HIJUNG (VALENTINA) SHIN

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EDUCATION

Massachusetts Institute of Technology, Cambridge, MA 2013 - present

Ph.D. candidate in Computer Science (advised by Frédo Durand)

- Provisional thesis title: Effective tools for manipulating audiovisual media
- Minor in Education (coursework completed at Harvard Graduate School of Education)

Massachusetts Institute of Technology, Cambridge, MA 2011 - 2013

M.S.E. in Computer Science (co-advised by Frédo Durand and John Ochsendorf)

- Thesis title: Analysis and visualization of equilibrium in masonry structures

Princeton University, Princeton, NJ 2007 - 2011

B.S.E. in Computer Science (Graduated with highest honors)

- Thesis title: Analyzing and assembling broken fresco fragments (co-advised by Thomas Funkhouser and Szymon Rusinkiewicz).

RESEARCH Projects

Iterative authoring interface for voice recordings

Advised by Frédo Durand (MIT), Wilmot Li (Adobe Research)

- Created *Voice Script*, a novel interface for authoring speech recordings that supports iterative workflows and asynchronous collaboration for script writing, audio recording and editing. Demonstrated through user studies that Voice Script facilitates the audio authoring process in various scenarios.

Interactive lecture notes for blackboard-style lecture videos

Advised by Frédo Durand (MIT), Wilmot Li and Floraine Berthouzoz (Adobe Research)

- Created *Visual Transcripts*, a novel navigation interface for lecture videos that automatically transforms blackboard-style lecture videos into interactive lecture notes. Conducted comparative users studies against state-of-the-art systems and demonstrated that Visual Transcripts improves the users learning experience.

On creating live presentations

Advised by Frédo Durand (MIT), Wilmot Li (Adobe Research)

- Currently developing a novel presentation interface, which integrates live inking with slides. The system supports dynamic layout management and beautification to allow the presenter to focus on content delivery.

Structural analysis of masonry

Advised by Frédo Durand (MIT) and John Ochsendorf (Building Technology, MIT)

- Investigated two commonly used methods for structural analysis: FEM and equilibrium methods. Systematically explained the discrepancy between the two methods, and mathematically proved that inverse FEM is a dual formulation of the block equilibrium method with equivalent results.
- Extended and implemented the principle of equilibrium methods to tensile elements such as cables and applied it to design stable masonry structures.

Analysis and assembly of broken fresco fragments

Advised by Thomas Funkhouser and Szymon Rusinkiewicz (Princeton University)

- Formulated a probabilistic model of fracture patterns by analyzing reconstructed frescoes, and confirmed the model using simulations. This model was used to train a classifier that effectively identified matching fragments in several frescoes from different archaeological sites, including ones that archaeologists were not able to find on their own.

PUBLICATIONS

Dynamic Authoring of Audio with Linked Scripts
H. Shin, W. Li, F. Durand. *UIST, 2016.*

Visual Transcripts: Lecture Notes from Blackboard-Style Lecture Videos.
H. Shin, F. Berthouzoz, W. Li, F. Durand. *SIGGRAPH ASIA, 2015.*

Reconciling Elastic and Equilibrium Methods for Static Analysis.
H. Shin, C. Porst, E. Vouga, J. Ochsendorf, F. Durand. *ACM Transactions on Graphics (TOG), 2016*

Structural optimization of 3D masonry buildings.
E. Whiting, **H. Shin**, R. Wang, J. Ochsendorf, F. Durand. *SIGGRAPH ASIA,* 2012

Analyzing and Simulating Fracture Patterns of Theran Wall Paintings.
H. Shin, C. Doumas, Th. Funkhouser, S. Rusinkiewicz, K. Steiglitz, A. Vlachopoulos, T. Weyrich. *ACM Journal on Computing and Cultural Heritage (JOCCH)*, 2012.

Learning how to match fresco fragments. (Awarded Best Paper in Eurographics, 2011)
T. Funkhouser, **H. Shin**, C. Toler-Franklin, A. Castañeda, B. Brown, D. Dobkin, S. Rusinkiewicz, T. Weyrich. *ACM Journal on Computing and Cultural Heritage (JOCCH)*, 2011.

RESEARCH INTERNSHIPS

Adobe Research, Seattle, WA 2016
- advised by Wilmot Li

Adobe Research, San Francisco, CA 2013
- advised by Floraine Berthouzoz and Wilmot Li

TEACHING EXPERIENCE

MIT Computer Science 2012 – present
- Advised three undergraduate students as part of a research program for undergraduates at MIT. Research topics included *3D structural modeling of Beauvais Cathedral*, *Dynamic simulation of 3D masonry* and *Reverse-engineering images drawn in blackboard-style lecture videos.*

Teaching & Learning Laboratory at MIT 2012
- Completed a teaching certificate program based on seven workshops aimed at development of teaching skills.

Women's Technology Program at MIT 2012
- Developed and taught a Discrete Math for Engineering curriculum to high school seniors. Topics included linear algebra, algorithms, combinatorics and probability. Gave 2 daily two-hour lectures, developed and evaluated student projects.

Educational Studies Program at MIT 2015
- Created and taught a one-day Introduction to Computer Graphics workshop for 9-12th grade students.

CONFERENCE PRESENTATIONS & INVITED TALKS

Reconciling elastic and equilibrium methods for static analysis (SIGGRAPH 2016, Los Angeles, U.S.)

Lecture notes from blackboard-style lecture videos. (SIGGRAPH Asia 2015, Kobe, Japan.)

Novel navigation interface for lecture videos (Guest lecture 2015. Dartmouth University, NH, U.S.)

Analysis and optimization of masonry structures (Guest lecture 2013. Seoul National University, & KAIST, Daejeon, Korea.)

Structural optimization of 3D masonry buildings (SIGGRAPH Asia 2012, Singapore.)

Learning how to match fresco fragments (**Best paper award**, Eurographics 2011, Llandudno, UK.)

Analyzing and Fracture Patterns of Theran Wall Paintings
(11th International Symposium on Virtual Reality Archaeology and Cultural Heritage 2010, Paris, France.)

FELLOWSHIPS

Samsung Scholarship for Graduate Study ($50,000/year, 5 years)	2011 – 2016
Google Anita Borg Scholarship	2011
Samsung Scholarship for Undergraduate Study ($50,000/year, 4years)	2007 - 2011

HONORS

Morris Joseph Levin Award for best Master of Engineering Thesis Presentation	2013
CRA Outstanding Undergraduate Researcher Award	2011
Outstanding Computer Science Senior Thesis Prize	2011
Phillip Y. Goldman ’86 Senior Prize in Computer Science	2011

REFERENCES

Frédo Durand (advisor)
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