

# Yen-Chia Hsu

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Department of Sustainable Design Engineering  
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## Research Interests

**Community-empowered artificial intelligence, community citizen science**, human-computer interaction, machine learning, computer vision, data science, crowdsourcing, participatory sensing, visualization, civic engagement, sustainability, smart city, social justice, environmental health, urban science.

## Experiences

- **Department of Sustainable Design Engineering, Faculty of Industrial Design Engineering, Technische Universiteit Delft, Netherlands**  
Postdoc Researcher, 03/2021 - present
- **CREATE Lab, Robotics Institute, School of Computer Science, Carnegie Mellon University, USA**  
Project Scientist, 12/2018 - 12/2020  
Senior Research Programmer/Analyst, 08/2018 - 11/2018  
Ph.D. Student Researcher, 09/2014 - 07/2018  
Web Designer/Developer, 10/2013 - 06/2014  
Research Associate, 01/2013 - 07/2013
- **Code Lab, School of Architecture, Carnegie Mellon University, USA**  
Master's Student, 09/2011 - 12/2012  
Lab Assistant, 09/2011 - 05/2012
- **IA Lab, Department of Architecture, National Cheng Kung University, Taiwan**  
Research Assistant, 09/2010 - 06/2011
- **Department of Architecture, National Cheng Kung University, Taiwan**  
General Coordinator, Graduation Design Preparation Committee, 09/2008 - 06/2009  
Director of General Affairs, Student Committee, 09/2007 - 06/2008

## Education

- **Ph.D. in Robotics**, 08/2014 - 08/2018  
Carnegie Mellon University, Pittsburgh, USA  
Thesis Title: Designing Interactive Systems for Community Citizen Science  
Committee: Illah Nourbakhsh (advisor), Aaron Steinfeld, Jeffrey Bigham, and Eric Paulos  
CeDiploma ID: 185C-4146-Y9U9 (can be validated from the link below)  
<https://www.cmu.edu/hub/registrar/graduation/diplomas/electronic/validation/index.html>
- **Master of Tangible Interaction Design**, 08/2011 - 12/2012  
Carnegie Mellon University, Pittsburgh, USA

- **Dual B.S. in Architecture and in Computer Science**, 08/2005 - 05/2010  
National Cheng Kung University, Tainan, Taiwan

## Awards and Honors

- [A6] Best Paper Honorable Mention Award (Top 2.5%, 7 out of 282 submissions). 2019. ACM IUI Conference on Intelligent User Interfaces, USA. <https://dl.acm.org/citation.cfm?id=3302293>
- [A5] Best Paper Honorable Mention Award (Top 5%). 2017. ACM CHI Conference on Human Factors in Computing Systems, USA. <https://dl.acm.org/citation.cfm?id=3025853>
- [A4] Webby People's Voice Award, Best Use of Video or Moving Image. 2014. International Academy of Digital Arts and Sciences, USA. <https://www.webbyawards.com/winners/2014/web/website-features-and-design/best-use-of-video-or-moving-image/timelapse/>
- [A3] Best New Artist. 2009. The National Golden Award for Architecture, Taiwan. [http://www.yestaiwan.com.tw/page06\\_5.html](http://www.yestaiwan.com.tw/page06_5.html)
- [A2] Third Prize, National Country House Design Competition. 2008. Ministry of the Interior, Taiwan.
- [A1] Outstanding Student Academic Achievement. 2005, 2006, 2007. Department of Architecture, National Cheng Kung University, Taiwan.

## Referred Journal and Magazine Papers

- [J2] **Yen-Chia Hsu**, Jennifer Cross, Paul Dille, Michael Tasota, Beatrice Dias, Randy Sargent, Ting-Hao Huang, and Illah Nourbakhsh. 2020. Smell Pittsburgh: Engaging Community Citizen Science for Air Quality. ACM Transactions on Interactive Intelligent Systems. <https://arxiv.org/abs/1912.11936>
- [J1] **Yen-Chia Hsu** and Illah Nourbakhsh. 2020. When Human-Computer Interaction Meets Community Citizen Science. Communications of the ACM. <https://arxiv.org/abs/1907.11260>

