# Meng-Lin Wu

765-337-6128

[m\_l\_wu@hotmail.com](mailto:m_l_wu@hotmail.com)

<https://menglin-wu.github.io/>

Education

**Purdue University Indiana, U.S.A.**

PhD, Computer Science 2019

Advisor: Voicu Popescu

Thesis: Occlusion Management in Conventional and Head-Mounted Display Visualization through the Relaxation of the Single Viewpoint/Timepoint Constraint

**National Taiwan University Taipei, Taiwan**

MS Physics 2007

Research Areas

**Qualcomm Technologies, Inc. San Diego, California, U.S.A.**

Staff Engineer 2019 – present

Professional Experience

**Qualcomm Technologies, Inc. San Diego, California, U.S.A.**

Staff Engineer 2019 – present

Shipped the first mobile always-sensing camera feature.

Mentored interns and graduate students on topics of image restoration, object detection, semantic image editing, using CNNs, transformers, and diffusion models

Filed patents in the areas of i) 3D photography, ii) light field, depth, and HDR sensing, iii) segmentation and detection, iv) DDPM

**Facebook Reality Labs Redmond, Washington, U.S.A.**

Research Intern 2018

Researched ML-based i) adaptive ray casting, and ii) sparse image denoising / reconstruction. Implemented the ML models using CNNs and GANs. Analyzed inference complexity.

**nuTonomy Cambridge, Massachusetts, U.S.A.**

Autonomous Driving Engineering Intern 2017

Established real-time validation framework for the autonomous driver by developing i) LiDAR and video sensor simulations to validate perception routine, and ii) vehicle simulation to validate low-level controller. Performed system identification on Renault Zoe and reproduced vehicle dynamics.

**Google Montréal, Québec, Canada**

Software Developer Intern 2016

Assisted in open-sourcing SwiftShader – Implemented OpenGL ES 3 features~~, leveraging CPU vector instructions for performance.~~

**VMware Palo Alto, California, U.S.A.**

Intern, Member of Technical Staff 2014

Assisted in releasing VMware Workstation 12 and Fusion 8 with OpenGL 3.3 support ~~– Implemented virtual graphics adapter OpenGL 3.x features.~~

**International Games System Taipei, Taiwan**

Game Planning Specialist, Physics Team 2009 – 2010

Developed vehicle simulation engine for racing games ~~– Enabled rapid development of the titles~~ *~~Speed Driver 3~~* ~~(2010),~~ *~~Speed Rider 2~~* ~~(2011),~~ *~~Power Truck~~* ~~(2011), and~~ *~~Speed Driver 4~~* ~~(2012).~~

Academic Projects

**Computer Graphics and Visualization Lab, Purdue University West Lafayette, Indiana, U.S.A.**

Occlusion Management in Real World Scenes

Developed real-time free-viewpoint video system leveraging RGBD streams, image and point cloud segmentation, object detection and tracking, and video inpainting. Presented at *ACM I3D 2019*.

Multiperspective Visualization for AR / VR Navigation

Improved AR / VR navigation efficiency with novel multiperspective approach. Conducted user studies using Microsoft HoloLens and Windows Mixed Reality headsets. The studies showed our method to be effective and intuitive. Presented at *IEEE VR 2018* and *EuroVR 2018*.

Multiperspective Focus+Context Visualization

Designed a flexible camera model to render 3D scenes from multiple disjoint viewpoints to a single image. Developed real-time ray tracing and rasterization algorithms. Published in *IEEE TVCG*.

**High Energy Physics Group, National Taiwan University Taipei, Taiwan**

Analyzed K meson decays in 4 and 6 photon modes in E391a Collaboration at KEK proton synchrotron, Japan. Established upper bounds for branching fractions of rare decay modes. Calibrated beamline model and generated Monte Carlo simulation. Published in *Physical Review Letters*.

