AGIMUS
INNOVATIVE ROBOTICS FOR AGILE PRODUCTION

Welcome to the winter school

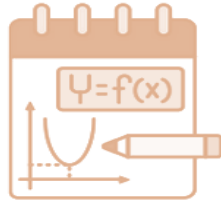Nicolas Mansard
CNRS

Ambition and objectives

- Small-batch factories, need for agile robotics

- AGIMUS aims at delivering **general-purpose robots** to **be quick to set up**, **autonomous** and to **easily adapt to changes** in the manufacturing process.

General approach

Advances in **optimization** based **motion** algorithms

Combining **off-line** training and **edge computing**

Optimal control policies using **sensor-feedback** with **hard-constrains**

On cutting-edge experimental platforms

Grounded by Expert-defined Industrial pilots

Agimus consortium

Academia / Technology Providers

Industry / Technology Providers

Industry / Early Adopters

SME / Innovation Advisor

Agimus consortium

Testing zone #1

Testing zone #2

Testing zone #3

Methodological core

Experiments on physical plateforms

Force control   Design   Perception

Industrial pilot #1
Aircraft and Satellite Manufacturing

Industrial pilot #1
Lift manufacturing

Industrial pilot #2
Packaging Manufacturing

Main results after 1 year

- First version of a **differentiable simulator** with differentiable collision

- Optimal control with **hard constraint**

- Task-and motion **planning from human demonstration**

- Object tracking without model knowledge at training time

  - **Awarded at BOP Challenge**

- Model predictive control with torque and vision feedback

- Memory of motion rewritten as reinforcement learning

Main results after 1 year

- Specifications and first prototype of the TiagoPro robot

- Planning and predictive control from RGB vision

Input video demonstration

Output task and motion plan
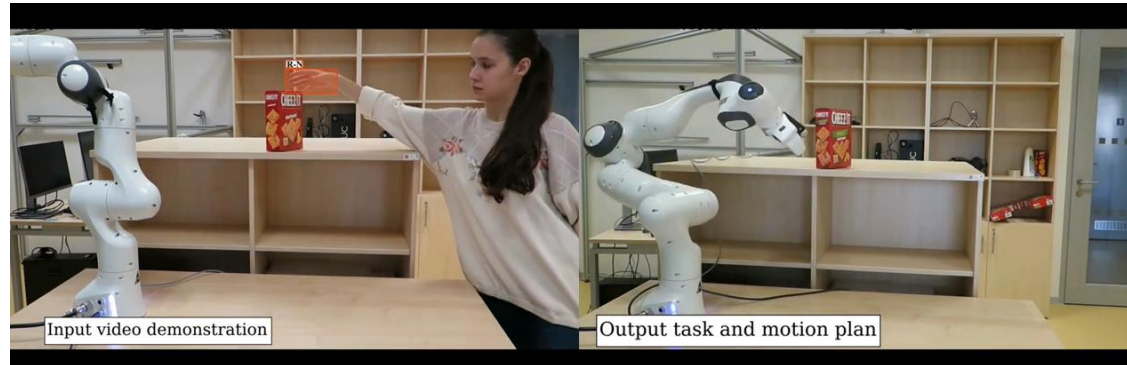
Zorina, Kateryna, et al. "Multi-contact task and motion planning guided by video demonstration." ICRA' 23
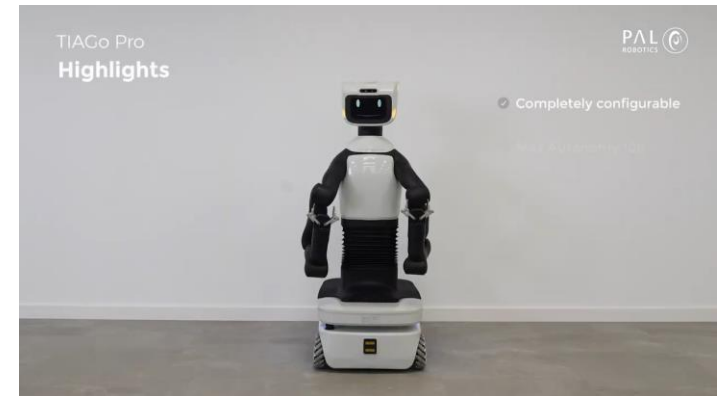

Static objects reaching

Scene cam:

Robot cam:

Run #1   Run #2   Run #3   Run #4

Fourmy, Mederic et al (2023). Visually Guided Model Predictive Robot Control via 6D Object Pose Localization and Tracking. arXiv:2311.05344.

