

Methods & models for fMRI data analysis – HS 2015

Justin Chumbley
Andreea Diaconescu
Jakob Heinze
Sandra Iglesias

Lars Kasper
Sudhir Shankar Raman
Klaas Enno Stephan



Translational Neuromodeling Unit

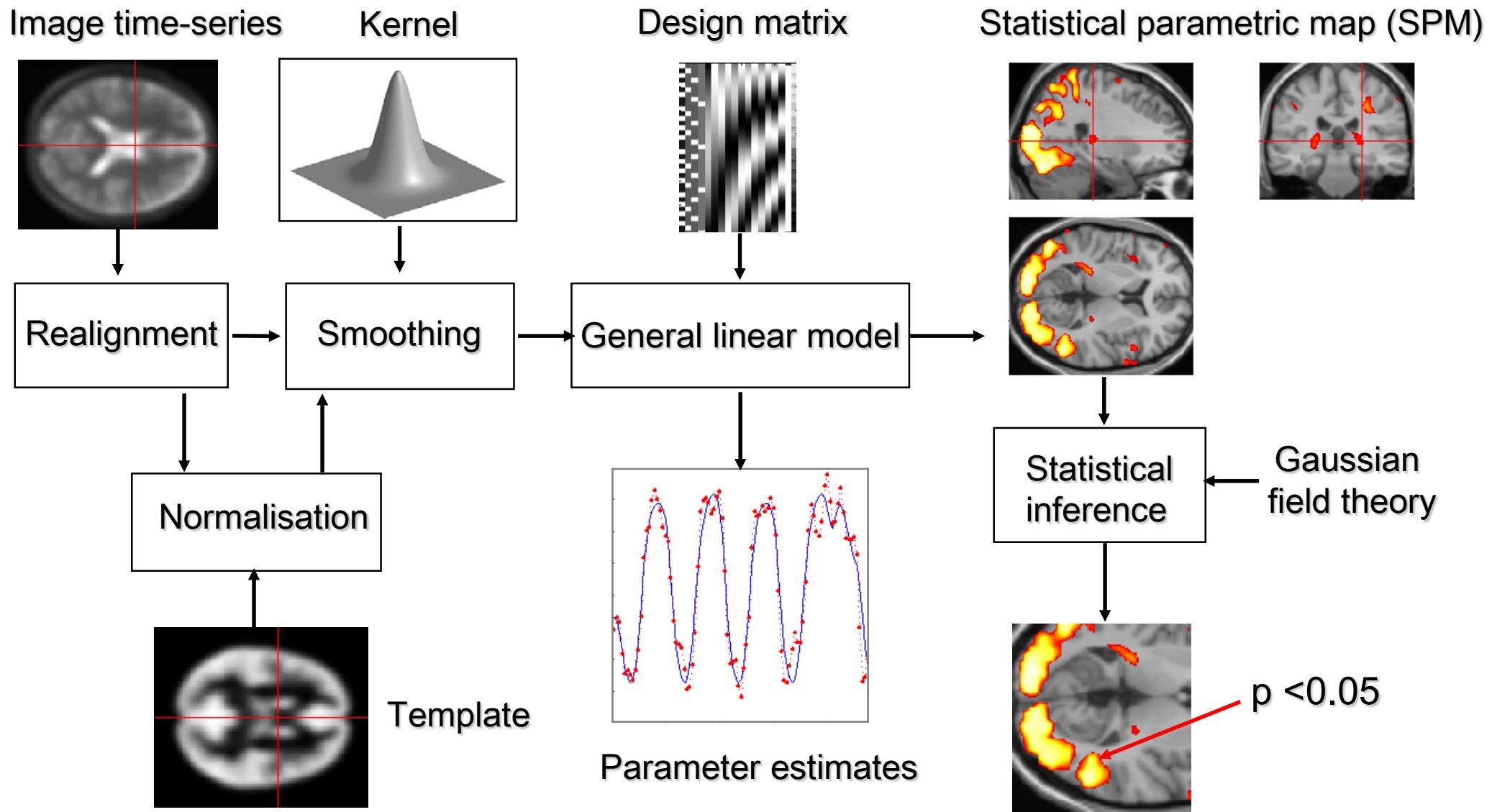


Universität
Zürich^{UZH}



Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Statistical Parametric Mapping (SPM)



