FANG SUN

CONTACT

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portfolio.fangfranksun.com/portfolio.pdf

EDUCATION

Bachelor of Science in Architecture
University of Virginia
Aug 2019 - May 2023

Master of Architecture
University of Pennsylvania
Aug 2024 - May 2027 (expected)

Master of Science in Design
Robotics and Autonomous Systems
University of Pennsylvania
Jan 2025 - May 2026 (expected)

DESIGN SKILLS

4+ Years of Experience

Rhinoceros
Grassshopper
Revit
AutoCAD
Adobe Photoshop
Adobe Illustrator
Adobe InDesign
Enscape

2+ Years of Experience

Sketchup
Lumion
Vray
ArcGIS

1+ Years of Experience

Keyshot
ArchiCAD
Dynamo
Maya

PROFILE

- Fang (Frank) Sun graduated with a Bachelor of Science in Architecture degree from the University of Virginia, distinguished by an insatiable enthusiasm for the intersection of **architecture**, **artificial intelligence**, and **digital fabrication**.

- After completing a four-year program and a year of practical experience, he has immersed himself in developing **sustainable and resilient design solutions** through robotics and digital fabrication. With a minor in computer science, he explores AI, computational methodologies, and adaptive modeling.

- His current work focuses on **rapid housing reconstruction** for natural disasters, utilizing 3D printing, robotics, and automation to enhance efficiency, optimize material usage, and improve structural resilience.

- Now pursuing **dual master's** degrees in Architecture and Science in Design: **Robotics and Autonomous Systems** at the University of Pennsylvania, he continues to blend technical expertise, creative vision, and innovation to advance digital fabrication and resilient design.

EXPERIENCE in *ARCHITECTURE*

Project Assistant | Roboticplus.AI (Shanghai) Co., Ltd
May 2024 - Aug 2024 — *Shanghai, China*

- Programmed robotic arm movements for intelligent construction and assisted in developing CNC routers with C++ and Java

- Designed two outdoor installations for the Jindi Office Building project and formulated models for robotic arm 3D printing with Rhinoceros and C++

- Helped Assemble 185 components printed by the robotic arm on site, created progress diagrams, charts and videos for the presentation to clients

Full-time Designer | STUDIOS Architecture
Jul 2023 - Feb 2024 — *Washington, D.C.*

- Modeled the existing 3-story parking garage in D.C. with Revit and designed 6 parametric ceiling and facade options with Dynamo

- Assisted with interior design and rendering for *Institute of International Finance (IIF)* with Enscape; created various furniture layouts and material choices in Revit for 50% Design Development (DD) presentation

- Working on model fixation for *Bond Bread Redevelopment at Howard University* under Design Development (DD) phase, concentrated on remodeling all staircases and podiums, redesigning entries, conducting canopy and roof drain studies

Design Intern | STUDIOS Architecture
Dec 2022 - Jan 2023 — *Washington, D.C.*

- Modeled physical building and site models for 2 ongoing health institution projects with 3D printing and lasering cutting machines

- Created 6 Grasshopper script tests to present the proof of concept of automatic plan generator and parking space formation

Teaching Assistant | UVA (School of Architecture)
Sept 2022 - Dec 2022 — *Charlottesville, VA*

- Worked as TA in ARCH 1010 course, *Lessons of the Lawn*, for 20 undergraduate-level students; provided lectures about Chinese religion and architecture history

- Led discussion sessions; provided feedback and grading on weekly assignments about architectural history and theory

LANGUAGES

English | Native
Chinese | Native
Spanish | Intermidiate

CERTIFICATE

- National Council of Architectural Registration Boards (NCARB)

- LEED AP Building Design + Construction (LEED AP BD+C)

HOBBIES

Chess | US National Master
Tennis | Chinese L2 Athlete
Biking
Cooking
Photography

Design Intern | Perkins&Will

May 2022 - Aug 2022   *Washington, D.C.*

- Benchmarked *UVA Gilmer Hall and Chemistry Building Renovation* projects; purged central and site BIM models and created new Revit templates

- Designed the loading dock and back entrance for *Omega Building & Key West Building in Rockville* and produced rendering images with Photoshop and Enscape

- Proposed 8 logo-inspired iterations of parametric shelf for *Perkins&Will DC office* with Rhino, Grasshopper and Dynamo

Design Intern | HDR Inc.

