



Technical Committee on Networks and Communication Systems

Yearly report

October 2025

Chair:

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TC scope and mission

Research on network systems has gained significant momentum within the CSS community, driven by rapid advances in control, learning, computation, and communication. These developments are enabling a new generation of networked systems characterized by complex interconnections, dynamic behavior, and tight integration with the physical world. This expanding field bridges networks, control, learning, optimization, and systems theory, with applications ranging from transportation and power systems to the Internet of Things (IoT), smart cities, and socio-economic, financial, and biological networks.

The IEEE Technical Committee on Networks and Communication Systems is at the forefront of this evolution, promoting cutting-edge research in learning, optimization, and control for networked systems. By providing a collaborative forum, the committee facilitates the exchange of ideas on the modeling, analysis, optimization, and control of emerging network systems with both social and technological dimensions. It actively coordinates member activities, such as organizing specialized workshops and hosting invited sessions on networks at prominent conferences like ACC and CDC. Additionally, the committee strives to enhance the visibility and dissemination of high-quality research by supporting and increasing CSS publications in this vital area. Through these efforts, the IEEE Technical Committee on Network Systems plays a pivotal role in addressing the multifaceted challenges of modern networked environments across various sectors.

Chair

Emiliano Dall'Anese
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Date of first appointment: January 1, 2025.

Major activities of the chair (January 2025–present): During the period January 2025–October 2025, the chair carried out the following activities:

- i) Rebuilt and periodically updated the list of members of the Technical Committee (TC): sent membership poll, updated emails and affiliations, removed inactive members, and invited new members.
- ii) Updated the TC's website:
 - Rebuilt the "TC Members" page: updated list of members, emails, and affiliations.

- Created the “Student Paper Prize” page: provided information on the TC members involved in the selection process and listed TC Outstanding Student Paper Award winners.
 - Updated the home page: revised mission statement.
- iii) Solicited feedback and sent out poll to TC members for a new name of the Technical Committee. The rationale was to better captures the current research interests of the TC members, better aligned with sessions at CDC/ACC/etc, and it is more aligned with the CSS mission. Based on the votes of the TC members, the proposal is to change the TC name from “TC on Networks and Communication Systems” to:

“TC on Network Systems”.

Another option was “TC on Learning, Decisions, and Control for Network Systems,”; however, it was judged to be too lengthy and inconsistent with the naming convention of other TCs.

The Chair informed the VP of Technical Activities Mario Di Bernardo on May 21, 2025.

- iv) Solicited feedback on names of the TC’s Working Groups and their missions.

Membership

As of October 7, 2025, the TC has **98** active members. The TC includes faculty, researchers (aggregating the titles of Senior Scientist, Senior Researcher, Researcher, Research Fellow, etc), Postdocs, and Ph.D. students as shown in Figure 1. The percentage of female members is 10.2%.

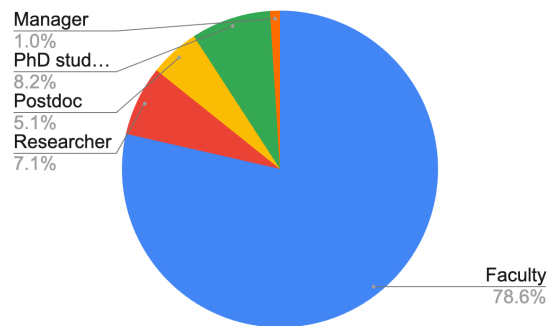


Figure 1: TC members' positions as of October 7, 2025.

Working groups

The TC has the following Working Groups (WGs):

1. Control of Network Systems, chaired by **Paolo Frasca**;
2. Networked Sensing and Sensor Networks, chaired by **Venkatesh Saligrama**;
3. Optimization and Game Theoretic Methods in Networks, chaired by Francesca Parise (stepped down) → **Open position**;

4. Information Networks and Control, chaired by **Takashi Tanaka**;
5. Cybersecurity and Privacy, chaired by **Yilin Mo**;
6. Infrastructure Networks, chaired by **Ketan Savla**;
7. Internet of Things, chaired by **Rolf Findeisen**;
8. Learning, Dynamics and Behaviors in Social Systems, chaired by **Chiara Ravazzi**.

