

# **AUTOMOTIVE RADAR-A SIGNAL PROCESSING PERSPECTIVE ON CURRENT TECHNOLOGIES AND FUTURE SYSTEMS**

IEEE AES/AP/COM/ED/MTT Joint Cleveland Chapter



## **Date & Time:**

**October 15, 2019  
5:30 to 7:30 PM**

## **Location:**

**Beacon Place Lower Level  
Conference Room  
6055 Rockside Woods Blvd. N,  
Independence, OH 44147**

## **Presenters:**

**Dr. Markus Gardill**  
*IEEE Microwave Theory and  
Techniques Society DL*

## **Agenda:**

**5:30 – 6:00 Registration,  
Refreshments, Networking  
6:00 – 7:00 Presentation**

## **RSVP:**

**<http://www.clevelandieee.org/events/automotive-radar>**

## **Questions:**

**Contact Max Scardelletti:**  
**Treasurer@clevelandieee.org**

**CPD: 1 Hour Bring Flyer**

The IEEE AES/AP/COM/ED/MTT Cleveland Joint Chapter and IEEE Cleveland Section invite you to attend the presentation “*Automotive Radar – A Signal Processing Perspective on Current Technology and Future Systems*” by Dr. Markus Gardill on Tuesday the 15<sup>th</sup> of October at Beacon Place in Independence, Ohio from 5:30 to 7:30 PM. Please RSVP by October 14 at the link provided or go to the IEEE Cleveland Section website RSVP and for more information.

## **Speaker Biography:**

Markus Gardill is head of the group radar signal processing & tracking at InnoSenT GmbH, developing together with his team future generations of automotive radar sensors.

He is member of the IEEE Microwave Theory and Techniques Society (IEEE MTT-S) and currently serves as co-chair of the IEEE MTT-S Technical Committee Digital Signal Processing (MTT-9).

He serves as Distinguished Microwave Lecturer (DML) for the DML term 2018-2020 with a presentation focussing automotive radar systems. His main research interest include radar and communication systems, antenna (array) design, and signal processing algorithms.

His particular interest is spatio-temporal processing such as e.g. beamforming and direction-of-arrival estimation with a focus on combining the worlds of signal processing and microwave/electromagnetics.

## **Abstract:**

Radar systems are a key technology of modern vehicle safety & comfort systems. Without doubt it will only be the symbiosis of Radar, Lidar and camera-based sensor systems which can enable advanced autonomous driving functions soon. This presentation will introduce the topic with a review on the fundamentals of FMCW radar and then dive into the details of fast-chirp FMCW processing. Starting with the fundamentals of target range and velocity estimation based on the radar data matrix, the spatial dimension available using modern single-input multiple-output (SIMO) and multiple-input multiple-output (MIMO) radar systems will be introduced and radar processing based on the radar data cube is discussed. Of interest is the topic of angular resolution – one of the key drawbacks which e.g. render Lidar systems superior to radar in some situations. Consequently, traditional and modern methods for direction of arrival estimation in FMCW radar systems are presented. The talk concludes with an outlook on future system aspects such as application of neural networks or over-the-air de-ramping.

This is to certify that \_\_\_\_\_ attended this seminar. Certified by \_\_\_\_\_  
the attendee for auditing purposes. Certificates of attendance and other evidence of CPD activity should be retained by