



INTERNATIONAL FEDERATION
OF AUTOMATIC CONTROL

IFAC Industry Committee

Tariq Samad, Outgoing Industry Committee Chair

Technological Leadership Institute, University of Minnesota

tsamad@umn.edu

Kevin Brooks, Incoming Industry Committee Chair

University of the Witwatersrand/APC Smart

kevin.brooks@wits.ac.za

11 July 2023

Agenda

- Industry Committee Background and Membership
- Task Force Updates
- Breakout Sessions
- Breakout Session Reports
- General Discussion and Q&A
- Concluding Remarks

Industry Committee Background

- Industry Committee formed as a formal IFAC organization in 2017
 - Preceded by a task force (2011-2014) and a “pilot” phase (2014-2017)
 - IFAC constitution amended to establish Industry Committee as part of IFAC Technical Board, reporting to the IFAC Council
- Objectives of the Industry Committee
“include increasing industry participation in in and impact from IFAC activities”
- We’re about to launch the third triennium of formal Industry Committee operation

Executive Committee



Kevin Brooks (ZA)



Stefano Di Cairano (US)



Moncef Chioua (CA)



Philippe Goupil (FR)



Steve Kahne (US)



Iven Mareels (AU)



Silvia Mastellone (CH)



Alisa Rupenyany (CH)



Tariq Samad (US)



Atanas Serbezov (US)



Alex van Delft (NL)

The IndCom Chair for 2023 – 26: **Kevin Brooks**

- Long career in process control and automation
- Leadership positions with Honeywell and BluESP
- Founded APC Smart in 2021 to mentor, train, and consult in advanced process control
- Honorary Adjunct Professor at the University of Witwatersrand (Wits) in Johannesburg, South Africa
- B.Sc. in Chemical Eng. and Ph.D. from Wits
- President, South African Council for Automation and Control (IFAC NMO) 2013-14—instrumental in 2014 IFAC World Congress organization
- Industry VC, TC 6.2 (Mining, Mineral and Metal Processing)



Kevin (right) with Wits Vice-Chancellor Zebulon Vilakazi at the University's Centenary Celebrations

IFAC Industry Committee Membership Roster

Current membership:

- Total number of members: 114
- Affiliations: 61 industry, 47 academia, 4 government, 2 retired
- Geographies: 55 Europe, 28 N. America, 20 Asia-Pacific, 7 Africa, 4 C./S. America
- 28 countries represented – US (21); CA, DE (7); FR, IT, ZA (6); AU, CN, JP, UK (5)

Please check your details at <https://sites.ifac-control.org/industry/roster> and let Kevin Brooks (kevin.brooks@wits.ac.za) know of any corrections

Committee roster populated through:

- a) Requests to NMOs and TCs for nominees
- b) TC Vice Chairs for Industry
- c) Recommendations for new members, especially with industry affiliations and from underrepresented business sectors, are always welcome

Accomplishments over the triennium (selected)

- “Industry Engagement with Control Research,” T. Samad et al., *Annual Reviews in Control*, 2020
- “The impact of control research on industrial innovation: What would it take to make it happen?,” S. Mastellone and A. van Delft, *Control Engineering Practice*, 2021
- *The Impact of Automatic Control Research on Industrial Innovation: Enabling a Sustainable Future*, S. Mastellone and A. van Delft (Eds.), Wiley/IEEE, 2023 (in press)
- *Best Practices for Enhancing Industry Participation in IFAC Events and Technical Committees*, P. Goupil et al., available on IFAC website
- Five Industry Connect webinars held, led by M. Chioua—available on IFAC YouTube channel
- Conference tutorial session and workshop organized (T. Samad, A. Rupenyan)
- Guidelines for academic/industry collaboration developed and published (R. Rhinehart)
- Two awards approved—for industry contributors and industry-related Ph.D.s (S. Di Cairano)
- Yokohama World Congress: Four forum sessions organized (M. Chioua, T. Samad, A. van Delft)

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Task Forces as Channels for Outcomes

- Communication and metrics – *Kevin Brooks*
- Industry participation in the 2023 World Congress – *Kazuya Asano*
- Industry Committee awards – *Stefano Di Cairano*
- IFAC Industry Connect webinars – *Moncef Chioua*
- Best practices for TCs and technical events to attract industry participation – *Philippe Goupil*
- Control concepts for managerial decision making – *Tariq Samad*
- Edited volume on impact of control on next-generation products and services – *Silvia Mastellone and Alex van Delft*
- Preparing graduate students in control for industry employment – *Alex van Delft* (proposed)
- Open access resources for practitioner education – *Atanas Serbezov* (new)
- Start-ups and entrepreneurship – *Alisa Rupenyan* (new)
- Benchmark problems and data sets – *Kaiqiang Zhang* (proposed)



