

Hojung (Ashley) Kwon

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Brown University
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EDUCATION

- *PhD, Computer Science* Sept. 2022 - Present
Brown University, Providence, RI
- *Bachelor of Science, Computer Science* Dec. 2021
Graduation with High Distinction
Duke University, Durham, NC
- *Bachelor of Arts, Art History* Dec. 2021
Graduation with Distinction
Duke University, Durham, NC

RESEARCH INTERESTS

Human-computer interaction, Social computing, Image processing, Data visualization, 3D modeling, Game engines, Augmented reality (AR), Virtual reality (VR), Machine learning, Computer science education

AWARDS AND HONORS

- Visual and Media Studies Award Apr. 2022
Recognized as an outstanding undergraduate student who conducted original research in Visual and Media Studies at Duke University
- Duke Technology Scholar Aug. 2020
Selected among 400+ students to participate in a program that provides networking opportunities and summer housing for female students majoring in STEM subjects at Duke
- Dean's List with Distinction Dec. 2018
Ranked in the highest ten percent of Duke students in Trinity College of Arts and Sciences in terms of grade point average
- Dean's List Dec. 2017
Ranked in the highest third of Duke students in Trinity College of Arts and Sciences in terms of grade point average

PUBLICATIONS

- Y. Chen, H. Kwon, H. Inaltekin, M. Gorlatova, *VR Viewport Pose Model for Quantifying and Exploiting Frame Correlations*, in Proc. IEEE INFOCOM 2022.
- H. Kwon, B. Seaman, *Visualizing Data Structures in the Insight Engine: Information Processing Structure, Intelligence, Resilience*, in Theoretical and Foundational Problems in Information Studies, Sept. 2021 [[Paper pdf](#)]

PRESENTATIONS

- Mapping the Distribution of Pigments in Paintings Using Macro XRF Element Maps and Mathematical Optimization, International Conference on Computational Photography 2022, Aug. 2022. [[Video of the talk](#)]
- Mapping the Distribution of Pigments in Paintings Using the Least Squares Method, 7th Image Processing for Artificial Intelligence Meeting, Apr. 2022. [[Presentation](#)]

- Visualizing Data Structures in the Insight Engine: Information Processing Structure, Intelligence, Resilience, Theoretical and Foundational Problems in Information Studies, Sept. 2021 [[Video of the talk](#)]
- Image Processing Algorithms for Art Conservation, 2018 Duke Bass Connections Showcase, May 2018

RESEARCH AND WORK EXPERIENCE

Undergraduate Team Member Jan. 2021 - Dec. 2021
Insight Engine Team, Duke University

- Built a search engine with Unity, C#, and Python that visualizes author and publication information from more than 2 million articles published in the ACM journal as an interactive forest
- Presented the forest model, along with other academic information visualization models, at the Theoretical Foundational Problems in Information Studies conference in Sept. 2021
- Led a group of two Ph.D. students to add more interactive features to the forest model

Undergraduate Research Assistant May 2020- Dec. 2021
Intelligent Interactive Internet of Things Lab, Duke University

- Designed an AR application that uses fine-tuned deep neural networks in detecting and labeling 5 different species of lemurs to use in educating visitors to the Duke Lemur Center and to reduce the amount of time that researchers take to manually label images in training datasets for DNN models
- Wrote a C# program that records 15+ users' coordinates and viewport orientation data in desktop VR applications made with Unity and collected movement data from users
- Extracted movement characteristics such as trajectory lengths and viewing angle distributions from the collected data to reduce frame rates without damaging the quality of desktop VR

Team Member June 2019 – Present
Art through the ICT Lens Team, University College London, Duke University

- Developed a machine learning algorithm in Python that uses wavelet transform and the least squares method to classify areas where different pigments were used in oil paintings based on their RGB images and x-ray elemental maps
- Discovered with the algorithm precise areas of overpaint and refill in a 16th century Italian painting by Titian that art restorers at the National Gallery of London were previously unable to identify

Undergraduate Team Member Sept. 2017 – Dec. 2019
Rhodes Information Initiative at Duke, Duke University

- Created a MATLAB application that virtually recolors an aged painting based on its original pigments' estimated RGB values and the proportions of mixed pigments
- Digitally rejuvenated colors of 14th century Italian wood panel paintings with art restorers at the North Carolina Museum of Art (NCMA) for the first time since the museum acquired the artworks
- Shed light on artistic details, including engravings and silver gildings, in two wood panel paintings at the NCMA that were invisible to viewers due to poor

conservation by rendering the details with MATLAB, GIMP, and Python and building 3D models of restored paintings with Blender

TEACHING EXPERIENCE

Graduate Student Mentor Jan. 2023 - May 2023

AR Label Visualization Team, Brown University

- Led a research group with two undergraduate students and one graduate student in AR text label visualization
- Taught C# programming and integration of AR/VR-related Unity packages into Android projects

Builder's Workshop Mentor

Oct. 2021 - Dec. 2021

CS Sidekick, Virtual

- Taught mathematical concepts and Python packages related to machine learning to middle school students in underserved communities in Durham, NC

Team Leader

Oct. 2020 - Aug. 2021

Digital Art Restoration Team, Duke University

- Taught digital image editing, linear algebra, and programming in Python and MATLAB to 6 engineering students at Duke through virtually restoring a 14th century Italian wood panel painting at the NCMA [[Video link](#)]

PERSONAL PROJECT

Personalized Contemporary Art Recommendation

Sept. 2019 - Dec. 2021

- Built as a senior thesis project for art history a website that recommends paintings by young contemporary artists using re-purposed computer vision algorithms modeled after human brains' visual processing steps and descriptive tagging methods