

A Physical Architecture for Studying Embodiment and Compliance: The GummiArm

Martin F. Stoelen, Ricardo de Azambuja,
Angelo Cangelosi
Centre for Robotics and Neural Systems (CRNS),
Plymouth University
Plymouth, UK
martin.stoelen@plymouth.ac.uk

Fabio Bonsignorio
The BioRobotics Institute,
Scuola Superiore Sant'Anna, Pisa
and Heron Robots, Genova,
Italy

Abstract— High bandwidth contacts and unforeseen deviations from planned actions are common in early human development. We here present the GummiArm, an open-source robot with characteristics that make it interesting for studying development, human motor control, and real-world applications that require robustness and safety. Joints with antagonist actuators and rubbery tendons provide passive compliance, where the stiffness can be adjusted in real-time through co-

contraction. The robot structure is made printable on low-cost 3D printers, enabling researchers to quickly fix and improve broken parts. The arm has 7+3 Degrees of Freedom (DOF), of which 8 have variable stiffness. It is currently being replicated across 3 research groups, and we hope to establish a thriving and productive community around this replicable platform.

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