Mapping Brooklyn: GIS, Spatial Narrative, and Urban Habitus at a Public College of Technology

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2. LIST OF PARTICIPANTS

In the role of Project Director, **Christopher Swift** will manage the overall project, which includes active participation in each phase of the grant, maintaining communications among participants, leading four status briefing meetings with Codirectors, organizing travel and stipends for invited speakers and workshop leaders, communicating with the NEH, overseeing the budget, logistics, and consultancies, and drafting the final white paper. Codirectors **Heidi Boisvert, Patrick Corbett,** and **Peter Spellane** will lead discussion at the Symposium. They will also consult the Fellows during the development of GIS teaching modules over the summer, 2020. Dr. Boisvert will oversee data management (see Data Management Plan). In collaboration with Maura Smale (Chief Librarian, CUNY and Advisory Board) and library staff, Dr. Corbett will set up an OpenLab project site for the dissemination of OER. Dr. Corbett will also function as a liaison between the library and the Institute of Museum and Library Services (IMLS) in establishing a data repository for managing and cataloging code, data models, csv files, and image banks for the projects. Dr. Spellane will assist Dr. Swift with the conceptual framing and funding proposal for a future DH hub at the library (outlined in the white paper).

Project Director
Christopher Swift
Associate Professor, Theatre History and Performance Studies
New York City College of Technology, CUNY

Codirectors
Heidi Boisvert
Assistant Professor, Entertainment Technology—Emerging Media
New York City College of Technology, CUNY

Patrick Corbett
Assistant Professor, English
New York City College of Technology, CUNY

Peter Spellane
Associate Professor, Chemistry
New York City College of Technology, CUNY

Fellows
Candido Cabo
Professor, Computer Systems Technology
New York City College of Technology, CUNY

Ting Chin
Assistant Professor, Architecture Technology
New York City College of Technology, CUNY

Richard Hanley
Professor Emeritus, English
Director, Brooklyn Waterfront Research Center
New York City College of Technology, CUNY

Anne E. Leonard
Associate Professor, Information Literacy and Instruction
New York City College of Technology, CUNY

Anne Leonhardt
Associate Professor, Architecture Technology
New York City College of Technology, CUNY

Sean MacDonald
Associate Professor, Economics
New York City College of Technology, CUNY

Ashwin Satyanarayana
Associate Professor, Computer Systems Technology
New York City College of Technology, CUNY

Satyanand Singh
Associate Professor, Mathematics
New York City College of Technology, CUNY

Board of Advisors
Matthew K. Gold
Associate Professor, English and Digital Humanities
Director, M.A. Program in Digital Humanities
Graduate Center, CUNY

Maura Smale
Professor and Chair, City Tech Library
Chief Librarian, CUNY

Invited Speakers and Workshop Leaders for Symposium
Christy Hyman (*Plenary Speaker, confirmed*)
August Edgren Graduate Fellow
Department of History, University of Nebraska-Lincoln

Wendy Kellog *(Plenary Speaker, invited)*
Research in Cognitive and Social Computing
IBM

Robert K. Nelson (*Keynote Speaker, confirmed*)
Director, Digital Scholarship Lab
University of Richmond

Steven Romalewski (*invited*)
Director, Center for Urban Research
City University of New York

Nick Shatan *(invited)*
Planning and Knowledge Capture Coordinator, CoLab
Massachusetts Institute of Technology

3. PROJECT NARRATIVE

Enhancing the Humanities through Innovation.
New York City College of Technology, CUNY (City Tech) is a public college and Hispanic-Serving Institution (HSI) committed to providing broad access to quality technological and professional education for a diverse urban population. City Tech's distinctive emphasis on applied skills and place-based learning is built upon a vibrant general education foundation. Students learn problem-solving skills within relevant socio-cultural contexts of technology. An NEH Digital Humanities Advancement Level 1 project, in conjunction with support from the Institute of Museum and Library Services (IMLS), will strengthen the nexus of the humanities and digital technologies at City Tech by focusing on data science, digital media, and writing about place. The proposed work complements a rigorous interdisciplinary program that helps students apply their skills to solving real world problems. This will fulfill the college mission to "understand and apply values, ethics, and diverse perspectives in personal, professional, civic, and cultural/global domains."[1] City Tech has used the inspiration of place to launch ten NEH-funded projects in as many years (see Appendix V, Previous NEH Projects). These grants have supported faculty development, summer workshops and institutes, and digital humanities (DH), the majority on place-based themes. This grant will extend these efforts into the field of digital mapping.

