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CaGIS

AutoCarto 2020

WhereNext

Dr. Aileen Buckley, Conference Chair

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esri THE SCIENCE OF WHERE

United States Census Bureau

University of Redlands

WhereNext

- **The conference theme** looks at where we are and where to go next.
- We also challenge the ideas of **where** and **next** in terms of meaning, communication, visualization, and reasoning in the new age of automation, robotic revolution, and artificial intelligence (AI).

- *Dr. May Yuan, Program Chair*

National Geographic Magazine, *September 2020*
https://www.nationalgeographic.com/magazine/2020/09/the-robot-revolution-has-arrived-feature/

How AI Can be Used in Smart Cities: Applications Role & Challenge

Vikram Singh Bisen Follow
May 14 · 7 min read

Advance Security Camera & Surveillance System
Vehicle Parking and Traffic Management System
Autonomous Flying Objects for Ariel View Monitoring
Face Detection Cameras and Movement for Public Safety
Smart Waste and Disposal Management System
Better Governance and Planning Management

https://medium.com/vsinghbisen/how-ai-can-be-used-in-smart-cities-applications-role-challenge-8641fb52a1dd

The New York Times

BREAKING NEWS

The number of Covid-19 hospitalizations in the United States hit an all-time high, as the pandemic continued shattering record after record. [nl.nytimes.com]

Tuesday, November 10, 2020 6:51 PM EST

The number of people hospitalized with the coronavirus, tallied by the Covid Tracking Project, has more than doubled since September, and now, at 61,964, exceeds the peak reached early in the pandemic, when 59,940 hospitalized patients were reported on April 15.

https://www.nytimes.com/live/2020/11/06/world/covid-19-coronavirus-updates

Oregon State University

Newsroom

FOR JOURNALISTS FOR FACULTY AND STAFF CONTACTS NEWS ARCHIVE

Robots provide food delivery to Corvallis campus

October 21, 2020

CORVALLIS, Ore. – It may look like a robot from a Star Wars movie, but those aren't droids roaming around Oregon State University's Corvallis campus. Starting

STORY BY:
Theresa Hogue, 541-908-4749,
theresa.hogue@oregonstate.edu
SOURCE:
Jennifer Viña, 541-737-8187,
jennifer.vina@oregonstate.edu

MULTIMEDIA:

https://today.oregonstate.edu/news/robots-provide-food-delivery-corvallis-campus

SHARE

FOCUS | HUMAN-ROBOT INTERACTION

The potential of socially assistive robots during infectious disease outbreaks

Brian Scassellati* and Marynel Vázquez
+ See all authors and affiliations

Science Robotics 15 Jul 2020:
Vol. 5, Issue 44, eabc9014
DOI: 10.1126/scirobotics.abc9014

Article | Figures & Data | Info & Metrics | eLetters | PDF

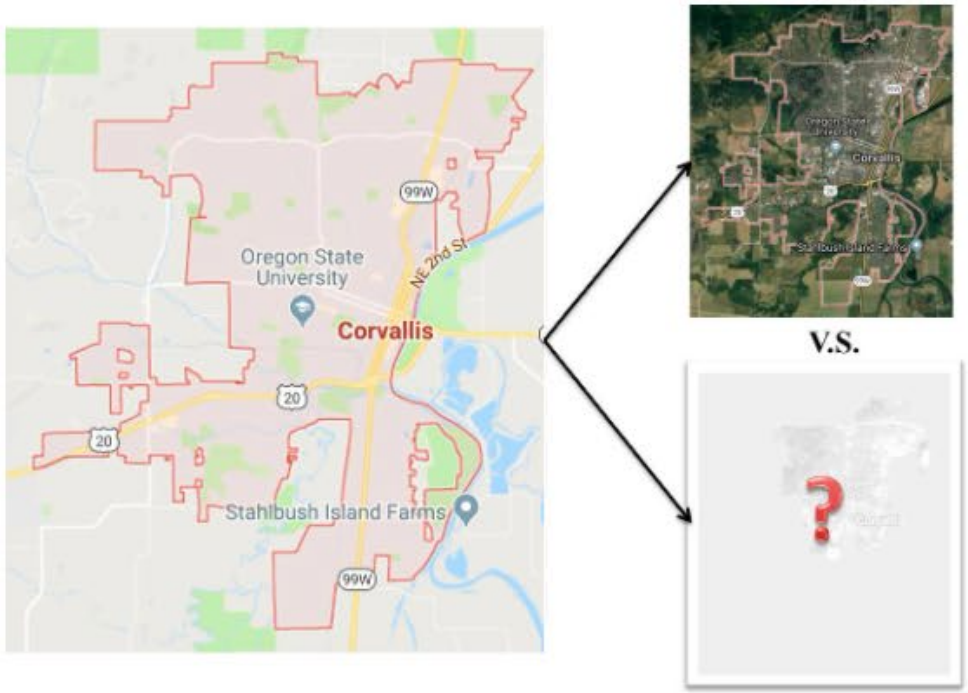
Abstract

Robots have a role in addressing the secondary impacts of infectious disease outbreaks by helping us sustain social distancing, monitoring and improving mental health, supporting education, and aiding in economic recovery.

https://robotics.sciencemag.org/content/5/44/eabc9014

Imaginary City

It is difficult to quantify geographic features with a certain character or pattern, especially taking spatial variability and heterogeneity into account. Landscape exhibits various patterns and processes in different scales. However, it seems that CycleGAN is able to extract some general features from spatial distribution of city structures.



Corvallis with a transferred style

To examine whether it is possible for CycleGAN to extract city styles and transfer the potentially learned style to other place, Corvallis is used as a sample for generating satellite images. View the real Corvallis Here.

View Here »

https://chunxxu.github.io/fakegeo/IC.html

AI could be applied to falsify geospatial data. CycleGANs has proved itself in 'remembering' what it saw in the past, and then generating fake data in any fields like image, speech or music. To demonstrate the thrilling power of AI, this research explored the potentials of deep learning algorithms in capturing geographic features and creating fake satellite images according the learned 'sense'.

Data and Method

Satellite images from Google Earth and positron (no label) basemap from CartoDB are used as input datasets. And CycleGANs is implemented to train the model and generate fake satellite images.

View details »

Training Process

Some results during training process. After the first epoch, the training model can learn and generate some geometric features. More details can be captured and created as the number of epoch increases.

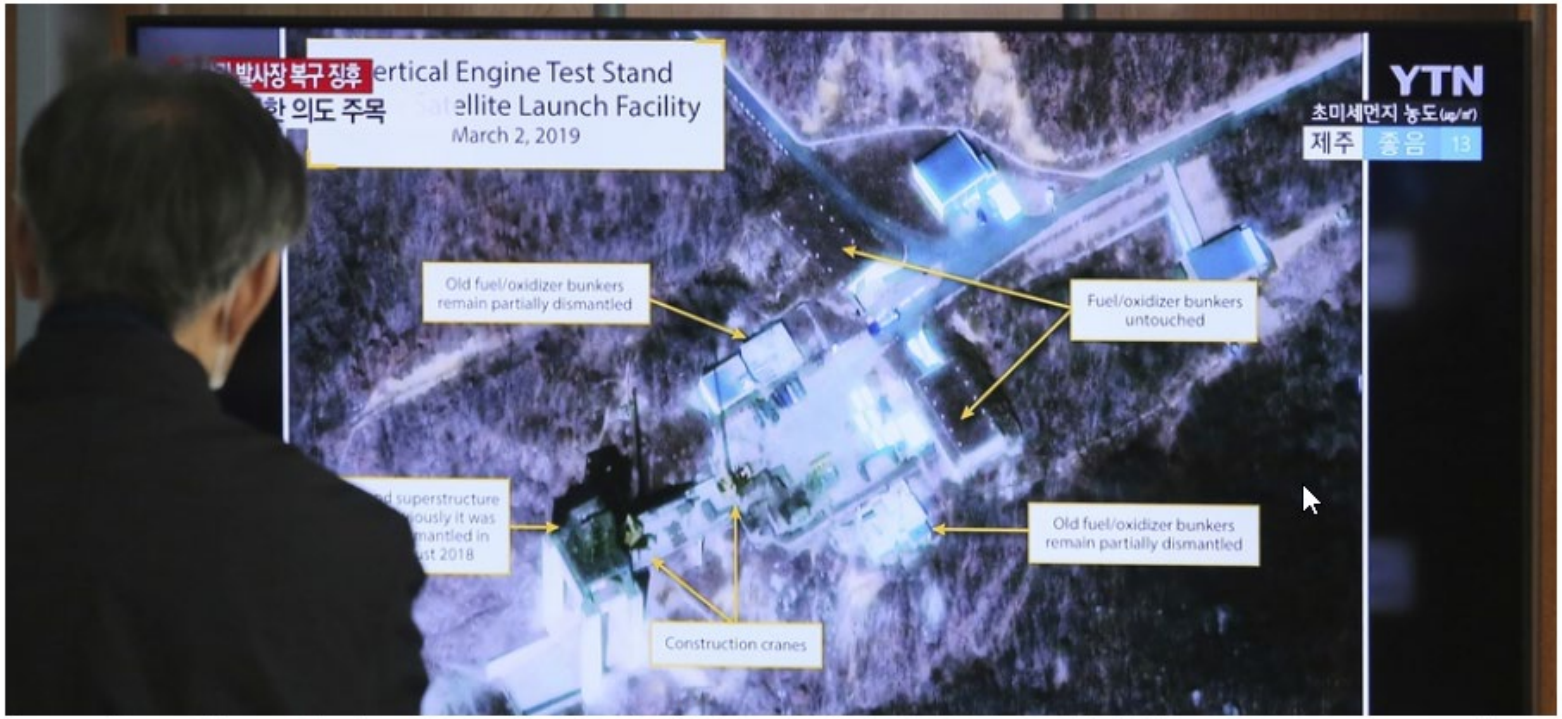
View details »