Dec 2021 - Jan 2022   *Arlington, VA*

- Drew analysis diagrams and recreated unit models for a children's hospital with AutoCAD, Rhino, Revit and Photoshop

- Designed 10 parametric façade iterations for a project under Schematic Design (SD) with Rhino, Grasshopper, Revit and Dynamo; conducted solar and radiation analysis

- Created 2 Grasshopper plugins (via Python) for HDR employees to conveniently generate solids only using curves in Rhino

Teaching Assistant | UVA (School of Architecture)

Sept 2021 - May 2022   *Charlottesville, VA*

- Worked as TA in PLAC 4010 and 6010 courses, *Neighborhood Planning Studios*, for 16 graduate-level students; provided feedback and grading for modeling coursework

- Conducted weekly workshops on ArcGIS, Rhino and Illustrator skill development; organized meetings with local architecture firms

- Provided 2 lectures about Chinese Gardens design in related to modern urban studies; assigned written assignments; led discussions and provided feedback

Research Assistant | AZL Architects

Jan 2021 - Mar 2021   *Nanjing, China*

- Created 7 iterations of entrance design for *Lei House* (a traditional Chinese townhouse) renovation project with Rhino and AutoCAD

- Refined rendered plans and sections for *Ruralation Museum Hotel* (a hot spring resort hotel) for media publication with AutoCAD, Photoshop, and Lumion

- Digitalized and documented the hand drawings of sections and plans for *China International Practical Exhibition of Architecture No.4 House* with AutoCAD and linked with Revit model for detailed model fixation

Design Intern | MAD Architects

Jul 2020 - Dec 2020   *Beijing, China*

- Helped draw the circulation plan and sections; produced rendering images for level 2 exterior space of Jiaxing Civic Center

- Produced rendered drawings for the public courtyard and urban context and proposed 3 gallery iterations for Pingtan Art Museum

- Improved the UI design of firm's website (http://www.i-mad.com); utilized the rendering image as the project background and created a sidebar for project listing

Design Intern | Tongji Architectural Design Group

Feb 2020 - May 2020   *Shanghai, China*

- Helped develop the level 1 gallery space of *Pinghe Secondary School in Suzhou* and drew the plans and perspective sections of the building to present to the clients

- Drew processing diagrams for *Tongji University Creative Research Institute* with AutoCAD and created 3 iterations for its north façade with SketchUp and Illustrator

- Executed aerial documentation through drone photography for the concept design project; acquired up-to-date data for the mapping process; helped concept rendering using Lumion, Enscape and Photoshop

EXPERIENCE in *COMPUTER SCIENCE*

Java Developer Intern | Alibaba Group Holding Limited
Jun 2021 - Sept 2021   *Hangzhou, China*

- Co-established the online Internet of Things (IoT) system for Xi'niu's On-demand Production Factory, enhanced efficiency by 21% for the embroidery production line
- Co-developed an automated customer management system for Xi'niu Factory to improve managing efficiency, allowing workers to remotely create printing samples and ship to the factory using Alibaba cloud services
- Reprogrammed label printers and embroidery machines with Java and ZPL to allow remote operations and launched it with new WebUI

Lark Frontend Technical Intern | ByteDance Ltd.
Mar 2021 - Jun 2021   *Shanghai, China*

- Provided debug and customization services for users of Lark Open Platform (workplace apps developer), led internal monthly SaaS meetings among customers and developers
- Fixed Lark compatibility issues such as plugin conflicts and mobile responsiveness issues, and reviewed a part of Lark 4.0 updates before it was launched.
- Co-initiated Lark Knowledge Base and used Java & Python to encode and categorize previous solutions, provided references for new hired employees

System Test Design Assistant | Apple Inc.
Apr 2017 - Oct 2018   *Shanghai, China*

- Solved 10 issues in macOS 10.14, including 3 severe security alerts with privacy and message missing; conducted issue reports
- Helped design test cases covering functional and non-functional aspects, including localization and Internationalization, integration and regression (MacOS 10.13.8)
- Collected and provided feedback on the user experience of the iOS 11 Application Program Interface, created comprehensive documentation for internal team reviews

