TARANG

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IEEE Microwave Theory and Techniques Society (MTT-S)

ABOUT IEEE

IEEE, an association dedicated to advancing innovation and technological excellence for the benefit of humanity, is the world's largest technical professional society. It is designed to serve professionals involved in all aspects of the electrical, electronic, and computing fields and related areas of science and technology that underlie modern civilization. IEEE's roots go back to 1884 when electricity began to become a major influence in society. There was one major established electrical industry, the telegraph, which since the 1840's had come to connect the world with a data communications system faster than the speed of transportation. The telephone and electric power and light industries had just gotten underway.

ABOUT IEEE MTT-S

The IEEE, Microwave Theory and Techniques Society (MTT-S) is a transnational society with more than 10,500 members and 190 chapters worldwide. Our society promotes the advancement of microwave theory and its applications, including RF, microwave, millimeter-wave, and terahertz technologies. The activities sponsored by the MTT-S include a broad spectrum of conferences, workshops, tutorials, technical committees, chapter meetings, publications and professional education programs. Our principal publications and conferences are world class, peer- reviewed and recognized as top of the class. Our professional venues provide a great opportunity for networking with experienced innovators, experts, and practitioners. Our volunteer programs provide for the development of critical, non-technical skills that enable you to be more effective professionally.

THE MISSION OF MTT-S :

The mission of IEEE MTT-S is to advance the field of microwave engineering by holding events to inform members about the theory and applications of high- frequency technology.

Principal
Dr.S.Sai Satyanarayana Reddy

It is my great pleasure and honor to be part of IEEE MTT-S, I really appreciate a noticeable progress in promoting various activities to support active researches and engineers. We are happy as their efforts in nurturing future engineers and researchers, improving the status and their international contribution. Our basic aim is to further develop our activities to improve the career development of students. I sincerely hope all of you involve with commitment and improve.

Dr. M. A. Jabbar
IEEE Advisor

Iam happy to share you that we are inaugurating another student chapter in our college . Vardhaman is the only college in the state of Telangana with more number of IEEE Students chapters . We are also planning to start IEEE Engineering in education student chapter in the upcoming days . IEEE is one of the largest international professional organizations dedicated to promoting engineers and scientists and inspiring youths around the world to follow their academic interests to a career in engineering. Future engineers can help in reducing poverty, development of the country and can provide a better chance for next generation. I congratulate students and faculty members for starting MTT IEEE student chapter. I hope this student chapter will strive for the development of upcoming engineers.

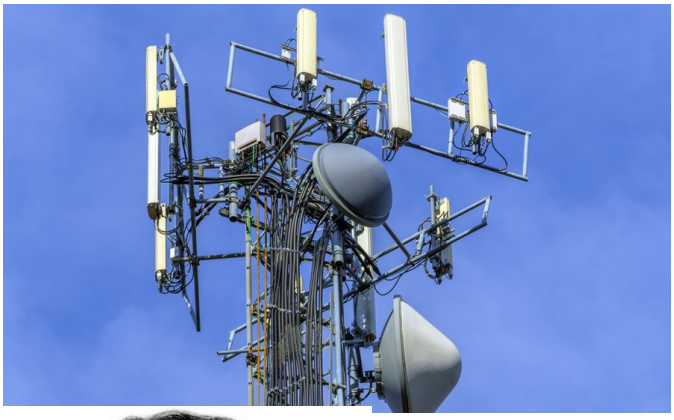
HOD,ECE
Prof. Y. Pandu Rangaiah

It is one of the greatest honor to be a part of this IEEE MTT-S society. The field of interest of the society shall be theory, techniques and applications of guided wave and wireless technologies spanning the electromagnetic spectrum from RF/microwave through millimeter-waves and terahertz. I Wish all the best to the student members of IEEE MTT-S student chapter of Vardhaman College of Engineering to try to enhance their knowledge and make use of this wonderful opportunity.

