NYU WIRELESS

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# Pulse

## Bringing Together the World's Foremost Wireless Researchers

SPECIAL ISSUE:
NYU WIRELESS WORKSHOP

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**About the cover**
Attendees at the 2024 NYU WIRELESS Workshop included (l. to r.) Milica Stojanovic, Northeastern University; Cicek Cavdar, KTH Royal Institute of Technology; and Sofie Pollin, KU Leuven.

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*NYU WIRELESS is a vibrant academic research center pushing the boundaries of wireless communications, sensing, networking, and devices.*

Centered at NYU Tandon School of Engineering and involving leaders from industry, faculty, and students throughout the entire NYU community, NYU WIRELESS offers its Industrial Affiliate Members, students, and faculty a world-class research environment that is creating fundamental knowledge, theories, and techniques for future mass-deployable wireless devices in a wide range of applications and markets.

Every January, NYU WIRELESS hosts an annual Open House for all of its students and Industrial Affiliate Members, followed in November by the prestigious invitation-only Brooklyn 6G Summit (B6GS.com), in cooperation with Nokia, for the Center's Industrial Affiliates and thought leaders throughout the global telecommunications industry. The NYU WIRELESS Workshop is scheduled for January 20–21, 2026, on the NYU Tandon School of Engineering campus.

**NYU WIRELESS**, info@nyuwireless.com

**Leadership** Founding Director Ted Rappaport, Director Thomas L. Marzetta, and Associate Directors Sundeep Rangan, John-Ross Rizzo, and Dennis Shasha manage NYU WIRELESS across Brooklyn and Manhattan campuses of NYU. Rappaport has powered the 5G millimeter wave era and is a leading educator in the wireless arena, having authored many books and started two companies and three major academic wireless research centers. Rangan is an Electrical Engineering Professor at NYU Tandon and was a co-founder of Flarion Technologies, which developed Flash-OFDM, one of the first cellular OFDM data systems. Marzetta originated the concept of Massive MIMO and seeks ten-fold improvements over Massive MIMO through a closer union of wave propagation physics and communication theory. Rizzo is an Associate Professor in the Departments of Rehabilitation Medicine and Neurology at NYU Langone Health. His research is focused on wearable technology and blindness and visual impairment. Shasha of Courant's Computer Science Department is widely known for his expertise in data-intensive algorithms and streaming data and is a highly acclaimed inventor of mathematical puzzles.

**The Industrial Affiliates Program** NYU WIRELESS invites global companies to join our Industrial Affiliates program, which offers instant access to cutting-edge research results and talented students in a mutually beneficial relationship among NYU WIRELESS researchers, students, facilities, and leading industry partners. NYU WIRELESS would like to thank our Industrial Affiliate Partners as well as NSF, NIH, and DOD for their continued support. Learn more about our Industrial Affiliates program by visiting nyuwireless.com/industrial-affiliates.

## NYU WIRELESS Newsletter

Download and read copies of our previous newsletters online by visiting **nyuwireless.com/nyu-wireless-newsletter**.

# From the Director

**Thomas L. Marzetta**
Director, NYU WIRELESS

The third NYU WIRELESS Workshop was held June 13–14, 2024. Professor Elza Erkip and I introduced the Workshop in 2021 specifically to bring together the foremost wireless researchers from industry and academia for a free exchange of ideas. Since then, the Workshop has become the flagship research event for NYU WIRELESS. The fourth NYU WIRELESS Workshop will be held January 20–21, 2026. The theme is "Twenty Years of Massive MIMO: What's Next?" We hope these photographs impart the excitement and vitality of the event!

# Third NYU WIRELESS Workshop

**WORKSHOP SPEAKERS**

**Danijela Čabrić**
UCLA

**Doru Calin**
MediaTek

**Cicek Cavdar**
KTH Royal Institute of Technology

**Thorkild B. Hansen**
Seknion, Inc.

**Urbashi Mitra**
USC

**Ana Pérez-Neira**
Centre Tecnològic de Telecomunicacions de Catalunya

**Sofie Pollin**
KU Leuven

**Hamed Rahmani**
NYU

**Milica Stojanovic**
Northeastern University

**Alessandro Vanelli-Coralli**
Università di Bologna

**Martin Weiss**
OUSD (R&E)

**Smaine Zeroug**
Schlumberger-Doll Research

The third NYU WIRELESS Workshop brought 70 of the world's top wireless researchers to Brooklyn on June 13-14, 2024. Organized by Tom Marzetta and Elza Erkip of NYU, Liesbet Van der Perre of KU Leuven, and Petar Popovski of Aalborg University, the Workshop occupied three half-days, each focused on a specific research theme: the challenges of FR3 spectrum, alternative wave propagation models, and the promise of communication satellite networks. Live participation only, and the absence of streaming and recording, ensured lively and candid discussion. The next Workshop will be held January 20-21, 2026.



## SESSIONS

**What Are the Challenges of the FR3 Spectrum?**

Radar Communications Coexistence

Building Bridges in FR3

Hardware Design Challenges & Considerations for Wireless Networks in the Upper Mid-Band

What are the Challenges of FR3 Spectrum?

**Alternative Wave Propagation Physics**

Using Complex Space to Model Transmitters and Receivers in Wireless Communications

Causal Graph Identification: An Optimal Strategy, Performance Bounds & a Low Complexity Algorithm

Where Radio Doesn't Go: Big Wavelengths & Other Sea Monsters

Wave Propagation for Subsurface & Wellbore Characterization

**Communication Satellite Networks: Strategic or Volatile?**

Satellite and Terrestrial Network Convergence—From B5G to 6G

6G for Connected Sky: 6G-SKY

The Perfect Storm for SatComs

Non-Terrestrial Networks in 6G: Vision, Architecture & Research Challenges


Wireless
hop

# Brooklyn 6G Summit Update

The 11th annual Brooklyn 6G Summit (B6GS) explored the impact of AI and machine learning on telecommunications. Held October 23–25, 2024, on the campus of NYU Tandon School of Engineering in Brooklyn, the Summit was attended by 300 people and was streamed live to a global audience in 25 countries.

Presentations and lively discussions over three days explored the ways in which AI and other quickly advancing technologies promise "superpowers" for 6G wireless, while at the same time posing challenges in areas such as security and sustainability.

For the first time, the Summit featured a student panel of doctoral candidates from schools including NYU Tandon School of Engineering; the University of Texas, Austin; Northeastern University; Technische Universität Dresden; and the University of Oulu in Finland.

Nokia's Peter Vetter, President of Bell Labs Core Research, moderated the panel, engaging the students in a spirited round of discussion about the challenges and opportunities in wireless, the benefits of industry collaboration with academia, and interesting aspects of wireless tech that attracted the students to the field.

