Matthew Peizhi YaN

Ph.D. Candidate at UBC Founder of Aurora Technology and Solutions

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# Research Interests

* **Computer Vision**: 3D face and general object reconstruction from 2D images; image generation.
* **Computer Graphics**: NeRF; 3D Gaussian Splatting (3DGS); 3D face modeling.
* **Machine Learning**: Large-Language-Models; foundational 3D generation models; explainable ML.

# Education

* **The University of British Columbia** Jan. 2021 – Ongoing

📍Vancouver, British Columbia, Canada

Ph.D. Candidate in Electrical and Computer Engineering

Supervisors: [Dr. Rabab Ward](https://ipl.ece.ubc.ca/), [Dr. Shan Du](https://cmps.ok.ubc.ca/about/contact/shan-du/)

Thesis: Learning-based 3D Human Face Creation

GPA: 4.0 / 4.0 (Average Grade: 95%, Letter: A+)

* **Lakehead University** Sept. 2018 – May 2020

📍Thunder Bay, Ontario, Canada

M.Sc. in Computer Science

Supervisor: Dr. Salimur Choudhury

Thesis: Towards Machine Learning Enabled Future-Generation Wireless Network Optimization

GPA: 4.0 / 4.0 (Average Grade: 98%, Letter: A+)

Distinction: Governor-General’s Gold Medal

* **Algoma University**  Sept. 2016 – May 2018

📍Sault Ste. Marie, Ontario, Canada

B.Sc. in Computer Science

Supervisors: Dr. Yi Feng, Dr. George Townsend

GPA: 4.0 / 4.0 (Average Grade: 96%, Letter: A+)

* **University of Jinan** Sept. 2014 – June 2019

📍Jinan, Shandong, China

B.Eng. in Computer Science

# Research and Work Experience

**The University of British Columbia** Research Assistant Jan. 2021 – Present

**BC Cancer Research Centre** Research Assistant Jun. 2024 – Oct. 2024

**Lakehead University** RA and Graduate TA Sept. 2018 – May 2020

**Algoma University** RA at BCI Lab 2017 - 2018

# Teaching Experience

**Lakehead University**

* Guest Lecturer (9 hours): Optimization Method (2020 Spring), graduate-level, 29 students
* Guest Lecturer (6 hours): Deep Learning (2020 Winter), graduate-level, 83 students
* Guest Lecturer (6 hours): Computer Vision (2019 Fall), graduate-level, 70 students
* Guest Lecturer (9 hours): Deep Learning (2019 Spring), graduate-level, 59 students
* Guest Lecturer (6 hours): Optimization Method (2019 Spring), graduate-level, 19 students
* Tutor: [Assembly](http://timetable.lakeheadu.ca/scripts/return.course.description.php?c=COMP&cn=3413) Language (2019 Winter), undergraduate-level, 38 students
* Tutor: [Data Base Management Systems](http://timetable.lakeheadu.ca/scripts/return.course.description.php?c=COMP&cn=3413) (2018 Fall), undergraduate-level, 25 students

# Academic service

**Organizational Roles**

* (ICIP 2025) Session Chair: Biomedical Signal and Image Processing 3
* (GI 2025) Program Committee Member for Graphics Interface Conference
* (CCECE 2025) Volunteer at IEEE Canadian Conference on Electrical and Computer Engineering
* (2015-2016) Vice President of Turing Computer Association (S/W Dept.), Univ. of Jinan, China

**Journal Reviewing**

* IEEE Transactions on Circuits and Systems for Video Technology (TCSVT) 25 reviews
* IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) 1 review
* IEEE Transactions on Visualization and Computer Graphics (TVCG) 1 review
* IEEE Transactions on Image Processing (TIP) 1 review
* IEEE Transactions on Multimedia (TMM) 4 reviews
* IEEE Canadian Journal of Electrical and Computer Engineering (CJECE) 4 reviews
* IEEE Transactions on Cybernetics 1 review
* ACM Trans. on Multimedia Computing, Communications, and Application (TOMM) 1 review
* Elsevier Neurocomputing 13 reviews
* Springer Neural Computing and Applications 1 review

**Conference Reviewing**

* (2025) Graphics Interface (GI 2025) Conference
* (2022) Asian Conference on Computer Vision (ACCV 2022)
* (2021 to 2023, & 2025) IEEE International Conference on Image Processing (ICIP)
* (2020) The 17th IEEE International Conference on Ubiquitous Intelligence and Computing

**Talks and Presentations**

* (2025) Presenter at UBC ECE Research Day
* (2024) Speaker at BC Cancer Summit on Skin Lesion Image Synthesis with Controllable Skin Tone
* (2023) Guest Speaker at Consortium for Advancement of MRI Education and Research in Africa
* (2023) Invited Talk on Machine Learning in 3D Face Modeling at UBC (Okanagan) COSC Seminar

