Methods & models for fMRI data analysis – HS 2018

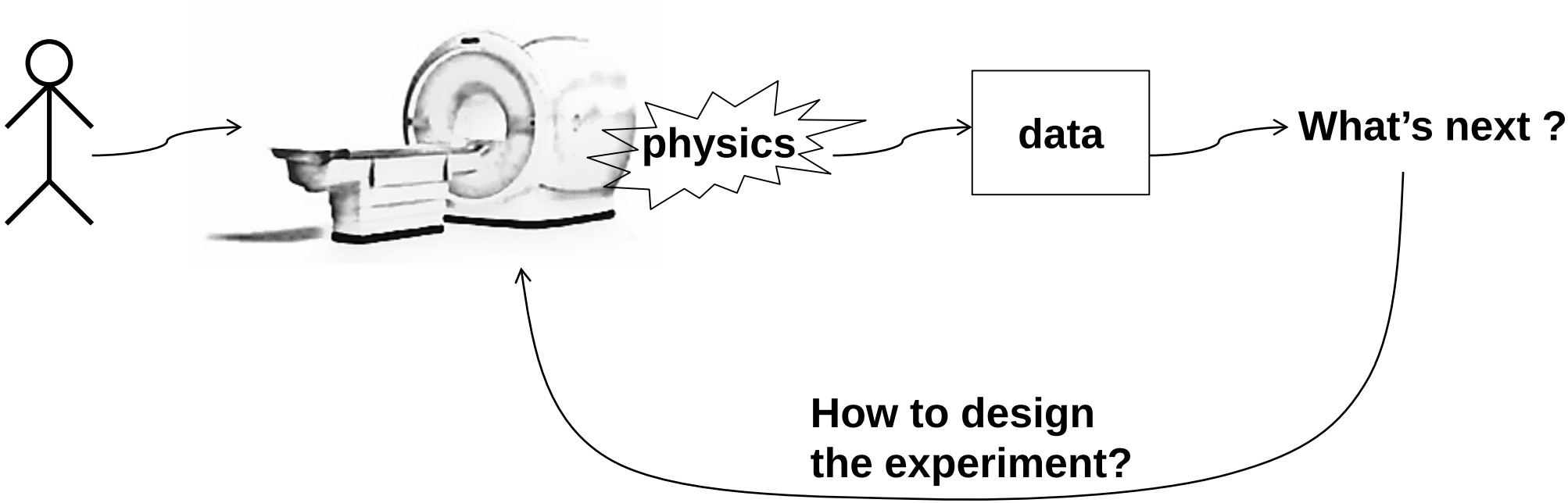
Andreea Diaconescu
Stefan Frässle
Samuel Harrison
Jakob Heinzle
Sandra Iglesias