INTERNATIONAL FEDERATION
OF AUTOMATIC CONTROL

IFAC Industry Committee

Communications and Metrics Task Force

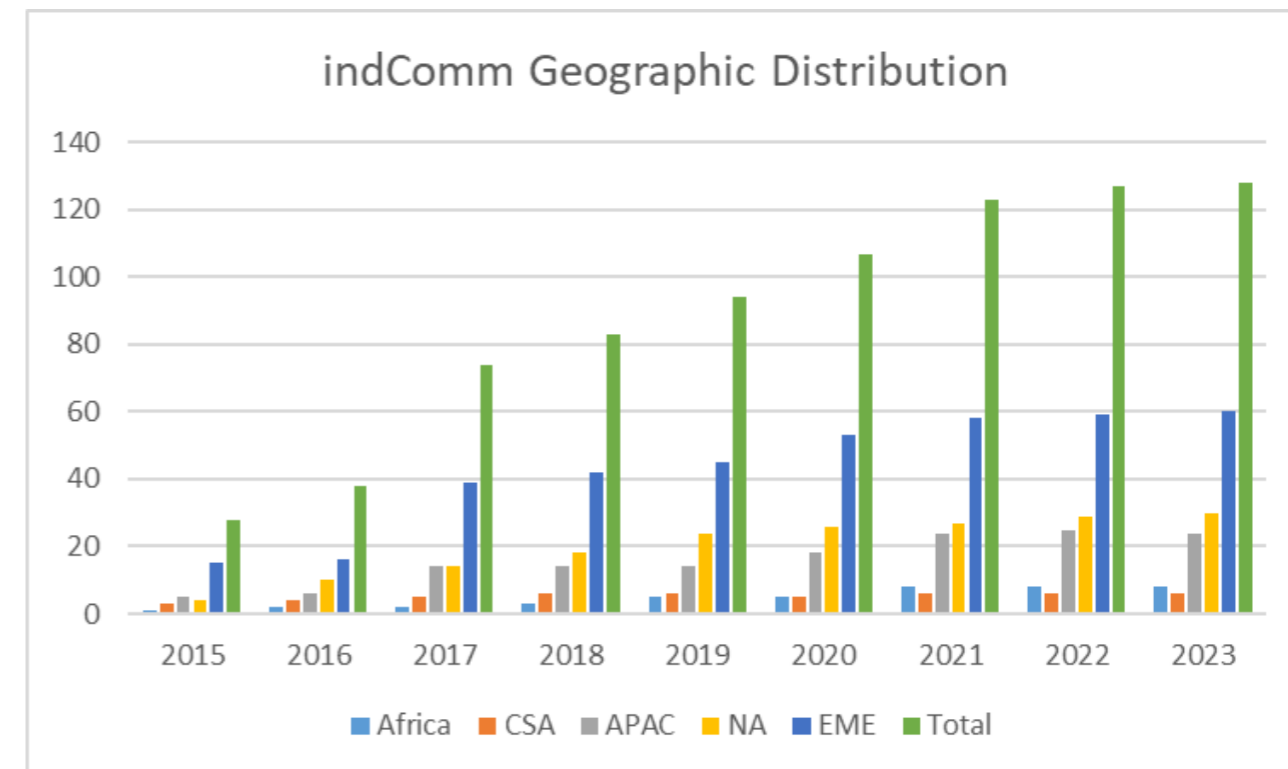
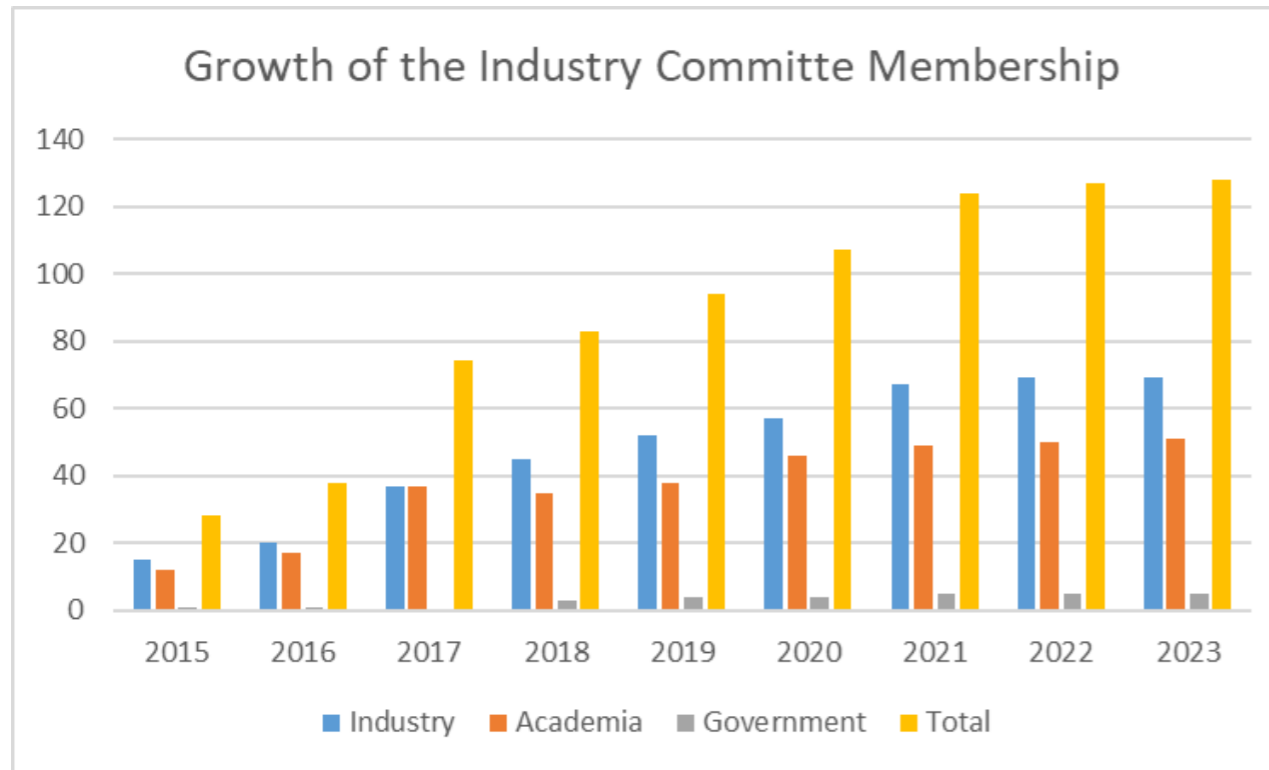
Kevin Brooks, Chair

July 2023

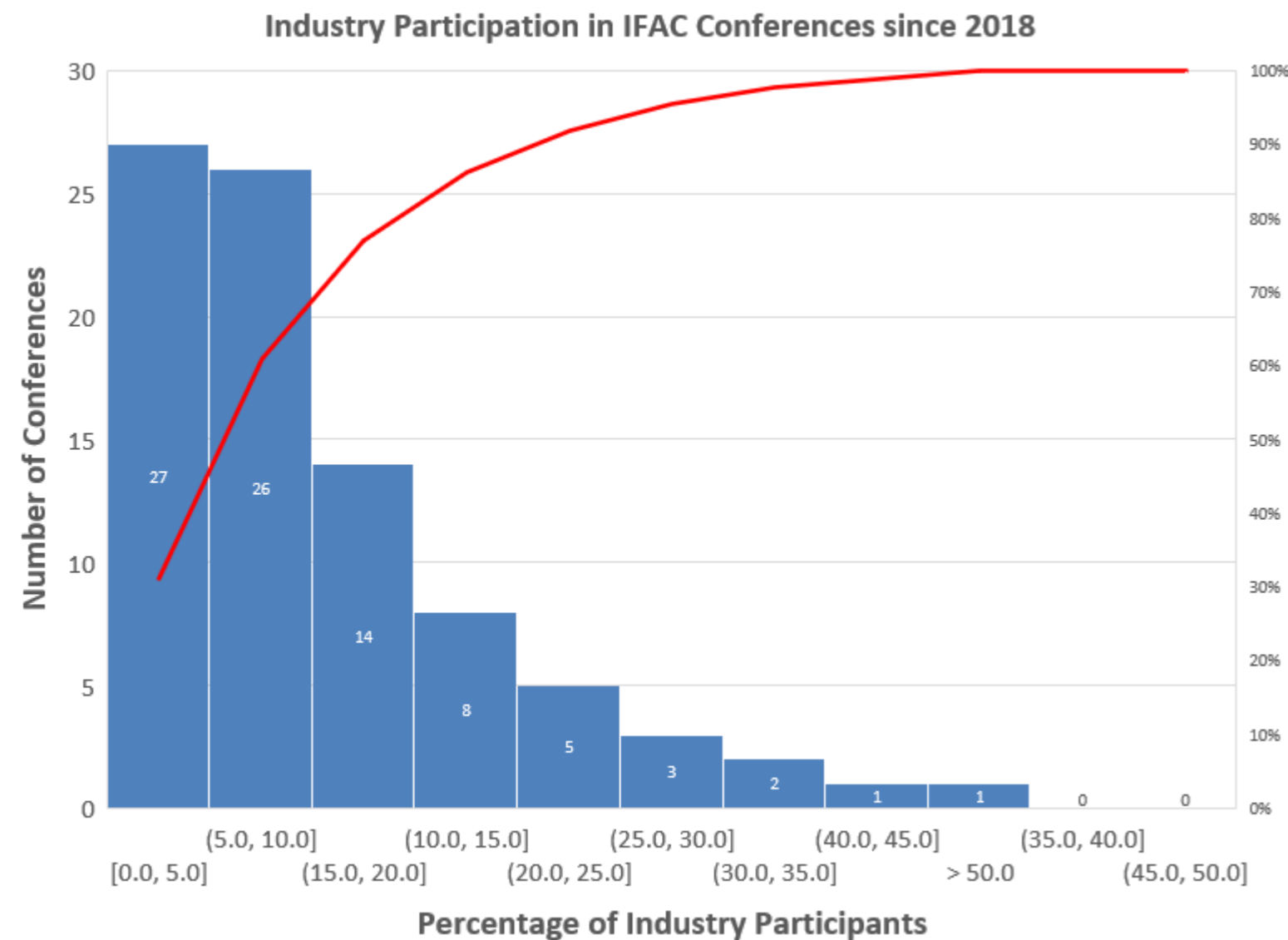
Communication and Metrics - Role

- Ensure communication with Indcomm members
- Publicise IFAC Connect webinars
- Keeping website <https://sites.ifac-control.org/industry> up to date
- Publish documents from Taskforces
- Analyse IFAC meeting reports for industry participation