Many of the college's degree programs are career-directed, designed to prepare students for employment in STEM fields. It is the institution's enduring challenge to integrate the humanities with education in advanced and applied technologies. We propose to develop an integrated set of teaching modules that embed data research and management in digital mapping projects and connect students to issues of urban environment, health, housing, and transportation. Digital mapping is a high-impact pedagogy, providing creative, interactive, and sophisticated methods for visualizing complex quantitative information in tangible ways (Young and Ferrandino; Kirwan, 5). Brooklyn is both a living archive for place-based learning opportunities and our students' hometown. Brooklyn-focused mapping projects offer student research tasks that reveal the complex factors that shape their daily experiences. This project will bring together members of the faculty who currently work independently on four distinct Global Information Systems (GIS) projects (see Appendix II, GIS Module Abstracts) and provide them the means to intensify the focus on the spatial humanities. These investigations will inform the development of high-impact teaching modules in an academic forum at City Tech where humanities scholars collaborate with data scientists and digital media designers. We will welcome additional support from IMLS; the college library could build and maintain a repository to manage code, data, and images generated in the current project. The library will also support the publication of teaching modules on Open Educational Resources (OERs) platforms and into broader scholarly networks.

The project will unfold in three stages:

1. *Symposium (Spring 2020).* With the Principal Investigator and Codirectors, eight Fellows (see List of Participants) will examine and consider critical theories of the spatial humanities. This intellectual framework is comprised of scholarly readings, surveys of mature GIS programs at other research institutions, and a Symposium with representatives from these universities will structure conversations about methods for applying GIS methods to examine urban issues. (see Appendix I, Symposium Agenda) The set of questions presented below will foster discussion and consideration of how georeferenced data can describe the complex social, economic, and environmental forces that conditions urban living.

[1] College Mission, New York City College of Technology. http://www.citytech.cuny.edu/about-us/mission.aspx.

A. In what ways can GIS mapping enliven undergraduate education in applied technology disciplines?
B. What kinds of aggregated data function effectively in GIS mapping ecosystems?
C. What local issues in Brooklyn communities can be elucidated with digital mapping tools?
D. How can written narratives supplement visual narratives to foster comprehension of place?

Readings on GIS in the humanities and a review of external DH platforms and projects (see Appendix III, Bibliography) will provide a framework for Symposium dialogue between invited speakers and Fellows. The metaphor of "deep mapping"[2] will structure the critical engagements of the April Symposium, encouraging participants to think expansively and creatively about applications of GIS in the study of urban life. Breakout workshops will allow participants to connect these emergent ideas with the learning goals of coursework, providing conceptual foundations for the teaching modules. The Symposium will have the added benefit of positioning our college of technology within the larger DH field and providing Fellows with opportunities to connect with specialists from industry and academia. We will invite faculty working in DH across CUNY to share resources and experiences. (see Appendix I, Symposium Agenda)

2. *Developing and Teaching Classroom Modules in GIS Mapping Urban Living (Summer/Fall 2020).* This intellectual engagement will inform the development of teaching modules for use in statistics, environmental economics, database systems, and architectural sustainability, which will impact the learning of approximately 125 students in related degree programs during the first semester the modules are taught. Having cultivated a vision of spatial humanities linked to learning outcomes, Fellows will develop four distinct teaching modules to be embedded in existing courses in mathematics, architecture technology, computer systems, and economics. The four GIS projects are described below:

A Spatiotemporal Model of the Development of the Brooklyn Tech Triangle. Fellows Ting Chin (Architectural Technology) and Satyanand Singh (Mathematics) will collaborate on a 3-week module for students enrolled in Statistics (MAT 1272) will give students the mathematical tools to create and interpret maps from a socio-economic perspective driven by political and economic influences. They will research the chronological development of the urban fabric of downtown Brooklyn tech center and its systems of organization. Data collected from PLUTO (the NYC Department of City Planning's open source land use and geographical information database) will be aggregated and mapped in ArcGIS Pro using the open source mathematical software R using the Plotly and Leaflet Libraries.
Mapping Lives of Brooklyn will be developed by Fellows Anne Leonard (Library) and Candido Cabo (Computer Systems Technology) for CST 1204, Fundamentals of Database Systems. They propose to develop a suite of interdisciplinary, accessible activities in ArcGIS Story Maps that will allow students to integrate spatial and written narratives of travel across the urban topography of Brooklyn. This way, students can begin to understand the relationships between transportation infrastructures and events and experiences on subways and buses. Information will be derived from ANSI structured query language and place undergraduate students in authorship roles.
The Brooklyn Waterfront project is a collaboration between Richard Hanley (English) and Sean Macdonald (Economics), who will develop a digital mapping module for Environmental Economics (ECON 2505). Using data from PLUTO and the Brooklyn Waterfront Research Center, the module will