Solicitations for nominations for the chair of the WG Optimization and Game Theoretic Methods in Networks have been sent to the TC members. The Chair has solicited feedback on names and missions of the WGs; in particular, to better align with current research trends and the expertise of the TC members, the Chair provided some suggestions as follows:

1. Control of Network Systems
2. Networked Sensing and Sensor Networks → **Learning in Network Systems**;
3. Optimization and Game Theoretic Methods in Networks → **Optimization and Games in Network Systems**
4. Information Networks and Control
5. Cybersecurity and Privacy
6. Infrastructure Networks
7. Internet of Things → **IoT and Communications**
8. Learning, Dynamics and Behaviors in Social Systems, → **Social Systems**.

This will be discussed in the next TC meeting.

Website

The website is: <https://ieeecss.org/technical-committee/networks-and-communications>.

The Chair performed a major update of the website (see “Major activities of the chair” above). The website is periodically updated by the Chair to reflect changes in the TC membership, affiliations, etc.

Planned changes in the website include:

- Update the page “Documents” to “Yearly reports” and re-organize the contents.
- Create a page “Events and Schools”;
- Create a page “Student resources”;
- Create a page “Resources” .

These changes will be discussed at the next TC meeting.

Activities organized in the past year

Activities are listed below (in no particular order).

a) Workshop, conference, symposium

- Yilin Mo was the Program Co-Chair of the 10th IFAC Conference on Networked Systems (NecSys 25), June 2 to 5, 2025, Hong Kong University of Science and Technology.
- Florian Dörfler, Hideaki Ishii, Karl Henrik Johansson, and Sonia Martinez were plenary speakers at the 10th IFAC Conference on Networked Systems (NecSys 25), June 2 to 5, 2025, Hong Kong University of Science and Technology.
- Francesco Bullo organized the workshop entitled “Contraction Theory for Systems, Control, Optimization, and Learning” at the 2024 Conference on Decision and Control in Milan, 2024.
- Giovanni Russo co-organized the workshop entitled “Control and Optimization in the Probability Space” at the 2024 Conference on Decision and Control in Milan, 2024.
- Giacomo Como co-organized the workshop: Lacro Pavel, Luca Schenato, Jeff Shamma, and Giacomo Como, “Past and Future in Control of Networked Systems: Insights and Perspectives,” at the 2024 Conference on Decision and Control in Milan, 2024. This was part of the celebration for the 10th anniversary of the IEEE Transactions on Control of Networked Systems.
- Shuang Gao co-organized the workshop: Peter E. Caines, Xudong Chen and Shuang Gao, “Workshop on Control and Games on Large Graphs,” Hong Kong University of Science and Technology IFAC Conference on Networked Systems, 2025.
- Matthew Hale organized the workshop: “Applied Category Theory for Compositional Decision Making,” American Control Conference, 2025.
- Emiliano Dall’Anese organized the workshop: E. Dall’Anese, C. Cassandras, E. Ntawong, “A Roadmap for Intelligence and Resilience in Power Grids,” Boston University, Nov. 2025. <https://www.bu.edu/cise/a-roadmap-for-intelligence-and-resilience-in-power-grids/>
- Yannis Paschalidis co-organized the symposium: AI for Biomedical Research & Drug Discovery - A Virtual Symposium of the AI Alliance.
- Nicola Bastianello and Angela Fontan organized a joint workshop KTH-University of Padova on “emerging topics at the intersection of learning, control, and optimization;” <https://sites.google.com/view/joint-workshop-kth-unipd/home>.
- Serdar Yüksel co-organize the workshop: Aditya Mahajan, Panagiotis Tsiotras and Serdar Yüksel, “Workshop on Large Population Teams: Control, Equilibria, and Learning,” IEEE Conference on Decision and Control, Dec. 2024. <https://dcs1gatech.github.io/cdc24-large-teams-workshop/>
- Lorenzo Zino, Angela Fontan, and Alessandro Rizzo co-organized with K.H. Johansson, P.U. Lima, S. Pequito the workshop “Complex Socio-Technical Networked Dynamics” at the IEEE Conference on Decision and Control, 2024.