The student panelists, who included Ruth Gebremedhin and Mingjun Ying of NYU WIRELESS, predicted that security will become a key issue as AI models are infused into research, practice, and products. They also saw AI as an accelerant for optimizing channels. Mingjun, for example, said his group is working on channel propagation measurements with an eye on devising ways of using AI to drive applications, leading to better coverage. He said his work is about how computer vision and AI transformers can create material-embedded 3D environments for industry to help with challenges around base station deployment. "I'm interested in leveraging AI to optimize network deployment within a material-embedded 3D environment and evaluating the Waste Factor for a more sustainable wireless network," he said.

**"...we can provide new insights for industry's practical goals..."**

MINGJUN YING, NYU WIRELESS PH.D. STUDENT

Ruth echoed Mingjun's sentiment, noting that a focus on sustainability and efficiency is key, particularly as AI tools infuse every corner of wireless architecture. "The use of AI comes with disadvantages around power use. I am looking into how to achieve sustainability while using AI as a tool."

Florian Gast, a Ph.D. student and research associate at TU-Dresden, said that his antennae—so to speak—went up when he heard a Summit keynote explaining how sustainability imperatives require reducing energy per bit by a factor of 50. But achieving these goals requires standardized means of measuring performance, something Mingjun pointed out to chagrined laughter from the audience. "Everyone is mentioning that sustainability is key to 6G," he continued. "I think the problem is we don't have a unified metric to analyze power efficiency of different architectures and networks. Our group is proposing a waste factor that can be applied to any cascade system."

During the panel, another key Summit theme found its way into the discussion: industry collaboration, about which the students were enthusiastic, as working in an industry setting offers fresh perspectives on how research can address society's real-world needs and,


therefore, presents novel commercial applications. "Collaboration can open our eyes," said Florian. "It helps us understand [to what extent] what we are doing is actually needed."

Ruth offered an inverse perspective in response to the moderator's query about topics the Summit had not delved into during its panels, themes, discussions, and keynotes. She suggested that there could have been more "Fundamentally disruptive visions.... [an exploration of] what can we change fundamentally." But she added that collaborating with industry offers (perhaps paradoxically) fresh exposure to such new ideas.

"Ph.D. students can be narrow and focused," she said. "What I liked about doing research at Nokia Bell Labs is that, I still did research, but it was different than the kind of work I have done toward my Ph.D. It gives me new tools and a fresh perspective on what the industry is doing, one that is much broader than the scope of my own doctoral work."

"There is a huge difference between industry and academia," added Mingjun. "[In academia] we are five to ten years ahead of the curve. For industry, which is more focused on practical problems, the key is making products and delivering." He said that this difference is a net positive for students, "because we can provide new insights for industry's practical goals and vice versa: It can help you define better assumptions for your problem, so your research will be more impactful."

*The 2025 Summit will be held November 5–7, 2025. Visit B6GS.com for more information.*

# NYU WIRELESS Team Awarded $10 Million Grant

Congratulations to NYU WIRELESS' Associate Director Sundeep Rangan, who, along with his collaborating investigators, institutions, and industry partners, has been awarded nearly $10 million to develop next-generation communications technology designed to enhance the resilience of wireless networks and U.S. leadership in open, secure communications infrastructure.

**Sundeep Rangan**
Associate Director, ECE

The project, which has been dubbed SALSA (Spectrally Agile Large-Scale Arrays), is funded by the U.S. Department of Commerce's National Telecommunications and Information Administration (NTIA).

SALSA aims to create advanced wireless systems that operate in the upper mid-band spectrum—a region of frequencies relatively unused in cellular systems that offers an optimal balance of coverage and data capacity. The goal of SALSA is to develop an advanced radio frequency integrated circuit (RFIC) operating in these bands.

The RFIC will be designed for the Open Radio Access Network (O-RAN) framework to enable deployment in emerging commercial networks. The award comes through the NTIA's Public Wireless Supply Chain Innovation Fund, established under the CHIPS and Science Act to promote O-RAN development and domestic manufacturing of telecommunications equipment, seen as crucial for economic competitiveness and national security.

"SALSA focuses on the upper mid-band—a sweet spot in wireless communications," explained Sundeep. "The upper mid-band frequencies provide an optimal balance of bandwidth and coverage, making them ideal for future high-data-rate applications. The spectrally agile features of the SALSA RFIC will enable coordination between cellular operators, satellites, and federal systems, ensuring robust communications even in adverse conditions. The scale of this investment, which we believe represents one of the largest federal commitments to O-RAN, underscores this work's importance."

"This project represents a pivotal moment in wireless technology development that builds on NYU Tandon's leadership in advancing cellular networks," said Juan de Pablo, NYU's Executive Vice President for Global Science and Technology and Executive Dean of NYU Tandon. "We're creating new technologies that will democratize advanced wireless networks, making them more open, efficient, and secure, helping to ensure that the next generation of wireless innovation serves the broader public good while strengthening America's technological leadership."

The SALSA project is structured around four major tasks: developing specialized wireless chips, building modular radio platforms, integrating with open network standards, and analyzing system performance.


The Pi-Radio upper mid-band radio kit used for channel propagation measurement. The development of this radio kit was funded by an earlier NTIA grant and will serve as the prototype of the current project.

# NYU Wireless Updates

## Hamed Rahmani Wins CAREER Award

Hamed Rahmani, Assistant Professor at NYU Tandon School of Engineering and a member of NYU WIRELESS, has been honored with the National Science Foundation (NSF) CAREER Award, one of the most prestigious recognitions for early-career faculty. Hamed's work exemplifies exceptional promise in research and education.

The five-year, $550,000 grant will support his groundbreaking project, "NeuroTap: Chip-Scale High-Resolution Neural Recording with Wireless Communication and Powering." This innovative research aims to develop batteryless, high-resolution brain implants that push the boundaries of neurotechnology, offering significant advancements in medical science.

"I'm focusing on scaling systems to record data from thousands of neurons simultaneously," said Hamed. "The NeuroTap project involves three key areas: wireless power transmission enabling efficient, batteryless operation of neural implants; high-throughput wireless communication facilitating real-time data transmission from brain implants; and large-scale neural recording capturing signals from thousands of neurons with unprecedented resolution."

