



UCL

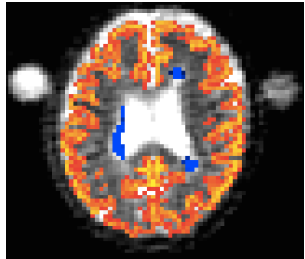


Translating engineering innovation into the clinic

-The collaboration between TIG and QSMSC-

Prof. Claudia Gandini Wheeler-Kingshott

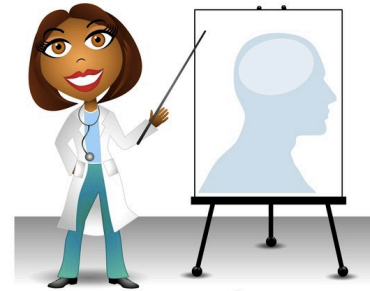




NMR Unit
-Physics team-



Dedicated 3T



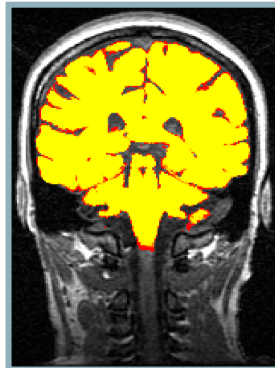
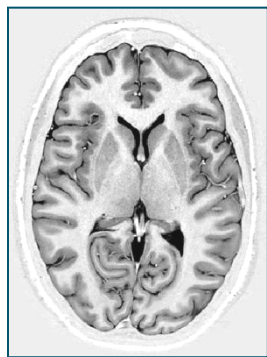
MS Clinic
-Clinic team-



Trial office

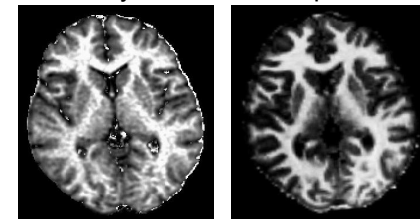
Morphological imaging

High resolution & Image analysis

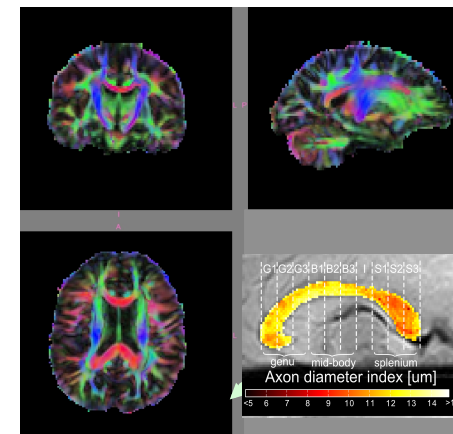


Structural imaging

Myelin fraction maps



White matter pathways & microstructure



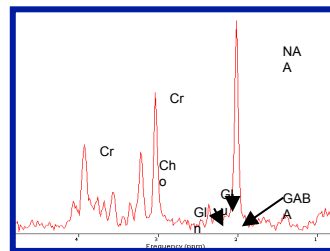
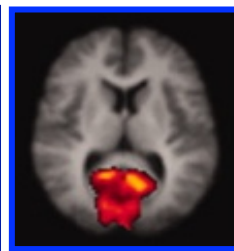
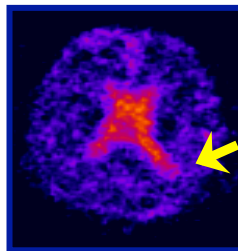
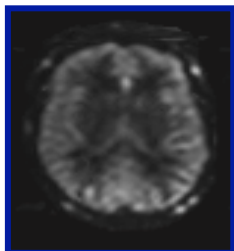
“Physiological” imaging

