F2F

Opportunities and Needs in AI and CI for Direct Market Farming and Farmers Markets

Sadia Khan, PhD student, Informatics, Indiana University
Alfonso Morales Vilas Distinguished Achievement Professor and Chair, Department of Planning and Landscape Architecture, UW-Madison
Beth Plale, Burns McRobbie Bicentennial Professor of Computer Engineering, Executive Director of the Pervasive Technology Institute, Indiana University
Gabriel Wilkins, MS student, Urban and Regional Planning, UW-Madison
The Kaufman Lab

Alfonso Morales, Edna Ely-Ledesma

The Kaufman Lab supports food system actors around the country. Food distribution, regulation and law, and marketplace organization are among our topics. Our farm2facts.org toolkit makes farmers market managers the PI of their market. For instance, the F2F toolkit (since 2014 supported by 19 USDA, NSF, and NIH grants, subawards, and contracts) is used around the country to foster food security, entrepreneurship, and climate smart agriculture. Our work with the Bloomington, IN farmers market addressed their problem with racist speech by restructuring the market’s bylaws to increase DEI.

F2F collects key data
For institutions, farmers, and markets

...on ecosystem services
To support good environmental practices

...and economics
To support good purchasing decisions
Who We Are

EDNA LEDESMAN
Director, Principal Investigator

ALFONSO MORALES
Founder, Research Associate

LAUREN SUERTH
Founder, Program Director

MAURICE PETROVIC
Research Associate

JESSICA CHAVIÇEZ
Graphic Design and Member Services Intern

ERICA SANDOVAL
Consumer Research and Food System Analyst Intern

EVELYN HENDOZA NUNEZ
Marketing and Web Development Intern

PHILIP WARSZAW
Research Associate

CATHIE DEMETS
Research Associate

ARODEN HEE
Research Associate

ANNA FELDMAN
Communications Intern

RACHEL FLU
Junior Software Developer

HANIBEL LLANO
Project Assistant (PA)

MAGGIE TOMASHEK
Senior Graphic Design and Member Services Intern

More About Edna

More About Alfonso

More About Lauren

More About Maurice

More About Jessica

More About Erica

More About Philip

More About Cathie

More About Aroden

More About Anna

More About Rachel

More About Hanibel

More About Maggie

Who We Are

EDNA LEDESMAN is an Assistant Professor of Planning and Landscape Architecture at the University of Wisconsin-Madison. She researches markets through an emphasis on place and inclusion. Edna is native of Brownsville, Texas, located on the U.S.-Mexico border.

ALFONSO MORALES is a Professor of Planning and Landscape Architecture at the University of Wisconsin at Madison, where he has concentrated policy-relevant research on street vendors. He is also from rural Mexico with roots in farming.

LAUREN SUERTH is the Founder and Program Director of Farm 2 Facts and the pilot project started in 2014.

MAURICE PETROVIC is a research associate at the Social Design Group at the School of Landscape Architecture at the University of Wisconsin-Madison. He served as a member of the Team稳内 Research-Translational Research at Minden Farms.

JESSICA CHAVIÇEZ is a graphic designer and member services intern. She is from southern California and received a B.A. in graphic design and social media.

ERICA SANDOVAL is an undergraduate student at the University of Wisconsin-Madison majoring in consumer behavior and marketing. She is an avid traveler and enjoys exploring new places.

EVELYN HENDOZA NUNEZ is a marketing and web development intern at Farm 2 Facts. Evelyn is from southern California and enjoys exploring new places.

PHILIP WARSZAW is an Assistant Professor of Agricultural Economics and Environmental Justice at Wisconsin State University. Phillip teaches sustainability and is interested in climate change in the rural setting.

CATHIE DEMETS is an Assistant Professor at the University of Wisconsin-Madison. She has worked closely with farmers and the agricultural community to build more resilient, sustainable regional food systems.

ARODEN HEE is an Assistant Professor at the University of Wisconsin-Madison. He has a background in economics, health, and data science.

