Han*(Aurora)* Wang

Curriculum Vitae

3090 Windemere Ct
Chino Hills, CA, 91709
+1-847-910-3572
wanghan.wh06@gmail.com
www.wanghan.io

Summary & Research Interests

- With almost **five years of industry experience** at tech giants like **Microsoft Research, Snapchat, and DiDi Research**, I have honed my skills in both engineering and research, focusing mainly on **computer graphics** (simulation and rendering) and computer vision, especially in the fields of **AR/VR** and **autonomous driving**. Moreover, as an **ACM-ICPC World Finalist** in **2016** and a **gold medalist** in the Asia region, these experiences have further shaped my technical proficiency and problem-solving capabilities.
- I've developed a strong motivation and enthusiasm in research on **Computer Graphics**, especially physics-based simulation/animation and rendering. I would love to advance my understanding of this field further, through Ph.D. study with an expert at a remarkable institution.

Education

- **Northwestern University** - IL, US *09/2017 - 06/2019*
  - *Master of Science* in Computer Science GPA: 3.7 / 4.0 Academic advisor: Prof. Jack Tumblin
  - Thesis: Action recognition in compressive sensing Thesis Advisor: Prof. Aggelos K. Katsaggelos
- **Northeastern University** - China *09/2013 - 06/2017*
  - *Bachelor of Engineering* in Software Engineering (Digital Media Technology track)
  - GPA: 3.80 Major Rank: Top 1 Graduated with Honors (Top <1%)
  - Principal Medal (7/39,766), National Scholarships (twice), First-prize Scholarship (4 times)

Professional Contests - Only the best awards are listed here.

- **World Finalist, *40th* ACM-ICPC (International Collegiate Programming Contest), Honorable Mention**
- **Gold Medal, 40th ACM-ICPC (International Collegiate Programming Contest), Asia Regional** *10/2015*

Work Experience

- ***Senior Software Engineer*** - Simulator Core Team, **DiDi Research America LLC. CA** *11/2022 - Present*
  - Researched, designed, and developed algorithms in domains including sensor simulation and vehicle dynamics, in order to make a simulation of the ego car and agents more realistic with graphics and CV techniques.
  - Led another two engineers developing **sensor simulation**, which can generate synthetic scenarios' 3D point cloud data scanned by simulated LiDAR based on physics-based ray casting and PBR material rendering.
  - Built and maintained 3D assets library with both hand-crafted large vehicle models and 3D generated small vehicles models using **3D reconstruction** techniques based on NeRF and SDF.
  - Researching and exploring LiDAR simulation (synthetic point cloud) on **inclement weather** scenarios.
- ***Software Engineer*** - Camera Platform Team, **Snap Inc. Santa Monica, CA** *07/2019 - 11/2022*
  - Mainly contributed to graphics, shader-related features and internal tools **with C++ and Qt** for **Lens Studio**, one of Snap's three pillars, **SnapAR** - 3D AR engine for building augmented reality experiences for Snapchat.
  - Tech and engineering owner of **Cloth Simulation** with 3D body mesh in Lens Studio 4.0 supported for AR effects with dynamic cloth physics on any mesh like real-world physics. Designed and implemented the pipelines of integration (cloth collision, stretching, bending, friction, cloth multi-attributes property, cloth vertex binding etc.) and APIs for points-based algorithms collaborated with **Snap Research**. This feature was released with Disney movie *Cruella* in **Snap Partner Summit 2021.**
  - **Collider System** for AR, implemented an integration and APIs design of collider system in both LensCore (the core rendering engine for Snapchat) and Lens Studio to support collision in AR lens creation, later combined in the **Physics system** released in Lens Studio which enable users creating more real AR experiences.
  - Engineering owner of **Shader Analyzer**, an internal tool for users to get **real-time analytics and compilation** info of shaders user created in Lens Studio. Designed and implemented the overall feature including **OpenGL shader** assembling, compilation info collecting, complexity analyzer and rendering for complexity crossed **4 repositories.**

- Developed **Texture Analyzer**, another internal tool enabling users to get visualized analytics of the texture.
- **Got Promoted after the first half year.** Besides above, also worked on small features like adding new graphic blend modes for image object and materials, draco compression supports for **glTF** files. Fixed bugs for Lens Core **rendering**, Lens Studio releasion, APIs, lens templates, OpenGL shaders and optimized rendering performance.

