IEEE 5G WORLD FORUM
An IEEE Future Networks Flagship Event

The 2021 IEEE 4th 5G World Forum (5GWF'21) seeks contributions on how to nurture and cultivate future network technologies and applications beyond 5G and how they can benefit society.

> This will be a virtual event similar to 5GWF'20 (view the 2020 Program for reference), but we are also planning an in-person event in Montreal, Canada that will be an official part of 5GWF'21. **Physical attendance is not expected or required for authors and presenters**, but those who live in or near Montreal are welcome at that in-person event pending local regulations for travel and social gatherings.

2021 IEEE 4th 5G World Forum (5GWF'21)

Theme: Future Networks

13-15 October 2021 – Virtual Event + Montreal, Canada

Organized by IEEE Future Networks Initiative, IEEE Computer Society, IEEE Communications Society, and IEEE Montreal Section

Call for Papers and Proposals

5G systems have started to deliver a novel mobile network architecture that not only improves physical data rate, but also creates a new ecosystem allowing the deployment of novel services and applications. A key target for future networks will be to improve support not only for classical mobile broadband applications and services but also for vertical industry (e.g. Intelligent Transport, Industrial IoTs, eHealth, etc.) and other mobility-based services.

This conference aims to bring experts from industry, academia and research to exchange their vision as well as their achieved advances in 5G and towards 6G, and encourage innovative cross-domain studies, research, early deployment and large-scale pilot showcases that address the challenges of 5G while identifying and investigating the possibilities of future networks.

Call for Technical Papers
Call for Special Session Proposals
Call for Workshop Proposals
Call for Tutorial Proposals
Call for Vertical Areas Proposals
Call for Topical Areas Proposals
Call for Industry Forum & Panel Sessions Proposals
Call for Entrepreneurship and Innovations Forum Proposals
Call for Industry Demonstrations

Original, innovative and high quality papers are solicited in the following technical topics of interest, but are not limited to:

Technical Paper Submissions

Track 1: 5G and Beyond Technologies: EDAS link

Track 2: 5G and Beyond Application and Services: EDAS link

Track 3: 5G and Beyond & IoT: EDAS link

Track 4: 5G and Beyond Security and Privacy: EDAS link

Track 5: 5G and Beyond Trials, Experimental Results and Deployment Scenarios: EDAS link

Track 6: 5G and Beyond Hardware and Test / Measurements: EDAS link

Track 7: 5G and Beyond Special Verticals: EDAS link

Track 8: 5G and Beyond Special Topicals: EDAS link

Proposals for sessions and events of general interest and relevance to 5G will be considered. These should address the Technical Community and/or provide educational or expository material or recognition of significant contributions to the advancement of 5G technologies.

Workshop and Special Session Proposal Submissions: EDAS link

Tutorial Proposal Submissions: EDAS link

Industry Forum Panel proposal submissions: EDAS link

Details of each submission are enumerated as follows:

A. Technical Paper Submissions

Track 1: 5G and Beyond Technologies

○ 5G and beyond New Radio (NR) specification ○ Flexible and programmable RAN ○ Cloud-RAN, functional split ○ 5G and beyond Ultra large Cell technologies ○ 5G and beyond Small Cell Technologies ○ Network Slicing ○ Multi-service architectures ○ 5G and beyond wireless technologies ○ Cloud-based 5G and beyond mobile architectures ○ 5G and beyond Network Function Virtualization (NFV) ○ Software Defined Networking (SDN) for 5G and beyond ○ Spectrum utilization and sharing ○ Massive MIMO Communications ○ Dynamic Beamforming techniques ○ Free Space Optical	○ Multicast / Broadcast in 5G and beyond ○ Convergence of RAN and Core Network ○ Novel mobility management ○ Mobile Edge Computing (MEC) ○ Multi-Connectivity/RAT ○ Resource (network, relay, cloud-computing, etc.) management techniques in 5G and beyond Wireless ○ Device-to-Device Communications and networking ○ Cognitive spectrum access ○ X-haul transport network ○ Self-backhaul / integrated access networks ○ Energy efficient network design and protocols for 5G and beyond	○ QoE/QoS management over 5G and beyond ○ Dynamic QoS framework as an enabler for disruptive use cases and services ○ Network and protocol interoperability in 5G and beyond Wireless Networks ○ Heterogeneous cells and communications ○ Millimeter wave communications ○ Coordinated and small-scale cell communications ○ Machine learning and adaptive techniques for 5G and beyond ○ Ultra-reliability and low-latency in 5G and beyond ○ 5G and beyond and AI ○ 6G technologies ○ LEO and Satellite Technologies

