



# Summer School 2020

**WHEN**  
FROM JUNE 17TH  
TO JUNE 19TH 2020

**WHERE**  
IHU LIRYC  
BORDEAUX, France

**INFO**  
[gadgetron2020.sciencesconf.org](http://gadgetron2020.sciencesconf.org)

This course is aimed at both new and experienced users of Gadgetron, covering basic reconstruction as well as the latest functionalities. The topics covered intended for researchers in basic science and/or clinical research. This course will consist of tutorial lectures, coding sessions and sessions at the MRI scanner.

## Admission:

Send your application, including a CV, to

[gadgetron2020-preregistration@sciencesconf.org](mailto:gadgetron2020-preregistration@sciencesconf.org)

and fill a short survey describing your activities. The admission fee is 100 euros.

## TOPICS

- > Introduction to the Gadgetron Framework
- > Converting kspace data from different MRI vendors
- > Gadgetron installation on the MRI (GE & Siemens)
- > Cartesian, radial, spiral, multiband reconstructions
- > Python or Matlab interaction inside the Gadgetron
- > In-line reconstruction using BART or SigPy
- > Practical coding & scanner session on 1.5T
- > C++ OpenMP programming in Gadgetron
- > How to debug and optimize Gadgetron
- > Distributed reconstruction on a local & remote cloud
- > Machine learning inside Gadgetron

## LECTURERS

- > Hui Xue - NIH
- > David Hansen - Gradient S.
- > Oliver Josephs - UCL
- > Kristoffer Knudsen - Gradient S.
- > Vinai Roopchansingh - NIH.
- > John Andrew Derbyshire - NIH.
- > Aurélien Trotier - CNRS
- > Pierre Bour - LIRYC
- > Maxime Yon - LIRYC
- > Valery Ozenne - LIRYC

This is the short version of the booklet for print use. Full abstracts with all authors, references, and figures can be found in the electronic version at <https://amcosconference.com/>

The open-source L<sup>A</sup>T<sub>E</sub>X template, AMCOS\_booklet, used to generate this booklet is available at [https://github.com/maximelucas/AMCOS\\_booklet](https://github.com/maximelucas/AMCOS_booklet)

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# About

This is a generic version of the real AMCOS conference booklet for which this L<sup>A</sup>T<sub>E</sub>X template was generated. All information about the use and distribution of this template, and all related codes, can be found at [https://github.com/maximelucas/AMCOS\\_booklet](https://github.com/maximelucas/AMCOS_booklet).

## Gadgetron summer school 2020

Gadgetron is an open-source magnetic resonance image reconstruction framework that can be interfaced with major MRI manufacturers, and that provides state-of-the-art image processing tools and algorithms. “Gadgetron” is a key tool for prototyping advanced reconstruction methods as well as for conducting large-scale clinical studies for magnetic resonance imaging.

This summer school is open to international students, engineers, and researchers wishing to understand the basics of the Gadgetron framework and the latest Gadgetron functionalities. It consists of tutorial lectures, coding and MRI scanner sessions.

## Organizing committee

Hui Xue	David Hansen	Kristoffer Knudsen
Vinai Roopchansingh	John Derbyshire	Oliver Josephs
Stanislas Rapacchi	Aurélien Trottier	Maxime Yon
Pierre Bour	Valéry Ozenne	

# Timetable

C: Course, P: Practical session, S: Scanner Session, D: Discussion.

## Wednesday, 17 of June

8:30–8:45	Registration		
8:45–9:00	Welcome remarks		
9:00–9:45	Course	David Hansen	C1: Gadgetron, a high level overview introduction
9:45–10:30	Course	Kristoffer Knudsen	C2: Gadgetron, a low level overview introduction
10:30–11:00	Coffee		
11:00–11:45	Practice	Stanislas Rapacchi Aurélien Trottier	P1: Basic reconstruction using python
11:45–12:30	Practice	Valery Ozenne	P2: Basic reconstruction using python
12:30–13:30	Lunch		
13:30–14:30	Scan	Hui Xue	S1: Communication process with the Siemens scanner
14:30–15:30	Practice	Vinai Roopchansinghv John Derbyshire	P3: Basic reconstruction using matlab
15:30–15:60	Coffee		
16:00–17:00	Scan	Oliver Josephs	S2: Prototyping at the scanner with Matlab
17:00–18:00	Practice	Maxime Yon - Kristoffer Knudsen	P4: Ismrmrd Part 1: Introduction
	End of day 1		