Lars Kasper
Frederike Petzschner
Klaas Enno Stephan
Sara Tomiello

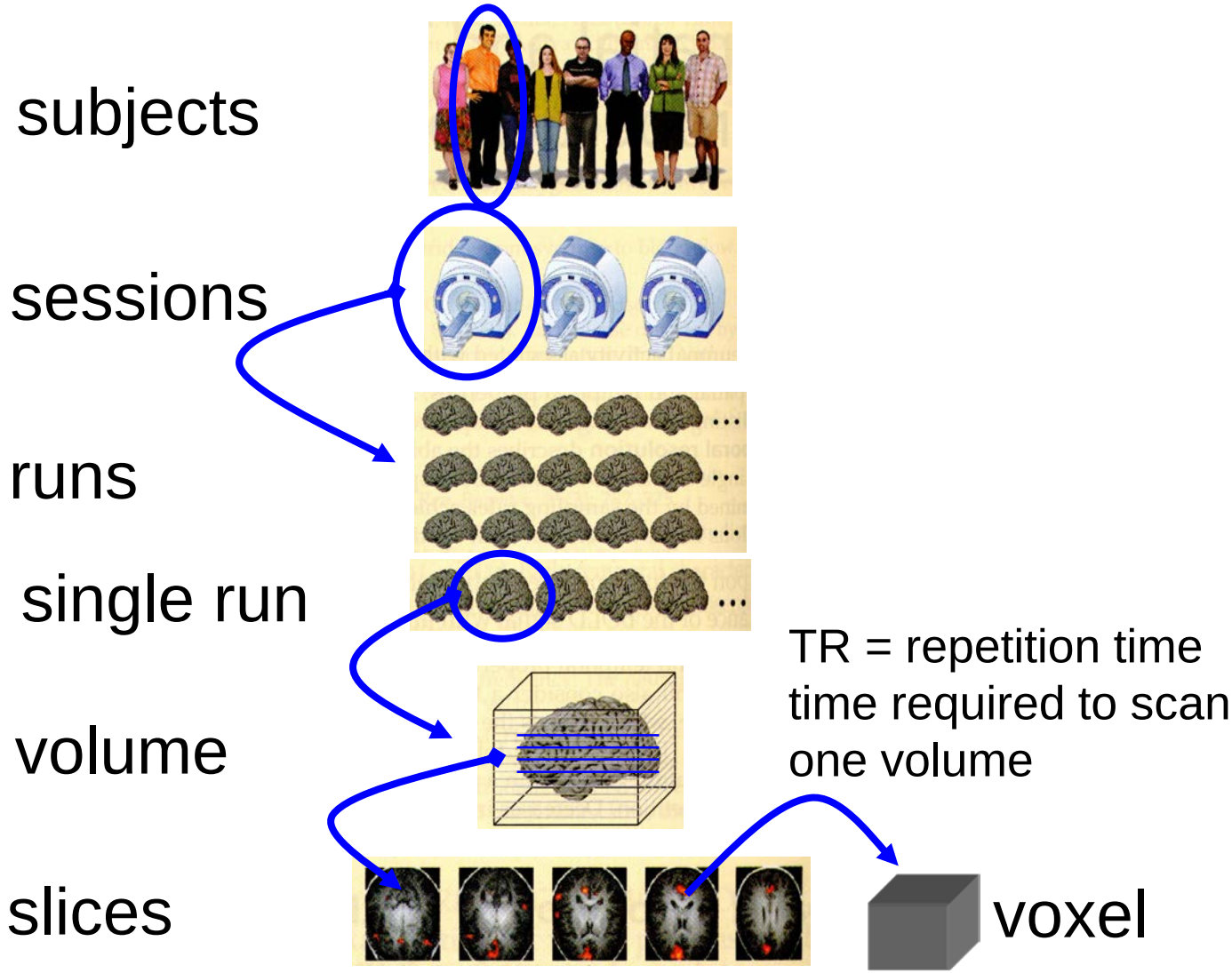
Translational Neuromodeling Unit

Universität Zürich[UZH]