## Referred Conference Papers

- [C6] **Yen-Chia Hsu**, Ting-Hao (Kenneth) Huang, Ting-Yao Hu, Paul Dille, Sean Prendi, Ryan Hoffman, Anastasia Tsuhlares, Jessica Pachuta, Randy Sargent, and Illah Nourbakhsh. 2020. Project RISE: Recognizing Industrial Smoke Emissions. arXiv preprint arXiv:2005.06111 (to be appeared in AAAI 2021). <https://arxiv.org/abs/2005.06111>
- [C5] Ting-Yao Hsu, Chieh-Yang Huang, **Yen-Chia Hsu**, and Ting-Hao Huang. 2019. Visual Story Post-Editing. In Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics (ACL 2019). <https://arxiv.org/abs/1906.01764>
- [C4] **Yen-Chia Hsu**, Jennifer Cross, Paul Dille, Michael Tasota, Beatrice Dias, Randy Sargent, Ting-Hao Huang, and Illah Nourbakhsh. 2019. Smell Pittsburgh: Community-Empowered Mobile Smell Reporting System. In Proceedings of the 24th International Conference on Intelligent User Interfaces (IUI 2019). ACM. (**Best Paper Honorable Mention Award, Top 2.5%**) [Note: this paper has errors, and we provide the corrections in the last two pages of the preprint] <https://arxiv.org/abs/1810.11143>
- [C3] **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. (**Best Paper Honorable Mention Award, Top 5%**) <https://arxiv.org/abs/1804.03293>

- [C2] **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. <https://dl.acm.org/citation.cfm?id=2145312>
- [C1] Yang-Ting Shen, Tay-Sheng Jeng, and **Yen-Chia Hsu**. 2011. A Live Interactive Tagging Interface for Collaborative Learning. International Conference on Cooperative Design, Visualization and Engineering (CDVE 2011). Springer. [https://link.springer.com/chapter/10.1007%2F978-3-642-23734-8\\_16](https://link.springer.com/chapter/10.1007%2F978-3-642-23734-8_16)

## Referred Posters, Works-in-Progress, and Workshop Papers

- [P4] Ting-Hao K. Huang, Chieh-Yang Huang, Chien-Kuang Cornelia Ding, **Yen-Chia Hsu**, C. Lee Giles. 2020. CODA-19: Using a Non-Expert Crowd to Annotate Research Aspects on 10,000+ Abstracts in the COVID-19 Open Research Dataset. In Proceedings of the 1st Workshop on NLP for COVID-19 at Association for Computational Linguistics (ACL 2020). <https://arxiv.org/abs/2005.02367>
- [P3] Ting-Yao Hsu, **Yen-Chia Hsu**, and Ting-Hao (Kenneth) Huang. 2019. On How Users Edit Computer-Generated Visual Stories. In Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems (CHI EA 2019). ACM. <https://arxiv.org/abs/1902.08327>
- [P2] **Yen-Chia Hsu**, Jennifer Cross, Paul Dille, Illah Nourbakhsh, Leann Leiter, and Ryan Grode. 2018. Visualization Tool for Environmental Sensing and Public Health Data. In Proceedings of the 2018 ACM Conference Companion Publication on Designing Interactive Systems (DIS 2018 Companion). ACM. <https://arxiv.org/abs/1804.03263>
- [P1] **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. <https://vimeo.com/136251467>

## Other Publications

- [O4] **Yen-Chia Hsu**. 2018. Designing Interactive Systems for Community Citizen Science. Ph.D. Dissertation. Robotics Institute, Carnegie Mellon University, Pittsburgh, PA. [https://figshare.com/articles/Designing\\_Interactive\\_Systems\\_for\\_Community\\_Citizen\\_Science/7195082/1](https://figshare.com/articles/Designing_Interactive_Systems_for_Community_Citizen_Science/7195082/1)
- [O3] Emiliano Huet-Vaughn, Nicholas Muller, and **Yen-Chia Hsu**. 2018. Livestreaming Pollution: A New Form of Public Disclosure and a Catalyst for Citizen Engagement. No. w24664. National Bureau of Economic Research, 2018. <https://www.nber.org/papers/w24664>
- [O2] **Yen-Chia Hsu**. 2018. SimArch: A Multi-agent System For Human Path Simulation In Architecture Design. arXiv preprint arXiv:1807.03760. <https://arxiv.org/abs/1807.03760>
- [O1] **Yen-Chia Hsu**. 2016. Industrial Smoke Detection and Visualization. Technical Report CMU-RI-TR-16-55. Robotics Institute, Carnegie Mellon University, Pittsburgh, PA. <https://www.ri.cmu.edu/publications/industrial-smoke-detection-and-visualization/>

## Featured Media and Book Coverage

- [F3] PC Magazine. Michelle Donahue. 2018. Citizen Science: Do Try This at Home. <https://www.pcmag.com/article/360317/citizen-science-do-try-this-at-home>
- [F2] Pittsburgh Post-Gazette. Ashley Murray. 2017. Carnegie Mellon Scientists Use App to Track Foul Odors in Pittsburgh. <http://www.post-gazette.com/business/tech-news/2017/07/03/smell-pgh-app-carnegie-mellon-university-cmu-create-lab-foul-smell-pittsburgh/stories/201706300430>