**"I'm focusing on scaling systems to record data from thousands of neurons simultaneously."**

**HAMED RAHMANI, ASSISTANT PROFESSOR, NYU WIRELESS**

## Tom Marzetta Receives Award

Thomas L. Marzetta, Distinguished Industry Professor at NYU Tandon School of Engineering and Director of NYU WIRELESS, received the IEEE Eric E. Sumner Award "for originating the Massive MIMO technology in wireless communications." Massive MIMO has proved to be the dominant 5G physical layer technology, and is conservatively estimated to provide between 3X and 4X improvements in spectral efficiency over the previous 4G technology. The Massive Mimo market size has grown exponentially in recent years. It is expected to increase from $8.12 billion in 2024 to $11.28 billion in 2025 at a compound annual growth rate (CAGR) of 38.9%.

## Ted Rappaport Honored

NYU WIRELESS Founding Director Ted Rappaport has been inducted into the Institute of Electrical and Electronics Engineers (IEEE) Vehicular Technology Society (VTS) Hall of Fame. The IEEE VTS's Hall of Fame recognizes "individuals whose truly outstanding leadership and contributions have had a significant impact on the technologies represented by the fields of interest of the IEEE VTS."

Ted was also named the Neil Armstrong Distinguished Visiting Fellow at Purdue University, his alma mater, for 2024–27 and a Texas A&M Hagler Fellow for 2024–28. Additionally, the Radio Club of America (RCA) honored Ted by establishing the Dr. Ted Rappaport Academic Scholarship. In further recognition of Ted's leadership role in the field, he gave seven keynote talks in 2024!

**Hamed Rahmani**
Assistant Professor, ECE

**Thomas L. Marzetta**
Director, NYU WIRELESS

**Ted Rappaport**
Founding Director,
NYU WIRELESS

# NYU WIRELESS 2024 Publications

## 5G and 6G Applications

**A. Giuliani, R. Nikbakht, G. Geraci, S. Kang, A. Lozano, S. Rangan,** "Spatially Consistent Air-to-Ground Channel Modeling via Generative Neural Networks," in IEEE Wireless Communications Letters, vol. 13, no. 4, pp. 1158-1162, Apr. 2024, doi: 10.1109/LWC.2024.3363653.

**A. Saviolo, P. Rao, V. Radhakrishnan, J. Xiao, G. Loianno,** "Unifying Foundation Models with Quadrotor Control for Visual Tracking Beyond Object Categories," in 2024 IEEE International Conference on Robotics and Automation, Yokohama, Japan, pp. 7389-7396, May 2024, doi: 10.1109/ICRA57147.2024.10610111.

**A. Yang et al.,** "Evaluating the efficacy of UNav: A computer vision-based navigation aid for persons with blindness or low vision," in Assistive Technology, pp. 1-15, Oct. 2024, doi: 10.1080/10400435.2024.2382113.

**B. Shen, G. Coruzzi, D. Shasha,** "Corrigendum: Bipartite networks represent causality better than simple networks: Evidence, algorithms, and applications," in Frontiers in Genetics, vol. 15, pp. 1440665, June 2024, doi: 10.3389/fgene.2024.1371607.

**D. Shakya, M. Ying, T. S. Rappaport, H. Poddar, P. Ma, Y. Wang, I. Al-Wazani,** "Propagation measurements and channel models in Indoor Environment at 6.75 GHz FR1(C) and 16.95 GHz FR3 Upper-mid band Spectrum for 5G and 6G," GLOBECOM 2024, Cape Town, South Africa, Dec. 8-12, 2024.

**D. Shakya, M. Ying, T. S. Rappaport, H. Poddar, P. Ma, Y. Wang, I. Al-Wazani,** "Wideband Penetration Loss through Building Materials and Partitions at 6.75 GHz in FR1(C) and 16.95 GHz in the FR3 Upper Mid-band spectrum," GLOBECOM 2024, Cape Town, South Africa, Dec. 8-12, 2024.

**D. Shakya, S. Ju, O. Kanhere, H. Poddar, Y. Xing, T. S. Rappaport,** "Radio Propagation Measurements and Statistical Channel Models for Outdoor Urban Microcells in Open Squares and Streets at 142, 73, and 28 GHz," IEEE Transactions on Antennas and Propagation, Feb. 24, 2024, doi: 10.1109/TAP.2024.3366581.

**G. Keegan, J. R. Rizzo, M. Morris, J. Panarelli, K. Joseph,** "Disparities in Care for Surgical Patients with Blindness and Low Vision: A Call for Inclusive Wound Care Strategies in the Post-Operative Period," in Annals of Surgery, Apr. 2024, doi: 10.1097/SLA.0000000000006312.

**H. T. Pham, D. Q. Nguyen, S. T. Bui, G. Loianno, V. A. Ho,** "Collision Dynamics of Motorized Deformable Propellers for Drones," in 2024 21st International Conference on Ubiquitous Robots, New York, NY, 2024, pp. 176-183, June 2024, doi: 10.1109/UR61395.2024.10597535.

**J. Mao, J. Yeom, S. Nair, G. Loianno,** "From Propeller Damage Estimation and Adaptation to Fault Tolerant Control: Enhancing Quadrotor Resilience," in IEEE Robotics and Automation Letters, vol. 9, no. 5, pp. 4297-4304, May 2024, doi: 10.1109/LRA.2024.3380923.

**K. Karunanayke, H. Weerasooriya, G. Rathnasekera, A. Singh, J. Jornet, T. S. Rappaport, A. Madanayake,** "Design of 145 GHz BPSK SDR on RF-SoC," in 2024 International Applied Computational Electromagnetics Society Symposium, Orlando, Florida, May 19-23, 2024, pp. 1-2, ieeexplore.ieee.org/document/10580085.

**M. Mezzavilla, T. Azzino, S. Rangan, P. Krishnamurthy, R. Karri, F. Khorrami,** "Detecting O-RAN Synchronization Attacks via 5G NR Positioning," in 2024 IEEE International Conference on Communications Workshops, pp. 541-547, Jun. 2024, doi: 10.1109/ICCWorkshops59551.2024.10615754.

**M. Sandoval-Castañeda, S. Copti, D. Shasha,** "AutoTag: automated metadata tagging for film post-production," in Multimedia Tools and Applications, vol. 83, pp. 6731-6753, June 2024, doi: 10.1007/s11042-023-15565-w.

**M. Ying, D. Shakya, T. S. Rappaport,** "Using Waste Factor to Optimize Energy Efficiency in Multiple-Input Single-Output (MISO) and Multiple-Input Multiple-Output (MIMO) Systems," GLOBECOM 2024, Cape Town, South Africa, pp. 1-6, Dec. 8-12, 2024.

**N. Patel, D. Shasha, T. Wies,** "Verifying Lock-Free Search Structure Templates," in 38th European Conference on Object-Oriented Programming (ECOOP 2024), Leibniz International Proceedings in Informatics, vol. 313, pp. 30:1-30:28, Sept. 2024, doi: 10.4230/LIPIcs.ECOOP.2024.30.

