes much of his work to making biomechanics available to those with limited mathematical or engineering formation.

## Organisation

Jos Vanrenterghem, [j.vanrenterghem@ljmu.ac.uk](mailto:j.vanrenterghem@ljmu.ac.uk)

Mark Robinson, [m.a.robinson@ljmu.ac.uk](mailto:m.a.robinson@ljmu.ac.uk), T: +44 (0) 151 904 6267

## Cost

£225. This includes registration, all workshop materials, hands-on tutorials, lunches and refreshments. To guarantee the quality of delivery the number of places is limited.

## Location

RSScan International headquarters, De Weven 7, 3583 Paal, Belgium (+32 14 23 2031)

## Registration

See registration link on <http://www.spm1d.org/Workshops.html> or email Jos.

