

EXCEMED Blended Education

International MRILab

A one-year journey from the basics to the
advanced methodologies of MRI

Live interventions in: Siena, Italy - 11-12 December 2020
Barcelona, Spain - 13-14 May 2021

PRELIMINARY
PROGRAMME



International MRILab

Overview

In demyelinating and neurodegenerative disorders such as multiple sclerosis (MS), magnetic resonance imaging (MRI) supports diagnostic and therapeutic decisions, assesses prognosis, and improves understanding of the disease. Standardization and optimization of MRI acquisition protocols and analysis are therefore critical, both in clinical and research settings. Quantitative methods assessing lesions and atrophy are far less subjective for measuring disease burden in MS, compared with visual inspection, and are moving from research into clinical settings. Structural damage is predictive of motor and cognitive disability and needs to be accurately quantified, also in order to measure response to treatment. Several methods for imaging post-processing have been developed over time with different strengths, limits and scopes. However, whereas quantitative MRI measures have been extensively used in clinical studies and as endpoints in clinical trials, their introduction in the clinical setting has been difficult due to a number of methodological issues.

EXCEMED together with the team of the University of Siena - Experimental Neurology Unit, Department of Medicine, Surgery and Neurosciences - and with the Vall d'Hebron University Hospital in Barcelona - Section of Neuroradiology and MRI Unit, Department of Radiology designed the MRILab - an international 12-month-training period for young neurologists and neuroradiologists particularly interested in quantitative neuroimaging applied to research in demyelinating and neurodegenerative disorders. The Lab is structured as follows:

- The first module will focus on MRI acquisition and imaging post-processing of the brain (lesions and volume)
- A remote tutoring programme provided by the members of the scientific committee and their teams will support the trainees in their research activities between the two modules by a message board on the MRILab dedicated page which will be accessible to all the participants to post questions and doubts.
- The second module, that will take place in 5 months from the first one, will focus on cortical lesions and volume and MRI acquisition and imaging post-processing of the spinal cord (lesions and volume).

Learning objectives

Through a series of different educational formats - both live and online - The MRILab, facing basic and advanced methodological key aspects related to the use of quantitative measures of lesions and atrophy, aims to achieve the following learning objectives:

- Illustrate the main issues in the standardization and optimization of MRI acquisition protocols
- Describe how to facilitate image post-processing
- Discuss strengths and limits of currently used software packages for image quantification
- Deliver full analysis of lesion burden and atrophy in MRI samples

Target audience

This programme is designed for a group of 20-25 young neurologists/neuroradiologists or other professionals with particular interest in quantitative MRI applied to research in multiple sclerosis.

Scientific Committee Members

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CME Provider

EXCEMED is a non profit foundation dedicated, since the last four decades, to the development of high-quality medical education programmes all over the world.

EXCEMED adheres to the guidelines and standards of the European Accreditation Council for Continuing Medical Education (EACCME®) which states that continuing medical education must be balanced, independent, objective and scientifically rigorous.

Scientific Secretariat

Med-Ex Learning in joint-partnership with EXCEMED
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GENERAL INFORMATION

Language

The official language of this educational project will be English.

Continuing medical education

The International MRI Lab, Siena, Italy, 11/12/2020-12/12/2020 has been accredited by the European Accreditation Council for Continuing Medical Education (EACCME®) with **14 (fourteen)** European CME credits (ECMEC®s). Each medical specialist should claim only those hours of credit that he/she actually spent in the educational activity.

Through an agreement between the Union Européenne des Médecins Spécialistes and the American Medical Association, physicians may convert EACCME® credits to an equivalent number of AMA PRA Category 1 Credits™. Information on the process to convert EACCME® credit to AMA credit can be found at www.ama-assn.org/education/earn-credit-participation-international-activities.

Live educational activities, occurring outside of Canada, recognised by the UEMS-EACCME® for ECMEC®s are deemed to be Accredited Group Learning Activities (Section 1) as defined by the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada.

The second module will be submitted for CME accreditation to the EACCME®.



Requirements

In order to get in order to get full benefit from attending the two courses, attendants need to ensure that the basic tools will be available at their host institution (or on a personal laptop). Requirements: Matlab (basic license), Statistical Parametric Mapping (www.fil.ion.ucl.ac.uk/spm; free software but needs Matlab to run) and FSL (<https://fsl.fmrib.ox.ac.uk/fsl/fslwiki>), which runs over a Linux/Unix system (in case you work with PCs, a Virtual Machine should be installed).

PRE-EVENT TUTORIALS

These preparatory tutorials provide an overview of the course for both modules focusing on the main goals that attendees will achieve through their learning journey in the field of quantitative MRI.

The video scribing format facilitates the understanding of the entire learning path, translating scientific concepts into graphic maps.

