Ira Winder

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EDUCATION

2011 – 2013 **MASSACHUSETTS INSTITUTE OF TECHNOLOGY**, Cambridge, MA – Urban Studies and Planning
Master of City Planning – City Design and Development
MIT Shell Energy Fellowship, China Energy Foundation
Commuter Common: Measuring and Improving the Transportation Footprint of Urban Institutions

2009 **HONG KONG UNIVERSITY**, Hong Kong, HK – Faculty of Architecture
Exchange Student, Friends of HKU Scholarship

2006 – 2010 **MASSACHUSETTS INSTITUTE OF TECHNOLOGY**, Cambridge, MA – Dep. of Architecture
Bachelor of Science, Art, and Design
Phi Beta Kappa Honors Society, CFWNC Regional Scholarship, Harry and Zoe Poole Scholarship
First Place Velux Design Competition, Faculty Award for Achievement in Design
Thesis: *Complete Drawing Prototypes for Urban Complete Streets*

2004 – 2006 **NC SCHOOL OF SCIENCE AND MATHEMATICS**, Durham, NC
Most Outstanding Senior Mathematics Student, National Honors Society

WORK & AFFILIATIONS

2019 - present **MIT DEPARTMENT OF AERONAUTICS AND ASTRONAUTICS**, Cambridge, MA
Research Affiliate, Collaborating with MIT Engineering Systems Laboratory to implement selected research projects as interactive simulations.

2019 - present **UNIVERSITY OF TOKYO GRADUATE SCHOOL OF FRONTIER SCIENCES**, Tokyo, Japan
Special Project Researcher, Leading design and implementation of laboratory-wide interactive simulation platform to help researchers deploy computational systems models.

2015 – present **ON CUE DESIGN LLC**, Cambridge, MA
Principal, Implementing interactive simulations of complex systems that facilitate business planning, client interactions, and education for a variety of domains including cities, aerospace (Airbus), pharmaceuticals (GSK), real estate (Lend Lease), distribution (Walmart), and infrastructure (Gensler).

2018 – 2019 **MIT DEPARTMENT OF URBAN STUDIES AND PLANNING**, Cambridge, MA
Technical Instructor, oversaw the development of the new program for Urban Science and Planning with Computer Science. Engaging in joint research with MIT Strategic Engineering Research Group at the convergence of systems engineering, decision science, interactive simulation, and visualization.

2014 – 2019 **MIT UNDERGRADUATE RESEARCH OPPORTUNIES PROGRAM (UROP)**, Cambridge, MA
Supervisor, Advised myriad MIT undergraduates as they conduct original research in the field(s) of urban planning, interactive computation, and human-computer interaction.

2018 – 2019	**MIT SOCIOTECHNICAL SYSTEMS RESEARCH CENTER**, Cambridge, MA
	Research Associate, Developed method, tools, and experiments to study how teams solve problems in complex systems. Collaborating with technical researchers to implement interdisciplinary simulations.
2017 – 2018	**CENTRE FOR LIVEABLE CITIES**, Singapore, SG
	Affiliate, Implemented interactive simulations of pedestrian walkability in Singapore.
2013 – 2017	**MIT MEDIA LAB**, Cambridge, MA – Changing Places Group
	Research Scientist, Invented the Tactile Matrix (a.k.a. CityScope), a tangible-interactive computational platform used for interdisciplinary research of complex systems and multi-stakeholder engagement. Personally developed and maintained research contracts with myriad companies and agencies including GSK, Walmart, and Singapore Government.
2010 – 2011, 2008	**KOBAYASHI MAKI DESIGN WORKSHOP**, Tokyo, Japan
	Designer, Researched feasibility of structural timber for high-rise development. Developed branding and design of 400 general merchandise stores newly acquired by Walmart.
2009 – 2010	**UTILE DESIGN**, Boston, MA
	Intern, Worked with City of Boston to design and produce Boston's Complete Streets Guidelines.

RESEARCH

2013 to present	**INTERACTIVE SIMULATION FOR ENGINEERING SYSTEMS**
	Implementing computational simulations of real-world phenomena for the purpose of problem exploration and rapid scenario evaluation. Advisor: Olivier de Weck, MIT AeroAstro
2014 to 2018	**TACTILE MATRIX (A.K.A. CITYSCOPE)**, https://ira.mit.edu/tactile-matrix/
	Open-source system of machine-readable objects that performs real-time computation and dynamic projection mapping, enabling tangible multi-stakeholder collaboration across domains.
2009 to 2018	**PEDESTRIAN WALKABILITY**
	Investigation of policies and properties within the built environment conducive to human walkability. Evaluation of walkability for real and hypothetical urban development scenarios.
2010 – 2012	**CLEAN ENERGY CITIES**
	Developed strategies and interactive pro forma analysis for clean energy real estate development. Advisor: Dennis Frenchman, MIT DUSP

