

## Hello

### I'm Boyuan 'Marx' Wang

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## Research Interests

Human-Computer Interaction, Human-AI Collaboration, Well-Being, Social Computing, Ubiquitous Computing, Personal Informatics

## Education

August 2021 - Present

**Virginia Tech**, Blacksburg, VA

Master of Science (MS), Computer Science and Application, GPA 4/4

Expected Graduation Date: Fall 2023

Thesis: Understanding How Users Express Their Social Identities through Animated Gif for Public Discourse

Advisors: Dr. Sang Won Lee (Chair), Dr. Kurt Luther, Dr. Eugenia Rho

August 2018 - May 2021

**Virginia Tech**, Blacksburg, VA

B.S. in Computer Science, Data Centric Computing, GPA 3.98/4

Graduated Summa Cum Laude in three years with Dean's list 6/6 semester and Honor College

## Publications

### Conference Papers and Journals

[C.1] Civil War Twin: Exploring Ethical Challenges in Designing an Educational Face Recognition Application.

Manisha Kusuma, Vikram Mohanty, **Marx Wang**, Kurt Luther

The 5th AAAI/ACM Conference on AI, Ethics, and Society, 2022

DOI: <https://doi.org/10.1145/3514094.3534141>

[J.1] The Effects of Incorrect Occlusion Cues on the Understanding of Bare-handed Referencing in Collaborative Augmented Reality.

Yuan Li, Donghan Hu, **Marx Wang**, Doug A Bowman, Sang Won Lee

Frontiers in Virtual Reality, 2021

DOI: <https://doi.org/10.3389/frvir.2021.681585>

### Currently In Review

[C.2] iThem: Programmable Connections Between IFTTT Services,

**Marx Wang\***, Daniel Manesh\*, Ruipu Hu, Sang Won Lee, 2022 (\* Equal contribution)

## Posters and Workshop Papers

[P.1] TaskScape: Fostering Holistic View on To-do List With Tracking Plan and Emotion.

**Marx Wang**, Sang Won Lee

The 35<sup>th</sup> ACM Symposium on User Interface Software and Technology (**UIST**), 2022

DOI: <https://doi.org/10.1145/3526114.3558720>

[P.2] Echofluid: An Interface for Remote Choreography Learning and Co-creation Using Machine Learning Techniques.

**Marx Wang**, Zachary Duer, Scotty Hardwig, Sam Lally, Alayna Ricard, Myoungsoon Jeon

The 35<sup>th</sup> ACM Symposium on User Interface Software and Technology (**UIST**), 2022

DOI: <https://doi.org/10.1145/3526114.3558708>

[P.3] iThem: Programming Internet of Things Beyond Trigger-Action Pattern.

**Marx Wang**, Daniel Manesh, Ruipu Liu, Sang Won Lee

The 35<sup>th</sup> ACM Symposium on User Interface Software and Technology (**UIST**), 2022

DOI: <https://doi.org/10.1145/3526114.3558776>

[P.4] Predicting Prosocial Behavior in Childhood and Early Adolescence by Integrating Parental Factors, Neighborhoods and The Brain.

**Marx Wang**, Ya-Yun Chen

Biennial Meeting of the Society for Research on Adolescence, 2022

[P.5] Predicting Aggressive Behavior in Childhood and Early Adolescence with the Socioecological Approach: From Neighborhoods, and The Brain.

Ya-Yun Chen, **Marx Wang**

The 14<sup>th</sup> Annual Meeting of the Social & Affective Neuroscience Society, 2022

[P.6] Understanding the Challenges of Online Group Chat for Productive Discourse at Scale,

Viral Pasad, **Marx Wang**, Sang Won Lee

Companion of the 2020 ACM Conference on Computer Supported Cooperative Work and Social Computing (**CSCW 2020**)

DOI: <https://doi.org/10.1145/3406865.3418335>

[P.7] Find Your Twin in History: Exploring Ethical Design Challenges in Facial Recognition

