

George R. MacCartney, Jr.

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Education

- **New York University (NYU) Tandon School of Engineering** Brooklyn, NY
Ph.D., Electrical Engineering 2013-2018
 - Thesis: Millimeter-wave base station diversity and human blockage in dense urban environments for coordinated multipoint (CoMP) applications.
 - Advisor: Theodore S. Rappaport
 - The Marconi Society - Paul Baran Young Scholar Award (2016)
 - The Dante Youla Award for Graduate Research Excellence in ECE (2017)
- **Villanova University** Villanova, PA
M.S., Electrical Engineering (Wireless and Digital Communications) 2011
B.S., Electrical Engineering 2010
 - Dean's list all 8 Semesters, Tau Beta Pi, Eta Kappa Nu Association
 - Joseph Kozikowski Award for senior capstone design project (2010)

Work Experience

- **Apple, Inc.** Cupertino, CA
Wireless System Engineer March 2018 - Present
 - Wireless PHY system design, validation, verification, with experience in pre-silicon, post-silicon, and software bringup.
 - Characterization and optimization of chip performance and algorithms in lab, and development and implementation of calibration routines.
 - Bringup and debugging of hardware features, development of test plans and software automation of data collection and analysis.
- **Apple, Inc.** Cupertino, CA
Wireless RF Intern June 2017 - Sept. 2017
 - RF propagation and wireless channel measurements and characterization.
- **SiBeam (A Lattice Semiconductor Company)** Sunnyvale, CA
Wireless Intern June 2015 - Aug. 2015
 - 60 GHz backhaul link margin test and validation of RF phased-array systems and WiGig baseband.
- **Lockheed Martin Corporation: Advanced Technology Laboratories** Cherry Hill, NJ
Member of Engineering Staff 2012
 - Wireless Protocol Research: WiMAX, WCDMA, & CDMA2000 w/ USRPs, GNU Radio, & BTS.
 - Ad-hoc antenna prototyping for direction finding purposes on small UAVs.
- **Lockheed Martin Corporation: IS&GS** King of Prussia, PA
Software Engineer 2011-2012
 - Provided hardware, software, and engineering support for real time command and control systems.

Summer Intern 2008-2011

 - Maintained hardware, built comms. cables, designed SQL reports, and debugged with Perl scripts.

Technical Skills

Proficient: Python, Git, MATLAB, LabVIEW, LabVIEW-FPGA, Wireless Propagation.

Test Equipment: Oscilloscope, Spectrum Analyzer, Arbitrary Waveform Generator, Logic Analyzer, DMM, VNA.

Familiar: C/C++, 802.11ad, 802.11 WiFi Standards, Simulink, Tableau, Bash, AIX, Linux, Perl, VHDL, SCPI, Antenna Prototyping, SDR.

Honors and Awards

- *The Marconi Society - Paul Baran Young Scholar Award* 2016
- *The Dante Youla Award for Graduate Research Excellence in ECE, NYU* 2017
- *Best Student Paper award IEEE VTC2018-Fall Conference* 2018
- *Best Paper award IEEE VTC2016-Spring Conference* 2016
- *GAANN Fellowship - NYU Tandon School of Engineering* 2013-2017
- *Dean's Award for Academic Excellence, Villanova University* 2010
- *Rev. Francis D. Dougherty, O.S.F.S. Endowed University Scholarship, Villanova University* 2009-2010
- *Lockheed Martin I.S.&G.S. Edward Reese Fellows Scholarship* 2008-2010
- *Pepsi-co Scholarship* 2006-2010
- *Habitat for Humanity Volunteer Award, Delaware County*

Service

- Mentorship
 - Sijia Deng (MSEE, Spring 2016) - Master's Thesis Project: Millimeter-Wave Diffraction
 - Jackie Ryan (BSEE, Fall 2016) - Bachelor's Thesis Project: Millimeter-Wave Material Penetration
- Reviewer
 - IEEE Transactions on Wireless Communications, IEEE Transactions on Communications, IEEE Communications Surveys and Tutorials, IEEE Access, IEEE Journal on Selected Areas in Communications, IEEE Transactions on Antennas and Propagation, IEEE Transactions on Mobile Computing, IEEE Antennas and Wireless Propagation Letters, IEEE Antennas and Propagation Magazine, IEEE Communications Letters, IEEE Communications Magazine, IEEE Transactions on Microwave Theory and Techniques, IEEE Transactions on Vehicular Technology, IEEE Wireless Communications Letters, IEEE ICC, IEEE GLOBECOM, IEEE VTC, EuCap, ACM Mobicom.

