INCOM 2021

17th IFAC Symposium on

Information Control Problems in Manufacturing.

http://www.incom2021.org/

Open invited session - identification code: ipj56

"Assembly 4.0": Smart, Collaborative, Responsive Assembly Processes & Systems for Industry 4.0 Era

Sponsored by: IFAC TC 5.1 - Manufacturing Plant Control

Abstract

Assembly systems are in perfect position to utilize the confluence of technological and theoretical advances is several domains. Some relevant examples of domains and advances are: (1) *Modeling domain*, advances in: digital twins, blockchain, and CAD assembly animations. (2) *Information Systems* (IS) domain, advances in: IoT, and cloud computing (CC). (3) *Worker assistance* domain, advances in: cobots, exoskeletons, and equipment reconfiguration. (4) *Computer vision* domain, advances in: augmented reality, gesture/posture recognition, remote measurement, and object tracking, (5) *Artificial intelligence domain*, advances in: machine learning, neural networks, expert systems, and speech recognition (6) *Parts supply* domain, advances in: additive manufacturing, kitting techniques, and autonomous dispatching (and navigating).

The ongoing and incoming developments in technology are radical, and are prone to improve assembly productivity and cost efficiency. Consequently, assembly systems will change the way they operate, and increase their product variety. A new generation of smart advanced and robust assembly processes and systems are in various degrees of development and are important part of the smart manufacturing systems known as Industry 4.0 (the fourth industrial revolution). Therefore, these smart, collaborative, responsive assembly processes and systems are dubbed “Assembly 4.0”. The challenge is how to develop models that best utilize recent technological and theoretical improvements. These developments necessitate the development of proper optimization models, control algorithms, automation technologies and management methods, to allow the aforementioned smart cyber physical systems of self-optimization, self-configuration, self-diagnosis and intelligent support to workers in their increasingly complex tasks. The implementation of Industry 4.0 principles to assembly processes defines “Assembly System 4.0”, and requires the development of proper models, techniques and algorithms. These models, techniques, and algorithms, would allow to better employ the “smart assembly stations” and “smart part logistics” and take full advantage of the virtual copy of the physical assembly process to enable quick and decentralized decisions. Thus, better models will lead to significant improvement of flexibility and speed of the whole assembly system that enables more customized products, an efficient and scalable production, and a high variance in production control.

This open invited session seeks original manuscripts to investigate the design and management of “Assembly 4.0” processes and systems exploiting advanced technologies, mathematical models and methods, automation, management techniques and approaches as well as industrial case studies.

Possible topics of this Open invited track include but are not limited to:

- Collaborative assembly and cobots (collaborative robots)
- Assembly as a service
- Additive manufacturing for assembly
- Smart assembly work-station design and management, including:
    - equipment reconfiguration, human interaction, advanced ergonomics,
- Smart assembly-line design and load balancing
- Smart part logistics design and management – including the use of block-chain.
- Self-optimization models for assembly systems, including innovative assembly line balancing and sequencing models (including equipment reconfiguration).
- Self-awareness, self-diagnosis, self-configuration and self-healing methods.
- Intelligent support systems to assist workers in their increasingly complex tasks.
- Innovative automation and robotic technologies to enhance the human-robot co-working.
- Virtualization and simulation techniques for decision making in the assembly process environment.
- Novel industrial and real world case studies to test and spread the adoption of "Assembly system 4.0".
- Implementing new technologies in the assembly line (e.g., augmented reality, smart sensors, internet of things (IoT), artificial intelligence (AI), smart robotics, cloud computing (CC), etc.)

Time schedule

31 October 2020	INCOM 2021-draft papers submission deadline
15 December 2020	Notification of acceptance
1 February 2021	Camera ready paper submission
8 February 2021	Early registration deadline
1 April 2021	Regular registration deadline
7-9 June 2021	INCOM 2021: 17th IFAC Symposium on Information Control Problems in Manufacturing - INCOM

Manuscript Preparation

For Manuscript Preparation please look at http://www.ifac.papercept.net/conferences/support/support.php
For Manuscript submission please look at https://ifac.papercept.net/conferences/scripts/start.pl
Upon submission, make sure to use the **Invited session identification code: _ipj56_**

IMPORTANT: See additional submission details in the next page.

