

CENTER OF
COMPLEX
INTERVENTIONS



2022 IMPACT REPORT



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PHOTO BY KAYANA SZYMCAK



WHO WE ARE

HELPING COMMUNITIES TRANSLATE SCIENCE INTO ACTION

The Center of Complex Interventions (CCI) is a Boston-based nonprofit that combines research with action to take on problems that have no easy answers. Working at the nexus of academia, industry, government, and community, CCI's role is to translate science into actionable steps to address some of society's most multifaceted challenges.

CCI receives funding through gifts and project specific grants from organizations including the Reid Hoffman Foundation and Digital Garage.

2022 IN RETROSPECT

This past year has brought many successes and changes. CCI continued to pursue its core mission of helping communities translate science into action. We are excited to share different expressions of this mission, including Mathesar, an open-source tool that allows users to manage their data, and the Chelsea Project, a community-led COVID response project that has evolved to address broader public health issues. In addition to CCI's project accomplishments, we expanded our network of collaborators and shared our work at the national public health conference.

2022 was also a year of transition for our organization. We welcomed new team members who bring deep expertise in public health, data science, and engineering while others moved on to new opportunities. Our experience working on the COVID response in Chelsea prompted us to narrow our focus to health-related problems, particularly areas where health intersects with other challenges such as climate change and data privacy. Finally, we've started exploring consulting opportunities that will allow us to partner with the government and industry to bring solutions to communities more sustainably.

As a young organization, we expect more changes in 2023 as we explore new opportunities and collaborations. Thank you to our partners, funders, and Board for your support and guidance. And a huge thank you to the CCI team - your dedication to making our complex world a better place is truly inspiring.

Samantha Bates

Samantha Bates
Executive Director



2022 IMPACT HIGHLIGHTS

HIGHLIGHTS

MATHESAR HAS LAUNCHED

Alpha version released in early 2023, Mathesar has over 1000 GitHub stars.

Our collaboration on the rapid testing study in Chelsea conducted over 3,000 rapid tests and provided real world data to support FDA approval of one brand of rapid antigen test. The application for FDA approval is currently under review.

MATHESAR WAS SELECTED AS A MENTORING ORGANIZATION FOR GOOGLE SUMMER OF CODE (GSOC)



WE RELEASED THREE NEW PUBLICATIONS DOCUMENTING OUR SUCCESSES AND LEARNINGS IN CHELSEA.

📖 COVID-19 INTERVENTION MANUAL

A handbook showcasing the successful approach used by the Chelsea Project to address COVID-19 transmission in Chelsea, Massachusetts.

📖 NOTES FROM THE FIELD IN THE AMERICAN JOURNAL OF PUBLIC HEALTH

The American Journal of Public Health accepted our article “The Chelsea Project: Turning research and wastewater surveillance on COVID-19 into health equity action” as a Note from the Field published in January 2023.

📖 INFECTIOUS DISEASES AND GLOBAL HEALTH PARTNERSHIPS

Public Health Director Cris Alonso wrote book chapter, “When women lead: alternative mobilizations”, in “Infectious Diseases and Global Health Partnerships” published by Springer Nature in 2023

2022 IMPACT HIGHLIGHTS

Our work in Chelsea was recognized in an episode of “wbur on point” and in a Propublica article about rapid antigen tests.

GROWING NETWORK OF COLLABORATORS

We worked with 8 new partners from industry, nonprofit sector and academia.

Completed two consulting projects with industry partners and applied for a third consulting project.

PROJECT STATS

3,946

RAPID TESTS CONDUCTED IN CHELSEA

57

COMMUNITY CONTRIBUTORS TO MATHESAR

8

NEW PROJECT COLLABORATORS/PARTNERS

1500+

GITHUB STARS FOR MATHESAR



HEALTH CARE WORKERS HENRY PAUL, FROM LEFT, RAY AKINDELE, WILTA BRUTUS AND LESLIE POWERS PROCESS COVID-19 RAPID ANTIGEN TESTS. (AP PHOTO/JAE C. HONG, FILE)

THE RAPID TESTING STUDY RECEIVED ONE OF ONLY TWO FDA NATIONAL RESEARCH GRANTS TO CONTINUE THROUGH THE END OF 2022.

