Ningfei Wang

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EDUCATION

- **University of California, Irvine** — California, USA
  Ph.D. in Computer Science – Advisor: Qi Alfred Chen — *Sep 2019 – Present*
- **Lehigh University** — Pennsylvania, USA
  M.S. in Computer Science — *Aug 2017 – May 2019*
- **Beijing University of Posts and Telecommunications (BUPT)** — Beijing, China
  B.E. in Information Engineering — *Aug 2013 – Jun 2017*

RESEARCH EXPERIENCE

- **3D Adversarial Object against MSF-based Perception in Autonomous Driving** — University of California, Irvine
  Graduate Student Researcher, ASGuard Research Group (Prof. Qi Alfred Chen) — *Sep 2019 - now*
  - **Description**: Explored the vulnerabilities of Multi-Sensor Fusion (MSF) -based perception in autonomous driving. We demonstrated our attacks on MLSys 2020 Demonstration Track.
  - **Progress**: Ongoing.
- **Interpretable Deep Learning under Fire** — University of California, Irvine / Lehigh University, USA
  Research Assistant, ALPS lab (Prof. Ting Wang) — *Sep 2018 - Sep 2019*
  - **Description**: Provided a broad class of attacks that generate adversarial inputs, which not only mislead target DNN models but also deceive their coupled interpretation models (saliency map models). The paper was accepted by USENIX Security 2020.
  - **Contribution**: Converted Caffe model and TensorFlow model into PyTorch and trained DNN (Resnet and Densenet) on ImageNet. Generated adversarial examples and their saliency map. Evaluated the success rate of the attacks and distances of saliency map between adversarial and benign examples. Deployed a potential countermeasure – Adversarial Training on RTS.
- **Code De-anonymization** — Lehigh University, USA
  Research Assistant, ALPS lab (Prof. Ting Wang) — *Mar 2018 - Jul 2018*
  - **Description**: Developed SUNDAE, a novel code de-anonymization framework which integrates both static and dynamic stylometry analysis. The paper was accepted by the 11th ACM Workshop on Artificial Intelligence and Security and we won the **best paper award**.
  - **Contribution**: Extracted static and dynamic features (ignored by previous works) of Python source codes. Designed a stylometry matcher based on Siamese Network, which contributes to predicting the similarity of source codes from different programmers. Our approach outperformed the state-of-art methods by a margin of 45.65%.
  - **Github Repository**: https://github.com/ningfeiwang/Code_De-anonymization
- **UniGL: Preventing WebGL-based Browser Fingerprinting** — Lehigh University, USA
  Research Assistant, SEC lab (Prof. Yinzhi Cao) — *Oct 2017 - Jul 2018*
  - **Description**: Developed UNIGL to rewrite OpenGL shading language (GLSL). uniformized WebGL rendering on different browsers to defend against WebGL-based browser fingerprinting. The paper was accepted by USENIX Security 2019.
  - **Contribution**: Converted the vertex shader to a JavaScript program and execute it. Redefined floating-point operations in fragment shader via integer simulation. Developed a website which connected with back-end MySQL database to collect rendering results and machines hardware features (e.g., DataURL, Agent).
  - **Github Repository**: https://github.com/ningfeiwang/dwebgl.github.io

INTERNSHIP

- **Machine Learning Intern** — Cheetah Mobile, China
  Machine Learning Department — *Mar 2017 - Jun 2017*
  - **Work Content**: Learned the algorithms of Deep Learning (e.g., Convolutional Neural Network and Recurrent Neural Networks). Accomplish LSTM algorithms. Optimized the Cheetah's input method by re-constructing the *Trie*.
  - **Achievement**: Grasped many machine learning algorithms(e.g., CNN, RNN, GRU, and LSTM). Trained data through GPU and enhanced my operation of Linux and my knowledge of input methods.

- **VR Intern** Tsinghua University, China
  Advisor: Prof. Xiangyang Ji *Feb 2016 - Aug 2016*
  - **Work Content**: Deployed real-time omnidirectional imaging system based on OpenCV
  - **Achievement**: Collected videos with six GoPro cameras, divided them into frames. Built and used Hugin to accomplish image stitching. Extracted features of images by Surf algorithm with OpenCV. Detected overlapping and generated mask by features.

PUBLICATION (* INDECATES EQUAL CONTRIBUTIONS)

Conference and Journal Publications

1) *Interpretable Deep Learning under Fire*
   Xinyang Zhang, **Ningfei Wang**, Hua Shen, Shouling Ji, Xiapu Luo, Ting Wang
   The 29th USENIX Security Symposium (2020 Spring Quarter Submission, 12/58 = 20.7%)

2) *Rendered Private: Making GLSL Execution Uniform to Prevent WebGL-based Browser Fingerprinting*
   Shujiang Wu, Song Li, Yinzhi Cao, **Ningfei Wang**
   The 28th USENIX Security Symposium (2019 Fall Quarter Submission, 25/254 = 9.8%)

Workshop and Poster Publications

1) *Demonstration: 3D Adversarial Object against MSF-based Perception in Autonomous Driving*
   Yulong Cao*, **Ningfei Wang***, Chaowei Xiao*, Dawei Yang*, Jin Fang, Ruigang Yang, Qi Alfred Chen, Mingyan Liu, Bo Li
   The 3rd Conference on Machine Learning and Systems (MLSys 2020) Demonstration Track (7/19 = 36.8%)

2) *Poster: Security of Deep Learning based Lane Keeping Assistance System under Physical-World Adversarial Attack*
   Takami Sato*, Junjie Shen*, **Ningfei Wang**, Yunhan Jack Jia, Xue Lin and Qi Alfred Chen
   Network and Distributed System Security Symposium (NDSS 2020) Poster session, 2020 **Best Technical Poster Award**

3) *Integration of Static and Dynamic Code Stylometry Analysis for Programmer De-anonymization*
   Ningfei Wang, Shouling Ji, Ting Wang
   The 11th ACM Workshop on Artificial Intelligence and Security (AISec 2018) **Best Paper Award**

HONORS & AWARDS

- **Champion (First Place),** Baidu AutoDriving CTF (BCTF) 2020
- **Best Technical Poster Award,** Network and Distributed System Security Symposium (NDSS 2020), Poster session 2020
- **Dean's Fellowship (Top 4),** UCI CS Department Dean's Fellowship for AY 19/20 2019-2020
- **Dean's Award,** UCI CS Department Dean's Award 2019-2020
- **Best Paper Award,** The 11th ACM Workshop on Artificial Intelligence and Security (AISec 2018) 2018
- **Third Prize,** Scholarship in BUPT for Three Years 2014-2016
- **Excellent Vice-Minister Honor,** Sports Department of Students' Union, BUPT 2016
- **Second Place,** the Game of Go on The BUPT Mind Sports Games 2016
- **Second Prize in Beijing Region,** National College Students' Innovative Projects 2016
- **Honorable Mention,** Interdisciplinary Contest in Modeling 2016
- **Second Prize,** Contemporary Undergraduate Mathematical Contest in Modeling 2015

TEACHING

- **Guest Lecturer, CS134: Computer and Network Security** Fall 2019
  Instructor: Prof. Qi Alfred Chen
  - Guest lecture on Machine Learning Security.

SKILLS & HOBBIES

- **Programming Language:** Python, C++, C, JavaScript, Matlab
- **Framework:** PyTorch, MySQL, Keras, Scikit-Learn, OpenCV, TBB, OpenMP