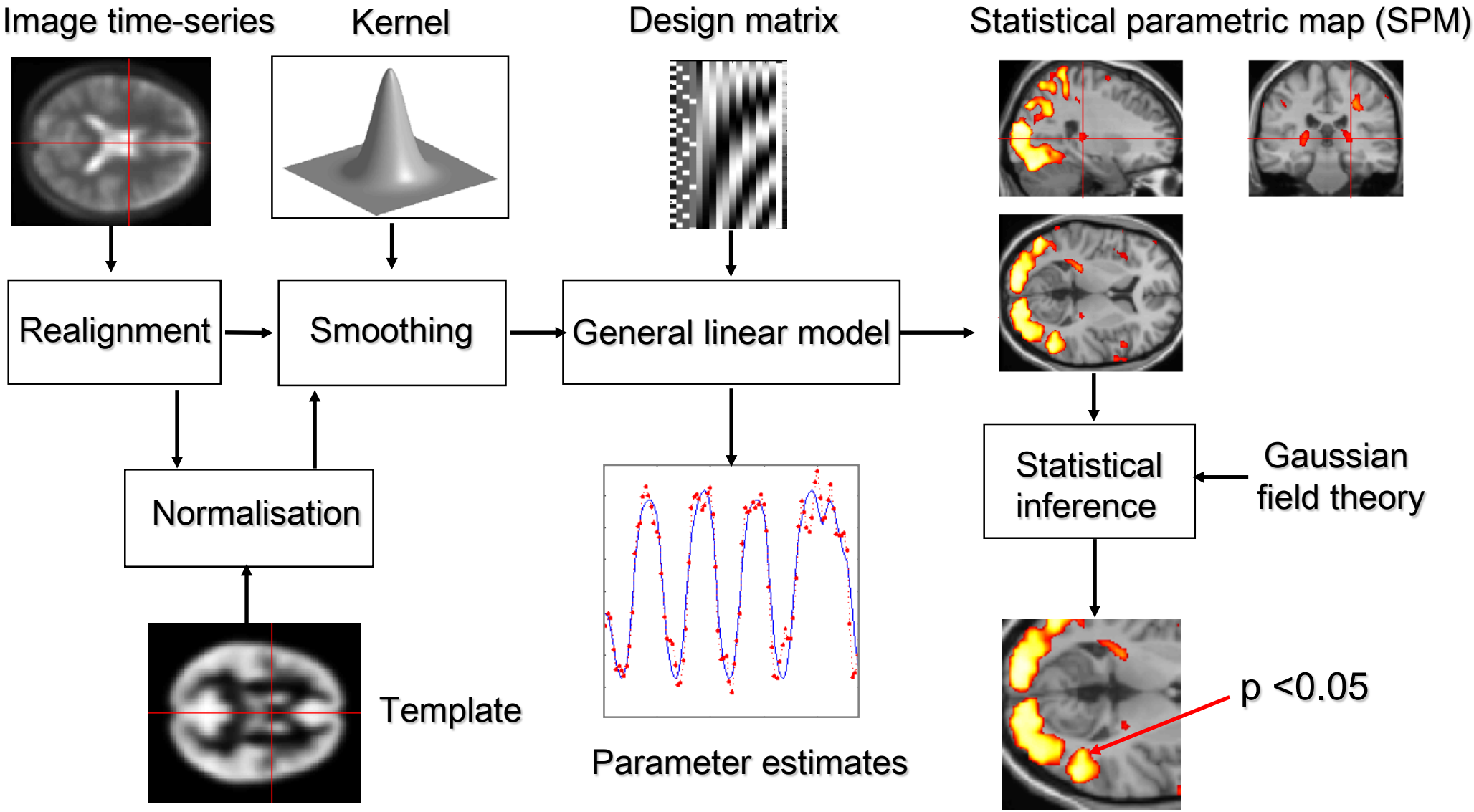
ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich


physics
data
What's next ?
How to design
the experiment?

Terminology of fMRI



Statistical Parametric Mapping (SPM)



Part 1 - Modul Mantelstudium

25.09	Lecture(2h): Foundations of functional MRI: neurophysiology and physics *(Jakob Heinzle)* Tutorial(2h): Setting up Matlab and SPM on own computers (Jakob Heinzle)	UZH Med & Econ / ETH
02.10.	Lecture(2h): Why is fMRI important for medicine? *(Klaas Enno Stephan)* Tutorial(2h): Basic functions of SPM (Jakob Heinzle)	
09.10.	Tutorial (2h): UZH/ETH: Scanning of own Experiment (Sandra Iglesias), MED: Running an SPM batch analysis *(Stefan Frässle)* Lecture (2h): Introduction to Spatial preprocessing of fMRI images (*Samuel Harrison)*	
16.10.	Tutorial (2h): MED: Scanning of own Experiment (Sandra Iglesias), UZH/ETH: Running an SPM batch analysis *(Jakob Heinzle)* Lecture (2h): The General Linear Model for fMRI analyses *(Frederike Petzschner)*	
23.10.	Lecture (2h): Classical (frequentist) inference and multiple comparison correction *(Klaas Enno Stephan)* Tutorial (2h): Analysis of own data	
30.10.	Lecture (2h): Experimental design and Resting State Analysis *(Sandra Iglesias, Sara Tomiello)* Tutorial (2h): Analysis of own data and preparation of presentation	
06.11.	Lecture (2h): Event-related fMRI and design efficiency *(Jakob Heinzle)* Tutorial (2h): Short presentation of results of analysis of own data (MED)	