Methods & models for fMRI data analysis

Room: ETZ F91

Schedule:

Time: Fri, 12:00 – 15:30

18.09.: Introduction: MRI physics and BOLD neurophysiology (Jakob Heinze)

25.09.: Spatial preprocessing of fMRI images (Lars Kasper)

02.10.: The General Linear Model for fMRI analyses (Jakob Heinze)

09.10.: Classical (frequentist) inference (Andreea Diaconescu)

16.10.: Noise models in fMRI and noise correction (Lars Kasper)

23.10.: Multiple comparison correction (Justin Chumbley)

30.10.: Experimental design and Resting state fMRI analysis (Sandra Iglesias)

06.11.: Event-related fMRI and design efficiency (Klaas Enno Stephan)

13.11.: Group level analysis (Justin Chumbley)

20.11.: Computational Neuroimaging – Model based fMRI (Andreea Diaconescu)

27.11.: Variational Bayes & Bayesian model selection (Sudhir Shankar)

04.12.: Multivariate models for fMRI (Sudhir Shankar)

11.12.: Basics of Dynamic Causal Modelling (Jakob Heinze)

18.12.: Advanced aspects of Dynamic Causal Modelling (Klaas Enno Stephan)

FAQs

- Slides available on <http://www.translationalneuromodeling.org>
- 6 credit points (ETH), 3 credit points (UNI, Neuroeconomics)
- Attendance requirements: 12/14 presentations
- Exam:
 - 15.01.2015: 12:00– 13:30
 - (36 MC questions, 90 min time)
 - Pass is required to get credit points

!!! Check the rules of the program you have signed up for !!!