ANNA FELDMAN is a communications intern at Farm 2 Facts. She is an undergraduate student majoring in journalism and is interested in social media.

RACHEL FLU is a Junior Software Developer at Farm 2 Facts. She is an undergraduate student at the University of Wisconsin-Madison.

HANIBEL LLANO is a project assistant at Farm 2 Facts. He is a research associate at the University of Wisconsin-Madison. He enjoys exploring new places.

MAGGIE TOMASHEK is a senior graphic design and member services intern at Farm 2 Facts. She is an undergraduate student at the University of Wisconsin-Madison. Maggie enjoys exploring new places.
OUR PHILOSOPHY of F2F METRICS

PHILOSOPHY
Practicing the co-creation and use of common and unique metrics.

MISSION
Amplifying farmers market manager’s voice by delivering impactful tools (software and storytelling) to collect, analyze and visualize data.

VISION
Co-producing empowered markets enhancing communities in achieving their objectives.

ETHICS and VALUES
Ethics relate ends, interests, and values. Market managers vary all three. We foster JEDI, engagement, integrity, and innovation.
On Wicked Opportunities...

People – in Farming and marketplaces
Simultaneously celebrated and separated

Software supported micro-democratic market practices
Place, production, processing, distribution, culture and consumption, post consumption

Ethical perspectives and processes
Human and non-human aspects of food system processes

Equitable and future-oriented solutions
FARM 2 FACTS REACH

WISCONSIN
FoodWise
FarmShed

CALIFORNIA
ACE

MICHIGAN
Michigan Farmers Markets Association
Economics Metric

WHY BUY LOCAL?

SPEND $100 AT A LOCAL BUSINESS

$68 STAYS IN YOUR COMMUNITY

LOCAL

PAYS

LOCAL TAXES

SALARIES, WAGES

Local service, accounting,

marketing, printing, etc.

LOCAL SUPPLIES

Farms, paper, signage, etc.

IMPORT SUPPLIES

Your money leaves the community

DONATIONS

Local charities

MAKES

LOCAL

PURCHASES

VAGUE

NON-LOCAL

PAYS

NON-LOCAL TAXES

SALARIES, WAGES

Non-local service

MARKETING,

ACCOUNTING,

PUBLIC RELATIONS

NON-LOCAL SUPPLIES

Farms, paper, signage, etc.

IMPORT SUPPLIES

Your money leaves the community

DONATIONS

Non-local charities

MAKES

NON-LOCAL

PURCHASES

$43 STAYS IN YOUR COMMUNITY

$32 LEAVES LOCAL ECONOMY

$57 LEAVES LOCAL ECONOMY

Data from Local First, 2008
"Local Matters" study by City Economics
Economics Metrics

Metrics Include:

- Annual sales of vendors
- Years in operation of vendors
- Economic Impact/Jobs created
- Sales of products
- Annual spending by customers
- And 264 more from the USDA FM/LFPP application as well as custom metrics....
Ecosystem Services Metric

Regenerative agriculture explained...

- **Regenerative farmers use growing practices that improve the health of their land. Methods include:**
  - **Cover crops**
    - That are grown in the soil after the commercial harvest and can be grazed or harvested themselves
  - **Integrating livestock**
    - To combine animals and plants in a circular ecosystem
  - **No-till systems**
    - That improve soil health and prevent erosion thanks to minimal soil disturbance
  - **Minimising chemical inputs**
    - That destroy biodiversity and pollute waterways due to runoff
  - **Increasing biodiversity**
    - To boost nutrients, natural decomposition and attract insect predators of pests.
  - **Rotating crops**
    - To naturally balance what is being taken out and put into the soil

[www.eitfood.eu/regenerativeagriculture](http://www.eitfood.eu/regenerativeagriculture)
Ecosystem Services Metric

- Alternative Power
- Soil Health
- Biodiversity
- Livestock
- Hauling to Markets
- Infrastructure & Machinery
Ecosystem Services Metric

Soil Health Practices

Do you practice diversified crop rotations with 3 or more crops?

