

Position Offered: POSTDOCTORAL RESEARCHER

Project: *Virtual prototyping for robotic manipulation of garments: enhancing the capabilities of the CLOTHILDE cloth simulator*

Technological and scientific fields: Computer Graphics, Robotics, Geometry

Location: Barcelona, Cataluña, Instituto de Robótica e Informática Industrial, CSIC-UPC, <https://www.iri.upc.edu>

Research Group/PI: Robot Perception and Manipulation at IRI (RobIRI), Carme Torras Genís

PROJECT SUMMARY

While there are numerous cloth simulators available, most of them lack the necessary physical realism to excel in challenging application areas, such as robotics. In our group, we developed a physically accurate cloth model, CLOTHILDE, and validated its realism empirically using recordings of various textiles. We aim to make this cutting-edge cloth simulator accessible to a wider audience and enhance its capabilities to enable robotic systems to manipulate garments more effectively based on the simulations it generates. The main goals of the project are: 1. Develop a user-friendly VR interface for the cloth simulator, emphasizing real-time feedback, ease of use, interactivity, and customization. 2. Expand the cloth model to include garments with complex designs, considering seams and mixed materials. 3. Optimize the cloth model for handling collisions, especially on surfaces like folding tables. 4. Integrate virtual robotic environments to model robot-cloth interactions with different grasping modes.

PROFESSIONAL PROFILE

Minimum requirements:

PhD in Applied Mathematics, Computer Science, Robotics, Mechanical Engineering or related fields. Proficiency in English.

Merits to be considered:

Proficiency in mathematical modelling, optimization and data science techniques. Knowledge of programming languages such as Python, MATLAB or C++. Experience with cloth simulators or virtual reality environments.

WHAT IS OFFERED

Joining a leading research group in robotic cloth manipulation, which has a laboratory equipped with four mobile robots, three of them with one arm, and three pairs of robots (WAM, KINOVA and UR5) for bimanual manipulation, as well as robot hands, high-precision and RGB-D cameras, motion capture and other sensors, virtual reality devices, and software maintained by laboratory support staff. 240 ECTS of training are also offered, which includes a stay in the ELAN team (modELisation de l'Apparence de phénomènes Non-linéaires, <https://team.inria.fr/elan/>) of the INRIA Grenoble Rhône-Alpes (France).

Contract conditions:

Indefinite contract for a Postdoctoral Researcher associated to the Momentum Project of 4 years' duration according to Spanish science law. Gross annual salary (41.000 € - 52.000 €).

Start of contract: before 31 December 2024

PRINCIPAL INVESTIGATOR CONTACT

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