- [F1] TIME. Jeffrey Kluger. 2013. Timelapse: Landsat Satellite Images of Climate Change. <http://world.time.com/timelapse/>

## Other Media and Book Coverage

- [M61] WDRB. Gilbert Corsey. 2020. New app allows users to report foul smells around the city. [https://www.wdrb.com/news/new-app-allows-users-to-report-foul-smells-around-the-city/article\\_42888ce4-5bcc-11ea-9ade-cb39e28f2697.html](https://www.wdrb.com/news/new-app-allows-users-to-report-foul-smells-around-the-city/article_42888ce4-5bcc-11ea-9ade-cb39e28f2697.html)
- [M60] Allegheny Front. Kara Holsopple. 2020. What You Need To Know About Air Quality, The U.S. Steel Settlement And Temperature Inversions. <https://www.alleghenyfront.org/what-you-need-to-know-about-air-quality-the-u-s-steel-settlement-and-temperature-inversions/>
- [M59] Pittsburgh Current. Larry J. Schweiger. 2020. The Smokey City Is Once Again At A Crossroads. <https://www.pittsburghcurrent.com/schweiger-the-smokey-city-is-once-again-at-a-crossroads/>
- [M58] CBS Pittsburgh. 2020. Environmental Groups Gather At City-County Building For Air Quality Rally. <https://pittsburgh.cbslocal.com/2020/01/10/air-quality-rally-outside-allegeny-city-county-building/>
- [M57] Group Against Smog and Pollution. 2020. GASP Congratulates CREATE Lab & Yen-Chia Hsu, for Smoke Hunting Tool Release. <https://gasp-pgh.org/2020/05/27/gasp-congratulates-create-lab-yen-chia-hsu-for-smoke-hunting-tool-release/>
- [M56] Louisville Future. 2019. Stinky smells in your neighborhood? There's an app for that. <https://louisvillefuture.com/archived-news/stinky-smells-in-your-neighborhood-theres-an-app-for-that/>
- [M55] KATU News. 2019. Smell MyCity Portland. <https://app.criticalmention.com/app/#/report/3c4ca767-6b14-4bf8-a4ea-ae6492c7faa1>
- [M54] The Portland Tribune. 2019. Smell MyCity app could sniff out air quality issues. <https://pamplinmedia.com/pt/9-news/444239-359239-smell-mycity-app-could-sniff-out-air-quality-issues>
- [M53] Willamette Week. Elise Herron. 2019. New App Helps People Track Air Pollution in Portland, Which Is Among the Top 25 Cities With the Most Short-Term Particulate Pollution. <https://www.wweek.com/news/2019/11/23/new-app-helps-people-track-air-pollution-in-portland-which-is-among-the-top-25-cities-with-the-most-short-term-particulate-pollution/>
- [M52] Group Against Smog and Pollution. Amanda Gillooly. 2019. Looking to Make a Difference in Local Air Quality? Here's How (BONUS: You Don't Even Have to Leave Your House). <https://gasp-pgh.org/2019/10/25/looking-to-make-a-difference-in-local-air-quality-heres-how-bonus-you-dont-even-have-to-leave-your-house>
- [M51] Pennsylvania Senate and House Democratic Policy Committees. 2019. Joint Public Hearing on Improving Air Quality. [http://www.pahouse.com/files/Documents/Testimony/2019-02-08\\_102639\\_hdpc020719.pdf](http://www.pahouse.com/files/Documents/Testimony/2019-02-08_102639_hdpc020719.pdf)
- [M50] Fast Company. Mark Wilson. 2019. Report stinky spots in your city with this free app. <https://www.fastcompany.com/90326996/report-stinky-spots-in-your-city-with-this-free-app>
- [M49] Business Journal. 2019. Smell something, say something: New smartphone app lets you rate your city's air quality. <https://www.northbaybusinessjournal.com/industrynews/technology/9444110-181/smell-mycity>
- [M48] Global News Wire. 2019. Smell Something, Say Something: Carnegie Mellon and Seventh Generation Partner to Take Action Against Air Pollution with Smell MyCity App. <https://www.globenewswire.com/news-release/2019/03/29/1788489/0/en/Smell-Something-Say-Something-Carnegie-Mellon-and-Seventh-Generation-Partner-to-Take-Action-Against-Air-Pollution-with-Smell-MyCity-App.html>

