CURVE
a look back on the first year
**something new**

**CURVE**, Collaborative University Research and Visualization Environment, is a new type of digital scholarship and data visualization center from Georgia State University Library, working in collaboration with campus partners.

CURVE’s mission is to enhance research and visualizations by providing technology and services that promote interdisciplinary engagement, collaborative investigation, and innovative inquiry.

In its first year, CURVE has made significant strides in its mission to enhance research and support interdisciplinary engagement and collaborative work. CURVE continues to receive national attention from notable research universities and is quickly gaining a reputation as a leader in digital scholarship innovation and support.
available technology

**interactWall** (pictured)
A 24-foot-wide, touch-enabled video wall for complex models and visualizations. The wall allows for multiple, simultaneous touch users and requires no special training or knowledge to get started.

**Collaborative Workstations**
High-end Dell Precision and Mac Pro workstations equipped with large displays and unique furnishings that accommodate small research teams.

**4K Resolution Workstation**
A touch enabled, ultra-high resolution display connected to a PC offering 12 cores, 128 GB RAM, scientific-grade graphics processors, and an ever-growing list of specialized software.

**3D Scanning Workstations**
Scanning hardware and software that can be used to create virtual models of objects, which can then be accessed from anywhere via the web.

year one usage

Based on total campus ID card swipes from July 1, 2014 through June 30, 2015.

Undergraduate Students: **10,288**
Graduate Students: **3,460**
Faculty: **6,628**
Staff: **2,589**

CURVE officially opened September 10, 2014.
research support

**THE PRIMARY FUNCTION** of CURVE is to support the research, digital scholarship, and original creative activities of Georgia State University students, faculty, and staff through specialized hardware, software, and services. Since its opening, CURVE has supported research across many disciplines and has also fostered interdisciplinary exchange. One notable example has been in the area of 3D visualization and modeling. Through the work of several Student Innovation Fellows, 3D modeling of objects and landscapes successfully crossed over into the research of several disciplines that do not normally use 3D modeling software. This cross-pollination has taken place between researchers in Anthropology, Geology, English, and Art History. All four departments have now integrated 3D modeling into research and teaching as a result of the 3D visualization projects and workshops initiated in CURVE.

CURVE is also supporting several data-intensive research projects. One notable example includes the creation of a hotel management software application developed by a team of undergraduate computer science students. Students noted that CURVE’s high-end computers were the only computers available to them that were powerful enough to run their algorithms in the development stage. Without CURVE technology, their senior project could not have achieved its full potential.

During the spring and fall semesters, CURVE also supported several grant-funded projects. Prior to the grand opening in September, researchers involved with “Addressing Social and Environmental Disparities through Community Geography and Geographic Information Systems” through a National Science Foundation (NSF) Research Experience for Undergraduates (REU) grant, were permitted to “pilot” the facility for their community geography and GIS-based research. CURVE’s collaborative workstations and visualization system were also used by researchers at Georgia State and the Centers for Disease Control and Prevention (CDC) on a collaborative grant, “Individual and Community Health in Low Income Neighborhoods: An Evaluation of Atlanta’s Beltline Project.” Researchers involved with the NSF-funded “Hominin Sites Paleolakes Drilling Project” analyzed high resolution scans of sediment drill cores on the interactWall and the 4K workstation. Dr. Dan Deocampo, PI and Geosciences chair, demonstrated CURVE’s unique visualization capabilities to his colleagues at the Smithsonian Institution, noting that analyzing the core images in CURVE has significantly improved the research process. Members of the Smithsonian Institution were so impressed that they have selected CURVE as the site of their 2016 project meeting.