Industry Committee Makeup



Industry Participation in IFAC Events



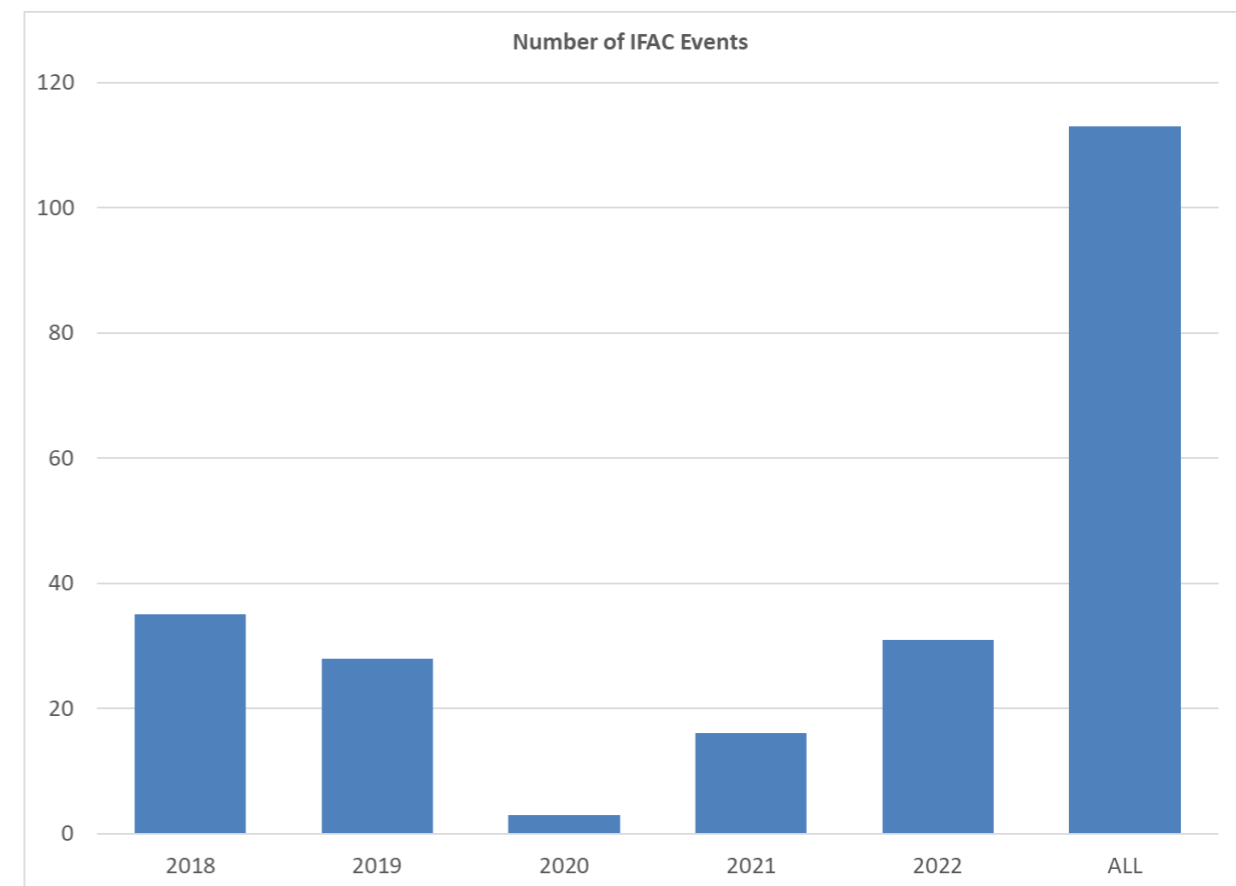
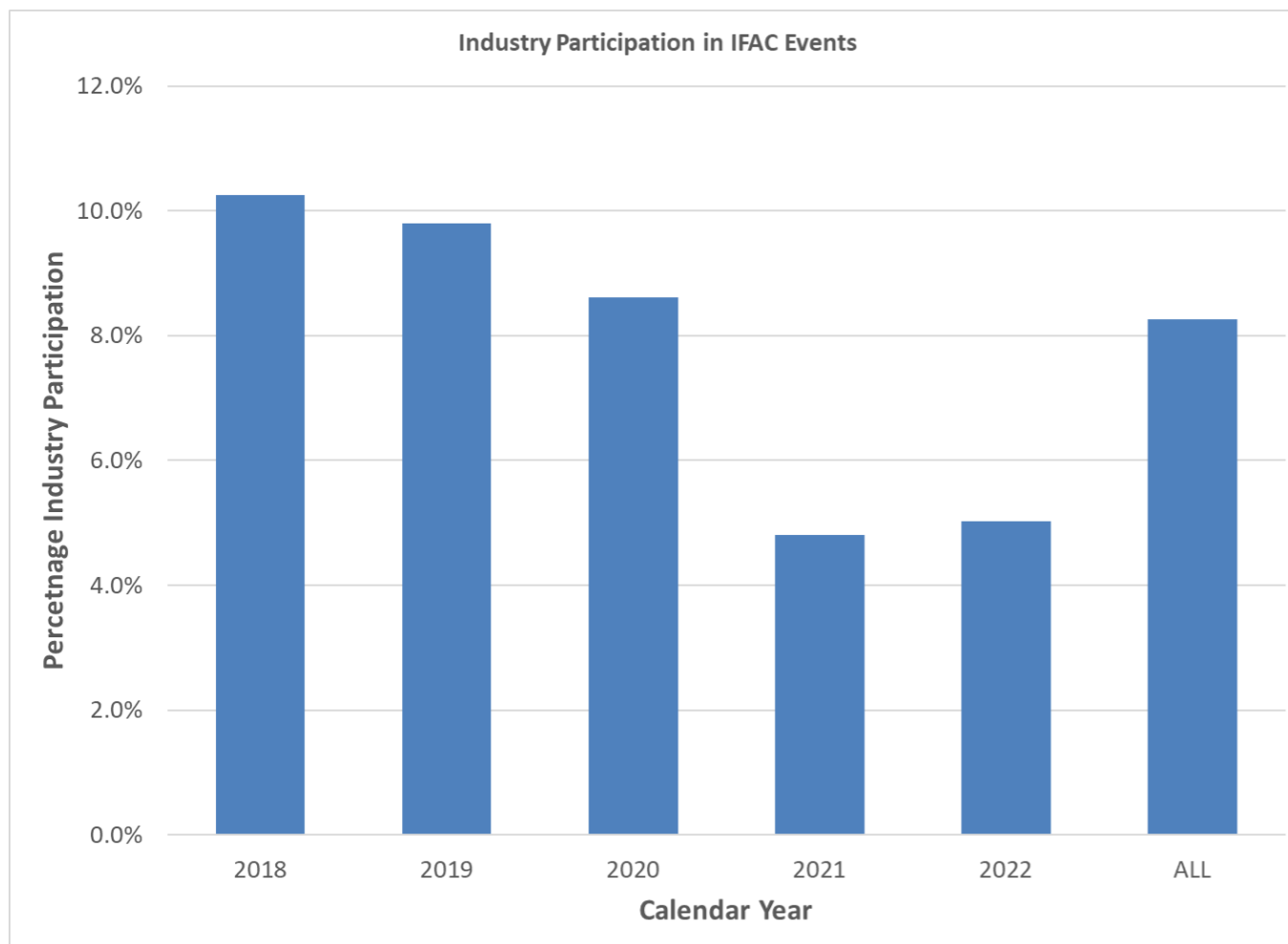
High (>20%) participation in:

- Control, Optimization and Automation in Mining, Mineral and Metal Processing
- Networked & Autonomous Air & Space Systems
- Control of Transportation Systems (x2)
- Automatic Control in Aerospace
- Blockchain and Knowledge Automation
- Robot Control (2018)
- Enterprise Integration, Interoperability and Networking
- Engine and Powertrain Control, Simulation and Modeling
- Control of Power and Energy Systems

No industrial participation for

- Biological and Medical Systems
- Robust Control Design
- Robot Control (2022)
- Discrete Event Systems

Participation and Events by Year



A Heartfelt Request

- Kevin Brooks will be chairing the IFAC Industry Committee for the 2023 – 2026 triennium
- We are looking for a replacement in his role in communications and metrics. This is an Exco role, and important for the smooth operation of Indcomm.
- Volunteers are requested