**O. Kanhere, H. Poddar, T. S. Rappaport,** "Calibration of NYURay for Ray Tracing using 28, 73, and 142 GHz Channel Measurements conducted in Indoor, Outdoor, and Factory Scenarios," in IEEE Transactions on Antennas and Propagation, Oct. 17, 2024, doi: 10.1109/TAP.2024.3472214.

**P. Vetter, T. S. Rappaport,** "6G will merge human, physical and digital realms—that matters," RCR Wireless News, www.rcrwireless.com/20241025/6g/6g-will-merge-human-physical-and-digital-realms-that-matters-reader-forum, Oct. 25, 2024.

**Q. Pagliuca, L. J. Chaves, P. Imputato, A. Tulino, J. Llorca,** "Dual Timescale Orchestration System for Elastic Control of NextG Cloud-Integrated Networks," in 2024 27th Conference on Innovation in Clouds, Internet and Networks, Paris, France, pp. 234-241, Mar. 2024, doi: 10.1109/ICIN60470.2024.10494452.

**S. Kang et al.,** "Cellular Wireless Networks in the Upper Mid-Band," in IEEE Open Journal of the Communications Society, vol. 5, pp. 2058-2075, Mar. 2024, doi: 10.1109/OJCOMS.2024.3373368.

**S. Kang, G. Geraci, M. Mezzavilla, S. Rangan,** "Terrestrial-Satellite Spectrum Sharing in the Upper Mid-Band with Interference Nulling," in ICC 2024 - IEEE International Conference on Communications, pp. 5057-5062, June 2024, doi: 10.1109/ICC51166.2024.10622881.

**S. M. Li Gioi, G. Loianno, F. Cordella,** "Robust Upper Limb Kinematic Reconstruction Using a RGB-D Camera," in IEEE Robotics and Automation Letters, vol. 9, no. 4, pp. 3831-3837, Apr. 2024, doi: 10.1109/LRA.2024.3373236.

**S. Wang, G. Xiong, S. Zhang, H. Zeng, J. Li, S. S. Panwar,** "Structured Reinforcement Learning for Delay-Optimal Data Transmission in Dense mmWave Networks," in IEEE Transactions on Wireless Communications, vol. 23, no. 10, pp. 14546-14559, Oct. 2024, doi: 10.1109/TWC.2024.3416437.

**T. Azzino, M. Mezzavilla, S. Rangan, Y. Wang, J. R. Rizzo,** "5G Edge Vision: Wearable Assistive Technology for People with Blindness and Low Vision," in 2024 IEEE Wireless Communications and Networking Conference, Dubai, United Arab Emirates, pp. 1-6, Apr. 2024, doi: 10.1109/WCNC57260.2024.10570607.

**T. S. Rappaport, M. Ying, N. Piovesan, A. De Domenico, D. Shakya,** "Waste Factor and Waste Figure: A Unified Theory for Modeling and Analyzing Wasted Power in Radio Access Networks for Improved Sustainability," in IEEE Open Journal of Communications, vol. 5, pp. 4839-4867, July 18, 2024.

**T. S. Rappaport, M. Ying, D. Shakya,** invited paper, "Waste Figure and Waste Factor: New Metrics for Evaluating Power Efficiency in Any Circuit or Cascade," Microwave Journal, May 13, 2024.

## Communications, Foundations & Machine Learning

**A. Boldini, J. R. Rizzo, M. Porfiri,** "Characterizing the response of piezoelectric-polymer composite haptic actuators and their interaction with skin," in Electroactive Polymer Actuators and Devices XXVI, Proc. SPIE 12945, May 2024, doi: 10.1117/12.3010615.

**A. Chowdary, A. Bazzi, M. Chafii,** "On Hybrid Radar Fusion for Integrated Sensing and Communication," in IEEE Transactions on Wireless Communications, vol. 23, no. 8, pp. 8984-9000, Aug. 2024, doi: 10.1109/TWC.2024.3357573.

**A. Madanayake, S. B. Venkatakrishnan, U. de Silva, G. Hellbourg, J. L. Volakis, T. S. Rappaport,** "AI/ML Interference Cancellation used in STAR Wireless for Radio Astronomy RFI Control," in 2024 IEEE International Conference on Microwaves, Communications, Antennas, Biomedical Engineering and Electronic Systems, Tel Aviv, Israel, July 9-11, 2024, pp. 1-6, doi: 10.1109/COMCAS58210.2024.10666237.

**A. Singh, T. L. Marzetta,** "Shannon Theory for Wireless Communication in a Resonant Chamber," in IEEE Journal on Selected Areas in Communications, vol. 42, no. 6, pp. 1494-1503, June 2024, doi: 10.1109/JSAC.2024.3389121.

**A. W. Azim, R. Shubair, M. Chafii,** "Chirp Spread Spectrum-Based Waveform Design and Detection Mechanisms for LPWAN-Based IoT: A Survey," in IEEE Access, vol. 12, pp. 24949-25017, Jan. 2024, doi: 10.1109/ACCESS.2024.3352591.

**B. Shen, G. Coruzzi, D. Shasha,** "Bipartite networks represent causality better than simple networks: evidence, algorithms, and applications," in Frontiers, vol. 15, May 2024, doi: 10.3389/fgene.2024.1371607.

**D. Kanoulas, S. Khattak, G. Loianno,** "Rising stars in field robotics: 2022," in Frontiers in Robotics and AI, vol. 11, Feb. 2024, doi: 10.3389/frobt.2024.1379661.

**D. Shakya et al.,** invited paper, "Comprehensive FR1(C) and FR3 Lower and Upper Mid-Band Propagation and Material Penetration Loss Measurements and Channel Models in Indoor Environment for 5G and 6G," in IEEE Open Journal of the Communications Society, vol. 5, pp. 5192-5218, July 7, 2024, doi: 10.1109/OJCOMS.2024.3431686.

**D. Shakya, M. Ying, T. S. Rappaport,** Technical Report, NYU WIRELESS TR 2024-01, "Indoor Hotspot Radio Propagation and Material Penetration Measurements at 6.75 GHz FR1C and 16.95 GHz FR3: A Guide to Understand the Measurement Campaign, the Measured Data, and Data Processing," NYU WIRELESS, Brooklyn, New York, Sept. 25, 2024.

**D. Shakya, M. Ying, T. S. Rappaport,** Technical Report, NYU WIRELESS TR 2024-02, "Outdoor Urban Microcell Radio Propagation Measurements at 6.75 GHz FR1(C) and 16.95 GHz FR3: A Guide to Understand the Measurement Campaign, the Measured Data, and Data Processing," NYU WIRELESS, Brooklyn, New York, Oct. 23, 2024.