- [M47] TechRepublic. 2019. Smell MyCity app combats air pollution. <https://www.techrepublic.com/videos/smell-mycity-app-combats-air-pollution/>
- [M46] Wave 3 News. 2019. Smell My City app allows Louisvillians to report foul odors, pollution. <https://www.wave3.com/2019/03/29/smell-my-city-app-allows-louisvillians-report-foul-odors-pollution/>
- [M45] 89.3 WFPL. 2019. Smell MyCity Is Louisville's Smell Something, Say Something App. <https://wfpl.org/smell-mycity-is-louisvilles-smell-something-say-something-app/>
- [M44] Seventh Generation. 2019. If You Smell Something, Now You Can Say Something. <https://www.seventhgeneration.com/blog/if-you-smell-something-now-you-can-say-something>
- [M43] Carnegie Mellon University News. Byron Spice. 2019. CMU's Smell PGH Air Pollution Reporting App Goes National. <https://www.cs.cmu.edu/news/cmu-smell-pgh-air-pollution-reporting-app-goes-national>
- [M42] World Economic Forum. Illah Nourbakhsh. 2018. Introducing EarthTime: animations which show how our planet is changing. <https://www.weforum.org/agenda/2018/04/introducing-earthtime-a-global-magnifying-glass-to-help-us-see-common-ground/>
- [M41] Environmental Health News. Kristina Marusic. 2018. ER visits for asthma dropped 38% the year after one of Pittsburgh's biggest polluters shut down. <https://www.ehn.org/shenango-coke-works-closed-asthma-dropped-2566777141.html>
- [M40] Hack The Grid. Andrea Polli. 2018. Carnegie Museum Of Art. <https://cmoa.org/publication/hack-the-grid/>
- [M39] Pittsburgh Tribune-Review (TribLIVE). Theresa Clift. 2018. Allegheny County Health Department defends air quality efforts and plans stricter coke plant rules. <https://archive.triblive.com/local/pittsburgh-allegeny/allegeny-county-health-department-defends-air-quality-efforts-plans-stricter-coke-plant-rules/>
- [M38] Pittsburgh Post-Gazette. Don Hopey. 2018. Air advocates read scroll of smells at health board meeting. <http://www.post-gazette.com/news/environment/2018/07/19/allegeny-county-air-quality-complaints-environmental-advocates-citizen-smells/stories/201807180177>
- [M37] Pittsburgh Tribune-Review (TribLIVE). Theresa Clift. 2018. Environmental groups pressure Allegheny County officials to crack down harder on polluters. <https://archive.triblive.com/local/allegeny/13863417-74/environmental-groups-pressure-allegeny-county-officials-to-crack-down-harder-on-polluters>
- [M36] ProMarket. Emiliano Huet-Vaughn, Nicholas Z. Muller, and **Yen-Chia Hsu**. 2018. Livestreaming Polluters to Enforce Environmental Policy: Evidence from a Natural Experiment in Pittsburgh. <https://promarket.org/livestreaming-polluters-enforce-environmental-policy-evidence-natural-experiment-pittsburgh/>
- [M35] PublicSource. Teake Zuidema. 2018. Will Pittsburgh flourish as a hub of eds and meds or gas and petrochemicals? Can we have it both ways? <https://www.publicsource.org/will-pittsburgh-flourish-as-a-hub-of-eds-and-meds-or-gas-and-petrochemicals-can-we-have-it-both-ways/>
- [M34] NEXTpittsburgh. Melissa Rayworth. 2018. Once again, Pittsburgh air ranks among the worst. Here's what you can do about it. <https://www.nextpittsburgh.com/latest-news/american-lung-associations-new-air-quality-report-points-areas-pittsburgh-must-improve/>
- [M33] Allegheny Front. Kara Holsopple. 2018. Turns Out Air Pollution Makes for Good Listening. <https://www.alleghenyfront.org/turns-out-air-pollution-makes-good-listening/>
- [M32] Pittsburgh Post-Gazette. Rachel Filippini. 2018. Allegheny County must crack down on odor emissions violations. <http://www.post-gazette.com/opinion/letters/2018/02/22/Allegheny-County-must-crack-down-on-odor-emissions-violations/stories/201802210024>