References

- Dr. Theodore S. Rappaport, Professor, ECE, New York University, Director NYU WIRELESS tsr@nyu.edu
- Dr. Sundeep Rangan, Professor, ECE, New York University srangan@nyu.edu

Publications

Journals, Letters, and Magazines

- [1] **G. R. MacCartney, Jr.** and T. S. Rappaport, "Millimeter-wave base station diversity for 5G coordinated multipoint (CoMP) applications," *IEEE Transactions on Wireless Communications*, vol. 18, pp. 3395–3410, July 2019
- [2] T. S. Rappaport, **G. R. MacCartney, Jr.**, S. Sun, H. Yan, and S. Deng, "Small-scale, local area, and transitional millimeter wave propagation for 5G communications," *IEEE Transactions on Antennas and Propagation*, 2017
- [3] T. S. Rappaport, Y. Xing, **G. R. MacCartney, Jr.**, A. F. Molisch, E. Mellios, and J. Zhang, "Overview of millimeter wave communications for fifth-generation (5G) wireless networks (Invited Paper)," *IEEE Transactions on Antennas and Propagation*, vol. 65, pp. 6213–6230, Dec. 2017
- [4] **G. R. MacCartney, Jr.** and T. S. Rappaport, "A flexible millimeter-wave channel sounder with absolute timing," *IEEE Journal on Selected Areas in Communications*, vol. 35, pp. 1402–1418, June 2017
- [5] **G. R. MacCartney, Jr.** and T. S. Rappaport, "Rural macrocell path loss models for millimeter wave wireless communications," *IEEE Journal on Selected Areas in Communications*, vol. 35, pp. 1663–1677, July 2017
- [6] A. I. Sulyman, A. Alwarafy, **G. R. MacCartney, Jr.**, T. S. Rappaport, and A. Alsanie, "Directional radio propagation path loss models for millimeter-wave wireless networks in the 28-, 60-, and 73-GHz bands," *IEEE Transactions on Wireless Communications*, vol. 15, pp. 6939–6947, Oct. 2016
- [7] **G. R. MacCartney, Jr.**, T. S. Rappaport, S. Sun, and S. Deng, "Indoor office wideband millimeter-wave propagation measurements and channel models at 28 GHz and 73 GHz for ultra-dense 5G wireless networks (Invited Paper)," *IEEE Access*, vol. 3, pp. 2388–2424, Oct. 2015
- [8] **G. R. MacCartney, Jr.**, T. S. Rappaport, M. K. Samimi, and S. Sun, "Millimeter-wave omnidirectional path loss data for small cell 5G channel modeling," *IEEE Access*, vol. 3, pp. 1573–1580, Aug. 2015
- [9] T. S. Rappaport, **G. R. MacCartney, Jr.**, M. K. Samimi, and S. Sun, "Wideband millimeter-wave propagation measurements and channel models for future wireless communication system design (Invited Paper)," *IEEE Transactions on Communications*, vol. 63, pp. 3029–3056, Sept. 2015
- [10] M. K. Samimi, T. S. Rappaport, and **G. R. MacCartney, Jr.**, "Probabilistic omnidirectional path loss models for millimeter-wave outdoor communications," *IEEE Wireless Communications Letters*, vol. 4, pp. 357–360, Aug. 2015

- [11] A. I. Sulyman, A. T. Nassar, M. K. Samimi, **G. R. MacCartney, Jr.**, T. S. Rappaport, and A. Alsanie, "Radio propagation path loss models for 5G cellular networks in the 28 GHz and 38 GHz millimeter-wave bands," *IEEE Communications Magazine*, vol. 52, pp. 78–86, Sept. 2014
- [12] S. Deng, C. J. Slezak, **G. R. MacCartney, Jr.**, and T. S. Rappaport, "Small wavelengths - big potential: Millimeter wave propagation measurements for 5G," *Microwave Journal*, vol. 57, pp. 4–12, Sept. 2014
- [13] A. Ghosh, T. A. Thomas, M. C. Cudak, R. Ratasuk, P. Moorut, F. W. Vook, T. S. Rappaport, **G. R. MacCartney, Jr.**, S. Sun, and S. Nie, "Millimeter-wave enhanced local area systems: A high-data-rate approach for future wireless networks," *Selected Areas in Communications, IEEE Journal on*, vol. 32, pp. 1152–1163, June 2014