Part 2 – ETH/UZH

13.11.	Lecture (2h): Group level analysis *(Sandra Iglesias)* Tutorial (2h):	ETH
20.11.	Lecture (2h): Noise models in fMRI and noise correction *(Lars Kasper)* Tutorial (2h): PhysIO	
27.11.	Lecture (2h): Bayesian inference and Bayesian model selection *(Klaas Enno Stephan)* Tutorial (2h): BMA and BMS	
04.12.	Lecture (2h): Computational Neuroimaging (model-based fMRI) *(Andreea Diaconescu)*	
11.12.	Lecture (2h): Introduction to Dynamic Causal Modelling *(Stefan Frässle)* Tutorial (2h): DCM analysis	
18.12.	Exam (08:15-09:45)	

FAQs

Course homepage:

https://www.tnu.ethz.ch/en/teaching/hs-2018/methodsandmodels.html

Credits: 6 points (ETH), 3 points (UNI, Neuroeconomics), Testat (MED)

Attendance requirements: 11/13 presentations

Contact: Sandra Iglesias - iglesias@biomed.ee.ethz.ch
Jakob Heinzle - heinzle@biomed.ee.ethz.ch

!!! 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!

Exam

- “Exam” for medical students (first half of course):
  - 06.11.2017: 10:15 – 12:00
  - Presentation and hand in of own SPM analysis
  - Pass is required to get credit points

- Exam for other students:
  - 18.12.2017: 08:15– 09:45
  - (36 MC questions, 90 min time)
  - Pass is required to get credit points

