

**Call for Participation**  
**7<sup>th</sup> mmW RCN Workshop – Visioning for the Next RCN Project**  
**NSF Research Coordination Network on Millimeter Wave Wireless**  
**University of South Carolina**  
**Columbia, SC**  
**May 18-19, 2020**  
<https://mmwrcn.ece.wisc.edu>

Millimeter-wave (mmW) wireless is the focus of intense current research in academia and industry for achieving multi-Gigabit data rates and low latency as part of the 5G and emerging wireless networks. This NSF-sponsored research coordination network (RCN) aims to spur research and development of mmW wireless, driven by innovations in three key areas:

- 1) CSP: communication and signal processing techniques;
- 2) HW: mmW hardware, circuits, antennas, and digital hardware; and
- 3) NET: wireless networking;

along with mmW prototypes and testbeds. The RCN aims to engage academic and industrial researchers as well as stakeholders from the US government agencies to facilitate cross-fertilization of ideas, identification of challenges and strategies to address them, and to guide the development of mmW wireless technology and standards. The RCN is led by the University of Wisconsin and includes a steering committee of sixteen leading researchers in the area of mmW wireless technology from academia and industry, including international representatives.

**Seventh RCN Workshop:** A key mechanism for interaction between RCN members and participants from the wider mmW research community is through two workshops each year. The originally planned six workshops have been held, starting with the kickoff in Washington, DC (Dec 2016) and ending with the 6<sup>th</sup> workshop at NIST in July 2019. Research topics that have been explored at the RCN workshops include:

- Research ideas and demonstration concepts at the interface of CSP-HW and CSP-NET areas, including new beamforming architectures, and channel and measurement models.
- Integration of channel models into system-level and network-level design and simulation.
- Combining measurements and ray tracing for accurate channel models.
- Research issues driven by mmW standards, including 5G NR (new radio), WiGig, and 802.11ay.
- Spectrum sensing, sharing, and access issues.
- Innovations in prototype and testbed development (especially lower cost approaches).
- Research ideas and challenges for mmW wireless at frequencies above 40 GHz (40-300GHz).
- The role of machine learning techniques in system design and optimization.
- System- and network-level analysis of integrated fixed wireless, backhaul, and access networks.
- New and emerging use cases, including AR/VR, vehicular networks, drone-based networks, and new enterprise-scale applications (e.g. airports and industrial IoT).
- Synergistic approaches from other applications such as imaging, radar and sensing.
- “Moonshot” problems (5-year and 10-year timeframe) for active academic-industry collaboration.

Some of the notable RCN accomplishments to date include:

- Identification of research challenges and opportunities at the HW-CSP interface.
- Identification of research challenges and opportunities at the CSP-NET interface.
- Development of a framework for network simulation that incorporates the advanced capabilities of mmW radios, including beamforming, in 5G and beyond.
- Development of accurate channel models based on mmW sounder measurements.
- Brainstorming ideas for developing mmW community testbeds for research and experimentation.

The mmW RCN community is nearly unanimous in its desire to continue the RCN activities in the future as part of a next-generation RCN project. Building on the discussion at the last workshop, this 7<sup>th</sup> RCN

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workshop is aimed at brainstorming and identifying research directions and themes for the next RCN project. Some of the research themes that have been suggested, include:

- Higher frequencies, THz and beyond, for both communications and sensing.
- Community testbed design and development.
- Accurate channel modeling and network simulation at mmW and higher frequencies.
- New concepts and use cases, including large scale problems and the use of data-driven machine learning techniques.

**Participation & White Papers:** Prospective participants are invited to submit a **one-page white paper** outlining their recent results and/or demonstration concepts relevant to mmW wireless, especially as they relate to themes and topics that may be relevant to the next RCN project. Accepted white papers will be presented as posters and/or demos at the workshop. The authors are encouraged to consult the agenda, posters and reports from the previews workshops at <https://mmwrcn.ece.wisc.edu/workshops/>. The white papers must include:

1. tentative poster/demo title,
2. list of authors (including a statement on who is the contact author), and
3. email addresses and affiliations of authors.

The one-page white papers should be submitted in **pdf format** to [mmwrcn@ece.wisc.edu](mailto:mmwrcn@ece.wisc.edu). **Please use the following format for the white paper filename: lastname\_firstname\_rcn7.pdf (contact author).** Postdoctoral and early-career researchers as well as researchers from under-represented groups are strongly encouraged. Limited funding is available to support the travel cost of senior academic researchers, including a few international participants, for selected white papers. **Please indicate in your white paper if you will be unable to attend without travel support. If you are requesting travel support, indicate the name of the author who will be receiving the travel support (one per white paper submission).** Participants without white papers, especially from industry, are encouraged to attend, subject to space availability. Please see the workshop page for registration and additional information; <https://mmwrcn.ece.wisc.edu/workshops/seventh-workshop-may-2020/>.

**Important Deadlines:**

Feb 3, 2020: call for participation published

**Mar 6, 2020: one-page white paper submission (please follow the submission instructions)**

Mar 20, 2020: white paper registration; register at the link:

Mar 27, 2020: Notification of white paper acceptance and travel support

April 10, 2020: travel (air and hotel) reservation deadline (for attendees with RCN travel support)

May 10, 2020: registration closes

May 18, 2020: workshop begins

**Organizers:**

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