Track 2: 5G and Beyond Applications and Services

○ Smart Cities, Smart Public Places ○ Smart Home, and 5G and beyond - based Building Automation ○ Smart Agriculture and Water Management ○ Cyber-physical systems, Context Awareness, Situation Awareness, Ambient Intelligence ○ Collaborative Applications and Systems ○ Service Experiences and Analysis ○ Cloud services with 5G & Future Networks ○ Next Generation Consumer Electronics with 5G & Future Networks	○ Consumer Electronics, Assisted Living, Rural Services and Production ○ 5G and beyond Wireless Networks for body sensors ○ Crowd-sensing, human centric sensing ○ Big data and 5G and beyond Data Analytics ○ Internet Applications Naming and Identifiers ○ Social-aware 5G and beyond networks ○ Industry of the future, e.g., Industry 4.0	○ Semantic Technologies, Collective Intelligence ○ Cognitive and Reasoning about Things and Smart Objects ○ Mobile Cloud Computing (MCC) and 5G and beyond ○ Horizontal application development for 5G and beyond ○ Design principles and best practices for 5G and beyond application development ○ Open Communities, Open API, Open Source ○ Testbeds/ Federated Testbed ○ Test-bed as a Service for Future Networks
Vertical Oriented Applications ○ Healthcare, e-Health, Assisted Living ○ Building Management and Operation Automation ○ Environmental Monitoring ○ Connected Car, Automotive Intelligent Transport	○ Aerospace and Defense ○ Smart Grid, Energy Management ○ Utilities Management and Operation ○ Consumer Electronics, Assisted Living, Rural Services ○ Mining, Oil & Gas, Digital Oilfield, Electronic Oilfield ○ Agriculture, Industrial IoT, Manufacturing, Hospitality, Retailing ○ Additive Manufacturing	○ Logistics, Entertainment ○ Large Event Management ○ Industrial Service Creation and Management ○ Financial Services ○ Health of Machinery ○ Highway, Rail Systems ○ Industry of the Future, e.g., Industry 4.0 ○ Media & Entertainment ○ Digital Twins of Complex systems with 5G & Future networks

Track 3: 5G and Beyond and IoT/Tactile/Blockchain

○ Architecture of IoT in 5G and beyond networks	○ Data collection, processing, aggregation, and communication	○ Relay, multi-hop, and cooperative communication in IoT

o Software defined solutions for IoT o Energy efficiency and energy harvesting in IoT o Cooperative and smart sensing techniques o Channel characteristics and modeling with dense and sparsely populated sensors o Terminal intelligence and light weight sensors o Food Chain Tracking & Tracing using Blockchain	o Efficient resource allocation schemes, QoS, and QoE in IoT o Co-existence and device inter-operability of sensors with 5G and beyond networks o Integrated D2D communication techniques for 5G and beyond networks o Self-organization and self-healing of IoT networks o Data processing and anomaly detection for IoT networks o Cross-layer design and optimization in IoT	o Ubiquitous communication, routing protocols, and network selection in IoT o Machine-type communications in 5G and beyond systems o Emerging IoT applications in 5G and beyond networks o Security issues and solutions for IoT in 5G and beyond networks o Sensor deployment, placement, control and management issues o Experimental results, prototypes and testbeds using sensors for 5G and beyond technologies