- ***Software Engineer Intern*** - Camera Platform Team, **Snap Inc. Venice, CA** *06/2018 - 09/2018*
  - Implemented **hand-tracking** integration in Lens Studio to support hand tracking AR lenses creation.
  - Prototyped and built AR lens templates which contain interaction between hand and 3D virtual objects with hand detection and tracking in Lens Studio with Javascript and **GLSL** (OpenGL shaders), were released in late 2018.
- ***Research Intern*** - Software Analytics Group, **Microsoft Research Asia. Beijing, China.** *12/2016 - 06/2017*
  - Built a stand-alone system Insight Evolution with C# for **insights** with explanations on **streaming data**, collaborated with the Power BI team, including raw streaming data pre-processing, insights mining, insights explanation and analysis and visualization of results with auto-insight (our visualization system).
  - Designed and implemented a data mining algorithm based on DBSCAN with benchmark tests.

Skills

Proficient in	C++, C, Python, JavaScript, GLSL, Common Lisp, Git, Qt, LaTeX
Familiar with	Java, C#, Rust, Swift, SQL, MATLAB, Blender, HTML, CSS, Pytorch
Experienced in	OpenGL, OpenCV, Game Development, Data mining, Machine Learning, Image Processing

Research / Projects Experience

- **Fraudulent Click Detection. Result website (Kaggle Link)** *03/2018 - 06/2018*
  - Built high-performance prediction model using **Panda** and **Sklearn** to predict whether a user will download an app after clicking a mobile app advertisement, based on the collection of users' clicking record.
  - Designed an effective algorithm based on both **Multilayer Perceptron (MLP)** regression and classification, which results in **95%** accuracy. Visualized the result and analysis of prediction using JavaScript and CSS.
- **Knowledge Representation & Reasoning on Question Answering** *02/2018 - 03/2018*
  Supervised by Prof. Ken Forbus, Northwestern University, IL, US
  - Implemented a knowledge representation & reasoning project to solves the tasks of answering a set of prerequisite toy tasks which were proposed by "Towards AI-Complete Question Answering: A Set of Prerequisite Toy Tasks" by Jason et. al. from **Facebook AI Research**.
  - Contributed to parsing the task text to the facts in KB, deployed the reasoning logic and relationship based on **Horn Clause** on five tasks, using Companions reasoning system to answer queries. Completed the accurary test on Facebook bAbI dataset.
  - Get all **100%** accuracy on 10 tasks. All Common Lisp code is posted here: **code**
- **Automatic 3D Animation Generation System** *05/2015 – 08/2016*
  Undergraduate Research Assistant, supervised by Prof. Ruiyun Yu, Northeastern University (CN)
  - Designed a smart and user-friendly animation generation system, providing management and visualization editing on the key resources of models, scenes and actions.
  - Developed the skeleton automatic binding algorithm based on skeleton distance factor, achieved better above-average binding effects by accurately computing the distance between skin and skeleton.

Publications

- Cheng Zhao, Haomei Jia, Ran Gao, Shiqi Zheng, Fengzhi Wu, Han Wang. Safety Risk Management System in Electric Power Engineering Construction under the Background of Big Data. IEEE International Conference on Artificial Intelligence, Big Data and Algorithms (CAIBDA), 2021

MISC

- **Research Assistant** - Advisor: Prof. Aggelos K. Katsaggelos Northwestern University *2018 - 2019*
- **Grader & Peer Reviews** - EECS351 - Computer Graphics Northwestern University *2018 - 2019*
- **Team lead** - ACM-ICPC Training Team, Northeastern University (CN) *2014 - 2016*
  - Led the ACM training team (16 teams, 50-people scale) to help train and improve team members' **C++ coding and algorithms** skills. Hosted multiple technical seminars and organized online programming competitions.
  - Led 2 teammates to make a **historic breakthrough** by winning the **first** Gold Medal of ACM-ICPC (Asia Regional Contest) in Northeastern University history.
  - The **only female** contestant from Chinese universities to compete in the **ACM-ICPC World Finals 2016**.