CHIYU **WANG**

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EDUCATION

University of California, Berkeley
Berkeley, CA

B.A. in Computer Science & Applied Mathematics (Double Major) - Overall GPA: 3.89/4.00 *Aug 2017 - Expected Dec 2021*

- **University of Michigan - Shanghai Jiao Tong University Joint Institute (UM-SJTU JI)** *Shanghai, China*
  UC Education Abroad Program - Electrical and Computer Engineering - Term GPA: 3.85/4.00 (Top 2%) *Sep 2019 - Dec 2019*

Relevant Coursework: Machine Learning, Artificial Intelligence, Computer Vision, Reinforcement Learning, Algorithms, Data Science, Database, Data Structures, Machine Structures, Computer Graphics, Probability & Random Processes, Optimization Models in Engineering, Linear Algebra & Differential Equations, Numerical Analysis, Real Analysis, Complex Analysis, Game Theory, Information Devices & Systems

PROFESSIONAL EXPERIENCE

Microsoft Research
Beijing, China

AI Research Intern, DKI (Data, Knowledge, Intelligence) Group, Microsoft Research Lab - Asia *Oct 2021 - Present*

- Devise a reinforcement learning-based intelligent request retry policy for cloud services (e.g. Microsoft Azure) using Deep Deterministic Policy Gradient (DDPG) method, potentially saving 1 million dollars per month by reducing 1% of company's total CPU usage.
- Modeled a multi-server network with Poisson Process in Python, and analyzed request data flow with several traditional rule-based methods.
- Formulate a generic retrial queuing model to extend the project scope to solve challenging healthcare issues, such as addressing the Intensive Care Unit (ICU) resource allocation problem across different countries under the Covid-19 pandemic through machine learning .

Amazon Web Services AI
Shanghai, China

Applied Scientist Intern, AWS Shanghai AI Lab *July 2021 - Oct 2021*

- Pioneered research on video amodal completion and its application in multiple object tracking using spatial-temporal prior and common-fate principle, and recently submitted the paper to *The Conference on Computer Vision and Pattern Recognition (CVPR) 2022*.
- Designed a novel end-to-end self-supervised training pipeline integrating CNN, LSTM, GNN and Conditional VAE, which achieved state-of-the-art amodal completion performance on synthetic and real-world benchmarks, and substantial improvement for the class-agnostic setting.
- Built a baseline Autoencoder model with CNN and RNN to predict amodal mask in Pytorch, achieving a testing mIoU over 95%.
- Created a synthetic video dataset based on WebGL Aquarium with a Node.js client, and conducted extensive statistical analysis in Python.

Software Dev Engineer Intern, AWS Machine Learning *Oct 2020 - June 2021*

- Contributed to *Deep Graph Library (DGL)*, an open-source efficient and scalable Python package for deep learning on graphs, and implemented several pointcloud-related Graph Neural Network (GNN) models (PointNet++, etc.) in Pytorch as its official examples.
- Delivered a front-end model search module in the official DGL website using Javascript (Bootstrap, JQuery, etc.) that allows users to quickly navigate examples in database with tagged keywords, serving the growing DGL community and featured in *DGL v0.7.0 major release*.
- Researched on 3D mesh reconstruction from images with GNN models and differentiable rendering by probabilistic map aggregation.

Pci-Suntek Technology Co., Ltd.
Guangzhou, Guangdong, China

Software Development Intern *May 2018 - Jun 2018*

- Enhanced the Face Recognition Terminal PCI-R6002 accuracy by 3% through code optimization and feature engineering in C++.
- Built an automated preprocessing and data analysis pipeline in Python for massive pedestrian datasets, reducing workload by over 90%.
- Field investigated the usage scenario and deployed the PCI face-recognition turnstiles across 20 dorms on Zhuhai Campus, SunYat-sen Univ..

