Lei Si

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EDUCATION

University of Houston
Ph.D student, Computer Science *08/2020 - Present*
- Research Assistant
- Cumulative G.P.A - 4.0/4.0
- Anticipated Graduation Date - 05/2025

University of Illinois at Springfield
Master of Science, Computer Science *01/2019 - 05/2020*
- Graduate Assistant
- Graduated with honor
- Cumulative G.P.A - 4.0/4.0

North China University of Technology
Bachelor of Science, Cyber Security *09/2013 - 07/2018*
- Undergraduate Research Assistant
- Cumulative G.P.A - 3.5/4.0

COURSE WORK

- **Graphic Related** - Computer Graphic, Visualization
- **Others** - Data Structures & Algorithms, Parallel Computations, Machine Learning

TECHNICAL SKILL

- **Research** - Quad and Hexa Mesh Generation and Simplification, Entry-level AI
- **Programming Language** - C/C++, Python
- **Simulation Software** - SOFA, MFEM, deal.ll
- **Software & Toolkit** - VTK, OpenGL, Blender, LaTeX

EXPERIENCE

State Key Laboratory of Information Security, Chinese Academy of Sciences Beijing, China
Research Intern *07/2016 - 07/2018*
- Attended Chinese Academy of Sciences Students Innovation Practice Training Program for digital watermark technology.
- Developed a GIF-based file concealed storage system. This system mapping any data into a set of GIF images with precomputed encoding rules.
- Designed a library to manage, distribute, and storage 4 TB GIF Images and them property to multiple physical nodes by using Hadoop Distributed File System and SQL. This library uses RAID 5 as its disk redundant configuration.
- Designed a algorithm using Apache Spark to calculate the encoding rules for the 4 TB GIF image data set on 6 physical nodes and 250 GB DRAM.
- Programming Language is Java and Scala.

National Undergraduate Electronics Design Contest Beijing, China
Team Leader *07/2015 - 07/2015*
- Designed a visual navigation and autopilot algorithm on STM32 and KL25 microcontroller to control a quadcopter to delivery an item.
- Applied proportional-integral-derivative method to control height, speed, attitude and moving based on sensor data in real time.
- Developed a object detection algorithm using first derivative operator.
- Won the second prize in the Beijing Division.
- Programming Language is C.

National University Students Intelligent Car Race Beijing, China
Team Leader, Director *07/2014 - 07/2015*

- Designed a visual navigation and autopilot algorithm based on MT9V034 CMOS camera and KL25 microcontroller. The algorithm running in real time at 16 KB RAM.
- Applied proportional-integral-derivative method to control car speed and steering range.
- Adopted Kalman filtering algorithm to correct path direction.
- Won the second prize, and third prize in the Beijing Division.
- Programming Language is C.

RESEARCH PROJECT

Hex/Quad Visualization Toolkit for Reveal Poor-quality Element University of Houston, TX, USA
Geometry Modeling, Visualization, Python, Javascript *11/2020 - 12/2021*

- Proposed a glyph design for highlighting the small elements that have bad mesh quality. This design can effectively allow people focus their attention on the bad quality elements without being disturbed by the element size.
- Developed a multi-view mesh quality visualization system to analyze mesh quality globally, regionally, adjacently, and locally.
- Developed a boundary error visualization system by using UV mapping method. This system transferred 3D surface error to the plane height difference.
- Implementing a web application based on three.js for the proposed system for cross-platform access.

Quadrilateral Mesh Optimization University of Houston, TX, USA
Geometry Modeling, C++ *08/2020 - 11/2020*

- Optimized the configuration of an embedded polygon constructed based on the one-ring neighbors of each interior vertex.
- Produced an inversion free mesh and outperforms the existing methods with best quality meshes.
- Developed a robust Hexa/Quad mesh half edge data structure.

Wild Life Detection University of Illinois at Springfield, IL, USA
Deep Learning, Python *10/2019 - 05/2020*

- Employed the animal images and their background images in the region proposal component to extract region candidates for the animal's location.
- The proposed method can detect wildlife animal in night images with 68 percent average accuracy. For deer, the method is 95 percent accurate.

Network Intrusion Detection University of Illinois at Springfield, IL, USA
Cyber Security, Deep Learning, Python *08/2018 - 09/2019*

- Collected 246 unique exploit-payload pairs from two common operating systems.
- Covert 12597 attack network traffic data into image format, and label the region of malware.
- Trained a real-time object detection system, named YOLO with the labeled network traffic images.
- On our dataset, the accuracy of this method reaches 99 percent.

PUBLICATION

1. Muhammad Naeem Akram, **Si, Lei**, and Guoning Chen. An embedded polygon strategy for quality improvement of 2d quadrilateral meshes with boundaries. In *VISIGRAPP (1: GRAPP)*, pages 177–184, 2021
2. Yanhui Guo, Thomas A Rothfus, Amira S Ashour, **Si, Lei**, Chunlai Du, and Tih-Fen Ting. Varied channels region proposal and classification network for wildlife image classification under complex environment. *IET Image Process.*, 14(4):585–591, 2020
3. Chunlai Du, Shenghui Liu, **Si, Lei**, Yanhui Guo, and Tong Jin. Using object detection network for malware detection and identification in network traffic packets. *CMC-COMPUTERS MATERIALS & CONTINUA*, 64(3):1785–1796, 2020
4. Chunlai Du, Shenghui Liu, Yanhui Guo, **Si, Lei**, and Tong Jin. Detection and information extraction of similar basic blocks used for directed greybox fuzzing. In *International Conference on Artificial Intelligence and Security*, pages 353–364. Springer, 2020

5. Yanhui Guo, Amira S Ashour, **Si, Lei**, and Deep P Mandalaywala. Multiple convolutional neural network for skin dermoscopic image classification. In *2018 IEEE International Symposium on Signal Processing and Information Technology (ISSPIT)*, pages 365–369. IEEE, 2018