**D. Shasha,** "Click Fulfillment," in Communications of the ACM, vol. 67, iss. 7, pp.88-ff, July 2024, doi: 10.1145/3654700.

**D. Shasha,** "Jump Snatch," in Communications of the ACM, vol. 67, iss. 4, pp. 100-ff, Mar. 2024, doi: 10.1145/3638565.

**D. Wang, A. Bazzi, M. Chafii,** "RIS-Enabled Integrated Sensing and Communication for 6G Systems," in 2024 IEEE Wireless Communications and Networking Conference, Dubai, United Arab Emirates, pp. 1-6, Apr. 2024, doi: 10.1109/WCNC57260.2024.10571090.

**E. da Silva Mattos, D. Shasha,** "Bankruptcy prediction with low-quality financial information," in Science Direct, vol. 237, pt. A, Mar. 2024, doi: 10.1016/j.eswa.2023.121418.

**E. Hadad, S. Hodarkar, B. Lemeneh, D. Shasha,** "Machine Learning-Enhanced Pairs Trading," in Forecasting, vol. 6, iss. 2, pp 434-455, June 2024, doi: 10.3390/forecast6020024.

**E. Martorana et. al,** "Motif Finding Algorithms: A Performance Comparison," in From Computational Logic to Computational Biology: Essays Dedicated to Alfredo Ferro to Celebrate His Scientific Career, Springer Nature Switzerland, pp. 250-267, Mar. 2024, doi: 10.1007/978-3-031-55248-9_12.

**E. Özyilkan, J. Ballé, E. Erkip,** "Neural Distributed Compressor Discovers Binning," in IEEE Journal on Selected Areas in Information Theory, vol. 5, pp. 246-260, Apr. 2024, doi: 10.1109/JSAIT.2024.3393429.

**E. Özyılkan, E. Erkip,** "Distributed Compression in the Era of Machine Learning: A Review of Recent Advances," in 2024 58th Annual Conference on Information Sciences and Systems, pp. 1-6, Mar. 2024, doi: 10.1109/CISS59072.2024.10480175.

**E. Özyılkan, F. Carpi, S. Garg, E. Erkip,** "Neural Compress-and-Forward for the Relay Channel," in 2024 IEEE 25th International Workshop on Signal Processing Advances in Wireless Communications, pp. 366-370, Sept. 2024, doi: 10.1109/SPAWC60668.2024.10694419.

**E. Taşçı, E. Özyılkan, O. K. Ülger, E. Erkip,** "Robust Distributed Compression with Learned Heegard–Berger Scheme," in 2024 IEEE International Symposium on Information Theory Workshops, pp. 1-6, July 2024, doi: 10.1109/ISIT-W61686.2024.10591775.

**F. Bertoncelli, V. Radhakrishnan, M. Catellani, G. Loianno, L. Sabattini,** "Directed Graph Topology Preservation in Multi-Robot Systems with Limited Field of View Using Control Barrier Functions," in IEEE Access, vol. 12, pp. 9682-9690, Jan. 2024, doi: 10.1109/ACCESS.2024.3352131.

**G. A. Azar, M. Emami, A. Fletcher, S. Rangan,** "Learning Embedding Representations in High Dimensions," in 2024 58th Annual Conference on Information Sciences and Systems, pp. 1-6, Mar. 2024, doi: 10.1109/CISS59072.2024.10480173.

**G. A. Azar, Q. Hu, M. Emami, A. Fletcher, S. Rangan, S. F. Atashzar,** "A Deep Learning Sequential Decoder for Transient High-Density Electromyography in Hand Gesture Recognition Using Subject-Embedded Transfer Learning," in IEEE Sensors Journal, vol. 24, no. 9, pp. 14778-14791, May, 2024, doi: 10.1109/JSEN.2024.3377247.

**J. Eschmann, D. Albani, G. Loianno,** "Learning to Fly in Seconds," in IEEE Robotics and Automation Letters, vol. 9, no. 7, pp. 6336-6343, July 2024, doi: 10.1109/LRA.2024.3396025.

**J. Pegoraro et al.,** "JUMP: Joint Communication and Sensing with Unsynchronized Transceivers Made Practical," in IEEE Transactions on Wireless Communications, vol. 23, no. 8, pp. 9759-9775, Aug. 2024, doi: 10.1109/TWC.2024.3365853.

**J. Yang, R. O'Keeffe, S. Y. Shirazi, S. Mehrdad, S. F. Atashzar, S. Rao,** "Muscle activity and hypoalgesia in blood flow restricted versus unrestricted effort-matched resistance exercise in healthy adults," in Physiological Reports, vol. 12, iss. 4, July 2024, doi: 10.14814/phy2.16037.

**K. Hreha et al.,** "Spatial Neglect is Not a Visual Field Defect: A Guide for Clinicians," in Archives of Physical Medicine and Rehabilitation, vol. 105, iss. 3, Mar. 2024, pp. 621–626.

**M. Mezzavilla, T. Azzino, S. Rangan, P. Krishnamurthy, R. Karri, F. Khorrami,** "Detecting O-RAN Synchronization Attacks via 5G NR Positioning," in 2024 IEEE International Conference on Communications Workshops, Denver, Colorado, pp. 541-547, June 2024, doi: 10.1109/ICCWorkshops59551.2024.10615754.

**M. Secchiero, N. Bobbili, Y. Zhou, G. Loianno,** "Visual Environment Assessment for Safe Autonomous Quadrotor Landing," in 2024 International Conference on Unmanned Aircraft Systems, Chania-Crete, Greece, pp. 807-813, June 2024, doi: 10.1109/ICUAS60882.2024.10557078.

**M. Yin, T. Li, H. Lei, Y. Hu, S. Rangan, Q. Zhu,** "Zero-Shot Wireless Indoor Navigation through Physics-Informed Reinforcement Learning," in 2024 IEEE International Conference on Robotics and Automation, pp. 5111-5118, May 2024, doi: 10.1109/ICRA57147.2024.10611229.

**M. Ying, D. Shakya, T. S. Rappaport,** Technical Report, NYU WIRELESS TR-2024-03, "Indoor Factory (InF) Radio Propagation Measurements at 6.75 GHz FR1(C) and 16.95 GHz FR3: A Guide to Understand the Measurement Campaign, the Measured Data, and Data Processing," NYU WIRELESS, Brooklyn, New York, Nov., 2024.