## Thursday, 18 of June

9:00–9:45	Course	<b>David Hansen</b>	C3: High level infrastructure on Gadgetron 4.1
9:45–10:30	Course	<b>Hui Xue</b>	C4: Generic Chain
10:30–11:00	<b>Coffee</b>		
11:00–11:45	Course	<b>David Hansen</b>	C5 : Source tree: mri core/toolboxes
11:45–12:30	Practice	<b>Hui Xue</b>	P5 calling toolboxes in C++
12:30–13:30	<b>Lunch</b>		
13:30–14:30	Scan	<b>Valery Ozenne</b>	S3: Distributed reco
14:30–15:30	Practice	<b>Vinai Roopchansinghv John Derbyshire</b>	P6: Ismrmrd Part 2: xml style sheet : Siemens/GE/Bruker conversion
15:30–15:60	<b>Coffee</b>		
16:00–17:00	Scan	<b>Pierre Bour</b>	S4: GPU reconstruction
17:00–18:00	Practice	<b>Kristoffer</b>	P7: Advances features: parallel stream & distributed reco
	<b>End of day 2</b>		

## Friday, 19 of June

9:30 – 10:30	Course	<b>Kristoffer Knudsen</b>	How to improve your code in your research activities? A Matlab oriented course.
10:30–11:00	<b>Coffee</b>		
11:00–11:45	Course	<b>All speakers</b>	How to start your MRI project and use gt in day to day practice (the dirty way)
11:45–12:30	Discuss	<b>Everybody</b>	Gadgetron: yesterday, today, tomorrow
12:30–13:30	<b>Lunch</b>		
13:30–14:30	Practice	<b>Everybody</b>	Bring your twix data, open session on mri reco and gadgetron
14:30–15:30	Practice	<b>Everybody</b>	Bring your twix data, open session on mri reco and gadgetron
15:30–15h45	<b>Conclusion</b>		
	<b>End of day 3</b>		

# List of Courses – Talks

## Wednesday 17th

### **Course 1 Gadgetron, a high level overview introduction**

**D. Hansen,** AFF

general presentation computer demonstration basic thing that gt can give

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**D. Hansen,** AFF

general presentation computer demonstration basic thing that gt can give

### **Practical Session 3 Basic reconstruction using Matlab**

**V. Roopchansingh,** -

Partial fourier reconstructions with ISMRMRD and Gadgetron, and applications (e.g. partial k-space, and UTE)

## Thursday 18th



## **Practical session 6: Ismrmrd Part 2: xml style sheet : Siemens/GE/Bruker conversion**

**V. Roopchansinghv,** –

Building vendor-specific ISMRMRD converters, and tailoring conversion via stylesheets.

**Friday 19th**

# List of Participants

John1 Doe1	Paris, France
John2 Doe2	Paris, France
John3 Doe3	Paris, France
John4 Doe4	Paris, France
John5 Doe5	Paris, France
John6 Doe6	Paris, France
John7 Doe7	Paris, France
John8 Doe8	Paris, France
John9 Doe9	Paris, France
John10 Doe10	Paris, France
John11 Doe11	Paris, France
John12 Doe12	Paris, France
John13 Doe13	Paris, France
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John28 Doe28	Paris, France
John29 Doe29	Paris, France

# Useful Information

**Talks** will be held at LIRYC – Electrophysiology and Heart Modeling Institute – Avenue du Haut Lévêque, 33600 Pessac, France.

**Coffee breaks and lunches** will be offered in the half-covered terrace in front of the main entrance of the conference hall.

Wi-Fi will be available during the conference. The PRBB also provides access to an eduroam network.

# Partner Institutions and Sponsors

The school organised by the Electrophysiology and Heart Modelling Institute (LIRYC), National Committee of Scientific Research (CNRS), National Institute of Health and Medical Research (INSERM), National Institutes of Health (NIH) and Gradient Software and was supported by the France Life Imaging (FLI), the University of Bordeaux, and the Labex Trail.

## Sponsors

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de **BORDEAUX**



**FLi**  
France Life Imaging

 **Inserm**  
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Gradient **Software**  
Medical Imaging Software