- [M31] StateScoop. Jason Shueh. 2017. A whiff of citizen engagement powers Pittsburgh's new air pollution app. <https://statescoop.com/a-whiff-of-citizen-engagement-powers-pittsburghs-new-air-pollution-app/>
- [M30] PSFK. Zack Palm. 2017. A New Platform in Pittsburgh Lets Citizens Report Foul Smells. <https://www.psfk.com/2017/07/a-new-platform-in-pittsburgh-lets-citizens-report-foul-smells.html>
- [M29] Pittsburgh Post-Gazette. Anna Garner. 2017. The Smell PGH app helps track air pollution. <http://www.post-gazette.com/opinion/letters/2017/06/27/The-Smell-PGH-app/stories/201706270077>
- [M28] Lawrenceville United. David Breingan. 2017. Joint Comments from LU and LC on Draft Operating Permit for McConway and Torley. <http://www.lunited.org/tag/allegeny-county-health-department/>
- [M27] NEXTpittsburgh. Amanda Waltz. 2017. CREATE Lab clears the air with improved Smell PGH app and new website. <https://www.nextpittsburgh.com/environment/create-lab-clears-the-air-with-improved-smell-pgh-app-and-new-website/>
- [M26] NEXTpittsburgh. Amanda Waltz. 2017. Environmental activists are using Smell PGH and other tech to unstink Pittsburgh, and so can you. <https://www.nextpittsburgh.com/environment/pittsburgh-environmental-activists-using-smell-pgh/>
- [M25] Pittsburgh Tribune-Review (TribLIVE). Matthew Santoni. 2017. California Towns Adapt Carnegie Mellon's Smell Pittsburgh App. <https://archive.triblive.com/local/allegheny/12632255-74/california-towns-adapt-carnegie-mellons-smell-pittsburgh-app>
- [M24] Grantcraft. Philip Johnson. 2017. Using Low-Cost Technology to Democratize Data and Protect Public Health. <http://www.grantcraft.org/blog/using-low-cost-technology-to-democratize-data-and-protect-public-health-cas>
- [M23] Fast Company. Mark Wilson. 2017. Does Your City Literally Stink? There's An App For That. <https://www.fastcompany.com/90133143/does-your-city-literally-stink-theres-an-app-for-that>
- [M22] Carnegie Mellon University News. Byron Spice. 2017. Smell PGH App Helps Pittsburghers Report Foul Odors. <https://www.cmu.edu/news/stories/archives/2017/june/smell-something-say-something.html>
- [M21] TechCrunch. John Biggs. 2017. Smell PGH Lets You Report Weird Smells in Pittsburgh. <https://techcrunch.com/2017/06/22/smellpgh-lets-you-report-weird-smells-in-pittsburgh/>
- [M20] Pittsburgh Post-Gazette. Stephen Riccardi and Beatrice Dias. 2017. Smelly air? There's an app for that. <http://www.post-gazette.com/opinion/Op-Ed/2017/03/26/Smelly-air-There-s-an-app-for-that/stories/201703260122>
- [M19] Greenapps&web. Judit Urquijo. 2017. Smell Pittsburgh, an example of app to report pollution by foul odors. <https://www.greenappsandweb.com/en/android-en/odor-pollution-report/>
- [M18] NEXTpittsburgh. Amanda Waltz. 2017. What it was like Living Downwind of Shenango Coke Works. <https://www.nextpittsburgh.com/environment/what-it-was-like-living-downwind-of-shenango-coke-works/>
- [M17] 90.5 WESA. Julie Grant. 2017. Life Smells Better After Shenango. <http://www.wesa.fm/post/life-smells-better-after-shenango#stream/0>
- [M16] Toxic News. Gwen Ottinger. 2017. Lessons Learned from an Experiment in Infrastructuring. <https://toxicnews.org/2017/05/16/lessons-learned-from-an-experiment-in-infrastructuring/>

