

# Xutong Ren

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<https://tonghelen.github.io/>

## EDUCATION

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### Peking University

Bachelor of Computer Science, EECS.

Beijing, China  
Sept. 2015 – July 2019

- GPA: 3.61/4.00.
- Special Research Class of EECS.
- Core Courses
  - Mathematics:  
Advanced Mathematics (96); Algebraic Structure and Combinatorial Mathematics (97);
  - Computer Science:  
Operating Systems (98); Principle of Programming Languages (96);  
Computer network practicum (95); Computer Architectures(94);
  - Programming:  
Introduction to Computation (95); Practice of Programming in C/C++ (95).
- TA: Introduction to Computer Systems

## PUBLICATION

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- [1] **Xutong Ren**, Mading Li, Wen-Huang Cheng and Jiaying Liu, "Joint Enhancement and Denoising Method via Sequential Decomposition," in *2018 IEEE International Symposium on Circuits and Systems (ISCAS)*, May 2018, pp. 1–5. (**oral**)
- [2] **Xutong Ren**, Lingxi Xie, Chen Wei and Alan Yuille, "Recurrent Curriculum Learning," prepare to submit to *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, June 2019.
- [3] **Xutong Ren**, Wenhan Yang, Jiaying Liu, "J3LR: Joint Low-Light Enhancement and Low-Rank Denoising Method," prepare to submit to *IEEE Transactions on Image Processing (TIP)*.
- [4] Chen Wei, Lingxi Xie, **Xutong Ren**, Alan Yuille, "Unsupervised Visual Recognition by Solving Arbitrary Jigsaw Puzzles," prepare to submit to *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, June 2019.

## PATENT

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- [1] Jiaying Liu, **Xutong Ren**, Mading Li, Zongming Guo, "Method, System and Computer Device of Low-light Enhancement and Denoising," CN201810243551.9

## RESEARCH EXPERIENCE

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### Research Assistant

Institute of Computer Science and Technology, Peking University.  
Advisor: Prof. Jiaying Liu, PKU.

Beijing, China  
May 2017 – present

- **Low-light Image Enhancement and Denoising**
  - Solve the problem that low-light enhancement methods ignore intensive noise in original images which leads to simultaneously enhance the noise as well.
  - Propose a joint low-light enhancement and denoising strategy based on a novel sequential Retinex decomposition concept.

- Perform well for a wide variety of images, and achieve better quality compared with the state-of-the-art methods. The paper and code are available at <http://www.icst.pku.edu.cn/course/icb/Projects/JED.html>.
- Bring up the idea, code in MATLAB and publish a paper [1] as the first author.
- **Joint Low-light and Low-rank Algorithm**
  - Explain and demonstrate why solving the Retinex decomposition problem iteratively causes noise to distribute in each component, which in the end impairs the denoising ability.
  - First to combine low-light enhancement method and low-rank denoising approach in order to improve the quality of images. An integrated low-rank decomposition of three channels in RGB space is applied to remove noise from the reflectance map.
  - Bring up the idea, code in MATLAB and write a paper [3] as the first author.

## Research Intern

Center for Imaging Science, Johns Hopkins University.  
 Advisor: Prof. Alan Yuille, JHU.

Baltimore, U.S.  
 July 2018 – Sept. 2018

- **Recurrent Curriculum Learning**
  - Propose a new form of Curriculum Learning, which follows an organized learning order by gradually reducing oracle information given to the network.
  - Design a general two-stage network model, using outputs of coarse stage to replace oracle information given to fine stage and increase learning difficulty.
  - Apply to different visual tasks such as object detection, segmentation and classification.
  - Bring up the idea, code in Torch and MatCaffe, and prepare to submit a paper [2] as the first author.
- **Transfer Learning via Jigsaw Puzzle**
  - Build a recurrent solution to a jigsaw puzzle of 9! different permutations in a self-supervised manner, without heavy burden of human annotation.
  - Enforce the neural network to learn from spatial contexts of puzzles and transfer the learned features to visual tasks such as medical image analyses.
  - Prepare to submit a paper [4] as the third author.

## HONORS

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| • Peking University Award for Academic Excellents      | 2018 |
| • Wang Shengdi Scholarship (top 10%)                   | 2018 |
| • Peking University Award for Academic Excellents      | 2017 |
| • 8108 College Scholarship (top 10%)                   | 2017 |
| • The Third Prize of Peking University ACM Competition | 2017 |

## SKILLS

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- **Deep Learning**  
 PyTorch, MXNet, Torch.
- **Programming**  
 C/C++, Matlab, Python, Lua, Java, Javascript, HTML, Go, Wolfram, Arduino.
- **Robotic Design**  
 Computer Science and Electrical Engineering Education Program at MIT, Boston.
- **English**  
 GRE (325); TOFEL (105).