Track 4: 5G and Beyond Security and Privacy

o 5G and beyond and Blockchain o 5G and beyond Privacy and Security Concerns o Identification and Authentication Issues o Intrusion Detection in 5G and beyond o Cryptography, Key Management, Authentication and Authorization for 5G and beyond	o Cross-layer Attacks in 5G and beyond o Security with QoS Optimization in 5G and beyond o Privacy based Channel Access in 5G and beyond o 5G and beyond Forensic Science o Big Data and Information Integrity in 5G and beyond	o Communication Security in 5G and beyond o Security Standards in 5G and beyond o Open Communities, Open API, Open Source o Testbeds

Track 5: 5G and Beyond Trials, Experimental Results and Deployment Scenarios

5G Experimental Scenarios o Closing the Gap between Research and Implementation o Experimental prototypes, Test-Bed and Field Trial Experiences o Multi-Objective 5G System Modelling and Analysis—Performance, Energy, Reliability, Robustness	o 5G Interconnections Analysis—QoS, Scalability, Performance, Interference o Real case deployment scenarios and results o 5G deployment at Government and ISPs o 5G deployment on agriculture, retails, smart cities, etc.	o 5G Interconnections among ISPs Analysis—QoS, Scalability, Performance, Interference management o Gap Analysis for real deployments o 5G and Future Internet architectures o Standardization and Regulation **Future Networks Experimental Scenarios** o Infrastrructureless communication o AI driven encoding & decoding o Future network simulators

Track 6: 5G and Beyond Hardware and Test / Measurements

o Massive MIMO, MU-MIMO, Multi-RAT system architectures o Reconfigurable and switching wireless network topologies o RF beamforming, digital beamforming and hybrid beamforming architectures o Beam steering and phased arrays o Antenna system architectures o 5G and beyond Radio designs o RFIC and CMOS technologies and architectures for 5G and beyond	o RF, PA, PLL, Source, phase shifting, ADC/DAC/Modem blocks Full-Duplex and STAR architectures and evaluation methods o RF blockers and interference cancelers o Test and measurement over entire 5G and beyond ecosystem. o Multi-standard coverage and measurement approaches o Antennas and Massive MIMO OTA tests o Array timing and synchronization	o Channel measurements and modeling o Radio measurements at microwave and mm-waves o Signal characterization o 5G and beyond device/component level testing; o mmWave Material, transistor and nonlinear device measurements o Terahertz for Future Networks (6G)

Track 7: 5G and Beyond Special Verticals

○ Tactile Internet ○ Smart factories and Industry 4.0 ○ Automotive, Intelligent Transport ○ 5G and beyond & Autonomous Driving	○ Industrial 5G and beyond Service Creation and Management Aspects ○ Smart Grid, Energy Management ○ 5G-based Supply Chains & Logistics	○ 5G and beyond Wireless Networks for the Industrial Internet of Things ○ E-Health and mobile health over 5G and beyond networks

Track 8: 5G and Beyond Special Topicals

Policy & Regulation ○ Policy and Regulations ○ 5G and beyond Spectrum ○ Best Practices, Standards, and Open Source ○ Technical enforcement of legal 5G regulations, service level agreements, mutual legal assistance requests, etc.	o Privacy and security in 5G and beyond Internet of Things: data sharing, threats, liability, audit and compliance concerns for cloud-supported 5G and beyond, fog and edge computing	**5G Standardization** ○ ITU-T IMT2020 Spectrum standardization ○ IEEE 5G and future networks standardization ○ 3GPP 5G and future networks standardization ○ ITU-T 5G and future networks standardization

		○ ETSI 5G and future networks standardization

The 4th IEEE 5G World Forum (IEEE 5GWF'21) solicits technical paper submissions.

- **Full papers** describing original research. Suggested size is four pages; papers up to six pages will be accepted. Extended versions of selected papers may be considered for publication in alternative IEEE publications.