Please select…

What percentage of your farm is covered in perennials?
Includes grass, trees, perennial products etc. (Plants that live 2 or more years)

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Do you practice reduced-till or no-till on your farm?

Please select…

Cala Farm 2021

Agroforestry, Organic, Permaculture, Silviculture Practices
Weekly to Monthly Rotational Grazing

25 Acres in Conservation
30% Perennial Crops

www.sharedgroundcoop.com/cala-farm
calafarm@gmail.com
Icicle.net 20m NSF AI/CI institute
OSU-DK Panda and 13 organizations
Democratizing AI ethically

Use-Inspired Science
(Smart Foodsheds,
Animal Ecology, Digital Agriculture)
Integrating software into CI

Cyberinfrastructure is a set of cloud-hosted services

Frameworks exist, and are being improved, for integrating desktop tools to work with cloud services

Tools often communicate with cloud services through Application Programming Interfaces (APIs)

New digital tools (e.g., drones, smart devices, field sensors) pose new challenges to integration

AI could facilitate this cyber communication and improve human-machine interaction
Incorporating Geographic Information Systems

Maps for Metrics
Foodsheds, supply chains, and market networks

Remote Sensing
Monitoring crop health, biodiversity, and trends over space and time

Maps for Marketing
Showcase local food networks, farm organization, wildlife habitat restored
Market creativity in context: how AI helps
Dimensions of Software Integration

- Software for the non-professional, e.g. Farm2facts.org
- Complimentary Software, e.g. for GIS
- Enables decision-support for local government
- Multiple and divergent perspectives

Dignity/Self representation
- Acknowledging interaction and perspective
- Foster consent/autonomy and appropriate interdependencies
- Distribute power/control enable planning, preparedness and responsiveness
Centering ICICLE within the landscape of AI ethics:

- Resurfacing historical concerns around moral norms and justice (STS and Information Theory)
- Drawing on contemporary work on AI ethics (participating in the discourse on FAIR /FACT and ethical AI)
- Implementing contemporary data security best-practices (Building off the Census Bureau's differential privacy and statistical safeguards)
- Bringing real-world issues of bias and social harm into focus (thinking about stakeholders in the context of the risks of AI)
Dimensions of Privacy

Public/Private Disclosure of Facts  
Right to be Let Alone  
Intrusion Upon Seclusion  
False Light

Dignity/Self Representation  
Consent/Autonomy  
Power/Control

Aspects of Non-human Privacy

- Human Threatened species
- Climate change – or second-order threats
- Human Use (or exploitation) of Ecosystem Data

- Places as ‘Persons’ and rights of species
- Habitat Preservation
- Habitat Restoration
Use **model cards** to build trust through accountability and contextuality.

Model cards need regular revisiting as conditions/perspectives (e.g., regulatory) change.

**Method**

**MODEL CARDS**: a mechanism for improving accountability in AI/ML development

- Model cards offer a standardized method of documentation for model building which encourages transparent model reporting.
- Model card reporting requires model developers to specify the context in which models are intended to be used, the performance statistics on a variety of conditions (such as cultural, demographic, and phenotypic groups) and other relevant information.
- Model cards must be regularly revisited as conditions (e.g., regulatory, technical) change.
Farms, Markets, AI, and Trust

Vendors and Consumers start with interest(s),

Markets realize those in a trusting context, produced by vendors, and stakeholders

Trust developed and modified by relationships and knowledge of data/AI tools/processes

AI may enable data synthesis across existing data tools and data collection practices

Earning and deserving that trust depends on transparency and ethical AI development
Summary & Conclusion

How do we know?
Assumptions, research, risks, relationships, trust (iterative and reciprocal)

F2F collects key data
On ecology and economy for institutions, farmers, and markets

Cyberinfrastrucutre adds capabilities
ICICLE enhances and grows these efforts

Ethics must be prioritized
From the conceptual beginning through to flexible, in-field improvements