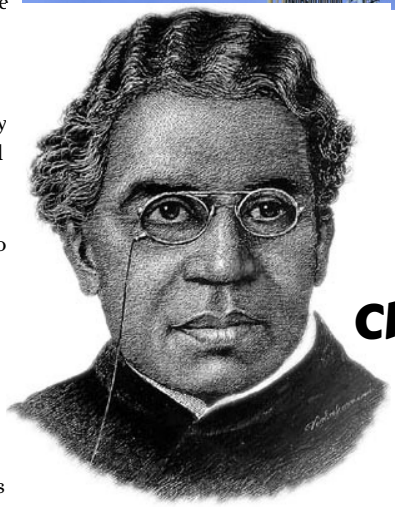
Dr. Sulakshana Chilukuri
IEEE MTT-S Student Chapter Advisor

It gives me immense pleasure to be member of IEEE MTT society and as advisor for the student chapter in Vardhaman College of Engineering. Today's research is towards miniaturization of communication devices and future research is on high speed data transmissions. Keeping these in view, our chapter focuses on activities involving learning essential technical information through various workshops, seminars , conferences by which acquiring new skills, developing networking opportunities with experts and advisors who can help shape career of society student members. Students involving in such activities get recognized and rewarded that help them in career development finally contributing to advancement of RF, Microwave and Wireless communication technologies. I congratulate all the student members of the society for their keen interest in joining IEEE MTT-S society.

HOW IS 5G GOING TO DECIDE THE NEXT SUPERPOWER ?



When we talk about the 5th generation wireless systems or 5G it's not just next generation mobile wireless telecommunications beyond the current 4G International Mobile Telecommunications (IMT)- Advanced Systems. It's a whole new system with new service capabilities. Current research is focusing on advanced characteristics like higher capacity than current 4G, higher density of mobile broadband users, and supporting device-to-device (D2D) communications and massive machine-type communications. To be precise these are the 8 features that are under development. 1-10 Gbps connections to end points in the field, 1 millisecond latency, 1000x bandwidth per unit area, 10-100x number of connected devices, 99.999% availability, 100% coverage, 90% reduction of network energy usage and up to ten years battery life for low power devices. The new 5G wireless systems is not just about traditional voice and data communication, it also opens up a whole new world of possibilities but the new architecture, new technologies, and new use cases in 5G wireless systems will bring new challenges to security and privacy protection. Due to the broadcast nature and the limited bandwidth of wireless communications, it is possible but difficult to provide security features such as authentication, integrity and confidentiality. There are various security issues in current cellular networks at media access control layer (MAC) and physical layer (PHY) in terms of possible attacks, vulnerabilities and privacy concerns . The security protections of voice and data are provided based on traditional security architectures with security features as user identity management, mutual authentications between the network and user equipment (UE), securing communication channel and so on. However, new security requirements are needed to support a variety of new use cases and the new networking paradigms . The security mechanisms are needed to comply with the overall 5G advanced features such as low latency and high energy efficiency . Moreover, unlike the legacy cellular networks, 5G wireless networks are going to be service-oriented which have a special emphasis on security and privacy requirements from the perspective of services. Apart from its tremendous commercial benefits, 5G – the fifth generation of mobile communication is revolutionizing military and security technology. The future landscape of warfare and cyber security could be fundamentally changed by 5G. Where as existing networks connect people to people, the next generation will connect a vast network of sensors, robots and autonomous vehicles through sophisticated artificial intelligence.



Sir Jagadish Chandra Bose

5G is being identified by many military experts as the cornerstone of future military technology. Imagine a group of skirmishers in a jungle. They are moving forward speedily with a distance from one another of a few hundred meters. Each of them wears a wristwatch that displays fellow members positions. This is not satellite positioning, because reception in the tropical forest is unstable; it's machine-to-machine communication. Suddenly one soldier, ambushed by an enemy combatant, is shot and loses consciousness. His smart wearable device detects his condition via sensors, immediately tightens a belt around his wounded thigh, injects an adrenaline shot and sends an emergency alert to the field hospital as well as the entire team. The D2D communication explained in this scenario shows the one of the features of next generation communications capability.