TIAGo Pro
Highlights

Completely configurable

First prototype of Tiago Pro

AGIMUS
INNOVATIVE ROBOTICS FOR AGILE PRODUCTION

	MON 11	TUE 12	WED 13	THU 14	FRI 15
GMT+01					
09:00	Welcome coffee, 09:30, Salle de	Plenary: task-and-motion plann 08:30, amphitheater (building B	Agimus meetin / Free time 08:30 – 12:30 / 08:30 – 11:00	Plenary: optimal control #2 08:30, amphitheater (building B	Plenary: visual recognition and 08:30 – 10:00 amphitheater (building B)
10:00	Plenary: simulation #1 10:00, Salle de conference (Buil	coffee break, 09:45		Practicals: optimal control #2 09:45, building A	coffee break, 10:00
11:00	Practicals: Simulation #1 11:15, Building A	Practicals: task-and-motion planning #1 10:15 – 12:00 building A	morning coffee, 11:00, buildin Keynote #3: Adrien Taylor 11:30, amphitheater (building	coffee break, 10:45 Plenary: optimal control #2 (co 11:15, amphitheater (building B	Practicals: visual recognition and planning 10:30 – 12:30 building A
12:00					
13:00					
14:00	Keynote #1: Timothy Bretl 14:00, Amphitheater (building B	Plenary: ROS2 13:30, amphitheater (building B	Plenary: Software development 14:00, amphitheater (building B	Social event #2: a walk in Banyuls 13:15 – 15:30	Keynote #4: Adrien Escande 13:30, amphitheater (building B
15:00	Plenary: optimal control #1 15:00, Amphitheater (building B	Practicals: ROS2 14:30, building A	Plenary: Simulation #2 15:00, amphitheater (building B		Plenary: simulation #3 14:30 – 16:00 amphitheater (building B)
16:00	Coffee break, 16:00	Agimus meetin / Practicals: ROS 15:30 – 19:00 / 15:30, building	coffee break, 16:00	coffee break, 15:30, building B	coffee break, 16:00
17:00	Practicals: optimal control #1 16:30, building A	coffee break, 16:30, building B keynote #2 (Ludovic Righetti) 17:00, amphitheater (building	Plenary: Simulation #2 (cont.) 16:30, amphitheater (building B	Practicals: task-and-motion planning #2 16:00 – 19:30 building A	Practicals: simulation #3 16:30 – 18:00 building A
18:00	Poster session + welcome reception 18:15 – 20:45 Restaurant of the hotel	Poster session 18:15 – 19:45 building B	Practicals: simulation #2 17:30 – 19:30 building A		
19:00					
20:00		Gala at the Biodiversarium 20:00 – 23:00			
21:00					
22:00					
23:00					

About the science:
https://aws-school.org

Agimus teachers

Florent Lamiraux
planning

Justin Carpentier
models

Mederic Fourmy
perception

Narcís Miguel
i Baños
architecture

Vladimir Petrik
perception

Guilhem Saurel
software

Wilson Jallet
constraints

Louis Montaut
collisions

Quentin Le Lidec
simulation

Assisted by Kateryna Zorina, Armand Jordana, Maximilien Naveau, David Kovar, Vladimir Petrik, Martin Cifka

Keynote speakers

Timothy Bretl
Univ. Illinois

Ludovic Righetti
New York Univ.