# Publications

**Citations: 190 h-index: 9 i10-index: 8 (statistics are from Google Scholar)**

**Journal**

1. **Yan, P.**, Ward, R., Wang, D., Tang, Q., & Du, S. (2025), “StyleMorpheus: Learning a StyleGAN-Based 3D-Aware Morphable Face Model with a Disentangled Style Space”. *Elsevier Neurocomputing*. (Accepted for publication, SCI Journal, IF: 6.5)
2. **Yan, P.**, Ward, R., Tang, Q., & Du, S. (2025), “Neural 3D Face Shape Stylization Based on Single Style Template via Weakly Supervised Learning”, *IEEE Transactions on Visualization and Computer Graphics (TVCG)*. (SCI Journal, IF: 4.7)
3. Liu, W., Hopkins, A. M., **Yan, P.**, Du, S., Luyt, L. G., Li, Y., & Hou, J. (2023), “Can Machine Learning ‘Transform’ Peptides/Peptidomimetics into Small Molecules? A Case Study with Ghrelin Receptor Ligands”, *Molecular Diversity*, 1-17. (SCI Journal, IF: 3.364)
4. **Yan, P.**, & Choudhury, S. (2021), “Deep Q-Learning Enabled Joint Optimization of Mobile Edge Computing Multi-Level Task Offloading”, *Elsevier Computer Communications*. (SCI Journal, IF: 3.923)
5. **Yan, P.F**, Paul, A.**F**, Yang, Y., Zhang, H., Du, S. & Wu, J. (2021), “Non-Iterative Online Sequential Learning Strategy for Autoencoder and Classifier”, *Springer Neural Computing and Applications*. (SCI Journal, IF: 6.106)
6. Tassone, J., **Yan, P.**, Simpson, M., Mendhe, C., Mago, V., & Choudhury, S. (2020), “Utilizing Deep Learning and Graph Mining to Identify Drug Use on Twitter Data”. *BMC Medical Informatics and Decision Making*, 20(11), 1-15. (SCI Journal, IF: 3.546)
7. **Yan, P.**, Al-Turjman, F., Al-Oqily, I., & Choudhury, S. (2020), “An Energy-Efficient Topology Control Algorithm for Optimizing the Lifetime of Wireless Ad-hoc IoT Networks in 5G and B5G”. *Elsevier Computer Communications*. (SCI Journal, IF: 3.923)
8. **Yan, P.**, Choudhury, S., & Wei, R. (2020), “A Machine Learning Auxiliary Approach for the Distributed Dense RFID Readers Arrangement Algorithm”. Intelligent and Cognitive Techniques for Internet of Things, *IEEE Access Journal*. (SCI Journal, IF: 5.456)
9. **Yan, P.**, & Feng, Y. (2018), “Using Convolution and Deep Learning in Gomoku Game Artificial Intelligence”. *Modern Physics Letters A*, 28(03). (SCI Journal, IF: 1.367)

**Conference**

1. **Yan, P.\***, Ward, R., Tang, Q., & Du, S., “Estimating Virtual Camera FOV to Reduce Perspective Shape Distortion in 2D-to-3D Face Reconstruction”. In Proceedings of the *International Conference on Image Processing (ICIP)*. 2025.
2. **Yan, P.\***, Ward, R., Tang, Q., & Du, S., “Gaussian Deja-vu: Creating Controllable 3D Gaussian Head Avatars with Enhanced Generalization and Personalization Abilities”. In Proceedings of the *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*. 2025. **(Oral; Accepted in Round 1; Acceptance rate 12%)**
3. Qiu, Z., **Yan, P.**, & Cai, Z., “Large Language Models for Second Language English Writing Assessments: An Exploratory Comparison”. In Proceeding of the *38th Pacific Asia Conference on Language, Information and Computation (PACLIC 38)*. 2024.
4. **Yan, P.\***, Ward, R., Wang, D., Tang, Q., & Du, S., “Learning Disentangled Features for NeRF-based Face Reconstruction”. In Proceedings of the *International Conference on Image Processing (ICIP)*. 2023.
5. **Yan, P.\***, Gregson, J., Tang, Q., Ward, R., Xu, Z., & Du, S. “NEO-3DF: Novel Editing-Oriented 3D Face Creation and Reconstruction”. In Proceedings of the *Asian Conference on Computer Vision (ACCV)*. 2022.
6. Mehajabin, N., **Yan, P.**, Kaur, S., Song, J., Pourazad, M. T., Wang, Y., ... & Nasiopoulos, P. An Efficient Refocusing Scheme for Camera-Array Captured Light Field Video for Improved Visual Immersiveness. In Proceedings of the 55th *Hawaii International Conference on System Sciences*. 2022
7. **Yan, P.\***, & Choudhury, S., “Optimizing Mobile Edge Computing Multi-Level Task Offloading via Deep Reinforcement Learning”. In Proceedings of the *IEEE International Conference on Communications (ICC)*. IEEE. 2020.
8. Emu, M., **Yan, P.**, Choudhury, S., “Latency Aware VNF Deployment at Edge Devices for IoT Services: An Artificial Neural Network Based Approach”. In Proceedings of the *IEEE International Conference on Communications (ICC) on Convergent IoT*. IEEE. 2020
9. **Yan, P.\***, Choudhury, S., & Wei, R. “A Distributed Graph-Based Dense RFID Readers Arrangement Algorithm”. In Proceedings of the *IEEE International Conference on Communications (ICC)* (pp. 1-6). IEEE. May, 2019.
10. **Yan, P.\***, & Feng, Y. “A Hybrid Gomoku Deep Learning Artificial Intelligence”. In Proceedings of the *2018 Artificial Intelligence and Cloud Computing Conference* (pp. 48-52). ACM. December, 2018.