Publications

1. **Consistent and Multi-Scale Scene Graph Transformer for Semantic-Guided Image Outpainting**Chiao-An Yang, Meng-Lin Wu, Raymond A. Yeh, Yu-Chiang Frank Wang  
   *International Conference on Image Processing 2023*
2. **Direct Handheld Burst Imaging to Simulated Defocus**  
   ML Wu, VRK Dayana, H Hwang  
   *International Conference on Image Processing 2022*
3. **Scene Graph Expansion for Semantics-Guided Image Outpainting**  
   CA Yang, CY Tan, WC Fan, CF Yang, ML Wu, YC Frank Wang  
   *Conference on Computer Vision and Pattern Recognition 2022*
4. **Robust Image Outpainting With Learnable Image Margins**CY Tan, CA Yang, SF Chen, ML Wu, YC Frank Wang  
   *International Conference on Image Processing 2021*
5. **Automatic Deictic Gestures for Animated Pedagogical Agents**SRK Kappagantula, N Adamo-Villani, ML Wu, V Popescu  
   *IEEE Transactions on Learning Technologies, 2019*
6. **RGBD Temporal Resampling for Real-Time Occlusion Removal**ML Wu, V Popescu  
   *SIGGRAPH Symposium on Interactive 3D Graphics and Games 2019*
7. **Anchored Multiperspective Visualization for Efficient VR Navigation**ML Wu, V Popescu  
   *International Conference on Virtual Reality and Augmented Reality (EuroVR) 2018*
8. **Efficient VR and AR navigation through multiperspective occlusion management**ML Wu, V Popescu  
   *IEEE Transactions on Visualization and Computer Graphics, 2017*
9. **Digital learning activities delivered by eloquent instructor avatars: scaling with problem instance**S Anasingaraju, ML Wu, N Adamo-Villani, V Popescu, SW Cook, M Nathan, M Alibali  
   *SIGGRAPH ASIA 2016 Symposium on Educatio*n
10. **Multiperspective Focus+Context Visualization**ML Wu, V Popescu  
    *IEEE Transactions on Visualization and Computer Graphics, 2016*
11. **Animation killed the video star**V Popescu, N Adamo-Villani, ML Wu, SD Rajasekaran, MW Alibali, M Nathan, SW Cook  
    *Proceedings of CHI 2014 Workshop on Gesture-based Interaction Design: Communication and Cognition*
12. **Study of the K0L →π0π0νν¯ decay**R Ogata et al. *Physical Review D, 2011*
13. **Search for the decay K0L → 3γ**YC Tung et al. *Physical Review D, 2011*
14. **Experimental study of the decay K0L →π0ν¯ν**JKA et al. *Phys. Rev. D, 2010*
15. **Search for a Light Pseudoscalar Particle in the Decay K0L → π0π0 X**YCT et al. *Phys. Rev. Lett., 2009*
16. **Search for a light pseudoscalar particle in the decay K0L → π0π0 X at the E391a experiment**YC Tung et al. *PoS, 2009*
17. **Search for X (214) in K0L → π0 π0 X (X → μ+μ-) using back-anti counter at the E391a experiment**R Ogata et al., *2009 KAON International Conference*
18. **Search for the Decay K0L → π0ν¯ν**JKA et al. *Phys. Rev. Lett., 2008*

Other Published Works

1. **Towards Light Weight Object Detection System**  
   Dharma KC, Venkata Ravi Kiran Dayana, Meng-Lin Wu, Venkateswara Rao Cherukuri, Hau Hwang  
   arXiv:2210.03861
2. **Image modification techniques**  
   Meng-Lin Wu, Chung-Chi Tsai, An Chen. *US Patent App.* 17/524,681
3. **Systems and methods for generating synthetic depth of field effects**  
   ML Wu, VRK Dayana. *US Patent App.* 17/481,155
4. *Speed Driver 4: World Fever* (2012)
5. *Power Truck* (2011)
6. *Speed Rider 2* (2011)
7. *Speed Driver 3: Crash Hour* (2010)

Reviewer

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| IEEE TVCG | ACM SIGGRAPH |
| IEEE Visualization Conference | ACM SIGGRAPH Asia |
| IEEE Virtual Reality Conference | Eurographics Conference |
| IEEE ISMAR | Eurographics Symposium on Rendering |
| IEEE ICIP | Computer Animation and Virtual Worlds |

Awards

Bilsland Dissertation Fellowship, Purdue University Graduate School