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   2015-2018
Tsinghua University, China
Dissertation: "Research on Multi-carrier Key Techniques for Visible Light Communications"
Supervisor: Prof. Zhaocheng Wang

B.Sc., Electronic Information Science and Technology   2011-2015
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

Vgej pkecn'Umknnu''

- MATLAB: 9-year Programming Experience in Monte-Carlo Simulations, 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 Embedded C/C++, Java, JavaScript, Jupyter, Verilog and VHDL (for FPGA)
- Experienced with Common Linux/Ubuntu Commands, Git/Github, Android Studio, Google Colab
- Proficient in using Oscilloscope, Spectrum Analyzer, JTAG, Logic Analyzer, System Analyzer
- 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 Leader with Strong Communication Skills
- Strong Written English and Mandarin

SELECTED PUBLICATIONS

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," *IEEE/OSA 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. Lutian Chen

    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 and Proof 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 Different 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.   Proposed a novel modulation scheme saving 50% arithmetic operations, and thus led a journal paper published in TGCN
        a. Drafted a Paper and Revised the Paper Following the Reviewers' Comments
        b. Prepared the Submission Files for Publication in TGCN

    II.   Finished a Paper Draft on Optimal Power Allocation
        a. Approximated A Non-convex Optimization Problem by A Group of Convex Problems
        b. Revised and Finalized a Manuscript Ready for Submission.

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 Tests 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

Active Journal and Conference Reviewer:
  IEEE Transactions on Communications, IEEE Journal of Lightwave Technology, Optics Express, IEEE Communication Letters, IEEE Access, etc.