PROJECTS

CCI translates science into action through research, community engagement, and tool building.

HEALTH

In addition to supporting the COVID-19 response in Chelsea, CCI brought together public health partners to discuss health equity initiatives, presented research at a national public health conference, and explored consulting opportunities to apply the Chelsea Project model to other health issues.



COVID-19 Intervention Manual



The Chelsea Project



Travel Patterns and Infectious Diseases Research

CLIMATE

CCI has continued to support a climate research mapping tool that identifies ongoing projects and funding in the climate change field. The team also provides research and strategic support to a California-based project to develop and implement a climate action plan in hospitals that address increased health risks caused by wildfire smoke.



Climate Map & Online Tools



Sustainable Homes



California Wildfires



PROJECTS & PUBLICATIONS

TOOLS

Tool building remains a core focus for the CCI team and plays a vital role in translating data into action. After two years of development, Mathesar, an open-source database tool that lets anyone of any technical skill level easily organize and use data, has officially launched. With the launch of Mathesar and further development of Datacurator, a key goal for CCI in 2023 will be to integrate these tools into the organization's other ongoing projects.



Mathesar



Data Curator



Policy Simulator

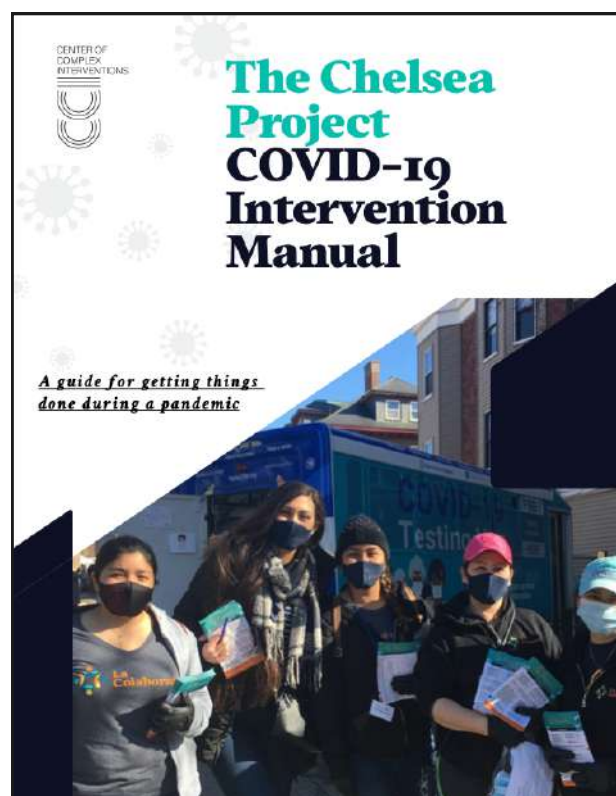
PUBLICATIONS



COVID-19 INTERVENTION MANUAL

This year we focused on documenting and disseminating our experience in the COVID-19 response in Chelsea through a series of important publications. We designed and published a toolkit that outlines our approach to the Chelsea project, including how we built a partnership model with our collaborators in Chelsea and our experience implementing a rapid quality improvement cycle for public health response.

The toolkit is available for free on our website for download. The accompanying diagrams for project design are also available for free download to help guide any implementing partner. Our target audience for the toolkit is local public health departments, community-based organizations, and public health foundations that seek to build collective power in tackling complex health inequities.



DOWNLOAD COVID-19 INTERVENTION
MANUAL AT [CENTEROFCI.ORG](https://centerofci.org)

PUBLICATIONS



WHEN WOMEN LEAD...

Public Health Director, Cristina Alonso, wrote two peer-reviewed articles about our experience to disseminate our findings among the public health community. The first is a chapter in "Infectious Diseases and Global Health Partnerships," published by Springer Nature in 2023. In our chapter "When women lead: alternative mobilizations," we describe how the women leaders of Chelsea called upon culturally accepted codes to reverse power roles, questioned scientific definitions of needs, and led their community out of potentially irreversible consequences of the COVID-19 pandemic holistically and sustainably. Their leadership serves as an example of how self-governed, women-led organizations rooted in the community may address the real needs of its members during a global catastrophic event.



