

SINAPSE the future

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Roland Sutton Professor of Radiology





BACK TO THE FUTURE™

Salute To 80s

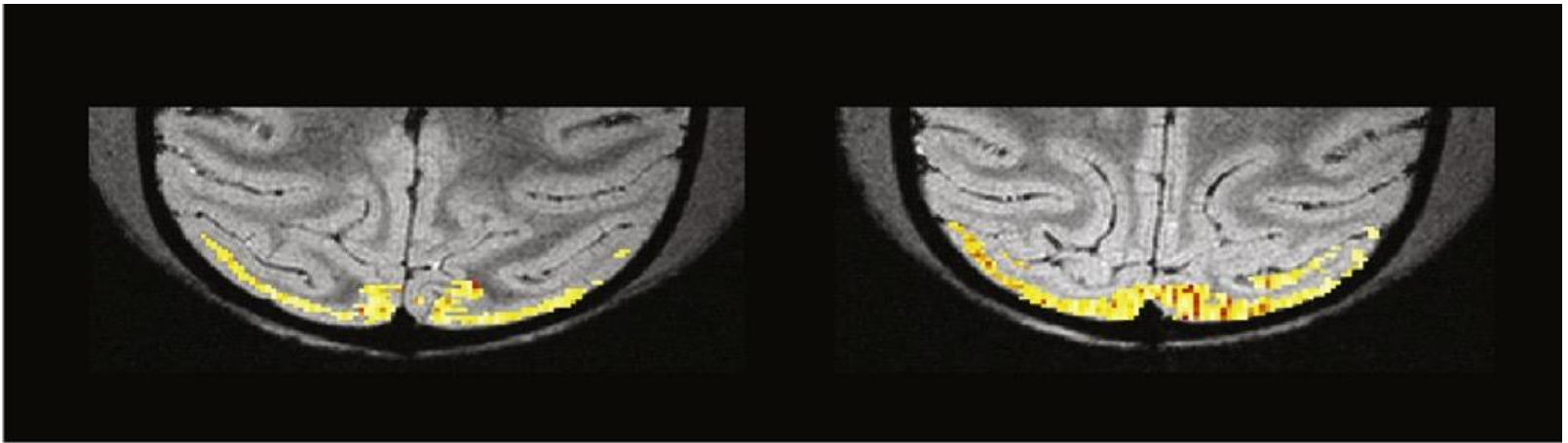


Increasing magnetic field strength

- 1979 – 0.04T
- 1985 – 0.8T
- 1992 – 1.0T
- 1999 - 1.5T
- 2007 – 3.0T
- 2015 – 7.0T



fMRI at 7T



- Activation in visual cortex of macaque
- Using fMRI and rCBF to dissect BOLD effect

Zaldivar D et al. *Current Biology* 2014

Clinical FC MRI: David Lurie

- ◆ We have developed Field-Cycling MRI, to exploit changes in tissue T_1 with magnetic field strength

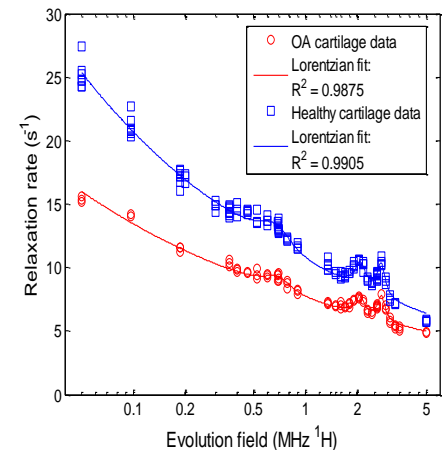
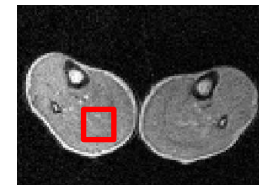
- We have built scanners with very special magnets, control techniques & power-supply technology



- ◆ FC-MRI can detect subtle changes in proteins in the body

- ◆ So far we have used FC-MRI to:

