

**Cheng Jin**

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## Education Background

**University of Electronic Science and Technology of China (UESTC)**  
Bachelor of Engineering in Optoelectronic Information Science and Engineering

08/2018-07/2022

### Awards & Honors:

Scholarship for Outstanding Student (Percentage: 15.5%), 12/2019

### International House at UC Berkeley

01-02/2019

Leadership and Innovation Program (on campus, with certificate, no transcript)

### Hong Kong University of Science and Technology (HKUST)

08/2022-07/2026 (expected)

Ph.D. of Engineering in Computer Science and Engineering

## Publication Information

- Z. -X. Chen, **C. Jin**, T. -J. Zhang, X. Wu, and L. -J. Deng. SpanConv: A New Convolution via Spanning Kernel Space for Lightweight Pansharpening. Accepted in *the 31st International Joint Conference on Artificial Intelligence and the 25th European Conference on Artificial Intelligence*, 2022. (Long Oral Acceptance, top 3.75%)
- **C. Jin**, L. -J. Deng, T. -Z. Huang, and G. Vivone. Laplacian Pyramid Networks: A New Approach for Multispectral Pansharpening. *Information Fusion*, 2022. (Impact Factor: 12.975)
- Z. -R. Jin, T. -J. Zhang, **C. Jin**, and L. -J. Deng. Weighted Shallow-deep Feature Fusion Network for Pansharpening. *IGARSS 2021-2021 IEEE International Geoscience and Remote Sensing Symposium*, 2021.
- S. -S. Xiao, **C. Jin**, T. -J. Zhang, R. Ran, and L. -J. Deng. Progressive Band-separated Convolutional Neural Network for Multispectral Pansharpening. *IGARSS 2021-2021 IEEE International Geoscience and Remote Sensing Symposium*, 2021.
- L. -J. Deng, G. Vivone, **C. Jin** and J. Chanussot. Detail Injection-Based Deep Convolutional Neural Networks for Pansharpening. *IEEE Transactions on Geoscience and Remote Sensing*, doi: 10.1109/TGRS.2020.3031366.
- YU Shiwei, **JIN Cheng**. Torpedo Tracing of Warship Escaping Along a Linear Direction. *Studies in College Mathematics*. 2019, 5.

## Professional Skills

Python (3yrs), C (1.5yrs), LaTeX (4yrs), MATLAB (3yrs), Linux (3yrs)

Certificates: Chinese Amateur Radio Operation License (Callsign: BH8CGG/VRXSP), Chinese Red Cross First Aider Certificate

## Internship in the Machine Learning area

**Mitacs & Computational Medicine Laboratory, Western University (online program, Canada)**

07-10/2021

Responsible for assessment of perfusion heterogeneity in human CT data using PM<sup>3</sup> (Precision Medicine Using Mathematical Modeling) platforms, and machine learning of segmentation

## Research Experiences

**Fusion of Satellite Panchromatic Image and Multispectral Image Based on Deep Learning**

04/2019-04/2022

*SpanConv: A New Convolution via Spanning Kernel Space for Lightweight Pansharpening* | Participant

12/2021-04/2022

- Assisted in: 1) conducting qualitative and quantitative experiments in order to prove the effectiveness of SpanConv Operation; 2) Proofreading the manuscript and refining the key concepts.

*Laplacian Pyramid Networks: A New Approach for Multispectral Pansharpening* | Major Participant

10/2019-10/2021

- Designed an end-to-end deep neural network structure: Laplacian Pyramid Networks based on the inspiration from the multi-scale spatial representation structure of the Laplacian Pyramid Decomposition (LPD)
- Used the Module Transfer Function (MTF) to describe the feature of each band of the multi-spectral image for image fusion

- Extensive experimental results based on quantitative and qualitative assessments exploiting benchmarking datasets demonstrate that the proposed architecture outperforms other seven state-of-the-art pansharpening methods (four are conventional methods, three are deep-learning based methods) in quality indexes SAM, ERGAS, SCC,  $Q2^n$  and Qavg.

