FRANKA ROBOTICS

Brochure

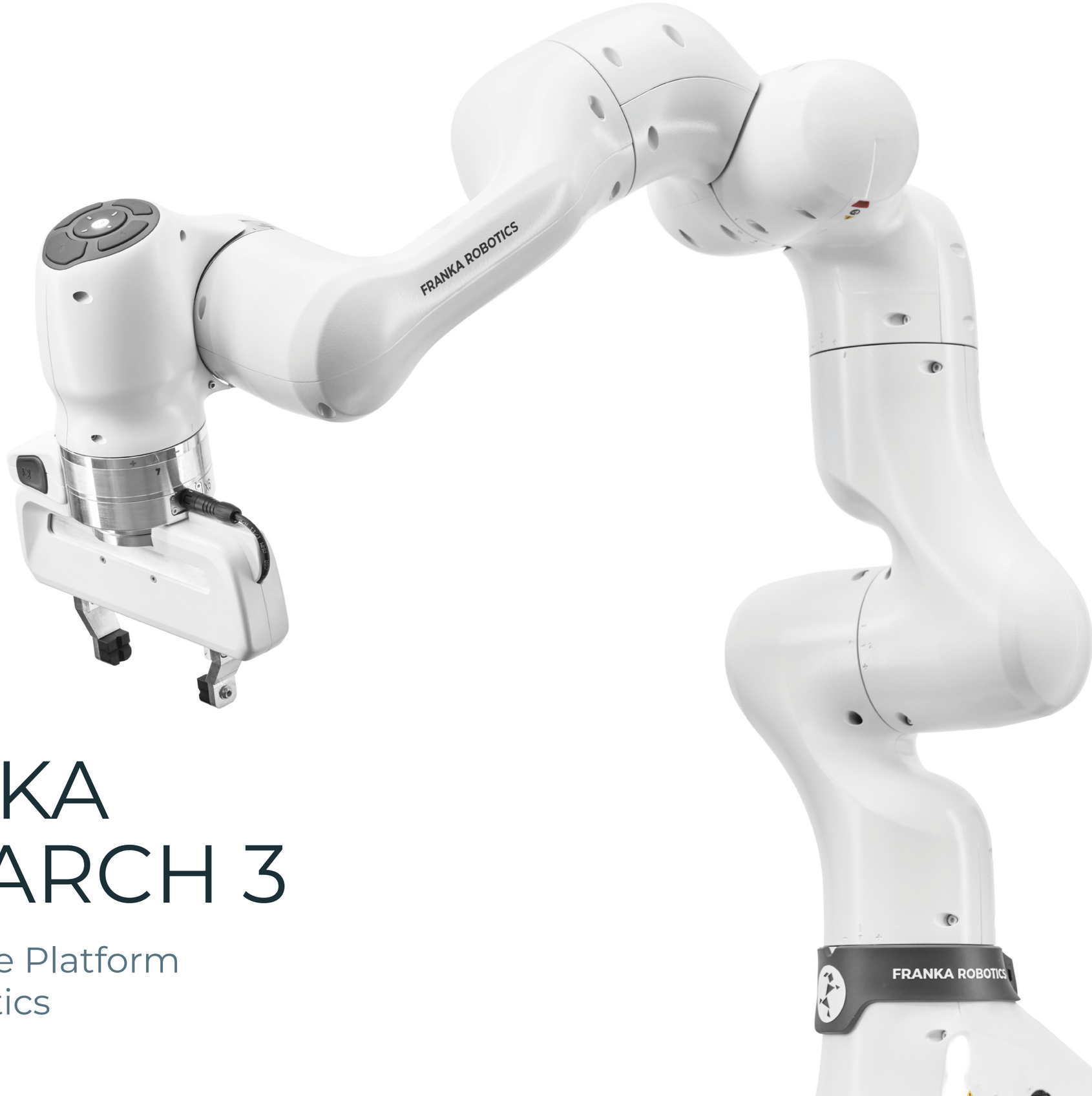
FRANKA RESEARCH 3

The Reference Platform
for AI & Robotics

July 2025

Franka Robotics GmbH
Frei-Otto-Straße 20
80797 Munich
Germany

research@franka.de
www.franka.de



FRANKA RESEARCH 3

The Reference Platform for AI & Robotics

At a Glance

Franka Research 3 is the global reference, force-sensitive robot system tailored for AI and robotics research. It combines intuitive usability with low-level access, empowering researchers to explore advanced control and learning capabilities.