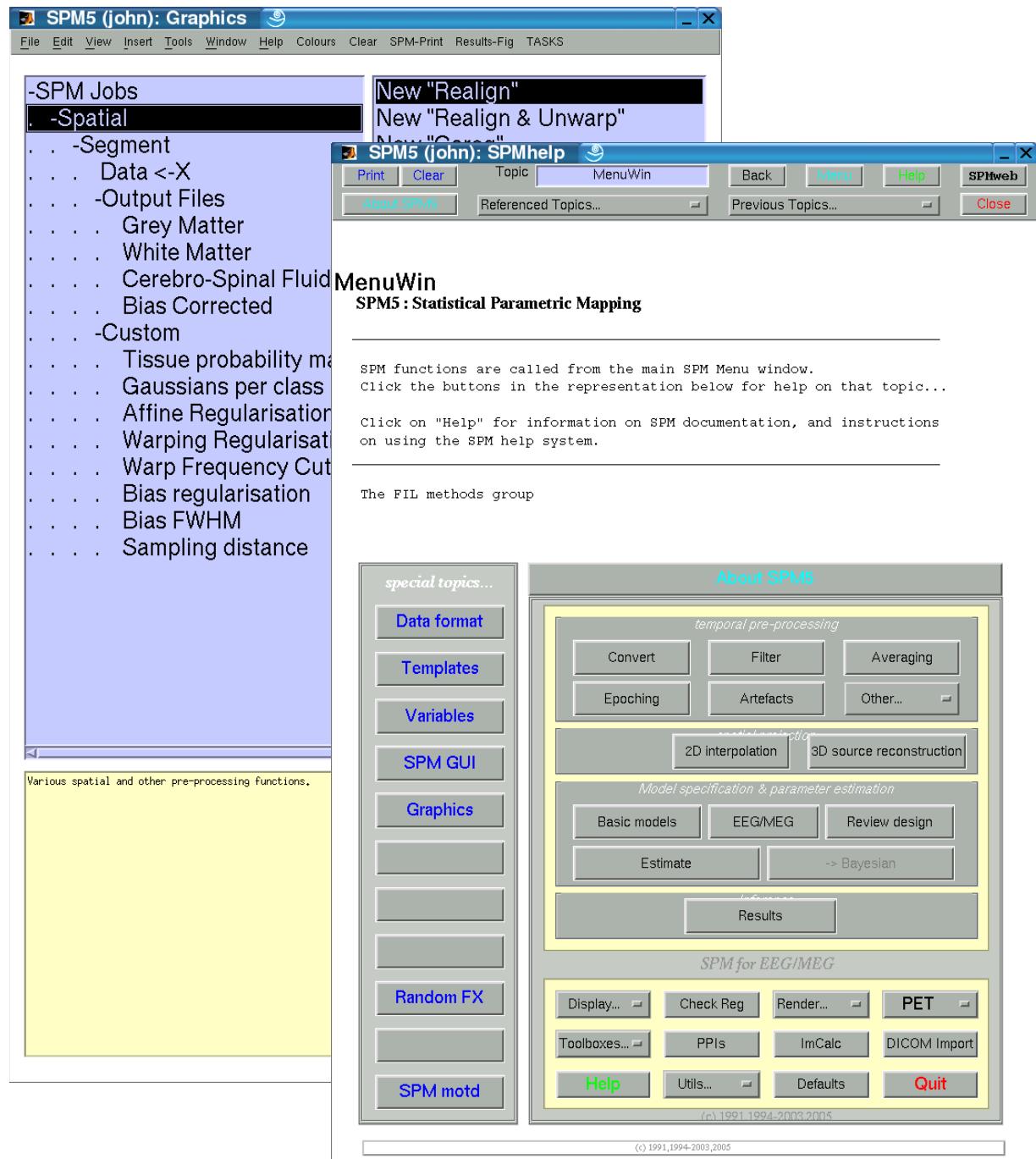
UZH students are enrolled for the course through the Department of economics → Enrolment for course = sign up for exam!!! Withdraw your official enrolment if you do not want to take the exam!