CURVE is also supporting research in the new and growing area of graphics processing unit (GPU) enhanced computing. The University Library has partnered with Georgia State’s new Research Solutions Unit to support new research computing methods and high-performance computing. Working closely with Research Solutions, CURVE is now equipped with several scientific-grade GPUs that chemistry researchers are using to build and test molecular models. Through CURVE, the Library and Research Solutions are also collaborating on ways to better support research and data visualization needs on campus.
selected research projects and demonstrations

3D Atlanta
Brennan Collins, Associate Director, Center for Instructional Effectiveness
Robert Bryant, M.A. student, Anthropology, and Student Innovation Fellow

3D Molecular Models Using VMD
Neranjan Suranga Edirisinghe, Scientific Computing Specialist, Research Solutions

3D Phoenix Project: Identifying and Scanning Artifacts Unearthed During MARTA Construction
Robin Wharton, Lecturer, English
Jeffery Glover, Associate Professor, Anthropology
Robert Bryant, M.A. student, Anthropology, and Student Innovation Fellow

3D Visualizations in Archaeology: Exploring Mayan Ruins
Jeffery Glover, Associate Professor, Anthropology
Andrew Vaughan, M.A. student, Anthropology, and Student Innovation Fellow
Robert Bryant, M.A. student, Anthropology, and Student Innovation Fellow

BioDigital Human
LaShondra Arnold, M.S., Biology, and Bio-Bus Fellow

DNA Damage on the Molecular Level: How Ribonucleotide Intrusions Impact Duplex Structure
Alexander Spring, Postdoctoral Fellow, Biology and Chemistry
Marina Evich, Ph.D student in Professor of Chemistry Markus W. Germann's Lab

Fluorescence Microscopy to Explore Molecular Biology
Ercan Cacan, Nagini Maganti, and Tomika Moody, Ph.D students from Associate Professor of Biology Susanna Greer's Lab, and Alexander Spring, Postdoctoral Fellow, Biology and Chemistry

H2O Tech Water Innovation Cluster
Founding research meeting with representatives from the U.S. Environmental Protection Agency.

Hominin Sites Paleolakes Drilling Project (NSF funded project)
Dan Deocampo, Chair and Associate Professor, Geosciences
Lawrence Kiage, Associate Professor, Geosciences
Nathan Michael Rabideaux, Ph.D student, Chemistry

Hotel Management Software Application Development
Chris Fasciano, B.S. student, Computer Science
Daniel Delliara, B.S. student, Computer Science
Tracy Robbins, B.S. student, Computer Science

Individual and Community Health in Low Income Neighborhoods: An Evaluation of Atlanta’s Beltline Project (GSU and CDC Collaborative Seed Grant)
Mathew Gayman, Assistant Professor, Sociology
Holley Wilkin, Associate Professor, Communication
Candace Rutt, Centers for Disease Control and Prevention (CDC)
John Steward, Academic Professional, Public Health
Chivon Mingo, Assistant Professor, Gerontology
Scott Weaver, Assistant Professor, Public Health
Isabel Garcia de Quevedo Landa, Centers for Disease Control and Prevention (CDC)

NVivo Software for Analyzing Qualitative and Unstructured Data
Mandy Swygart-Hobaugh, Data Services and Social Sciences Librarian

REU Site: Addressing Social and Environmental Disparities through Community Geography and Geographic Information Systems (NSF-REU)
Timothy Hawthorne, Assistant Professor, Geosciences
Katherine Hankins, Associate Professor, Geosciences

Robinson Country Intelligence Index Research and Teaching Project
Christopher Brown, Vice President for Research and Analysis, World Affairs Council of Atlanta
Tracing a History of Atlanta’s Public Transit
Shakib Ahmed, B.S. student, Computer Science
Wasfi Momen, B.S. student, Computer Science
Alexandra Orrego, B.S. student, Geosciences, with a minor in Computer Science
Nicole Ryerson, M.A. student, Geosciences
Amber J Boll, M.S. student, Geosciences
Joseph Hurley, Interim Director, CURVE

Turner Field Neighborhoods Interactive Documentary Project “Stadiumville” (NEH proposal)
Brennan Collins, Associate Director, Center for Instructional Effectiveness
Timothy J. Crimmins, Director, Center for Neighborhood and Metropolitan Studies

Urban Gardening, Food Deserts and Mapping
Nicole Ryerson, M.A. student, Geosciences, and Student Innovation Fellow
Amber Boll, M.S. student, Geosciences, and Student Innovation Fellow

