Yuming Zhang

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EDUCATION

Doctorate of Computer Engineering, University of New Mexico, Albuquerque, NM — July 2018
Dissertation - Intelligent Computational Transportation
GPA 3.94

Master of Electrical Engineering, Chinese Academy of Sciences, Beijing, China — July 2002

Bachelor of Electrical Engineering, Tsinghua University, Beijing, China — July 1999

PROFESSIONAL SKILLS

Physics-based Simulation and Modeling: rigid body, elastic body, sand, snow, fluid, gas
Numerical Methods: FEM, FVM, SPH, PIC, MPM
Programming Languages and Platforms: C, C++, Matlab, Python, CUDA, OpenGL, Qt
Image Processing and Computer Vision: moving object detection, depth detection, 3D reconstruction
Transportation System Analysis: traffic flow simulation, traffic data visualization
Electrical Hardware Development: magnetic component design, circuit design and simulation, PCB layout

WORK EXPERIENCE

New Mexico State University, Las Cruces, NM — January 2019 – present
Visiting Assistant Professor, Department of Computer Science

- Taught multiple computer science courses
  - ✓ C/C++ programming, Java programming
  - ✓ computer organization/architecture and concepts
  - ✓ computer graphics
  - ✓ parallel programming
  - ✓ introduction to smart grids
- Conducted computer graphics research
  - ✓ overlapping-test-free voxelization
  - ✓ traffic flow modeling and simulation

Midea Emergent Technologies, San Jose, CA — December 2018 – January 2019
Intern

- Kinect-based image capture
- TCP/IP communication between Android devices using Bluetooth

University of New Mexico, Albuquerque, NM — June 2014 – July 2018
Research Assistant, Department of Electrical and Computer Engineering

- Developed **a comprehensive traffic analysis system**
  - ✓ conventional traffic flow simulation using FVM
  - ✓ future CAV-enabled traffic flow simulation using SPH
  - ✓ traffic reconstruction by the real-world data
  - ✓ cloth-simulation-based density/velocity field visualization
- Developed **a cost-effective pavement surface assessment system**

  - ✓ data collection using Microsoft Kinect
  - ✓ converting multi-view depth images to a 3D triangle mesh using KinectFusion
  - ✓ crack detection through geometry analysis
  - ✓ crack measurement and severity evaluation
- Developed **a fast 3D triangle mesh voxelization system**
  - ✓ an efficient scanline-based strategy
  - ✓ supercover-guaranteed voxelization quality as the state-of-the-art
- Implemented **a Material Point Method-based snow simulation system**
  - ✓ verification of the versatility from elastic to plastic deformation
  - ✓ GPU-based acceleration using the NVIDIA CUDA platform
- Developed a vehicle-shadow-removal tool and a fish-motion-tracking tool based on GMM detection.
- Developed fully self-contained Qt-based GUIs for the above systems from scratch.
- Collected real on-site traffic data such as videos of shadowed vehicles running on highways.

Teaching Assistant, Department of Computer Science
- Graded students' homework, and taught the programming experiment class.

Huawei Technologies Company, Shenzhen, China — September 2010 – June 2012
Senior Power Electronic Engineer, Department of Energy Business
- Developed **high-end switching mode AC/DC and DC/DC power converters**
  - ✓ high efficiency achieved by the state-of-the-art power conversion techniques
  - ✓ high frequency and high power-density up to 180 W/in^3
  - ✓ from concepts to mass products
  - ✓ stably running on many customer products in the market
- Modeled and simulated power supply systems by PSpice and/or SIMETRIX/SIMPLIS.
- Designed and optimized magnetic components such as transformers and inductors, by calculating winding turns, flux densities of magnets, and current densities.
- Designed control circuits of power converters, such as under voltage protections, over voltage protections, over current protections, feedback controls, remote controls and pre-bias start up.
- Selected semiconductor devices accordingly, including PWM IC, MOSFETS, drivers, diodes, bipolar transistors, calculation amplifiers and optical isolators.
- Hand-made prototypes to verify the design. Diagnosed and troubleshot technical problems in the laboratory and/or application fields. Measured and tested power supplies using diverse power equipment like oscilloscopes, voltmeters, ammeters, electronic loads, loop testing instruments, incubators, etc.
- As a member of the Expert Committee, evaluated feasibilities of new projects and approved or redirected the general technical schemes of new products.
- Led a research and development team (10 engineers). Trained and advised junior engineers.

Emerson Network Power Company, Shenzhen, China
Senior Power Electronic Engineer, Department of BMP/CP — May 2005 – September 2010
Power Electronic Engineer, Department of BMP/CP — July 2002 – May 2005

PUBLICATIONS

- Zhang, Y., Zhang, G., Fierro, R., & Yang, Y. (2018). Force-Driven Traffic Simulation for a Future Connected Autonomous Vehicle-Enabled Smart Transportation System. *IEEE Transactions on Intelligent Transportation Systems*. Year: 2018, Volume: 19, Issue: 7 Pages: 2221 - 2233
- Zhang, Y., Chen, C., Wu, Q., Lu, Q., Zhang, S., Zhang, G., & Yang, Y. (2018). A Kinect-Based Approach for 3D Pavement Surface Reconstruction and Cracking Recognition. *IEEE Transactions on Intelligent Transportation Systems*. Year: 2018, published
- Zhang, Y., Garcia, S., Xu, W., Shao, T., & Yang, Y. (2017). Efficient voxelization using projected optimal scanline. *Graphical Models*. Year: 2017, published