

GOOD SYSTEMS



A UT Grand Challenge

Good Systems and City of Austin Collaboration Overview

December 9, 2020

City of Austin presenters (in order of appearance)

CHARLES PURMA

IT Manager, CTM

SARA SMITH

IT Business Analyst, Senior, City of Austin

TED LEHR

IT Data Architect, CTM

University of Texas Presenters (in order of appearance)

JENNIFER LYON GARDNER

Deputy Vice President for Research

ANDREA CRISTELLE

Good Systems Network Relationship Manager

JUNFENG JIAO

Good Systems Executive Team Chair



Opening Remarks



Charles Purma, III
IT Manager, CTM



Jennifer Lyon Gardner
Deputy Vice President for Research

GOOD SYSTEMS

A UT Grand Challenge

Designing AI technologies that benefit society is our Grand Challenge...

Vision

Generate AI ethics protocols that are widely accepted, cited, and used.

Mission

Create human machine partnerships that address the needs and values of society.

Mechanisms

- Research Projects
- Good Systems Network
- Research Focus Areas

FY21 Research Focus Areas

CRITICAL SURVEILLANCE INQUIRY

We work with scholars and organizations to curate conversations and exhibitions that help people understand the social and ethical implications of surveillance.

DISINFORMATION

We support an interdisciplinary faculty research community that makes monthly research presentations, and sponsor special programming to advance the understanding of dis- and misinformation.

FAIR AND TRANSPARENT AI

We work to create fair and transparent AI technologies that people can easily use and rely on.

FUTURE OF WORK

The way people work is changing. Our research explores new ways for people and AI to work together.

GOOD SYSTEMS

PUBLIC INTEREST TECHNOLOGY

We build teams that gather public, open, and accessible data, to integrate research with policy, journalism, and local activism.

MACHINE LEARNING AND ROBOTICS

We focus on how fairness and other ethical considerations are applied in machine learning and robotics.

RACIAL JUSTICE

We serve as a resource for education, community engagement, and research at the intersections between racial justice and technology/AI.

SMART CITIES

We develop transformative technologies to achieve resiliency and sustainable growth in urban communities.



Collaboration Scope

We are bridging barriers between fundamental knowledge and real-world problems by connecting disciplines, techniques, and ways of thinking.

- **7 Collaborative projects**
- **12 City of Austin Departments**
- **13 UT Departments and Schools**

Good Systems City of Austin Collaborative Projects

- Austin AI Housing Analysis
- Inclusive and Trustworthy AI Governance Design
- Inspection of City Infrastructure via Peripheral Perception
- ML4GIS: Developing and Evaluating Computer Vision Methods to Enhance Access to Geospatial Data in Large Historical Map Collections
- Optimize EMS Responses during Extreme Events
- Cameras, AI and Public Values in Smart Cities
- Smart Cities Should Be Good Cities: AI, Equity, and Homelessness



Austin AI Housing Analysis



Junfeng Jiao

Associate Professor

Hampton K. and Margaret Frye Snell Endowed Chair in Transportation

Junfeng Jiao is an associate professor in the Community and Regional Planning program and founding director of Urban Information Lab at UTSOA.



Jake Wegmann

Assistant Professor

Jake completed his doctoral work at the University of California, Berkeley in 2014, with a dissertation entitled "We Just Built It: Code Enforcement, Local Politics, and the Informal Housing Market in Southeast Los Angeles County." His research lies at the nexus of housing, real estate development, and planning. He has published research on the racialized restructuring of metropolitan space, microhousing infill, and the measurement of affordable rental housing cost efficiency in *Urban Geography*, *Journal of Urbanism*, and *Housing Policy Debate*.



Hao Zhu

Assistant Professor

Dr. Hao Zhu joined the Department of Electrical and Computer Engineering at The University of Texas at Austin in August 2017. Before that, she has been an Assistant Professor of ECE at the University of Illinois Urbana-Champaign (UIUC) since 2014. Her research interests include energy data analytics and cyber-physical situational awareness for power grids. Dr. Zhu received the NSF CAREER Award in 2017, the Siebel Energy Institute Seed Grant in 2016.



