AARON RUOWEN BAI

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EDUCATION

Ph.D., Electrical and Computer Engineering 2018-2021
McMaster University, Canada
Dissertation: "Spectrum and Optical Power Efficient OFDM for Visible Light Communications"
Supervisor: Prof. Steve Hranilovic
Ph.D. Comprehensive Examination: P+
GPA: A+

M.Eng. (with Hons.), Electronic Engineering 2011-2013
Tsinghua University, China
Dissertation: "Research on Multi-carrier Key Techniques for Visible Light Communications"
Supervisor: Prof. Zhaocheng Wang

2007-2011

B. Sc., Electronic Information Science and Technology
Nankai University, China
Dissertation: "The Design of Microstrip Antenna"

HONORS AND AWARDS

Ph.D. Comprehensive Examination: pass with distinction (P+)	2020
National Scholarship for Graduate Students (¥20000, rank 1/62)	2017
National Scholarship for Undergraduate Students (¥8000, rank 1/46)	2014
National First Prize in Contemporary Undergraduate Mathematical Contest in Modeling	2014
Tianjin Province-First Prize in National Undergraduate Electronic Design Contest	2013
Tianjin Province-First Prize in "TI Cup" Undergraduate Electronic Design Contest	2012

TECHNICAL SKILLS

- MATLAB: 9-year Programming Experience in Simulations, and Algorithm Design and Implementation, Proficient in Simulink, and Tool Boxes Related to Communications and DSP
- Python: 5-year Programming Experience in Machine Learning Framework, TensorFlow and PyTorch
- Proficient in Jupyter, C, C++, Java, JavaScript, Verilog and VHDL
- Experienced with Ubuntu commands, Git/Github, Android Studio, Google Colab, and IBM Quantum Lab
- Proficient in using an Oscilloscope, Spectrum Analyzer, JTAG, Logic Analyzer and Digital Multimeter
- Proficient in Using Operating Systems Such as Windows, Linux/Ubuntu and macOS
- Proficient in Microsoft Office Tools Such as Word, Excel and PPT
- Good Team Player and Team Leader with Strong Communication Skills
- Strong Written English and Mandarin

SELECTED PUBLICATIONS

Google Scholar Citations: 140+

Journal Articles

R. Bai and S. Hranilovic, "Low-Complexity Layered ACO-OFDM for Power-Efficient Visible Light Communications," *IEEE Transactions on Green Communications and Networking*, vol. 6, no. 3, pp. 1780-1792, Sept. 2022, doi: 10.1109/TGCN.2022.3147970.

R. Bai and S. Hranilovic, "Kramers-Kronig Optical OFDM for Bandlimited Intensity Modulated Visible Light Communications," *Journal of Lightwave Technology*, vol. 39, no. 22, pp. 7135-7145, Nov. 2021, doi: 10.1109/JLT.2021.3110661.

R. Bai and S. Hranilovic, "Layered antisymmetry-constructed clipped optical OFDM for low-complexity VLC systems." Optics Express, vol. 29, no. 7, pp. 10613-10630, Mar. 2021.

R. Bai and S. Hranilovic, "Absolute Value Layered ACO-OFDM for Intensity-Modulated Optical Wireless Channels," *IEEE Transactions on Communications*, vol. 68, no. 11, pp. 7098-7110, Nov. 2020, doi: 10.1109/TCOMM.2020.3010986.

R. Bai, Z. Wang, R. Jiang and J. Cheng, "Interleaved DFT-Spread Layered/Enhanced ACO-OFDM for Intensity-Modulated Direct-Detection Systems," *IEEE/OSA Journal of Lightwave Technology*, vol. 36, no. 20, pp. 4713-4722, Oct., 2018, doi: 10.1109/JLT.2018.2864275.