The tutorials will enable to:

- Defining the importance of quantitative imaging in the evaluation of structural damage in MS
- Explaining the main advancements and pitfalls in this field and how to approach quantitative MRI in a critical way

FACULTY

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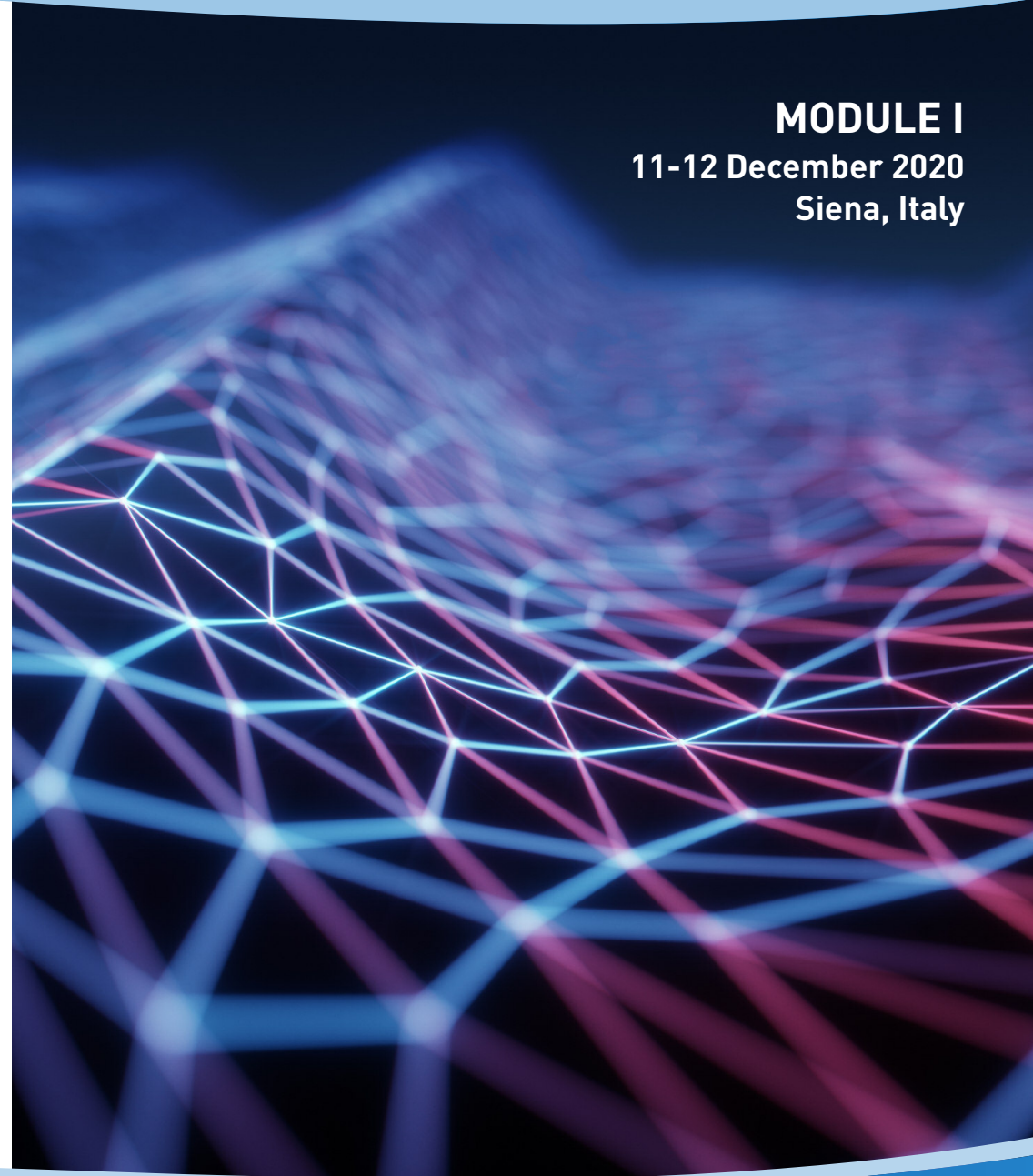
Menno Schoonheim

