Impact of Published Work

Over the last decade, I have established a global reputation for groundbreaking contributions to next-generation wireless communication systems, particularly in reconfigurable intelligent surfaces (RIS), advanced multiple access schemes, cell-free massive MIMO, high-frequency communications, integrated sensing and communications (ISAC), digital twin, among others. My 2025 publication portfolio exceeds 30 IEEE papers published in Q1 high Impact Factor journals, including IEEE Transactions on Communications, IEEE Transactions on Wireless Communications, IEEE Transactions on Vehicular Technology, IEEE Internet of Things Journal, and IEEE Communications Magazine. These works introduce *novel analytical models*, *learning-driven frameworks*, and *optimization paradigms* that shape ongoing global efforts toward 6G and beyond. Several key contributions, such as deep-learning-based composite channel estimation for RIS-aided systems, movable-antenna system optimization, and secure near-field communications with mobile eavesdroppers, are already cited as reference models in ongoing 6G research. In addition, one of my papers entitled "Toward 6G-Enabled URLCCs: Digital Twin, Open RAN, and Semantic Communications" (IEEE Communications Magazine, 2025) is expected to become one of the seminal works connecting digital-twin frameworks with open architectures and semantic communication paradigms. The breadth of my 2025 publications, spanning from theory (new fading models and stochastic geometry analysis) to applications (vehicular sensing, UAV-enabled mobile edge computing, spectrum awareness networks), illustrates my ability to integrate physical-layer modeling, AI-enhanced optimization, and cross-layer system design. Last, but not least, it is noteworhty that I have been listed as **World's Top 2% Scientist by Stanford/Elsevier since 2021,** in two categories - single-year impact and career-long impact, and I have been ranked among **1% Top Scientists in the world in the broad field of Electronics and Electrical Engineering since 2022.**

Scientific Contributions to the Publications

My scientific role is distinguished by conceptual innovation, rigorous mathematical formulation, and strategic orchestration of multidisciplinary teams. Across my 2025 works, my contributions can be grouped into four major areas:

1) Reconfigurable and Intelligent Environments: I pioneered analytical and learning-based frameworks for RIS- and STAR-RIS-assisted systems, including robust channel estimation and active-RIS design under phase-noise constraints. These studies integrate information-theoretic insights with deep learning to enhance system adaptability, shaping the design of environment-aware wireless networks.

2) Integrated Sensing and Communication, Security, and Near-Field Communications: This research extends the physical-layer security paradigm into near-field and ISAC scenarios, offering novel beamfocusing and covert-communication models. My works demonstrate how sensing-aided frameworks can achieve both spectral efficiency and resilience, directly supporting emerging 6G requirements for joint communication and perception.

3) Resource Optimization and Network Intelligence: Through deep reinforcement learning and semantic spectrum-sensing networks, I introduced AI-native approaches for dynamic resource allocation in vehicular edge computing and cognitive IoT. My papers on GF-NOMA resource

pooling and QoS-aware strategies reveal lightweight yet optimal mechanisms for large-scale IoT deployments.

4) New Theoretical and Modeling Foundations: I introduced the Nakagami–Lomax distribution, a hyper-composite fading model which unifies small- and large-scale propagation effects. Additionally, my work on channel modeling for ISAC in vehicular environments provides a baseline for next-generation automotive wireless standards.

In all coauthored works, my scientific input typically covers: formulation of the core problem and analytical framework; validation of simulation models; and strategic linkage of results to broader 6G roadmaps (Digital Twin, Open RAN, and Cognitive Cities). My methodological rigor ensures that each publication contributes not only incremental progress but conceptual advances toward programmable and sustainable wireless ecosystems.

Research Leadership

I am widely recognized as a visionary research leader whose influence spans disciplines. As Acting Director of IRC-CSS at KFUPM, I am steering the Center's transformation into a national innovation hub for Digital Twin technologies, Open RAN frameworks, and cognitive city communications. My leadership integrates academia, industry, and government through strategic collaborations. I have also served as Editor-in-Chief of IEEE Communications Letters, a flagship IEEE journal publishing over 1,200 papers annually, where I have implemented fair review practices, quality metrics, and accelerated dissemination of emerging 6G topics. As Specialty Chief Editor of Frontiers in Communications and Networks and Vice-Chair of the REFLECTIONS Special Interest Group (IEEE SPCC), I have driven community formation in RIS and signal processing research studies. My previous service as Latin American Chapters Coordinator (IEEE VTS) and Vice-Chair of Propagation Committee illustrates my long-term commitment to capacity building and regional empowerment. At KFUPM, I have started to catalyze large-scale initiatives such as the Digital Twin of KFUPM Campus, 6G Open RAN Testbed, and Next-G Research Roadmap, while mentoring numerous postdoctoral researchers and graduate students. The receipt of the Open RAN & 6G Challenge Award (RDIA, 2024) and the Best Research Award 2025 (KFUPM) underscores my ability to connect high-impact research with national priorities. Through my Keynote lectures, IEEE Distinguished Speaker activities (IEEE VTS), and editorial activities, I have shaped global understanding of intelligent communication systems, promoting open architectures, AI-driven design, and sustainability-driven innovation.

Supporting Documents

Please visit my personal homepage (https://sites.google.com/site/danielbenevides81/) for detailed information about my career journey, including scientific production, professional activities, and honors/awards.