EXPERIENCE in *LEADERSHIP*

CEO & Founder | Hummer Education
Apr 2019 - Now   *Shanghai, China (Hybrid)*

- Established a 2-person studio and personally instructed high-school students for chess playing every weekend and held regular chess tournaments
- Independently created and published over 400 chess training videos on various media platforms, including Bilibili, TikTok, and YouTube. Spearheaded the online promotion of chess education, garnering a following of over 150,000 enthusiasts
- Established a 12-member company, primarily overseeing various online platforms, including video editing, market operations, and educational services
- Devised chess-playing website and WeChat mini-program with Node.js and React, widely used for online tournaments and training in China since late 2022

Initiator & Leader | Aparkers (Smart Parking Development)
Oct 2016 - Mar 2018   *Beijing, China (Hybrid)*

- Led a project team of 8 to identify the causes of parking problems in Shanghai
- Designed a parking garage demo to model and devise more efficient parking layouts using Rhinoceros and AutoCAD, employed algorithms using Java and agent-based models to visualize optimized parking routes
- Developed and installed signal detection devices in existing parking lots to assess real-time location for vehicles, aiming to achieve indoor guidance without GPS
- Created a mobile application providing both outdoor and indoor parking guidance and launched it in AppStore and Google Play
- Received the patent (201721325329.0); the project was later acquired by ETCP, a leading company in intelligent parking in China

PROGRAM SKILLS

Program Languages
Java
Python (Django)
C++
JavaScript
HTML/CSS
PHP
Node.js
React
Golang
Ruby

Cloud-Based Technology
Docker
AWS
Apache Spark

RELEVANT COURSES (ARCHITECTURE)

- Architecture History (I & II)
- Foundation Studios (I - VII)
- Modeling Visualization
- Architecture Theory / Tectonics
- Structural Design
- Historical Preservation

RELEVANT COURSES (COMPUTER SCIENCE)

- Software Development Methods
- Discrete Mathematics
- Program and Data Representation
- Cybersecurity
- Machine Learning

RESEARCH EXPERIENCE

Independent Researcher | UVA (School of Architecture)

Jan 2023 - June 2023   *Charlottesville, VA*

- Supervised by Dr. Ehsan Baharlou, developed *Drive Easy*, an innovative solution designed to improve drivers' parking experience
- Identified potential parking constraints and used agent-based modeling to simulate viable parking solutions
- Applied graph theory and generative sorting algorithms to assign the optimal spot for vehicles to reduce time spending
- Integrated AR assistance in a test vehicle and successfully simulated network-independent navigation controlled by IoT devices only in the garage

Research Intern | College of William and Mary (Lens Lab)

Nov 2021 - Jun 2022   *Williamsburg, VA (Hybrid)*

- Supervised by Dr. Gang Zhou, helped develop a covert channel attack which leaks user data by encoding and transmitting them through smart bulb's infrared emission
- Analyzed power usage pattern of the bulb instead of monitoring the infrared emission
- Helped design a power-auditing system and a CNN model which identifies the smart bulb's leakage of private data

PROJECTS in *ARCHITECTURE* (SELECTED)

Howard University - Bond Bread Redevelopment   Jan 2024 - Apr 2024

- Building design, master planning, interior design, working drawing production, physical model production (STUDIOS Arcitecture)

Institute of International Finance (IIF)   Sept 2023 - Dec 2023

- Rhino and Revit file remodel, Interior design, interior rendering, program analysis, material selection (STUDIOS Architecture)

899 North Capitol Street   Jul 2023 - Sept 2023

- Interior design, ceiling and facade redesign, construction drawing production, physical drawing production (STUDIOS Architecture)

Pingtan Art Museum   Jul 2020 - Sept 2020

- Concept design, program analysis, working drawing production (MAD Architects)

Jindi Office Building Installations   June 2020 - Aug 2020

- Concept design and model, working drawing production, exterior rendering, robotic arm programming (Roboticplus.AI)

PROJECTS in *COMPUTER SCIENCE* (SELECTED)

Chess Alpha Pro   Apr 2022 - Sept 2022

- A chess reinforcement learning by AlphaGo Zero methods. *[Python, Keras, Machine Learning]* (Collaboration)

Chess Lc0 Engine (Leela Chess Zero)   Oct 2019 - Feb 2020

- A chess AI following the same type of techniques as AlphaZero using Stockfish's position representation and move generation. *[Python, C++]* (Collaboration)