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

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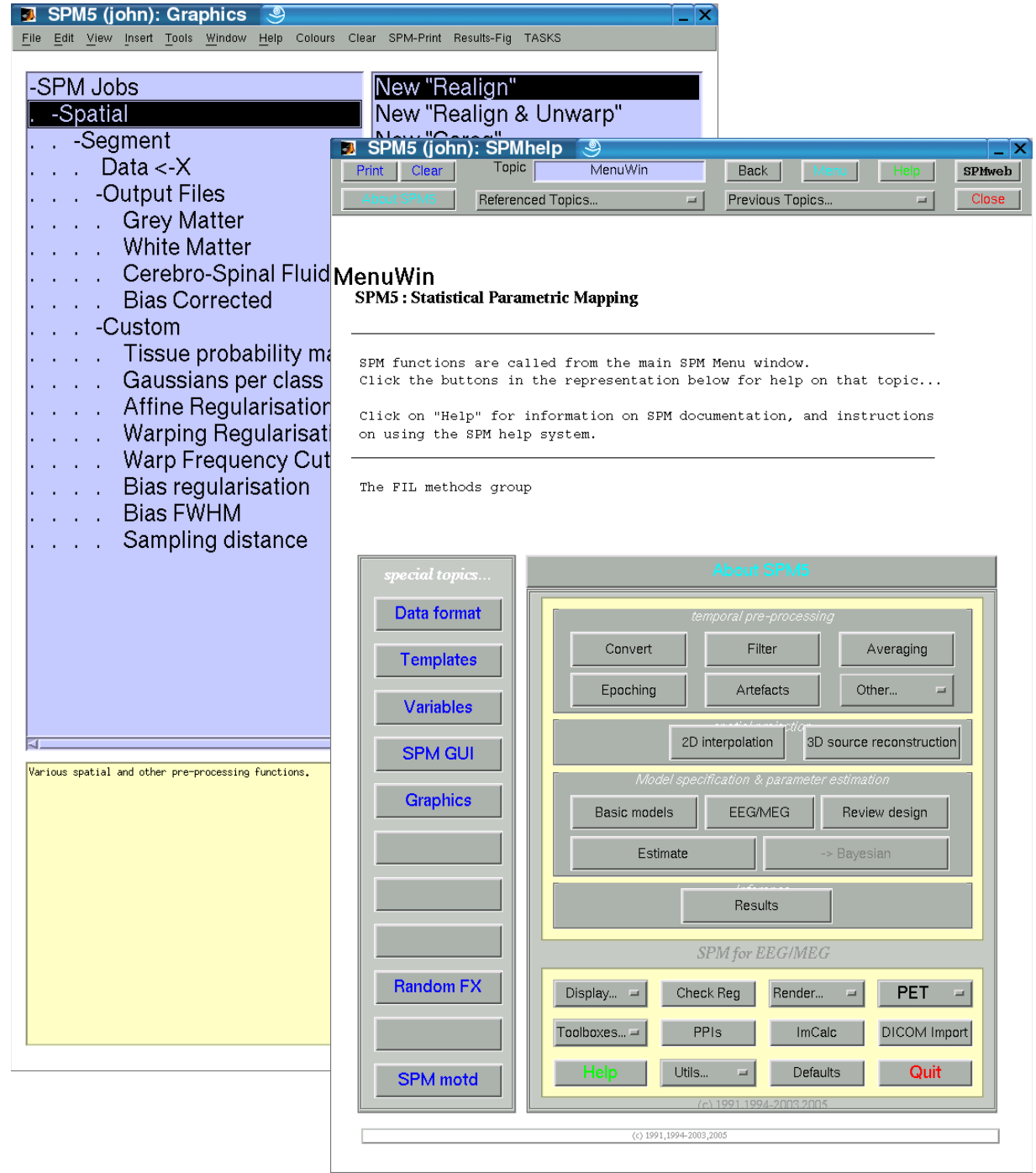
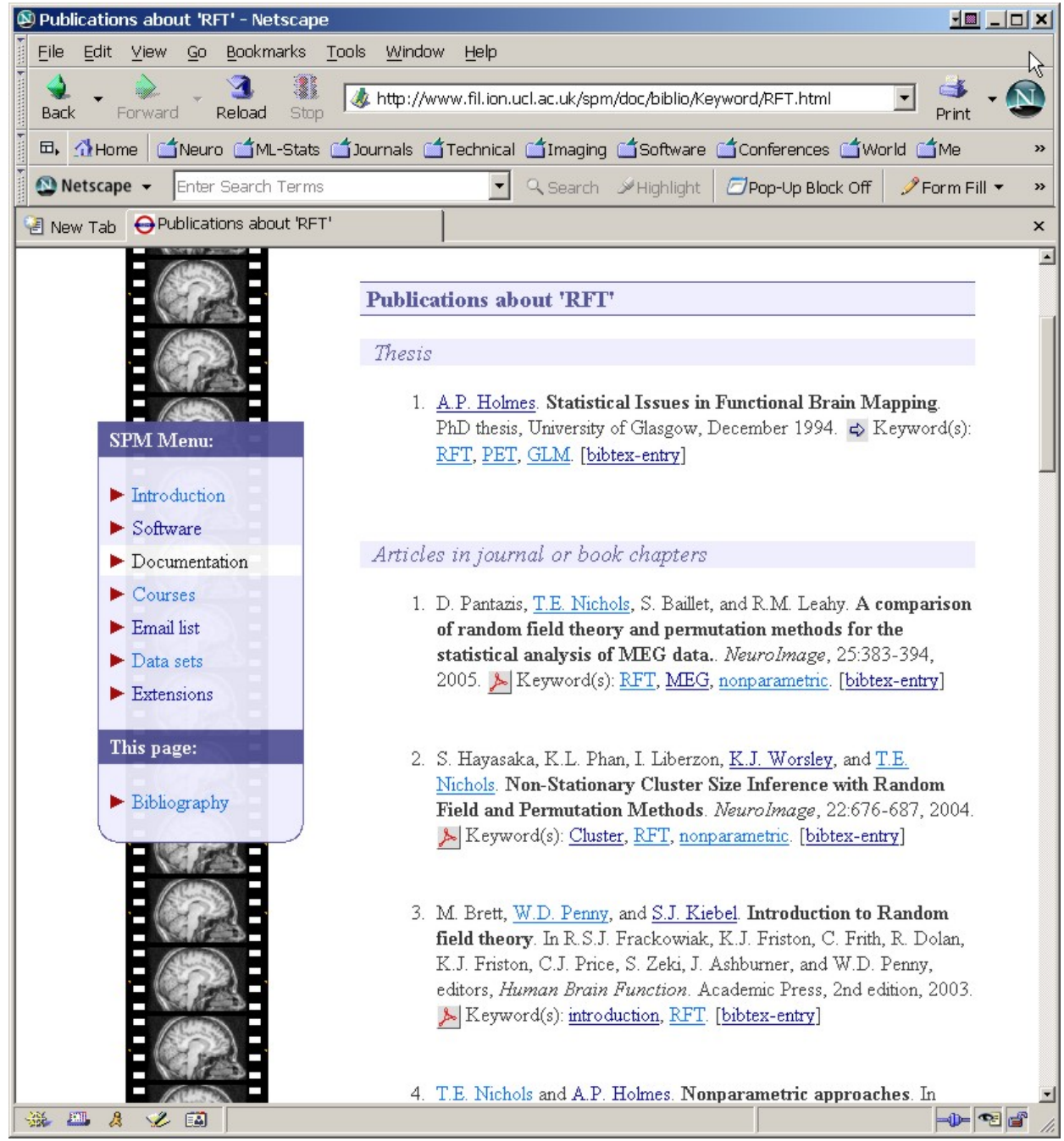
SPM12