Katie Pierce Meyer

Head of Architectural Collections

I am responsible for developing new and curating existing collections at the Architecture & Planning Library, in collaboration with my colleagues in the Alexander Architectural Archives. I also participate in digital humanities, scholarship, and preservation activities and will happily discuss complex digital objects.



Weijia Xu

Research Engineer
Manager, Data Mining And Statistics
Data Intensive Computing

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xu@tacc.utexas.edu

Dr. Weijia Xu is the group lead for Data Mining & Statistics group. Prior to joining TACC, he obtained a master's degree in Biological Sciences and a doctoral degree in Computer Science from The University of Texas at Austin.

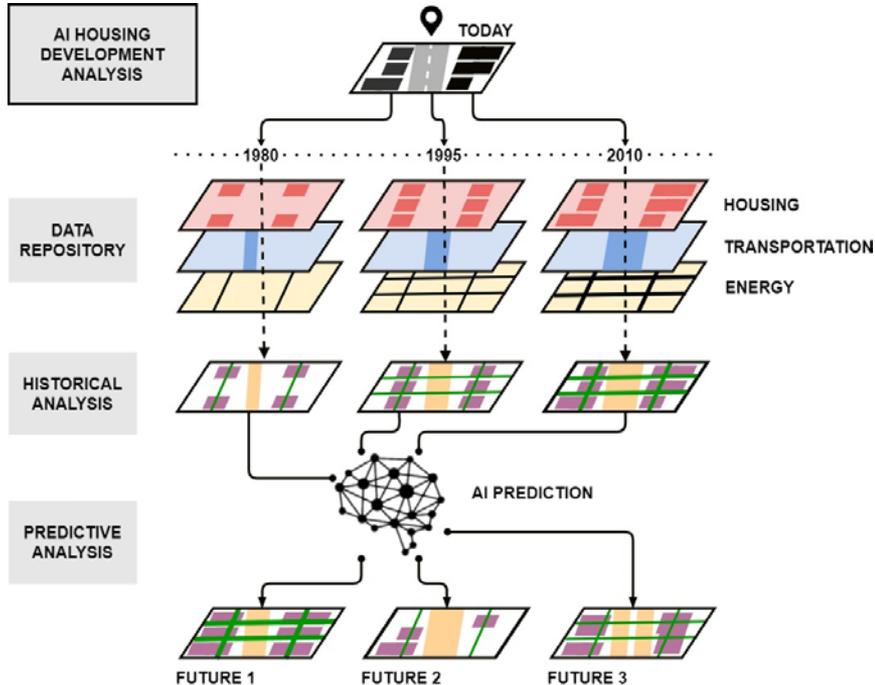
Dr. Xu's main research interest is in the field of large-scale information management and analysis. The goal of his research is to enable data driven discoveries through developing new methods and applications that facilitate the data to knowledge transfer process. Dr. Xu has extensive experiences in working with domain scientists in database and analytical methods development. Dr. Xu has over thirty peer-reviewed conference and journal publications in similarity based data retrieval, data analysis and information visualization with data from various scientific domains.

