

INTERNATIONAL CONFERENCE

# ICACNGC 2022

ON ADVANCED COMPUTING  
& NEXT-GENERATION COMMUNICATION

# PROGRAM

**OCT 12-13, 2022**

Saint Petersburg, Russia

Hybrid Mode



# ABOUT THE CONFERENCE

The International Conference on Advanced Computing & Next-Generation Communication ICACNGC 2022 organized by organized by the The Bonch-Bruевич Saint Petersburg State University of Telecommunications, Russia. This conference provides an opportunity to account for state-of-the-art works, future trends impacting Advanced Computing & Next-Generation Communication, that concerns to organizations and individuals, thus creating new research opportunities, focusing on elucidating the challenges, opportunities, and inter-dependencies that are just around the corner.

CCSET 2022 was devoted to Advances in Computing & Next-Generation Communication. It was considered a meeting point for researchers and practitioners to implement advanced information technologies into various industries.

There were 75 paper submissions from 8 countries. Each submission was reviewed by at least two chairs or PC members. We accepted 20 regular papers (26%). Unfortunately, due to limitations of conference topics and edited volumes, the Program Committee was forced to reject some interesting papers, which did not satisfy these topics or publisher requirements.

We would like to thank all authors and reviewers for their work and valuable contributions. The friendly and welcoming attitude of conference supporters and contributors made this event a success!

*Conference Chairs*

# THE CONFERENCE TOPICS

## Track 1: Advanced Computing

- Architectures and Networking for CPS
- Smart City
- IoT
- Software platforms and systems for CPS
- Foundations of CPS
- Human-machine interactions
- Sensing and monitoring
- Specification languages and requirements
- Design, optimization, and synthesis
- Testing, verification, certification
- Applications of CPS technologies
- Tools, testbeds, demonstrations and deployments
- Blockchain
- Applications of big data analytics for CPS

## Track 2: Next Generation Communication

- Machine Learning and Artificial Intelligence in Communication Networks
- Deployment of MEC for 5G systems.
- Offloading algorithms for MEC based radio access networks.
- Designing and developing intelligent core network for 5G systems based on SDN.
- Integrating SDN core network with MEC based radio access network.
- AI algorithms for 5G systems.
- Network slicing and NFV.
- Novel network structures that support both dense deployment and ultra-low latency applications.
- 6G networks and enabling technologies.

## Track 3: Cyber-Physical Systems

- Architectures and Networking for CPS
- Smart City
- IoT
- Software platforms and systems for CPS
- Foundations of CPS
- Human-machine interactions
- Sensing and monitoring
- Specification languages and requirements
- Design, optimization, and synthesis
- Testing, verification, certification
- Applications of CPS technologies
- Tools, testbeds, demonstrations and deployments
- Blockchain
- Applications of big data analytics for CPS

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# CONFERENCE KEYNOTES



## Prof. Andrey Koucheryavy

Russia

Bonch-Bruevich Saint Petersburg State University of Telecommunications, Communication Networks and Data Transmission department

After graduating from Leningrad University of Telecommunications in 1974, A. Koucheryavy joined Telecommunication Research Institute LONIIS, where he worked till October 2003 (from 1986 to 2003 as the First Deputy Director). Dr. A. Koucheryavy holds Professor position at the Bonch-Bruevich St. Petersburg State University of Telecommunications (SUT) since 1998. There, in 2011 he became a Chaired Professor in “Telecommunication Networks and data transmission” department. Dr. A. Koucheryavy was an advisor of the Central Science Research Telecommunication Institute (ZNIIS) from 2003 to 2010.

Co-founder of the International Teletraffic Seminar (1993, 1995, 1998, 2002); founder of the model network for digital networks at LONIIS (1997); co-founder of the model network for packet networks at ZNIIS (2004); co-founder of the Internet of Things Laboratory (2012) and Quality of Experience and IPTV Laboratory (2014) at SUT. Chair of the Scientific school on teletraffic theory in LONIIS (1990 – 2003); Founder and scientific school chair “Internet of Things and self-organizing networks” in SUT (2010 up to now); Steering committee member of IEEE technically co-sponsored series of conferences ICACT and NEW2AN.

SG11 ITU-T vice-chairman 2005 – 2008, 2009 – 2012. WP3/WP4 SG11 chairman 2006 – 2012, WP4 SG11 vice-chairman 2015-2016, Chairman of SG11 in Study period 2017- march 2022. Co-founder of International Testing Center for new telecommunications technologies at ZNIIS under ITU-D competence. Host and technical program committees member of the “Kaleidoscope 2014” at SUT.

Honorary member of Popov’s society (2002).