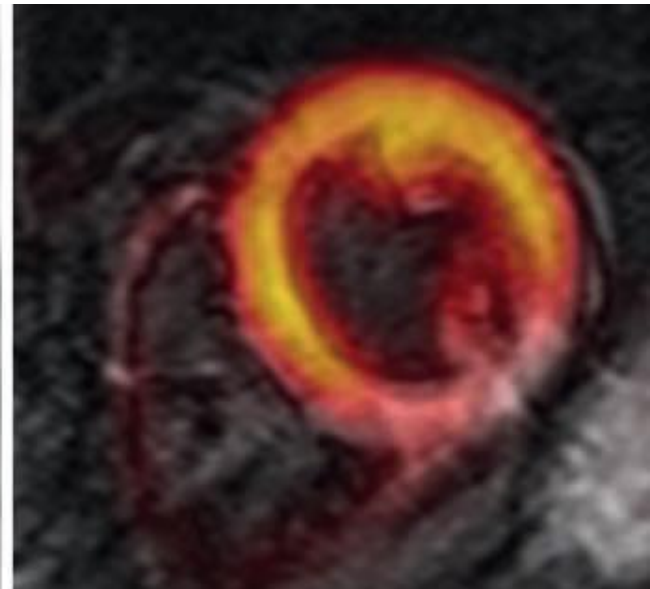
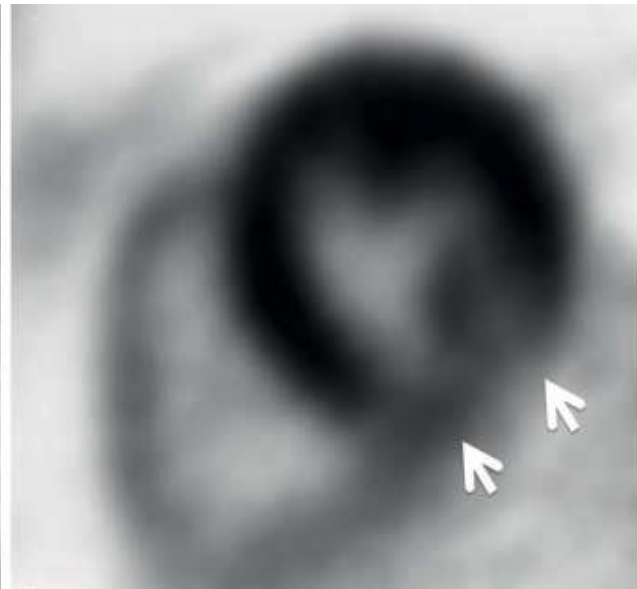
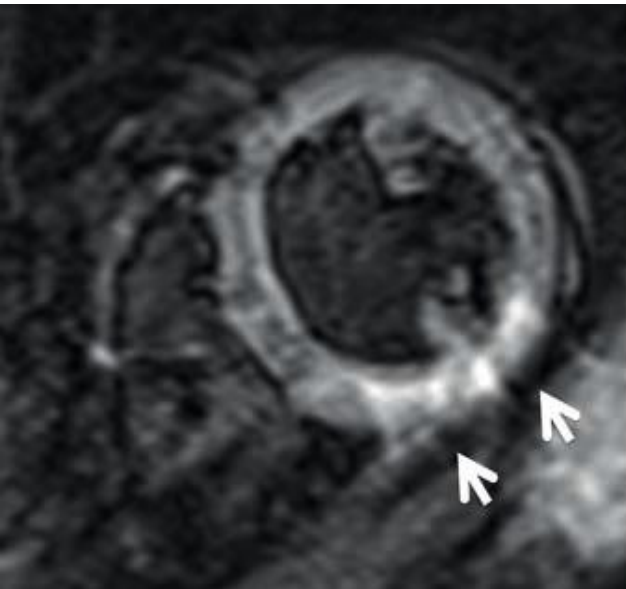
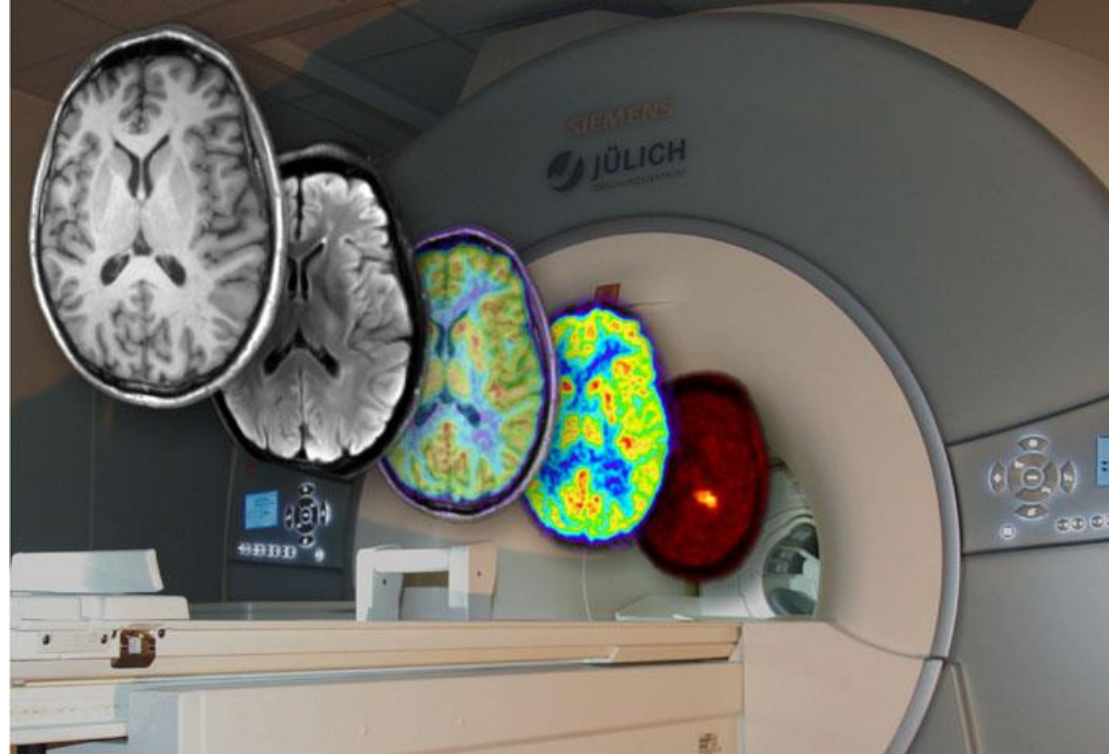
- Monitor the process of thrombosis
- Detect changes in joints - osteoarthritis



