Runyi Yang

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EDUCATION

Imperial College London, London, United Kingdom   **Sep 2023 - Sep 2024**
Master of Research (MRes) in AI and Machine Learning, Computing, advised by Dr. Tolga Birdal
Research Topic: Quantifying Camera Relocalization Uncertainty via Conformal Prediction

Beijing Institute of Technology (BIT), Beijing, China   **Sep 2019 - Jun 2023**
Bachelor of Engineering in Automation, GPA: 3.8/4.0, Score: 90.1/100, Rank: 5%
Awards: Outstanding Graduates of BIT, Outstanding Student Award, Academic Excellence Scholarship ×
8, Student Representative of School of Automation
Interested Fields: Scene Understanding; 3D Generation; Spatial Reasoning

EXPERIENCE

Computer Vision Group, INSAIT   **Sofia Bulgaria**
Researcher in Computer Vision and Robotics, advised Prof. Luc Van Gool   *Jan 2025 - Present*
Research Topic: 3D Scene Understanding & 3D Reconstruction
- SceneSplat series main contributor. Working on large-scale 3D dataset building and benchmarking, and trained a large model based on the dataset to enhance 3D scene understanding.
- 3D-LLMs. Working on 3D-LLMs for spatial understanding in 3D environment as long-term memory. Real-time long-term spatial understanding is the goal.

Pixomondo Innovation Lab, Sony   **London, Hybrid (Main Team based in Canada)**
Part-time Research Scientist   *May 2024 – October 2024*
- Integrate Integrating advanced 3D reconstruction methods, e.g. NeRFs and 3D Gaussian Splatting to VFX.
- Enable language-embeded 3DGS and use it for object removal and inpainting.
- Accommodate the current tools to viser as a viewer.

DISCOVER Lab, Institute for AI Industry Research, Tsinghua University   **Hybrid**
Research Intern, Advised by Prof. Zhou Guyue and Prof. Zhao Hao.   *May 2022 – April 2024*
- Research in **Neural Radiance Fields** and **3D reconstruction**. Improve the sampling methods of point clouds for the implicit representation. Integrate graph-based methods to NeRFs and 3D Gaussian Splatting. Achieved balanced performance of rendering effects like PSNR, storage and performance.
- Research in **camera pose estimation** (corresponding to SLAM), use deep learning methods to generate a robust loop-closure module. Build a loop-closure system for Xiaomi Robots indoor use.
- Research in large-scale city map reconstruction using **Signed Distance Fields**. Achieved balanced performance on storage and geometric shape.

Johnson Matthey Challenge, Data Study Group, The Alan Turing Institute   **London, UK**
Facilitator   *Nov 2023 - Dec 2023*
- Use LSTM, NARX and Transformer to forecast time series control variables in chemical processing scenarios. Achieved less than 0.1 RMSE in the prediction. https://doi.org/10.5281/zenodo.13847810
- Use conformal prediction methods to quantify the prediction region and uncertainty of the forecasting model.
- Facilitate a multidisciplinary team of 10 PhD researchers and data scientists.

Xverse (Top Metaverse Company in China)   **Shenzhen, China**
Strategy Analyst Intern   *June 2023 – Aug 2023*
- Analysis of cutting-edge academic research and technological methods and tools, including NeRFs, 3D Reconstruction and LLMs.

- Focusing on applications in the intelligent city, intelligent agriculture, digital culture heritage, and virtual cultural tourism.

PUBLICATIONS & Pre-Prints

- **First Author.** Differentiable Real2Sim2Real Data Densification for Visual–Tactile Topology-Changing Fruit Cutting. (In submission)

- **Core Contributor.** Chorus: A Multi-Teacher Pretraining Framework for Holistic 3D Gaussian Scene Encoding. (In submission)

- **First Author.** Rethinking Expressivity and Degradation-Awareness in Attention for All-in-One Blind Image Restoration. (In submission)

- Survey Paper: Multimodal Spatial Reasoning in the Large Model Era: A Survey and Benchmarks. (arxiv 2510.25760)

- **Core Contributor.** EgoNight: Towards Egocentric Vision Understanding at Night with a Challenging Benchmark. (In submission, *arxiv 2510.06218*)

- **Contributor**. SceneSplat++: A Large Dataset and Comprehensive Benchmark for Language Gaussian Splatting. (In submission, *arxiv 2506.08710*)

- **Core Contributor**. SceneSplat: Gaussian Splatting-based Scene Understanding with Vision-Language Pretraining. (ICCV 2025, *arxiv 2503.18052*)

- **Core Contributor.** CityLoc: 6 DoF Localization of Text Descriptions in Large-Scale Scenes with Gaussian Representation. (In submission, *arxiv 2501.08982*)

- **First Author**. *SUNDAE: Spectrally Pruned Gaussian Fields with Neural Compensation*. (In submission, *arxiv 2405.00676*)

- Contributor. *GaussianGrasper: 3D Language Gaussian Splatting for Robotic Grasping.* (IEEE RA-L*, arxiv 2403.09637*)

- **First Autor.** *City-scale continual neural semantic mapping with three-layer sampling and panoptic representation.* Knowledge-based Systems.

- **Core Contributor.** *MARS: An Instance-aware, Modular and Realistic Simulator for Autonomous Driving.* CAAI International Conference on Artificial Intelligence. (Best Paper Runner-up Award, Oral Presentation, 2/348)

- *AsyncNeRF: Learning Large-scale Radiance Fields from Asynchronous RGB-D Sequences with Time-Pose Function.* (In submission*, arxiv: 2211.07459*)

  - *Core Contributor means I know all of the technique details and contribution is not replacable.*
    - *Contributor means I am involved in the paper and in charge of one part in the paper.*
      - *Non-labeled means I am involved in the paper but on helper mode.*

HONORS & PRIZES

- CICAI 2023 Best Paper Runner-up Award.   May 2023

SKILLS and LANGUAGE

- Programming: **Python (PyTorch)**, **C & C++**, **MATLAB**, Web (PHP+JavaScript+html5), CUDA C
- Software: Proteus, Multisim, Simulink (MATLAB), AutoCAD, Altium Designer
- IELTS: 7.0 (Listening 7.5, Reading 8.0, Writing 7.0, Speaking 6.0), CET-6: 557/710

EXTRACURRICULAR ACTIVITIES

- *Founder, President*, BIT Swimming Club   Dec 2019 - Jun 2022
- *Captain*, BIT Swimming Team   Mar 2021 - Jun 2022
- *Organizer,* First Swimming Match Shuke & Beta Tournament   Jun 2021