R. Bai, Q. Wang and Z. Wang, "Asymmetrically Clipped Absolute Value Optical OFDM for Intensity-Modulated Direct-Detection Systems," *IEEE/OSA Journal of Lightwave Technology*, vol. 35, no. 17, pp. 3680-3691, Sept. 2017, doi: 10.1109/JLT.2017.2716983.

R. Bai, J. Chen, T. Mao and Z. Wang, "Enhanced Asymmetrically Clipped DC Biased Optical OFDM for Intensity-Modulated Direct-Detection Systems," *Journal of Communications and Information Networks*, vol. 2, no. 4, pp. 36-46, Dec. 2017, doi: 10.1007/s41650-017-0035-5.

T. Mao, R. Jiang, and **R. Bai**, "Optical dual-mode index modulation aided OFDM for visible light communications", *Optics Communications*, vol. 391, pp.37-41, May 2017.

R. Bai, R. Jiang, T. Mao, W. Lei, and Z. Wang, "Iterative receiver for ADO-OFDM with near-optimal optical power allocation," *Optics Communications*, vol. 387, pp. 350–356, Mar. 2017.

Conference Articles

R. Bai and S. Hranilovic, "Layered Antisymmetry-constructed Clipped Optical OFDM for IM/DD Systems," in Proc. IEEE Global Communications Conference (GLOBECOM 2019), Waikoloa, HI, USA, 2019, pp. 1-6.

R. Bai and S. Hranilovic, "Absolute Value Layered ACO-OFDM for Intensity-modulated Optical Wireless Channels", in *Proc. IEEE International Conference on Communications (ICC 2019)*, Shanghai, China, 2019, pp. 1-6.

R. Bai, R. Jang, J. Tan and J. Quan, "Performance comparison of VLC MIMO techniques considering indoor illuminance with inclined LEDs," in *Proc. IEEE International Conference on Wireless for Space and Extreme Environments (WiSEE)*, Aachen, Germany, 2016, pp. 105-110.

PROFESSIONAL EXPERIENCE

The University of British Columbia 05.2022 – Present

Postdoctoral Research Fellow

Supervisor: Prof. Julian Cheng

I. Help Create Secure Mobile Networks Using Ultraviolet Communication Technology
   a. Research on Monte-Carlo Simulation Models for Multiple Scattering UVC Channels
   b. The UVC Capacity Derivation and Proof.
   c. System Simulation Based on USRP, Matlab & Simulink
   d. Ultraviolet Communication System Design Based on FPGA and ARM

II. Marine Mammal Detection and Classification
   a. Research on Machine Learning Neural Networks Using Marine Mammal Sounds/Pictures
   b. Construct Neural Network Models Based on PyTorch and Tensorflow AI Framework
   c. Achieve Above 95% Classification Accuracy for 32 kinds of Mammals

III. Help Write NSERC Grant Proposals on Intelligent Robotic Communications
   a. Literature Review and Discussion with Other Colleagues
   b. Proposal Drafting with Other Team Members

McMaster University 01.2022 – 04.2022

Postdoctoral Research Fellow

Supervisor: Prof. Steve Hranilovic

I. Lead L-LACO Paper to Be Published in TGCN
   a. Revised the Manuscript Following the Reviewers' Comments
   b. Prepared the Submission Files for Publication in TGCN

II. Finished a Paper Draft on Optimal Power Allocation Ready to Submit
   a. Approximated A Non-convex Optimization Problem by Convex Problems
   b. Revised and Finalized a Manuscript Ready to Submit to CL.

McMaster University 09.2018 – 12.2021

Teaching Assistant for 7 courses

My Responsibilities Including *Leading Tutorials, Lab Supervision, Lab Report Marking, Project Report Marking, Grading Midterm Test and Final Exam, Interacting with students, etc.*

SERVICE

IEEE Member Since 2016

Optica(formerly OSA) Member Since 2019

Volunteer Tutor for 7 Undergraduates: 2021-2022

a. Research on LED Deployment under Illumination Constraints;

b. Simulate an Office Illumination Distribution Using Zemax OpticStudio