[2] Deep mapping highlights "the ways in which qualitative and humanistic forays into the representation and practice of space and place are multi-faceted, open-ended… [D]eep mapping necessitates engaging with the same performative dynamics by which its various iterations are made manifest in practice." Roberts (2016), viii.

analyze the economic viability of current NYC proposals for addressing environmental challenges along the waterfront. Using the multimedia open-source mapping application Story Maps (ArcGIS) student researchers can publish summaries of their findings alongside interoperable digital maps.
Understanding Climate, Health Risks, and Environmental Sustainability in South Brooklyn through Data Mapping. Fellows Anne Leonhardt (Architectural Technology) and Ashwin Satyanarayana (Computer Systems Technology) will develop an interactive map of climate, health risks and sustainability for students of architectural technology, physics, biology, and computer science. The team will take as inspiration the iconic model of IBM and Charles and Ray Ames' 1964 Minds of Modern Mathematics project, and like the IBM project, our interactive map, developed with the ArcGIS Pro application and SQL, will include a timeline linked to geo-referenced visual representations of key South Brooklyn environmental data over time. Subjects of study for the prototype mapping tool include air pollution, climate risk, health service access, and food deserts.

In summary, the teaching modules will involve students in the organization and interpretation of the public record to consider the public good. In Fall 2020, faculty participants will pilot the modules in scheduled classes. Based on their assessments of these pilots at the end of the semester, Fellows may restructure and refine the assignments.

3. Publication of OER material, Ursula C. Schwerin Library, City Tech (Winter/Spring 2021)
In collaboration with Library faculty, Fellows will design and build permanent OpenLab[3] hosting platforms for dissemination of learning modules as OER. Each project site will contain prototype interactive maps, lists of relevant queries and datasets, and scaffolded, integrated mapping and writing assignments. The Library currently runs an OER Fellowship program for the development of zero-cost teaching resources. The program has been funded by New York State since 2017 and will be funded in 2019-2020. The OER Fellowship program will support online publication of NEH modules. We welcome funding from the IMLS to create a repository hub at the library that will store research data and mapping projects. IMLS funds will provide startup costs for technology, as well as funds for adjunct personnel to build the repository. The repository would need ongoing library personnel support after setup, and Dr. Smale (Library Chair and Grant Advisor) will use the IMLS grant to advocate for filling two unoccupied faculty lines.

Environmental Scan. The rich sources of georeferenced data maintained by the NYC Department of Financing (PLUTO), The Department of Information Technology and Telecommunications (NYC Open Data) and the New York Public Library (Digital Collections: Maps and Atlases) are resources that have enabled the development of compelling mapping projects by City agencies and research institutions, including ours. These models and DH projects and programs in mapping at other universities provide sound guideposts for pedagogies that integrate quantitative data mapping with qualitative analysis of, and reflection on, the impact of urban development and environmental change. We have examined projects and programs that address the particular needs of undergraduate research, with special focus on areas of housing justice, historiography of immigration and minoritization, and ecological issues. One such program is the University of Richmond's Digital Scholarship Lab, which underwrites the American Panorama Atlas. The Lab has developed mapping projects that chart displacement of racial minorities in

[3] The OpenLab digital platform (Wordpress) is part of an initiative called "A Living Laboratory: Revitalizing General Education for a 21st-Century College of Technology", funded by the U. S. Department of Education under its HSI Title V Program, and is a central component to general education at City Tech.

urban redevelopment, forced migration of enslaved people, and migration patterns on the continent. The Lab's director, Robert K. Nelson, will present the Symposium Keynote Address. Public institutions that house spatial humanities laboratories, like UCLA's Digital Humanities Program and the University of Maryland's MITH program, are like us: they support undergraduate education in urban settings.

