# Lu Dong

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## Generative AI/ Computer Vision / LLMs

Personal Homepage
LinkedIn: Lu Dong

I am a 4th-year PhD student at the University at Buffalo, SUNY (UB). My research interests focus on Human Behavior Modeling, 3D Mesh Reconstruction, Vision-Language and Multimodal Generation, Motion and Multi-Person Interaction, Facial Emotion Inference, Sign Language Generation, and Robotics Physical Simulation. My long-term goal is to advance Computer Vision, LLMs, Generative Models, Reinforcement Learning, and Statistical Machine Learning to better understand multimodal human behavior and serve human needs. Besides, I'm experienced with Data Science techniques including Data Crawling, Pattern Mining, Information Retrieval, and Search Engine Optimization. I am also actively looking for research intern positions and postdoc positions.

## EDUCATION

**State University of New York at Buffalo (UB)**, Buffalo, New York, USA. 08/2021-Now

- Ph.D candidate in Computer Science & Engineering — Advisor: Prof. Ifeoma Nwogu

**Rochester Institute of Technology**, Rochester, New York, USA. 08/2020-05/2021

- Ph.D candidate in Computing and Information Sciences — Advisor: Prof. Ifeoma Nwogu

**Xi'an Jiaotong University** , Xi'an, Shaanxi, China. 08/2013-05/2016

- Master's Degree in Computer Science and Technology — Advisor: Prof. Xinyu Yang

**Northeast Electric Power University** , Jilin, Jilin, China.

- Bachelor's Degree in Computer Science and Technology — 08/2007-05/2011
- Bachelor's Degree in Electrical Engineering and Automation — 08/2008-05/2012

## RESEARCH EXPERIENCE

**National AI Institute for Exceptional Education, University at Buffalo-SUNY, Buffalo, NY, USA.** 01/2024–Now
*Position: Research Assistant, Advisor: Ifeoma Nwogu*

- **Research Focus: Nonverbal Communication Modeling for Exception Children's Education (AIGC + Social/Emotion)**
  - Topic: Improve Facial Emotion Inference with 3D face.[Ig3D]
  - Topic: Interactive 3D Embodiment with Social Intelligence (using LLMs, Diffusion, Gaussian Splatting).
  - Topic: Emotional Trend Analysis of Characters in Videos and Emotion-Aware 3D Synthesis (using LLMs and Diffusion).

**Human Behavior Modeling Lab, University at Buffalo-SUNY, Buffalo, NY, USA.** 08/2021–Now
*Position: Research Assistant, Advisor: Ifeoma Nwogu*

- **Research Focus: Multimodal Modeling of Human Behavior and AI-Generated Content (AIGC).**
  - Topic: Multimodal Whole-Body Motion Generation with Diffusion Models and Large Language Models. [wSignGen][SignDesp]
  - Topic: 3D Sign Language Motion Reconstruction and Generation. [SignAvatar]
  - Topic: Language-guided Human Motion Synthesis with Atomic Actions. [ATOM]

**YLAB, Xi'an Jiaotong University, Xi'an, Shaanxi, China.** 08/2013–06/2016
*Position: Research Assistant, Advisor: Xinyu Yang*

- **Research Focus: Exploring the Enduring MEME of Traditional Folk Songs**
  - Topic: Unveiling Chinese Folk Songs' Melodic Characteristics via Machine Learning.
  - Topic: Towards a Systematic Classification and Benchmarking of Traditional Chinese Folk Songs.

## PUBLICATIONS

1. **Lu Dong**, Xiao Wang, Mason Lary, Ifeoma Nwogu. "Word-Conditioned 3D American Sign Language Motion Generation" *The 2024 Conference on Empirical Methods in Natural Language Processing (EMNLP 2024)*.

2. **Lu Dong\***, Xiao Wang\*, Srirangaraj Setlur, Venu Govindaraju, Ifeoma Nwogu."Ig3D: Integrating 3D Face Representations in Facial Expression Inference" *The 18th European Conference on Computer Vision, ECCV 2024 Workshop*.

3. Mengyi Shan, **Lu Dong**, Yutao Han, Yuan Yao, Tao Liu, Ifeoma Nwogu, Guo-Jun Qi, Mitch Hill. "Towards Open Domain Text-Driven Synthesis of Multi-Person Motions." *The 18th European Conference on Computer Vision, ECCV 2024*.

4. **Lu Dong**, Lipisha Nitin Chaudhary, Fei Xu, Xiao Wang, Mason Lary, Ifeoma Nwogu. "SignAvatar: Sign Language 3D Motion Reconstruction and Generation." *The 18th IEEE International Conference on Automatic Face and Gesture Recognition (FG 2024)*.