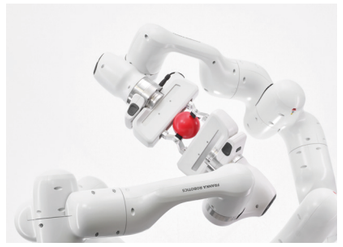
Why FRANKA RESEARCH 3?

High-Quality Mechatronic System

Engineered and manufactured in Germany, Franka Research 3 is a reliable robot system, TÜV certified for Human-Robot collaboration.

Seven Axes of Dexterity

The 7-DOF Arm offers human-like motion, enabling dexterous navigation in tight spaces and around obstacles in constrained environments.

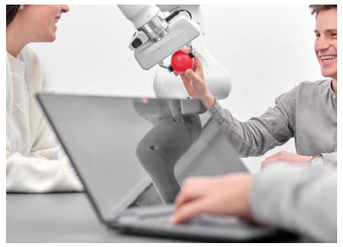


Integrated Torque Sensors at Each Joint

Enhanced sensitivity to contacts and fine estimation of external forces provide advanced control capabilities and smooth hand-guiding.

Versatile Control Interfaces

From the most intuitive programming UI for quick task setup to advanced direct joint control for deep-dive research, Franka Research 3 adapts to every user level.



Advanced Motion Control

Achieve high-frequency (1 kHz) motion control with a low-level, high-quality data interface, ideal for roboticists working on control systems or applications requiring specialized control solutions.

Open and Collaborative Platform

Join a global community of top robotics researchers, integrating seamlessly with leading frameworks like ROS, ROS 2, and MATLAB to share, reproduce, and advance cutting-edge research.

Key Specs

Franka Research 3 is a high-tech, expertly engineered robot system designed for advanced research.

Payload
3.0 kg

Position repeatability
< ± 0.1 mm

Workspace efficiency
94,5 %

Reach
855 mm

Degrees of freedom
7

Int. torque sensors
7

Certifications
ISO 10218
ISO 13849

The Arm

The force sensitive and dexterous Arm features 7 DOF, with torque sensors at each joint, industrial-grade position repeatability of +/- 0.1 mm, and negligible path deviation even at high velocities.

The system provides a payload of 3 kg, a reach of 855 mm and a 94.5 % work-space coverage.

Franka Control Interface - FCI

Franka Control Interface (FCI) is designed for roboticists who require fine-grained control over the robot and real-time access to its sensor data. It is ideal for motion control research and the development of advanced, specific behaviors.

Direct Control

Enables low-level, 1 kHz control of the robot without any filters, while internal supervision prevents self-damage. Gain access to the control loop, including position, velocity and torque in joint space, as well as position and velocity in Cartesian space.

Data Acquisition

Capture extensive sensor states at 1 kHz. FCI also provides external force estimations.

Community

Join the ever-growing Franka Robotics community and leverage C++, ROS 2, or MATLAB & Simulink to accelerate robotics innovation.

Safety

Implement safety rules to protect both operators and equipment.

Real-time Control and ROS integration

The Franka Control Interface (FCI) allows a fast and direct low-level bidirectional connection to the Arm and Hand.
It provides the current status of the robot and enables its direct control with an external workstation PC connected via Ethernet.
By using *libfranka*, our open-source C++ interface, you can send real-time control values at 1 kHz with 5 different interfaces:

- Joint torque commands with gravity and friction compensation.
- Joint position or velocity commands.
- Cartesian pose or velocity commands.

Simultaneously, you gain access to 1 kHz measurements of:

- Joint data, such as the position, velocity and link side torque sensor signals.
- Estimation of externally applied forces.
- Various collision and contact information.