RESEARCH EXPERIENCE

The Molecular Foundry, Lawrence Berkeley National Laboratory (Berkeley Lab)
Berkeley, CA

Undergraduate Researcher **supervised by** Dr. Archana Raja & Dr. Edward Barnard *Feb 2020 - May 2020*

- Pipelined the assembly of graphene through automated lab equipment control, auto-focusing with CNNs, and data acquisition in a Python environment, which greatly eased researchers' workflow by roughly 80% and achieved high reproducibility of material properties.
- Collaborated with staff scientists to develop *ScopeFoundry*, a modular, cross-platform Python Graphical Interface for controlling custom lab experiments with fast data acquisition and visualization, and implemented APIs to enable hardware plug-ins for scientific equipment.
- Redesigned ScopeFoundry's GUI in Javascript that allows researchers to create custom experiment metrics and perform statistical analysis.

School of Electronics Engineering and Computer Science, Peking University
Beijing, China

Research Assistant **supervised by** Prof. Shengyong Xu *Jun 2019 - Aug 2019*

- Prototyped an electronic helmet device (patented) to assist the visually-impaired in navigation by transforming visual information into time-domain tactile graphics on human scalps, potentially helping millions of visually-impaired users to walk with little or no outside assistance.
- Conducted statistical analysis on tactile data collected by mechanical units on subjects' scalps, and applied density-based clustering methods in Python to identify patterns in these sensory spots to improve transmission and efficacy of the tactile stimulation.
- Researched on integration of scene understanding machine learning models to achieve real-time data processing for semantic assistance.

Environmental Health Lab, UH Mānoa
Manoa, Honolulu

Student Researcher **supervised by** Prof. Yuanan Lu *Jul 2016 - Aug 2016*

- Initiated the world-first analytical study of public's health risk awareness on urban air pollution among residents living in different megacities in China, collaborating with researchers from Fudan Univ., Nanchang Univ. and Wuhan Univ..
- Performed data cleaning and analyzed 3800+ real-world survey data from megacity inhabitants using Chi-square tests, wrote descriptive analyses and published the academic paper in IERPH Journal (*doi:10.3390/ijerph13090845*).

PUBLICATIONS

Self-supervised Video Amodal Completion By Modeling Completed Dense Object Motion Prior

J. Yao, **Wang, Chiyu**, Y. Hong, T. Xiao, Y. Fu, T. He, D. Wipf, J. Yan, Z. Zhang
Under Review for The Conference on Computer Vision and Pattern Recognition (CVPR) 2022

Public's Health Risk Awareness on Urban Air Pollution in Chinese Megacities: The Cases of Shanghai, Wuhan and Nanchang

X. Liu, H. Zhu, Y. Hu, S. Feng, Y. Chu, Y. Wu, **Wang, Chiyu**, Y. Zhang, Z. Yuan, Y. Lu
International Journal of Environmental Research and Public Health 13.9 (Aug. 2016) p. 845. MDPI AG, 2016

SELECTED PROJECTS

Deep Reinforcement Learning-based AI for Generative Art
Sep 2021 - Present

- Lead a team of three to design a model-based DRL algorithm to train agents that can decompose the target image into a sequence of brush strokes in a fashion mimicking human painting processes on canvases, using Deep Deterministic Policy Gradient and Stroke-based rendering.
- Designed Perceptual Loss and Content Masked Loss to allow agents to recreate stylized images in a more human-like painting manner.

COVID-19 United States County-Level Prediction and State-Level Policy Analysis
June 2021 - Present

- Built an ensemble prediction model with Ridge Regression, SEIR and RNN in Python to forecast the county-level epidemic spread, based on geographical, social-economics and behavioral features extracted from cases, mobility info (GPS data), socio-economics data, etc..
- Implemented a causal inference model using Conditional RNN for state-level policy analysis to provide insights into future policy design.

Interactive Visualization Toolkit for 3D Deep Learning
Oct 2020 - Dec 2020

- Developed a visualization toolkit in browser to track machine learning metrics and render mesh objects using Flask web framework and Three.js, enabling users to load models and target images, run model inference on images, and render mesh objects interactively.
- Supported Pytorch3D and differentiable rendering to train mesh reconstruction models and visualize objects step by step like Tensorboard.