**M. Ying, F. B. Sarpkaya, S. Bakirtas, E. Erkip, T. S. Rappaport, S. Rangan,** "Capacity of a Binary Channel with a Time-Bounded Adversary," in Proceedings of the 58th Annual Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, California, pp. 1-6, Oct. 27-30, 2024.

**N. M. Shahtori, S. F. Atashzar,** "Temporal Dynamics and Interplay of Transmission Rate, Vaccination, and Mutation in Epidemic Modeling: A Poisson Point Process Approach," in IEEE Transactions on Network Science and Engineering, vol. 11, no. 5, pp. 5023-5034, Sept.-Oct. 2024, doi: 10.1109/TNSE.2024.3421308.

**N. R. Olson, T. S. Rappaport, J. G. Andrews,** "A Tractable Framework for Spectrum Coexistence Between Satellite Receivers and Terrestrial Networks," in IEEE Open Journal of the Communications Society, vol. 5, pp. 6758-6779, Oct. 23, 2024, doi: 10.1109/OJCOMS.2024.3485569.

**O. K. Ülger, E. Erkip,** "One-Shot Wyner-Ziv Compression of a Uniform Source," in 2024 IEEE International Symposium on Information Theory, pp. 1895-1900, Aug. 2024, doi: 10.1109/ISIT57864.2024.10619513.

**O. Yildiz, A. Al Ammouri, J. Mo, Y. Nam, E. Erkip, J. C. Zhang,** "3D Beamforming Through Joint Phase-Time Arrays," in 2024 IEEE 100th Vehicular Technology Conference (VTC2024-Fall), pp. 1-7, Oct. 2024, doi: 10.1109/VTC2024-Fall63153.2024.10757955.

**P. P. Rao et al.,** "QuadFormer: Real-Time Unsupervised Power Line Segmentation with Transformer-Based Domain Adaptation," in 2024 21st International Conference on Ubiquitous Robots, New York, New York, pp. 161-167, June 2024, doi: 10.1109/UR61395.2024.10597474.

**P. S. Roberts, J. Wertheimer, D. Ouellette, K. Hreha, K. Watters, J. Fielder, M. J. Graf, K. Weden, J. R. Rizzo,** "Feasibility and Clinician Perspectives of the Visual Symptoms and Signs Screen: A Multisite Pilot Study," in Topics in Geriatric Rehabilitation, vol. 40, iss. 1, pp. 69-76, Jan./Mar. 2024, doi: 10.1097/TGR.0000000000000424.

**Q. Hu, G. A. Azar, A. Fletcher, S. Rangan, S. F. Atashzar,** "ViT-MDHGR: Cross-Day Reliability and Agility in Dynamic Hand Gesture Prediction via HD-sEMG Signal Decoding," in IEEE Journal of Selected Topics in Signal Processing, vol. 18, no. 3, pp. 419-430, Apr. 2024, doi: 10.1109/JSTSP.2024.3402340.

**R. Bomfin, K. S. Ali, M. Chafii,** "A System Level Analysis for Integrated Sensing and Communication," in 2024 IEEE Wireless Communications and Networking Conference, Dubai, United Arab Emirates, pp. 1-6, Apr. 2024, doi: 10.1109/WCNC57260.2024.10571030.

**R. Shubair, M. Chafii,** "Welcome from the General Chairs," in 2024 IEEE Wireless Communications and Networking Conference, Dubai, United Arab Emirates, p. 1, Apr. 2024, doi: 10.1109/WCNC57260.2024.10570606.

**S. Bakirtas, E. Erkip,** "Database Matching Under Noisy Synchronization Errors," in IEEE Transactions on Information Theory, vol. 70, no. 6, pp. 4335-4367, June 2024, doi: 10.1109/TIT.2024.3388990.

**S. Chakraborty, S. Jagabathula, L. Subramanian, A. Venkataraman,** "Frontiers in Operations: News Event-Driven Forecasting of Commodity Prices," in Manufacturing & Service Operations Management, Mar. 2024, doi: 10.1287/msom.2022.0641.

**S. Chakraborty, S. Jagabathula, L. Subramanian, A. Venkataraman,** "News event-driven forecasting of commodity prices," in SSRN, Feb. 2024, doi: 10.2139/ssrn.4716473.

**S. F. Yilmaz, E. Özyilkan, D. Gündüz, E. Erkip,** "Distributed Deep Joint Source-Channel Coding with Decoder-Only Side Information," in 2024 IEEE International Conference on Machine Learning for Communication and Networking, pp. 139-144, Aug. 2024, doi: 10.1109/ICMLCN59089.2024.10625214.

**S. Kang et al.,** "Cellular Wireless Networks in the Upper Mid-Band," in IEEE Open Journal of the Communications Society, vol. 5, pp. 2058-2075, Mar. 2024, doi: 10.1109/OJCOMS.2024.3373368.

**S. Naoumi, R. Bomfin, R. Alami, M. Chafii,** "TANAGERS: Emergent Communication for UAVs as Flying Passive Radars," in 2024 IEEE Wireless Communications and Networking Conference, Dubai, United Arab Emirates, pp. 1-6, Apr. 2024, doi: 10.1109/WCNC57260.2024.10571151.

**S. Shurrab, A. Guerra-Manzanares, A. Magid, B. Piechowski-Jozwiak, S. F. Atashzar, F. E. Shamout,** "Multimodal Machine Learning for Stroke Prognosis and Diagnosis: A Systematic Review," in IEEE Journal of Biomedical and Health Informatics, vol. 28, no. 11, pp. 6958-6973, Nov. 2024, doi: 10.1109/JBHI.2024.3448238.

**T. Azzino, M. Mezzavilla, S. Rangan, Y. Wang, J. R. Rizzo,** "5G Edge Vision: Wearable Assistive Technology for People with Blindness and Low Vision," in 2024 IEEE Wireless Communications and Networking Conference, pp. 1-6, Apr. 2024, doi: 10.1109/WCNC57260.2024.10570607.

**T. Dussarrat et al.,** "Phylogenetically diverse wild plant species use common biochemical strategies to thrive in the Atacama Desert," in Journal of Experimental Botany, vol. 75, iss. 11, pp. 3596-3611, June 2024, doi: 10.1093/jxb/erae117.

**T. Hudson, A. Seiple, S. Shafiee, M. Beheshti, J. R. Rizzo,** "Visualizing simultaneous eye-hand movements in a MATLAB dashboard," in MethodsX, vol. 12, Apr. 2024, doi: 10.1016/j.mex.2024.102722.

**T. S. Rappaport,** "Editorial: Special Article Collection on Antennas and Propagation for Emerging 5G/6G Communications IEEE Transactions on Antennas and Propagation," in Virtual Special Issue of IEEE Transactions on Antennas and Propagation, doi: 10.1109/TAP.2024.3428288.

