



COST ACTION CA15209

Workshop on NMR relaxometry and Magnetic Resonance Imaging

Winter school: 13.02.2019 – 15.02.2019

Organizers

- Dr. Lionel Broche, PhD: University of Aberdeen, Scotland, UK
- Prof. Najat Salameh, PhD: University of Basel, Switzerland

Location

University of Basel, Department of Biomedical Engineering (DBE)
Gewerbestrasse 14, 4123 Allschwil, Switzerland

Targeted audience and objectives

This school of MRI targets in particular PhD students and junior postdoctoral fellows (N = 24) who work in the field of MR relaxometry. The students should have a background in NMR but not necessarily in MR imaging. All of them must have at least a Master's degree in natural science (typically chemistry or physics) or in biomedical engineering.

The goal of this 3-day training school is for the students to gain practical and theory knowledge in:

- Basic principles of MR imaging and RF coil excitation/detection
- Sequence programming for relaxometry & imaging (design and coding)
- RF coil simulations, design and fabrication (single coil and arrays)
- Theoretical concepts and simulations in relaxometry
- Contrast agents and relaxometry measurements & interpretation
- Reporting and dissemination of experimental results

Preliminary program

The school of MRI will take place during 3 days from 13.02.2019 until 15.02.2019. It will host 24 students that will be split into five different groups for the practical classes on Day 1, four groups on Day 3. For logistical reasons, on Day 1 each group will focus on one particular theme for the practical session, i.e. pulse sequence development or RF coil design/simulations. Half a day will be dedicated to reporting the findings to the other groups (Day 2). Therefore, it is important that each candidate reports her/his area of interest so that we can organize the groups accordingly, if and when possible.



Time table

		Wed. 13.02.2019	Thu. 14.02.2019	Fri. 15.02.2019
Morning	09:00	Welcome (LB/NS)	Insight on report writing	
	09:15	Welcome – DBE head	Report writing	Intro Danuta
	09:30	Basics of MRI		Relaxometry theory
	10:30	Q/A with the teachers		
	11:00	Basics of RF coils	Reports reading	Contrast Agents
	12:00	Meet the teachers	5-min presentation – 1/group	Meet the teachers
	12:30	Lunch		
Afternoon	13:30	MRI:	Advanced Imaging	Relaxometry:
	14:30	2 groups: RF coils	Advanced RF	3 groups: simulations
	15:30	2 groups: Sequences	Q/A with the teachers	1 group: experiments
	16:00		Fast Field Cycling	
	17:00		Meet the teachers	
	17:30			
	18:00	Testing	Social event	
	19:00		Dinner	

	Administration
	Courses
	Workshops
	Group contributions
	Social gathering



Details of practical classes

We do not have enough resources and time to allow all students to attend all workshops on Day 1 so we decided to have 5 groups of 2-4 students each:

RF	Group 1	Surface coil, small loop	2 students building a low-frequency coil
			2 students building a high-frequency coil
	Group 2	Surface coil, large loop	2 students building a low-frequency coil
			2 students building a high-frequency coil
	Group 3	Simulations	4 students running RF simulations
	Sequences	Group 4	Spectroscopy
3 students for signal processing and analysis			
Group 5		Imaging	3 students for 1D sequence, GRE sequence, B_0 , B_1 maps
			3 students for image processing
Testing (depending on small loop-size)	Groups 1-5	Coil testing	Pulse calibration
			B_1 maps
		Sample characterization	T_1 , T_2 measurements & fits
		System characterization + 3D image	B_0 map + 3D image of something else than a vial

On day 3 the workshop will be organized around 4 groups but this time one group at a time will be remotely running experiments on a Stellar relaxometer (1 hour) while the other 3 groups will run simulations.

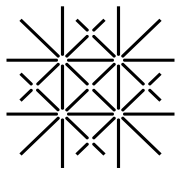


Lecturers

- Simona Baroni (U Torino): Contrast agent, Workshop Day 3 (relaxometry experiment)
- Lionel Broche (U Aberdeen): Intro Day 1, Back up Workshop Day 1, Intro on report writing Day 2, FFC Day 2, Workshop Day 3 (relaxometry experiment)
- Roberta Frass (U Vienna): RF simulations workshop Day 1 groups 3
- Jean-Christophe Ginefri (U Paris-Saclay): Basics of RF, Workshop groups 1-2 Day 1, Advanced RF Day 2
- Danuta Kruk (U Warmia & Mazury): Intro Day 3, theory relaxometry Day 3, workshop Day 3 (simulations)
- Marie Poirier-Quinot (U Paris-Saclay): Basics of RF Day 1, Workshop groups 1-2 Day 1, Advanced RF
- Julien Rivoire (RS²D): Workshop Day 1 groups 4-5
- Najat Salameh (U Basel): Intro Day 1, Basics of MRI and workshop Day 1 groups 4-5, Advanced MRI Day 2
- Robert Stormont (General Electric Healthcare): Workshop Day 1 groups 1-2

Sponsors

We would like to acknowledge COST for its financial support, the Department of Biomedical Engineering for providing the lecture rooms, but also Computer Controls AG and RS²D for generously providing equipment and resources used during the event.