Perfusion imaging

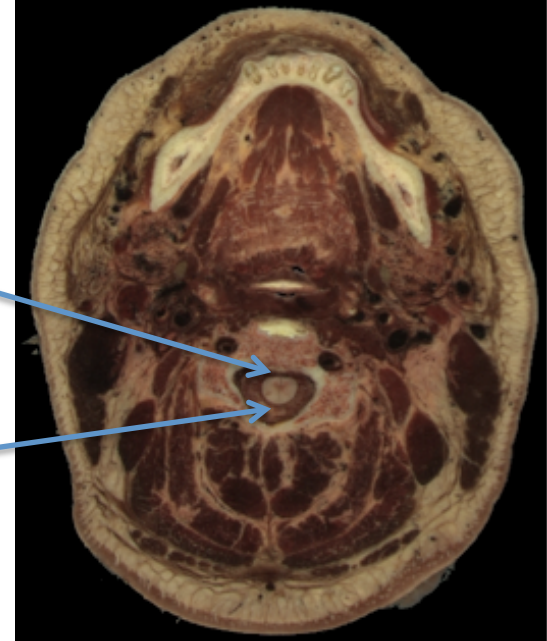
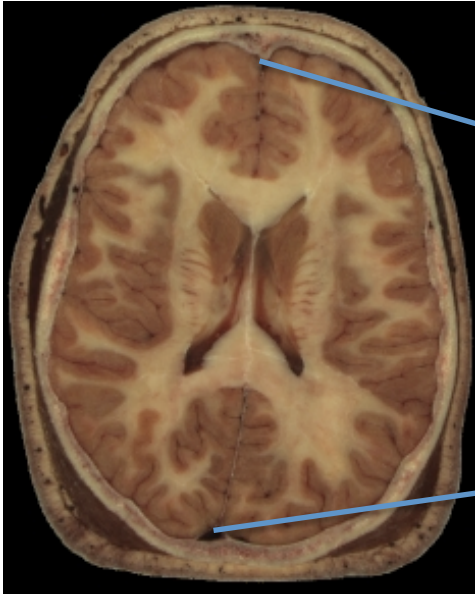
Sodium imaging

Functional imaging

Proton spectroscopy



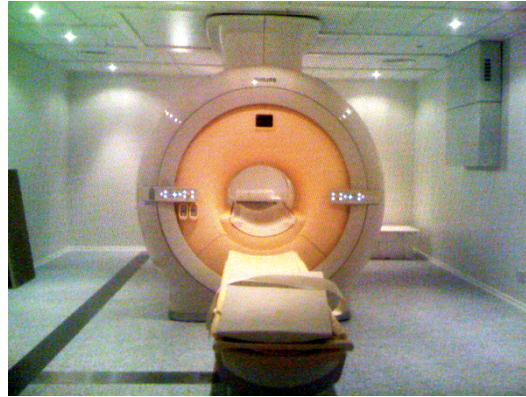
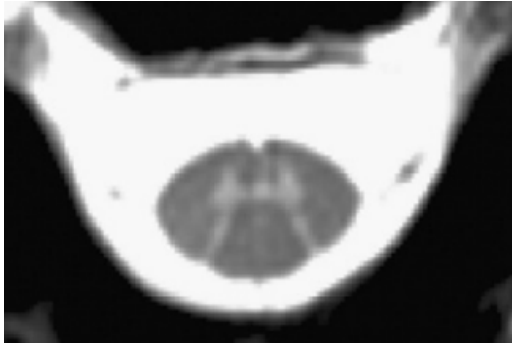
Can we translate all these techniques to small structures?



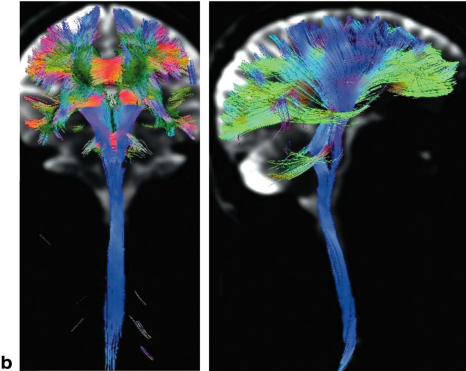
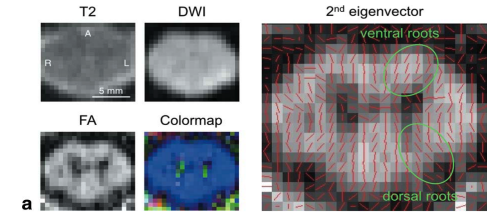
Transversal crosssection of the brain and neck
(Images from Visible Human Project)