TURNING RESEARCH INTO ACTION

Our article "The Chelsea Project: Turning research and wastewater surveillance on COVID-19 into health equity action", describes The Chelsea Project as a collaborative effort that included government entities, local nonprofits, and startups that partnered to deploy wastewater analysis, targeted PCR testing and vaccine outreach, and a community-led communications strategy. The article was accepted by the American Journal of Public Health as a Note from the Field and published in January 2023.

READ THE CHELSEA PROJECT WHITEPAPER AT [CENTEROFCCI.ORG](https://centerofcci.org)

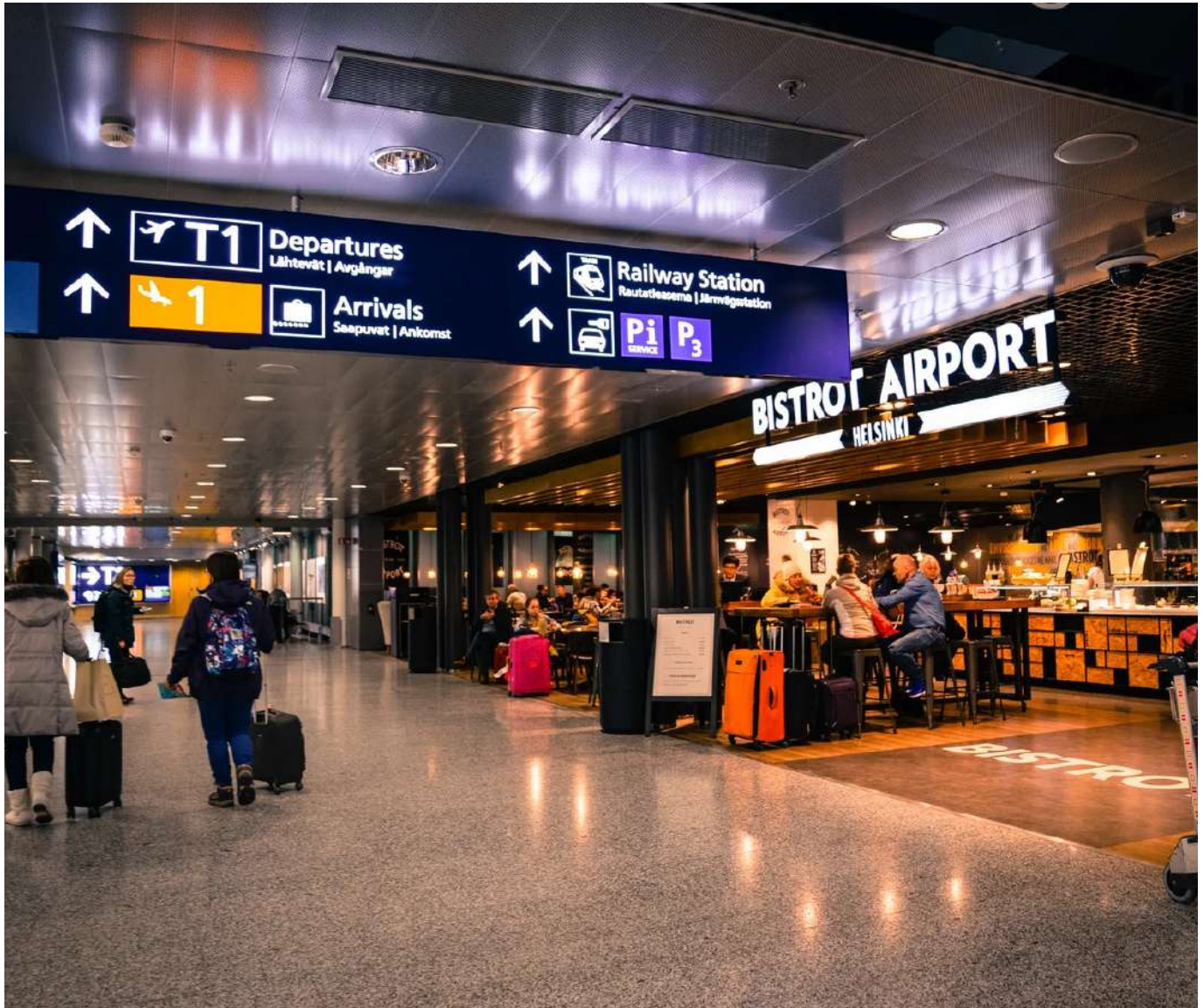
RESEARCH

AIRPORT WORKER MOBILITY PATTERNS AND COVID TRANSMISSION IN VULNERABLE COMMUNITIES

In collaboration with Mass General Hospital, our research team is conducting a novel analysis of airport mobility patterns in Massachusetts that focuses on the travel of essential workers during the COVID-19 pandemic. We found that considerable research has been published about the relationship between air travel and infectious disease. However, very little is known about the impact on air travel on those who work in airports and live in surrounding communities.

Our research identified that most airport workers live in communities that have high rates of social vulnerability. As a result, we deduce that the airport workers' likelihood of being exposed to travel-related infectious diseases is high due to their public-facing jobs, potentially contributing to the high COVID-19 rates and poor outcomes experienced