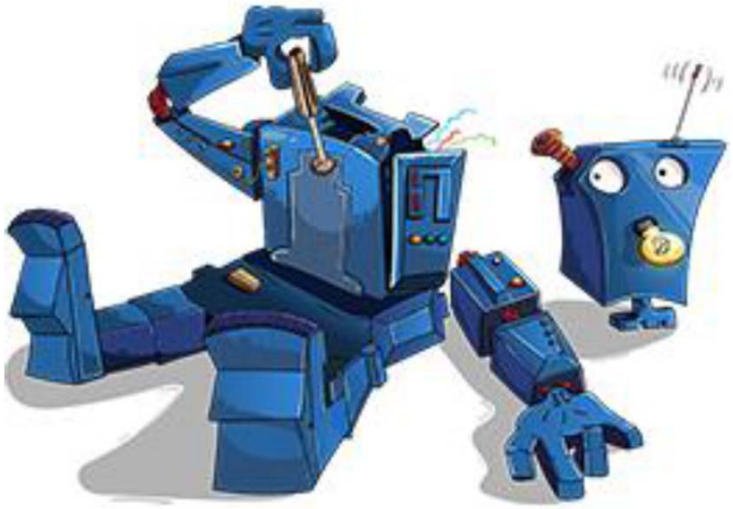


Robotics Principia

https://project.inria.fr/roboticsprincipia

Winter School of GdR Robotique

January 21-25th, 2019

Inria Sophia-Antipolis Méditerranée

G. Allibert, P. Martinet, J.P. Merlet

Robotics Principia

This school is aimed primarily at PhD students in robotics in first year and aims to teach the basics of robotics.

It is organized within the framework of CNRS GdR Robotics (national network of robotics) at the initiative of the CHORALE and HEPHAISTOS project of INRIA.

It is important for PhD students to catch the fundamental basics in robotics in a minimum of time. Understanding the background and fundamental basics may help them to understand quicker the main concepts and tools.

As the lectures are delivered in English, all foreign students working in the French laboratories have access to the winter school.

Organization

Organizers

- Guillaume Allibert (I3S-CHORALE)
- Philippe Martinet (Inria-CHORALE)
- Jean-Pierre Merlet (Inria-HEPHAISTOS)

Scientific Committee

- Stéphane Caro (LS2N)
- Mohamed Chetouani (ISIR)
- Philippe Fraisse (LIRMM)
- Jean-Paul-Laumond (LAAS)
- Philippe Martinet (Inria-CHORALE)
- Jean-Pierre Merlet (Inria-HEPHAISTOS)
- Youcef Mezouar (IP)
- Mustapha Mouaddib (MIS)
- Brahim Tamadazte (FEMTO-ST)