History of the Project. This project in digital mapping will expand upon digital humanities projects that emerged from earlier grants (see Appendix V, Previous NEH Projects). These can be developed further. In particular, *The Cultural History of Digital Technology* grant inspired members of the faculty go further in the investigation of spatial humanities and the integration of GIS mapping into existing curricula. Five participants in this 2016-18 grant are stakeholders in the current proposal (Drs. Leonhardt, MacDonald, Singh, Spellane, and Swift). Another forerunner of the present proposal is a GIS project called *The City Performs: An Architectural History of Theater in New York City* for the Emerging Scholars Program (Drs. Swift and Chin). The OER incorporates student research and was built with ArcGIS Story Maps. The current proposal is a resubmission of a 2018 application entitled *Mapping Brooklyn: Digital Tools to Support Place-Based Learning at an Urban Minority-Serving College of Technology.*

Work Plan.

February 1-May 31, 2020. Prior to the April Symposium, informal conversations centered around readings will be moderated by Dr. Swift (PI). The PI will organize the April Symposium and Codirectors Heidi Boivert, Patrick Corbett, and Peter Spellane will participate with Fellows. Attendees will be invited from allied institutions, including CUNY Center for Urban Research, CUNY Program in Digital Humanities, and the New York Public Library. Matthew Gold (Advisory Board) will help us identify and bring together the main stakeholders. (see Appendix I, Symposium)

June 1-December 31, 2020. Over the summer, interdisciplinary teams comprised of eight Fellows will create GIS teaching modules in courses from the schools of Technology and Design and Liberal Arts and Sciences. The PI and Codirectors will supervise and advise.

January 1-May 31, 2021. Fellows will conduct an assessment of their work using the GIS Module Assessment template (see Appendix IV). The Library faculty from the OER Fellowship program will support the development of OpenLab sites with Fellows. OER modules will be completed by March 31. The PI will compose and submit the white paper at the conclusion of the funding period.

Final Product and Dissemination. The deliverables for the project will be four OER modules in geospatial data research, GIS mapping, and writing exercises—an interdisciplinary suite of tools that incorporates data science, digital media, and field reporting. The modules will be published on City Tech's OpenLab project site, which will also include a resource page listing sources, queries, links to exemplary GIS projects, and assignments. The site will be fully searchable and accessible through the world wide web, and will be managed by the grant Codirectors (the material will remain available on OpenLab beyond the grant period). The modules will also be published on public OER platforms, such as OER Commons. With support from IMLS, a data repository managed by the Library will be built. Over the 2021 winter intersession, fellows will assess outcomes in a written report (see Appendix IV, GIS Module Assessment). The information from these reports will be summarized in a white paper, contextualizing digital mapping curricula within the general education goals of the college. The white paper will also outline goals for projects to develop an institutional DH hub, which will include infrastructure for data archiving and curation, project hosting, and OER content to be administered through the college library.

4. BIOGRAPHIES

Heidi Boisvert (Codirector) is a new media artist, creative technologist, experience designer, researcher and writer. She founded and serves as the CEO and Creative Director of the futurePerfect lab, a boutique creative agency that works with nonprofits to develop imaginative applications of integrated media and emerging technology. Heidi was formerly the Media Director at Breakthrough where she designed, developed and promoted a range of viral, new media and pop culture campaigns that helped raise awareness and instigate policy change on pressing social issues. She created the first 3D social change game, *ICED I Can End Deportation*, to shift the frame around unfair U.S. immigration policies. Heidi also designed *America 2049*, an alternative reality game on Facebook about pluralism, which was nominated for Games for Change and Katerva awards. Most recently, she co-founded, XTH, an open-source bio-creative technology start up, and was named a Harvestworks Creativity + Technology = Enterprise Fellow as well as a Media Impact Fellow at the Harmony Institute. She received her PhD in Electronic Arts at Rensselaer Polytechnic Institute and is currently the Director of Emerging Media Technology at New York City College of Technology, CUNY and a research affiliate at MIT OpenDoc Lab.

Candido Cabo (Fellow) is Professor of Computer Science Technology at New York City College of Technology, CUNY. Dr. Cabo provides expertise in the integration of general education skills and competencies in computer science curriculum, and in the research of innovative approaches to the development of problem-solving skills in beginning computer programmers. Dr. Cabo has participated in several initiatives at City Tech linking the humanities to technology including the *Making Connections: Engaging the Humanities at a College of Technology* NEH grant and First-Year Learning Communities that link computer courses with English Composition to improve student's abilities in writing and computer programming. Dr. Cabo also pursues research in computational biology to understand biological processes using computer models.