Contact: Jakob Heinze - heinzle@biomed.ee.ethz.ch

For all administrative issues: Silvia Princz - sprincz@biomed.ee.ethz.ch

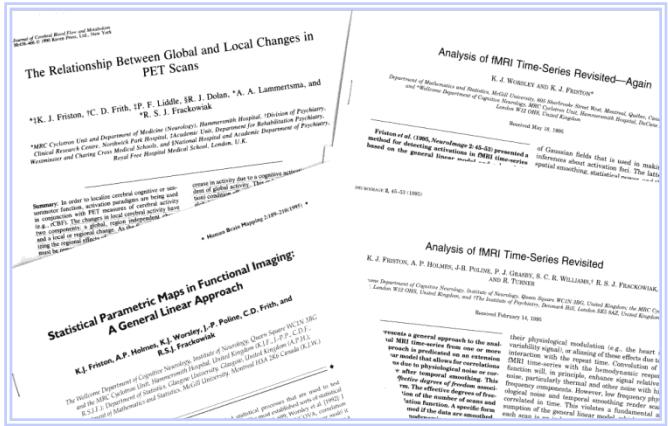
SPM12

- the history
- the program
- the spirit

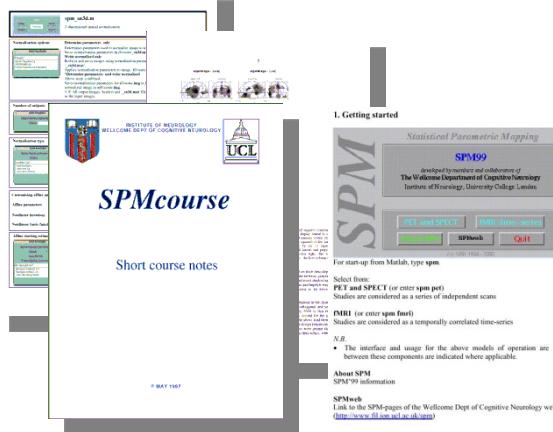
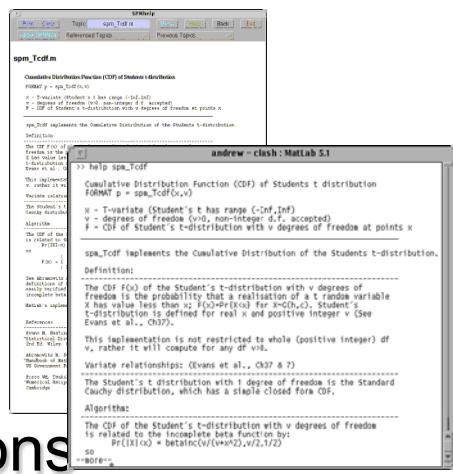


SPM documentation

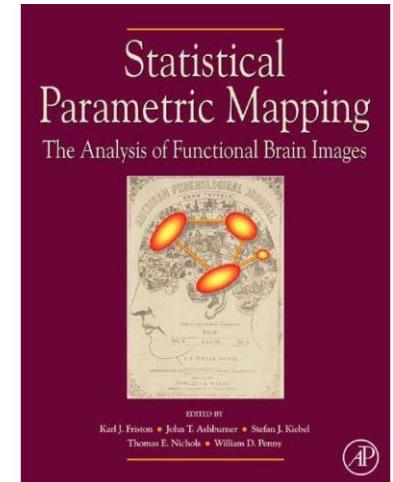
peer reviewed literature



online help & function descriptions



SPM course notes, SPM book & SPM manual



algorithm descriptions
code annotations,
pseudo-code

SPM online bibliography

<http://www.fil.ion.ucl.ac.uk/spm/>

The screenshot shows a Netscape browser window with the title "Publications about 'RFT' - Netscape". The address bar displays the URL <http://www.fil.ion.ucl.ac.uk/spm/doc/biblio/Keyword/RFT.html>. The menu bar includes File, Edit, View, Go, Bookmarks, Tools, Window, and Help. The toolbar includes Back, Forward, Reload, Stop, Print, Home, and various links like Neuro, ML-Stats, Journals, Technical, Imaging, Software, Conferences, World, Me, and a Netscape logo. A search bar at the top right contains the text "Enter Search Terms" with a "Search" button and other options like "Highlight", "Pop-Up Block Off", and "Form Fill".

On the left, there is a vertical sidebar titled "SPM Menu:" containing links: Introduction, Software, Documentation (which is highlighted), Courses, Email list, Data sets, and Extensions. Below that is a section titled "This page:" with a link to Bibliography.

The main content area has a header "Publications about 'RFT'" and a sub-header "Thesis". It lists one publication:

1. [A.P. Holmes](#), [Statistical Issues in Functional Brain Mapping](#). PhD thesis, University of Glasgow, December 1994. Keyword(s): [RFT](#), [PET](#), [GLM](#). [\[bibtex-entry\]](#)

The content area also includes a section titled "Articles in journal or book chapters" which lists four publications:

