# Yuanbo Li

646-821-2178 Email:yl4092@columbia.edu
Github: https://github.com/Liyb2002 Website: https://liyb2002.github.io/

## Education

**Brown University** **(Sep 2022 -May 2024)**
M.S in Computer Science (Visual Computing Track) (GPA: 3.8)
Relevant Courses: Computer Graphics, Advanced Computer Graphics, Deep Learning

**Columbia University, Columbia College** **(Sep 2018 - May 2022)**
B.A in Mathematics (GPA: 3.6)
Relevant Courses: Advanced Programming, Natural Language Processing, Cloud Computing, Analysis and Optimization, Abstract Algebra

## Research Interests

Computer Graphics, 3D Generation, Geometry Processing, Simulation, Natural Languages, AR/VR

## Publications

*PossibleImpossibles: Exploratory Procedural Design of Impossible Structures, (in submission),* **Yuanbo Li**, Tianyi Ma, Zaineb Aljumayaat, Daniel Ritchie

## Research Experience

**Visual Computing Group , Brown University** **(Sep 2022 - Sep 2023)**
*Worked on Generating 3D Impossible Structures*
*Advisor: Prof. Daniel Ritchie*

- Introduce a new procedural language and an algorithm to generate cycles for the language
- Explored taxonomy of impossible structures, and designed a procedural model to generate them
- Designed scoring functions for characterizing visually pleasing impossible structure, and applied sequential monte carlo to guide the output space of the result

**Visual Computing Group, Brown University.** **(Feb 2023 -)**
*Worked on Creating labels for objects in AR*
*Advisor: Prof. James Tompkin*

- Proposed algorithm to interpolate pixel values based on background image, and implemented the algorithm in Unity shader
- Designed a server request in Unity that hosts a neural network and communicates with it
- Explored human perception of color saliency using a neural network and LPIPS dataset

**Collaborative Prediction Market Lab, Columbia University** **(Sep 2021 - Jan 2022)**
*Worked on making prediction using blockchain service*
*Advisor: Prof. Siddhartha Dalai*

- Built App backend using Django framework and REST API. Deployed service on AWS EC2. Retrieved on-chain data using web3js for analysis.
- Adapted and implemented AMM algorithm to reduce the slippery rate by 15% each transaction.

## Work Experience

**ARPA Technology** **(May 2022 - Aug 2022) / (June 2020 - Aug 2020)**
*Software Engineer Intern*

- Designed and implemented Behavior Driven Tests for Randcast, a distributed random number generating system for Blockchain Networks.

- Wrote documentations and developer tutorial for Randcast
- Designed Wrote smart contract for Bella.fi, a DeFi protocol, based on Open Zeppelin contract libraries

**Tencent CSIG** **(May 2021 - Aug 2021)**
*Technical Product Manager Intern*
- Participated in architecture design for blockchain-based IPFS (InterPlanetary File System).
- Wrote 10+ pages documentation helping open source engineers to build on our IPFS system.
- Drafted 30+ pages whitepaper for business development.

**Tencent Videos** **(June 2019 - Aug 2019)**
*Product Manager Intern*
- Used python to write web-crawler for 4 websites and gather view information for a total of 100+ articles on Tencent videos
- Used python (data cleansing) to analyze performance of different 100+ Key Opinion Leader

## Projects

*Path Tracer (Graphics) [C++]* Implemented a path tracer with 4 basic types of BRDFs, soft shadows, Russian Roulette path termination and event splitting with BRDF importance sampling.

*Mesh Processing (Graphics) [C++]* Implemented mesh subdivision, simplification, denoising, and remeshing.

*Finite Element Simulation (Graphics) [C++]* Implemented finite element simulation with internal elastic and viscous damping forces, collision detection, and RK4 integration.

*ARAP (Graphics) [C++]* Dissected and implemented paper "As-Rigid-As-Possible Surface Modeling" (2007).

*Stylized Caustics (Graphics) [C++]* Dissected and implemented paper "Stylized caustics: progressive rendering of animated caustics"(2016).

*Impressionism Filter (Graphics) [C++]* Dissected and implemented paper "Processing images and video for an impressionist effect"(1997).

## Talks and Teaching Experiences

*Generating 3D impossible structures via guided Sequential Monte Carlo, Brown Visual Computing Group, Feb 2023*
*Mathematics behind M.C Escher's Tessellations*, Columbia Mathematics Seminar, Feb 2021
*Introduction to Markov chain basics and applications*, Columbia Mathematics Seminar, Oct 2021
*Calculus III TA, (class by prof. Daniele Alessandrini) , Columbia Mathematics Department, Sep 2021 - Dec 2021*

## Skills

**Programming Languages:** C++, Python, C#, Java
**Libraries/Frameworks:** OpenGL, Tensorflow, Torch, threeJS, Unity, Pyrender, Django
**Tools:** Adobe Illustrator, Adobe Photoshop, Blender, Mesh Lab, AWS, Final Cut Pro