- ◆ FC-MRI is sensitive to protein concentration & motion

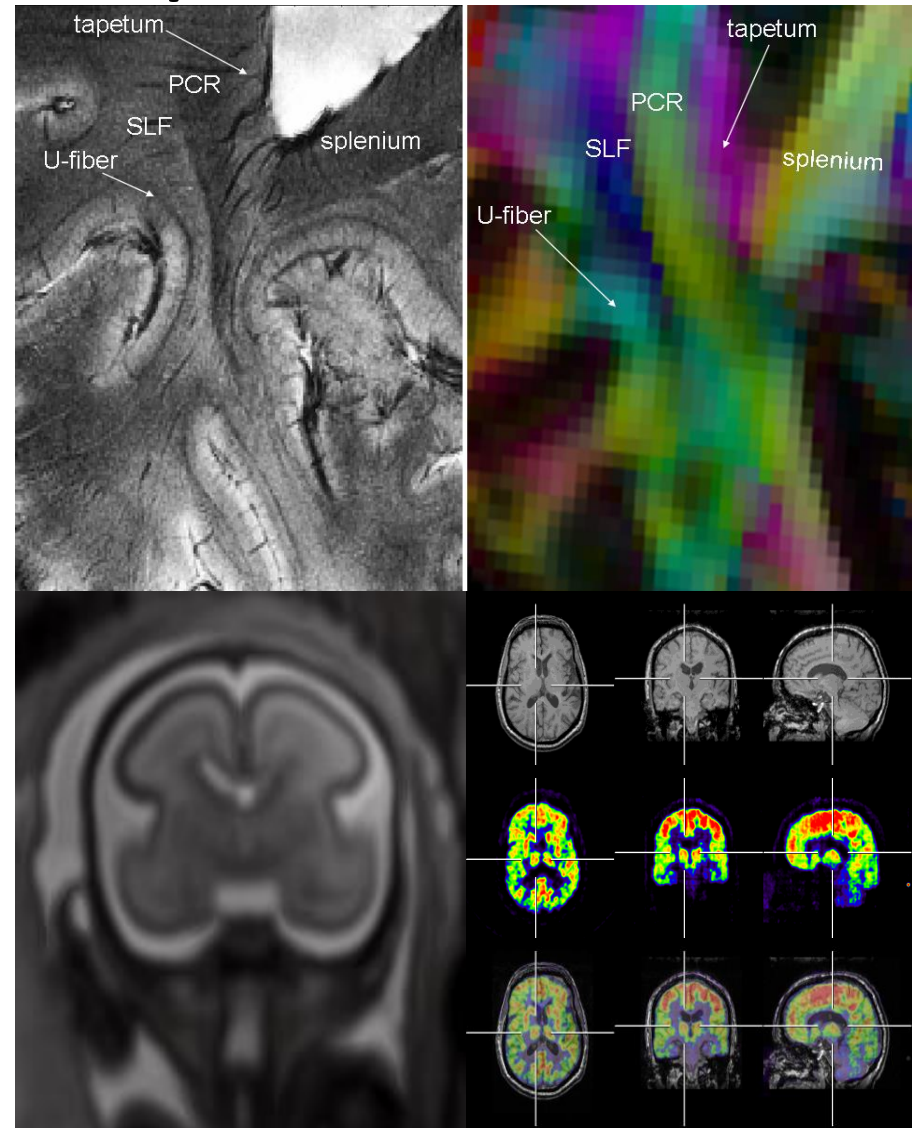
- Potential for diagnosis & monitoring of stroke (see poster) and proteinopathies in neurodegenerative diseases e.g. AD, PD