Support of the Industry Committee for the 22nd IFAC World Congress in 2023

Kazuya Asano, ka-asano@jfe-tec.co.jp

11 July 2023

Industry Committee Forums

- IC Forum 1: The Impact of Automatic Control Research on Industrial Innovation chaired by Kevin Brooks and Benjamin Sawicki, 13:30-15:30, July 11
- IC Forum 2: The Entrepreneurship Route: From Controls Research to Startup Ventures, chaired by Tariq Samad, 13:30-15:00, July 13
- IC Forum 3: Control Systems for Climate Change Mitigation and Adaptation: An Urgent Call, chaired by Tariq Samad and Pramod Khargonekar, 16:00-17:30, July 13

Industry Group & Industry Committee Forum

- IG & IC Forum: Industry 4.0: Examples, challenges and the way forward for human-AI collaboration, chaired by Hideaki Tanaka, 10:00-12:00, July 12

Industry Group Forums

- Artificial Intelligence SG: Current Progress in AI Technology Application
 - Biological and Medical Systems SG: Artificial Intelligence in Biological and Medical Systems
 - Smart Agriculture SG: Technologies and Initiatives in Smart Agriculture and Smart Agricultural Machines in the Japanese Market
 - Systems Science and Technology SG: Co-creative Systems Approach for Sustainable Society
 - Smart Cities SG: Automatic Control for Smart Cities: Can people accelerate control of urban systems?
 - Power and Energy Systems and Environmental Systems SG: State-of-the-art technology and future vision for environment, energy, and power systems
- All Industry Group Forums are on July 10-12.

<https://www.ifac2023.org/program/forums/> for details of IC and IG Forums

Other events organized by the WC2023 Industry Group - 1

More than 30 events including Forums have been proposed and organized by 17 subgroups.

- Citizens' Forums (in Japanese)
 - Aerospace Technology SG, Control in Construction SG, July 9
 - Marine Systems SG: Marine Robots Night Festival, Nippon-maru Memorial Park, July 12
- Workshop
 - Internet of Things SG: Encrypted Control Workshop, July 9
- Invited sessions
 - 10 sessions organized by Mechatronic Systems, Steel Manufacturing Processes, Automotive Control, Smart Cities, Aerospace Technology, Systems Science & Technology, Internet of Things, Measurement & Instrumentation SGs, July 11-14

Other events organized by the WC2023 Industry Group - 2

- Competitions
 - Aerospace Technology SG and MathWorks: MathWorks Mini Drone Competition, July 10-11
 - Aerospace Technology SG and Advanced Robotics Foundation: World Drone Competition, July 11-13
- Exhibitions
 - Power and Energy Systems and Environmental Systems, Automotive Control, Marine Systems, Aerospace Technology (Live video of World Drone Competition, Control in Construction SGs, July 10-14)
- Technical Tours
 - Automotive Control SG: Honda R&D Ltd., Hino Motors Ltd.
 - Smart Agriculture SG: Field Robotics in Japan
 - Systems Science & Technology SG: Hitachi R&D

IFAC WC 2023

- Total papers accepted: 2120
 - Regular 1261, Invited session papers 220, Open invited track papers 621, Dissemination papers 10, Demonstrator papers 8
- Registered participants: 2828 (as of July 3)

1	Japan	574	13	Canada	49
2	China	304	14	Switzerland	48
3	Germany	245	15	Australia	46
4	France	203	16	Belgium	39
5	United States	185	17	India	31
6	Italy	139	18	Russia	29
7	Korea	127	19	Brazil	28
8	Netherlands	109	19	Denmark	28
9	United Kingdom	96	21	Austria	27
10	Sweden	90	21	Taiwan	27
11	Spain	67	23	Finland	26
12	Norway	64	24	Hungary	22



INTERNATIONAL FEDERATION
OF AUTOMATIC CONTROL

IFAC Industry Committee

Awards Task Force

Stefano Di Cairano, Chair

dicairano@ieee.org

July 2023

New IFAC Industry Committee Awards

- New Awards approved:
 - **IFAC Industry Committee Award**
 - Given for control developments in industry with significant business impact
 - Up to 3 prizes per Triennium
 - **IFAC Industry Committee Doctoral Thesis Award**
 - Given for a PhD thesis with potential for significant business impact in industry
 - Up to 3 prizes per Triennium
- Will be active from incoming triennium.
 - Call for nominations about 1y before next IFAC triennium.
- Thanks to Task Force members:
 - Alex Van Delft, Iven Mareels, Francesco Cuzzola, Gian Antonio Susto, Roger Goodall



INTERNATIONAL FEDERATION
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IFAC Industry Connect

Virtual Panel Discussion for the Control Community

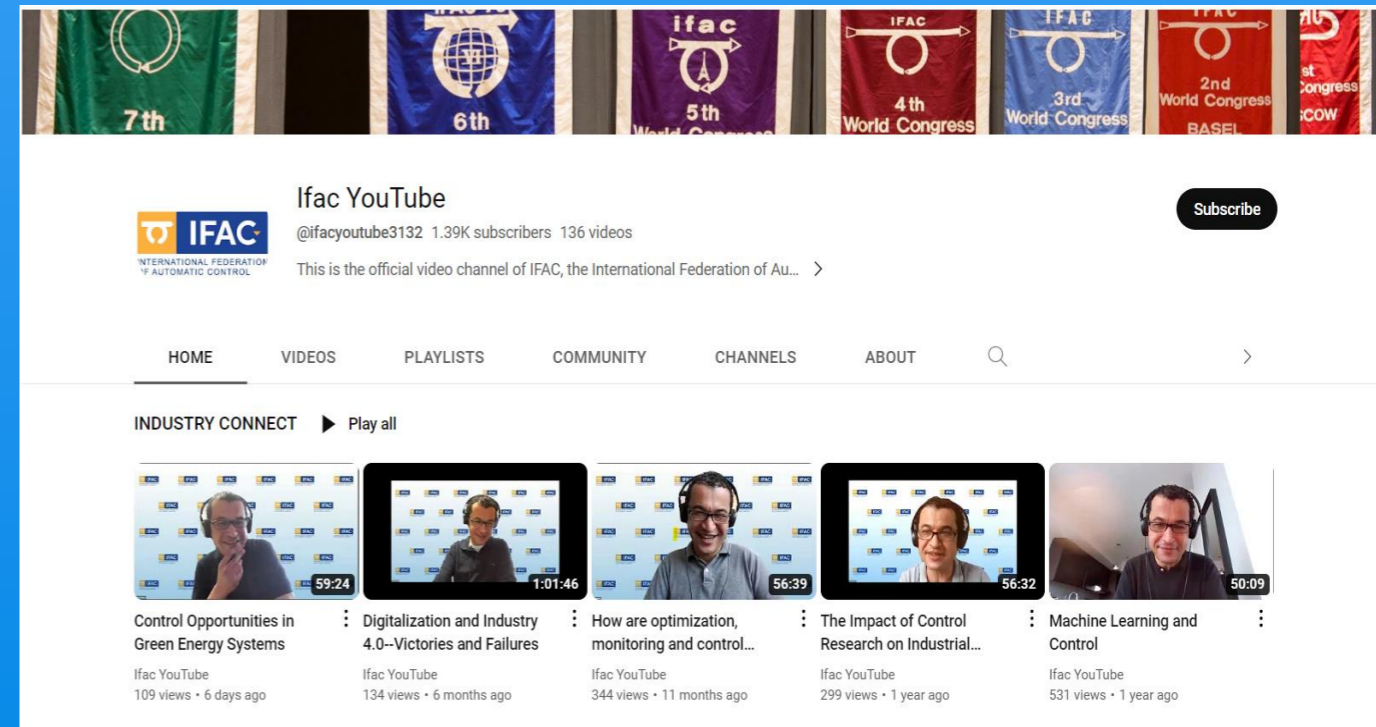
Moncef Chioua, Program Manager

moncef.chioua@polymtl.ca

11 July 2023

IFAC Industry Connect (IIC)