## Prof. Konstantin Samouylov

Russia

RUDN University, Institute of Applied Mathematics and Telecommunications

Konstantin Samouylov received his PhD in probability theory from the Moscow State University, in 1985, and a Full Doctor of Sciences degree in telecommunications from the Moscow Technical University of Communications and Informatics, in 2005. During 1985-1996 he held several positions at the Faculty of Science of the Peoples’ Friendship University of Russia (RUDN University) where he became a head of Telecommunications System Department in 1996. Since 2014 he is a head of the Applied Probability and Informatics Department, and since 2017 he also holds the position of Director of Applied Mathematics and Communications Technology Institute (IAM&CT) at the RUDN University. He was visiting professor/professor-research at Lappeenranta University of Technology and Helsinki University of Technology (Aalto), Finland; Moscow Technical University of Telecommunications and Informatics, Russia; Moscow International Higher Business School (Mirbis), Russia; University of Pisa, Italy. He was a member of the ITU-T SG11 and IFIP TC6 WG 6.7. He worked and works now in a number of r&d projects within different frameworks, e.g., COST IRACON, COST INTERACT, within projects of Russian Foundation for Basic Research (RFBR), TEKES (Finland) and companies including Nokia, Telecom Finland, VTT, Rostelecom, etc. He is a member of editorial boards and reviewer of several scientific magazines, he is co-chair and TPC member of several international conferences. His current research interests include applied aspects of probability theory and stochastic processes, queuing and teletraffic theory, performance analysis of 5G/6G networks, resource allocation in heterogeneous wireless networks, wireless network slicing, IAB, URLLC and eMBB. He has authored and co-authored over 250 scientific and conference papers and seven books.



## **Prof. Mansaf Alam**

India

Department of Computer  
Science, Jamia Millia Islamia

Prof. Mansaf Alam has been working as Professor in the Department of Computer Science, Faculty of Natural Sciences, Jamia Millia Islamia, New Delhi-110025, Young Faculty Research Fellow, DeitY, Govt. of India & Editor-in-Chief, Journal of Applied Information Science. He has published several research articles in reputed International Journals and Proceedings of reputed International conferences published by IEEE, Springer, Elsevier Science, and ACM. His area of research includes Big Data Analytics, Machine Learning & Deep Learning, Cloud Computing, Cloud database management systems (CDBMS), Object-Oriented Database systems (OODBMS), Information Retrieval, and Data Mining. He serves as a reviewer of various journals of International repute like Information Science, published by Elsevier Science. He is also a member of the program committee of various reputed International conferences. He is on the Editorial Board of some reputed Intentional Journals in Computer Sciences. He has published three books namely Digital Logic Design by PHI, Concepts of Multimedia by Arihant, and Internet of Things: Concepts and Applications by Springer, Big Data Analytics by Taylor and Francis. He recently got International Patent.

# CONFERENCE PROGRAM

Time Zone in GMT +3

## DAY 1 October 12, 2022

- 9:00 Registration
- 9:30 Opening Speech
- 10:00 Keynote 1
- 10:40 Coffee Break
- 11:00 **Session I.1 Advanced Computing and Cybersecurity**  
(6 papers presentations)
- 13:00 Lunch Break
- 14:00 **Session II.1 Next Generation Communication**  
(6 papers presentations)
- 16:00 Coffee Break



Join Our Zoom Video Meeting  
for 2 days

## DAY 2 October 13, 2022

- 10:00 Keynote 2
- 10:40 Coffee Break
- 11:00 **Session I.2 Advanced Computing and Cybersecurity**  
(6 papers presentations)
- 13:00 Lunch Break
- 14:00 **Session II.2 Next Generation Communication**  
(7 papers presentations)
- 16:00 Coffee Break
- 16:10 Closing Ceremony



# CONFERENCE SESSIONS PROGRAM

**DAY 1** October 12,  
2022

## Session I.1

### Advanced Computing and Cybersecurity

Chairs: Dr. Anastasia Vybornova

- 3** **Spatial Data of Smart Cities: Trust.**  
Shestakov A.V. & Nesterov A.A.
  
- 5** **Smart City infrastructure projects:  
spatial data of risks**  
Frolova K.A. & Shestakov A.V.
  
- 12** **Pseudo-Random Error-Correcting Codes  
in Network Coding**  
Sergey Vladimirov
  
- 16** **A Comparative Analysis of Blockchain-Based  
Authentication Models for IoT Networks**  
Tran Duc Le, Truong Duy Dinh,  
Quoc Khanh Dang, Thi Le Quyen Nguyen  
& Ruslan Kirichek
  
- 21** **Federated learning for Linux Malware  
detection**  
Tran Duc Le, Phuc Hao Do, Sylvestre  
Uwizeyemungu, Thang Le Dinh
  
- 22** **Proactive management in Smart City:  
transport convoys**  
Pletnev Y.A., Shestakov A.V.