*Weighted Shallow-deep Feature Fusion Network for Pansharpening | Participant*

12/2020-02/2021

- Assisted in proposing Adaptive Skip Weighter (ASW) to perform dynamic feature graph overlay for image fusion, which helped improve limitations of ResNet

*Progressive Band-separated Convolutional Neural Network for Multispectral Pansharpening | Participant*

12/2020-02/2021

- Assisted in drawing schematic diagrams of the proposed method, which promoted uneven optimization results of each band in traditional methods (given the specificity of each band) by creating optimization functions for different bands to perform image fusion

*Detail Injection-Based Deep Convolutional Neural Networks for Pansharpening | Major Participant*

06-10/2020

- Reconstructed DiCNN-1 and DiCNN-2 according to the paper Pansharpening via Detail Injection Based Convolutional Neural Networks
- Conducted image fusion benchmark test for DiCNN-1, DiCNN-2, and PanNet, and compared the results with those of CS-Net, MRA-Net, and Fusion-Net
- Programmed algorithms (DiCNN-1, DiCNN-2, and PanNet) under the framework of TensorFlow using Python

**Brain-like Computational Simulation Based on Two-dimensional Materials | Participant for software part 12/2019-12/2020**

- Used PyQt5 to program the front-end Graphical User Interface (GUI) that allowed users to select suitable two-dimensional materials for their subsequent simulation work
- Assisted in 1. Carried out curve fitting to get the basic electrical characteristic parameters of the materials using Origin based on the electrical conditions of the materials provided by the hardware/material group; 2. Programmed to recognize handwritten digital image dataset (MNIST) by treating these electrical inputs/outputs as neuron nodes in a neural network

**Torpedo Tracing of Warship Escaping Along a Linear Direction | Major Participant**

12/2018-03/2019

- Built the corresponding differential equation for a random linear trajectory that a warship escapes along
- Solved the differential equation and obtained the analytic solution of the torpedo tracing trajectory, by Transformed the scene into one that the enemy ship flees in the vertical direction of our ship's coordinate axis using the coordinates rotation

### **Commission of Trust**

Regular Reviewer for:

- *IEEE Transactions on Neural Networks and Learning Systems*
- *IEEE Transactions on Geoscience and Remote Sensing*
- *IEEE Journal of Biomedical and Health Informatics*
- *IEEE Geoscience and Remote Sensing Letters*
- *International Journal of Computer Vision*
- *Information Fusion*

### **Professional Contests**

2<sup>nd</sup> Prize at the national level in National University Students' Opt-Sci-Tech Competition 08/2021

1<sup>st</sup> Prize at the national level in CUMCM (Contemporary Undergraduate Mathematical Contest in Modeling) 11/2020

3<sup>rd</sup> Prize in the 20th Mathematical Contest in Modeling of UESTC 06/2020

### **Projects**

Smartphone-based analysis of non-destructive apple brix measurement | *Participant*

08/2021

- Assisted in obtaining apple reflection spectrum by designing the optical path in external detector as an accessory
- Used Android Studio to program an Android application for mobile use in displaying apple reflection spectrum measurements and predicted apple brix results
- Integrated a 3-layered convolutional neural network with the Android application mentioned above to predict the brix value of the spectrum-measured apple
- Used Autodesk Inventor to design 3D external schematic diagram of spectrum detector, followed by 3D printing to obtain the physical object

- Visualization of Abstract Concepts in Solid and Semiconductor Physics | *Participant* 12/2020
- Assisted in the visualization work of 1. one-dimensional monoatomic lattice vibration, 2. 1st& 2nd Brillouin regions of body-centered/face-centered/simple cubic crystals, 3. macroscopic operation of crystals via Autodesk 3DS MAX and Adobe After Effects
  - Responsible for the presentation video editing work
- Segmenting and extracting the contour images of blood cells under the microscope | *Independent Study* 11/2020
- Used Wavelet transform for image denoising, Histogram averaging to increase image contrast, the OTSU threshold method to binarize the images
  - Used the expansion and etching methods in image morphology processing to fill/remove the invalid area, obtained contour image of blood cells after segmentation and extraction
- Design of Control Circuit of Washing Machine Based on Verilog | *Independent Study* 06/2020
- Wrote the logical expression for the functions of the controller, timer, state display, control object, alarm circuit, and other modules
  - Simplified the logical expression using Karnaugh Map, selected the chips for application in Multisim, and drew the basic circuit schematic diagram
  - Programmed and simulated it using Vivado
- Selected Extracurricular Activities**
- Amateur Radio Association, UESTC (Founder) 02/2022-now
- Responsible for antenna design, activity organization and orientation
  - Served as the keynote speaker of the introduction, theory explanation lecture
- UESTC Linux User Group 03/2019-now
- Responsible for document writing and package building
- Applied Electronic Science and Technology Association, UESTC 10/2018-now
- Responsible for handling professional questions, such as the operation of Linux system, network configuration, programming
  - Served as the keynote speaker of the annual recruitment lecture
- "Bee's Home" Volunteer Teaching Team, College of Optoelectronic Science and Engineering, UESTC 07/2019-04/2021
- Responsible for operation of WeChat official account and participated in volunteer teaching work (reported by local TV)
  - Awarded "Outstanding Volunteer" (twice), "Excellent Individual in Social Practice" (once)