- Developed by IFAC Industry Committee
- (TF: Steve Kahne (chair), Finn Ankersen, Ankur Ganguli, Moncef Chioua)
- Approved by IFAC Officers (July 2021)
- Periodic 60-minute panel-discussion events with 4 – 5 panelists
- Emphasize topics of interest to industry—precompetitive
- Zoom platform (tech support from Conference Catalyst, IFAC YouTube channel)
- No publications, no papers, registration compulsory (free of charge)
- Five events held between June 2021 and June 2023



Video recordings available at:

https://www.youtube.com/playlist?list=PLLhem8_dLoaoikHfRxezejVZRLJhjtOVN 24

Industry Connect Topics and Panelists

- **The Impact of Control Research on Industrial Innovation: What would it take to make it happen? (06/2021)**
Hans Aalto, Finn Ankersen, Alex van Delft, Silvia Mastellone and Iven Mareels.
- **Machine Learning and Control (2021/10)**
Lane Desborough, Biao Huang, Alf Isaksson and Greg Stewart.
- **How are optimization, monitoring and control bringing performance and economic value to industry? (07/2022)**
Lidia Auret, Loutjie Coetzee, Oleg Gusikhin, Stéphane Renou and Tariq Samad.
- **Digitalization and Industry 4.0--Victories and Failures (12/2022)**
Iven Mareels, Ahmed Ragab, Alisa Rupenyan and Georg Weichhart.
- **Control opportunities in Green Energy Systems (06/2023)**
Aitor Arnaiz, Rogier Blom, Cristian Kunusch and Peter Fogh Odgaard.

Future events topics

- Curriculum for Control Engineering, an industry opinion
- Quantify risks as part of the design process
- Special session with authors of “The impact of automatic control on the future of industrial innovation” (Book available in 2024, coordinated by the IFAC Industry Committee)

Your input is needed!



INTERNATIONAL FEDERATION
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Task Force on Best Practices for Attracting Industry Participation

Philippe Goupil, chair

philippe.goupil@airbus.com

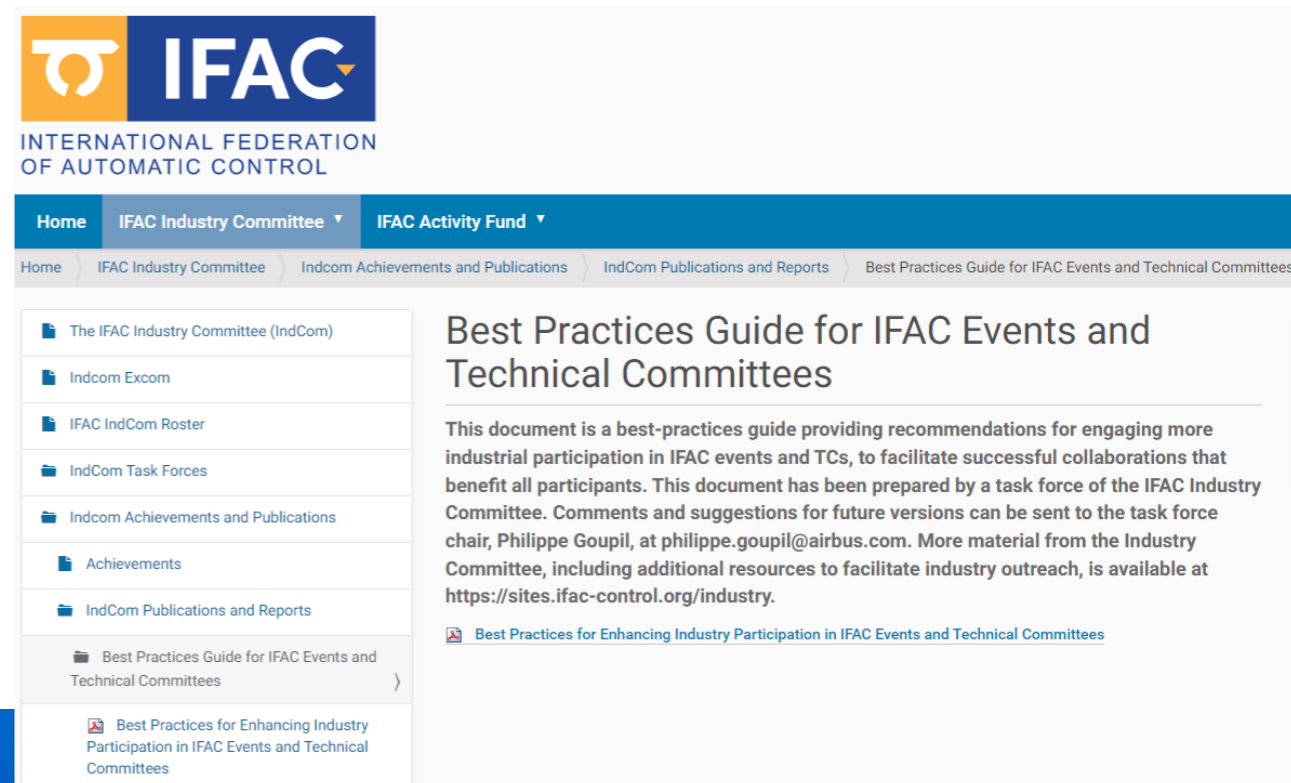
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Task Force on Best Practices for technical events and TCs to attract industry participation (chair: P. Goupil, Airbus)

- ✓ Conference and TC support:
 - An updated version of the Best Practices guide for Enhancing Industry Participation in IFAC Events and Technical Committees is available at: <https://sites.ifac-control.org/industry/committee-reports-and-presentations/indcom-publications-and-reports/best-practice-guide>
 - The current version of the guide is being **distributed to all event organizers** by IFAC Secretariat.
 - **Feel free to send any remarks, suggestions, comments...** to enrich the guide.

The new version includes:

- A more detailed description of a key role:
the IPC Vice-Chair of Industry
- The discussion papers
- A small update on the benchmarks