FELLOWSHIP & AWARDS

2022 Perkins&Will Summer Internship Design Competition

- Designed an ergonomic chair, finished modeling, drawing, and rendering within a day
- Won the second prize among all participating interns and delivered a presentation

2022 Yongxin Gucheng Bridge Design Competition

- Designed a bridge for both vehicles and pedestrians to ease local traffic pressure, incorporating local climatic and cultural elements
- Received honorable mention from the competition committee

- Human-Centered Architecture Design
- Resilient and Adaptive Architecture
- Generative Space Design with AI
- Advanced Digital Fabrication and Parametric Design
- Smart Cities and IoT in Urban Design and Development
- AI-Driven Tools Development

ONGOING RESEARCH

- **Generative Design for Architectural Space Planning**

  The project aims to generate various plan layouts automatically by outlining a specific area with different functions in the sketching software, allowing designers to explore more possibilities for concepts in early stages.

- **Advanced 3D Printing for Rapid Housing Reconstruction**

  This research explores new technologies and printing methods to accelerate post-disaster housing reconstruction. By integrating robotics, automation, and computational analysis, it aims to enhance construction speed, material efficiency, and structural resilience, enabling scalable and adaptive rebuilding solutions.

2020 Roboticplus Meng-Xi Innovative Design Fellowship

- Used research funds to design and improve a new 3D printer which is able to print high-strength TPU and nylon, and produced a machine prototype within four weeks
- Integrated the machine into cloud service to address the conflict of control by multiple devices simultaneously; enhanced the printer's capability to print objects with higher slope values by about 18% without support

PUBLICATIONS

- Sun, F. (2023). Zhouzhuang, Suzhou: The Change of Residential Space in Jiangnan Water Ancient Towns due to the Continuously Rising Commercialization. Journal of Planning Education and Research (in press)
- Sun, F. (2023). "Metabolism Tragedy" – The Deconstruction of Nakagin Tower. Journal of Architectural Education (under peer review)
- Sun, F. (2023). How to Modify the Time of Yellow Traffic Lights in order to Improve Traffic Efficiency? International Journal of Mathematics (under peer review)

SERVICES

Thesis Mentor | Howard University Department of Architecture
Oct 2023 - Apr 2024   *Washington D.C.*

- Serve as a dedicated professional mentor for a thesis student throughout both Fall and Spring semesters, providing feedback and actively communicate with the student
- Meet with the assigned student twice a week and check the work progress put on Miro; discuss and annotate iterations for further research
- Participate in each formal thesis review, providing insights during each session for all thesis students; collect notes from all reviewers and share with student

Chess Arbiter Volunteer | The 4th Asian Para Games
Oct 2023 - Oct 2023   *Hangzhou, China (Hybrid)*

- Provided online technical support for game recording and online live broadcasting
- Worked as a B1 category arbiter for fully visually impaired participants, assisted players in moving pieces and ensured fairness and impartiality in each game
- Studied communication languages (Russian, Arabic, Korean, and Malay) from different countries, translated critical tournament information and announcements to facilitate effective communication between players and officials

Career Development Mentor | UVA (School of Architecture)
Jan 2023 - May 2023   *Charlottesville, VA*

- Offered specific career advice for 5 undergraduate students based on their interests
- Provided resources and guidance for finding job opportunities and helped them prepare for job (internship) interviews and review portfolios individually
- Helped organize career fairs and workshops to foster relationships between students and architecture industry professionals

School Tour Volunteer | UVA (School of Architecture)
Aug 2022 - Sept 2022   *Charlottesville, VA*

- Conducted regular tours for external visitors showcasing our school building; provided chances to observe ongoing classes and enjoy students' model works in the FabLab
- Introduced the school's history and culture and addressed any questions from visitors

Exhibition Volunteer | Living Garden: The House of the Future
Sept 2018 - Oct 2018   *Beijing, China*

- Assisted in the coordination of the exhibition by Yansong Ma and MAD Architects
- Collaborated with the event team to design the exhibition layout for four sections, played a key role in the setup to guarantee an engaging experience for attendees
- Led guided tours, offering insights into the design concepts presented by Yansong Ma, enhancing visitors' understanding of the exhibition, and answering inquiries