AREAS OF RESEARCH

- Big Data
- Data Science
- Cloud Computing



Austin AI Housing Analysis



Key aspects

Housing affordability model

Geographic and demographic analysis of change over time

Housing costs + Energy costs + Transportation costs

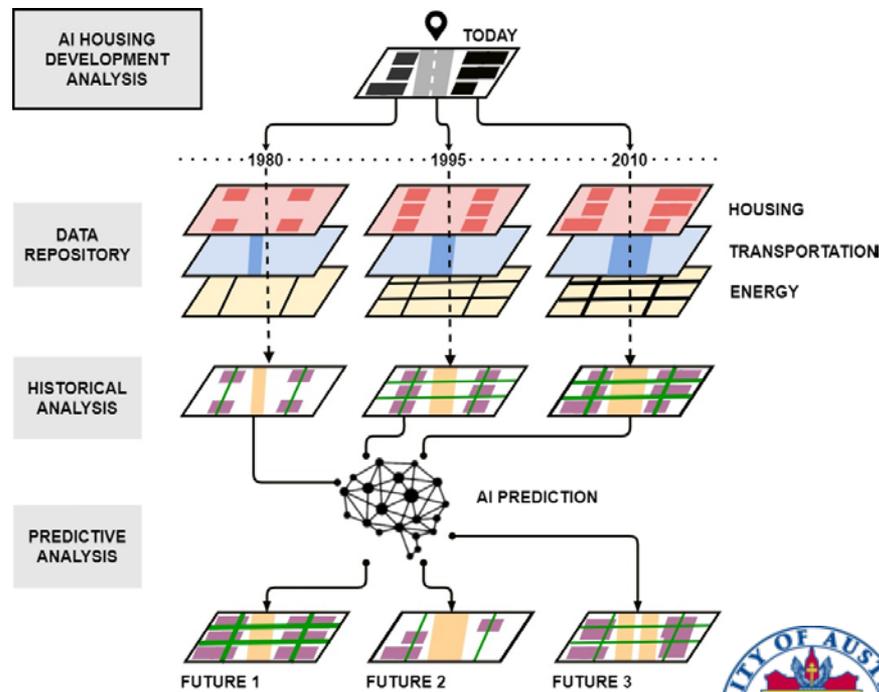
Tool for evaluating and testing equitable regulatory scenarios

Housing affordability and COVID-19 (what has changed so far?)

Austin AI Housing Analysis

Milestones

1. **Data Repository**
 - Web-based open data portal
2. **Longitudinal Housing Affordability Model (Historical Analysis)**
 - Change in appraised property values, as well as energy and transportation costs
 - 1990 to 2020, yearly
 - Parcel scale (analysis of *types* of housing development)
 - Analysis of outcomes of past policy (what has helped?)
 - Model will provide training data for predictive AI
3. **Regulatory Scenario Equity Evaluation (Predictive Analysis)**
 - AI-assisted
 - Projection of past affordability trends into future
 - Estimate effect of various regulation changes on affordability projections based on past outcomes
4. **Public workshops to introduce analysis data and method to researchers**



COA-UT Good Systems Projects

Project Title	UT Departments	Research Focus Areas	COA Departments	SD23 Goals
Austin AI Housing Analysis	<ul style="list-style-type: none"> Architecture Electrical and Computer Engineering Texas Advanced Computing Center 	<ul style="list-style-type: none"> Smart Cities 	<ul style="list-style-type: none"> Housing and Planning Transportation Austin Energy Watershed CTM 	<ul style="list-style-type: none"> Government that works for all Economic Opportunity & Affordability Health & Environment Mobility
Inclusive and trustworthy AI governance design	<ul style="list-style-type: none"> College of Liberal Arts Communications Studies Computer Science Information Population Health 	<ul style="list-style-type: none"> Fair and Transparent AI Racial Justice 	<ul style="list-style-type: none"> Development Services 	<ul style="list-style-type: none"> Government that works for all Economic Opportunity & Affordability
Inspection of City Infrastructure via Peripheral Perception	<ul style="list-style-type: none"> Architecture Computer Science 	<ul style="list-style-type: none"> Machine Learning and Robotics Smart Cities 	<ul style="list-style-type: none"> Public Works Sustainability Office 	<ul style="list-style-type: none"> Government that works for all Safety Health & Environment
ML4GIS: Developing and Evaluating Computer Vision Methods to Enhance Access to Geospatial Data in Large Historical Map Collections	<ul style="list-style-type: none"> Geography and the Environment Information UT Libraries 	<ul style="list-style-type: none"> Future of Work Public Interest Technology Smart Cities 	<ul style="list-style-type: none"> Austin Water Austin History Center 	<ul style="list-style-type: none"> Government that works for all Economic Opportunity & Affordability Culture and Lifelong Learning
Optimize EMS Responses during Extreme Events	<ul style="list-style-type: none"> Electrical and Computer Engineering Mathematics 	<ul style="list-style-type: none"> Machine Learning and Robotics Smart Cities 	<ul style="list-style-type: none"> Austin Travis County EMS 	<ul style="list-style-type: none"> Government that works for all Safety
Cameras, AI and Public Values in Smart Cities	<ul style="list-style-type: none"> Journalism and Media Texas Advanced Computing Center 	<ul style="list-style-type: none"> Critical Surveillance Inquiry Smart Cities 	<ul style="list-style-type: none"> Transportation 	<ul style="list-style-type: none"> Government that works for all Mobility
Smart Cities Should Be Good Cities: AI, Equity, and Homelessness	<ul style="list-style-type: none"> Information LBJ School of Public Affairs 	<ul style="list-style-type: none"> Racial Justice Smart Cities 	<ul style="list-style-type: none"> Public Works Housing and Planning CTM 	<ul style="list-style-type: none"> Government that works for all Economic Opportunity & Affordability Safety