Prerequisites

https://project.inria.fr/roboticsprincipia/prerequisites-2/

Documents

https://project.inria.fr/roboticsprincipia/speakers/

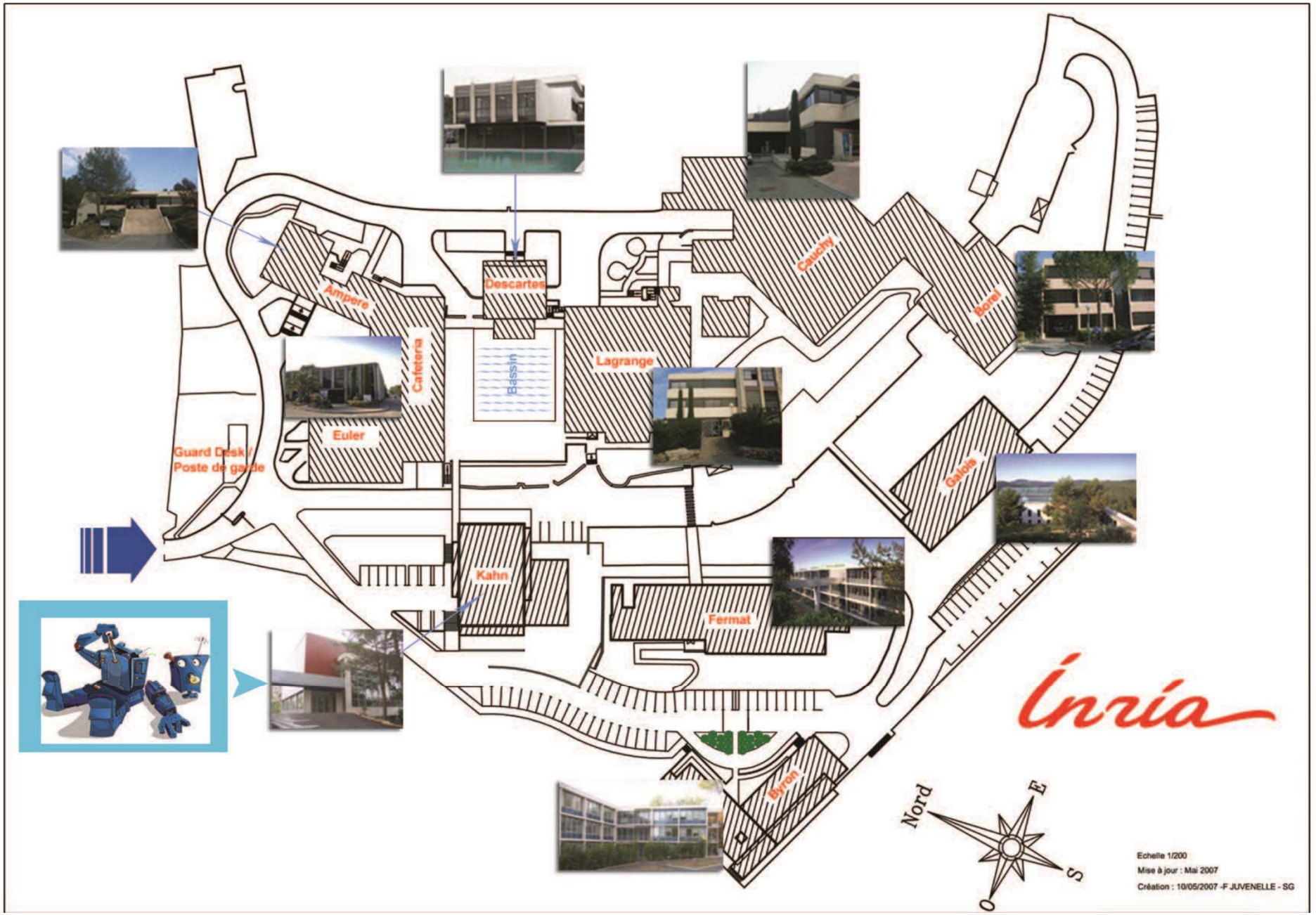
Organizing committee

- Agnès Cortell (Inria)
- Philippe Martinet (Inria)
- Jean-Pierre Merlet (Inria)
- Patricia Riveill (Inria)
- Patrick Rives (Inria)
- Paolo Salaris (Inria)
- Laurie Vermeersch (Inria)
- *Support engineer for the hands-on*
- André Anglade

Invited Lecturers

- Roland Chapuis (IP, Clermont-Ferrand)
- François Chaumette (IRISA, Rennes)
- Cédric Demonceaux (ImViA-VIBOT, Le Creusot)
- Manfred Husty (Innsbrück, Austria)
- Florent Lamiraux (LAAS, Toulouse)
- Frédéric Précioso (I3S, Sophia Antipolis)
- Bruno Siciliano (Napoli, Italy)
- Olivier Simonin (INSA/Inria, Lyon)
- Olivier Stasse (LAAS, Toulouse)
- Catherine Tessier (ONERA, Toulouse)

Practical Information



Practical Information

By public transport (Fare ticket 1,50€))
From Nice-Côte d'Azur Airport and Nice city:
Line 230 - Bus stop "Inria"
From Cannes SNCF railway station (with transfer):
Line 630 - Stop "Gare routiere Sophia Antipolis" then take Lines 1, 9, 12 or 100 - Bus stop "Inria" (1,12) or "Templiers" 5mn walking distance from Inria, you just have to cross the campus SophiaTech (9, 100)
From Antibes:
Envibus Lines Lines 1 - 9 - 12 Bus stop "Inria" (1, 12) or "Templiers" (9)
Express line 100 - Bus stop "Templiers" (5mn walking distance from Inria, you just have to cross the campus SophiaTech)
From CIV
The walking time between CIV and Inria is less than 30 minutes. You can also take the bus
Envibus lines 1 or 22 – Bus stop Inria
From airport By taxi
About 20 minutes, depending on traffic jam (appr. 55€)
Transfert Service (English spoken) - special rates for Inria +33 (0) 6 09 50 92 53
Taxi Sophia +33 (0) 6 27 51 01 51
Centrale Orange Taxi +33 (0) 820 906 960
Motorbike transport: +33 (0) 6 58 79 81 31
see also: *http://www.cote-azur.com.fr*

Participants presentation

In one sentence : name, laboratory, research theme of PhD

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M	CLAMENS	Thibault	thibault.clamens@groupe-esigelec.org	regular	Le2I - VIBOT ERL CNRS 6000
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Program overview

	Monday 21	Tuesday 22	Wednesday 23	Thursday 24	Friday 25
8H30-9H	Introduction				
9H-10H30	Perception I *Roland Chapuis*	Modelling I *Bruno Siciliano*	Control I *Bruno Siciliano*	Motion planning *Florent Lamiraux*	SBC *François Chaumette*
10H30-11H	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break
11H-12H30	Perception II *Cédric Demonceaux*	Modelling II *Bruno Siciliano*	Control II *Bruno Siciliano*	Learning *Frédéric Précioso*	Decision *Olivier Simonin*
13-14H	Lunch	Lunch	Lunch	Lunch	Lunch
14H-15H30	Experimental approach & Ethics *Catherine Tessier*	Mathematical tools *Manfred Husty*	Program/simulation tools: *ROS/Gazebo /VREP Olivier Stasse.*	Hands on 4	Restitution
15H30-16H	Coffee break	Coffee break	Coffee break	Coffee break	Closing
16H-17H30	Hands on 1	Hands on 2	Hand on 3	Hands on 5	
18-20H	Hands on extension	Hands on extension	Special event	Hands on extension	

Program details

Modules	Content
Perception I & II	Basic tools of computer vision for helping the robot to perceive its world and localize itself with a several sensors.
Modelling I & II	Kinematic and dynamic models, necessary to describe motion of mechanical systems
Control 1 & 2	The different ways to control Robots : motion control, force control, etc.
Motion planning	How to automatically compute path between two given configurations
Learning	The techniques allowing a robot to acquire novel skills or adapt to its environment through learning algorithms
Decision	Probabilistic models, decision-making architectures in robotics, Link with learning and AI, action planning, decision in multi-robot systems
Sensor based Control	How to directly use sensors space to control Robots
Mathematical Tools	Overview of mathematical tools for Analysis and Synthesis of Mechanisms and Robots
Experimental approach & Ethics	Law, deontology, and Research Integrity. Best practice : experiments with participants
Program & simulation tools	Different and useful softwares and tools to simulate robots in its environment