Adrien Taylor
Inria Paris

Adrien Escande
Inria Grenoble

MON 11	TUE 12	WED 13	THU 14	FRI 15

GMT+01

MON 11

Welcome coffee, 09:30, Salle de
Plenary: simulation #1
10:00, Salle de conference (Buil
Practicals: Simulation #1
11:15, Building A

Keynote #1: Timothy Bretl
14:00, Amphitheater (building B
Plenary: optimal control #1
15:00, Amphitheater (building B
Coffee break, 16:00
Practicals: optimal control #1
16:30, building A

Poster session + welcome
reception
18:15 – 20:45
Restaurant of the hotel

TUE 12

Plenary: task-and-motion plann
08:30, amphitheater (building B
coffee break, 09:45
Practicals: task-and-motion
planning #1
10:15 – 12:00
building A

Plenary: ROS2
13:30, amphitheater (building B
Practicals: ROS2
14:30, building A
Agimus meetin | Practicals: ROS
15:30 – 19:00 | 15:30, building
coffee break, 16:30, building B
keynote #2 (Ludovic Righetti)
17:00, amphitheater (building
Poster session
18:15 – 19:45
building B

Gala at the Biodiversarium
20:00 – 23:00

WED 13

Agimus meetin | Free time
08:30 – 12:30 | 08:30 – 11:00

morning coffee, 11:00, buildin
Keynote #3: Adrien Taylor
11:30, amphitheater (building

Plenary: Software development
14:00, amphitheater (building B
Plenary: Simulation #2
15:00, amphitheater (building B
coffee break, 16:00
Plenary: Simulation #2 (cont.)
16:30, amphitheater (building B
Practicals: simulation #2
17:30 – 19:30
building A

THU 14

Plenary: optimal control #2
08:30, amphitheater (building B
Practicals: optimal control #2
09:45, building A
coffee break, 10:45
Plenary: optimal control #2 (co
11:15, amphitheater (building B

Social event #2: a walk in
Banyuls
13:15 – 15:30

coffee break, 15:30, building B
Practicals: task-and-motion
planning #2
16:00 – 19:30
building A

FRI 15

Plenary: visual recognition and
08:30 – 10:00
amphitheater (building B)
coffee break, 10:00
Practicals: visual recognition
and planning
10:30 – 12:30
building A

Keynote #4: Adrien Escande
13:30, amphitheater (building B
Plenary: simulation #3
14:30 – 16:00
amphitheater (building B)
coffee break, 16:00
Practicals: simulation #3
16:30 – 18:00
building A

Organization of the poster sessions

https://forms.gle/uegGSa4iHdY2g97J7

Agimus winter school: poster sessions

Connectez-vous à Google pour enregistrer votre progression. En savoir plus

What is your name

Votre réponse
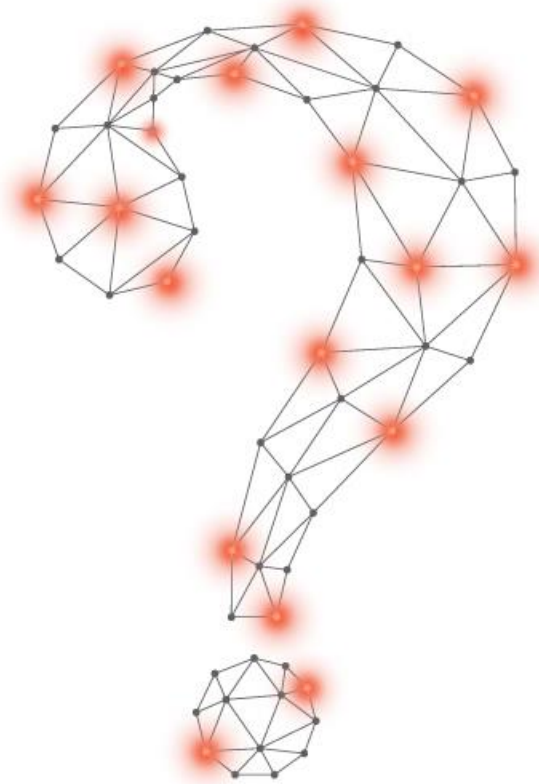
I have a poster

○ No

○ Yes

Title of the poster

Votre réponse

I have a preference for the session where I would present it

○ No

○ Preferably Monday

○ Preferably Tuesday

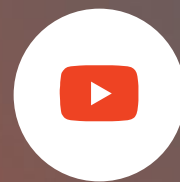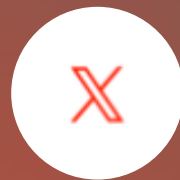# Questions and Answers

Contact Details

Nicolas Mansard

CNRS

[*nmansard@laas.fr*](mailto:nmansard@laas.fr)