Project Exploration & Team Formation Workshop

Overview

- Event held February 2020
- Cocreated by UT and COA staff
- Design thinking methodology
- 45 COA participants / 19 departments
- 36 UT participants / 15 departments



Outcomes

- Networking
- Cross-pollination of ideas
- Better understanding of COA priority challenges & UT expertise and interests
- Initial project idea and team formation + 1 month to formalize and submit a proposal

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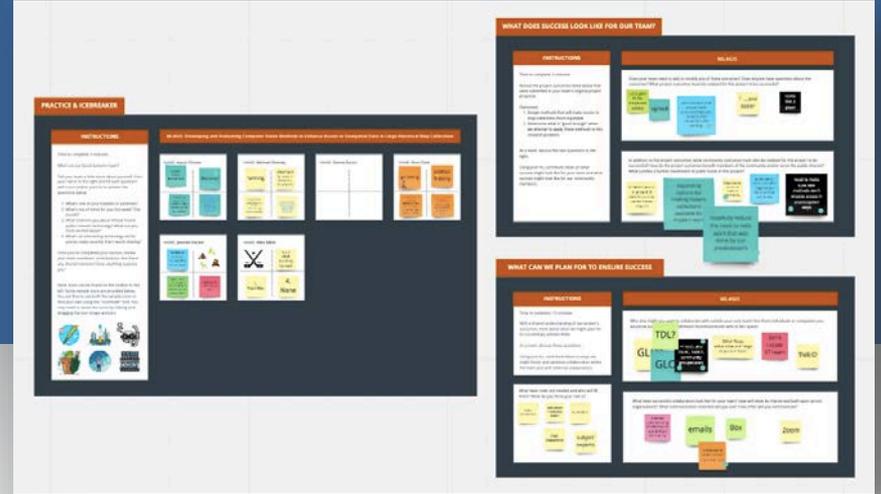
Project Teambuilding and Strategy Workshop

Overview

- Event held November 2020
- Co-organized by UT and COA
- Remote strategic cocreation workshop

Outcomes

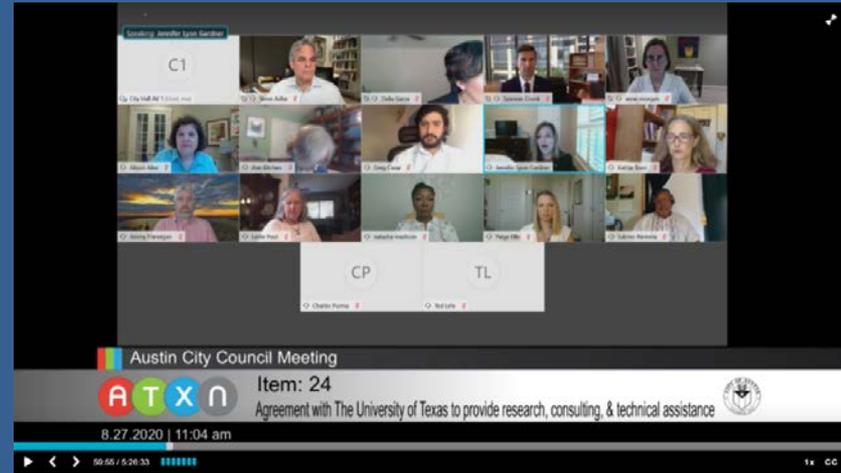
- Project alignment with Smart Cities
- Better understanding of stakeholder needs
- Team building
- Co-created collaboration plans