- [M15] The Glassblock. Adam Shuck. 2016. If You Smell Something, Say Something: CMU Launches Mobile App Smell PGH. <http://theglassblock.com/2016/09/29/smell-something-say-something-cmu-mobile-app-smell-pgh/>
- [M14] Allegheny Front. Lou Blouin. 2016. You Can Now Report Terrible Air in the Burgh with this New App. <https://www.allegenyfront.org/you-can-now-report-terrible-air-in-the-burgh-with-this-new-app/>
- [M13] Group Against Smog and Pollution. 2016. A Change in the Air After the Closure of the Shenango Coke Plant. <https://gasp-pgh.org/2016/06/01/a-change-in-the-air-after-the-closure-of-the-shenango-coke-plant/>, <https://gasp-pgh.org/wp-content/uploads/hotline-2016spring-web.pdf>
- [M12] The Society for Social Studies of Science (4S). Gwen Ottinger. 2016. A Missing Link in Making Meaning from Air Monitoring? [http://www.4sonline.org/blog/post/a\\_missing\\_link\\_in\\_making\\_meaning\\_from\\_air\\_monitoring](http://www.4sonline.org/blog/post/a_missing_link_in_making_meaning_from_air_monitoring)
- [M11] HuffPost. Illah Nourbakhsh. 2016. A Community Advocacy Success Story. [https://www.huffingtonpost.com/illah-Nourbakhsh/a-community-advocacy-sucess\\_b\\_8859210.html](https://www.huffingtonpost.com/illah-Nourbakhsh/a-community-advocacy-sucess_b_8859210.html)
- [M10] Pittsburgh Post-Gazette. Don Hopey. 2015. Regulators Reviewing Shenango Coke Works' Compliance with 2012 consent decree. <http://www.post-gazette.com/news/environment/2015/11/19/Regulators-reviewing-Shenango-Coke-Works-compliance-with-2012-consent-decree/stories/201511190230>
- [M9] Pittsburgh Post-Gazette. Don Hopey. 2015. Shenango Channel Keeps an Eye on the Neville Island Sky. <http://www.post-gazette.com/local/west/2015/11/16/Shenango-Channel-keeps-an-eye-on-the-Neville-Island-sky/stories/201511160007>
- [M8] Pittsburgh City Paper. Ashley Murray. 2015. What you need to know about Pittsburgh news this week. <https://www.pghcitypaper.com/Blogh/archives/2015/11/20/what-you-need-to-know-about-pittsburgh-news-this-week>
- [M7] Carnegie Mellon University News. Byron Spice. 2015. Shenango Channel Provides Online Resource For Sharing Images, Data About Coke Plant. <https://www.cmu.edu/news/stories/archives/2015/november/tracking-coke-plant.html>
- [M6] Pittsburgh Post-Gazette. 2015. Pollution cam: Now the public has an eye on Shenango, 24/7. <http://www.post-gazette.com/opinion/editorials/2015/11/21/Pollution-cam-Now-the-public-has-an-eye-on-Shenango-24-7/stories/201511300034>
- [M5] Ars Technica. Sean Gallagher. 2013. How Google built a 52-terapixel time-lapse portrait of Earth. <https://arstechnica.com/information-technology/2013/06/how-google-built-a-108-terapixel-time-lapse-portrait-of-earth/>
- [M4] Google Earth Engine. 2013. Earth Timelapse. <https://earthengine.google.com/timelapse/>
- [M3] Google Official Blog. 2013. A picture of Earth through time. <https://googleblog.blogspot.com/2013/05/a-picture-of-earth-through-time.html>
- [M2] Google AI Blog. 2013. Building A Visual Planetary Time Machine. <https://ai.googleblog.com/2013/06/building-visual-planetary-time-machine.html>
- [M1] Carnegie Mellon University News. 2013. Robotics Institute Helps Make Stunning Satellite Imagery Easily Accessible. [https://www.cmu.edu/news/stories/archives/2013/may/may9\\_timelapse.html](https://www.cmu.edu/news/stories/archives/2013/may/may9_timelapse.html)

## Released Open Source Tools

- [T13] CMU CREATE Lab. Deep Learning Models and Dataset for Recognizing Industrial Smoke Emissions. Computer software. <https://github.com/CMU-CREATE-Lab/deep-smoke-machine>
- [T12] CMU CREATE Lab. A Tool for Labeling Video Clips (both Front-end and Back-end). Computer software. <https://github.com/CMU-CREATE-Lab/video-labeling-tool>
- [T11] CMU CREATE Lab. Predicting and Interpreting Smell Data Obtained from Smell Pittsburgh. Computer software. <https://github.com/CMU-CREATE-Lab/smell-pittsburgh-prediction>
- [T10] CMU CREATE Lab. Earth Timelapse Viewer. Computer software. <https://github.com/CMU-CREATE-Lab/data-visualization-tools>
- [T9] CMU CREATE Lab. A Mobile Application to Crowdsource and Visualize Pollution Odors. Computer software. <https://github.com/CMU-CREATE-Lab/smell-pittsburgh-rails>
- [T8] CMU CREATE Lab. Visualization Tool for Environmental Sensing and Public Health Data. Computer software. <https://github.com/CMU-CREATE-Lab/ehp-channel>
- [T7] CMU CREATE Lab. A Web-Based Interactive Viewer for Visualizing Large-Scale Timelapses. Computer software. <https://github.com/CMU-CREATE-Lab/timemachine-viewer>
- [T6] Yen-Chia Hsu. A HTML/CSS Template for Building Projects or Personal Websites. Computer software. <https://github.com/yenchiah/project-website-template>
- [T5] Yen-Chia Hsu. A JavaScript Library for Creating an Interactive Geographical Heatmap. Computer software. <https://github.com/yenchiah/geo-heatmap>
- [T4] Yen-Chia Hsu. A JavaScript Library for Creating an Interactive Timeline Heatmap. Computer software. <https://github.com/yenchiah/timeline-heatmap>
- [T3] Yen-Chia Hsu. A Wearable Shoe-Integrated Interaction Interface. Computer software. <https://github.com/yenchiah/SENSEable-Shoes>
- [T2] Yen-Chia Hsu. A Multi-agent System for Human Path Simulation In Architecture Design. Computer software. <https://github.com/yenchiah/SimArch>
- [T1] Yen-Chia Hsu. A Web-based Platform for Labeling Real-time Video. Computer software. <https://github.com/yenchiah/SynTag>

