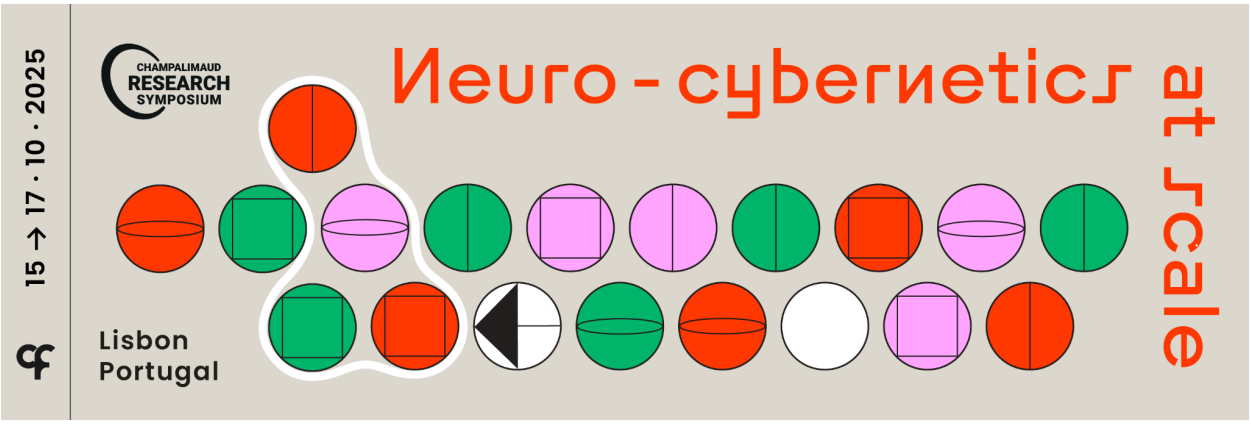

Exploring Human Information Processing in Virtual Reality during Physical Inverse Design

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We develop an immersive Virtual Reality (VR) paradigm to study the cognitive and behavioral mechanisms underlying complex human planning in high-dimensional design problems. In particular, participants must shape a deformable virtual clay to optimize fluid flow—an open-ended inverse design task inspired by Differentiable Learned Simulators [1]. By analyzing patterns of surface deformation and fine-grained hand and eye movement data, we investigate how internal planning strategies unfold over time and how they adapt across dynamic and static contexts. VR enables not only realistic interactions but also the introduction of non-physical affordances—such as symmetry activations—that support the deformation process and reveal deeper layers of planning.

motor planning, inverse design, virtual reality, hand-tracking, deformable objects