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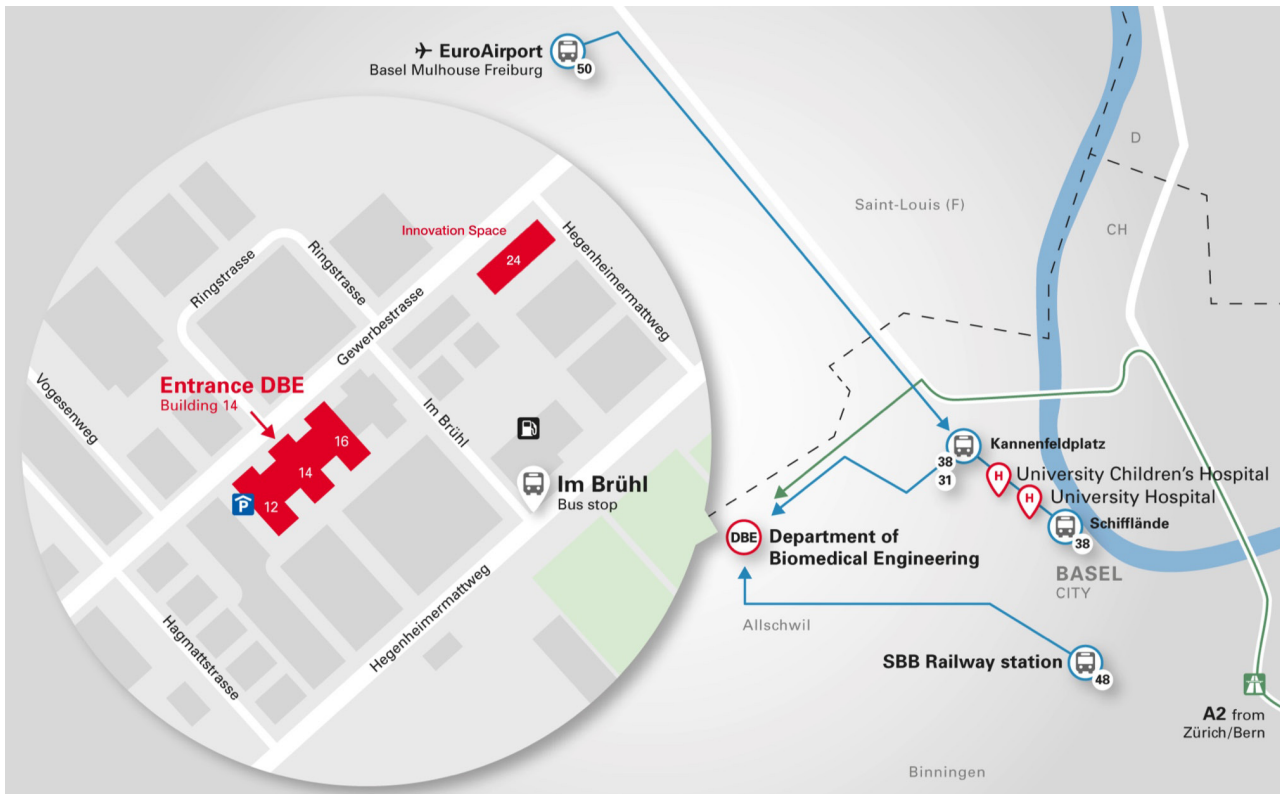
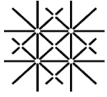
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The department is located at the Switzerland Innovation Park Basel Area. The SIP Basel Area is a catalyst for innovation in Health & Life Sciences.

How to find us:

Arriving by public transport:

From Euroairport (approx. 20 min.)

- Bus No. 50 in direction SBB train station
- Get out at the bus stop Kannenfeldplatz
- Cross the street to take bus No. 31 or 38 direction Allschwil
- Get off the bus at "Im Brühl"
- Walk down Im Brühl, then turn left into Gewerbstrasse
- Our secretariat is located on the 3rd floor of Gewerbstrasse 14 (open from 8 – 12 h)

From SBB Railway station (approx. 20 min.)

- Bus No. 48 direction Bachgraben (the bus leaves behind the Airport bus No. 50)
- Get off the bus at "Im Brühl"
- Cross the street and walk down Im Brühl, then turn left into Gewerbstrasse
- Our secretariat is located on the 3rd floor of Gewerbstrasse 14 (open from 8 – 12 h)

By tram or bus from Basel City/Schifflande (approx. 15 min.)

- Take bus No. 38 direction Allschwil Dorf
- Get off the bus at "Im Brühl"
- Walk down Im Brühl, then turn left into Gewerbstrasse
- Our secretariat is located on the 3rd floor of Gewerbstrasse 14 (open from 8 – 12 h)

Arriving by car:

From Bern / Zürich

- Highway A2 to Basel
- Follow direction "EuroAirport"
- Exit Basel Kannenfeld /Allschwil
- Follow Allschwil Bachgraben
- Follow Hegenheimermattweg
- At Coop Pronto turn right into "Im Brühl"
- Follow the street until you arrive at "Gewerbstrasse", turn left for Gewerbstrasse 14
- Our secretariat is located on the 3rd floor of Gewerbstrasse 14 (open from 8 – 12 h)

Parking

- Navigate to car park entrance next Gewerbstrasse 12
- To enter ring the bell at University of Basel
- Please park on marked visitor parking space
- Take the orange door for the elevator of building 14