Next Up: Project exploration and budget planning workshop - February 2021

City of Austin, University of Texas Formalize Research Partnership

- 5-year interlocal agreement
- Pre-approves \$7.5 million for research, consulting and technical assistance from UT faculty and researchers
- Pre-negotiated terms and conditions
- Removes administrative barriers & streamlines city research



"The new ILA facilitates much more rapid collaboration between UT experts and City staff, while collecting tracking information and progress on these collaborations in one location, which should help to ensure closer coordination across projects to improve accountability and to reduce duplicative efforts and costs."

- Jennifer Lyon Gardner
UT Deputy VP for Research

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MASTER INTERLOCAL AGREEMENT No. UTA19-000382
BETWEEN
THE CITY OF AUSTIN, TEXAS
AND
THE UNIVERSITY OF TEXAS AT AUSTIN
FOR
RESEARCH, CONSULTING, AND TECHNICAL ASSISTANCE

THIS MASTER INTERLOCAL AGREEMENT ("Master Agreement") is entered into and effective the 1st day of October, 2020, by and between the City of Austin, a home-rule municipality incorporated under the law of the State of Texas (the "City"), and the University of Texas at Austin, an institution of higher education and agency of the State of Texas (the "University") (hereinafter each referred to individually as a "Party" and collectively as the "Parties"), acting by and through their respective governing bodies, pursuant to and under authority of the Interlocal Cooperation Act, Chapter 791 of the Texas Government Code.

RECITALS:

WHEREAS, this Master Agreement is authorized by Chapter 791 of the Texas Gov't Code; and

WHEREAS, the City is a local government entity as that term is defined in Tex. Gov't Code Sec. 791.003 and the University is an institution of higher education and part of a university system as defined in Tex. Gov't Code Sec. 791.035 and Tex. Edu. Code Sec. 61.003; and

WHEREAS, the University is considered by the City to be qualified to conduct research projects (the "Projects") on the performance of the City's governmental functions, so as to allow the City to identify innovative solutions for serving City residents and addressing local challenges; and

WHEREAS, the City desires to engage the University to conduct the Projects; and

WHEREAS, the research will be focused on the performance of governmental functions or services as that is defined in Tex. Gov't Code Sec. 791.003(3); and

WHEREAS, the City and the University anticipate working together on a range of governmental functions or service Projects over the period governed by the Master Agreement; and

WHEREAS, payment under the Master Agreement will be made based on a cost-recovery method, and therefore the Projects are not subject to competitive procurement under Tex. Gov't Code Sec. 791.035; and

"With the university as a partner, the City has a powerful resource for addressing our most challenging civic issues. The ILA is the right move to set the City up for long-term success in collaborative research and data-driven decision making,"

- Mayor Steve Adler



Big Picture City of Austin & Good Systems Plans for the Future

What are we doing now and where will we be in the future?

AI Vision for Austin: A community-wide competency & AI literacy

- Increased efficiency, better decision making
- Community partnerships to ensure safe, equitable outcomes

Mutual Benefit: domain knowledge & knowledge sharing

- Interdisciplinary and transdisciplinary teams solve real-world challenges

Example future project: UT, CTM and Equity Office collaboration

- Research on bias and AI procurement and implementation

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How the CTTC can help

- Ongoing support to continue Good Systems work
 - Project formation and priority alignment
 - Budget assistance and recommendations
- Staffing & competency needs to support AI long-term
- Active participation and advocacy

Thank you!