Imaginary City

Fake datasets with 'learned' style from three big cities are generated through CycleGAN in Corvallis. It seems GANs can 'remember' a certain 'sense of place' and further apply that 'sense' to another place.

View details »

https://chunxxu.github.io/fakegeo/sis.html



A man watches a TV screen showing an image of the Sohae Satellite Launching Station in Tongchang-ri, North Korea, during a news program at the Seoul Railway Station in Seoul, South Korea, Wednesday, March 6, 2019. AP / AHN YOUNG-JOON

SCIENCE & TECH

The Newest AI-Enabled Weapon: 'Deep-Faking' Photos of the Earth

Step 1: Use AI to make undetectable changes to outdoor photos. Step 2: release them into the open-source world and enjoy the chaos.

https://www.defenseone.com/technology/2019/03/next-phase-ai-deep-faking-whole-world-and-china-ahead/155944/

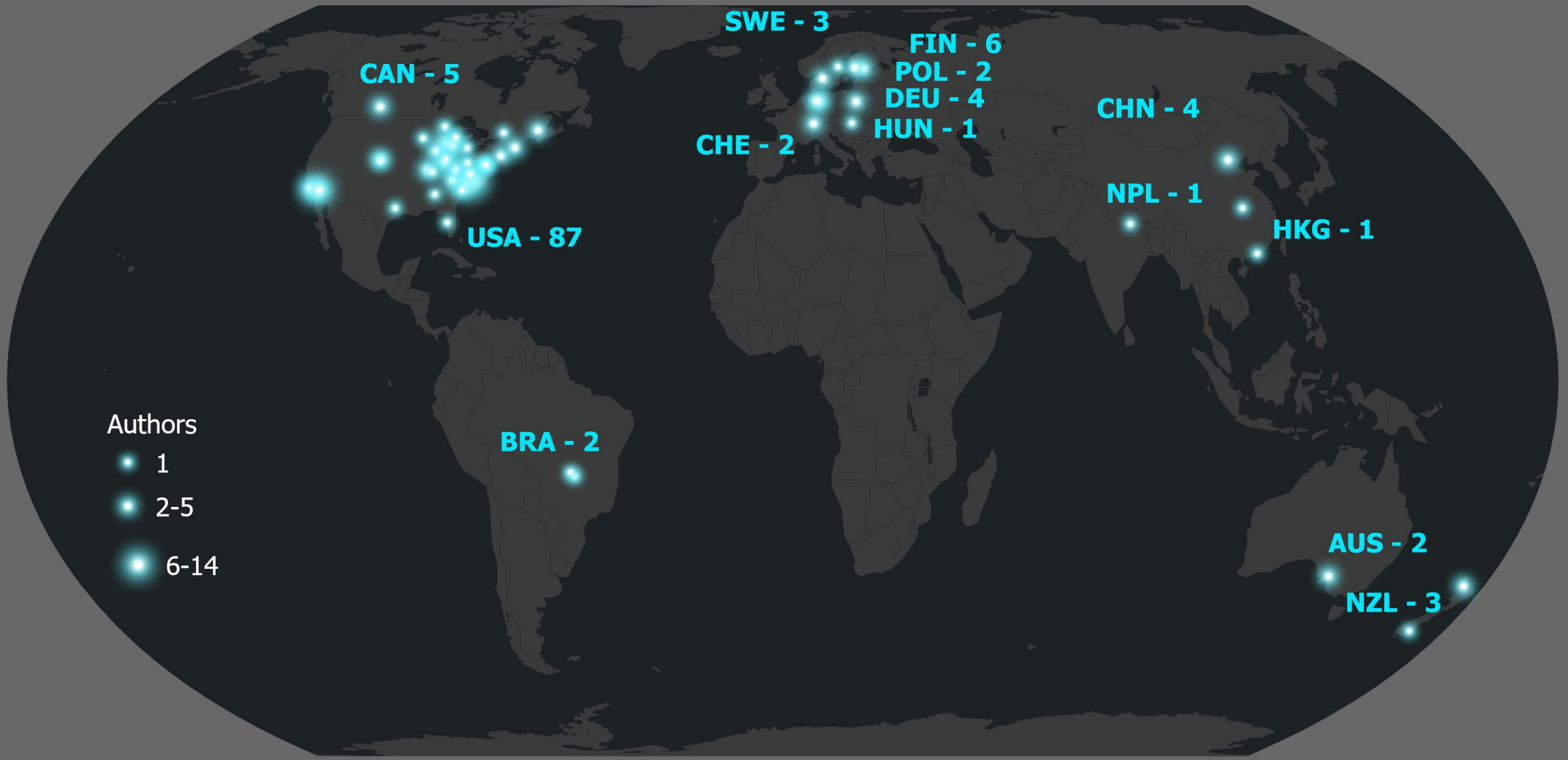
https://www.gtav.asn.au/documents/item/583#:~:text=Concepts%20are%20the%20big%2C%20organising,as%20a%20field%20of%20study.&text=In%20VCE%20Geography%2C%20the%20ten,process%2C%20spatial%20association%20and%20sustainability


Scale
Place
Network
Distance
Movement
AutoCarto 2020
Distribution
Navigation
Interaction
Change
Association