PET MRI



Future developments

- 7T knowledge
- Fast-field cycling MRI
- Improved multimodal neuronavigation
- Image -guided treatment and robotics
- Molecular MR - disease specific PET tracers
- Fetal MRI
- Retinal imaging
- Integration of imaging data with “big data”
- AI make diagnosis faster and safer

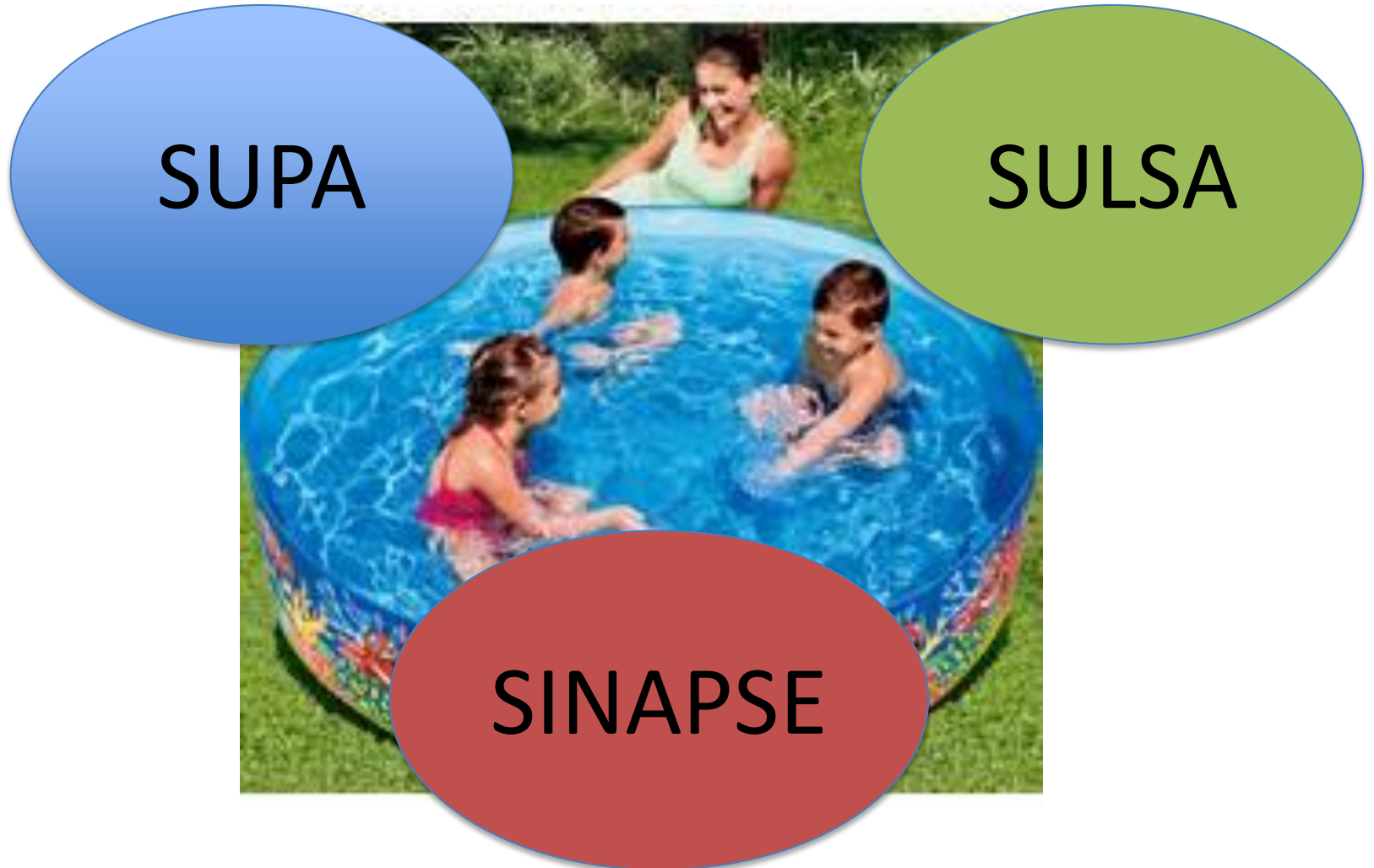


Built on strong foundations

- NHS
- Academia
- Industry facing partners
- Envy of many collaborators



Joint pooling applications

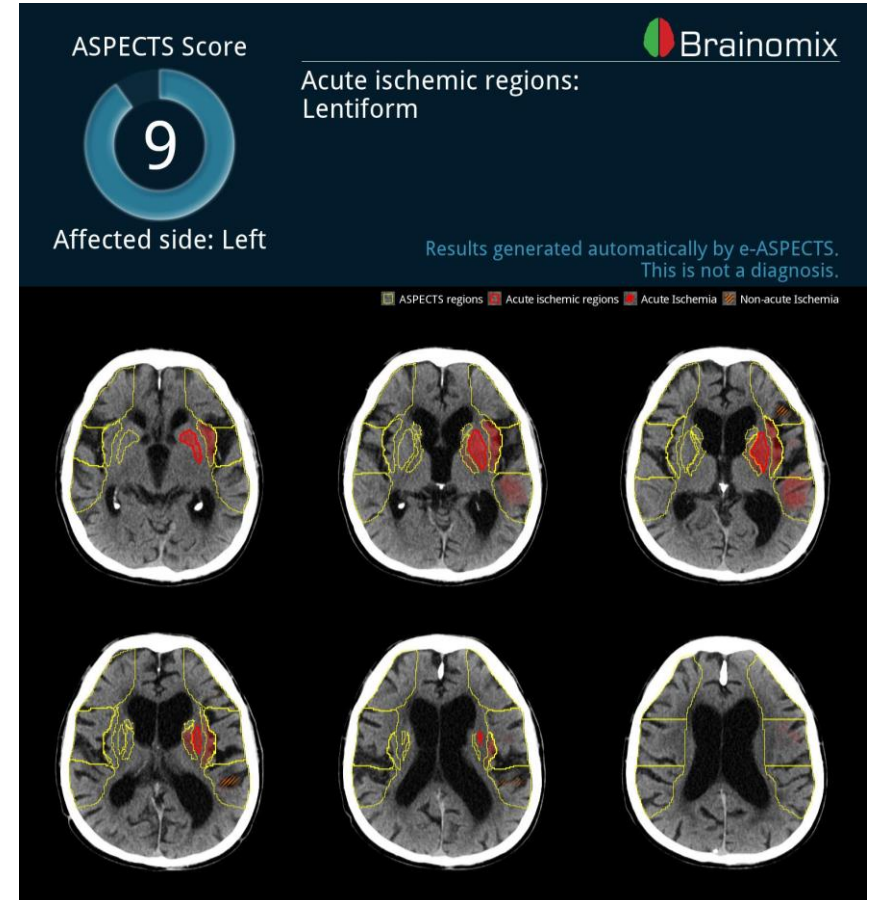
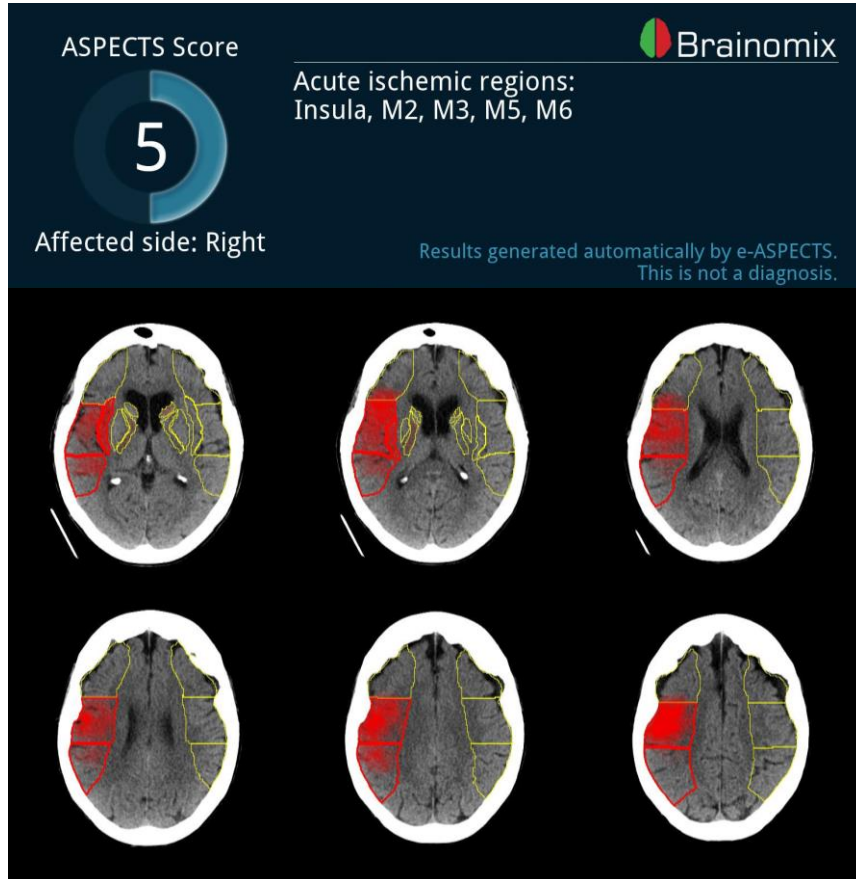