PUBLICATIONS

2023	I. Winder and K. Hiekata. **Inclusive Interactive Simulation: Stakeholder Empowerment, Satisfaction, And Confidence In Solution Design And Decision Making.** Product: Management and Development vol.21, n1, e20230010 (2023). doi: 10.4322/pmd.2023.004

I. Winder and K. Hiekata. **Inclusive Interactive Simulation: Stakeholder Empowerment in Design.** *Leveraging Transdisciplinary Engineering in a Changing and Connected World: Proceedings of the 30th International Society of Transdisciplinary Engineering (ISTE) Global Conference*, July 11–July 14, 2023, Hua Hin Cha Am, Thailand. Vol. 41. IOS Press, 2023. doi: 10.3233/ATDE230677

2022   I. Winder and K. Hiekata. **Generic User Interface for Inclusive Interactive Simulation.** *Transdisciplinarity and the Future of Engineering: Proceedings of the 29th International Society of Transdisciplinary Engineering (ISTE) Global Conference*, July 5–July 8, 2022, Cambridge, MA, USA. Vol. 28. IOS Press, 2022. doi: 10.3233/ATDE220656

2021   I. Winder and K. Hiekata. **User Interface Design for Multi-Objective Decision Making.** *The 28th ISTE International Conference on Transdisciplinary Engineering (TE2021)* England (Virtual), Vol. 16, pp. 566-573, July 5-9, 2021. doi: 10.3233/ATDE210137

2020   I. Winder, D. Delaporte, S. Wanaka and K. Hiekata, **Sensing Teamwork During Multi-objective Optimization**, *2020 IEEE 6th World Forum on Internet of Things (WF-IoT)*, New Orleans, LA, USA, 2020, pp. 1-6, doi: 10.1109/WF-IoT48130.2020.9221086

P. Manandhar, K. Rong; K. Carroll, R. de Filippi, I. Winder, J. Dieffenbach, B. Moser. **Sensing Systemic Awareness And Performance Of Teams During Model-Based Site Design**, *2020 IEEE 6th World Forum on Internet of Things (WF-IoT)*, New Orleans, LA, USA, 2020, pp. 1-6, doi: 10.1109/WF-IoT48130.2020.9221406

2018   Chavy-Macdonald, Pelegrin, Wanaka, Winder, and Moser. 2018. **Field Guide To Interpreting Engineering Team Design Behavior With Sensor Data.** In Proc. *Complex Systems Design & Management Conference. Dec 2018.*

Winder, Lutz, and Chen. **Evaluation Toolkit for Synchronous Collocated Collaborative HCI.** *In Proc. MIT Systems Design & Management Symposium, May 2018.*

2017   Winder, Ira. **Bits and Bricks: Tangible Interactive Matrix for Real-time Computation and 3D Projection Mapping.** Best Project Demonstration. *In Proc. IEEE Future Technologies Conference, Nov 2017.*

2016   Nakagawa, Anisha, and Ira Winder. **Hurricane Evacuation Traffic Model.** 2016 IEEE MIT Undergraduate Research Technology Conference (URTC). 1–4. IEEE, 2016.

Leng, Yan, Alejandro Noriega, Alex "Sandy" Pentland, Ira Winder, Nina Lutz, and Luis Alonso. **Analysis of Tourism Dynamics and Special Events through Mobile Phone Metadata.** *ArXiv:1610.08342 [Cs]*, October 26, 2016. http://arxiv.org/abs/1610.08342.

2015   Winder, Ira. **System for Real-time Digital Reconstruction and 3D Projection-Mapping of Arbitrarily Many Tagged Physical Objects.** US Provisional Patent, April 2015.

President's Council of Advisors on Science and Technology. **Technology and the Future of Cities Report to the President.** p 73-75, Feb 2015.

Alrashed, Tarfah, Almaha Almalki, Salma Aldawood, Tariq Alhindi, Ira Winder, Ariel Noyman, Anas Alfaris, and Areej Alwabil. **An Observational Study of Usability in Collaborative Tangible Interfaces for Complex Planning Systems**. *Procedia Manufacturing* 3 (2015): 1974–80.

2013   Winder, James Ira. **MIT Commuter Common : Measuring and Improving the Transportation Footprint of an Urban Institution.** Thesis, Massachusetts Institute of Technology, 2013.

2011   Frenchman et al. **Designing Clean Energy Cities: New Approaches to Urban Design and Energy Performance.** *Research and Studio Report, 2010*. Massachusetts Institute of Technology and Tsinghua University, 2011.

