JINGYI LI

Distributed System Programming + Geospatial Analytics + Historic Preservation

Tel: 610-938-7161 Email: jingyili@upenn.edu (or jyljingyili@gmail.com)

EDUCATION

University of Pennsylvania, Stuart Weitzman School of Design, Philadelphia, PA *Present*
Master of Science in Historic Preservation
Concentration: Preservation Planning, GPA: 3.927

Harbin Institute of Technology, School of Architecture, Harbin, China *Jun 2020*
BA in Architecture, GPA: 88.97/100
Architecture Portfolio

TEACHING IN ENGINEERING

Department of Computer & Information Science, Penn Engineering , Philadelphia, PA *Present*
Teaching Assistant for CIS5050 Software Systems (2023 Spring)

- Holds office hours (1.5h/week) and special session tutorials to help 90 students with distributed system programming.
- Leads 7 groups(of 4 people) for their final projects on developing distributed solution for the backends servers of Key-value Pair (NoSQL) Database.

Department of City Planning, Stuart Weitzman School of Design, UPenn , Philadelphia, PA *Present*
Teaching Assistant for MUSA5090 Geospatial Cloud Computing & Visualization (2023 Spring)

- Holds office hours (3hr/week) to assist a 31-person class with Geospatial database and queries, building scripts with Python/ Javascript, and building automated and cloud-based data pipelines.
  (PostgreSQL, PostGIS, GIS Cloud Services, GCP Big Query, Python, Carto, Javascript)

Department of City Planning, Stuart Weitzman School of Design, UPenn , Philadelphia, PA *Sep 2022 - Dec 2022*
Teaching Assistant for MUSA611 Javascript Programming for Planners and Designers (2022 Fall)

- Held office hours to assist 30 students with developing applications to generate , display and analyze Geospatial data.
  (Javascript, HTML, Leaflet, Mapbox, Google Earth Engine, CSS, Turf,js, Node.js, Bootstrap)

PROFESSIONAL EXPERIENCE

Department of City Planning, Stuart Weitzman School of Design, UPenn , Philadelphia, PA *Present*
Machine Learning & NLP Research Assistant for Prof. Elizabeth Delmelle (Ongoing)

- Develops a typology for using machine learning and NLP approaches to map the longitudinal pathways of neighborhood changes.
  (Python, NLTK, Bert, Word Embeddings, Tensorflow, Deep Learning, Matplotlib)

Astoria AI Inc, New York, NY *Jun 2022 - Aug 2022*
Software Developer Engineer & Data Analysis Intern (Remote)

- Developed a prototype for customer service chatbot for online recruiting platforms using Natural Language Processing.
  (Python, NLTK, Bag of Words, Tensorflow, Numpy)
- Developed scripts to automate the harvesting of public-sourced data (Generated 1000 rows of data per day).
  (Python, BeautifulSoup, Playwright)
- Deployed applications and collaborating on cloud platforms (Azure).

Center for Architectural Conservation, Philadelphia, PA *April 2022 - Jan 2023*
Digital Technology Intern for Pennsylvania Hospital CMP & Wupatki National Monument

- Conducted GIS & hydrology analysis and Geospatial data visualization for Wupatki National Monument.
- Created a website, with interactive maps and visualized 3D Geospatial data for Pennsylvania Hospital Conservation Management Plan Project (CMP).
  (Frontend Development, Javascript, Mapbox, Leaflet, HTML, CSS, ESRI ArcGIS Online Storymap, CesiumJS)
  Website of the Pennsylvania Hospital Conservation Management Plan

China Architecture Design and Research Group, Beijing, China *Nov 2019 - Mar 2020*
Intern Architect, Ju Atelier Department

- Completed conceptual design, 3D modeling and architectural drawings of a boutique hotel project.
- Conducted site research, analytical diagram drawings and construction drawings for an industrial park competition located in Henan, China. The proposal got nominated as one of the finalists for the competition.
  (AutoCAD, Sketchup, Revit, Adobe Creative Suite, Rhino, Visualization of Architectural Concept and Design)

ACADEMIC PROJECTS

Projects in Web Development (Frontend & Full-stack) & Geospatial Data Visualization

- ***Full-stack Web App: Crowd-sourcing Geospatial Data for Community Centered Preservation of 7th Ward in Philadelphia:***
  (Javascript, RESTful API, Node.js, Express, HTML, CSS, JQuery, MongoDB, Geospatial Cloud Database, DOM, Bootstrap)
  MUSA611 Javascript Programming for Planners and Designers, 2022 Spring
  Github Page of the Web App
  - Full-stack web programming and API development, and work with cloud databases.
  - Use NodeJS to write server-side JavaScript, use NPM to install package and deploy applications on the cloud.