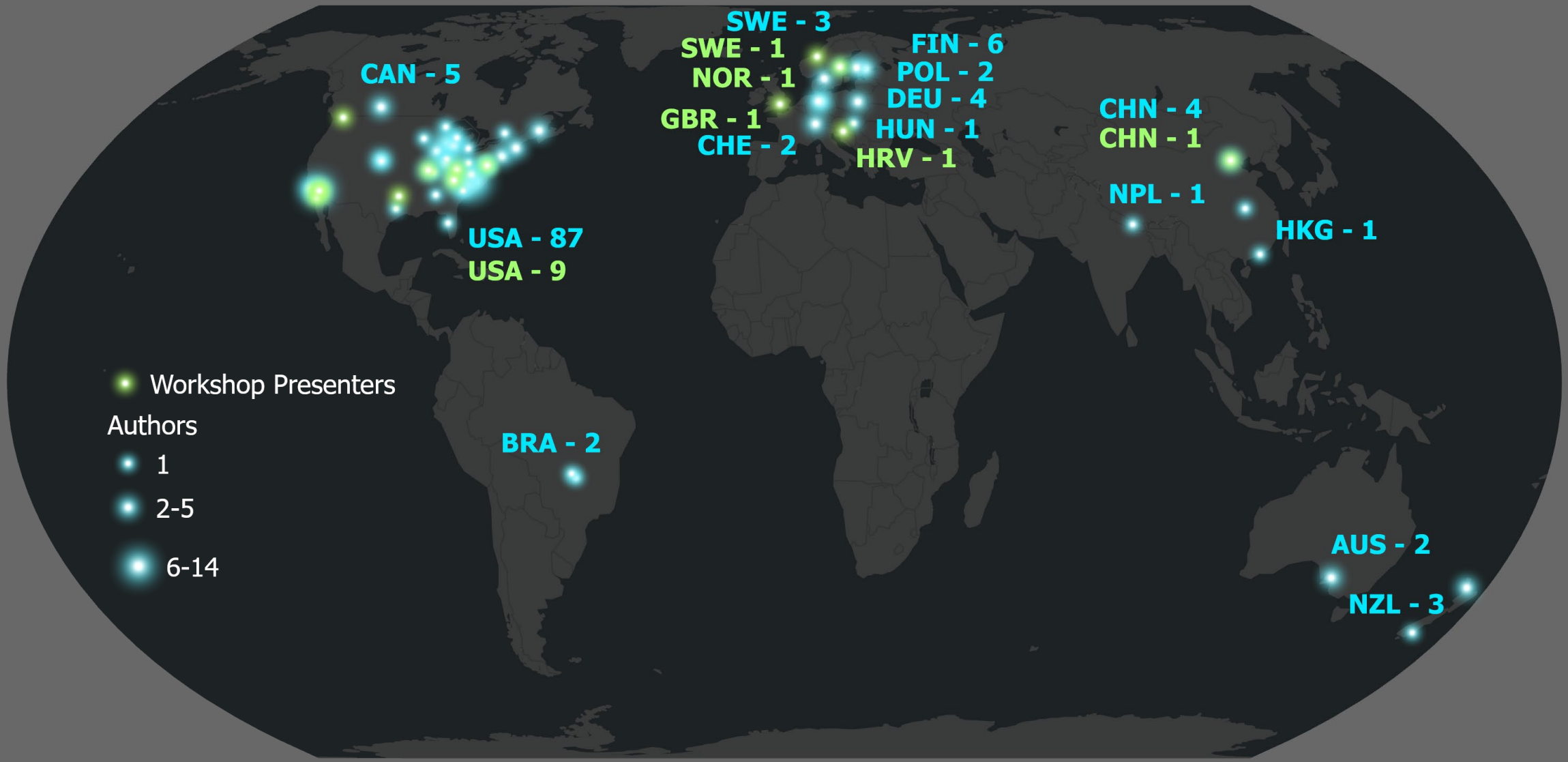
AutoCarto 2020 Offerings

- **40** papers | **121** authors | **15** countries
- **7** workshops | **16** organizers | **6** countries
- **4** keynotes | **4** different perspectives

