

# AARON RUOWEN BAI

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## EDUCATION

<b>Ph.D., Electrical and Computer Engineering</b>	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+	
<b>M.Eng. (with Hons.), Electronic Engineering</b>	2015-2018
Tsinghua University, China	
Dissertation: "Research on Multi-carrier Key Techniques for Visible Light Communications"	
Supervisor: Prof. Zhaocheng Wang	
<b>B.Sc., Electronic Information Science and Technology</b>	2011-2015
Nankai University, China	
Dissertation: "The Design of Microstrip Antenna"	

## HONORS AND AWARDS

Ph.D. Comprehensive Examination: pass with distinction (P+)	2020
<a href="#">National Scholarship</a> 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

## VEJ PÆCN'UMKNU''

- 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

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Google Scholar Citations: 145

### 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.

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05.2022 – Present

*Postdoctoral Research Fellow*

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- 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 Wplxgtulw**

01.2022 – 04.2022

*Postdoctoral Research Fellow*

*Uwr gt xkuqt <Rt ql0Ugxcg"J t cplqxke*

- 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 Wplxgtulw**

09.2018 – 12.2021

*Teaching Assistant for 7 courses*

My Responsibilities Including Ngcf kpi 'Vwqtkcnu.'Ncd'Uwr gt xkukqp.'Ncd'Tgr qtv'O ctmkpi . 'Rtqlgev'  
Tgr qtv'O ctmkpi . 'I tcf kpi 'O kf vgt o 'Vguw'cpf 'Hkpcn'Gzco . 'Kpvtcev kpi 'y kj 'lwxf gpwu.'gve0

## SERVICE

IEEE Member	Since 2016
Optica(formerly OSA) Member	Since 2019
Volunteer Tutor for 7 Undergraduates:	2021-2022
<ol style="list-style-type: none"><li>a. Research on LED Deployment under Illumination Constraints</li><li>b. Simulate an Office Illumination Distribution Using Zemax OpticStudio</li></ol>	
Active Journal and Conference Reviewer:	
IEEE Transactions on Communications, IEEE Journal of Lightwave Technology, Optics Express, IEEE Communication Letters, IEEE Access, etc.	