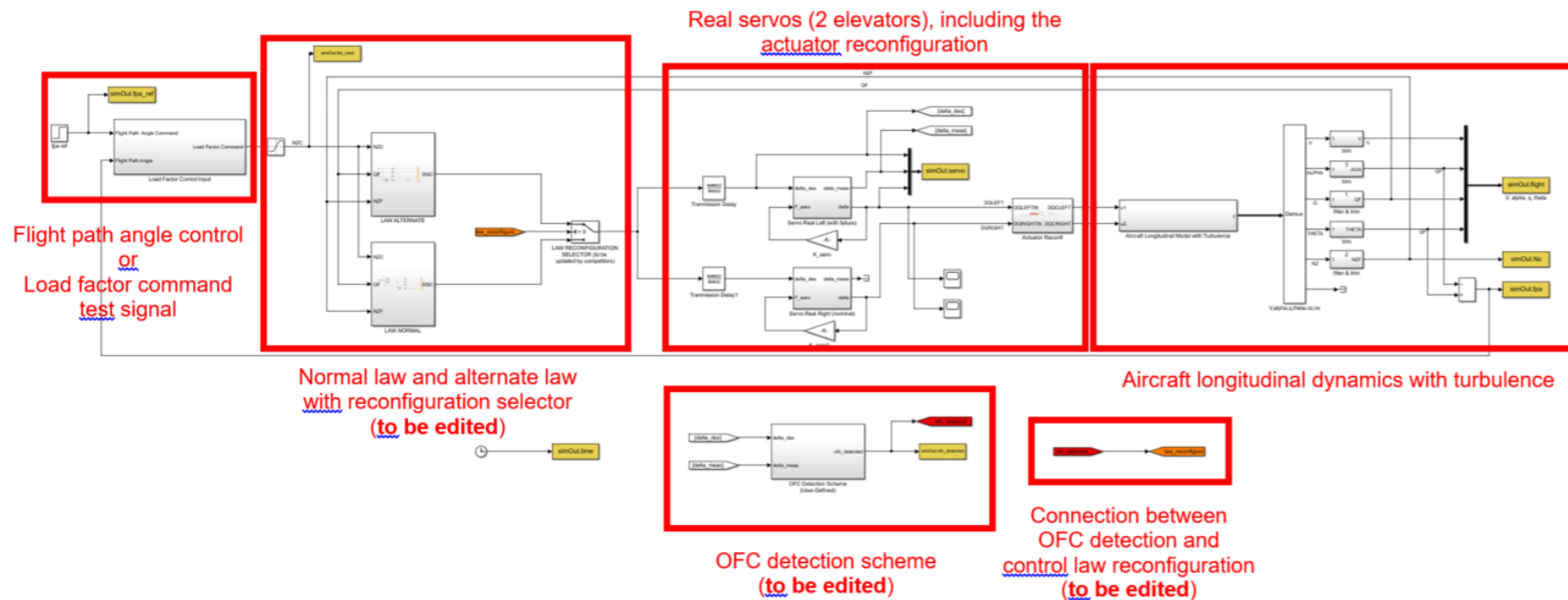
The screenshot shows the IFAC website interface. At the top is the IFAC logo and the text "INTERNATIONAL FEDERATION OF AUTOMATIC CONTROL". Below the logo is a navigation bar with "Home", "IFAC Industry Committee", and "IFAC Activity Fund". A breadcrumb trail reads: "Home > IFAC Industry Committee > Indcom Achievements and Publications > IndCom Publications and Reports > Best Practices Guide for IFAC Events and Technical Committees". The main content area is titled "Best Practices Guide for IFAC Events and Technical Committees". It contains a paragraph: "This document is a best-practices guide providing recommendations for engaging more industrial participation in IFAC events and TCs, to facilitate successful collaborations that benefit all participants. This document has been prepared by a task force of the IFAC Industry Committee. Comments and suggestions for future versions can be sent to the task force chair, Philippe Goupil, at philippe.goupil@airbus.com. More material from the Industry Committee, including additional resources to facilitate industry outreach, is available at <https://sites.ifac-control.org/industry>." Below this is a link: "Best Practices for Enhancing Industry Participation in IFAC Events and Technical Committees". On the left side of the page, there is a sidebar menu with the following items: "The IFAC Industry Committee (IndCom)", "Indcom Excom", "IFAC IndCom Roster", "IndCom Task Forces", "Indcom Achievements and Publications", "Achievements", "IndCom Publications and Reports", "Best Practices Guide for IFAC Events and Technical Committees", and "Best Practices for Enhancing Industry Participation in IFAC Events and Technical Committees".

Task Force on Best Practices for technical events and TCs to attract industry participation (chair: P. Goupil, Airbus)

- ✓ Example of recommended practice: propose benchmarks for Competition !
- Aerospace competition: an enriched version of the WC 2020 benchmark has been proposed for WC 2023 (Open Invited Session - MoA16)



Airbus & Stellenbosch Univ. (ZA)
A way to bridge the gap between Academia and Industry, based on a real industrial challenge.



Awards during the Closing Ceremony.



INTERNATIONAL FEDERATION
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Task Force: Control Concepts for Managerial Decision Making

Tariq Samad

tsamad@umn.edu

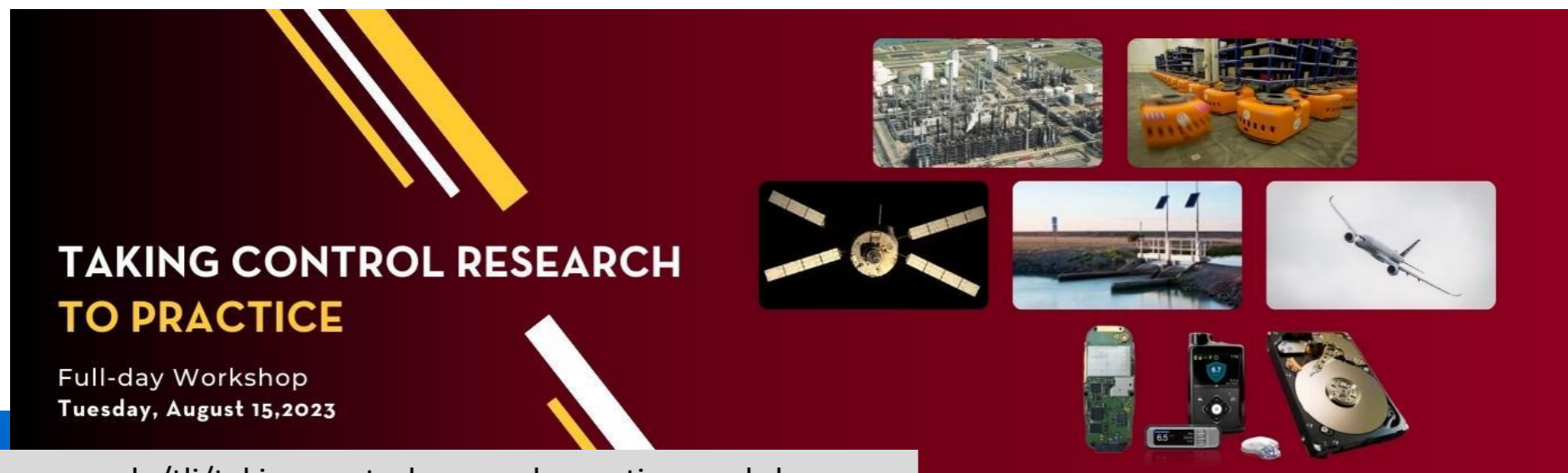
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Control Concepts for Managerial Decision Making

- The relevance of control extends beyond engineered systems
- Even if the mathematical machinery of control theory isn't applicable to managerial decision making, the concepts of control are!
- The task force is meeting regularly and having occasional e-mail discussions on a variety of relevant topics, e.g.:
 - Climate Change, Planet Exploitation & Norbert Wiener's Cybernetics (Iven Mareels)
 - Industrial Perspective on Machine Learning and AI Challenges in Process Systems Engineering (Leo Chiang)
 - Managerial Decision Making Based on Control Principles (Tariq Samad)
 - Medical devices are on the same trajectory as cars, aircraft, and petrochemical plants. What can we learn? (Lane Desborough)
 - Digital Product Passport for batteries: A circular economy trend (F. Cuzzola) – next meeting
- Tutorial session organized at 2022 American Control Conference; planning on more sessions/workshops at conferences next year

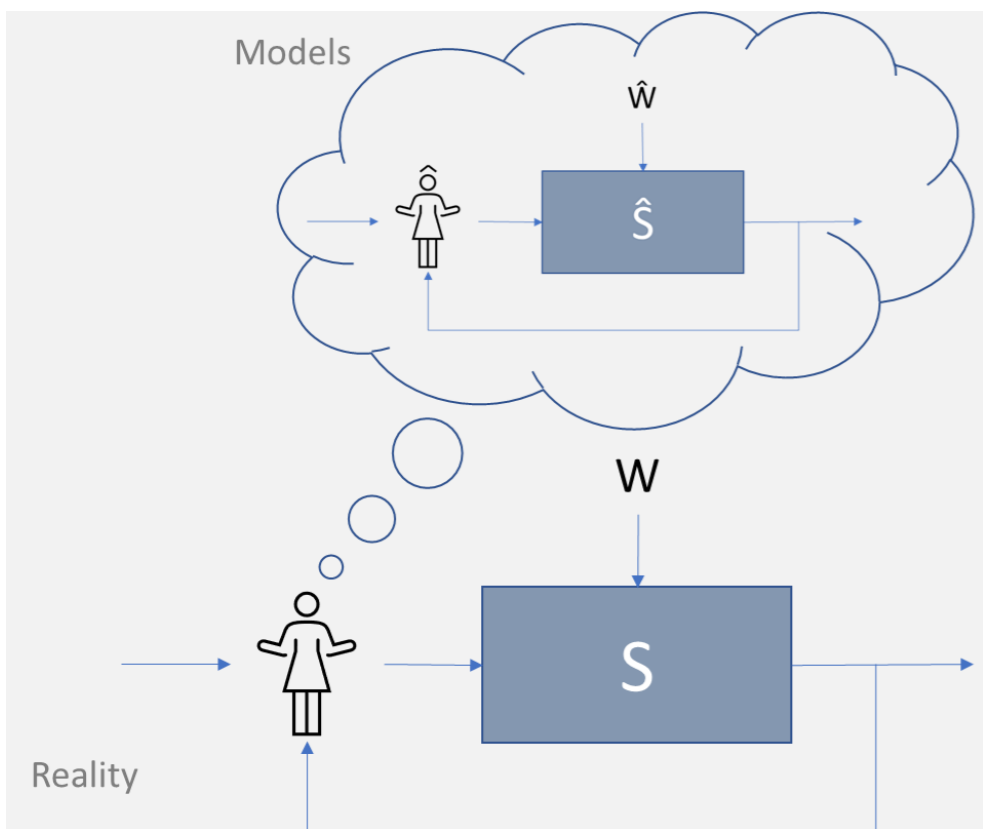
Workshop: From Research to Practice in Control