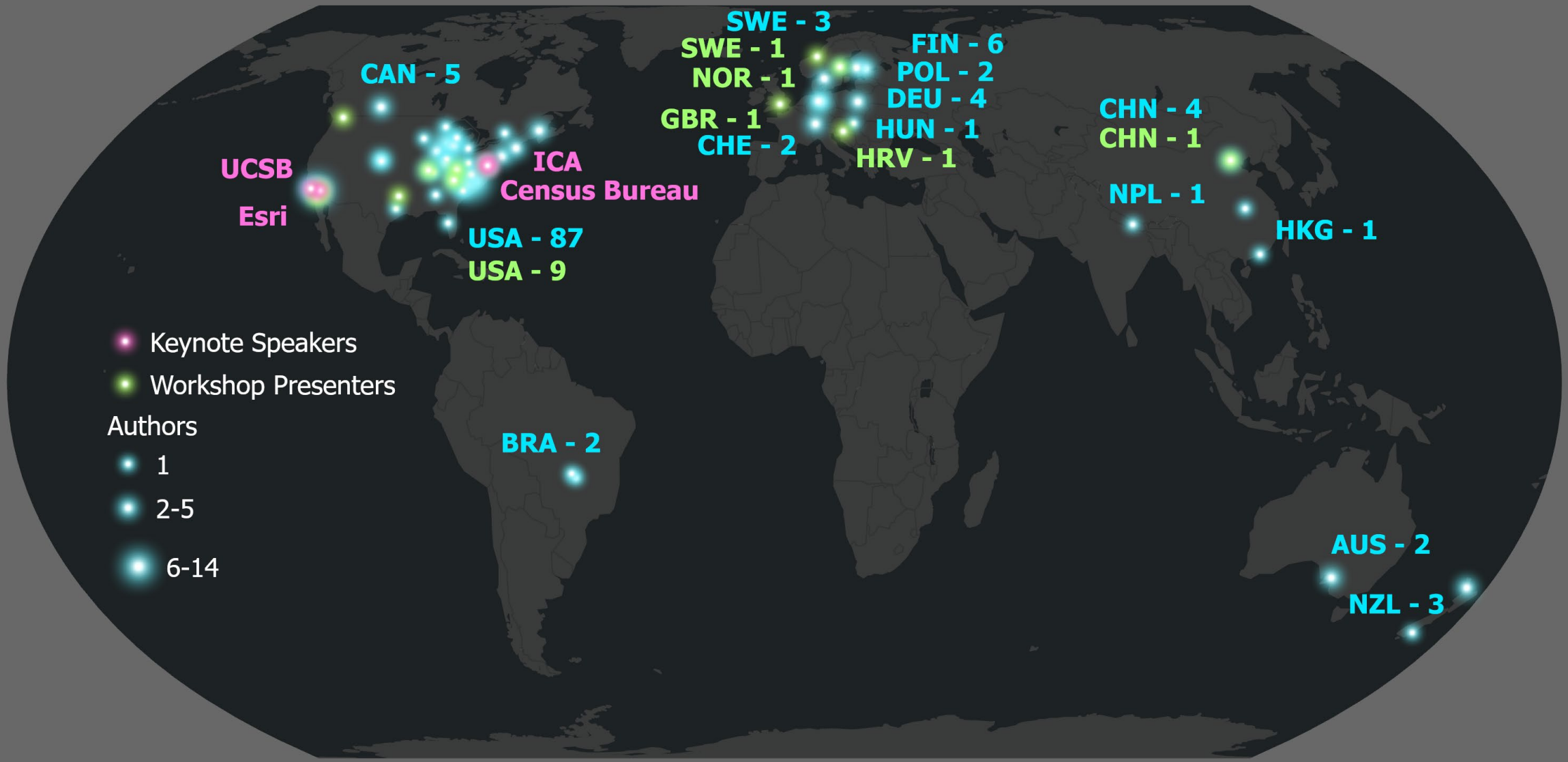
40 papers | 121 authors | 14 countries



7 workshops | 16 organizers | 6 countries

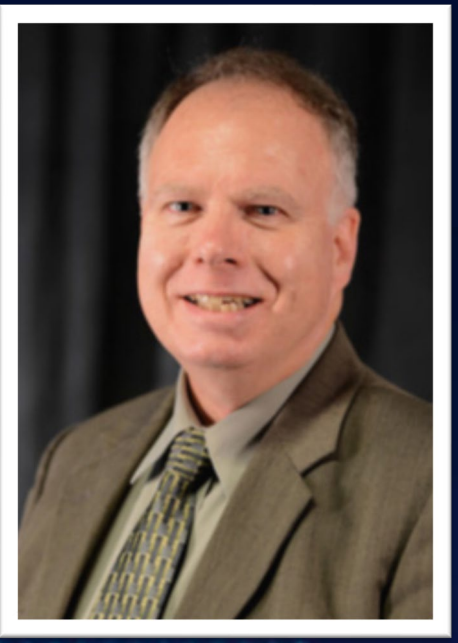


4 keynotes | 4 perspectives

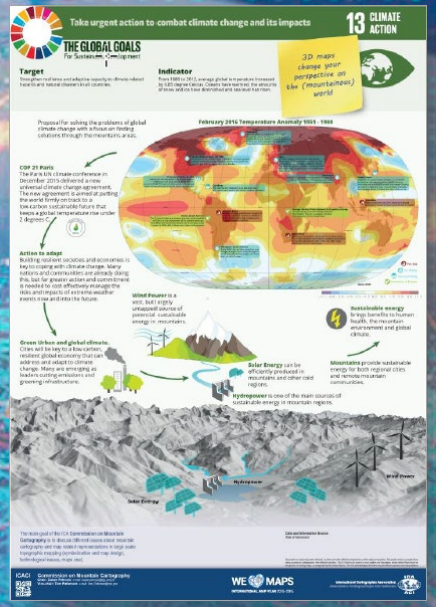


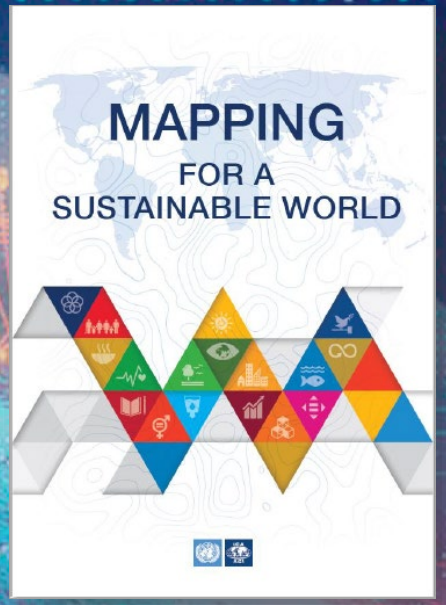
Tim Trainor

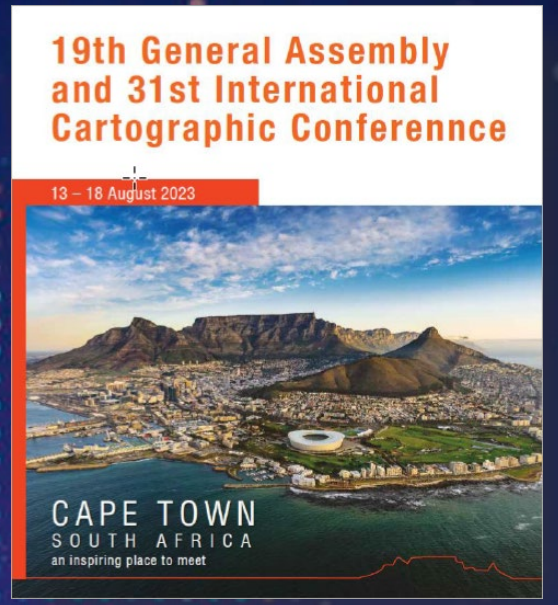
President, International Cartographic Association



- Tackle global challenges through a platform for engagement to advance areas of research in support of international efforts, primarily:
  - United Nations Sustainable Development Goals (SDGs
  - Integrated Geospatial Information Framework (IGIF)
  - Global Statistical Geospatial Framework (GSGF)



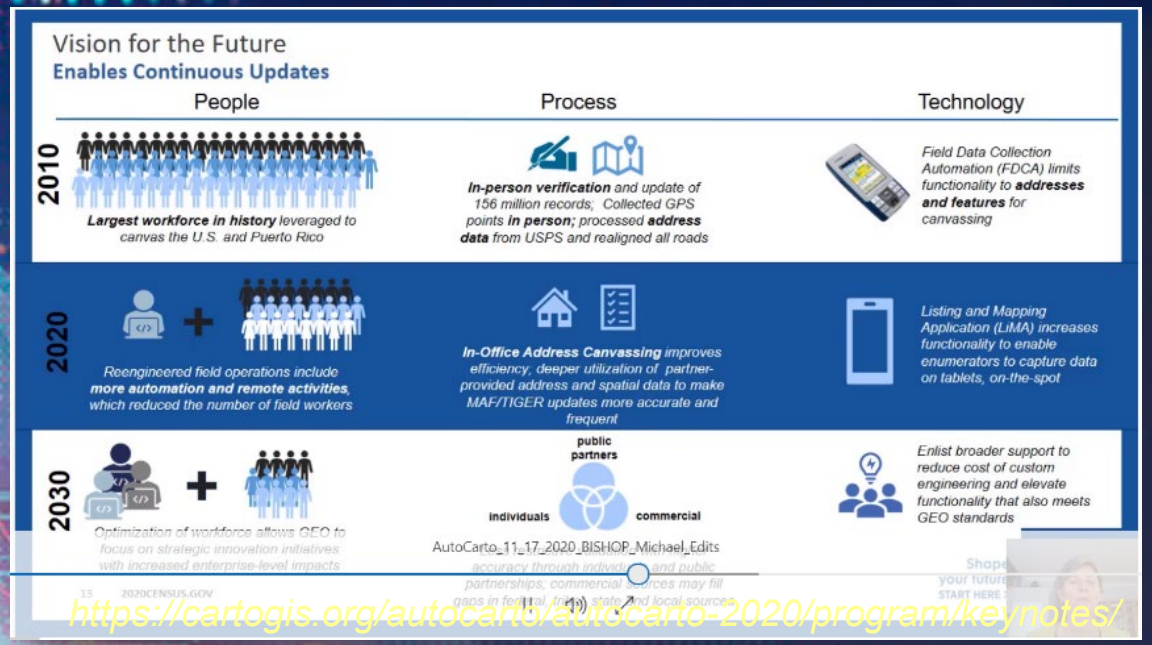




Deirdre Dalpaiz Bishop

Chief, Geography Division, U.S. Census Bureau

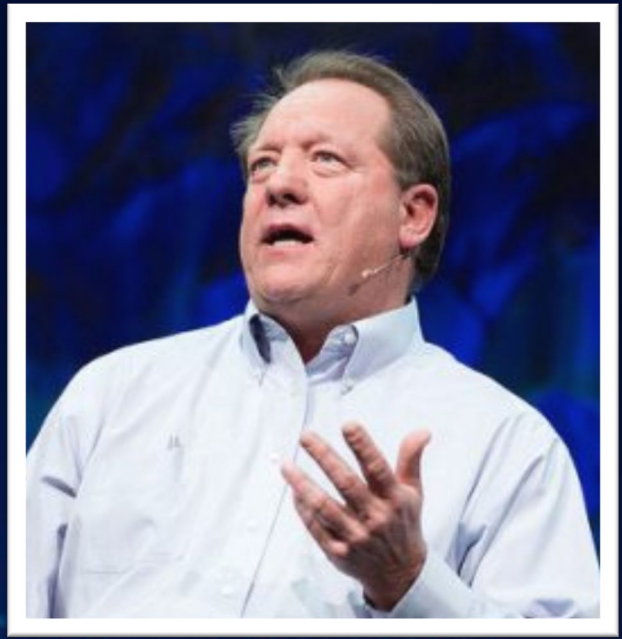
- Geographic partnerships
- Big data at a local level, completeness and consistency
- Using satellite imagery to validate social data
- Publicly sharing the progress being made



https://cartogis.org/autocarto/autocarto-2020/program/keynotes/

Clint Brown

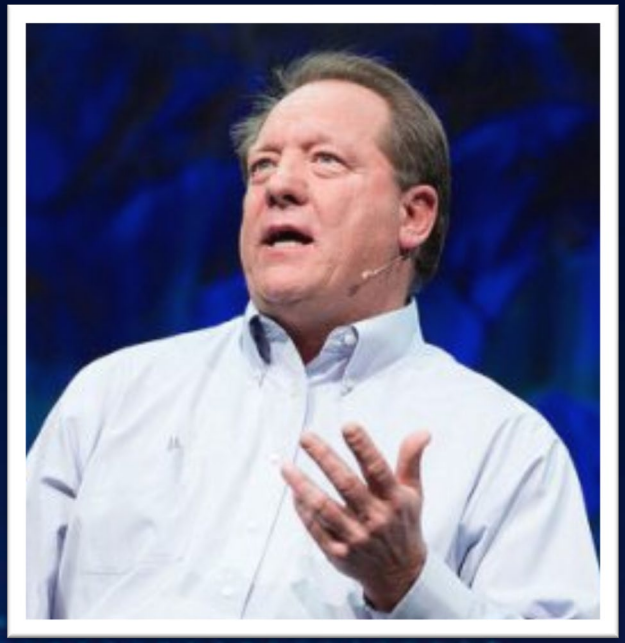
Director or Product Engineering, Esri



- Cloud-based, elastic computing
- Dynamic, multiscale, mashed up, interactive/reactive maps
- Linked to data, built from integrated data
- Sharing – e.g., 1.5 million story maps, 35 million items in ArcGIS Online (½ data, ½ models, maps, apps)