1. D. Pantazis, [T.E. Nichols](#), S. Baillet, and R.M. Leahy. [A comparison of random field theory and permutation methods for the statistical analysis of MEG data.](#) *NeuroImage*, 25:383-394, 2005. Keyword(s): [RFT](#), [MEG](#), [nonparametric](#). [\[bibtex-entry\]](#)
2. S. Hayasaka, K.L. Phan, I. Liberzon, [K.J. Worsley](#), and [T.E. Nichols](#). [Non-Stationary Cluster Size Inference with Random Field and Permutation Methods.](#) *NeuroImage*, 22:676-687, 2004. Keyword(s): [Cluster](#), [RFT](#), [nonparametric](#). [\[bibtex-entry\]](#)
3. M. Brett, [W.D. Penny](#), and [S.J. Kiebel](#). [Introduction to Random field theory](#). In R.S.J. Frackowiak, K.J. Friston, C. Frith, R. Dolan, K.J. Friston, C.J. Price, S. Zeki, J. Ashburner, and W.D. Penny, editors, *Human Brain Function*. Academic Press, 2nd edition, 2003. Keyword(s): [introduction](#), [RFT](#). [\[bibtex-entry\]](#)
4. [T.E. Nichols](#) and [A.P. Holmes](#). [Nonparametric approaches](#). In

SPM web site



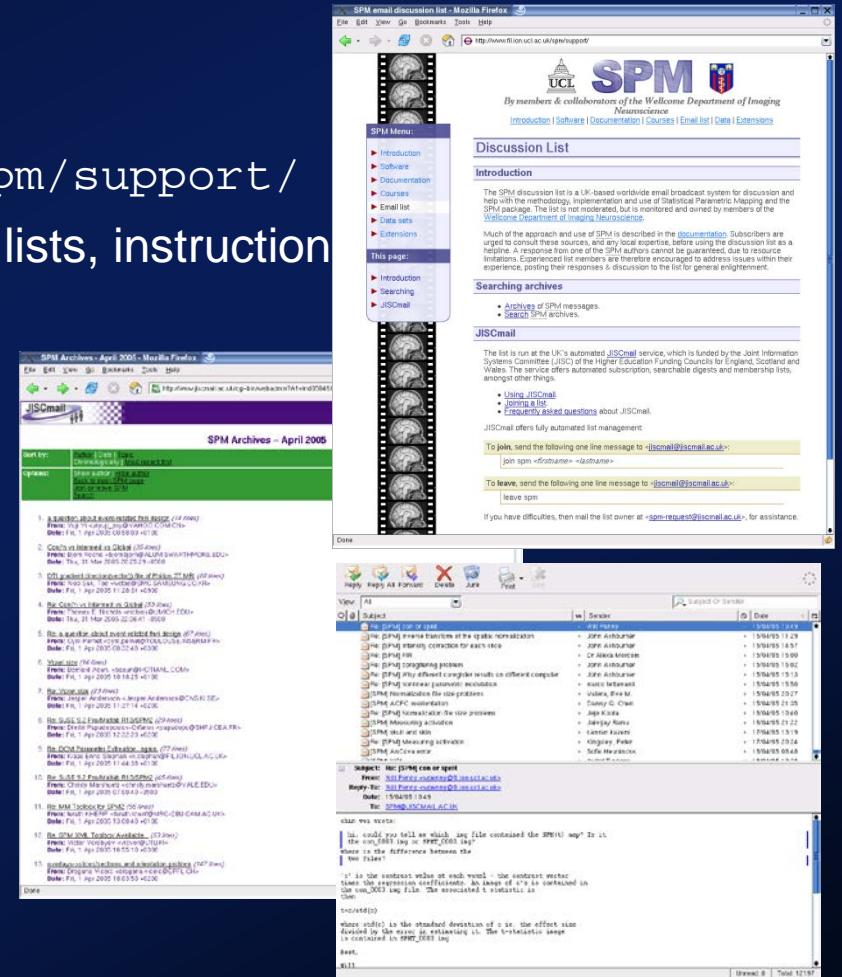
- **Introduction to SPM**
- **SPM distribution:
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SPM8**
- **Documentation &
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- **SPM email discussion list**
- **SPM short course**
- **Example data sets**
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<http://www.fil.ion.ucl.ac.uk/spm/>

SPM email list

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 - Usage queries, theoretical discussions, bug reports, patches, techniques, &c...



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