**V. Bonnici, R. Grasso, G. Micale, A. di Maria, D. Shasha, A. Pulvirenti, R. Giugno,** "ArcMatch: high-performance subgraph matching for labeled graphs by exploiting edge domains," in Data Mining and Knowledge Discovery, vol. 38, pp. 3868-3921, Aug. 2024, doi: 10.1007/s10618-024-01061-8.

**X. Lyu, S. Aditya, B. Clerckx,** "Rate-Splitting Multiple Access for Non-Orthogonal Unicast Multicast: An Experimental Study," in 2024 IEEE 25th International Workshop on Signal Processing Advances in Wireless Communications, Lucca, Italy, pp. 591-595, Sept. 2024, doi: 10.1109/SPAWC60668.2024.10694383.

**X. Lyu, S. Aditya, B. Clerckx,** "Rate-Splitting Multiple Access for Overloaded Multi-Group Multicast: A First Experimental Study," in IEEE Transactions on Broadcasting, pp. 1-12, Oct. 2024, doi: 10.1109/TBC.2024.3475743.

**X. Lyu, S. Aditya, J. Kim, B. Clerckx,** "Rate-Splitting Multiple Access: The First Prototype and Experimental Validation of Its Superiority Over SDMA and NOMA," in IEEE Transactions on Wireless Communications, vol. 23, no. 8, pp. 9986-10000, Aug. 2024, doi: 10.1109/TWC.2024.3367891.

**X. Zhou, P. Paik, S. F. Atashzar,** "Intention-Aware Reverse Passivity-Based Teleoperation Stabilizer for Physical Human-(tele) Robot Interaction," in 2024 American Control Conference, Toronto, Ontario, pp. 5238-5243, July 2024, doi: 10.23919/ACC60939.2024.10644460.

**X. Chen et al.,** "A neural speech decoding framework leveraging deep learning and speech synthesis," in Nature Machine Intelligence, pp. 1-14, Apr. 2024, doi: 10.1038/s42256-024-00824-8.

**Y. Hao, F. Yang, H. Huang, S. Yuan, S. Rangan, J. R. Rizzo, Y. Wang, Y. Fang,** "A Multi-Modal Foundation Model to Assist People with Blindness and Low Vision in Environmental Interaction," in Journal of Imaging, vol. 10, iss. 5, Apr. 2024, doi: 10.3390/jimaging10050103.

**Y. Zhou, L. Quang, C. Nieto-Granda, G. Loianno,** "CoPeD-Advancing Multi-Robot Collaborative Perception: A Comprehensive Dataset in Real-World Environments," in IEEE Robotics and Automation Letters, vol. 9, no. 7, pp. 6416-6423, July 2024, doi: 10.1109/LRA.2024.3406207.

**Z. Yuan, S. Rawlekar, S. Garg, E. Erkip, Y. Wang,** "Split Computing With Scalable Feature Compression for Visual Analytics on the Edge," in IEEE Transactions on Multimedia, vol. 26, pp. 10121-10133, May 2024, doi: 10.1109/TMM.2024.3406165.

## Mobile Edge & Low Latency Networking

**B. M. Liu, M. Beheshti, T. Naeimi, Z. Zhu, R. Vedanthan, W. Seiple, J. R. Rizzo,** "The BLV App Arcade: a new curated repository and evaluation rubric for mobile applications supporting blindness and low vision," in Disability and Rehabilitation: Assistive Technology, vol. 19, iss. 4, pp. 1405–1414, May 2024, doi: 10.1080/17483107.2023.2187094.

**D. Kumbhare, J. R. Rizzo, A. Bean, T. Annaswamy, AAP Research Committee,** "Evidence-based practice education in physical medicine and rehabilitation residency programs: A Canadian national survey," in American Journal of Physical Medicine & Rehabilitation, Feb. 2024, doi: 10.1097/PHM.0000000000002455.

**G. A. Azar, Q. Hu, M. Emami, A. Fletcher, S. Rangan, S. F. Atashzar,** "A Deep Learning Sequential Decoder for Transient High-Density Electromyography in Hand Gesture Recognition Using Subject-Embedded Transfer Learning," in IEEE Sensors Journal, vol. 24, no. 9, pp. 14778-14791, May 2024, doi: 10.1109/JSEN.2024.3377247.

**G. Hamilton-Fletcher et al.,** "Accuracy and Usability of Smartphone-Based Distance Estimation Approaches for Visual Assistive Technology Development," in IEEE Open Journal of Engineering in Medicine and Biology, vol. 5, pp. 54-58, Jan. 2024, doi: 10.1109/OJEMB.2024.3358562.

**J. Yeom, T M B Roshan Balu, G. Li, G. Loianno,** "Experimental System Design of an Active Fault-Tolerant Quadrotor," in 2024 International Conference on Unmanned Aircraft Systems, Chania-Crete, Greece, pp. 814-821, June 2024, doi: 10.1109/ICUAS60882.2024.10556870.

**L. Morando, G. Loianno,** "Spatial Assisted Human-Drone Collaborative Navigation and Interaction through Immersive Mixed Reality," in 2024 IEEE International Conference on Robotics and Automation, Yokohama, Japan, pp. 8707-8713, May 2024, doi: 10.1109/ICRA57147.2024.10611351.

**R. Jauregui, N. Abreu, J. R. Rizzo, T. Hudson, J. Rucker, S. Grossman,** "Eye Movement Characteristics of Congenital Myasthenic Syndromes (P4-10.001)," in Neurology, vol. 102, no. 17, Apr. 2024, doi: 10.1212/WNL.0000000000205267.

**R. O'Keeffe et al.,** "Low-frequency Motor Cortex EEG Predicts Four Rates of Force Development," in IEEE Transactions on Haptics, pp. 1-12, July 2024, doi: 10.1109/TOH.2024.3428308.

**S. Naoumi, A. Bazzi, R. Bomfin, M. Chafii,** "Complex Neural Network based Joint AoA and AoD Estimation for Bistatic ISAC," in IEEE Journal of Selected Topics in Signal Processing, pp. 1-15, Apr. 2024, doi: 10.1109/JSTSP.2024.3387299.

**T. F. Faust et al.,** "Technology for Persons with Blindness and Low Vision: Hardware to Improve Function and Quality of Life," in Archives of Physical Medicine and Rehabilitation, vol. 105, iss. 10, pp. 2017-2028, Oct. 2024, doi: 10.1016/j.apmr.2024.06.021.

**Y. Hank, M. Beheshti, B. Jones, T. Hudson, W. H. Seiple, J. R. Rizzo,** "Wearables for persons with blindness and low vision: form factor matters," in Assistive Technology, vol. 36, iss. 1, pp. 60–63, Jan. 2024, doi: 10.1080/10400435.2023.2205490.