Papers will be fully peer reviewed. If the paper is accepted and presented, it will be included in the conference proceedings and be submitted to the Xplore Digital Library. IEEE takes the protection of intellectual property very seriously. All submissions will be screened for plagiarism using Cross Check. By submitting your work you agree to allow IEEE to screen your work for plagiarism: http://www.crossref.org/crosscheck/index.html

Important Dates for Paper Submissions

Technical paper submission: **July 15, 2021**
Acceptance Notification: **August 15, 2021**
Camera-ready submission: **September 5, 2021**
Papers must be submitted electronically - see above for EDAS links for each track

Contacts for Technical Papers

TPC-Chair, Fabrice Labeau, fabrice.labeau@mcgill.ca
TPC Co-Chair (IEEE Computer Soceity), Anura Jayasumana, Anura.Jayasumana@colostate.edu
TPC Co-Chair (IEEE Future Networks), Essaïd Sabir, essaid.sabir@yahoo.fr
TPC Co-Chair (IEEE Montreal), Halima Elbiaze, elbiaze.halima@uqam.ca
TPC Co-Chair (IEEE Communications Society), Gunes Kurt, gunes.kurt@polymtl.ca

B. Special Sessions and Workshop Proposal Submissions

IEEE 5GWF'21 will be hosting a series of special sessions and workshop. Special sessions and workshop feature topics relevant to the 5G community on the latest research, engineering, standards and business issues They provide a sample of the state-of-the-art research in both academia and industry in special, novel, challenging, and emerging topics. Special sessions and workshops typically include a mix of regular and invited presentations including regular papers, invited papers, as well as invited presentations and panels to facilitate highly interactive sessions. Special-session proposals should be submitted by the prospective organizer(s) who will commit to promoting and handling the review process of their special session or workshop as Chairs or Co-Chairs of the event. Proposals should include the following information (maximum five pages):

- Special session or Workshop title
- Length of the special session (half/full day)
- Name(s) of special session organizer(s)
- Email of main contact person
- A brief biography (no more than 200 words per person) of special session organizer(s)
- Brief description of the special session including abstract, scope, outline, importance, and timeliness
- Planned format of the special session including projected number of referred papers and hot topic sessions
- Potential participants including program committee members and invited speakers
- Related topics
- Prior history on past editions of the special session, if any, including the number of submitted and accepted papers, the number of attendees, etc.
- A draft of the call for papers

Accepted events must follow IEEE academic best practices regarding peer reviews and paper publication. Papers submitted to special sessions will have to be evaluated and peer-reviewed along the very same criteria of the regular sessions. Accepted and presented papers will be added to IEEE Xplore and the conference proceedings.

Important dates for Special Session proposal submissions

Proposals due: **July 15, 2021**
Notification of selection: **August 15, 2021**
Website for special session and workshop: TBA
Deadline for paper submission: TBA
Acceptance Notification: TBA
Camera-Ready Submission: TBA

Submission Guidelines

Please provide all the information requested above when preparing your special session proposal before electronically submitting it in PDF format to **EDAS link**.

Contact for Special and Workshop Sessions

Workshop co-chair, Mohamed Faten Zhani, MohamedFaten.Zhani@etsmtl.ca
Workshop co-chair, Eman Hammad, eman.hammad@gmail.com
Workshop co-chair, Mohammad Patwary, patwary@wlv.ac.uk

C. Tutorial Proposal Submissions

IEEE WF-5G 2021 solicits proposals for 1.5 hour Tutorials that complement the regular program with clear and focused coverage in new and emerging topics within the scope of conference. Tutorials are an opportunity for researchers, developers, and practitioners from academia and industry to learn about the state-of-the-art research. Proposals should concisely describe the motivation, the content, and the structure of the tutorial.