Using Tableau as a Data Visualization Tool to Explore Reoccurring Cancer Trends (2nd Place, Oral Presentation, 2015 Georgia State Undergraduate Research Conference)
Charbel Aoun, First-year Honors student and Student Innovation Fellow

Visualizing Spatial and Temporal Data
Ayush Shrestha, Computer Science Ph.D. candidate

Zoukis Summer Research Institute: Crime, Punishment and Policing in the South
3-day institute sponsored by the Department of Political Science.

awards and honors

Georgia State University Library
2015 Campus Technology Magazine Innovators Award, Education Futurists category.

Collins Cooper Carusi Architects
Selection of CURVE, 2015 AIA Atlanta Architects Tour.

New South Construction
First Place for CURVE, 2015 Associated General Contractors Build Georgia Awards.

national recognition

CURVE continues to receive national attention from other notable research universities. As a result, we are quickly gaining a reputation as a leader in data visualization and digital scholarship innovation and support. We have welcomed numerous site visits and are involved in ongoing conversations and collaborations with the following:

Association of Southeastern Research Libraries (ASERL)

College of William & Mary
Arts and Sciences, Libraries

Georgia Institute of Technology
Library, Office of Information Technology, College of Architecture

Stanford University Libraries
David Rumsey Map Center

University of Chicago
Research Computing Office, Research and National Laboratories

University of Cincinnati Libraries

University of Colorado – Boulder Libraries

University of Illinois
Grainger Engineering Library Information Center

University of Michigan Libraries

University of New Mexico Libraries

University of North Carolina at Chapel Hill Libraries

University of North Carolina at Charlotte Library

University of Pennsylvania
School of Medicine, Institute for Biomedical Informatics

University of South Carolina Libraries
workshops

**Selected workshops offered through CURVE**
- 3D Modeling with Agisoft
- Bloomberg Terminal
- Cleaning Data with OpenRefine
- Demographic Maps and Data Made Easy: SimplyMap
- Demographic Maps and Data Made Easy: Social Explorer
- Spatial Symposium: An Introduction

**Selected workshops hosted in CURVE**
- Digital Humanities Series
- Entrepreneurial Startup Exchange
- Georgia Geographic Alliance Digital Mapping Workshop (National Geographic Foundation/Geosciences funded)
- Helping Your Students Visualize Data
- MATLAB
- R User Group (weekly gathering)
- Tableau Day

**selected class projects and presentations**

CURVE technology, including the interactWall and collaborative workstations, have been widely used by instructors across a broad array of disciplines. These resources allow instructors to explore innovative ways of teaching and offer new learning experiences for Georgia State students.

**Architecture Seminar**
Professor of the Practice Stuart Romm, Georgia Tech School of Architecture
Students made CURVE their laboratory, an example of the library of the future.

**Honors Visualization Seminar**
Associate Professor Stewart Ziff, Art and Design
Students collaborated on final presentations using CURVE’s unique technology.

**Illustration: Concepts through Images**
Lecturer Jason Snape, Art and Design
Students offered critical feedback of each other’s artwork using the interactWall.

**Psychology of Instruction**
Professor Nannette Commander, College of Education & Human Development
Students collaborated on research projects and small-group interactive presentations.

**Urban Health**
Academic professional John Steward, School of Public Health
Graduate students engaged with members of the downtown community with maps and visualizations.

**Women in Science Honors Seminar**
Assistant Professor Nadine Kabengi, Geosciences
Students designed multimedia presentations for the interactWall.

**Writing on Material Culture**
Lecturer Robin Wharton, English
Students created 3D models using Agisoft 3D modeling software available in CURVE.