- ***Front-end Web App: Filtering Preservation Geo-database of Philadelphia***
  (Javascript, Leaflet, HTML, CSS)
  MUSA611 Javascript Programming for Planners and Designers, 2022 Spring
  Girhub Page of the Web App
  - Built for historic preservation researchers to efficiently locate a historic assets in its Geospatial context
  - Load, process and visualize GeoJSON data from public data sources

Projects in Distributed Systems Programming & Geospatial Database

- **Data-centric Full-stack App for Geospatial Databasing and Cloud Computing (Ongoing)**
  (PostgreSQL, PostGIS, Data Warehouse, Geospatial Database and Management, Data Pipelining, GCP Big Query, Python, Javascript)
  MUSA5090 Geospatial Cloud Computing & Visualization, Present
  - Build a data pipeline and a dashboard for large Geospatial dataset(e.g. 500K pwd parcel data) processing on the cloud.

- **Penn Cloud - A Cloud Platform Supporting Webmail and Storage Server Based on Distributed Key-value Store**:
  (C/C++, Distributed/Software Systems, gRPC, Cloud-native Application Development, High Availability and Low Latency Server Design, Distributed Data Management, NoSQL Database, VMware)
  CIS5050 Software Systems, 2022 Fall (Contact me for a private share of the code)
  - Program distributed servers key-value pair database (3 groups of servers, 3-node replication per group, scalable to more).
  - Implement load balancing, data partition, replication, fault tolerance, scalability, consistency and leader election among nodes.

- **SMTP and POP3 Email Servers Implementation for a Real Email Client (Supporting Local and Non-local users/Mail Relay)**:
  (C/C++, Linux/Unix, TCP/Stream Socket Programming, Server Design, Implementation of RFC-style Protocol Specifications, Multi-node Distributed System, Multithread Server Architecture, Low-latency, High Availability)
  CIS5050 Software Systems, 2022 Fall (Contact me for a private share of the code)
  - Build two multithreaded servers: SMTP & POP3 for sending and receiving emails.

- **Distributed Multicasting Chat Servers**
  (C/C++, Linux/Unix, UDP/Datagram Socket Programming, Support for Unordered, FIFO and Total Ordering Multicast with More Than 15 Servers/Nodes and 300 Clients)
  CIS5050 Software Systems, 2022 Fall (Contact for a private share of the code)
  - Implement a replicated chat server that uses multicast to distribute chat messages to the different replicas.

- **Penn-shell: Implementation of an Interactive Shell**
  (C, Linux/Unix, Docker-based Development , OS Implementation & Design)
  CIS5480 Operating Systems Implementation and Design, 2023 Spring (Contact for a private share of the code)
  - Implement foreground & background processes, terminal control & job control, standard in/output redirections and pipelines

- **PennOS: Implementation of a User-level Unix-like Operating System (Ongoing)**
  CIS5480 Operating Systems Implementation and Design, 2023 Spring

Projects in Geographic Information System (GIS) & Geospatial Analytics

- ***Mapping Flood Susceptibility for Historic Properties and Districts in Philadelphia:***
  (ArcGIS Pro, Model Builder, Raster Calculation, Public-sourced Data, Hydrology Analysis)
  ENVS681 Modeling Geographic Space, 2022 Spring
  Report on Mapping Flood Susceptibility

- ***Mapping Pre/Post-war Larissa, Greece - Geo-referencing and Digitization using ArcGIS:***
  Digitize Ancient City

- ***Grading System of Locating a Community Garden in Rio de Janeiro, Brazil:***
  (ArcGIS Pro, Raster Data Classification and Calculation)
  Grading System of a Community Garden
  - Normalize and classify raster data to understand urban topics: population, water, transportation, topography and land use.