Amsterdam UMC
Amsterdam, The Netherlands

MODULE I

11-12 December 2020

Siena, Italy



PROGRAMME

DAY 1 - Friday, 11 December 2020

- 8.45 **Opening and Welcome**
N. De Stefano (Italy) - A. Rovira (Spain)
- 9.00 **L1: MRI acquisition protocols and characteristics of MRI sequences for brain lesion load and volume assessment.**
A. Rovira (Spain)
- 9.25 **L2: MRI post-processing brain lesion load and volume assessment.**
N. De Stefano (Italy)
- 9.50  **Q&A**
- 10.00 **L3: Iron rims and smoldering lesions.**
A. Rovira (Spain)
- 10.25 **L4: MRI markers of disease progression**
A. Rovira (Spain)
- 10.50  **Q&A**
- 11.10 **Coffee break**
- 11.30 **L5: MRI acquisition issues influencing the accuracy of quantitative measurements**
M. Battaglini (Italy) - D. Pareto (Spain)
- 12.00 **L6: Practical Issues with brain lesions segmentation and brain lesions segmentation**
M. Battaglini (Italy) - D. Pareto (Spain)
- 12.25  **Q&A and discussion**
- 13.00 **Lunch**

- 14.00 **Hands on practice training: brain lesions (lesion load)**
M. Battaglini (Italy) - D. Pareto (Spain)
Learn the Tools: how to use JIM to perform manual lesion load.
• **Case 1:** T2-W lesion load
• **Case 2:** T1-W lesion load (or black-holes)
• **Case 3:** Gadolinium enhancing lesion load
How to measure lesion load segmentation with "Lesion Segmentation Toolbox"
- 17.30  **General discussion and day 1 wrap-up**

DAY 2 - Saturday, 12 December 2020

- 9.00 **L7: Clinical relevance of brain atrophy**
N. De Stefano (Italy)
- 9.30  **Q&A**
- 9.40 **L8: MRI acquisition protocols for grey matter lesions assessment**
A. Rovira (Spain)
- 10.20  **Q&A**
- 10.30  **Discussion**
- 11.00 **Coffee break**
- 11.15 **L9: Artificial intelligence for creating predictive models in multiple sclerosis**
M. de Bruijne (The Netherlands)
- 12.00  **Q&A**
- 12.10 **L10: Practical issues with global brain volume segmentation**
N. De Stefano (Italy)
- 12.35  **Q&A**

Legend: L : Lecture  : Questions & Answers  : Discussion  : Wrap-up

12.45 **L11: Methods to quantify global brain volumes /changes: pros and limits**
M. Battaglini (Italy) - D. Pareto (Spain)

13.10  **Q&A**

13.20 **Lunch**

14.25 **L12: Methods to quantify regional brain volumes: pros and limits**
M. Battaglini (Italy) - D. Pareto (Spain)

14.55 **Hand on practice training: brain volume**

M. Battaglini (Italy) - D. Pareto (Spain)

Learn the Tools: how to use SIENAx/SIENA to assess brain volume/change estimation.

- Cross-sectional cases: SIENAx
- Effect of filling on calculated GMF, WMF, BPF
- Longitudinal cases: SIENA

16.25 **Coffee break**

16.45 **Difficulties faced during hand-on sessions**
(all)