Tutorial Proposal Format

Tutorial proposals (4 pages maximum) in PDF format (Column: Single, Font: Times Roman, Size: 11 pt) should be submitted by the prospective Tutorial Speaker(s). Tutorial proposal submission must include the following:

- Title of Tutorial
- Name, Affiliation and E-mail of Tutorial Speaker
- Abstract (200 words)
- Description of the Tutorial Proposal
    - Objectives and motivation
    - Novelty, highlighting the technical innovations presented in this tutorial
    - Tutorial content, indicating the topics that the tutorial will cover in detail
    - Tentative timeline schedule
- Tutorial Length: Maximum length of 1.5 hours
- Intended audience
- Prior history of the tutorial presentations and number of past attendees, if applicable
- Short biography (half page) of Tutorial Speaker

How to submit

Tutorials should complement the regular program with new and emerging topics of interest. Tutorial Proposals must be in single PDF file not exceeding Four Pages and submitted electronically to IEEE WF-5G 2021 Tutorial Track using the EDAS Link.

Important dates for Tutorial proposal submissions

Proposal submissions: **15 July 2021**
Acceptance Notification: **9 August 2021**

Contact for Special and Workshop Sessions

Tutorial co-chair, Amruthur Narasimhan, narasimhan83@gmail.com
Tutorial co-chair, Christopher Udeagha, c.udeagha@ieee.org

D. 5G and Beyond Focus - Vertical Areas and Topical Areas Propositions

Proposals in the Vertical and Topical Areas should address: suggestions for speakers (all speakers will be invited – no papers), panel discussions, roundtables, presentation sessions on focus topics, demonstrations of novel or important technologies, and events with other formats that may be effective for furthering the involvement and participation of the attendees.

Vertical/Topical Areas Proposal Format

Each proposal (maximum 3 pages) must include:

1. Title of the Vertical or Topical Area Proposal
2. Names, Institutions, addresses, and a short biography (up to 200 words) of the organizers
3. Motivation, background, objective, description of the challenges issues to be covered (1-page max), and timeliness
4. Structure proposal, tentative invited speakers and panelist and links to their bio
5. If appropriate, a description of past versions of the previous Vertical or Topical Area session, the number of attendees, etc.
6. Public adequacy

Proposal submissions are not through EDAS — anyone Interested in submitting a proposal to these tracks should get in contact via e-mail with the corresponding contact persons indicated below:

Contact for Topical/Vertical Areas Proposal:

Topical/Vertical co-chair, Aloizio Pereira da Silva, aloiziops@vt.edu
Topical/Vertical co-chair, Ivan Seskar, seskar@winlab.rutgers.edu
Topical/Vertical co-chair, Subhas Mondal, subhas.mondal@wipro.com

Important dates for 5G and Beyond Focus Vertical and Topical Area Proposal Submissions
Proposal submissions: **July 25, 2021**
Acceptance Notification: **August 9, 2021**

E. Industry Forum & Panel Sessions proposal submissions

IEEE 5GWF'21 will be hosting Industry Forum & Panel Sessions. Panel presentation materials will not be published in the conference proceedings but will be available on the conference web site. Industrial Forum Panel proposal should contain an abstract, scope, intended audience, objectives, prior history, an outline, the biographical sketch of presenters, and any other information that may assist in making decisions. Industry Forum & Panel Proposals must be in single PDF file not exceeding Four Pages and submitted electronically to IEEE WF-5G 2021 Industry Forum & Panel Track using the EDAS Link.

Important dates for Industry Forum and Panel Sessions proposal submissions
Proposal submissions: **15 July 2021**
Acceptance Notification: **9 August 2021**

Contacts for Industry Forum & Panel Sessions:
5GWF-info@ieee.org

F. Entrepreneurship and Innovations Forum (EIF)

5G and its extensions (i.e., B5G) have unleashed significant entrepreneurial, innovation, and investment opportunities the world over. It is generally entrepreneurial pioneers and startups who take the risk with new and innovative technologies, products and services, and introduce them to the market. This initiative is meant to actively promote the engagement of entrepreneurs and young businesses in pioneering innovations in 5G and B5G and to stimulate vibrant discussions on how these would improve and evolve with time as technologies mature to deliver their full potential. The EIF offers a platform for innovators from the entrepreneur community to present and showcase their evolutionary or revolutionary 5G strategies, and potentially disruptive business models. It also provides a networking venue for startup executives, entrepreneurs, investors, academics, and participants.