## Session II.1

### Next Generation Communication

Chairs: Dr. Ammar Muthanna

- 24** **Telepresence delivery models**  
Makolkina Maria & Bogdan Pankov
  
- 27** **Analysis of intelligent compression  
methods for traffic transmission  
in satellite communication channels**  
Phuc Hao Do, Tran Duc Le,  
Aleksandr Berezkin & Ruslan Kirichek
  
- 29** **Intelligent Distributed Network  
Architecture for Autonomous Vehicles**  
Ahmed Al Ansi, Khakimov Abdukodir,  
Ammar Muthanna & Andrey Koucheryavy
  
- 30** **Delay prediction in M2M networks  
using Deep Learning approach**  
Malik Alsweity, Ali Refaee  
& Andrey Koucheryavy
  
- 33** **Analysis of the principles of the resource  
allocation function for network slicing  
in mobile networks**  
Vasiliy Elagin & Anton Vasin
  
- 36** **Study of 6G services standardization:  
specifications and requirements**  
Abdelhamied A. Ateya, Ammar Muthanna,  
Hanaa A. Abdallah & Naglaa F. Soliman
  
- 73** **Determination of oncological pathologies  
based on the analysis of medical images  
using machine learning methods**  
Valeria Pisarkova, Denis Garaev, Ekaterina  
Lopuhova, Azat Bilyalov, Ruslan Kutluyarov  
& Alexey Kovtunenکو
  
- 75** **Energy-Efficient Beam Shaping  
in MIMO System Using Machine Learning**  
Aigul Absalyamova, Ekaterina Lopukhova,  
Rosalina Ishakova, Anna Voronkova,  
Grigory Voronkov & Elizaveta Grakhova

# DAY 2

October 13,  
2022

## Session I.2

### Advanced Computing and Cybersecurity

Chairs: Prof. Alexander Paramonov

**39** **Development of a method for analyzing traffic on WPA2 Enterprise wireless network**  
Gerling Ekaterina, Zebzeev Yegor, Kistruga Anton, Kovtsur Maxim & Petrova Tatyana

**42** **Swept-source optical coherence tomography system with an on-chip k-clock based on silicon photonics**  
Elizaveta Grakhova, Ivan Stepanov, Evgeniy Talynev, Anton Ivanov, Grigory Voronkov & Ruslan Kutluyarov

**45** **Development of determining a wireless client location method in the IEEE 802.11 network in order to ensure the IT infrastructure security**  
Drepa Vladislav, Kovtsur Maxim, Minyaev Andrey, Konovalova Victoria & Kuzmina Olga

**46** **Blockchain-based conceptual communication network architecture for implementing WEB 3.0**  
Mineeva Varvara, Inkin Georgy & Avdonkin Nikolay

**49** **Multi-party quantum protocol of private set intersection cardinality based on d-level single-photons**  
Weijian Wang, Long Zhang & Kejia Zhang

**52** **Image semantic segmentation based on SA-PSPNet**  
Dikang Wu, Jiamei Zhao & Zhifang Wang

## Session II.2

### Next Generation Communication

Chairs: Prof. Ruslan Kirichek

**54** **Channel Cluster Configuration Selection Method for IEEE 802.11 Networks Planning**  
A. Vikulov & A. Paramonov.

**56** **Space Tessellation and Adjacent Channel Interference Model in IEEE 802.11 Networks Planning**  
A. Vikulov & A. Paramonov

**59** **Service migration algorithm for UAVs recharge zones in future 6G network**  
Vadim Kovolenko, Abdelhamied A. Ateya, Ammar Muthanna & Andrey Koucheryavy

**60** **FedBA: Non-IID Federated Learning Framework in UAV Networks**  
J. Peng et. al

**64** **A System for Collecting, Transmitting and Reproducing Kinesthetic Information for Tactile Internet Applications**  
Vybornova Anastasia & Anvarjonov Bahodirjon

**66** **Concept of optical network digital twin**  
Anton Saltikov, Roman Hrabrov & Ruslan Kirichek

**69** **Tactile Arm Robot for heterogeneous industrial applications**  
Abdelhamied A. Ateya & Ammar Muthanna

# PRESENTATIONS GUIDELINES

1. Oral presentations for the ICACNGC 2022 have been allocated 15 minutes of effective presentation time, plus 2 minutes given to Q/A and 30 sec turnaround time between speakers.
2. All presentations are in English.
3. Arrive 10 minutes before the session start time to prepare your power point presentation. Please, start and end your presentation on time and keep the time schedule.
4. Bring your presentation in MS-PowerPoint or Adobe PDF formats. A volunteer will be at your disposal to help you show it in your room.
5. We will use the ZOOM platform for online presentations. All the plenary talks will be online. You may choose to present the paper using one of the following options:
  - a. Online on ZOOM platform: If you chose this option, then we will schedule your online presentation according to the program.
  - b. Offline presentation: You may record the presentation and share us the URL / YouTube link (by April 30) and we can share the link with the ICACNGC 2022 attendees. The talk shall be for 10-15 minutes and clearly indicate the presenting author contact details on the first and last slides.



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