**open houses for departments and colleges**

Numerous colleges and departments scheduled tours and orientation sessions in CURVE, including:
- Andrew Young School of Policy Studies
- Center for Latin American & Latino/a Studies Faculty Affiliates
- College of Education & Human Development
- Department of Computer Science
- Department of Geosciences
- Department of History
- Department of Psychology
- Department of Sociology
- Institute for Women’s, Gender, and Sexuality Studies
- J. Mack Robinson College of Business
- Byrdine F. Lewis School of Nursing and Health Professions
- School of Public Health
Clockwise from top:
Anthropology faculty member Jeffrey Glover gives students a virtual 360° tour of Mayan archaeological sites.
Student Innovation Fellow and M.S. Geosciences student Amber Boil offers an impromptu session using Google Earth.
Instructors engage students in new ways in CURVE’s multiple collaborative spaces.
Students work in groups at CURVE collaborative workstations to analyze visual data.
selected guest speakers

Georgia’s Congressional Staffers from Washington, D.C.
August 29, 2014

Visited CURVE to learn about research projects and innovations happening at Georgia State. Visitors included staff from the offices of Senators Saxby Chambliss and Johnny Isakson and Congressmen Sanford Bishop, Phil Gingrey, Tom Graves, Jack Kingston, John Lewis, Tom Price, Austin Scott, and David Scott. Faculty presentations included:

Susanna Greer, Associate Professor of Biology, on “Turning Immune Cells on to Cancer”
Rich Muller, Senior BioSafety Officer, on lab security on campus
John McMillian, Assistant Professor of History and author of the recent book, Beatles vs. Stones

Seven Technological Changes that are Reshaping Teaching and Learning (Sponsored by the Center for Instructional Innovation)
October 21, 2014

Richard Halverson, Associate Professor of Educational Leadership and Policy Analysis in the University of Wisconsin-Madison School of Education

Technologies for Education vs. Technologies for Learners: How Technologies Have, Haven’t and Might Change Schooling (Sponsored by the Center for Instructional Innovation)
October 22, 2014

Richard Halverson, Associate Professor of Educational Leadership and Policy Analysis in the University of Wisconsin-Madison School of Education

World Community Grid
November 12, 2014

Art Vandenberg, retired GSU Information Systems & Technology Data Administrator and Director of Advanced Campus Services

scholarship about CURVE

Article

Conference Presentations
Krista Graham, Khyle Hannan, Joseph Hurley, and Bryan Sinclair; “Interactive Visualization: Video Walls for Collaborative Research and Discovery (Snapshot of CURVE), DLF Forum (Digital Library Federation), Georgia Tech, October 29, 2014.

Bryan Sinclair, Jill Sexton (UNC-Chapel Hill), and Joseph Hurley, “Visualization on the Big Screen: Hands-on Immersive Environments Designed for Student and Faculty Collaboration,” CNI Spring Meeting (Coalition for Networked Information), Seattle, WA, April 13, 2015.

(Invited) Krista Graham, Panel Discussion, Re-think it: Libraries for a New Age, Grand Valley State University, Michigan, August 10-12, 2015.


promotion and media

Feature

Georgia Library Association Website
CURVE: Collaborative University Research & Visualization Environment in the Spotlight!, Spring 2015.

Georgia Public Broadcasting
GPB filmed Geosciences researcher Brian Meyer’s work on Georgia coastline erosion in CURVE. Aired Spring 2015.
Campus Publications
“From the President” column, Georgia State University Magazine, Winter 2014.

“In the City: Ahead of the CURVE, New visualization technology enhances interactive learning experiences,” Georgia State University Magazine, Fall 2014.

“Library South welcomes the CURVE,” the Signal, March 1, 2014.

GSU Home Page Feature
Archeologist Reveals Secrets Of Maya Site, Fall 2014, discussing CURVE and some of its unique technology for visualization.

Video
Innovation in Action: CURVE. Produced by Georgia State University Student Innovation Fellows, Spring 2015.

acknowledgments

Thanks to all our campus partners who provided support and expertise that led to the creation of this unique facility at Georgia State University Library. Because of you, and the many dedicated students, faculty, and staff included in these pages, CURVE had an overwhelmingly successful first year.
CURVE

website: curve.gsu.edu
twitter: @CURVE_GSU
facebook: curvegsu
pinterest: georgiastateul/curve