- Lorenzo Zino and Alessandro Rizzo co-organized the Mini-symposium "Modeling and Controlling Human Behavior in Complex Systems" at the SIAM Conference on Applications of Dynamical Systems.
- Chiara Ravazzi co-organized a workshop on Fair Decision-Making and Societally-Aware Control in Networked Systems" at CDC 2024.
<https://sites.google.com/view/cdc-2024-fairworkshop/schedule>
- Michelle Chong and Henrick Sanbergmco-oeganized the workshop on Resiliency of Cyber-Physical-Human Systems at ACC 2025.

b) **Invited sessions and tutorials**

- Liangming Chen organized the open invited track titled "Advances in Rigidity Theory, Multi-Agent Formations, and Distributed Localization" at IFAC 2026.
- Matthew Hale attended and had a paper at the Invited Session called "Spreading Processes in Complex Systems: Analysis, Control, and Estimation," American Control Conference, 2025.
- Sebin J. Gracy co-organized the invited session: S. Gracy, J. I. Caiza, and P E. Pare, "Complex Networks - Analysis and Control", 2024 63rd IEEE Conference on Decision and Control, Milan, Italy 2024.
- Sebin J. Gracy co-organized the invited session: S. Gracy, C A. Uribe, P E. Pare, and E D Sontag, "Spreading Processes in Complex Networks: Analysis, Control and Observability", American Control Conference, Toronto, Canada 2024.
- Sebin J. Gracy co-organized the invited session: S. Gracy, C A. Uribe, P E. Pare, and M. Cao, "Complex Networks - Analysis and Control", European Control Conference, Stockholm, Sweden 2024.
- Shuang Gao co-organized the invited session: Peter E. Caines, Dena Firoozi and Shuang Gao, "Recent Advances in Mean Field Control and Mean Field Games," SIAM Conference on Control and Its Applications (CT25), Montreal, Canada.
- Gangshan Jing has a paper in the invited session "Advances in rigidity theory, multi-agent formations, and distributed localization", which is organized by Liangming Chen and Zhiyong Sun.
- Gangshan Jing organized an invited session "Cooperation and Control for Networked Systems" at the 2025 Joint International Conference on Automation-Intelligence-Safety (ICAIS) & International Symposium on Autonomous Systems (ISAS), together with Prof. Te Wu (Xidian University).
- Serdar Yüksel organized an invited session: Ali Kara, Erhan Bayraktar, and Serdar Yüksel, "Stochastic Control Theory and Applications," SIAM Meeting in Montreal, 2025. https://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=84474
- Prashant Mehta and Serdar Yüksel organized three invited Sessions on Advances in Stochastic Control, I, II, III at the Conference on Decision and Control, Dec. 2024.
- Amit Sinha, Ali Devran Kara, Aditya Mahajan, and Serdar Yüksel organized a tutorial session at the CDC in Milano with title: "Recent advances in partially observed Markov

decision processes: regularity, existence, approximations, and learning with agent-state policies.”

- Lorenzo Zino co-organized with M. Ye, M. Cao, and N.E. Leonard an invited Session “Analysis and Control of Network Dynamics in the Social and Life Sciences” at CDC 2024.
- Giovanni Russo co-organized two special sessions on Contraction theory at CDC 2024.

c) **Special issues**

- Sonia Martinez had a special section in the IEEE OJCSYS on the ‘Theory and Fundamentals of Multi-Agent Systems.’ Guest Senior Editors of the section were David Casbeer, Dejan Milutinovic, and Tansel Yucelen. Sonia Martinez was also acting as a Senior Editor.