-ASHU ADHANA
Vice Secretary

WHAT IS 'TARANG' ?

TARANG mean waves in Sanskrit. This newsletter gives information on the developments of MTT-S and to actively participate in the acknowledgement of advanced technical improvements and discoveries in the field.

Mission of 'TARANG'

To be efficacious in scientific, technical & industrial activities in the field of EM, RF & microwave engineering contributing to the advancement of present & future wireless communications.

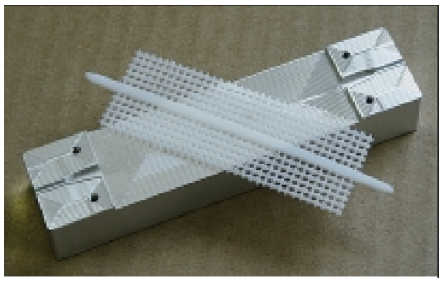
Dr. P. Nageswara Rao
Coordinator ,IQAC

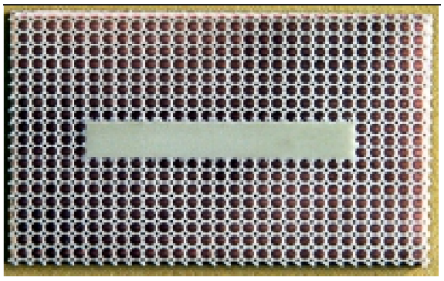
It is a great honor and pride to be a part of IEEE MTT-S committee. I congratulate students and faculty members for starting IEEE MTTS , IEEE students chapter, Vardhaman College of Engineering.The discipline of microwave theory & techniques applies physical and mathematical principles to analyze devices, components and structures that interact with electromagnetic fields and often have dimensions representing a significant fraction of a wavelength.I hope this Student branch will strive for the development of upcoming engineers.

FACTOID

Microwave ovens were invented by accident by an engineer named Percy Spencer when a chocolate bar in his pocket melted while building magnetos for radar sets in the 1940's.

Future Research Trends and Advantages of Substrate Integrated Wave guide Technology





Novel SIW structures requires the design of novel wide band transitions from microstrip and co-planar lines to multilayered SIW components whose frequency is between 60 - 350 GHz that will open intersecting perspective for new market applications. The design of such microwave components will meet the needs of UWB systems and the telecommunication circuits by modeling filters for space applications. Novel SIW structures posted the development of more efficient components and circuits with advanced performances which are able to integrate more functions in the same component. The next future trend is to obtain System On Substrate (SOS) approach of SIW structures. Currently we are using System In Package (SIP) concept, the portion of the circuit is integrated in chip set which may include oscillators, mixers, LNA and the remaining part is usually printed on Planar technology and compromises power amplifiers, selective filters and antennas. The Microstrip antennas are convenient below 30 GHz but becomes practical at higher frequency due to prohibitively of high loss and interference between adjacent circuits. Usage of the new materials and different technologies for the fabrication of SIW Technology are adopting LT-CC and HT-CC (Low temp and High temp co-fired ceramic). These technologies will permit the fabrication of 3D SIW components. For the further design flexibility to lead the novel solutions with better performance.

- A. NAGARAJU
Editor

Do you know?

Microwave communication is used by NASA and other space agencies for deep space communication. Since a microwave has a narrow, focused frequency band, it will travel in a straight line and can penetrate the Earth's atmosphere. Microwave communication is clear over a long distance through space.

In 1959 U.S. Navy engineers discovered that microwaves could bounce off objects in the solar system. They were able to bounce a microwave communication from Washington D.C., off the moon, to a receiving in Hawaii.