Clint Brown

Director or Product Engineering, Esri

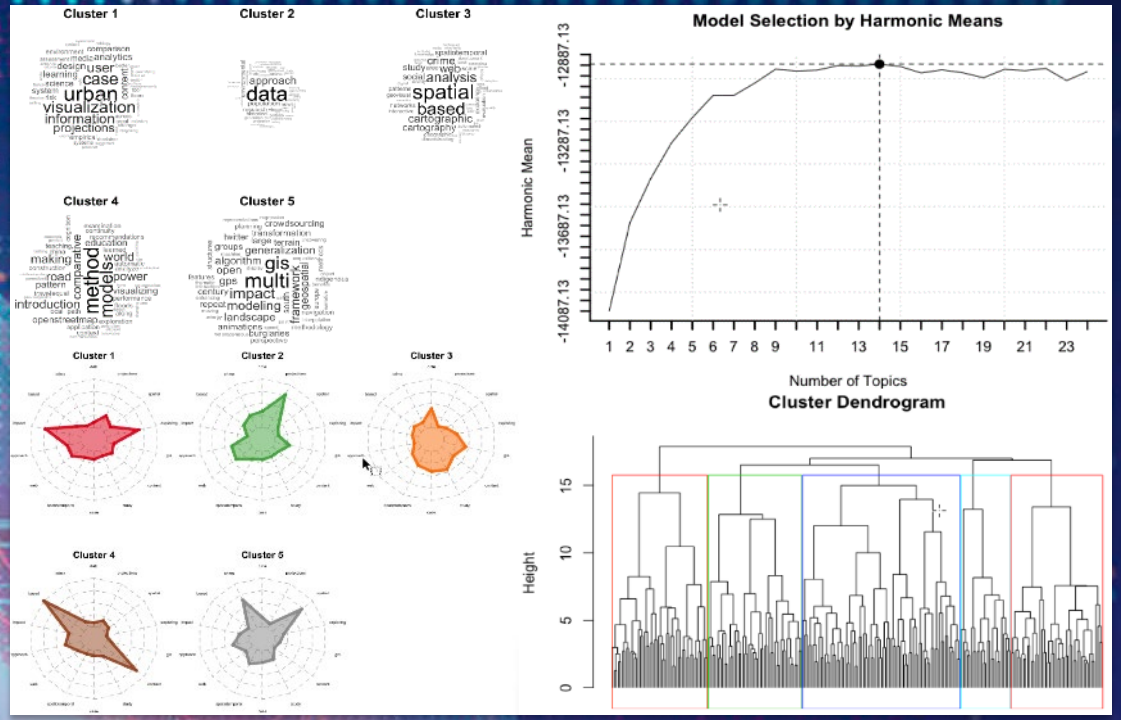


- “…all of our information is being brought together and integrated in interactive maps built for specific audiences so that everyone gets the map for their mission, purpose or work…GIS and maps are becoming relevant for everyday citizens.”

Keith Clarke

Professor, Department of Geography, UCSB

- Research areas: “information visualization, “cartographic data”, “spatial analysis and apps”, “methods and models”, “GIScience”
- Maps are ubiquitous, embedded, functional
- Maps can help with global environmental and societal issues
- Every citizen will have the power to search and analyze the world



AutoCarto – A Brief History

- In **1974**, about 15 years after the advent of automated cartography, “the International Conference on Automation in Cartography” —**AutoCarto—convened for the first time** to bring together “people interested in automation in cartography”
- **Credit is due** to those who first saw a need for such a forum, envisioned it, made it happen:
  - **Government researchers**, mostly cartographers, from the Defense Mapping Agency's Topographic and Hydrographic Centers, National Ocean Survey, Central Intelligence Agency, U.S. Bureau of the Census, and U.S. Geological Survey
  - **Academic cartographers** came from countless institutions around the world
  - **Researchers from private industry**

Ilse Genovese, https://issuu.com/geo-media/docs/cartography_and_gisciencеab-elu-ab-iaedits

Auto-Carto I

Dean T. Edson, Conference Chair, Conference Opening

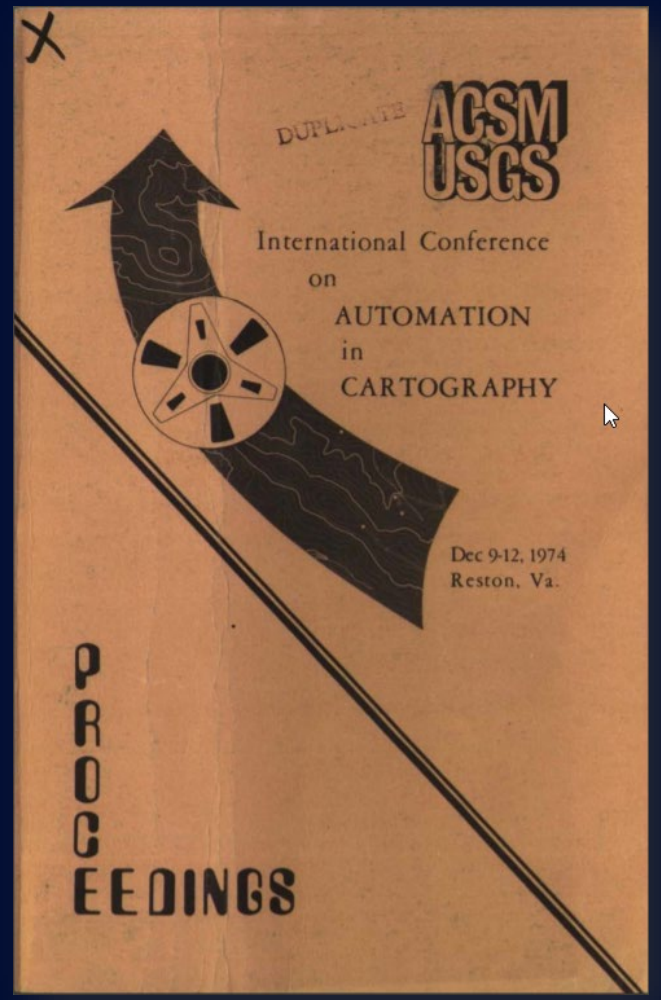
- I can think of more specific reasons for automation:
  - To speed up the mapmaking process
  - To improve the economics of mapping
  - To generate digital data for direct dissemination and rapid manipulation to produce, with a minimum of effort, maps at different scales and with selected contents
  - To facilitate map revision
  - To reduce the incidence of error

https://cartogis.org/docs/proceedings/archive/auto-carto-1/pdf/conference-opening.pdf

Auto-Carto I: “The International Conference on Automation in Cartography”

Dean T. Edson, Conference Chair, Foreword

- The intent of the conference **was to promote greater understanding of a rather new technology** for the many users who are constrained by the lack of in-house research and development. Automation for cartography is the result of large R&D investments over the past 15 years; the **something-for-everyone concept seems to have been put aside in favor of costly supersystems**. While it appears that industry has responded only to the big spenders, **a stable market for automated cartographic equipment and services will ultimately depend on the many hundreds, if not thousands, of low-budget users**.