For any further information, please contact the Open invited track Technical Committee

Guest Editors

Yuval Cohen, yuvalc@afeka.ac.il
Department of Industrial Engineering, Tel-Aviv Afeka Institute of Engineering,
38 Mivtsa Kadesh, Tel Aviv 69988, Israel

Francesco Pilati
francesco.pilati@unitn.it
Department of Industrial Engineering,
University of Trento,
Via Sommarive, 9, 38123 Povo , Italy

Maurizio Faccio
maurizio.faccio@unipd.it
Department of Management and Engineering,
University of Padova,
Stradella San Nicola 3, 36100 Vicenza, Italy

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Initial Submission Details:

Paper writing & preparations:

The formal deadline for paper submision is: September 30, 2020 (may be extended)

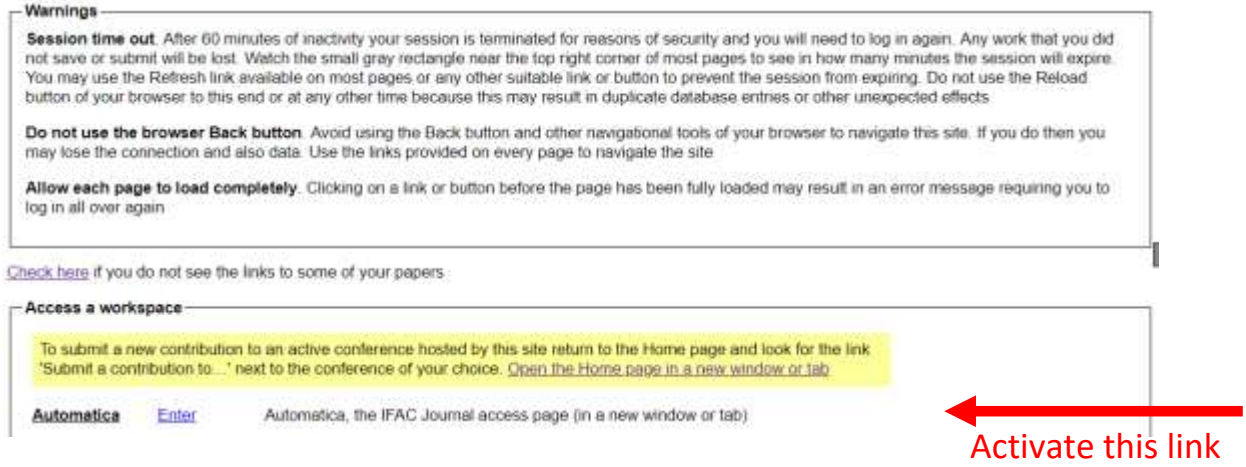
Prepare your paper using the Author guide: https://www.ifac-control.org/events/author-guide

Further paper writing support: http://www.ifac.papercept.net/conferences/support/support.php

WORD template and sample package: http://www.ifac-control.org/events/information-for-ifac-authors

Once your paper is ready for submission:

1. **Go to: http://ifac.papercept.net/conferences/scripts/start.pl**
2. **Log-in with your IFAC Personal Identification Number (PIN) – (*new members can create one).***
3. **Scroll your screen to "Access a workspace" and activate the link: "Open the Home page in a new window" as shown here:**



4. **In the new screen - Scroll down to :**

5. **Activate the link "Submit a contribution to INCOM 2021"**
6. **The upper part of your screen looks like this:**

7. **Scroll down to "Invited Session Paper" and activat the "Submit" link**

First submissions	Regular Paper	June 1, 2020	October 31, 2020	Submit
	Invited Session Proposal	June 1, 2020	October 31, 2020	Submit
	Invited Session Paper	June 1, 2020	October 31, 2020	Submit
	Special Session Proposal	June 1, 2020	October 31, 2020	Submit
	Special Session Paper	June 1, 2020	October 31, 2020	Submit
	Open Track Session Proposal	June 1, 2020	October 31, 2020	Submit
	Open Track Paper	June 1, 2020	October 31, 2020	Submit