

Bordeaux Summer School

Gadgetron

June 17th – June 19th, 2020



In a nutshell...

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.

Course content will provide participants with an in-depth understanding of the Gadgetron framework and will present its multiple applications, from prototyping to clinical routines.



Expertise upon completion

This coding-oriented course, designed by researchers and developers, will help participants better understand and use the Gadgetron framework in their MRI research.

A certificate of participation will be awarded to students upon completion of the course.

> Program*

Days 1 & 2: June 17th & June 18th

- › Introduction to the ISMRM raw data format
- › Converting k-space data from different MRI vendors to the ISMRM raw data format
- › "Gadgetron" installation on Ubuntu and Windows stations
- › "Gadgetron" installation on MRI scanners (Siemens and GE)
- › Introduction to the Gadgetron framework
- › Discovery of cartesian, radial, spiral and multiband reconstructions
- › Python or Matlab interaction inside the Gadgetron
- › In-line reconstruction using BART or Sigpy inside the Gadgetron
- › Practical coding sessions
- › C++ and OpenMP programming in the Gadgetron
- › How to debug and optimize the Gadgetron?
- › Distributed reconstruction on a local cluster
- › In-line reconstruction on a remote cloud
- › 1.5T clinical MRI scanner session
- › Machine learning inside the Gadgetron

Day 3: June 19th

- › Scientific sessions
- › Interactive debugging session based on participants' k-space data
- › Closing remarks

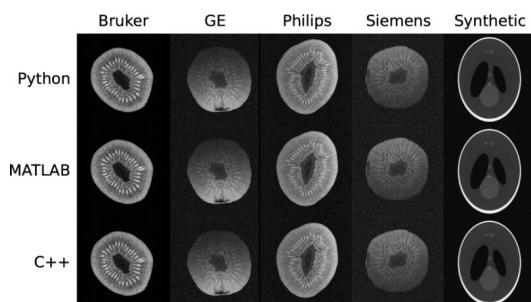
*Program may be subject to change.

A panel of experts

**Speakers may be subject to change.*

Lecturers include international speakers and local contributors.

- › **H. Xue:** National Heart, Lung, and Blood Institute, Bethesda, USA
- › **D. C. Hansen:** Gradient Software, Aarhus, Denmark
- › **K. L. Knudsen:** Gradient Software, Aarhus, Denmark
- › **O. Joseph:** University College London, United Kingdom
- › **V. Roopchansingh:** National Institute of Mental Health, Bethesda, USA
- › **J. A. Derbyshire:** National Institute of Mental Health, Bethesda, USA
- › **A. Trotier:** Magnetic Resonance Center (CRMSB), Bordeaux, France
- › **S. Rapacchi:** Center for Magnetic Resonance in Biology and Medicine (CRMBM), Marseille, France
- › **M. Yon:** Electrophysiology and Heart Modeling Institute (Liryc), Bordeaux, France
- › **P. Bour:** Liryc, Bordeaux, France
- › **V. Ozenne:** Liryc, Bordeaux, France



WHY BORDEAUX?

Bordeaux boasts a long tradition of excellence in magnetic resonance imaging research, from hardware to MR-sequence development. This expertise is shared by the Electrophysiology and Heart Modeling Institute (Liryc), specializing in cardiovascular medicine, and the Bordeaux Magnetic Resonance Center (CRMSB), specializing in neurology.

Both of these institutions offer unique technological platforms with cutting-edge equipment dedicated to clinical and preclinical studies, and benefit from the support of multidisciplinary teams. Both utilize the Gadgetron on a daily basis for real-time image processing, monitoring MR-guided therapies, and advanced quantitative imaging with innovative sequences.

These innovations have led to multiple collaborations between the two groups, for medical applications in cardiology or neurology with the Neurofunction Imaging Group (GIN), as well as for the post-processing of neuroimaging on large-cohorts. Methodological developments initiated in Bordeaux have also been deployed within several French groups: the Brain & Spine Institute (ICM) from Paris, ICube from Strasbourg, Creatis from Lyon, and the Center for Magnetic Resonance in Biology and Medicine (CRMBM) from Marseille.

Our objective is to consolidate the research-based knowledge in Bordeaux and to share it with the French and international community in order to increase the visibility of research carried out in Bordeaux.

Liryc and the CRMSB, in collaboration with the Translational Research and Advanced Imaging Laboratory Cluster of Excellence, will provide students with internationally recognized training courses in magnetic resonance imaging.

Practical information

Dates: June 17th – June 19th, 2020.

N° participants: 52

Language: classes are conducted in English.

Location: classes take place at LIRYC – Electrophysiology and Heart Modeling Institute – Avenue du Haut Lévêque, 33600 Pessac, France.

Participant profile: the course is designed for international students, engineers and researchers wishing to acquire knowledge about the Gadgetron or to develop their understanding of the software and its latest functionalities.

Applications: to be completed online *via* our website: bss-gadgetron.u-bordeaux.fr

A CV and cover letter will be necessary.

Deadline: March 31st, 2020.

Participation fee: 100€ per academic participant; 400€ per non academic participant, incl. VAT. Partial boarding costs will be covered for all participants. Lodging and travelling fees remain at the participants' expense.

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More information:

bss-gadgetron.u-bordeaux.fr