https://cartogis.org/docs/proceedings/archive/auto-carto-1/pdf/foreword.pdf

No. in Series	Name	Year	Location	Conference Chair	Number of People		Notes	
1	Auto-Carto 1	1974	Reston, Virginia	Dean T. Edson	288	registrants		
2	Auto-Carto 2	1975	Reston, Virginia	Robert T. Aangeenbrug	567	participants		
3	Auto-Carto 3	1978	San Francisco, California	James E. Chamberlain	54	speakers		
4	Auto-Carto 4	1979	Reston, Virginia	Robert T. Aangeenbrug	181	authors	870 participants	
5	Auto-Carto 5	1982	Crystal City, Virginia	Jack Foreman	125	authors		
6	Auto-Carto 6	1983	Ottawa/Hull, Canada	D.R.F. Taylor	76	presentations		
8	Auto-Carto 7	1985	Washington, District of Columbia	Steven J. Vogel/Jack Foreman	178	presentations		
9	Auto-Carto London	1986	London, England	Michael Blakemore	115	presentations		
10	Auto-Carto 8	1987	Baltimore, Maryland	Nicholas. R. Chrisman	86	presentations	133 authors	
11	Auto-Carto 9	1989	Baltimore, Maryland	Eric Anderson	104	presentations	142 authors	
12	Auto-Carto 10	1991	Baltimore, Maryland	David M. Mark/Denis White	27	papers	39 full papers submitted	
13	Auto-Carto 11	1993	Minneapolis, Minnesota	Robert B. McMaster/Marc P. Armstrong	43	papers	70+ abstracts	
14	Auto-Carto 12	1995	Charlotte, North Carolina	Donna J. Peuquet	39	papers	60+ extended abstracts	
15	Auto-Carto 13	1997	Seattle, Washington	Nicholas Chrisman	45	papers	69 authors	
16	AutoCarto 2005	2005	Las Vegas, Nevada	Lynn Usery / Eric Anderson	34	presentations	80 authors	
17	AutoCarto 2006	2006	Vancouver, Washington	Lynn Usery	40	presentations	94 authors	
18	AutoCarto 2008*	2008	Shepherdstown, West Virginia	Keith Clarke	32	presentations	65 authors	
19	AutoCarto 2010*	2010	Orlando, Florida	Lynn Usery				
20	AutoCarto 2012*	2012	Columbus, Ohio	Sarah Battersby	62	presentations	168 authors	
21	AutoCarto 2014*	2014	Pittsburgh, Pennsylvania	Dan Cole	65	presentations	137 authors	
22	AutoCarto 2016	2016	Albuquerque, New Mexico	Scott Freundschuh	31	presentations	72 authors	
23	AutoCarto 2018*	2018	Madison, Wisconsin	Scott Freundschuh	41	presentations	116 authors	
24	AutoCarto 2020	2020	Online	Aileen Buckley	40	papers	121 authors, 4 keynotes	
25	AutoCarto 2022			Thomas Pingel				

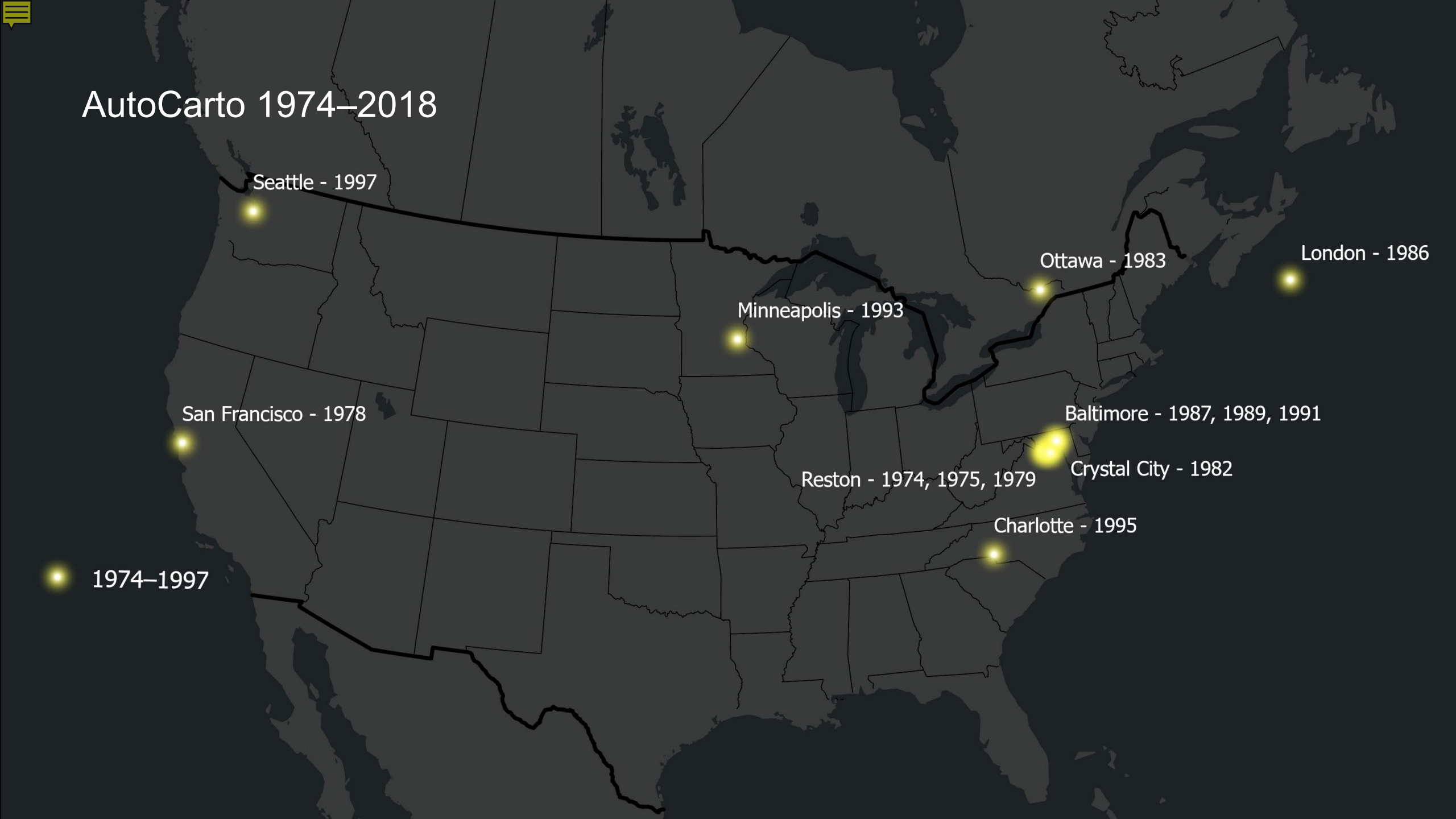
* Also in the CaGIS journal

AutoCarto Archives: https://cartogis.org/autocarto/autocarto-archives/:

AutoCarto – A Brief History

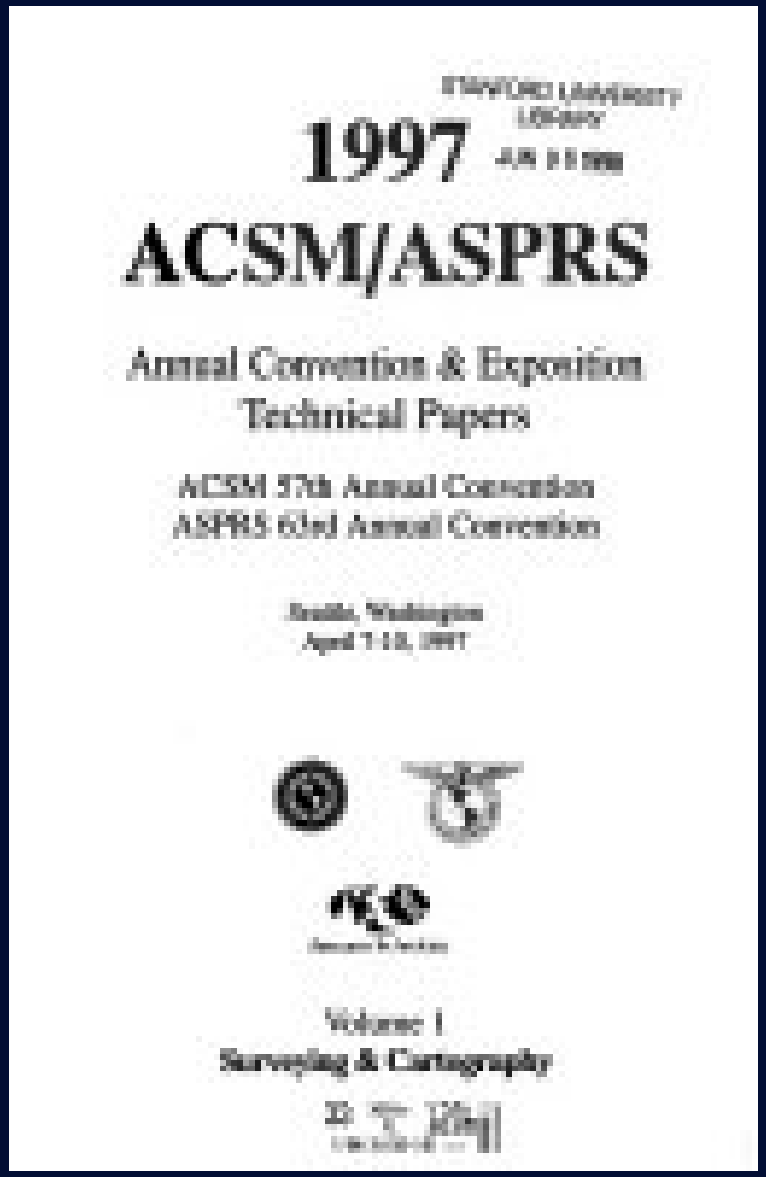
- **The symposium series was laid to rest in 1997**, under the assumption that it had accomplished its goal to provide a forum for researchers and scientists working at the interface of cartography and GIScience.