Vikram Mohanty, **Marx Wang**, David Thames, Manisha Kusuma, Kurt Luther

Companion of the 2020 ACM Conference on Computer Supported Cooperative Work and Social Computing (**CSCW 2020**)

Ethics in Design Workshop

## Currently Under Preparation

[C.3] Understanding How Users Express Their Social Identities through Animated Gif for Public Discourse

Marx Wang, Momen Bhuiyan, Eugenia Rho, Kurt Luther, Sang Won Lee 2022

[C.4] TaskScape: Applying Well-Being Oriented System Design in To-do List For Fostering Holistic Awareness

Marx Wang, Sang Won Lee, 2022

[C.5] Prosociality in Children and Adolescents: Accessing Effects of Neighborhoods, Family, Environment and Neurological Factors With Machine Learning Techniques

Marx Wang, Ya-Yun Chen, Tae Ho Lee, 2022

[C.6] Exploring the effect of Socioecological and Neural Approach in Predicting Child Aggression

Ya-Yun Chen, Marx Wang, Tae Ho Lee, 2022

## Research Experience

Fall 2019 - PRESENT

### Research Assistant, EchoLab, *Virginia Tech*

- Led a team of 3, designed and implemented a machine learning pipeline that visualizes user emotions through auto-suggesting gifs in real time based on messages in ongoing conversation with NLP and CNN. Achieved 95.6% accuracy rate in composite models of multiple high-level linguistic features such as empathy, sarcasm [C.3].
- Organized user studies and implemented high fidelity twitter like study programs for ecological validity. Applied sociolinguistic techniques such as matched disguised tests. Built web scraping scripts and collected a dataset with approximately 1000000 gifs. Extended studies to multiple computational sociolinguistic studies in multimodal natural language processing and search engine bias [C.3].
- Designed user studies with real time collaborative tasks to analyze users' behavior patterns and coping strategy in disorganized group chat. Conducted thematic analysis, moderated user studies, analyzed large scale data. Engineered 6 novel chat systems in MeteorJS with psychology-backed features such as live keystrokes to realize co-temporality [P.6].
- Heuristically evaluated the UX of Microsoft HoloLens. Developed synchronous web applications for VR studies without any framework (with JavaScript, PHP, MySQL, Apache) Thematically analyzed users' compensatory spatial referencing strategies in AR conditions [J.1].

Jan 2020 - Present

### Research Assistant/UX Designer, Music Mind Machine Lab, *Virginia Tech*

- Designed mapping systems to computationally capture emotional experiences and cognitive messages of art and translating visual features (e.g. painting structure ) to auditory parameters (e.g. tempo).
- Designed and implemented EchoFluid, an AI-powered choreography tool that allows dance learners to easily build their AI models for practices and co-creation. Implemented the algorithm with reinforcement learning for real time dance movement analysis and developed the interface with Unity. Presented the work at UIST2022 [P.2].

June 2021 - Present

### **Research Assistant, Affective Neurodynamics and Development Lab, *Virginia Tech***

- Used machine learning techniques to forecast children's prosocial behaviors, improved model accuracy from 55% to 85%, created data visualization to effectively communicate findings to various stakeholders. Presented work at SANS 2021 [P.4, P.5].
- Conducted comprehensive data analyses and regression analyses, applied advanced statistics, and modeled the complex relationship between family, neighbors, and environmental factors and children's prosocial and aggressive behaviors. Conducted fMRI Scan and analyzed neurobiological data [C.5, C.6].

June 2021 - Present

### **Research Assistant, Crowd Intelligence Lab, *Virginia Tech***

- Conducted user research to understand elderly users' privacy concerns, designed effective visualizations and detailed gradual steps to clearly communicate underlying ethical challenges in data privacy, transparency, security, gender and racial bias, while effectively educating AI concepts to an older audience, designed selected to CSCW 2021 workshop and published in AIES 2022 Conference [C.1].
- Designed UI/UX of civil war twin website, a historical educational website that allows people to use AI to find their look-alike in the Civil War era. Implemented high fidelity frontend with animation in JavaScript to fulfill long and innovative implementation requirements, coordinated with the lead developer and integrated the frontend with Django based backend [P.7].