External funding opportunities

- **Digital systems & AI in healthcare (via UKRI)**
- HDR UK (via MRC)
- GCRF (via UKRI and MRC)
- EU – we are still members



eASPECTS



Images courtesy of Dr Mary Joan Macleod, Aberdeen

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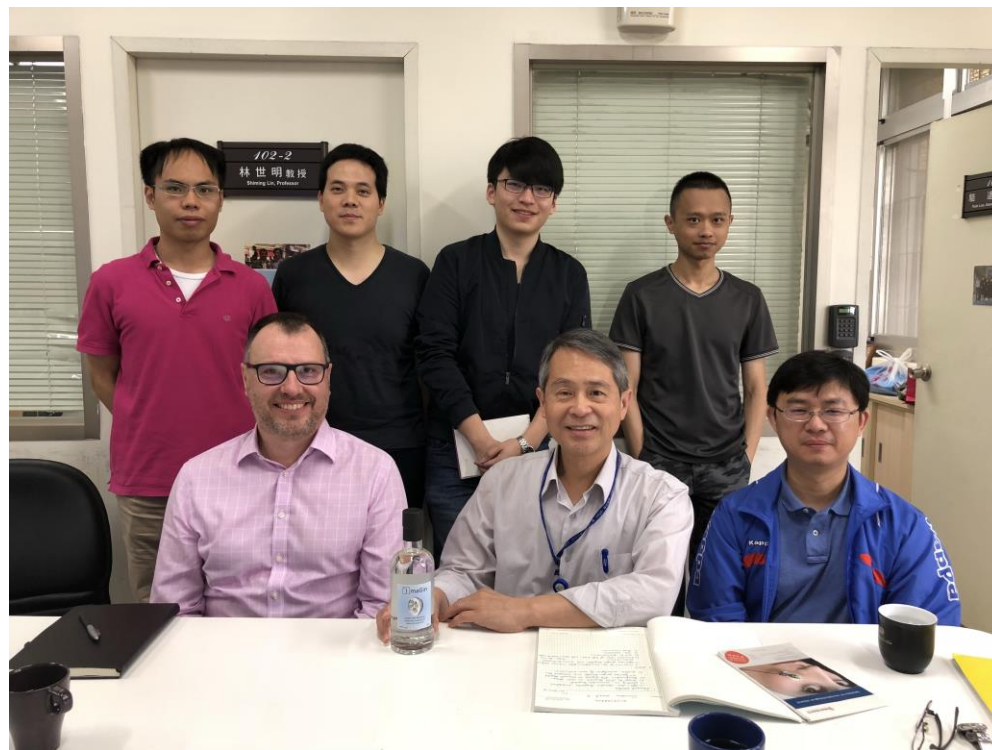