d) **Awards**

- Francesco Bullo was Elected Fellow of the Network Science Society (NSS), Class of 2025.
- Florian Dorfler was awarded the 2024 Control Systems Magazine Outstanding Paper Award.
- Florian Dorfler was awarded the Rössler Prize.
- Ketan Savla received the 2024 Outstanding Application Award from the IEEE Intelligent Transportation Systems Society.
- Sasha Davydov, Giovanni Russo, and Francesco Bullo received the 2024 IEEE Control Systems Letters Outstanding Paper Award for the paper “Euclidean Contractivity of Neural Networks with Symmetric Weights”.
- Marco Coraggio is author of Finalist paper of the “2025 IEEE CSS Italy Young Author Best Paper Award” entitled “Guaranteeing control requirements via reward shaping in reinforcement learning”.
- The TC awarded the TC Outstanding Student Paper Prize to:

Soham Das for the paper “Learning Nash in Constrained Markov Games With an α -Potential,” *IEEE Control Systems Letters*, vol. 8, pp. 808-813, 2024, and *IEEE Conference on Decision and Control*, Milan, Italy, 2024.

The TC selection committee was: Giacomo Como, Marco Coraggio, Matthew Hale, and Ketan Savla.

e) **TC meetings**

- The TC had a meeting on Zoom on July 22, 2025. This meeting was organized on Zoom given the anticipated low attendance of ACC 2025.

f) **Other activities**

- Chara Ravazzi organized the 6th Colloquium Roberto Tempo in Automatica. Speaker: Hideaki Ishii. <https://r8.ieee.org/italy-css/colloquia-roberto-tempo/>
- Marco Coraggio gave a 45-minute invited talk entitled “Coordination and synchronization in complex human networks: Past, present, and perspectives” at the 2025 European Control Conference (ECC), Thessaloniki, Greece, 24-Jun-2025.

- Marco Coraggio gave a 45-minute invited talk entitled “Coordination, synchronization, and control in complex human networks”, invited opening 45-mins talk at the “Complex Socio-Technical Networked Dynamics” workshop at the 2024 63rd IEEE Conference on Decision and Control (CDC), Milan, Italy, 15-Dec-2024.
- Ketan Savla was a keynote speaker at at the Workshop for IEEE Transactions on Mobility for Smart Cities in Asia Napa, Cyprus, June 30-July 1 2025.
- Yannis Paschalidis gave an invited talk and participated in a panel discussion at the WHO Global Pandemic Center; <https://www.youtube.com/watch?v=ELWEYz1g9MY>.
- Francesco Bullo gave a plenary lecture at the 13th IFAC Symposium on Nonlinear Control Systems, NOLCOS 2025.
- Gangshan Jing was the publication chair and an organizing committee chair of the conference “2025 Joint International Conference on Automation-Intelligence-Safety (ICAIS) & International Symposium on Autonomous Systems (ISAS),” held in Xi’an, China, May 23-25, 2025).
- Gangshan Jing was the invited session committee chair of the 44th IEEE Chinese Control Conference held in Chongqing, China, July 28-30, 2025.

Activities planned/envisaged for next year

Some of the activities planned/envisaged for next year are as follows:

- TC meeting in December 2025. The meeting is planned to be held in person at CDC 2025.
- TC mid-year meeting in June/July 2026. The meeting is planned to be held virtually on Zoom.
- TC Outstanding Student Paper Prize 2026.
- Involvement in the organization of the CSS Days 2026.
- TC Seminar series.
- Update of the structure, naming, and missions of the WGs.
- Discussion with the TC members on how the WGs can promote the organization (or directly organize) workshops, special sessions, etc.
- Discussion with the TC members on how the TC can work more closely with journals.
- Discussion with the TC members on how to better involve students and postdocs.

Expenditure of CSS Budget allocation

Since taking the position on January 1, 2025, the Chair does not have expenditures to report. Expended may include:

- Catering for the TC annual meeting at CDC 2025.

- The Chair will discuss with the TC members the option of having a monetary prize of \$200 for the winner of the TC Outstanding Student Paper Prize.
- The Chair will discuss with the TC members and the VP of Technical Activities Mario Di Bernardo if funds can be allocated to assist with the organization of workshops.