## Grants and Other Support

- [G1] Nvidia GPU Grant (accepted), GeForce Titan Xp, 2018  
A Deep Learning Tool for Smoke Detection

## Projects



### Project RISE: Recognizing Industrial Smoke Emissions [C6, T13], 2018 - 2020

I co-designed a system with local communities in labeling videos with industrial smoke emissions. These labels were used to train a deep neural network to recognize smoke and industrial pollution events for air quality advocacy. (<https://smoke.createlab.org/>)



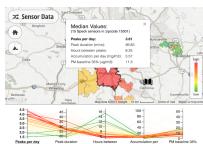
### A Tool for Creating Interactive Stories on the EarthTime Timelapse [T10], 2018

I worked in a team to develop a web-based tool that enables users to create, edit, and share stories about nature changes and human impact on EarthTime, visualizing the transformation of the EarthTime over three decades with images and datasets. (<https://earthtime.org>)



### Community-Empowered Mobile Smell Reporting System [C4, F2, T9, A6], 2017 - 2018

I worked in a team to develop Smell Pittsburgh, a mobile application for citizens to report pollution odors to regulators. A map visualizes the reports with air quality and wind data. A machine learning model predicts odors and sends push notifications. (<http://smellpgh.org>)



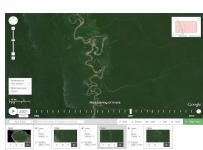
### Visualization Tool for Environmental Sensing and Public Health Data [P2, T5, T8], 2017

I worked in a team to develop the Environmental Health Channel, an interactive web-based tool for visualizing health symptoms, particulate measurements, and personal stories from residents who are affected by oil and gas drilling development. (<http://envhealthchannel.org>)



### Community-Empowered Air Quality Monitoring System [C3, F3, A5], 2015 - 2016

I worked with a community to develop an air quality monitoring system that integrates live camera data, sensing data, and smell reports. The system uses computer vision to generate videos with smoke emissions, which serve as evidence of pollution for community advocacy.



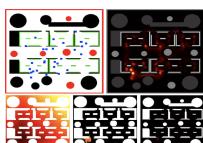
### A Web-based Large-scale Timelapse Editor for Interactive Storytelling [P1, T7], 2014

Based on the timelapse viewer, I developed a tool for users to create interactive slideshows or guided tours. Users can embed or share the slideshows or tours on social media for telling interactive stories. (<http://timemachine.cmucreatelab.org/wiki/EarthEngineTourEditor>)



### Earth Timelapse Viewer Visualizing Landsat Satellite Imagery [F1, T7, A4], 2013

I worked in a team to develop an Earth timelapse viewer, consisting of cloud-free mosaics of the planet with billions of pixels for decades. The interactive viewer was released with Google and TIME. (<https://earthengine.google.com/timelapse/>, <http://world.time.com/timelapse/>)



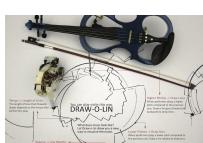
### SimArch: A Multi-Agent System for Human Path Simulation [O2, T2], 2012

SimArch uses Markov Decision Process to build a behavior model. The model simulates 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 [T3], 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 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 the robot by playing various pitches, alternating the volume, and changing the tempo.



### SynTag: A Web-Based Platform for Labeling Real-time Video [C2, C1, T1], 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.

## Professional Activities

- **Program Committee/Reviewer**

Association for the Advancement of Artificial Intelligence (AAAI), 2021  
ACM Conference on Computer-Supported Cooperative Work (CSCW), 2019 - 2020  
ACM Conference on Human Factors in Computing Systems (CHI), 2019 - 2021  
ACM Conference on Designing Interactive Systems (DIS), 2019  
Journal of Environmental Planning and Management, 2020  
Pattern Analysis and Applications Journal, 2019  
Taiwan Association of Computer-Human Interaction (TAICHI), 2017 - 2020  
IEEE Robotics and Automation Magazine, 2015

- **Conference Presenter**

Association for the Advancement of Artificial Intelligence (AAAI), 2021  
ACM Conference on Intelligent User Interfaces (IUI), 2019  
ACM Conference on Designing Interactive Systems (DIS), 2018  
ACM Conference on Human Factors in Computing Systems (CHI), 2017  
Air and Waste Management Association (A&WMA), 2017  
ACM Conference on Computer-Supported Cooperative Work (CSCW), 2012