We welcome proposals for individual talks or panels that can give the Future Networks community fresh insights into how entrepreneurs are playing an innovative role. Please provide an abstract and suggested length for each proposed presentation or panel. Start-ups are invited to showcase their innovation in this track, sending e-mail to the contact persons.

Contact:
Start-Ups co-chair, Sudhir Dixit, sudhir.dixit@gmail.com
Start-Ups co-chair, Titus Lo, titus.lo@ieee.org

G. Industry Demonstrations

The Industry Demonstrations are aimed at the researchers from academia and industry, practicing engineers, and technical managers who need to understand both technical and practical aspects of new and emerging topics within the scope of communications, networking, industrial practices/standards and so on. Industry Demonstrations should also emphasize training for current topics and demonstrate some practical works of interest to the industry targeting near-term implementations and development in those areas.

For in-person demos, a 6-foot tabletop will be allotted to the industry demonstrator with the fee of $2000. The fee can be waived in few cases based on conference organizers' decision. Each tabletop is equipped with a power supply. Any furniture or additional equipment is subject to additional fees. Placement of the tabletop is determined by conference organizers.

Industry Demonstrations Proposal Format
Each proposal (maximum 3 pages) must include:

1. Title of the demonstration
2. Length of the demonstration (Half-day or Full-day)
3. Names, Institutions, addresses, and a short biography (up to 200 words) of the organizers
4. Motivation, background, objective, description of the technical issues that the demonstration will address (1-page max), and timeliness
5. If appropriate, a description of past versions of the demonstration including the number of demonstration, the number of attendees, etc.
6. Public adequacy

Industry Demonstrations Proposal Submission
5GWF-info@ieee.org

General Paper Submission Guidelines

Full papers submissions for Technical Paper, Workshop, and Special Session should be written in English with a maximum paper length of SIX (6) printed pages (10 point font) including figures, tables, without incurring additional page charges (maximum of ONE additional page with over length page charge if paper is accepted).

When preparing your manuscript, please also pay attention to the following:

- If your paper has been prepared using Microsoft Word or LaTeX, please ensure that you have used the most current version which will help reduce pdf conversion issues such as embedded fonts, bookmarks, etc.
- No page numbers and no headers/footers
- Use non-zero PDF top and bottom margins (typically at least 0.5 inches/12.7 mm) to help indicate if there are any page numbers

Papers Format

Standard IEEE conference templates for Microsoft Word and LaTeX formats can be found here:
http://www.ieee.org/conferences_events/conferences/publishing/templates.html

Papers to be submitted using EDAS System.

Papers are reviewed on the basis that they do not contain plagiarized material and have not been submitted to any other conference at the same time (double submission). These matters are taken very seriously, and the IEEE 5G Initiative will take action against any author who has engaged in either practice.

IEEE Web Page on Plagiarism:
http://www.ieee.org/web/publications/rights/Plagiarism_Guidelines_Intro.html

IEEE Web Page on Double Submission:
http://www.ieee.org/web/publications/rights/Multi_Sub_Guidelines_Intro.html

Please note: To be published in the IEEE 5G World Forum 2021 Conference Proceedings and to be eligible for publication in IEEE Xplore®, an author of an accepted paper is required to register for the conference and the paper must be presented by an author of that paper at the conference unless the TPC Chair grants permission for a substitute presenter arranged in advance and who is qualified both to present and answer questions. Non-refundable registration fees must be paid prior to uploading the final IEEE formatted, publication-ready version of the paper. Accepted and presented papers will be published in the IEEE 5G World Forum 2021 Conference Proceedings and submitted to IEEE Xplore®.

CALL FOR PAPERS AND PROPOSALS

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13-15 October 2021 — Montreal, Canada
http://www.ieee-wf-5g.org