



Twenty Eighth National
Conference on Communications



Workshop on “Standards Driven Research” at NCC 2022

24 May 2022, 1000-1700 IST



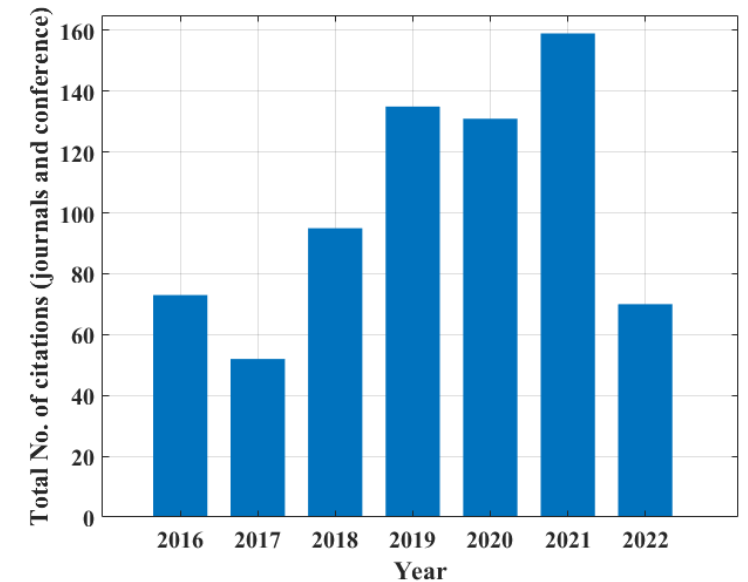
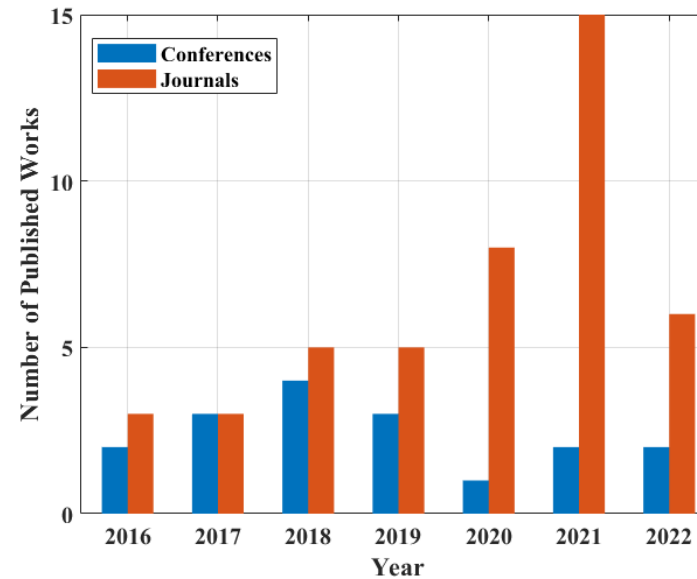
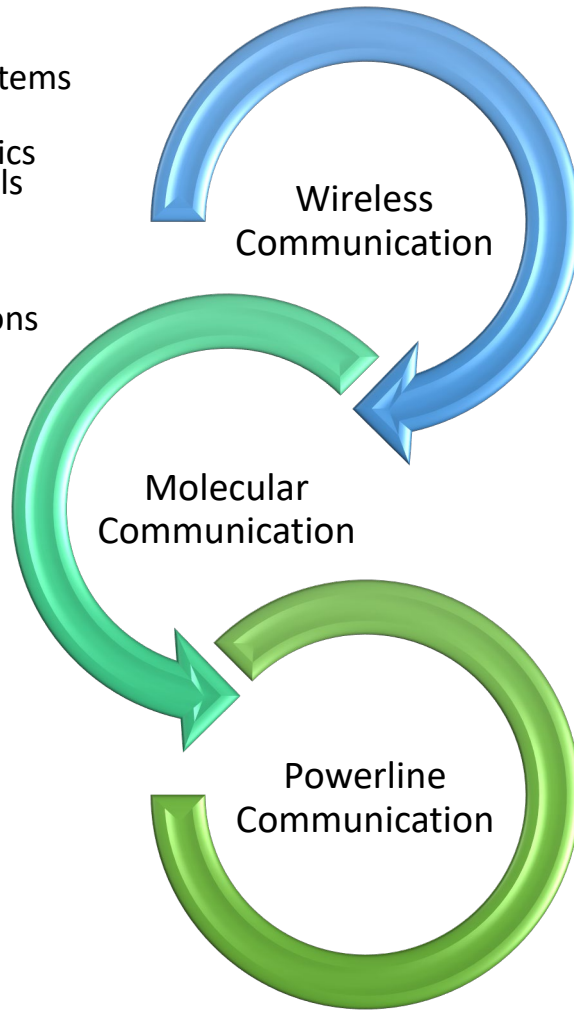
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WiBiCom Group VNIT

Areas of Interest

5G and 6G systems
URLLC
Silicon Photonics
Smart materials
And RISs
Biological
Communications



6 Faculty members, more than 30 students are active in Communication related research.

We have collaborations with several institutions in India and abroad.