2010   Winder, James Ira. **Complete Drawing Prototypes for Urban Complete Streets.**
Thesis, Massachusetts Institute of Technology, 2010.

SELECTED SPEAKING & TEACHING

2020   **FABCAFE: MAKER COMMUNITIES RESPOND TO COVID-19**, Tokyo, Japan
Speaker: Pandemic Simulation, 24 Apr 2020

2019   **EDGEOF INNOVATION TALKS**, Tokyo, Japan
Speaker: Evolutionary Simulation, 8 Nov 2019
PRAGUE CITY DATA CONGRESS, Prague, Czech Republic
Keynote Speaker: Interactive Simulation, 31 May 2019

2018   **MIT 11.S195 COMPUTATIONAL URBAN SCIENCE WORKSHOP**, Cambridge, MA
Instructor. Winter and Spring Courses, 2019
GATES VENTURES: AFFORDABLE HOUSING WORKSHOP, Seattle, WA
Developed and Presented Tangible Simulation for Bill Gates, 19 Nov 2018
INNOVATION: BEYOND THE BUZZWORD, Cambridge, MA
Speaker: MIT Professional Education Program, 17 July 2018
MIT WORLD REAL ESTATE FORUM, Cambridge, MA
Keynote. Interactive Simulation: Novel Interfaces For Decision-Making. 22 May 2018.

2017   **COMPLEX SYSTEMS DESIGN & MANAGEMENT CONFERENCE**, Paris, France
Exhibitor. Tactile Matrix Tangible Interface. 12-13 December 2017.
FUTURE TECHNOLOGIES CONFERENCE, Vancouver, Canada
Speaker. Bits and Bricks: Tactile Matrix Interface for Collaborative Decision Making. 28 Nov 2017.
URBAN95 EXPERT ASSEMBLY: FROM IDEAS TO ACTION FOR YOUNG KIDS, Amsterdam,
Netherlands
Panelist. Bernard Van Leer Foundation. 3-4 May 2017.

2016   **BOSTON PROPERTIES UNIVERSITY**, Cambridge, MA
Speaker. AR Simulation Systems To Predict The Impact Of Disruptive Interventions. 14 Sep 2016.
WORLD CITIES SUMMIT, Singapore, SG
Exhibitor. Tangible Matrix for Walkable Cities. 8-9 July 2016.
G7 SUMMIT: ICT FORUM, Takamatsu, Japan
Panelist. Encoding Discourse. 21 April 2016.
AMERICAN PLANNING ASSOCIATION CONFERENCE, Pheonix, AZ
Speaker. Tech Zone: Changing Reality. 4 April, 2016.

2015   **BEYOND SMART CITIES**, Cambridge MA
Speaker. MIT Professional Education Program, 25 June 2015.
US CHAMBER OF COMMERCE FOUNDATION, Washington, DC
Keynote at Board Meeting. Towards High-Performing, Liveable, Entrepreneurial Cities. 5 November
2015.
GUIYANG BIG DATA EXPO, Guiyang, China
Keynote. CityScope Urban Analytics Platform. 27 May 2015.

2014	**AUTODESK UNIVERSITY**, Las Vegas, NV
	Speaker. Innovation Forum: The Future of How Infrastructure is Made. 3 November 2014.
	TEDx BOSTON, Boston, MA
	Speaker. Updates from Our Future City. 2 October 2014
	MIT MAS.552J/4.557J – CHANGING CITIES, Cambridge, MA
	Co-Instructor. Urban Systems Prototyping Using CityScope. Fall 2014 Course.
2013	**MIT MAS.552J/4.557J – INNOVATION HUBS**, Cambridge, MA
	Co-Instructor. Urban Systems Prototyping Using Rhino and GrassHopper. Fall 2013 Course.
	MIT MAS.552J/4.557J - NEW URBAN VILLAGE, Cambridge, MA
	Co-Instructor. Urban Systems Prototyping Using Lego. Spring 2013 Course.

METHODS Mathematical Modeling, Computation, Data Visualization, Tangible-Interaction, Augmented Reality, Rapid Prototyping, Computer Vision, Statistics, Graphic Design, Scale Modeling, Sketching

TOOLS Java/Processing, Javascript/p5.js/HTML/CSS, GitHub, AWS (EC2), Unity/C#, OpenCV (Computer Vision), ArcGIS/QGIS, Google Maps API, CAD (Rhino, Autodesk), Scripting/Grasshopper, SketchUp Pro, Adobe Suite, Carpentry, Laser Cutting/CNC 3D Printing

MISC Japanese Language (Intermediate), Folk Dancing, Organic Farming, Rural Communities, Cycling, Board Games