**Submitted**

1. **Yan, P.**, Ward, R., Tang, Q., & Du, S., “ArchitectHead: Continuous Level of Detail Control for 3D Gaussian Head Avatars”. Submitted. 2025.
2. Yu, X., **Yan, P.C**, Liu, S. & Wu, C. “MMFashion+: Multimodal Federated Learning for Personalized Clothing Recommendation”. Submitted to *IEEE Transactions on Consumer Electronics*.

**\*** presenter.

**F** co-first authorship.

**C** correspondence author.

# Selected Awards and Honors

**Canada**

* (2020) The Governor-General’s Gold Medal Award (Canada’s highest award in graduate level)
* (2018) Vector Scholarship in Artificial Intelligence (VSAI) by Vector Institute, CA$17,500

**University of British Columbia**

* (2023) ICICS Travel Award
* (2021, 2022, 2023) Graduate Support Initiative (GSI) Award

**Other**

* (2025) IEEE Signal Processing Society (SPS) Travel Grant

# Projects

**Research-Oriented**

* (2024-2025) 3D Head Reconstruction and Tracking <https://github.com/PeizhiYan/flame-head-tracker>

⭐ GitHub 110+ Stars

Developed a 3D head tracking pipeline capable of performing 3D head reconstruction from a single image or tracking the 3D head from a monocular video. The results can be used in 3D head avatar training, video aftereffects, etc.

* (2024) Gaussian Deja-vu: 3DGS-based 3D Head Creation <https://peizhiyan.github.io/docs/dejavu>

⭐️ GitHub 50+ Stars

Developed a 3D Gaussian-based method for creating animatable head avatars using monocular video as training data. This work was accepted at WACV 2025 in the first round.

* (2024) Mesh-based Neural 3D Face Style Transfer <https://peizhiyan.github.io/docs/style>
* (2023) StyleMorpheus: NeRF-based 3D Face <https://github.com/ubc-3d-vision-lab/StyleMorpheus>
* (2022) NEO-3DF: 3D Face Creation and Editing <https://peizhiyan.github.io/docs/neo3df>
* (2019) Deep Learning 4X Video Super-Resolution [https://www.youtube.com/watch?v=W8Tx`](https://www.youtube.com/watch?v=W8Tx%60)

**Other Open-Source Projects**

* (2025) Gmesh: Differentiable Hybrid 3D Rendering Pipeline <https://github.com/PeizhiYan/gmesh>

Developed a pipeline for differentiable hybrid rendering of scenes that contains both 3D Gaussians and 3D meshes. It supports end-to-end learning and seamless integration with Pytorch pipelines.

* (2021) ZenFlow: Open-Source Machine Learning Demo <https://github.com/PeizhiYan/zenflow>
* (2021) Light-Field Refocusing Algorithm Demo <https://www.youtube.com/watch?v=pRxXQcuVQSs&t=9s>
* (2019) Open-Source Whiteboard Web App. <https://peizhiyan.github.io/www/draw.html>
* (2018) Convolution-Based Gomoku Game AI <https://peizhiyan.github.io/js_codes/gomoku>

# Supervised and Mentored Students

* **Haoyu Wang** (supervised Ph.D. student at UBC Okanagan, research assistant, Sept – Dec. 2024)

**Projects**: 3D face and head tracking; 2D image ear landmark detection.

* **Xiangrui Liu** (supervised master’s student at UBC Okanagan, research assistant, May – Aug. 2023)

**Project**: 3D and 3D-aware face modeling.

* **Md Nafis Abedin** (supervised undergrad student at University of Waterloo, co-op 2020 summer intern)

**Project**: Developing an interactive web user interface for the satellite image lichen mapping project.

* **Keizo Kato** (mentored student at UBC Okanagan, 2023) on his undergraduate thesis.
* **Marshall Wenqi Guo** (mentored student at UBC Okanagan, 2023) on his undergraduate thesis.

# Technical Skills

* **Programming Languages**: Python, Java, C++, C, JavaScript
* **Open-Source Libraries**: PyTorch, Tensorflow, Keras, Open3D, OpenCV, Gurobi, Paper.js, React
* **Computer Networking:** VPN, SSH, SAMBA, FTP, Router Settings (DHCP, NAT)
* **Others**: LaTeX, Linux, SLURM (HPC), Photoshop, Blender

# Other OPEN-SOURCE Contributions

* Simple-KNN (used by 3DGS): Solved a CUDA device-related issue (PR accepted).

<https://github.com/camenduru/simple-knn>

Updated on Oct. 12, 2025