Projects in Computer Vision & Computer Graphics

- **Mini Minecraft Game**
  (C++, OpenGL, GLSL, Qt Creator, Shaders, 3D Data Generation and Rendering, Concurrency Programming)
  CIS560 Interactive Computer Graphics, 2022 Spring (Contact me for a private share of the code)
  Mini-minecraft
  - Implement procedural terrain, efficient terrain rendering and chunking. game engine tick function and player physics
  - Implement multithreaded terrain generation, texturing, texture animation, NPCs & AI and third-person mode

- **Mini Maya (CIS560)**
  (C++, OpenGL, Qt Creator, 3D Modeling Software Development, Half-edge Mesh, Catmull-Clark Subdivision, Skeleton & Skinning, Object-oriented Programming)
  Mini-maya
  - Implement half-edge data structure and visualize the mesh using OpenGL vertex buffers
  - Implement Catmull-Clark subdivision algorithm, bind a half-edge mesh to a skeleton (json file) and deform the mesh on the skeleton.

- **OpenGL Shader Fun (CIS560)**
  (OpenGL, Qt Creator, Shader, GLSL)
  Shader Fun
  - Program portions of OpenGL's graphics pipeline by writing different vertex and fragment shaders to apply different coloration effects to the surface of 3D models.

- **3D Reconstruction from 2D Images (SFM) and from Two-view Stereo & Plane-sweep (multi-view) Stereo**:
  (Python, OpenCV, SFM, COLMAP, Two-view Stereo, Plane-sweep (multi-view) Stereo, Photogrammetry Pipeline)
  CIS5800 Machine Perception, 2022 Fall (Contact me for a private share of the code and the results)
  - Implemented Structure-from-motion Algorithms to reconstruct 3D object from 2D images.
  - Implemented two-view and plane-sweep stereos to generate a sparse and a dense point cloud from 2D images.

- **Augmented Reality with AprilsTag (CIS5800)**:
  (Python, OpenCV, PnP, P3P, Procrustes Problem)
  Augmented Reality GIF

- **Call of Duty - Java Console Game:**
  (Java, Objected-oriented Programming)
  Game in Java: Call of Duty

Projects in Historic Preservation & Interdisciplinary Study

- ***Master Thesis: The Study on the Differences between NeRF and Photogrammetry in Terms of the Advantages and Limitations and on the Possibility of using NeRF as an Alternative to Photogrammetry in the 3D reconstruction of Heritage Sites.***
  HSPV7000 & HSPV7010 Thesis I & II
  - Optimize the 3D reconstruction workflow for heritage sites and explore interdisciplinary studies between computational technology, AI and historic preservation.

SOFTWARE PROFICIENCY

Programming Languages and Database: C/C++, Python, Java, Javascript, PostgreSQL , SQL, MongoDB, MySQL
Geographic Information System: ESRI ArcGIS Pro/Online, ArcGIS Storymap, HEC-RAS, HEC-HMS, Carto, GCP Big Query, PgAdmin4
Cloud Platforms: Google Cloud Platform, Azure
Computer Aided Design: Sketchup, AutoCAD, Rhino, Grasshopper, Vray, Lumion
Miscellaneous: Qt Creator, Docker, VMware, Git & Github, Microsoft Office Suite, Adobe Creative Suite,

COURSES IN ENGINEERING

University of Pennsylvania:

CIS5050 Software Systems (2022 Fall) | ***CIS5480*** Operating Systems Design and Implementation (2023 Spring - Ongoing)
CIS5530 Networks Systems (2023 Spring - Auditing/Ongoing) | **CIS5800** Machine Perception (2022 Fall)
CIS560 Interactive Computer Graphics (2022 Spring) | ***CIT590*** Program Languages and Techniques (2021 Fall)
MUSA611 Javascript Programming for Planners and Designers (2022 Spring)
ENVS570 Modeling Geographic Space (2022 Spring)

Other Courses (Online & Undergraduate):

Algorithms, Part I and II (Coursera, Princeton University) | The ***Web Development*** Bootcamp (Udemy)
Advanced ***Algebra*** I and II | ***Mathematical Analysis*** I and II | Analytical ***Geometry*** | Elementary Number Theory
Single Variable Analysis | ***Probability*** Theory and Mathematical ***Statistics***