Manohar Rangu
IEEE MTT-S Chair

It is my honor to work for the IEEE. Being the chair of this society I promise to put dedicated efforts to develop the student memberships of this society to help students gain great insights into Microwave Theory and Techniques and other inter-disciplinary fields around the area. I also hope to promote the advancement of microwave theory and its applications, including RF, microwave, millimeter-wave, and terahertz technologies in alignment with the society's aims and objectives. I will try my best as the chair to lead this society towards great achievements.

V. Akshita
IEEE MTT-S Vice chair

It gives me immense pleasure to be a part of IEEE Microwave theory and Techniques society. Advances in RF & Microwave electronics are often fast-paced and innovative, so we know that as a design engineer we want to be kept up-to-date with current developments. IEEE MTT-S helps us in doing that. From smartphones to satellite service, GPS and more, RF technology is a future of modern life.So Being the member of this society and also the Vice chair I would learn and also help my friends around me to learn the advancements in RF technology and its growing importance.

Priyanka Sappidi
IEEE MTT-S Secretary

I feel really honored to be a part of this technical professional society. It has given me a great opportunity to enhance my skills. And am very thankful to this society for giving an opportunity to work with them as a secretary. Its my responsibility to give my best and to help the people around me to work in the world of technology and innovation. I'm looking forward for more opportunities to work with this great society.

Ashu Adhana
Vice Secretary

It is an amazing time for microwave engineering and science. The desire for people and objects to exchange information without the need for wires or cables is now almost universal MTT-S is the largest global organization of professionals engaged in the broad range of microwave-based technology and it is my heartfelt wish to introduce these advancements to my colleagues through this wonderful opportunity.

COMMITTEE

Dr. S.Sai Satyanarayana Reddy	- Patron
Prof. Y. Pandu Rangaiah	- HOD,ECE
Dr. M. A. Jabbar	- IEEE Advisor
Dr. Sulakshana Chilukuri	- IEEE MTT-S Faculty Advisor
Manohar Rangu	- Chair
Akshita Vuppala	- Vice chair
Priyanka Sappidi	- Secretary
Ashu Adhana	- Vice Secretary
Pooja Garlapati Reddy	-Treasurer

Editorial Team

Maram Hema Vardhan Reddy
Afsha Sukaina Begum
Avishek Singh
Nagaraju

Maram Hema Vardhan Reddy
Chief Editor

It has been a dream of mine to put all my idea's on-board. On being a part of Innovative Engineering club, I think it could be accomplished to a good extent. I am grateful to be the Chief editor of IEEE's Microwave Theory and Techniques Society (MTT-S) of Vardahaman College of Engineering. I here by take the honor of being an active member in IEEE MTT society and to put my best efforts to take the society to a great extent.

G. Pooja Reddy
Treasurer

It gives me great pleasure to work for the IEEE Microwave Theory and Techniques Society as the treasurer of this society. Being a treasurer is not an easy responsibility and I thank IEEE Microwave Theory and Techniques Society Review Committee for trusting my abilities. I promise to be fair in all allocations of funds and to help create a formal financial aggregate of all events that happen under this society. I hope as the treasurer, I will help this society take a much more formal shape and thus help the society propel forward.

A.Nagaraju
Editor

I have been waiting for a long time to take part and work in the communication stream and I thank each and everyone who made this society. Microwave theory is the place which doesn't have an end in the creativity. I think IEEE MTT-S is the right place where I can share my thoughts to the world and I could learn lots of things. Being a member of IEEE, I would take the responsibility of making and arranging the programs in time in a disciplinary manner. I hope that I will give my 100% as an editor and make society move forward.

Afsha Sukaina Begum
Editor

I thank the organizers of the IEEE's Microwave Theory and Techniques Society (MTT-S) of Vardhaman College of Engineering, for giving me the opportunity to work with them as an editor. Being an editor, I put all my efforts to deliver the content and commit myself best to take the innovation in engineering forward.

Avishek Singh
Editor

I am very thankful to the IEEE society such opportunity to enhance the technical and innovative skills within me and the people around me. Looking forward for such great opportunities.