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IROS 2020 Workshop

Application-Driven Soft Robotic Systems: Translational Challenges

Introduction Video and Poster Presentations

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Workshop Twitter Hashtag: <u>#SoftRobotsHardChallenges</u>

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Workshop Objectives

With the increased interest in the use of soft materials for the creation of highly dexterous robots, soft robotics has established itself as an important research field, as evidenced by the surge of publications in the recently appearing monothematic journals, such as "Soft Robotics" and conferences, such as Robosoft - the IEEE International Conference on Soft Robotics and dedicated sessions at the major robotics conferences, ICRA and IROS.

Researchers have successfully demonstrated advantages of soft robotics over traditional robots made of rigid links and joints in several application areas including manufacturing, healthcare and surgical interventions. However, only a few of these potential soft robotic solutions have resulted in certified products contributing to a continuously growing robotic market.

This workshop will focus on application-driven, holistic soft robotic systems and discuss the translational outcomes achieved to date. We will discuss obstacles along the path from designing a soft robot towards its commercialisation and we will learn from successes and failures of experienced soft roboticists in overcoming translational barriers. We will provide young academics and industrial researchers interested in exploring the potential of soft robotics with a platform to discuss these translational challenges with senior academics, industrial experts and end users.

Applications will be presented in which soft robotic solutions have greatly surpassed their rigid counterparts or traditional robotic solutions failed. We will explore and identify sectors in which soft robots show great potential.

The objectives of this workshop are:

- to discuss and identify the barriers preventing fundamental soft robotic research from being translated into commercial products
- to discuss and identify the design paradigms with the highest translational potential for specific applications
- to provide young researchers in industry and academia with a platform to meet, to learn from experienced soft roboticists and to discuss the future of soft robotics research
- to contribute to the creation of a white paper on soft robotics as proposed by the UK-RAS Strategic Task Group on Soft Robotics

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Topics of Interest

- Soft robotics for healthcare, industrial, agricultural, inspection and exploration applications.
- Application-specific material selection
- Fabrication techniques for large scale manufacturing of product-grade soft robots
- Certification challenges in industrial and healthcare applications of soft robotics
- Safety in soft robotics
- User requirements for soft robotic systems
- Robust methods for sensing, modelling, control and actuation in soft robotics
- State monitoring in uncertain environments/conditions
- Unexplored application areas of soft robotics
- Biocompatibility in soft robotics
- Disposable and sterilizable soft robots
- Pierce-proof and cut-proof soft robots
- Self-healing soft robots

Workshop Structure

The workshop is divided into four live panel sessions. These will cover soft robotics applications in (1) industrial, (2) healthcare, (3) agricultural and (4) inspection/exploration engineering. These panel sessions will be held via Zoom (Zoom links will be posted on the workshop website: https://ori.ox.ac.uk/labs/srl/iros2020/). These sessions will take place Sunday the 25th of October and they aim at involving all workshop participants to comment on topics related to the translational challenges in soft robotics such: certification of soft robots in industrial and healthcare applications, safety in soft robotics, user requirements for soft robotic systems. Up to date programme is also available on the workshop website. Videos of the talks of the presenters of each session will be uploaded on the IROS 2020 on demand video platform. Poster presentations are integrated in the introduction video of the workshop. Poster awards (200\$) sponsored by the UCL Wellcome / EPSRC Centre for Interventional and Surgical Sciences (WEISS) for the best Healthcare poster and by Ocado Ltd. (UK) for the best Industrial poster will be awarded at the end of the respective panel sessions.

Endorsement

This workshop is supported by the TC for Soft Robotics and by the TC for Performance Evaluation & Benchmarking of Robotic and Automation Systems.