

Chenxi Lei

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EDUCATION

School of Architecture, Tianjin University, China

Sep. 2021 - Jan. 2024

- Master of Architecture, Major in **Architectural Technology and Science**.
- GPA: 3.80/4.0

School of Civil Engineering and Architecture, Wuhan University of technology, China

Sep. 2016 - June 2021

- Bachelor of Architecture, Major in **Architecture**.
- GPA: 3.75/4.0 for core courses

PUBLICATION

Conference Paper (Oral Presentation)

Sep. 2023

- **Chenxi Lei** , Yuzhuo Kang , Zhen Han, Xiaoqian Li , Chiming Liu, Xianwei Liu , Gang Liu. A User-centered Interactive Optimization Approach based on Immersive Virtual Reality. *The 18th International IBPSA Conference and Exhibition, Building Simulation, Shanghai, China, 2023*.

Research Article (JCR Q1, Under review)

May. 2023

- **Chenxi Lei** , Yue Liu , Zhen Han, Xiaoqian Li , Gang Liu. Research on the Difference of Brightness Perception Between Virtual Reality Environment and Real Environment. *Building and Environment*.

Patent (202310976082.2)

Aug. 2023

- Gang Liu, **Chenxi Lei** , Yuzhuo Kang, Zhen Han, Xiaoqian Li , Yue Liu. A lighting assistant design system based on virtual reality. 2023.

RESEARCH EXPERIENCES

Low-carbon and sustainable design strategy for large sized railway stations

Sept. 2021 - Nov. 2022

- Employed Grasshopper and Ladybug tools for building energy modeling and simulation to assess energy consumption within typical railway stations.
- Conducted sensitivity analyses on key design parameters for thermal zones across China.
- Presented passive design strategies aimed at enhancing performance and improving energy efficiency.

Interactive lighting design assistant system based on virtual reality

Oct. 2021 - Aug. 2022

- Developed a virtual reality-based architectural lighting design system encompassing modeling, simulation, data transfer, and interactive modules, enabling real-time data exchange across different platforms.
- Integrated architectural performance simulation values and lighting rendering scenes into a virtual environment, allowing users to combine subjective environmental perception with objective performance metrics in an immersive virtual setting to aid in lighting design.
- Embedded the lighting design expert system into the design assistance system, and proposes a dimension-adaptive particle swarm algorithm, which is applied to different lighting design decision-making processes, and adds the intelligent recommendation function of the scheme to the system.

A user-centered interactive optimization approach based on immersive virtual reality

Nov. 2022 - May. 2023

- Established an immersive indoor daylight evaluation process using Rhino, Grasshopper, and D5 Render.
- Developed a multi-objective optimization framework that combines user-subjective evaluations with building objective performance.
- Validated the methodology through a case study based on a small office , comparing it to traditional objective-focused optimization methods.

The difference of brightness perception between virtual reality and real environment *May. 2022 - Apr. 2023*

- Established test environments to assess lighting consistency between virtual reality and reality in the Artificial Climate Laboratory and Unreal Engine. Conducted brightness threshold tests and subjective evaluations using psychophysical methods.
- Analyzed brightness perception threshold experiment data, revealing the impact of light temperature and intensity on virtual reality brightness perception.
- Developed and validated predictive models for brightness and luminance thresholds in virtual reality using artificial neural networks.
- Investigated disparities in brightness and luminance thresholds, along with subjective brightness perception ratings, between real and virtual environments through statistical analysis, shedding light on differences in brightness perception.

Energy-efficiency intelligent control platform *July. 2022 - July. 2023*

- Established a real-time detection system to promptly identify internal and external disturbances within buildings.
- Utilized historical temperature and building loads datasets to train a predictive model that enables accurate predictions of future building loads over a specified time period based on LSTM Network.
- Implemented the predictive results to dynamically control water supply temperature and pressure for ground source heat pumps.

Effects of spatial characteristics on detection thresholds of gains in redirected walking *Oct. 2022 - Nov. 2023*

- Identified prototypical spatial features in virtual reality settings, affecting spatial perception in both single and combined spaces.
- Used psychophysical experiments to measure translational, rotational, and curvature gains in single spaces under various spatial conditions.
- Conducted psychophysical experiments to assess gains in translational, rotational, and curvature movements in different spatial combinations.
- Analyzed data with psychometric functions and neural networks to uncover patterns in how specific spatial characteristics influence redirected walking thresholds.

WORKING EXPERIENCES

Teaching assistant of the course *Parametric Modeling in Design* *Sept. 2022 - July. 2023*

Research assistant in Center for Low carbon Architecture in *Tianjin University* *Sept. 2021 - Dec. 2023*

HONORS & AWARDS

Outstanding Graduate, Tianjin University *Jan. 2024*

Outstanding Student Leader at School Level, Tianjin University *Sept. 2023*

Postgraduate Scholarship (First class), Tianjin University *Sept. 2023 & Sept. 2022 & Sept. 2021*

Outstanding Graduate, Wuhan University of technology *June. 2021*

May Fourth Youth Medal, Wuhan University of technology *May. 2021*

SKILLS

Language: Mandarin & English

Software & Tool : Modeling & Building Performance Simulation & Game Engines & Graphics

- Modeling: Rhino, SketchUp, 3ds Max
- Building Performance Simulation; Ladybug Tools (Ladybug, Honeybee, Butterfly) , Fluent, EnergyPlus
- Game Engines: Unity, Unreal Engine
- Graphics: Photoshop, Adobe Illustrator, InDesign

Programming Languages: Python, Matlab, C#