

## Robotic assembly of non-rigid objects

### Session Chairs:

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**Abstract.** The primary objective of this track is to bring together specialists in different fields of robotics and manufacturing specializing in robotic assembly of non-rigid objects. The track addresses scientific and engineering problems that arise from the deformation of the assembled objects, and their implication for the robotic manipulation task and the manufacturing process. Topics covered by the track include automatic planning for deformable object assembly, artificial intelligence and machine learning for advanced robotic operation, non-rigid object grasping and manipulation, sensors required for robotic assembly of non-rigid objects, simulation of robotic assembly of non-rigid objects, as well as method for introducing collaborative robots and human robot interaction in assembly processes with non-rigid objects. Special emphasis is given to innovative methodologies and advanced technologies for industrial implementation of robotic assembly of non-rigid objects.

**Keywords.** Robotics in manufacturing; Modeling, simulation, control and monitoring of manufacturing processes Scheduling; Planning; Human robot interaction; Machine learning; Artificial intelligence

### Track topics and their description

Robotic assembly of non-rigid objects incurs significant difficulties due to the inherent process uncertainties stemming from object deformation during the assembly process. In recent years there have been significant advances in robotic capabilities, task planning and task learning methods, sensors and end effectors suitable for handling deformable objects, and human-robot interaction methods. In order to contribute towards advancing large scale integration of robots in industrial assembly of deformable objects, this track includes the following topics, but not limited by them:

- Design for robotic assembly
- Robotic assembly planning
- Automatic assembly sequencing
- Deformable object simulation
- Sensors for robotic assembly of deformable objects
- Dexterous manipulation of deformable objects
- Optimization and optimal control of robotic assembly systems
- Motion planning and optimization for assembly robots
- Learning and adaptive systems
- Objective measurement of system operation
- Constraints management of non-rigid objects assembly
- Collaborative assembly robots
- Human-robot interaction, collaboration, and cooperation
- Augmented, virtual and mixed reality for non-rigid objects

### Important dates:

December 25, 2021	Deadline for the submission
February 15, 2022	Notification of acceptance/rejection
March 15, 2022	Deadline for the final submission