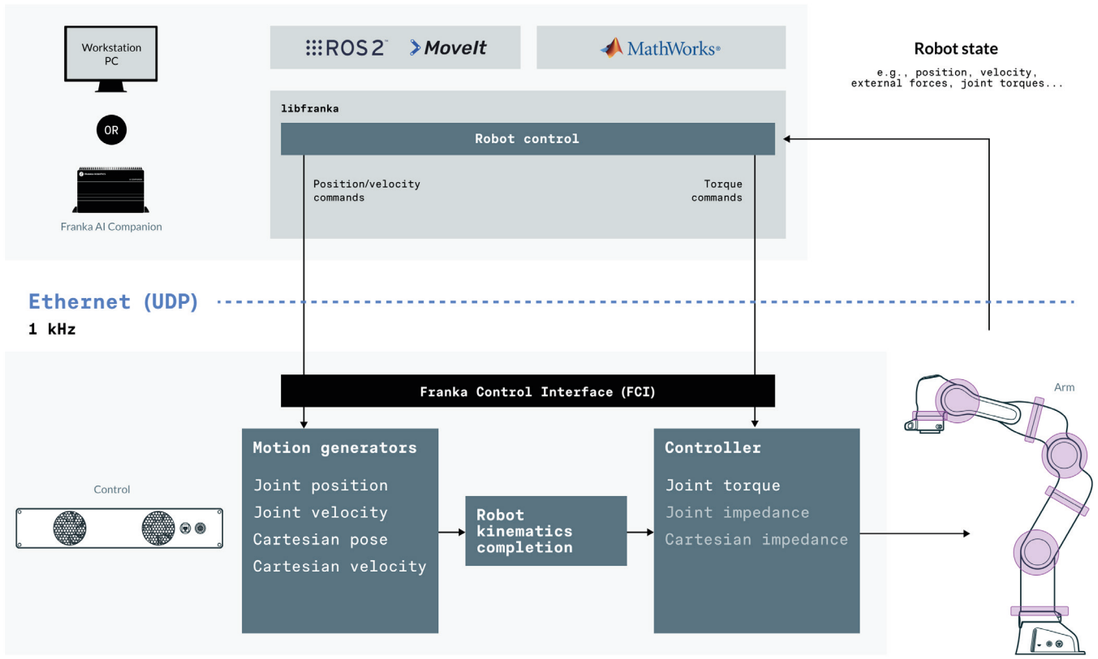
The robot model library provides:

- Forward kinematics of all robot joints.
- Jacobian matrix of all robot joints.
- Dynamics, inertia matrix, Coriolis and gravity vector.

Additionally, *franka_ros* connects Franka robots with the entire ROS 2 ecosystem, integrating *libfranka* into ROS 2 Control. It includes URDF models and detailed 3D meshes of our robots and end effectors, which allows visualization (e.g., RViz) and and Gazebo simulation. And the MoveIt! integration simplifies motion planning and gripper control, with example implementations demonstrating how to operate the robot using ROS 2.

▶ Download open-source boilerplates

▶ Read FCI documentation



Discover the latest upgrades

Targeted enhancements for optimized performance.

Visit the FR3 webpage

Desk API

System Image v5.8

The new Desk API enables you to programmatically administrate and operate FR3. Progammatically open the brakes and activate FCI, clear safety violations and much more!

Torque Sensor Calibration

System Image v5.8

Directly in the field, recalibrate the internal torque sensors to deliver consistent accuracy during the complete lifetime.

MUJOCO Support

From the Community

Power up your simulations with MUJOCO, offering a seamless experience for modeling and testing.

Enhanced Usability & Design

FR3 Arm v2.0

With intuitive joint rotation markings and X/Y axis indicators, plus a sleek, modern look, the new design is as functional as it is eye-catching.

A growing Ecosystem

Franka Robotics offers a variety of integrations based on our Franka Control Interface (FCI), providing a solid bridge between our cutting edge hardware and the most-used ecosystems in research and academia. Such synergies enable you to make full use of the powerful data acquisition and real-time control capabilities of Franka Research 3.