Ilse Genovese, https://issuu.com/geo-media/docs/cartography_and_gisciencеab-elu-ab-iaedits


AutoCarto 1974–2018
Seattle - 1997
Ottawa - 1983
London - 1986
Minneapolis - 1993
San Francisco - 1978
Baltimore - 1987, 1989, 1991
Crystal City - 1982
Reston - 1974, 1975, 1979
Charlotte - 1995
1974–1997

American Congress on Surveying and Mapping

- National Society of Professional Surveyors (NSPS)
- Cartographic and Geographic Information Society (CaGIS)
- American Association for Geodetic Surveying (AAGS)
- Geographic and Land Information Society (GLIS)



https://www.google.com/books/edition/Technical_papers_1997_ACSM_ASPRS_Annual/399OAQAAIAAJ?hl=en

AutoCarto – A Brief History

- In **2005**, after CaGIS, the society, became incorporated, **the AutoCarto symposium was resurrected**, in recognition that, with the advent of new technologies, cartography and GIScience continue to evolve and new research is still needed on how to conceive of and develop maps, geospatial data, and geographic databases for the 21st century.

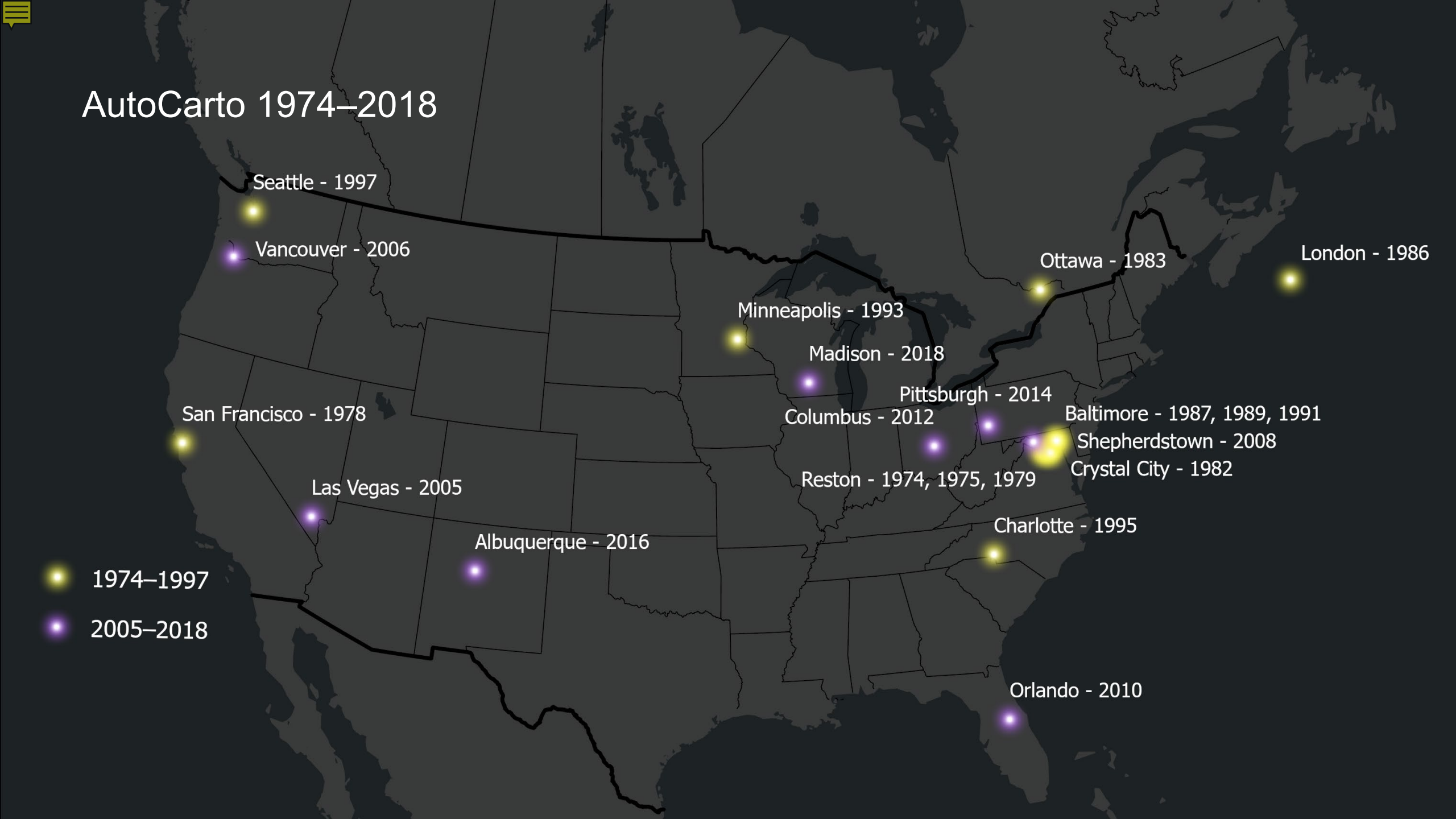
Ilse Genovese, https://issuu.com/geo-media/docs/cartography_and_gisciencеab-elu-ab-iaedits