in their home communities in 2020 and 2021. We expect this work to catalyze further research into the dynamics of essential workers from socially vulnerable communities and their vulnerability to travel-related infectious diseases.

RESEARCH



THE CHELSEA PROJECT

COVID-19 RAPID TESTING STUDY

At the start of the Omicron surge in the winter of 2021/2022, CCI partnered with a startup, IDx20, and The Chelsea Housing Authority to launch a rapid testing study to provide free rapid tests to senior residents.

We tested residents in two Chelsea Housing Authority buildings weekly. A vital component of this work was teaching residents how to perform rapid tests so they could test themselves frequently. The FDA used the data collected from this study to support the approval of new rapid tests.



RAPID TESTING TEAM

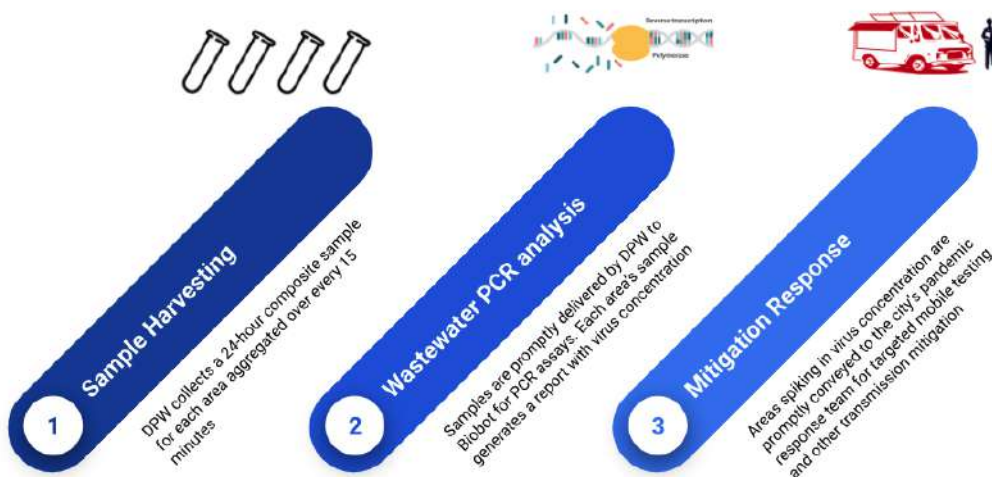
**READ THE CHELSEA PROJECT
WHITEPAPER AT [CENTEROFCCI.ORG](https://centerofcci.org)**

IN THE SPRING OF 2022, THE CHELSEA PROJECT AND COLLABORATOR IDX20 RECEIVED ONE OF ONLY TWO FDA NATIONAL RESEARCH GRANTS TO CONTINUE THE RAPID ANTIGEN TESTING STUDY IN CHELSEA THROUGH THE END OF 2022.

THE CHELSEA PROJECT

WASTEWATER TESTING AND VACCINATION OUTREACH

As seen in prior years, COVID wastewater levels increased right before the holidays and during the cold weather. Unlike previous winters, we knew a mask mandate would not be feasible, so we focused on decreasing the risk of severe outcomes. We partnered with La Colaborativa to develop messaging emphasizing the importance of vaccination.