## Quantum Devices & Circuits

**A. W. Azim, A. Bazzi, R. Bomfin, R. Shubair, M. Chafii,** "Layered Chirp Spread Spectrum Modulations for LPWANs," in IEEE Transactions on Communications, vol. 72, no. 3, pp. 1671-1687, Mar. 2024, doi: 10.1109/TCOMM.2023.3331019.

**C. Chung, H. Mun, S. F. Atashzar, K. U. Kyung,** "A Novel Design of Thin Flexible Force Myography Sensor Using Weaved Optical Fiber: A Proof-of-Concept Study," in 2024 21st International Conference on Ubiquitous Robots, New York, New York, pp. 1-6, June 2024, doi: 10.1109/UR61395.2024.10597532.

**E. Tyacke, K. Gupta, J. Patel, R. Katoch, S. F. Atashzar,** "From Unstable Electrode Contacts to Reliable Control: A Deep Learning Approach for HD-sEMG in Neurorobotics," in 2024 IEEE International Conference on Robotics and Automation, Yokohama, Japan, pp. 7874-7879, May 2024, doi: 10.1109/ICRA57147.2024.10610638.

**F. Sarpkaya, A. Srivastava, F. Fund, S. Panwar,** "To switch or not to switch to TCP Prague? Incentives for adoption in a partial L4S deployment," in Proceedings of the 2024 Applied Networking Research Workshop, pp. 45-51, July 2024, doi: 10.1145/3673422.3674896.

**K. S. Ali, M. Haenggi, A. Al-Dweik, M. Chafii,** "Impact of Network Geometry on Large Networks with Intelligent Reflecting Surfaces," in IEEE Transactions on Vehicular Technology, pp. 1-15, Aug. 2024, doi: 10.1109/TVT.2024.3438692.

**M. Goarin, G. Loianno,** "Graph Neural Network for Decentralized Multi-Robot Goal Assignment," in IEEE Robotics and Automation Letters, vol. 9, no. 5, pp. 4051-4058, May 2024, doi: 10.1109/LRA.2024.3371254.

**M. Jamalzadeh et al.,** "Toward robust quantification of dopamine and serotonin in mixtures using nano-graphitic carbon sensors," in Analyst, vol. 149, iss. 8, Feb. 2024, doi: 10.1039/D3AN02086J.

**M. Jamalzadeh, E. Cuniberto, D. Shahrjerdi,** "A Framework for Benchmarking Emerging FSCV Neurochemical Sensors," in Advanced Physics Research, vol. 3, iss. 2, Feb. 2024, doi.org/10.1002/apxr.202300079.

**Q. Hu, G. A. Azar, A. Fletcher, S. Rangan, S. F. Atashzar,** "ViT-MDHGR: Cross-Day Reliability and Agility in Dynamic Hand Gesture Prediction via HD-sEMG Signal Decoding," in IEEE Journal of Selected Topics in Signal Processing, vol. 18, no. 3, pp. 419-430, Apr. 2024, doi: 10.1109/JSTSP.2024.3402340.

**R. Deshmukh, A. J. Wright, M. Jamalzadeh, H. H. Nasralla, E. Riedo, D. Shahrjerdi,** "Mitigation of electronic crosstalk interference in graphene transistor biosensors," in Journal of Vacuum Science & Technology, vol. 42, iss. 4, July 2024, doi: 10.1116/6.0003783.

**R. O'Keeffe et al.,** "Low-frequency Motor Cortex EEG Predicts Four Rates of Force Development," in IEEE Transactions on Haptics, pp. 1-12, July 2024, doi: 10.1109/TOH.2024.3428308.

**S. Kang, G. Geraci, M. Mezzavilla, S. Rangan,** "Terrestrial-Satellite Spectrum Sharing in the Upper Mid-Band with Interference Nulling," in ICC 2024 - IEEE International Conference on Communications, Denver, Colorado, pp. 5057-5062, June 2024, doi: 10.1109/ICC51166.2024.10622881.

**S. Oliver, S. F. Atashzar,** "Synergistic Functional Muscle Networks Reveal the Passivity Behavior of the Upper-Limb in Physical Human-Robot Interaction," in IEEE Robotics and Automation Letters, vol. 9, no. 5, pp. 4679-4686, May 2024, doi: 10.1109/LRA.2024.3382496.

## Terahertz (THz) Communications and Sensing

**D. Shakya et al.,** "Exploring Millimeter-Wave and Terahertz Circuits and Systems with a Novel Multiuser Measurement Facility: Multiuser Terahertz Measurement Facility (THz Lab)," in IEEE Microwave Magazine, vol. 25, no. 2, pp. 68-79, Feb. 2024, doi: 10.1109/MMM.2023.3320820.

**H. Poddar, A. Chowdary, T. S. Rappaport, M. Chafii,** "Full-Stack End-To-End Sub-THz Simulations at 140 GHz using NYUSIM Channel Model in ns-3," in 2024 IEEE Wireless Communications and Networking Conference, Dubai, United Arab Emirates, pp. 1-6, Apr. 2024, doi: 10.1109/WCNC57260.2024.10570665.

**H. Poddar, S. Ju, D. Shakya, T. S. Rappaport,** "A Tutorial on NYU SIM: Sub-Terahertz and Millimeter-Wave Channel Simulator for 5G, 6G and Beyond," in IEEE Communications Surveys and Tutorials, June 2024, doi: 10.1109/COMST.2023.3344671.

**J. Jornet, V. Petrov, H. Wang, Z. Popović, D. Shakya, J. Siles, T. S. Rappaport,** "The Evolution of Applications, Hardware Design, and Channel Modeling for Terahertz (THz) Band Communications and Sensing: Ready for 6G?," in Proceedings of the IEEE, July 1, 2024, pp. 1-32, doi: 10.1109/JPROC.2024.3412828.

**S. Ju, T. S. Rappaport,** "Statistical Channel Model of Wideband Sub-THz Radio Propagation in Indoor Factories at 142 GHz: Towards 6G Industrial Wireless Networks," in IEEE Transactions on Wireless Communications, vol. 23, no. 11, pp. 16316-16331, Nov. 2024, doi: 10.1109/TWC.2024.3439770.

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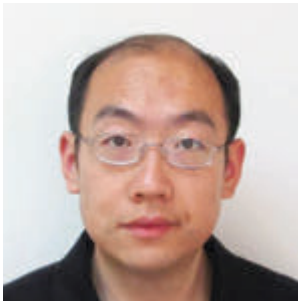

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