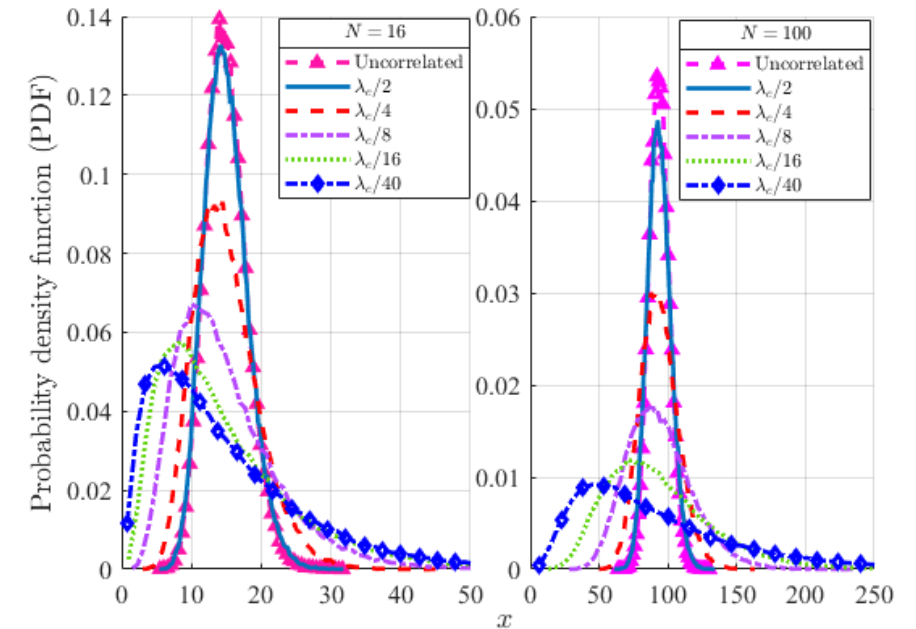
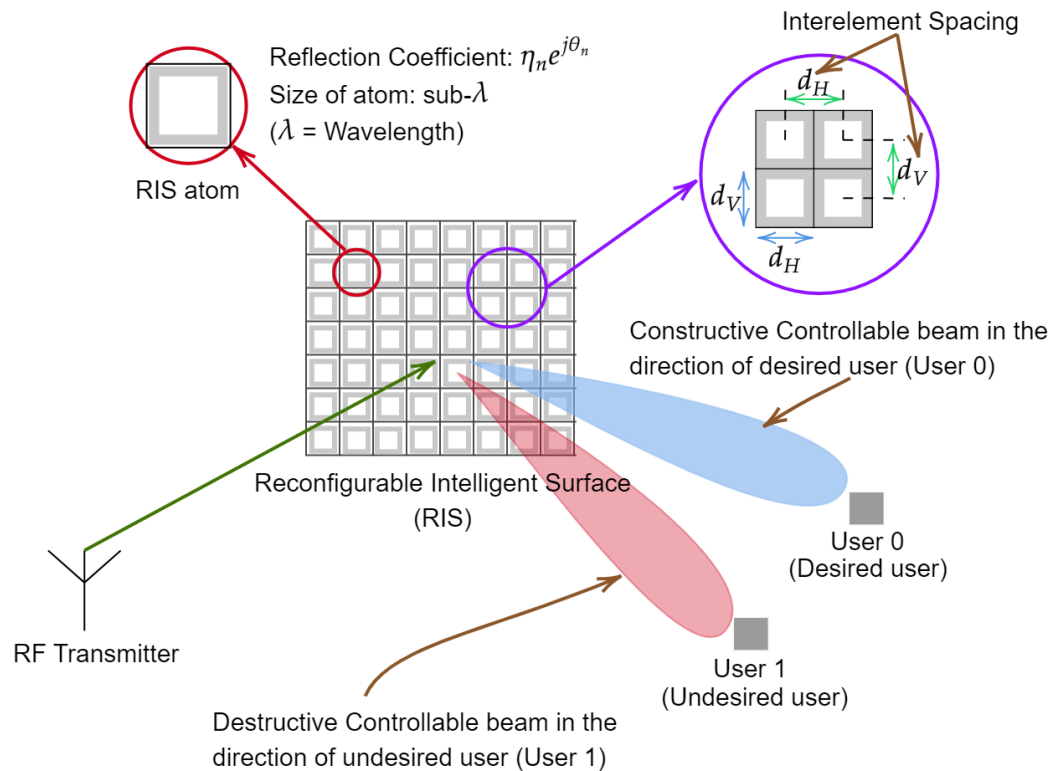
Completed Projects

1. Development and Analysis of Spectrally Efficient Communication System for Future Generation IoT Applications, MeitY, GoI, 2017-2020.
2. Full Duplex Wireless Communications: Performance Analysis and Implementation Issues, SERB, GoI, 2016-2019

Ongoing Projects

1. Analysis Design and Implementation of Intelligent Reflecting Surfaces (IRSs) Assisted Wireless Communication Systems, MeitY, GoI, 2021-2024.