A DIAGRAM OF THE WASTEWATER MANAGEMENT PROCESS

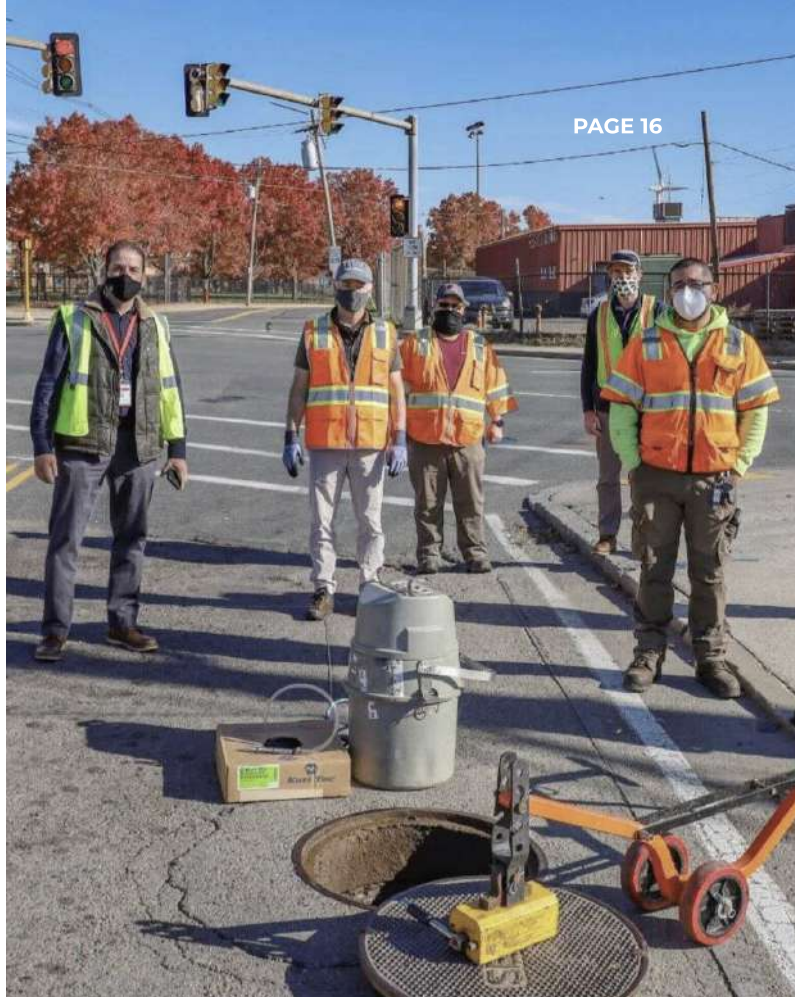


"OUR WORK IN CHELSEA IS BECOMING AN EXEMPLAR TO OTHER CITIES AND COMMUNITIES IMPLEMENTING WASTEWATER TESTING FOR INFECTIOUS DISEASE MONITORING. WE HAVE PROVIDED TECHNICAL ADVICE AND REGIONAL BRAINSTORMING FOR BOSTON AND REVERE WITH OUR PARTNERS AT THE BOSTON PUBLIC HEALTH COMMISSION AND THE CAMBRIDGE INNOVATION CENTER (CIC HEALTH)."

Cris Alonso
Director of Public Health

THE CHELSEA PROJECT

We provided \$40 grocery store gift cards as incentives to encourage residents to get their COVID and flu vaccines at clinics in December 2022 and January 2023. Over these two months, roughly 300 residents received flu and COVID vaccines through the community-led vaccine clinics.



Mass General Hospital supplied 500 free COVID rapid tests to include in holiday gift bags that La Colaborativa handed out to residents receiving food from the food pantry. By embedding wastewater monitoring in a holistic public health strategy that included community outreach and consistent communication across the city government and community organizations, wastewater data provided the impetus for action.

