
# 1st IEEE Workshop on Electromagnetic Information Theory towards 5G-Advanced (5.5G EIT)

## ORGANIZERS

***Marco Di Renzo***, CNRS & Paris-Saclay University, France

***Linglong Dai***, Tsinghua University, China

***Marco Donald Migliore***, University of Cassino and Southern Lazio, Italy

***Tengjiao Wang***, Huawei Technologies, China

## INVITED TALK

1. ***When Shannon meets Maxwell: Electromagnetic Information Theory in 5.5G***, by *Tengjiao Wang*, Huawei Technologies, China
2. ***5.5G EIT: State of Research and the Road Ahead,*** by *Marco Di Renzo*, CNRS & Paris-Saclay University, France

## TPC MEMBERS

***Jiyong Pang***, Huawei Technologies, China

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## SCOPE

In order to meet the immensely higher data rate, reliability, and traffic demands in the future 5G-Advanced communications, novel communication frameworks are rapidly emerging to fully utilize the electromagnetic waves, including holographic MIMO, extremely large antenna arrays, reconfigurable intelligent surfaces, etc. The ultimate limitation of the channel capacity and the ways to achieve this capacity are two fundamental questions in the system design. However, current design and performance analysis methods are usually based on the scalar-quantity, far-field, planar-wavefront, monochromatic and other non-physically-consistent assumptions, which may cause mismatch between the system design and the realistic propagation environment.

To solve this problem, the emerging electromagnetic information theory (EIT) is proposed and has attracted increasing interests from both academia and industry. By integrating the statistical information theory with the deterministic electromagnetic theory, it is able to build a more physically consistent communication model and establish more fundamental limitations on the communication systems. It is expected that EIT will bring brand new theoretical analysis and system design paradigms to the future wireless communications.

While research into EIT based theoretical analysis, signal processing, channel modeling, antenna design, and standardization for the future wireless communications are still in the early stage, it is essential to establish a clear vision and provide guidance for the worldwide academic researchers and industrial partners. Thus, we believe this workshop will bring a good opportunity to attendees from both academia and industry to present novel ideas on EIT and to exchange views on 5G-Advanced openly.

## TOPICS OF INTEREST (*including but are not limited to*)

**EIT based Theoretical Analysis**

· Channel capacity analysis
· Degree of freedom analysis
· Characteristic mode analysis
· Performance evaluation

**EIT based Channel Modeling**

· Physics consistent channel modeling
· Computational electromagnetics
· Circuit theory based modeling
· Reactive/radiating near field modeling

**EIT based Signal Processing**

· Beamforming for near/far field
· Channel estimation for near/far field
· Interference cancelation
· Joint system optimization

**EIT based Antenna Design**

· Holographic MIMO
· Extremely large antenna arrays
· Reconfigurable intelligent surfaces
· Electromagnetic metasurfaces

## IMPORTANT DATES

**Paper Submission Deadline:** **24 February 2022**
Paper Acceptance Notification: 17 April 2022
Camera Ready: 1 May 2022

## SUBMISSIONS

Submission link: https://vtc2022s-rr-wks.trackchair.com/track/2052
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