- Workshop in 2023 IEEE Conf. on Control Technology & Applications (CCTA), Bahamas, August 15, 2023
 - Organizers/chairs: Tariq Samad (Univ. of Minn.) and Alisa Rupenyan (Inspire / ETH Zurich)
- Presentations include:
 - Maximizing the Impact of Control Research: Lessons Learnt from Joint Industry-Academia Projects – Alisa Rupenyan
 - Enablers for Impactful Research with Industry – Kingsley Fregene (Lockheed Martin)
 - Innovation in a Living Lab – Benjamin Sawicki (NCCR Automation)
 - Tools for Managing Technological Innovation – Tariq Samad
 - Managerial Decision Making Based on Control Principles – Tariq Samad



A goal for next year

- Develop a short course on applying control concepts to management and leadership



T. Samad, "Control Systems — Concepts and Insights for Managerial Decision Making," *Proc. IEEE 10th Int'l Conf. on Intelligent Systems*, Varna, Bulgaria, Aug. 2020

Insights from Control . . . for Decision Making

- **Feedback** and **feedforward**—counteracting uncertainty and improving response time
- **Models** are essential for improving performance—and they are in the crania of decision makers!
- **Uncertainty, noise, and disturbances**: rigorous methods available to handle each
- Distinctions—and tradeoffs—between **performance / robustness / adaptation**
- **Exploration** versus **exploitation**—there's no free lunch
- Control loops and **stability**: Well-designed control can make an unstable system stable; poor control can make a stable system unstable
- **Sampling rates** should be sensitive to system dynamics—over-sampling can result in over-reaction, waste resources
- The right variables for decision-making are not outputs but **states—estimation** is necessary
- How to update mental models: **sufficient excitation** is required
- Hierarchical and multi-level control—theory extends to **systems of systems**



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Task force: The impact of control research on industrial innovation

Task force (proposed): Preparing graduate students in control for industry employment

Alex van Delft

alex@vandelft.it

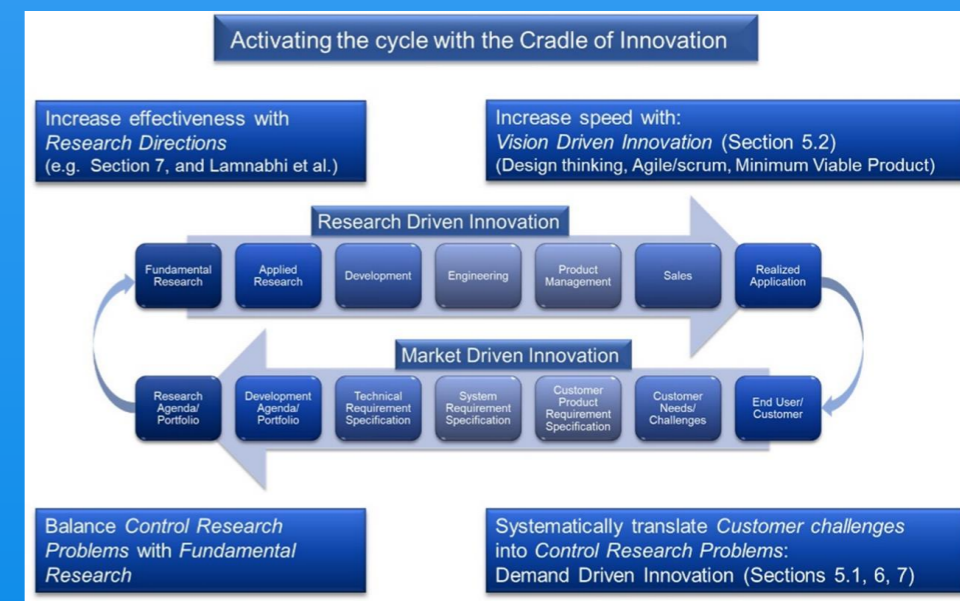
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Task Force: “The impact of control research on industrial innovation” *Edited Volume.* Chairs: Silvia Mastellone (CH) and Alex van Delft (NL)

Edited Volume

“The Impact of Automatic Control Research on Industrial Innovation: Enabling a Sustainable Future”

- Purpose: *Establish a control research agenda based upon industry requirements in different clusters*
- Based on Control Engineering Practice 2021 paper and IFAC Industry connect webinar
- Will be published as edited volume in *Wiley/IEEE Press Series on Control Theory and Applications.*



Task Force: “The impact of control research on industrial innovation” *Edited Volume.* Chairs: Silvia Mastellone (CH) and Alex van Delft (NL)

Status today:

- Editorial Board has completed the manuscript April 2023, Final production with J. Wiley & Sons is ongoing and aimed for September 2023.
- Chapters on *Process industry, Robotics and Manufacturing automation, Data industry, Energy and power conversion, Automotive, Building automation*, as well as non-technical issues of educational aspects, ethics, regulations, etc.
- Book is also aimed to be used as textbook for graduate students.
- Forum session today at 13.30 hrs, IFAC World Congress 2023: Flyers available !
- Editors are preparing supporting activities for the book (webinars, summer schools etc.)



The Impact of Automatic Control Research on Industrial Innovation: Enabling a Sustainable Future

Silvia Mastellone (Editor), Alex van Delft (Editor)

Hardcover 978-1-119-98361-3 December 2023

\$140.00



SERIES

IEEE Press Series on Control Systems Theory and Applications

Editorial board: Silvia Mastellone (University of Applied Science Northwestern Switzerland), Alex van Delft (vanDelft.it, DSM), Tariq Samad (University of Minnesota), Iven Mareels (Federation University Australia, IBM), Scott Bortoff (Mitsubishi Electric Research Labs), Stefano Di Cairano (Mitsubishi Electric Research Labs) and Alisa Rupenyan (ETHZ)

New Task Force idea: “Preparing graduate students in control for industry employment” Chair: Alex van Delft (NL)

Preliminary objective: *Increase effectiveness, effectivity and job satisfaction of graduate students pursuing a career in industry*

- My thoughts (based on personal experiences joining a multinational process industry after my MsC/PhD in Automatic Control).
 - How to set up a business case ? What is the value of automation ?
 - How is industry organized ? Who are the stakeholders ?
 - What is “good enough” in terms of automatic control ?
 - How to set up an automation policy/strategy ?
 - What are career paths for a control engineer
- Your thoughts on this topic ?
 - What should be part of the curriculum ?
 - How to organize (internships etc)?
 - Incorporate the Edited Volume (see TF) in a graduate course ?
- Are you interested in joining/contributing to this “to-be” TaskForce ?