THE CHELSEA PROJECT

HEALTH EQUITY SUMMIT II



IRENE BOSCH (IDX20), DAN CORTEZ (CHELSEA HUB) AND SAMANTHA BATES (CCI) DISCUSS THEIR WORK TO SUPPORT CHELSEA DURING THE PANDEMIC. THE DISCUSSION WAS MODERATED BY SARA ARMAN FROM GREENROOTS.

THE CHELSEA PROJECT

For the second year, CCI organized the Chelsea Health Equity Forum, “Planning Public Health Strengthening for Chelsea.” The event occurred on April 14 from 1 to 5 pm in Chelsea City Hall. Following the model from our previous Health Equity Forum (held virtually in June 2021), we organized a series of panels that provided insight into diverse perspectives on documenting successes in the COVID-19 response and envisioning a collective path in the future as a community. A facilitated afternoon session aimed to build a strategic plan incorporating all partners to address Chelsea’s long-standing social determinants of health.

**READ THE HEALTH EQUITY SUMMIT AGENDA
AT [TINYURL.COM/HEALTHEQUITYAGENDA](https://tinyurl.com/healthequityagenda)**

THE CHELSEA PROJECT

AMERICAN PUBLIC HEALTH ASSOCIATION ANNUAL MEETING

CCI was proud to share our work at an exhibit booth at the APHA annual meeting. We discussed our public health research and interventions with meeting attendees and distributed 100 copies of our Chelsea Project toolkit. We connected with students, academics, public health practitioners, and physicians seeking to learn about community-based models to inspire new ideas for health equity. The value of our participation was connecting with the larger public health community and enabling larger organizations to learn about our services and unique projects.



CCI PRESENTING OUR WORK

READ THE CHELSEA PROJECT
WHITEPAPER AT CENTEROFCI.ORG

CALIFORNIA WILDFIRE CLIMATE ACTION PROJECT

UNDERSTANDING TAHOE'S CLIMATE COMPLEXITY

In 2022, CCI worked with climate activist Meg Heim to map out the climate dynamics impacting the health of the Lake Tahoe basin ecosystem. Meg, a Lake Tahoe resident, aimed to understand how various natural and human elements impacted this local mountain community and its surrounding wildlands against the increasing risk of drought-fueled wildfires.

To better understand the climate risk in this region, we analyzed the interplay between natural events like bark-beetle infestations and varying annual snowpack depths and human-centered issues like the state of the energy infrastructure and the lack of workforce housing. Meg examined these factors to uncover the area's complexity and nuance driving climate risk.

Meg also plotted the efforts of local organizations working to address different aspects of the climate dynamics to identify future opportunities for intervention.

In addition to building models of the climate risks within the Tahoe basin, Meg spent time researching the impact of climate change on public health within the region.



"THROUGH THIS WORK WE HAVE A UNIQUE OPPORTUNITY TO MAKE OUR COMMUNITIES MORE DEEPLY CONNECTED AND RESILIENT, AND TO HEAL OUR COLLECTIVE RELATIONSHIP WITH THE NATURAL WORLD."

Meg Heim

Climate Activist

CALIFORNIA WILDFIRE CLIMATE ACTION PROJECT

Meg joined forces with Citizens Climate Lobby to organize an educational community event highlighting climate change's physical and mental health effects. Additionally, Meg urged the local hospital system to play a more active part in mitigating and adapting to climate change.

This initiative spawned two op-ed articles ([one](#), [two](#)) published in the regional newspaper, further educating the public on the need for deeper investment in local climate action by public health institutions.



SUSTAINABLE HOMES

BRIDGING THE GAP IN SUSTAINABLE LIVING

Transitioning to environmentally and financially sustainable buildings is one of the hardest complex problems for our communities to solve as buildings and retrofits sit at the intersection of climate change, the energy transition, cost of living crisis, equality, skilled labor shortages, and government policy, whilst representing the largest store of capital value in our societies.

Our goal is to empower communities to improve the financial and environmental sustainability of their homes and offices. We plan to achieve this by bringing to light the invisible and complex factors that determine the cost and comfort of living in a building.

To achieve our objective, we have taken the first step by loading one of the complicated national models of building energy performance into DataCurator. Specifically, we have used the UK's SAP 2012 model. Additionally, we have started building a network of collaborators across various local communities, as well as academia, industry, and startups in the national energy, infrastructure and built environment.