Selected Conferences

- [14] Y. Xing, O. Kanhere, S. Ju, T. Rappaport, and **G. R. MacCartney, Jr.**, "Verification and calibration of antenna cross-polarization discrimination and penetration loss for millimeter wave communications," in *2018 IEEE 88th Vehicular Technology Conference (VTC2018-Fall)*, pp. 1–6, Aug. 2018
- [15] **G. R. MacCartney, Jr.**, T. S. Rappaport, and A. Ghosh, "Base station diversity propagation measurements at 73 ghz millimeter-wave for 5g coordinated multipoint (comp) analysis," in *2017 IEEE Globecom Workshops (GC Wkshps)*, pp. 1–7, Singapore, Dec. 2017
- [16] **G. R. MacCartney, Jr.**, T. S. Rappaport, and S. Rangan, "Rapid fading due to human blockage in pedestrian crowds at 5G millimeter-wave frequencies," in *2017 IEEE Global Communications Conference (GLOBECOM)*, pp. 1–7, Singapore, Dec. 2017
- [17] **G. R. MacCartney, Jr.** and T. S. Rappaport, "Study on 3GPP rural macrocell path loss models for millimeter wave wireless communications," in *2017 IEEE International Conference on Communications (ICC)*, pp. 1–7, May 2017
- [18] **G. R. MacCartney, Jr.**, H. Yan, S. Sun, and T. S. Rappaport, "A flexible wideband millimeter-wave channel sounder with local area and NLOS to LOS transition measurements," in *2017 IEEE International Conference on Communications (ICC)*, pp. 1–7, May 2017
- [19] S. Sun, H. Yan, **G. R. MacCartney, Jr.**, and T. S. Rappaport, "Millimeter wave small-scale spatial statistics in an urban microcell scenario," in *2017 IEEE International Conference on Communications (ICC)*, pp. 1–7, May 2017
- [20] J. Ryan, **G. R. MacCartney, Jr.**, and T. S. Rappaport, "Indoor office wideband penetration loss measurements at 73 GHz," in *2017 IEEE International Conference on Communications Workshops (ICCW)*, pp. 1–6, May 2017
- [21] S. Deng, **G. R. MacCartney, Jr.**, and T. S. Rappaport, "Indoor and outdoor 5G diffraction measurements and models at 10, 20, and 26 GHz," in *2016 IEEE Global Telecommunications Conference (GLOBECOM)*, pp. 1–7, Dec. 2016
- [22] **G. R. MacCartney, Jr.**, S. Sun, T. S. Rappaport, Y. Xing, H. Yan, J. Koka, R. Wang, and D. Yu, "Millimeter wave wireless communications: New results for rural connectivity," in *Proceedings of the 5th Workshop on All Things Cellular: Operations, Applications and Challenges: in conjunction with MobiCom 2016*, ATC '16, (New York, NY, USA), pp. 31–36, ACM, Oct. 2016
- [23] **G. R. MacCartney, Jr.**, S. Deng, S. Sun, and T. S. Rappaport, "Millimeter-wave human blockage at 73 GHz with a simple double knife-edge diffraction model and extension for directional antennas," in *2016 IEEE 84th Vehicular Technology Conference (VTC2016-Fall)*, pp. 1–6, Sept. 2016
- [24] M. Samimi, **G. R. MacCartney, Jr.**, S. Sun, and T. S. Rappaport, "28 GHz millimeter-wave ultrawideband small-scale fading models in wireless channels," in *2016 IEEE 83rd Vehicular Technology Conference (VTC2016-Spring)*, pp. 1–6, May 2016
- [25] K. Haneda, **G. R. MacCartney, Jr.**, *et al.*, "5G 3GPP-like channel models for outdoor urban microcellular and macrocellular environments," in *2016 IEEE 83rd Vehicular Technology Conference (VTC2016-Spring)*, pp. 1–7, May 2016
- [26] S. Sun, **G. R. MacCartney, Jr.**, M. K. Samimi, and T. S. Rappaport, "Synthesizing omnidirectional antenna patterns, received power and path loss from directional antennas for 5G millimeter-wave communications," in *2015 IEEE Global Communications Conference (GLOBECOM)*, pp. 3948–3953, Dec. 2015
- [27] **G. R. MacCartney, Jr.**, M. K. Samimi, and T. S. Rappaport, "Exploiting directionality for millimeter-wave wireless system improvement," in *2015 IEEE International Conference on Communications (ICC)*, pp. 2416–2422, June 2015
- [28] **G. R. MacCartney, Jr.**, M. K. Samimi, and T. S. Rappaport, "Omnidirectional path loss models in New York City at 28 GHz and 73 GHz," in *IEEE 25th International Symposium on Personal Indoor and Mobile Radio Communications (PIMRC)*, pp. 227–331, Sept. 2014
- [29] H. C. Nguyen, **G. R. MacCartney, Jr.**, T. A. Thomas, T. S. Rappaport, B. Vejlgard, and P. Mogensen, "Evaluation of empirical ray-tracing model for an urban outdoor scenario at 73 GHz E-Band," in *2014 IEEE 80th Vehicular Technology Conference (VTC2014-Fall)*, pp. 1–6, Sept 2014
- [30] **G. R. MacCartney, Jr.** and T. S. Rappaport, "73 GHz millimeter wave propagation measurements for outdoor urban mobile and backhaul communications in New York City," in *2014 IEEE International Conference on Communications (ICC)*, pp. 4862–4867, June 2014
- [31] **G. R. MacCartney, Jr.**, J. Zhang, S. Nie, and T. S. Rappaport, "Path loss models for 5G millimeter wave propagation channels in urban microcells," in *2013 IEEE Global Communications Conference (GLOBECOM)*, pp. 3948–3953, Dec 2013
- [32] S. Nie, **G. R. MacCartney, Jr.**, S. Sun, and T. S. Rappaport, "72 GHz millimeter wave indoor measurements for wireless and backhaul communications," in *2013 IEEE 24th International Symposium on Personal Indoor and Mobile Radio Communications (PIMRC)*, pp. 2429–2433, Sept. 2013