

# Yen-Chia Hsu

## Contact

PhD Candidate  
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## Biography

I am a PhD candidate in the CREATE Lab, Robotics Institute, Carnegie Mellon University. My recent research focuses on the design, implementation, and evaluation of civic technologies: information technology for public good. I develop interactive systems and applications which integrate artificial intelligence, crowdsourcing, and data visualization techniques to support citizen empowerment.

## Research Interests

Civic Technology / Citizen Science  
Human Computation and Crowdsourcing

Interactive Data Visualization and Storytelling  
Machine Learning / Computer Vision

## Education

**Carnegie Mellon University, Pittsburgh, USA**

2014/09 - 2018/05 (expected)

Ph.D. in Robotics

Advisor: Illah R. Nourbakhsh

Thesis: Design Data Visualization and Crowdsourcing Systems in Community-Based Citizen Science

**Carnegie Mellon University, Pittsburgh, USA**

2011/09 - 2012/12

Master of Tangible Interaction Design (GPA: 3.72/4.0 overall)

**National Cheng Kung University, Tainan, Taiwan**

2005/09 - 2010/06

Dual B.S. in Architecture, and in Computer Science (GPA: 87.89/100 overall)

## Experiences

**CREATE Lab, Robotics Institute, School of Computer Science, Carnegie Mellon University, USA**

Ph.D. Student Researcher

2014/09 - 2018/05 (expected)

Web Designer/Developer

2013/10 - 2014/06

Research Associate

2013/01 - 2013/06



**Smell PGH: A Mobile Application to Crowdsourcing and Visualize Pollution Odors**

2017

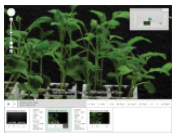
I worked in a team to develop Smell Pittsburgh, a mobile application for citizens to report and track pollution odors. Smell reports are sent to the local health department as they are submitted. A map visualizes and animates the reports with air quality data and wind directions. (<http://smellpgh.org>)



**Community-Empowered Air Quality Monitoring System [1][2]**

2015 - 2016

I worked with a local community in Pittsburgh to develop an air quality monitoring system, which integrated various data over a large spatial and temporal scale. The system afforded scientific evidence by using animated images, air quality data, and smell reports. (**Top 5% Award in ACM CHI 2017**)



**A Web-based Large-scale Timelapse Editor for Interactive Storytelling [3]**

2014

Based on the timelapse viewer, I developed a storytelling tool that operates along multiple dimensions: geolocation, time, and scale. Users can use it to create interactive slideshows or guided tours, and then embed or share them on social media for telling interactive stories. (IEEE VIS Poster)



**Earth Timelapse Viewer Visualizing Landsat Satellite Imagery**

2013

I worked in a team to develop a timelapse viewer over spacetime with billions of pixels. We released an Earth timelapse viewer consisting of 33 cloud-free mosaics of the planet from 1984 to 2016 Landsat data with Google and TIME. (<http://world.time.com/timelapse>, **Webby People's Voice Award 2014**)

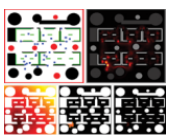
**Code Lab, School of Architecture, College of Fine Arts, Carnegie Mellon University, USA**

Master Student

2011/09 - 2012/12

Lab Assistant

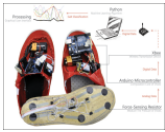
2011/09 - 2012/05



**SimArch: A Multi-Agent System for Human Path Simulation**

2012

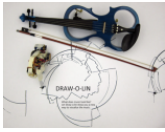
SimArch uses Markov Decision Process to build a behavior model. The model simulates simple mental states, target range detection, and collision prediction when agents behave in a museum. SimArch outputs the prediction of how likely a person will occur in a location after simulation.



## SENSEable Shoes: Hands-Free and Eyes-Free Mobile Interaction

2012

SENSEable Shoes is a platform for interaction designers to create applications. It recognizes low-level activities by measuring the weight distribution over the feet with sensors embedded in the shoe pad. A Support Vector Machine classifier identifies mobile activities and foot gestures.