Franka AI Companion, and more!

Franka AI Companion is exclusively tailored to your FR3 to streamline the setup and speed up execution of your robotics and AI research, while offering NVIDIA® Jetson Orin™ NX GPU-accelerated edge computational power. Other FR3 integrations include NVIDIA® Isaac Sim™, one among the robotics simulation and synthetic data-generatio tools that allows you to replicate real-world scenarios and build your robot digital twin.

Franka Toolbox for MATLAB

A quick, intuitive, and robust way for researchers to evaluate their algorithms on Franka Research 3. Franka Toolbox for MATLAB provides all of the necessary control options and signals from the robot. A rich set of MATLAB® scripts and Simulink® blocks is available, as well as a collection of advanced demos, covering a wide array of possibilities for controlling the Franka robot.

Franka ROS 2

ROS 2 is the de facto standard choice for robotics researchers, mainly thanks to its vast ecosystem of community contributions. At Franka, we strive to deliver robots that are natively compatible with all long-term ROS 2 distributions. Get started right away on what matters, skipping the boilerplate thanks to ROS 2 and Franka ros_control.

MoveIt

MoveIt 2 is a powerful and flexible framework for motion planning and control. Franka robots integrate seamlessly with it through ROS 2, enabling a quick and efficient start.

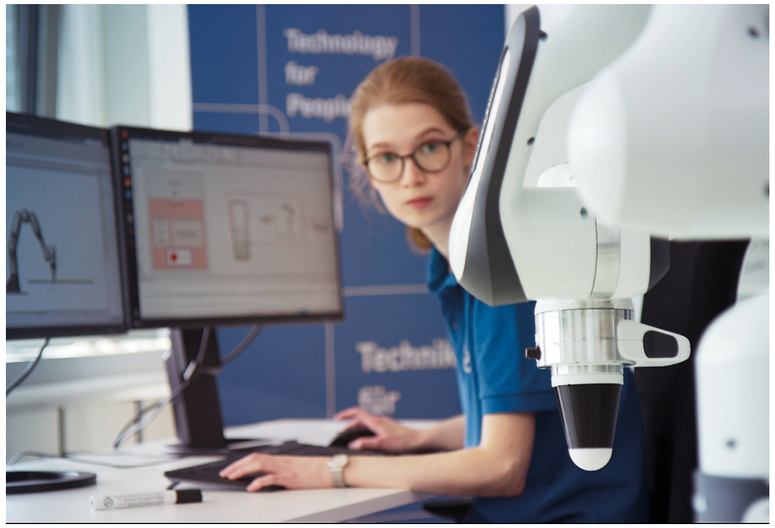
Community Contributions

The Franka Community is renowned for its innovative and collaborative spirit in robotics and AI. Discover the outstanding contributions that make this community exceptional, ranging from groundbreaking research to practical applications and educational resources. Explore tools for robot control and planning, robotics simulation, learning environments, datasets, calibration methods and more: [www.franka.de/community.](www.franka.de/community)

▶ Find resources on the development page

Franka Toolbox for MATLAB

Franka Toolbox for MATLAB® provides all necessary control options and signals from the FR3 robot, resulting in a quick, intuitive, and robust way for students and researchers to evaluate their algorithms. In the toolbox, users will find a rich set of MATLAB® scripts and Simulink® blocks, and a collection of advanced demos.



▶ Find out more

Quick and easy integration

Leverage the straightforward integration provided by Franka Toolbox or MATLAB to seamlessly connect the Franka robot to MATLAB and Simulink, the widely-used programming platform.

Direct connection to the robot

Establish a direct connection to the robot by closing the real-time loop at 1 kHz: develop control algorithms across various modalities like torque control, visualize data and streamline the debugging and prototyping process.

Real-time data handling

Easily display, acquire, and record real-time data of the robot such as force, position or angles using MATLAB´s plotting functions and other Simulink features.

A wealth of examples

Build upon available examples to accelerate development and focus on your specific application. Facilitate access to the field of robotics via a known software environment.