- the history
- the program
- the spirit



SPM online bibliography

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



SPM web site

- Introduction to SPM
- SPM distribution: SPM99, SPM2, SPM5, SPM8, SPM12
- Documentation & Bibliography
- SPM email discussion list
- SPM short course
- Example data sets
- SPM extensions

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

SPM email list

- spm@jiscmail.ac.uk
  - Web home page
    - http://www.fil.ion.ucl.ac.uk/spm/support/
    - Archives, archive searches, membership lists, instruction
  - Subscribe
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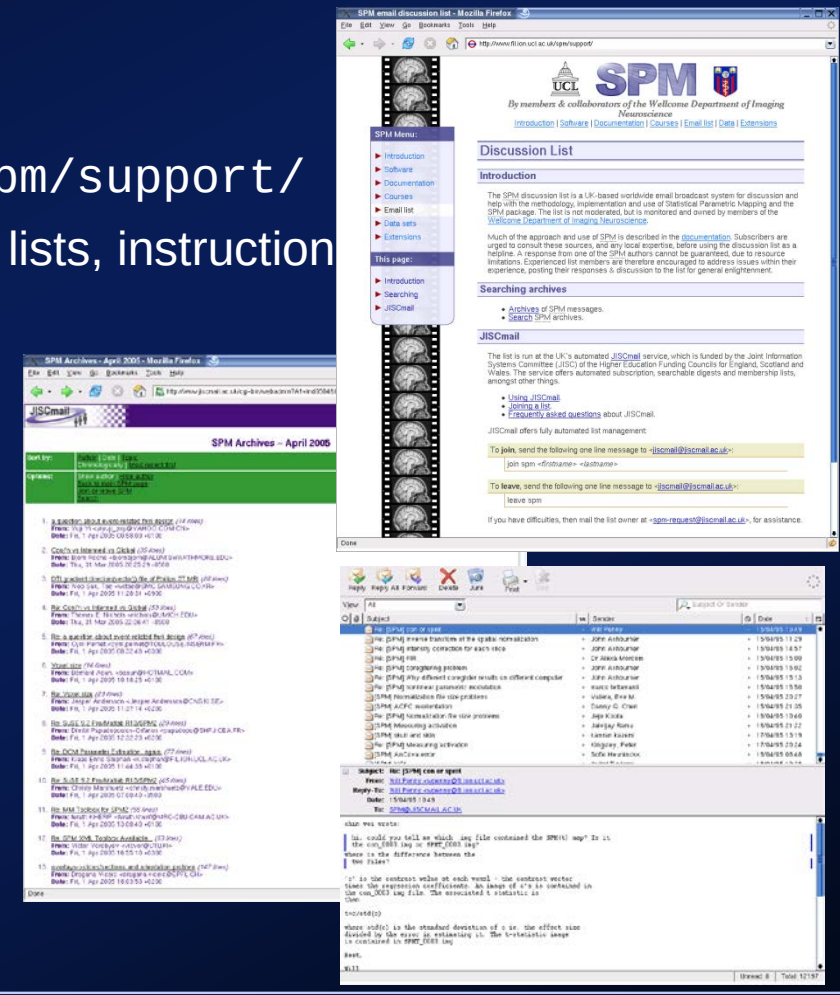
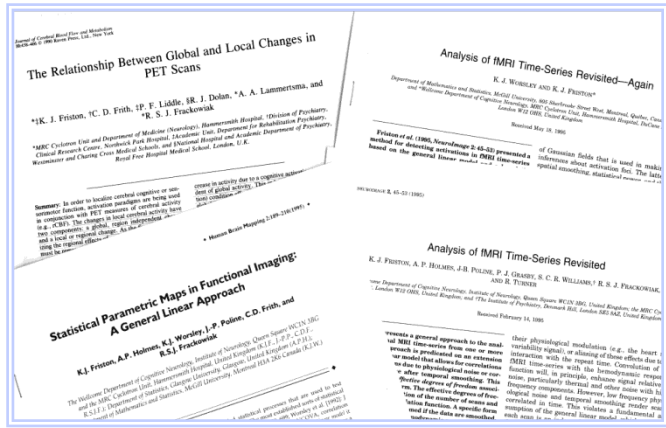
    - email jiscmail@jiscmail.ac.uk
      - join spm *Firstname Lastname*
  - Participate & learn
    - email spm@jiscmail.ac.uk
    - Monitored by SPMauthors
    - Usage queries, theoretical discussions, bug reports, patches, techniques, &c…