## Draw-o-lin: A Music Visualizer for Violin

2011

What does music look like? Draw-o-lin is an interactive mobile robot visualizing music by drawing graphs on a paper according to various sound properties. Violin performers control Draw-o-lin robot by playing higher or lower pitches, alternating the volume, and changing the tempo of the music.

## IA Lab, Department of Architecture, National Cheng Kung University, Taiwan

Research Assistant

2010/09 - 2011/06

Digital Fabrication Factory Administrator

2008/09 - 2011/06



## SynTag: A Web-based Platform for Labeling Real-time Video [4][5]

2010

Users can label Good, Question, and Disagree tags in real or non-real time with visualization of time-stamp video previews on an interactive timeline. SynTag creates thumbnails by using real-time tags for presenters to receive instant feedback and for others to retrieve videos. (ACM CSCW 2012)

## Publications

[1] **Yen-Chia Hsu**, Paul Dille, Jennifer Cross, Beatrice Dias, Randy Sargent, and Illah Nourbakhsh. 2017. Community-Empowered Air Quality Monitoring System. In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI 2017). ACM. [**Top 5% Honorable Mention Award**]

[2] **Yen-Chia Hsu**, Paul Dille, Randy Sargent, and Illah Nourbakhsh. 2016. Industrial Smoke Detection and Visualization. tech. report CMU-RI-TR-16-55, Robotics Institute, Carnegie Mellon University, September, 2016.

[3] **Yen-Chia Hsu**, Paul Dille, Randy Sargent, Christopher Bartley, and Illah Nourbakhsh. 2015. A Web-based Large-scale Timelapse Editor for Creating and Sharing Guided Video Tours and Interactive Slideshows. IEEE Information Visualization Posters, 2015.

[4] **Yen-Chia Hsu**, Tay-Sheng Jeng, Yang-Ting Shen, and Po-Chun Chen. 2012. SynTag: A Web-based Platform for Labeling Real-time Video. In Proceedings of the ACM 2012 Conference on Computer Supported Cooperative Work (CSCW 2012). ACM.

[5] Yang-Ting Shen, Tay-Sheng Jeng, **Yen-Chia Hsu**. 2011. A "Live" Interactive Tagging Interface for Collaborative Learning. In: Luo Y. (eds) Cooperative Design, Visualization, and Engineering. CDVE 2011. Lecture Notes in Computer Science, vol 6874. Springer, Berlin, Heidelberg

## Skills

**Programming languages:** MATLAB, Python, HTML, CSS, JavaScript

**Design tools:** Adobe Photoshop/Illustrator/Premiere, AutoCAD, 3DsMax, Arduino

## Professional Activities

**Program Committee:** TAICHI 2017

**Reviewer:** IEEE Robotics and Automation Magazine 2015

**Conference Presenter:** ACM CHI 2017, A&WMA 2017, ACM CSCW 2012

**Invited Speaker:** Google Earth Engine User Summit 2015, Bloomberg Philanthropies 2017

## Honors & Awards

Top 5% Honorable Mention Paper Award, ACM CHI, USA

2017

Webby People's Voice Award, USA

2014

Best New Artist, The National Golden Award for Architecture, Taiwan

2009

Third Prize, National Country House Design Competition, Ministry of the Interior, Taiwan

2008

Outstanding Student Academic Achievement, National Cheng Kung University

2005, 2006, 2007

## Leadership

**Department of Architecture, National Cheng Kung University, Taiwan**

General Coordinator, Graduation Design Preparation Committee

2009

Director of General Affairs, Student Committee

2008

Class Representative

2007

## Teaching

**Robotics Institute, School of Computer Science, Carnegie Mellon University, USA**

Teaching Assistant of 16-811 Math Fundamentals for Robotics

2015