SUSTAINABLE HOMES SIMULATION

Users can enter details about their own home before exploring and building an intuitive understanding of the hidden forces that determine how financially and environmentally sustainable it is to live in currently and how it can be improved.

LAUNCHED EARLY 2023

MATHESAR

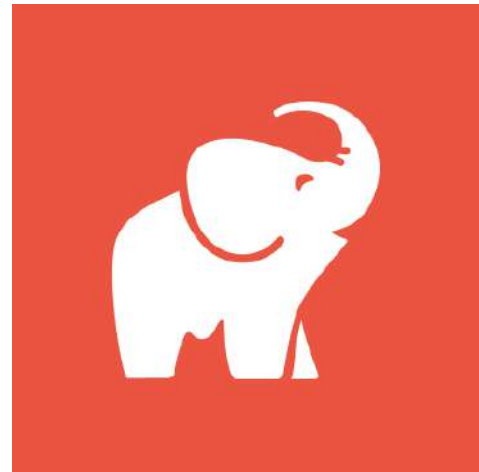
AN OPEN-SOURCE DATABASE APPLICATION FOR EVERYONE

Mathesar is an open-source database tool that lets anyone of any technical skill level easily organize and use data.

Effective interventions to complex problems are often buried within data. Mathesar simplifies the process of collaboratively organizing complex data sets and extracting valuable insights from them. Our web-based interface helps collaborators work with data more independently and comfortably – without the need for technical skills. Mathesar is self-hosted, giving users ownership, privacy, and control over their data.

Potential use cases for Mathesar include:

- Publishing and exploring public datasets.
- Running business processes such as inventory management and project tracking.
- Providing a ready-made interface for speedy data entry and custom reporting.
- Collecting and processing data from large groups of people.
- Simple data cleaning and analysis.
- Automatic web API generation.



“RIGHT NOW, THERE ISN’T A TOOL THAT’S FREE AND OPEN SOURCE – TAKING OUR APPROACH.”

Kriti Godey
Project Lead

MATHESAR

2022 FOCUS AREAS

PRODUCT

During 2022, our main objective was to develop the key features of Mathesar, in preparation for the project's initial release. We expanded support for 10+ data types, built a powerful table editor, added support for automatically reconfiguring table structures, and created several new features for working with linked tables smoothly. We also created a new query-building tool to make finding insights and building reports easier and designed a visually appealing and user-friendly interface for the product.

COMMUNITY

We expanded Mathesar's open-source community, more than doubling the number of contributors to 68. Google accepted us to Google Summer of Code 2022, and we mentored three contributors - from India, Ukraine, and the US. Additionally, we participated in a product design course at UC Berkeley.

FUNDING

We received continuing support from Reid Hoffman Foundation. We also received funding from The Center for Radical Transformation at the Chiba Institute of Technology, which allowed us to hire an additional full-time engineer to help build the product and internationalize the UI.

MATHESAR

The screenshot displays a search interface for the MATHESAR database. A search bar at the top contains the text "james". Below it, a table of search results is shown, with several rows highlighted in yellow. The table has columns for a selection checkbox, a count, the author name, a last name, and a URL. A pop-up window titled "+ Create Record From Search Criteria" is overlaid on the table, showing a preview of the selected records. Below the pop-up, another table of records is visible, with columns for year, call number, barcode, and author name.

✓ Pick	#	Author	Last Name	URL
✓ Pick	178	James	Gleick	http://around.com/
✓ Pick	226	James	Joyce	NULL
✓ Pick	310	James	Peterson	https://jimcooks.com/
✓ Pick	44	James	Barclay	NULL
✓ Pick	127	James S.A.	Corey	https://www.jamessacorey.com/
✓ Pick	126	James S. A.	Corey	https://www.jamessacorey.com/
✓ Pick	36	James Edward	Austen-Leigh	NULL