Reconfigurable Intelligent Surfaces



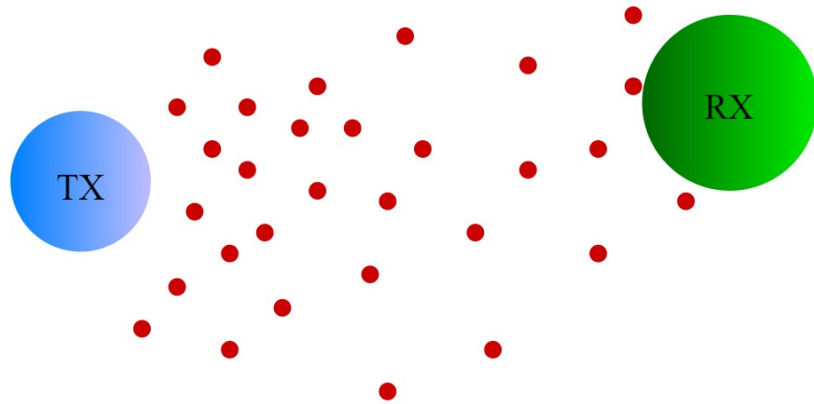
Current Scenario:

European Telecommunications Standards Institute (ETSI) has formed a special group for standardization of RIS, which shall focus on networking e2e reference architecture including RIS elements, RIS based specific deployment practice / guidelines, etc. [1]

Requirement for Standardization:

1. Standardization of the element dimensions: based on operating frequency, correlation and available resources.
2. Standardization of phase-control algorithms.
3. Standardization of material to be used as substrate for construction of the surface. Materials such as graphene are thought of as a potential material.
4. Provide a Gap Analysis for RIS microelectronics and enabling technologies
5. Deployment strategies, RIS use cases, channel modelling, etc.

Molecular Communication



Current Scenario:

A definition, terminology, conceptual model, and standard metrics for ad hoc network communication at the nanoscale are provided. Human-engineered networking is extended by the physical properties of nanoscale communication in ways beyond that defined in existing communication standards [2].

Requirement for Standardization (Out of Body applications):

(Bacterial and disease carrying particles' propagation, water treatment, etc.)

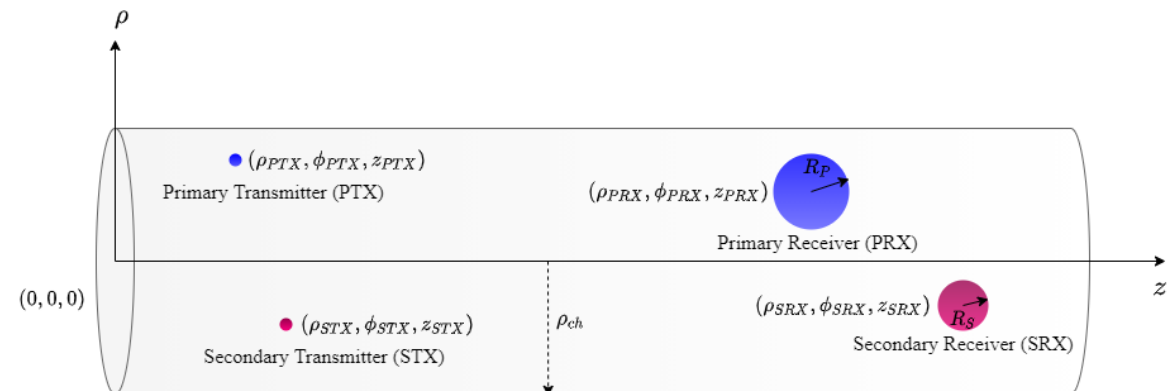
1. Standardization for the use, construction and development of the sensing nanomachines compatible and do not hamper the physical and chemical properties of the fluid in which they are released (e.g. Water treatment).
2. Standardization of sensing mechanisms.

- Inspired by cell-to-cell communication inside organisms
- Use molecules to transmit information.

Requirement for Standardization (In-body applications):

(Disease detection, Targeted Drug delivery)

- Standardization to be developed with the help of medical expertise.
- For targeted drug delivery, the material, dimensions, etc. for the nanomachines.
- For disease detection, it is proposed to use the available in-body enzymes, proper structure and mechanism needs standardization.
- Detection schemes require standardization.
- Communication of the detected information outside the body requires technologies such as Internet of Bio-Nano Things, standardization and development of interface for the same is required.



[2] "IEEE Recommended Practice for Nanoscale and Molecular Communication Framework," in IEEE Std 1906.1-2015, vol., no., pp.1-64, 11 Jan. 2016, doi: 10.1109/IEEESTD.2016.7378262.

Standard Driven Research

No emphasis so far.

Challenges for Standardisation

Awareness.

Administrative Policies and support.

Lack of focussed collaboration.

Way Ahead

More interaction at Institute and Individual levels.

Constitution of working groups.

Maximum Participation from all.

Thank You !