Morphological imaging

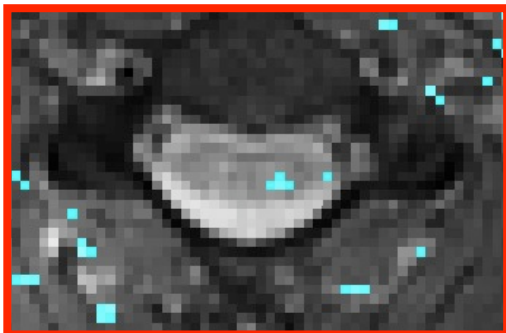
High resolution & Image analysis



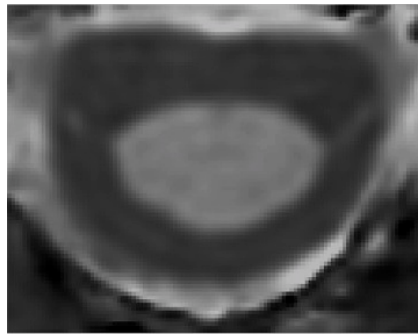
Structural Imaging



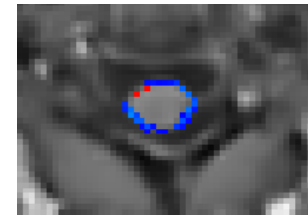
Functional imaging



Myelin imaging (MT)



Longitudinal atrophy estimation



Engineering



Clinical MS



Cluster + data analytics



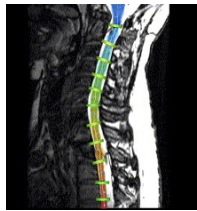
Dedicated 3T for MS



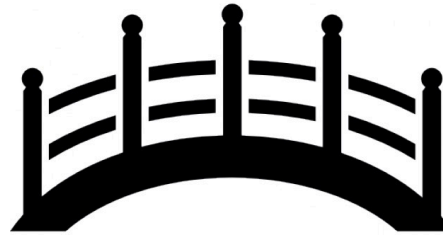
Bioengineers



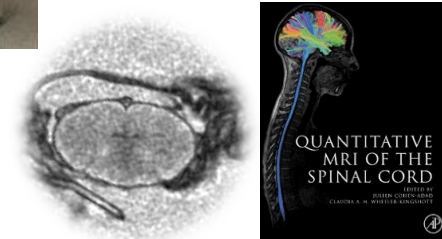
Clinicians and Physicist



State of the art
medical image
analysis



Trial office



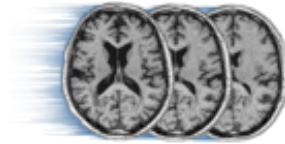
Sebastien Ourselin
Medical Image Computing

Frederik Barkhof
Neuroradiologist

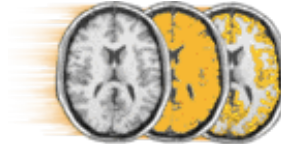
Claudia Wheeler-Kingshott
Magnetic Resonance Physics

Olga Ciccarelli
Neurologist

NiftyReg



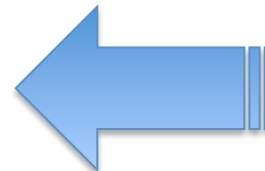
NiftySeg



XNAT



Support



Standardization



Research



A multi-time-point modality-agnostic patch-based method for lesion filling in multiple sclerosis

Ferran Prados^{1,2*}, Manuel Jorge Cardoso¹, Boris Kamber¹, Olga Ciccarelli³, Raja Kapoor¹, Claudia A.M. Gandini Wheeler-Kingshott^{1,4}, Sebastian Ourselin^{5*}

SCIENTIFIC REPORTS

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Ferran Prados^{1,2*}, M. Jorge C. Elias Taboada¹, Hugh Keenan, Claudia A.M. Gandini Wheeler

An abnormal periventricular magnetization transfer ratio gradient occurs early in multiple sclerosis

J. Williams L. Brown^{1,2*}, Matteo Pantini^{1,2*}, Wallace J. Browne¹, Kyrhoni Fernandes¹, Rebecca Samson¹, Ferran Prados Carrasco^{1,2*}, Sebastian Ourselin^{5,4*}, Claudia Gandini Wheeler-Kingshott^{1,4}, David H. Miller⁴ and Declan T. Chard^{1,4}

*These authors contributed equally to this work.