5. Yuanhao Zhai, Mingzhen Huang, Tianyu Luan, **Lu Dong**, Ifeoma Nwogu, Siwei Lyu, David Doermann, Junsong Yuan. "Language-guided Human Motion Synthesis with Atomic Actions." *The 31st ACM International Conference on Multimedia, 2023(ACM MM'23)*.

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6. Fei Xu, Lipisha Nitin Chaudhary, **Lu Dong**, Srirangaraj Setlur, Venu Govindaraju, Ifeoma Nwogu. "A Study of Video-based Human Representation for American Sign Language Alphabet Generation." *(FG 2024)*.

7. Juan Li, **Lu Dong**, Jianhang Ding, Xinyu Yang. "Exploring the General Melodic Characteristics of XinTianYou Folk Songs." In *12th Sound and Music Computing Conference, Maynooth, Ireland, 2015*, pp. 393-399. (SMC 2015)

## WORK EXPERIENCE

**InnoPeak Technology (OPPO US Research), Seattle, WA, USA.**                    06/2023–08/2023
*Position: Research Internship, Mentor: Dr. Mitch Hill and Dr. Guo-Jun Qi*

- Topic: Text-Driven Multi-Person Motion Synthesis towards Controlled Quantities and Realistic Interactions in Open-Domain.

**InnoPeak Technology (OPPO US Research), Palo Alto, CA, USA.**                    05/2022–08/2022
*Position: Research Internship, Mentor: Dr. Xun Xu and Dr. Shuxue Quan*

- Topic: Human Pose Estimation for Home Fitness Apps Amidst Severe Self-Occlusion Challenges.

**Shaanxi Haina Electronic Technology Co., LTD, Xi'an, Shaanxi, China.**                    09/2016–04/2020
*Position: Senior Data Scientist*

- Developed and Optimized the Recommendation System.
- Developed and Managed the Information Collection and Retrieval System.
- Ensured System Stability and Provided Sustained Support to over 100 Customer Companies.

## PROJECT EXPERIENCE

**Information Retrieval Project -Covid19 & Vaccine Analysis Search Engine [Page Link]**                    09/2021-12/2021 @UB
- Regarding COVID and Vaccines, I collected a dataset of 50,000 tweets from diverse languages, various countries, authorities, and the general public using Tweepy. The front-end utilizes a Google-like user interface with HTML, CSS, Bootstrap, JavaScript, and Ajax techniques. The back-end using the Flask server, deployed on AWS EC2 cloud, employs statistical models and semantic-based language analysis to track trends among authorities related to COVID-19, public attitudes toward vaccines, and their impacts.

**Natural Language Processing Project- Medical Tutoring ChatBot [Page Link]**                    09/2021-12/2021 @UB
- This project supports a non-profit organization's mission to enhance medical knowledge in underdeveloped regions of India. My contributions addressed obstacles such as developing databases from PDFs, implementing accessible chatbots, and generating high-quality dialogue to maintain user engagement. The chatbot functions as a vital educational resource, elevating medical literacy and potentially saving lives.

**Reinforcement Learning Project –Multi-Agent Collaborative Reinforcement Learning**                    09/2021-12/2021 @UB
- This individual project focused on developing an RL Learning system within the OpenAI Gym Environment, incorporating various reinforcement learning algorithms, including Q-Learning, SARSA, DQN, DDQN, Actor-Critic, and especially PPO. It excels in multi-agent cooperation tasks featuring dynamic reward systems and establishes benchmarks.

## PROFESSIONAL SERVICE

**Conference Reviewer**
- ACM International Conference on Multimedia, 2023, 2024.

**Journal Reviewer**
- Springer Nature, Machine Vision and Applications, 2024.

**Competition**
- Invited Judge for UB Hacking Competition, 2022.

**Membership**
- IEEE Student Membership, IEEE Biometrics Council Membership.

## HONORS AND AWARDS

**Excellent Graduate Student(Top 10%)**, Xi'an Jiaotong University, 2014 & 2015.
**Silver Medal in University Women's Hurdles Competition**, Xi'an Jiaotong University, 2014.
**National Graduate Academic Scholarship (Top 10%)**, Xi'an Jiaotong University, 2013-2016.
**National Encouragement Scholarship (Top 5%)**, Northeast Electric Power University, 2010.
**Undergraduate Academic Scholarships(Top 10%)**, Northeast Electric Power University, 2010 .
**Champion in University Women's Basketball Competition as the Team Captain**, Northeast Electric Power University, 2010.