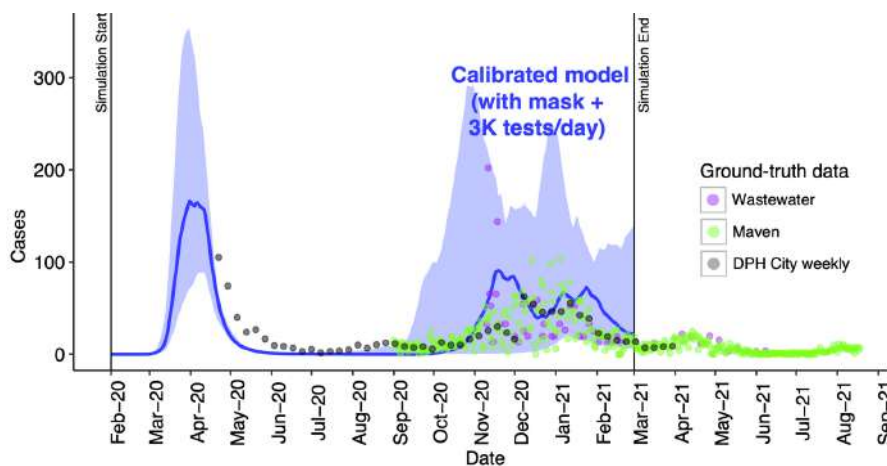
Year	Call Number	Barcode	Author
1992	HD9696.C63 U51586	0-2-0157032-7	Robert X Cringely
2020	PZ7.L578345 C	006-28781-9-0	Gail Carson Levine
2020	NULL	173-52865-0-8	Cyd Harrell
1999	PS3552.U397 C58	0-67-157827-8	Lois McMaster Bujold
2011	PR6015.E795 C58	1-4-0223877-0	Georgette Heyer
2017	PR6015.E795 C58	978-12-3-671481-6	Georgette Heyer
2011	PS1308 .A1	1-6138-2047-X	Mark Twain
2010	PZ7.T85565 C	0-0618709-3-5	Megan Whalen
2011	PZ7.T85565 C	0-0-618709	Megan Whalen
2005	PZ7...	0-0-618709	Megan Whalen

VISIT MATHESAR.ORG TO LEARN MORE.

POLICY SIMULATOR

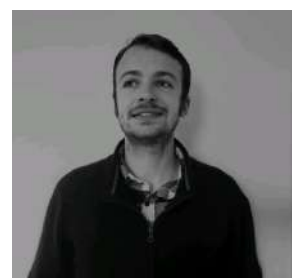
SIMULATING HOW POLICY DECISIONS PLAY OUT IN OUR COMMUNITIES

Tracking the impact that different policies have can be an elusive task. Since 2020, our team has been experimenting with an exciting simulator to measure and evaluate the link between high-level policy decisions and real-world outcomes in COVID-19.



CALIBRATED MODEL AGREES WITH GROUND-TRUTH DATA.

We are working with collaborators at Northeastern University to develop an infectious disease model that allows us to quickly identify demographic-based outcome discrepancies for various income, race, gender, and age categories. We aim to use this tool to understand better how various policy interventions, such as stay-at-home orders and mask mandates, affected demographic groups differently during the COVID-19 pandemic, with the hope of applying retrospective learnings to future public health emergencies.



"POLICY SIMULATOR CAN HELP GOVERNMENTS OF ALL SIZES OPTIMIZE THEIR DECISION-MAKING."

Daniel Begemann
Researcher

2023

EXCITED FOR THE YEAR AHEAD

2023 promises to be another exciting year for our organization as we continue to share our work and embark on new projects. We are exploring funding opportunities to support projects that apply the Chelsea Project model to other health issues, such as teen mental health and chronic diseases. With the launch of Mathesar, adoption and sustainability will become a significant priority for the project in 2023. We will also consider health equity consulting opportunities combining our data analysis capabilities and community engagement strategy expertise.

Most importantly, we will continue pursuing our primary mission - strengthening community action through science.

JOIN US

GET INVOLVED AT CCI

We are always looking for others who are passionate about intervening in complex problems. If you have questions or ideas about any of our projects or if you would like to collaborate, please reach out to us at info@centerofci.org.

If you have interest in supporting the organization and our work, reach out to the Executive Director, Samantha Bates

samantha@centerofci.org.



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