

Ming Chuang

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SUMMARY I am a Computer Graphics/Vision researcher and engineer with expertise in multiple areas, including 3D reconstruction for VR/AR, real-time geometry/image processing, 3D video compression, GPU computing, real-time rendering, and SLAM systems. I fast prototype research ideas into product-ready features; lead design and implement high-performance systems; enthusiastically promote and lead technical discussions.

EDUCATION *Ph.D., Computer Science,* Fall 2008 - Spring 2013
Supervisor: Michael (Misha) Kazhdan
Thesis area: Finite elements system for geometry processing
Johns Hopkins University, Baltimore, MD

M.S.E., Computer Science, Fall 2006 - Spring 2008
Thesis area: Spectral analysis for 3D object retrieval and classification
Johns Hopkins University, Baltimore, MD

B.S., Computer Science and Information Engineering, Fall 2000 - Spring 2004
Thesis area: Neural network for sign language recognition
National Central University, Taiwan

EXPERIENCE *Founding Engineer* Summer 2016 - Present
PerceptIn (www.perceptin.io), Santa Clara, CA

- Designing first sparse-dense hybrid SLAM system with hardware integration
- Robust and high-quality dense reconstruction with self-navigating robots.
- Applications to robotics and VR/AR

Senior Software Engineer Spring 2013 - Summer 2016
Microsoft, Redmond, WA

- Leading surface reconstruction and geometry processing expert in the free-viewpoint video (FVV) team for Microsoft HoloLens
- Developed the geometry processing pipelines, consisting of hull-constrained surface reconstruction, importance-aware mesh simplification and unwrapping, gradient-domain texturing, spatiotemporal filtering/inpainting, etc.
- Developed the mesh tracking algorithm, a non-rigid registration and remeshing pipeline specifically designed for high-performance FVV compression
- Important collaborations: Mars Frontier with NASA, Living Room Football with NFL (featured: plausible framerate up-scaling), Actiongram with XBOX, seamless 3D video looping with MSR, real-time surface reconstruction, etc.

Research Intern Summer 2011 - Winter 2012
Pixar Animation Studios, Emeryville, CA

- Supervisor: Tony DeRose
- Early engineer of OpenSubdiv, an open-source library for real-time subdivision surface evaluation (<http://graphics.pixar.com/opensubdiv>)

- Developed several assisting tools for technical artists (the Good Dinosaur)
- Developed real-time simulation solution for large-scale point cloud projection with a GPU-based stackless KD-tree implementation.

Ph.D. Candidate Fall 2008 - Spring 2013

Johns Hopkins University, Baltimore, MD

- Focused on numerically efficient finite elements systems for geometry processing applications, including gradient-domain texture stitching, anisotropic surface filtering, interactive mesh editing, curvature flow, shape matching, surface parameterization, mesh segmentation, geometric detail transferring, etc.
- For source code and demos, see <http://www.cs.jhu.edu/~ming/>

Teaching Assistant Fall 2008 - Spring 2010

Johns Hopkins University, Baltimore, MD

- Algorithms x2 (Professors: Susan Hohenberger and Baruch Awerbuch)
- Compute Graphics x3 (Professor: Michael Kazhdan)

Research Assistant Fall 2007

Laboratory of Medical Image Computing, Department of Radiology

Johns Hopkins University, Baltimore, MD

- Supervisor: Dzung L. Pham
- Medical image processing plug-ins for NIH's MIPAV software

Software Engineer Summer 2007

National Human Genome Research Institute, NIH

- Supervisor: Priya Duggal
- Data analysis and visualization tools of single-nucleotide polymorphism

Software Engineer Winter 2005 - Winter 2006

Simulation Training Center, Taiwanese Army

- Military service as a second lieutenant
- Developed several web-based management system

