

# JIANWEN SONG

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## EDUCATION

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### Sichuan University

*Sep. 2017 - Jun. 2020*

Master of Science, Detection Technology and Automatic Equipment

GPA: **91/100 (3.8/4.0)**

Supervisor: Kai Liu

### Sichuan University

*Sep. 2013 - Jun. 2017*

Bachelor of Engineering, Electronics and Information Engineering

GPA: 85.14/100 (3.35/4.0)

Supervisor: Wei Wu

## RESEARCH INTERESTS

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3D vision; Point cloud processing; Fringe projection profilometry

## PUBLICATIONS

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- Kai Liu, Kangkang Zhang, Jinghe Wei, **Jianwen Song**, Daniel L. Lau, Ce Zhu and Bin Xu\*, “Extending epipolar geometry for real-time structured light illumination”, **Optics Letters**, 2020, 45(12): 3280-3283.
- Kai Liu, Wenqi Hua, Jinghe Wei, **Jianwen Song**, Daniel L. Lau, Ce Zhu and Bin Xu\*, “Divide and conquer: High-accuracy and real-time 3D reconstruction of static objects using multiple-phase-shifted structured light illumination”, **Optics Express**, 2020, 28(5): 6995-7007.
- Kai Liu, **Jianwen Song**, Daniel L. Lau, Xiujuan Zheng, Ce Zhu, and Xiaomei Yang\*, “Reconstructing 3D point clouds in real time with look-up tables for structured light scanning still objects along both horizontal and vertical directions”, **Optics Letters**, 2019, 44(4): 6029-6032.
- **Jianwen Song**, Daniel L. Lau, Yo-Sung Ho, and Kai Liu\*, “Automatic look-up table based real-time phase unwrapping for phase measuring profilometry and optimal reference frequency selection”, **Optics Express**, 2019, 27(9): 13357-13371.
- **Jianwen Song**, Yo-Sung Ho, Daniel L. Lau, and Kai Liu\*, “Universal phase unwrapping for phase measuring profilometry using geometric analysis”, Proc. SPIE (Emerging Digital Micromirror Device Based Systems and Applications X), 2018, 10546: 105460B.
- Zhenli, Xiaomin Yang, **Jianwen Song**, Kai Liu, Zuping Wang, and Wei Wu\*, “Improving Resolution of 3D Surface With Convolutional Neural Networks”, Sustainable Cities and Society, 2018, 42: 127-138.
- **Jianwen Song**, Daniel L. Lau, Xiaomin Yang, Bin Xu, and Kai Liu\*, “Universal decoding method for periodic patterns in phase shifting structured light illumination”, Optics Express. [Preparing]

## PATENTS

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- Kai Liu, **Jianwen Song**, Jiang Wang, and Yiguang Liu, “Customized projector and projection method based on one-dimensional information”, Chinese Patent, CN105737761B.

- Kai Liu, **Jianwen Song**, and Han Zhang, “System calibration method, device, and three-dimensional reconstruction system ”, Chinese Patent, CN107170010A. [Patent pending]
- Kai Liu, **Jianwen Song**, Ziyang Hu, and Bin Xu, “Phase unwrapping method, device and electronic instrument based on two-dimensional look-up table ”, Chinese Patent, CN110006365A. [Patent pending]
- Kai Liu, **Jianwen Song**, Jun Gong, and Ce Zhu, “Three-dimensional reconstruction method and system based on structured light periodical pattern”, Chinese Patent, CN110285775A. [Patent pending]

## PROJECTS

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- Fast and high-precision 3D shape measurement system using surface structure light, supported by Chengdu Zhongliang Electronic Technology Corporation *Jun. 2019*  
– Build the whole system and design the operation interface programmed using C++.
- Low-cost and fast structured light 3D imaging for product examination in high-end manufacturing, supported by Science and Technology Support Program of Chengdu City *Sep. 2018 - Present*  
– Study different kinds of coding schemes in structured light illumination and compare their accuracy and efficiency.
- High-precision structured light 3D imaging for pressure vessel and pipeline deformation corrosion detection, supported by Science and Technology Support of Sichuan University and Zigong City Cooperation Project *Sep. 2018 - Present*  
– Design a high-accuracy and efficient phase unwrapping algorithm for structured light illumination.
- Inexpensive real-time high-precision multi-frame structured light 3D face imaging, supported by Beijing Baidu Network Technology Corporation *May. 2018 - Apr. 2019*  
– Design a universal decoding method that can be applied to different coding schemes of structured light illumination.
- High-precision structured light 3D imaging for high-reflective aero-engine blades, supported by Science and Technology Support Program of Sichuan Province *Jan. 2018 - Present*  
– Design an algorithm that can detect the light saturation area in a structured light system.
- High-precision structured light 3D imaging for illumination saturation overflow and multipath effects, supported by the National Natural Science Foundation of China *Sep. 2017 - Dec. 2018*  
– Study the influence of point spread function on a structured light system.
- Pipeline analysis system, supported by Seikowave Corporation *Jun. 2017 - Sep. 2018*  
– Fit the rotation parameter of given pipeline point clouds by using Hough transform.

## HONORS AND AWARDS

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- **National Scholarship for Postgraduate Student** *Nov. 2018 and Nov. 2019*
- Outstanding Postgraduate Student of Sichuan University *Nov. 2018 and Oct. 2019*
- First-class Postgraduate Academic Scholarship of Sichuan University *Sep. 2017-Present*
- Outstanding Undergraduate Thesis of Sichuan University *Jun. 2017*
- Outstanding Undergraduate Student of Sichuan University *Oct. 2016 and Oct. 2014*
- Third-class Scholarship of Sichuan University *Oct. 2016 and Oct. 2014*
- 1<sup>st</sup> Prize, Ship Model Competition of Sichuan University *Apr. 2014*

## SKILLS

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Programming Languages: MATLAB, C/C++, Python

Toolkits: L<sup>A</sup>T<sub>E</sub>X, OpenCV, PCL, PyTorch, TensorFlow, Linux, etc.