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International relevance

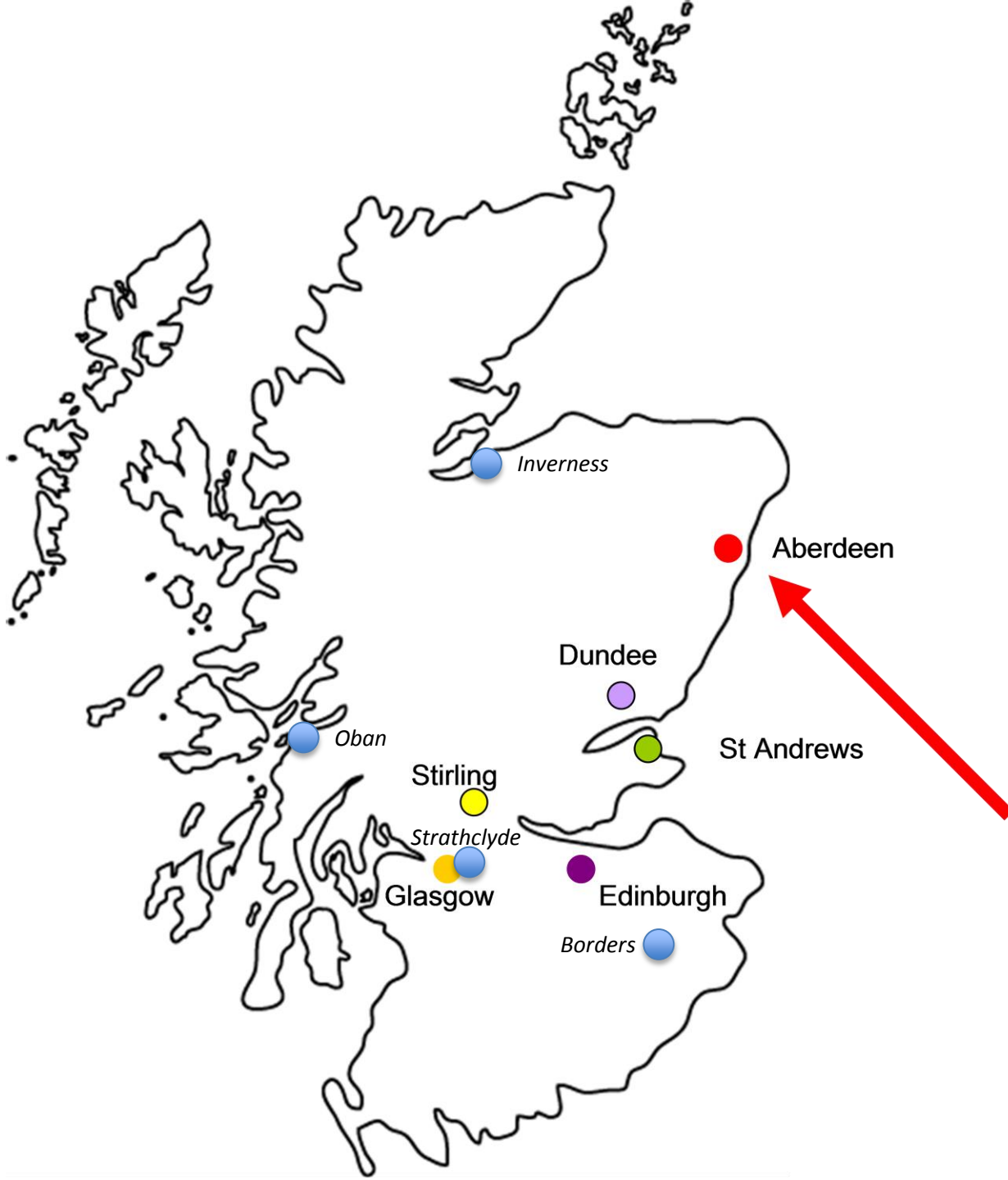


SINAPSE PECRE destinations



2018-19 PECRE recipients





TO BE

CONTINUED 