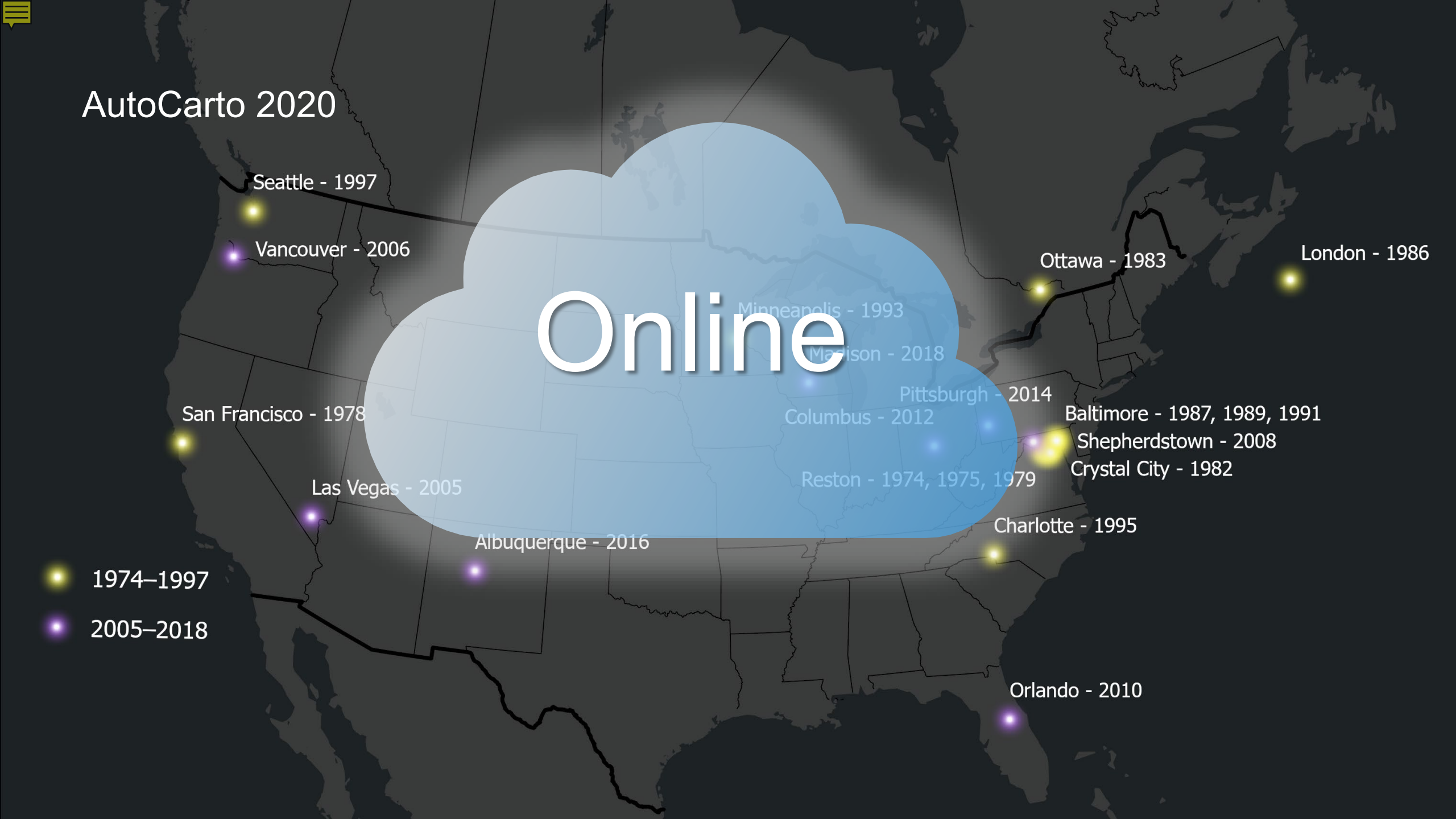
AutoCarto Archives

- Online archive of all AutoCarto Proceedings from 1974 though 2018
- 3-year project
- Started in 2005 and completed in 2008
- AutoCarto 2020 will be added to the archives

Auto-Carto 1	December 9–12, 1974	Reston, Virginia
Auto-Carto 2	December 21–25, 1975	Reston, Virginia
Auto-Carto 3	January 16–20, 1978	San Francisco, California
Auto-Carto 4, Vol 1	November 4–8, 1979	Reston, Virginia
Auto-Carto 4, Vol 2	November 4–8, 1979	Reston, Virginia
Auto-Carto 5	August 22–28, 1982	Crystal City, Virginia
Auto-Carto 6	October 16–21, 1983	Ottawa/Hull, Canada
Auto-Carto 7	March 11–14, 1985	Washington, District of Columbia
Auto-Carto London, Volume 1	September 14–19, 1986	London, England
Auto-Carto London, Volume 2	September 14–19, 1986	London, England

https://cartogis.org/autocarto/autocarto-archives/


AutoCarto 1974–2018
Seattle - 1997
Vancouver - 2006
Ottawa - 1983
London - 1986
Minneapolis - 1993
Madison - 2018
Pittsburgh - 2014
San Francisco - 1978
Columbus - 2012
Baltimore - 1987, 1989, 1991
Shepherdstown - 2008
Crystal City - 1982
Reston - 1974, 1975, 1979
Las Vegas - 2005
Charlotte - 1995
Albuquerque - 2016
1974–1997
2005–2018
Orlando - 2010


AutoCarto 2020
Seattle - 1997
Vancouver - 2006
Online
Minneapolis - 1993
Madison - 2018
Ottawa - 1983
London - 1986
Pittsburgh - 2014
Columbus - 2012
San Francisco - 1978
Baltimore - 1987, 1989, 1991
Shepherdstown - 2008
Crystal City - 1982
Reston - 1974, 1975, 1979
Las Vegas - 2005
Charlotte - 1995
Albuquerque - 2016
1974–1997
2005–2018
Orlando - 2010

AutoCarto 2020: “The International Conference at the Interface of Cartography and GIScience”

- Opened on GIS Day, AutoCarto 2020 shares international research in open access format (**easily accessible, distributed online, free of cost**).
- The intent of the conference is **to promote and disseminate cutting edge research and development at the interface of cartography and GIScience.**

Auto-Carto I

Dean T. Edson, Conference Chair, Conference Opening

- “…things are going on in the field of cartography that were unthought of just a few years ago. Perhaps after our meeting concludes we will have a better idea of what the future might hold.”

https://cartogis.org/docs/proceedings/archive/auto-carto-1/pdf/conference-opening.pdf

AutoCarto 2020 Acknowledgements

- **593** days since we first met to talk about the conference (April 5, 2019 at the AAG in DC)
- **17** people on the organizing committee (to organize the conference)

Aileen Buckley, Esri
May Yuan, The University of Texas at Dallas
David Alvarez, Esri
Samantha Arundel, U. S. Geological Survey
Rex Cammack, University of Nebraska – Omaha
Daniel Cole, Smithsonian Institute
Kari Craun, retired (U.S. Geological Survey)
Eric Delmelle, University of North Carolina – Charlotte
Charlie Frye, Esri
Kevin Hawley, U.S Census Bureau
Indy Hurt, Zillow
Mark Kumler, University of Redlands
Rakesh Malhotra, North Carolina Central University
Thomas Pingel, Virginia Tech University
Jaynya Richards, Esri
Anthony Robinson, The Pennsylvania State University
Michael Shin, University of California – Los Angeles
Alexandre Sorokine, Oak Ridge National Laboratory
Denis White, Oregon State University

Organizing committee: https://cartogis.org/autocarto/autocarto-2020/

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- **35** people on the program committee (to review submissions)

May Yuan, University of Texas at Dallas – Chair
David Alvarez, Esri
Samantha Arundel, U.S. Geological Survey
Thomas Blaschke, University of Salzburg
Barbara Buttenfield, University of Colorado – Boulder
Keith Clarke, University of California – Santa Barbara
Daniel Cole, Smithsonian Institution
Tom Cova, University of Utah
Eric Delmelle, University of North Carolina – Charlotte
Sara Irina Fabrikant, University of Zurich
Song Gao, University of Wisconsin – Madison
Marco Helbich, Utrecht University
Alexander Hohl, University of Utah
Indy Hurt, Zillow
Bin Jiang, University of Gävle
Jamal Jokar Arsanjani, Aalborg University Copenhagen
Mei-Po Kwan, The Chinese University of Hong Kong
Nina Lam, Louisiana State University
Wenwen Li, Arizona State University
Steven Manson, University of Minnesota
Grant McKenzie, McGill University
Jennifer Miller, University of Texas at Austin
Tom Pingel, Virginia Tech University
Anthony Robinson, Pennsylvania State University
Shih-Lung Shaw, University of Tennessee
Alex Singleton, University of Liverpool
Gaurav Sinha, Ohio University
Alexandre Sorokine, Oak Ridge Nathional Laboratory
Kathleen Stewart, University of Maryland
Wenwu Tang, University of North Carolina – Charlotte
E. Lynn Usery, U.S. Geological Survey
Dalia Varanka, U.S. Geological Survey
Monica Wachowicz, University of New Brunswick
Hongbo Yu, Oklahoma State University
Chuanrong Zhang, University of Connecticut

Organizing committee: https://cartogis.org/autocarto/autocarto-2020/
Program committee: https://cartogis.org/autocarto/autocarto-2020/program/

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- **1** exceptional web master – Thomas Pingel

Organizing committee: https://cartogis.org/autocarto/autocarto-2020/
Program committee: https://cartogis.org/autocarto/autocarto-2020/program/

AutoCarto 2020 Acknowledgements

- A big thank you to all of our sponsors!

AutoCarto 2020

WhereNext

Online at https://cartogis.org/autocarto/autocarto-2020/

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