## Invited Talks and Lectures

- *Community Citizen Science: A new approach driving HCI and AI to promote social good and pursue sustainability*, AI Biomedical Research Center, National Cheng Kung University, Taiwan, 2021
- *Community Citizen Science: A new approach driving HCI and AI to promote social good and pursue sustainability*, Department of Industrial Engineering and Engineering Management, National Tsing Hua University, Taiwan, 2021
- *Smell Pittsburgh: Community-Empowered Mobile Smell Reporting System*, One Health One Planet Symposium, Phipps Conservatory and Botanical Gardens, Pittsburgh, PA, USA, 2020
- *Designing Citizen-Centered Artificial Intelligence Systems*, Faculty of Technology, Policy and Management, Technische Universiteit Delft, Netherlands, 2020
- *Designing Interactive AI Systems for Community Empowerment*, Faculty of Industrial Design Engineering, Technische Universiteit Delft, Netherlands, 2020
- *Designing Interactive Systems for Community Citizen Science*, Faculty of Information (iSchool), University of Toronto, Ontario, Canada, 2020
- *Designing Interactive Systems for Community Citizen Science*, Department of Systems and Computer Engineering, Carleton University, Ontario, Canada, 2020
- *Designing Interactive Systems for Community Citizen Science*, Department of Computer Science, Washington University in St. Louis, MO, USA, 2020
- *Designing Interactive Systems for Community Citizen Science*, Department of Computer Science, Rensselaer Polytechnic Institute, NY, USA, 2020
- *Designing Interactive Systems for Community Citizen Science*, Department of Computer Science, William & Mary, VA, USA, 2020

- *Designing Interactive Systems for Community Citizen Science*, Department of Human Centered Design and Engineering, University of Washington, WA, USA, 2020
- *Designing Interactive Systems for Community Citizen Science*, Department of Computer Science, University of Texas at Dallas, TX, USA, 2020
- *Designing Interactive Systems for Community Citizen Science*, School of Information Studies, Syracuse University, NY, USA, 2020
- *Designing Interactive Systems for Community Citizen Science*, Department of Computer Science, University of Illinois at Chicago, IL, USA, 2020
- *When Artificial Intelligence Meets Community Citizen Science*, Principles and Engineering Applications of AI (18-662), Department of Electrical and Computer Engineering, Carnegie Mellon University, PA, USA, 2020
- *Air Quality and Artificial Intelligence*, EPA Region III MARAMA Air Quality Monitoring Training Workshop, Swarthmore, PA, USA, 2019
- *When Artificial Intelligence Meets Community Citizen Science*, Creative AI (10-737), Department of Machine Learning, Carnegie Mellon University, PA, USA, 2019
- *Air Quality and Citizen Science*, Sustainability Salon, Local Community Meeting, Pittsburgh, PA, USA, 2019
- *Smell Pittsburgh: Community-Empowered Mobile Smell Reporting System*, Health and Environment In Pittsburgh (ANTH 1727-1010), Department of Anthropology, University of Pittsburgh, PA, USA, 2019
- *Labeling and Recognizing Industrial Smoke Emissions*, Breathe Collaborative Community Meeting, Pittsburgh, PA, USA, 2019
- *Designing Interactive Systems for Community Citizen Science*, Crowdsourcing & Crowd-AI Systems (IST 597), College of Information Sciences and Technology, Pennsylvania State University, PA, USA, 2019
- *Designing Interactive Systems for Community Citizen Science*, Smart Cities (ARCH7124), Department of Architecture, National Cheng Kung University, Taiwan, 2019
- *Smell Pittsburgh: Community-Empowered Mobile Smell Reporting System*, Undergraduate Seminar (ANTH 1750-1270), Department of Anthropology, University of Pittsburgh, PA, USA, 2018
- *Designing Interactive Systems for Community Citizen Science*, Department of Architecture, National Cheng Kung University, Taiwan, 2018
- *Designing Interactive Systems for Community Citizen Science*, Department of Industrial Design, National Cheng Kung University, Taiwan, 2018
- *Designing Interactive Systems for Community Citizen Science*, Special Topics: Crowd Computing (05-899), Human-Computer Interaction Institute, Carnegie Mellon University, PA, USA, 2017
- *Community-Empowered Air Quality Monitoring System*, Sustainability Salon, Local Community Meeting, Pittsburgh, PA, USA, 2017
- *A Web-based Large-scale Timelapse Editor for Interactive Storytelling*, Geo For Good User Summit, Google Earth Engine, Mountain View, CA, USA, 2013

## **Teaching**

- **Robotics Institute, School of Computer Science, Carnegie Mellon University, USA**  
Teaching Assistant of 16-811 Math Fundamentals for Robotics, Fall 2015
- **Department of Architecture, National Cheng Kung University, Taiwan**  
Teaching Assistant of Living Labs Workshop, Fall 2009

## **Mentoring**

- **Robotics Institute, School of Computer Science, Carnegie Mellon University, USA**  
Undergraduate Intern (Sean Prendi), 2018 - 2019

(Last updated: March 15, 2021)