2D StackBot: Automated Assembly of Atomically Thin 2D Materials for Energy and Electronics Applications @ Berkeley Lab
Feb 2020 - May 2020

- Built an autonomous stacking robot to layer atomically thin 2D materials under microscope through hardware automation and Python interface, collaborating with staff engineers from the Imaging and Manipulation of Nanostructures Facility at Berkeley Lab.
- Extended the scope of hardware automation to auto-detect and focus the monolayers using Convolutional Neural Networks and OpenCV.

TEACHING & MENTORING EXPERIENCE

Computer Science Mentors
Berkeley, CA

Mentor - CS 70 (Discrete Mathematics & Probability Theory)
Feb 2019 - Jun 2019

- Mentored a small group of students with academic assistance and facilitated a community of inclusiveness in Berkeley's large CS department.
- Led weekly teaching sections to give digestible mini-lectures, and created supplemental worksheets and notes for students to practice.
- Awarded as the outstanding mentor for Spring 2019 due to students' course performances and their feedback.

UC Berkeley EECS Department
Berkeley, CA

Academic Intern - CS 61A (Structure & Interpretation of Computer Programs)
Jun 2018 - Dec 2018

- Served as student instructor during OHs to tutor students in Python, Scheme, and SQL for CS 61A (Structure & Interpretation of Computer Programs), the most popular introductory computer science course at UC Berkeley with 2,000+ students enrolled.
- Provided code-writing mentoring for 30+ students in weekly lab sections on OOP, Interpreter design, and functional programming.

LEADERSHIP & EXTRACURRICULAR ACTIVITIES

Robotics@Berkeley
Berkeley, CA

Vice President
Sep 2017 - May 2019

- Led the 60+ members central robotics organization at Berkeley, and coordinated with 8-member leadership for two years.
- Recruited Project Team Leads, and co-founded the GM (General Membership) program, which significantly increased semester-to-semester retention and also opened more opportunities for disadvantaged Berkeley students.
- Organized the R@B Dorm Ex Machina robotics design competitions for Fall 2018 and 2019, funded by UC Berkeley's College of Engineering.

University of California Education Abroad Program
Berkeley, CA

Student Ambassador
Aug 2019 - May 2020

- Co-founded a study abroad club at Shanghai Jiao Tong University to promote cultural exchange by holding regular student panels.
- Organized outreach events and workshops to provide resources on international career and opportunities for future study abroad students.

SJTU ArtCenter
Shanghai, China

Design Lead
Sep 2019 - Dec 2019

- Responsible for all the graphic design works, including Brochure design, Ticket and Flyer design, T-shirt design and social media marketing for university-wide welcoming events and musical festivals, with 20,000+ students attending.

Berkeley Chinese Students and Scholars Association
Berkeley, CA

Chief Director
Oct 2017 - Feb 2018

- Directed a Spring Festival Gala at Berkeley with an attendance of 800+ people that consists of 16 programs to promote cultural literacy.

The Berkeley Project
Berkeley, CA

Volunteer - Site Leader
Nov 2017 - Jun 2020

- Coordinated with both the site manager and The Berkeley Project team, and joined 1000+ other Cal students to participate in a vast number of community services throughout the City of Berkeley, from working at elementary schools to planting trees.
- Responsible for managing a group of 20+ volunteers to clean weeds and debris for the weekly maintenance of Halcyon Commons in Berkeley.

SKILLS & INTERESTS

Programming Languages Python, Java, R, C/C++, SQL, Matlab, Javascript, HTML/CSS, Scheme, Go (Order by Proficiency)
Frameworks & Tools PyTorch, NumPy, Scikit-learn, Pandas, tidyverse, TensorFlow, DGL, Git, Flask, Docker, AWS EC2, Azure DevOps
Design & Interests Prototyping (AutoDesk Fusion 360), Graphic Design (Adobe Ps/Lr/Ai), Photography, Painting