A formal TF proposal to be composed afterwards





INTERNATIONAL FEDERATION
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Open Access Resources for Practitioner Education

IFAC Industry Committee Task Force

Atanas Serbezov

serbezov@rose-hulman.edu

July 11, 2023

Motivation

- Curated repositories of open access online resources will serve the practice community to
 - Refresh on fundamentals;
 - Prepare for licensure examinations;
 - Learn new skills.
- There are many open resources, but they are scattered all over the place.
- The goal is to curate lists of open access resources developed for practitioners and accessible through a common portal.

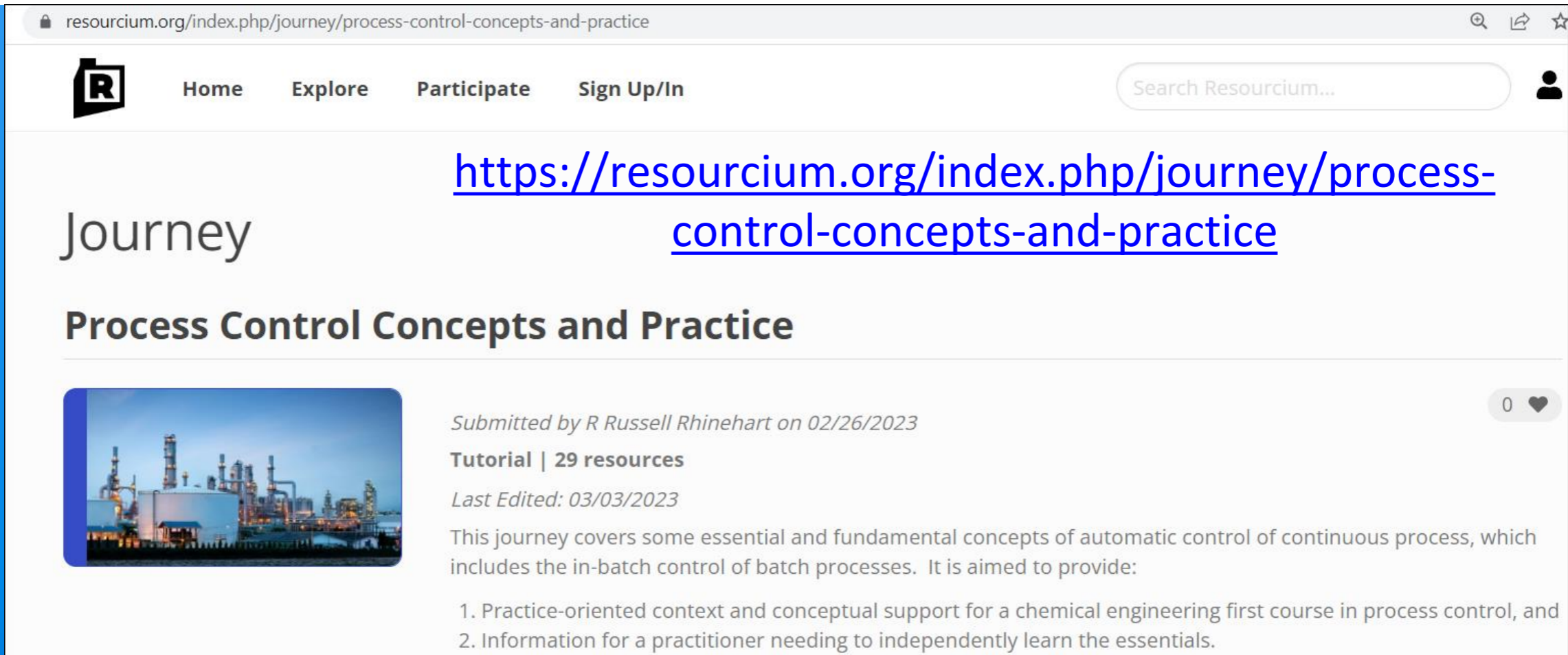
Process

- Identify topics of interest to the practice community and subject matter experts who are willing to volunteer their time to curate a list of open access resources.
- Utilize the resourcium.org platform to organize the resources in a journey.
- American Automatic Control Council (a2c2.org) has agreed to host a portal for the links to the Resourcium journeys
- The Industry Committee web site may also provide a portal for the links (to be explored).

Task Force Participants

- Atanas Serbezov serbezov@rose-hulman.edu
- Russ Rhinehart
- Lars Eriksson
- Gernot Herbst
- More volunteers are welcome, contact Atanas Serbezov

Resourcium Journey Example



The screenshot shows a web browser window with the URL resourcium.org/index.php/journey/process-control-concepts-and-practice. The page features a navigation menu with 'Home', 'Explore', 'Participate', and 'Sign Up/In', along with a search bar and a user profile icon. The main content area displays the journey title 'Process Control Concepts and Practice' and a thumbnail image of an industrial facility. The journey is described as a tutorial with 29 resources, submitted by R Russell Rhinehart on 02/26/2023 and last edited on 03/03/2023. The description states that the journey covers essential and fundamental concepts of automatic control of continuous process, including in-batch control of batch processes, and is aimed to provide:

1. Practice-oriented context and conceptual support for a chemical engineering first course in process control, and
2. Information for a practitioner needing to independently learn the essentials.



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IFAC Industry Committee Task Force on Entrepreneurship and Start-ups

Alisa Rupenyan, Chair

rupenyan@inspire.ethz.ch

July 2023

Task Force Entrepreneurship and Startups

- Truly global team: Alisa Rupenyan, Atanas Serbezov, Ming Ge, Lane Desborough, Thomas Jones
- TF Goal: Encourage and support innovation and technology transfer in the control field through entrepreneurship
- TF Activities:
 - Inputs from entrepreneurs in the field
 - Best practices for startups at different stages of development
 - Mentorship / networking opportunities
 - Forums / webinars around the topic
 - Facilitating collaboration between academia and aspiring entrepreneurs
- Kick-off: Now - June / July 2023
- First action: Collecting relevant contacts, collecting topics for questionnaire / survey



INTERNATIONAL FEDERATION
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IFAC Industry Committee Task Force on Benchmarking (proposed)

Kaiqiang Zhang

kaiqiang.zhang@ieee.org

July 2023

Task Force Initiative – Benchmarking

Motivations:

(Benchmarking problems are important)

- Problem statements for the control community
- Collect new data sets and benchmarks
- Relay well-known and long-established benchmarks
- Curation of benchmarks

Team:

Kaiqiang Zhang, Lars Eriksson, Andres Marcos, Philippe Goupil (Ex board)
with support from Kevin Brooks (Ex board), Tariq Samad (Ex board),
and **YOU**

Task Force Initiative – Benchmarking

What to do now?

- Discuss about what our IFAC IndCom SHALL do
 - Direct the task force FOCUS
 - PLAN the actions, effort and resources

 - Need everyone to join the discussions
 - Need YOU to join the task force
- (please contact kaiqiang.zhang@ieee.org if you feel interested in joining.)

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Breakout Sessions!

- Breakout sessions on (some or all of) the following topics:
 - Preparing graduate students for industry employment
 - Entrepreneurship and start-ups
 - Industry benchmark problems and data sets
 - Open-access educational resources for practitioners
 - General discussion on industry and control engineering/research
 - *Any other topics of interest?*
- For the hybrid meeting, we'll have separate in-person and online breakouts
- Approx. 25 minutes for discussion
 - Start with introductions
 - The respective task force chair may be in the breakout; if not, identify a rep for the report-out
 - You'll get a reminder a few minutes before closure
- You should get a pop-up enabling you to join the session of your choice
 - Tariq will assign you in case you don't

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Opportunities to contribute!

- Participate in a task force
- Propose a new task force
- Suggest additional members for the committee
- Volunteer your services to the Industry Committee
 - We're specifically looking for a new Executive Committee member who can help with communications and metrics

Contact Kevin Brooks at kevin.brooks@wits.ac.za and/or Tariq Samad at tsamad@umn.edu