PENDING PATENTS

Adaptive Decimation Using 3D Video Features

Filed on July 2016 with Kristofer Iverson, Emmett Lalish, and Khai Tran

Motion graphs for Unstructured Textured Meshes

Filed on July 2016 with Hugues Hoppe, Fabian Prada, and Alvaro Collet

Raster Mesh Simplification

Filed on Spring 2015 with Dave Lindsay

Consistent Tessellation Via Topology-Aware Surface Tracking

Filed on July 2015 with Don Gillet, Alvaro Collet, and Pat Sweeney

Context-Adaptive Allocation of Render Model Resources

Filed on July 2015 with Alvaro Collet and Pat Sweeney

SELECTED PUBLICATION

Motion Graphs for Unstructured Textured Meshes

Fabian Prada, Michael Kazhdan, Ming Chuang, Alvaro Collet, and Hugues Hoppe
ACM Transactions on Graphics (SIGGRAPH 2016), Volume 35, Issue 4

High-Quality Streamable Free-Viewpoint Video

Alvaro Collet, Ming Chuang, Pat Sweeney, Don Gillett, Denis Evseev, David Calabrese, Hugues Hoppe, Adam Kirk, Steve Sullivan
ACM Transactions on Graphics (SIGGRAPH 2015), Volume 34, Issue 4

A Connectivity-Aware Multi-level Finite-Element System for Solving Laplace-Beltrami Equations

Ming Chuang and Michael Kazhdan
(arXiv:1505.03615)

Ph.D. Dissertation Grid-based Finite Elements System for Solving Laplace-Beltrami Equations on 2-Manifolds

Ming Chuang
Johns Hopkins University, 2013

Fast Mean-Curvature Flow via Finite-Element Tracking

Ming Chuang and Michael Kazhdan
Computer Graphics Forum (Eurographics 2012), Volume 30, Issue 6

Interactive and Anisotropic Geometry Processing Using the Screened Poisson Equation

Ming Chuang and Michael Kazhdan
ACM Transactions on Graphics (SIGGRAPH 2011), Volume 30, Issue 4

A Real-Time Screened-Poisson Solver for Interactive Surface Editing

Ming Chuang and Michael Kazhdan
ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games 2010

Estimating the Laplace-Beltrami Operator by Restricting 3D Functions

Ming Chuang, Linjie Luo, Benedict J. Brown, Szymon Rusinkiewicz, and Michael Kazhdan
Eurographics/ACM SIGGRAPH Symposium on Geometry Processing 2009

A Shape Relationship Descriptor for Radiation Therapy Planning

Michael Kazhdan, Patricio Simari, Todd McNutt, Binbin Wu, Robert Jacques, Ming Chuang, and Russell Taylor
Medical Imaging Computing and Computer Assisted Intervention (MICCAI 2009)

Patient Geometry-Driven Information Retrieval for IMRT Treatment Plan Quality Control

Binbin Wu, Francesco Ricchetti, Giuseppe Sanguineti, Michael Kazhdan, Patricio Simari, Ming Chuang, Russell Taylor, Robert Jacques, Todd McNutt
Medical Physics (2009), Volume 36, Issue 12

A Fuzzy Rule-Based Approach to Hand Shape Recognition Systems

Mu-Chun Su, Yu-Xiang Zhao, Chao-Hsin Hung, and Ming Chuang
Joint Conference on AI, Fuzzy System, and Grey System, Taiwan, 2013

**SELECTED
PRESS
COVERAGE**

2016 Verge, NASA will let you walk on Mars using HoloLens
2016 Meshable, Microsoft HoloLens could fill your living room with NFL football
2016 Engadget, Microsoft launches Actiongram on HoloLens with a tiny George Takei
2015 Gizmodo, Hololens tech brings us one step closer to Star Wars holograms
2015 Popular Science, This is how Microsoft is making 3D videos for hololens
2015 Pixable, Microsoft records Holographic Video and the results are unbelievable
2015 Verge, Microsoft announces Windows Holographic with HoloLens headset
2015 Ars Technica, Microsofts new interface: FREAKING HOLOGRAMS
2013 CG Daily News, Get Pixar's OpenSubdiv Library for Free
2012 Cinema Blend, Pixar Sets Title For Dinosaur Film