Franka AI Companion

Franka AI Companion elegantly combines the hardware and software you need to streamline the setup and speed up execution of your robotics and AI research work, while also offering NVIDIA® GPU-accelerated edge computational power and Franka Research 3´s real-time 1kHz control.

Integration of GPU power with real-time control

Benefit from connecting AI models with real-time robot control on the same platform, eliminating the need for external resources when conducting tasks like combined object detection and grasp-planning.

Simplified research setup

Easily create, manage, and switch between research setups using a sandboxed development environment that integrates docker containers (e.g. LLMs and vision models). Quickly transfer setups and data in the same lab or share them with other institutions.

Extended capabilities

Out-of-the-box compatibility with an expanding array of popular hardware devices (e.g. Intel® RealSense™) and software components.

▶ Find out more

A thriving research Community, impactful applications

Academic and Corporate Research

As the reference platform for AI & robotics research, Franka Research 3 has fostered a thriving, open, and global research ecosystem. In 2024 alone, nearly 1,400 research publications have featured Franka robots, underscoring its pivotal role in advancing the field. As the go-to platform for collaboration, it enables researchers to exchange ideas, share breakthroughs, and push the boundaries of robotics, ultimately giving AI a robot body.

Service Robotics by OEM Innovators

Additionally, industries such as agriculture, healthcare, hospitality, and retail benefit from our robot system by automating routine tasks, boosting efficiency, and enhancing customer experiences. These impactful applications are transforming industries and unlocking new growth opportunities.

- Check out our Applications
- Discover the contributions from the Community

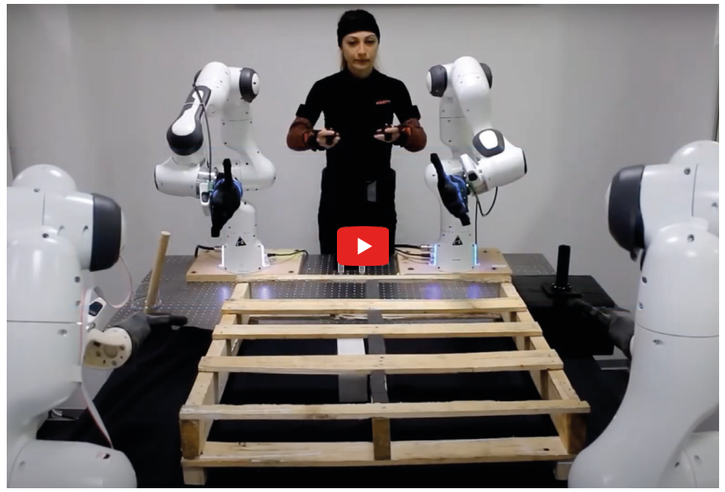
Franka Research 3 empowers visionary thinkers to explore, collaborate, create, and share – fostering advancements in robotics and AI, with impactful applications across diverse industries.

Driving Innovation with Robotics and AI

Discover how visionary researchers and innovators are shaping the future with Franka Research 3. From academic labs to corporate R&D and OEM applications, our platform powers real-world impact across robotics and AI.