**Physics
development**

Physics led

**Technical
development**

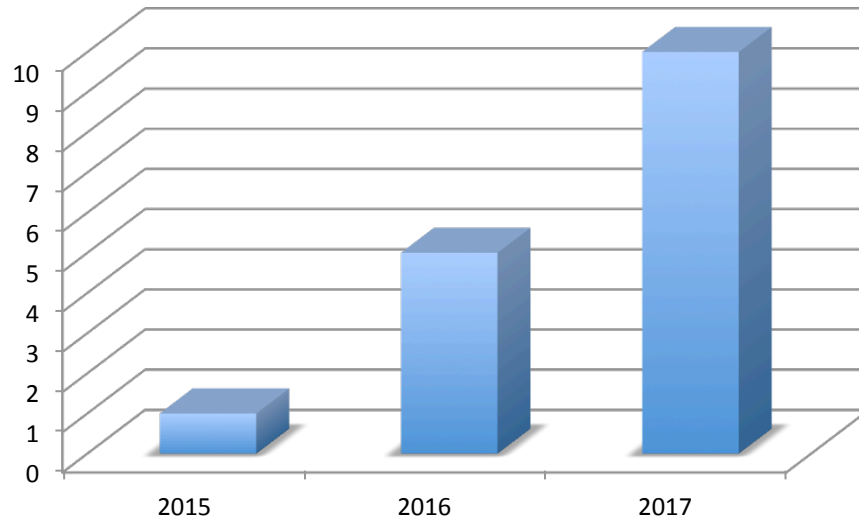
Computer science led

**Clinical Research
Studies**

Clinically led

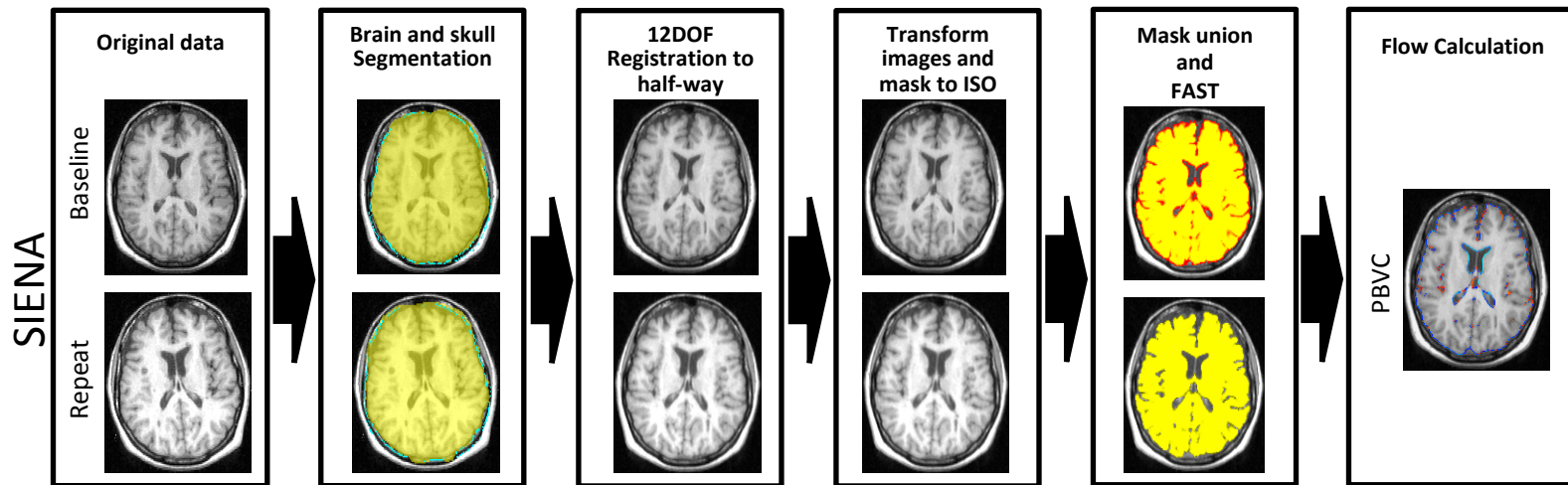
Clinical Trials

Trial unit / investigator
led

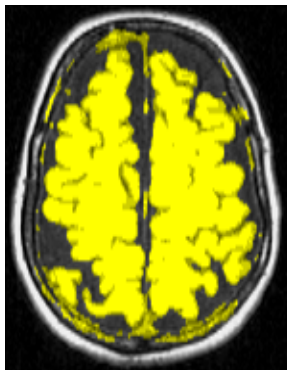


The collaboration started in mid 2012