## **Teaching**

Fall 2021

### **Graduate Teaching Assistant**

**User Interface Software**, with Dr. Kurt Luther, 78 students

Spring 2022

### **Graduate Teaching Assistant**

**Professionalism in Computing**, with Dr. Daniel Dunlap, 200 students

## **Technical Skills**

## Machine Learning & Data Analytics

Data Analytics, Regression Analysis with R, Python;  
 Relational Database Management Systems: SQL, MySQL, PostgreSQL, MongoDB;  
 Natural Language Processing, Computer Vision, Applications of Machine Learning with TensorFlow;

## UI/UX Design Research & Usability Engineering & Graphic Design

Interface Design, User Study, Interview, and Evaluation;  
 Interaction Design, Wireframe & Prototype Design, Conceptual Model Design, Contextual Analysis, Storyboarding, Heuristic Evaluation;  
 Figma, Sketch, Framer X, Cinema 4D, Photoshop, InDesign, Premiere Pro, After Effect, Illustrator;

## Software Development

*Proficient in rapidly developing and deploying full stack web apps, blockchain apps, and other popular software languages:*

JavaScript with NodeJs, NextJs, React, Redux;  
 Django, Java, PHP; Unity, HTML5, CSS, Bootstrap;  
 Blockchain Dapps with Solidity, Smart Contracts;  
 Worked with Cloud Providers (AWS, Heroku, Azure) and Third-Party APIs (Twitter APIs, Auth0 APIs, Google APIs, Giphy APIs)

## Extracurricular Activities

Jan 2021 - July 2021

### Founder & CEO, [PikaCourse.Com](https://pikacourse.com)

- Founded PikaCourse.com, a social networking course scheduler designed for students to easily meet people, passively make friends, and effectively preserve peer connections
- Managed a team of 6 members remotely across 4 different colleges, recruited 97 beta users, received Apex Center KickStart Award
- Led business strategy and product design, conducted need analysis of student's social needs during lockdown
- Formulated business problems, surveyed customer need and market, navigated rapid decision making through competing priorities and risks, defined detailed product requirements, produced high fidelity product design with 93.2% users' approval in two weeks
- Led cross-functional team, proactively identified risks, communicated technical needs precisely, resolved conflicts effectively, built a positive, supportive, and vibrant work environment with 100% of the members return
- Branded, designed, and developed the frontend and backend of the web applications with React, Ant Design and Django, produced a fully functional product from scratch in less than three weeks

Jan 2015 - Present

### **Graphic Designer, Freelance**

- Led and managed a cross-functional team of 32, worked through ambiguous, open-ended business requirements, communicated with multiple stakeholders to understand needs and goals, crafted visual system, drafted design guidelines, and produced a 496-pages printed book in 15 days
- Engaged and helped clients to discover and define their needs with effective communication and storytelling, utilized customer-centric mentality to listen to clients' feedback and revise designs.
- Formulated ideas based on client's need, illustrated abstract aesthetic concepts, designed various posters, flyers, logos, videos, and visual identities, rapidly created and iterated on designs within 6h

**Raft Crisis Hotline**, Jan 2022 - Present

**Mock Trial, Regional Best Attorney**, Sept 2021 - Present

**Phi Alpha Delta, International Pre-law Fraternity**, Sept 2021 - Present

**Phi Beta Kappa**, May 2021

**Lambda Iota Mu, Natural Resources and Conservation Service Fraternity**, Jan 2020 - Present

**United Feminist Movement**, Sept 2021 - Present

**Active Minds**, Sept 2020 - Present

### **Hobbies**

Mix Martial Arts (Boxing, Kickboxing, Jujitsu), WeightLifting, Running, Tennis

Reading, Writing, Painting, Hiking, Travel