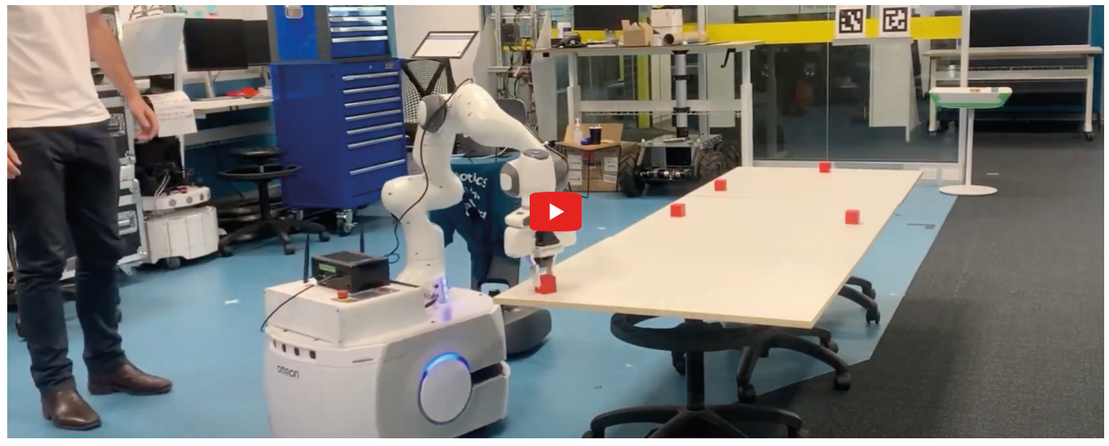
Online Replanning in Belief Space

MIT Nvidia



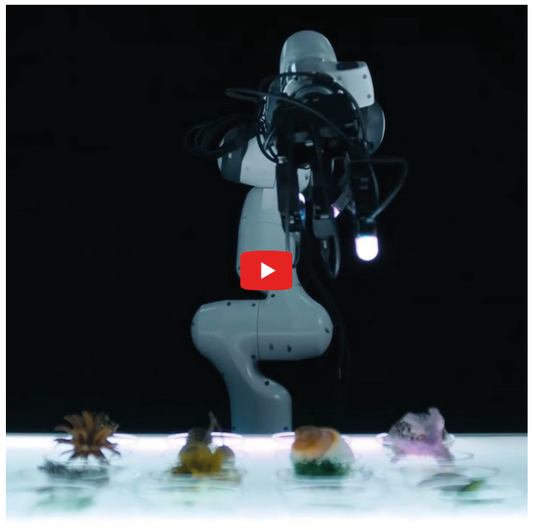
Reconfigurable Control Framework for Telemanipulation of Multi-Arm Systems

IIT



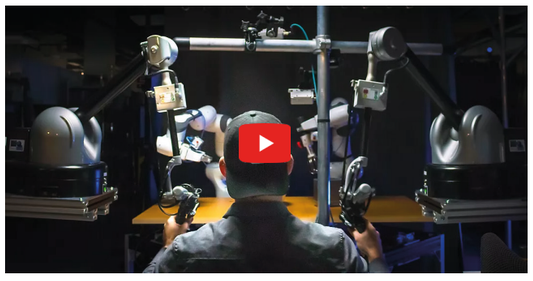
Reactive Base Control for On-the-Move Mobile Manipulation in Dynamic Environments

QUT



Advancing Robotics And Touch Perception

Meta FAIR



Teaching Robots New Behaviors

Toyota Research Institute

DROID: A Large-Scale In-the-Wild Manipulation Dataset

Stanford

ANA Avatar Xprize | NimbRo wins $5M

Univ. Bonn

ProteCT – A MedTech Project

TUM

Harvesting Strawberries with Robot System BERRY

Organifarms

Begin your journey, contact the Franka Team!

USA, Canada, Europe

Veronika Diemientieieva
Partner / Channel Manager

▶ Connect via LinkedIn

Asia, Middle East

Kilian Köppl
Partner / Channel Manager

▶ Connect via LinkedIn

Email
info@franka.de
sales@franka.de

Phone
+49 89 2006069 20

Website
www.franka.de

Address
Frei-Otto-Straße 20
80797 Munich
Germany

Franka Robotics is a German, research-driven robotics company headquartered in Munich and operating globally.

Founded in 2016, it is part of Agile Robots SE since 2023. By developing the reference robotics platform, Franka Robotics drives continuous advancements in the field, fostering collaboration, creativity, and knowledge sharing among robotics and AI professionals worldwide.

Vision

Capable AI-powered robots will live and work alongside us. We envision a positive future where intelligent machines enhance our existence, becoming fundamental to our society.

Mission

Our mission is to enable the growing community of robotics and AI professionals to shape a pivotal moment in human evolution: giving AI a robot body.

Franka Robotics GmbH
Frei-Otto-Straße 20
80797 Munich
Germany

franka.de