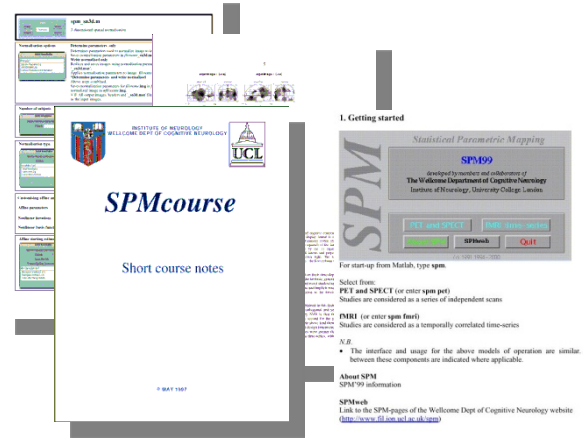


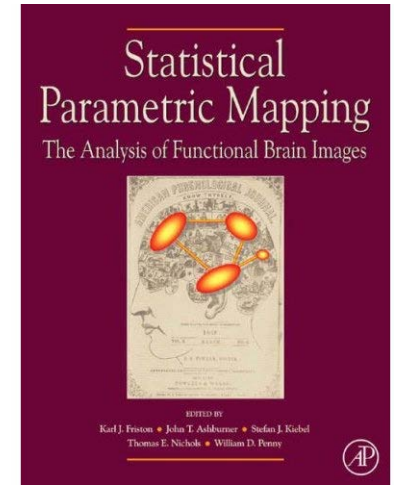
SPM documentation

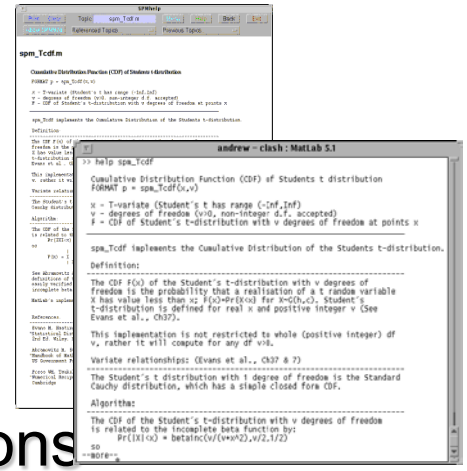
peer reviewed literature



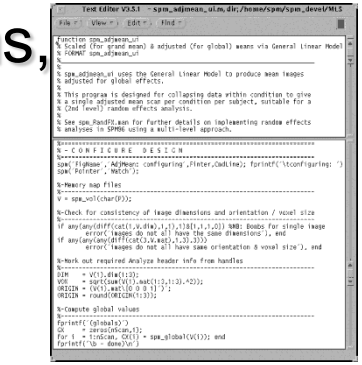
SPM course notes,
SPM book & SPM manual







algorithm descriptions,
code annotations,
pseudo-code



online help &
function descriptions