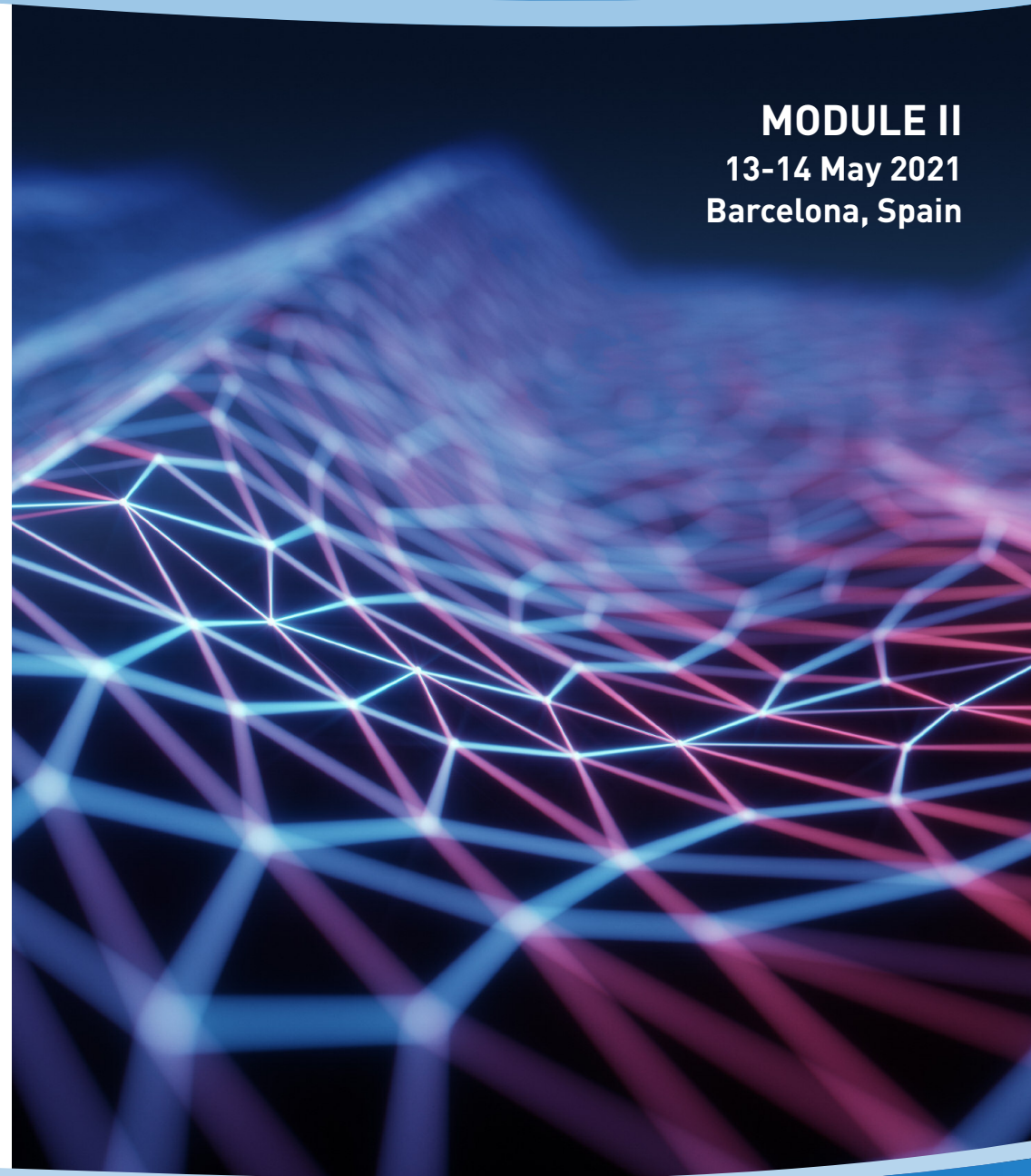
17.15 **L13: Unmet needs: topics for MRI research in MS**
N. De Stefano (Italy)

17.45 **Revision of the “Home-works”**

18.15 **Module I conclusions**

MODULE II

13-14 May 2021
Barcelona, Spain



PROGRAMME

DAY 1 - Thursday, 13 May 2021

- 8.45 Opening and Welcome
- 9.00 Training experience (over the previous 6 months) all attendees
- 9.30 L1: Pathology of Grey matter in MS
M. Schoonheim (The Netherlands)
- 10.15  Discussion
- 10.30 L2: Clinical relevance of GM lesions
N. De Stefano (Italy)
- 11.00  Discussion
- 11.15 Coffee break
- 11.30 Hands on practice training: Cortical GM volume
M. Battaglini (Italy) - D. Pareto (Spain)
Introduction to VBM
• VBM analysis of grey matter
- 13.00 Lunch
- 14.00 Hands on practice training: deep grey matter volume
M. Battaglini (Italy) - D. Pareto (Spain)
• FIRST/FSL
- 17.30  Day 1 wrap up

DAY 2 - Friday, 14 May 2021

- 9.00 L3: Clinical relevance of spinal cord atrophy and lesions
N. De Stefano (Italy)
- 9.30 L4: How to recognize and differentiate spinal cord lesions
A. Rovira (Spain)
- 10.00 L5: Methods to quantify spinal cord volumes: pros and limits
M. Battaglini (Italy) - D. Pareto (Spain)
- 10.30 Coffee break
- 10.45 Hands on practice training: spinal cord volume
M. Battaglini (Italy) - D. Pareto (Spain)
• JIM
• Spinal cord toolbox
- 12.45  Discussion
- 13.00 Lunch
- 14.15 Revision of the “home-works” and discussion on problems encountered
- 18.30  Final discussion and course conclusions

POST EVENT TUTORIALS

The post-course tutorials aim to summarise the main topics delivered in the modules. It will provide attendees with tips and practical exercises to help them develop original research projects building on the information gathered during the course.

The tutorials will enable to:

- Simplifying complex concepts into manageable information
- Efficiently translating the theory of quantitative MRI into working knowledge

APPLICATION

All applications will be reviewed by the scientific committee members who will select the best candidates according to their profiles.

The following requirements are needed to apply:

- An abbreviated curriculum vitae of the applicant including bibliography of any relevant publication
- An applicant's letter of intents
- A letter of reference from the applicant's mentor

Scientific Committee members will evaluate the applications for attendance.

Application deadline: 30 September 2020

- The registration fee is **€ 600.00** for sponsored applicants and **€ 300.00** for academic applicants per module and includes:
 - Online tutorials and webinar
 - Live interventions
 - Coffee breaks and lunch
 - Educational materials
 - Certificate of attendance

For registration please contact:

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