Practical case: SIENA pipeline using GIF, GIRONA



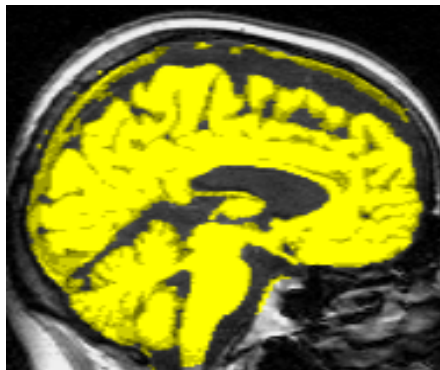
BET+FAST



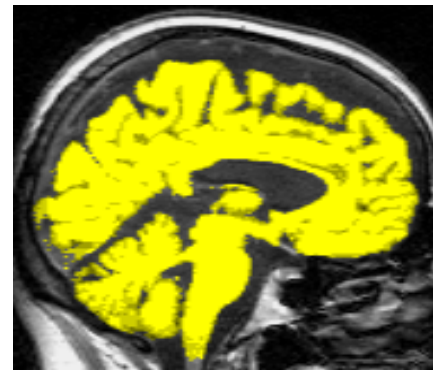
GIF

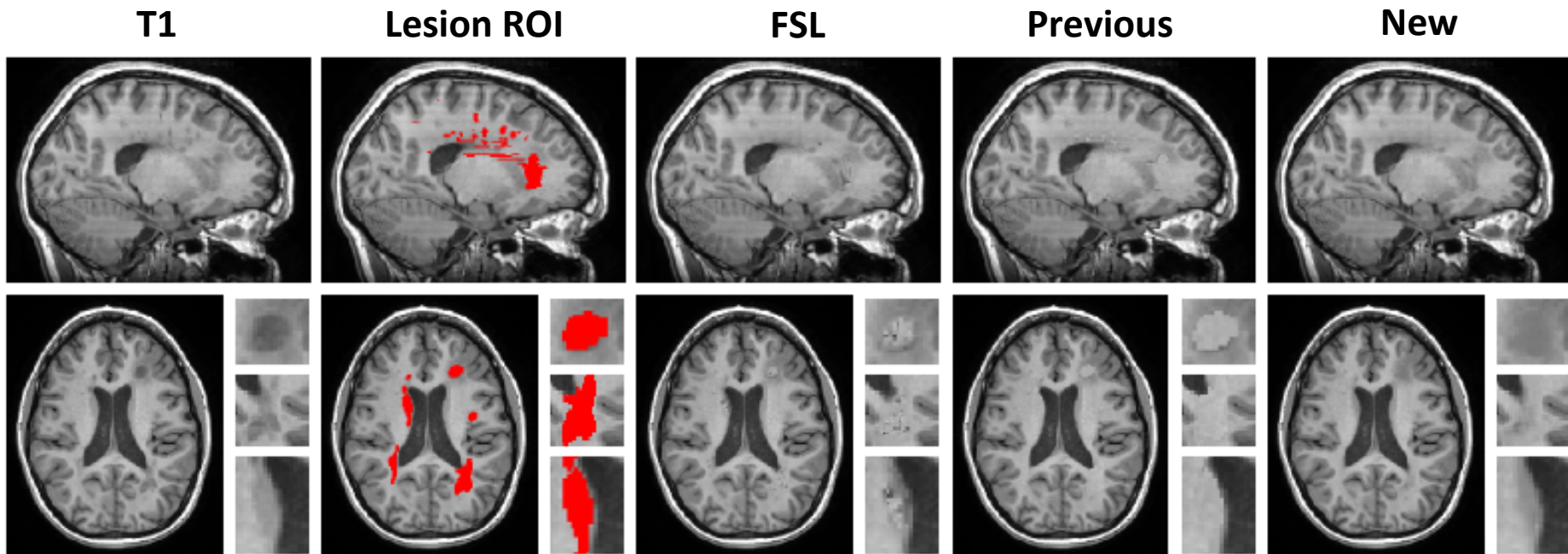


BET+FAST



GIF





The new technique introduces less bias, artifacts and spurious edges than previous techniques and it is multi-time-point and modality-agnostic