Ting Chin (Fellow) is an Assistant Professor of Architectural Technology at the New York City College of Technology, CUNY, a licensed architect, and a founding principal of Linearscape, an award-winning interdisciplinary design studio. Her teaching and practice engage in research, exploration, and collaboration to arise at design solutions that address a wide-range of urban issues related to the built environment. Linearscape was the recipient of the 2012 AIA Emerging New York Architects award for their project *Sym*bio*pia* and has more recently received a 2016 AIA Citation and 2015 SARA Design Excellence Award for their work on *Wild Walk* in Tupper Lake, NY. Prior to teaching and founding Linearscape. Ting had over ten years of experience working in a diverse array of architectural and landscape design offices. Her project experience includes airports, office towers, master planning, healthcare, laboratory, cultural and educational facilities, and the design of public urban spaces. More recently she has been presenting at international conferences, researching, and writing about the potential of sustainable and symbiotic urban environments. She received her Master in Architecture from the Graduate School of Design at Harvard University in 2004.

Patrick Corbett (Codirector) is an Assistant Professor of English at New York City College of Technology, CUNY. In addition to being an institutional writing specialist, Dr. Corbett's primary research area is technical communications, with a particular focus on examining the impact of the acquisition of digital literacies on learning, technology adoption, and the institutionalization of technological tools. Dr. Corbett has participated in or advised multiple institution-wide projects including the U.S. Department of Energy Solar Decathlon as a communications advisor, a U.S. Department of Education Title V grant *The Living Lab* as a participant Fellow and as one of the lead compliance writers, and as faculty liaison to

the College's Office of Sponsored Programs, where he serves as a resource for all PIs of external grants. Currently, Dr. Corbett splits his research activities between testing the use of "buildable" open-educational resources in writing classrooms and examination of the impact of strategic grants initiatives on institutional teaching culture, particularly through the employment of new technologies in the classroom.

Matthew K. Gold (Advisory Board) is Associate Professor of English and Digital Humanities at The Graduate Center of the City University of New York, CUNY, where he holds teaching appointments in the PhD Program in English and multiple MA programs including the MA Program in Digital Humanities, which he also directs. He serves as an Advisor to the Provost for Digital Initiatives, Director of the CUNY Academic Commons, Codirector of the CUNY Digital Humanities Initiative, and Director of the GC Digital Scholarship Lab. He is series editor (with Lauren F. Klein) of the *Debates in the Digital Humanities* book series (University of Minnesota Press) and has edited multiple volumes in the series. He has directed multiple NEH grant projects focused on undergraduate digital humanities education, including *Looking for Whitman* (which received two start-up grants from the NEH Office of Digital Humanities) and *Learning in the Public Square*, which received an Implementation Grant from the NEH Office of Digital Humanities. He is Vice-President/President-Elect of the Association for Computers and the Humanities.

Richard E. Hanley (Fellow), who holds a PhD in English and American literature from Binghamton University, is an emeritus professor of English at New York City College of Technology, CUNY, where he directs the Brooklyn Waterfront Research Center. He is the founding editor of the Journal of Urban Technology (JUT), an international academic journal devoted to the study of the effects of technologies on cities and of the ways cities shape and employ technologies. Dr. Hanley has directed three NEH programs. In 2008, he directed a faculty development grant *Water and Work: The Ecology of Downtown Brooklyn*. In 2010 and 2012, he directed summer workshops in the *Landmarks in American History and Culture* program, *Along the Shore: Changing and Preserving the Landmarks of Brooklyn's Industrial Waterfront*.

Anne E. Leonard (Fellow) is an Associate Professor and the coordinator of Information Literacy and Library Instruction at New York City College of Technology. She also co-teaches an interdisciplinary course, *Learning Places: Understanding the City*. She holds an MS in Urban Affairs from Hunter College and an MLIS from the University of Texas at Austin. Her academic interests include place-based learning, embodied learning, and critical information literacy. With colleague Peter Spellane, she published "Using old maps and new methods to discover the early chemicals and petroleum industries of Newtown Creek," *Journal of Map and Geography Libraries*, 9, 25-43 (2013).

Anne Leonhardt (Fellow) was the Project Director of the NEH *A Cultural History of Digital Technology* Grant from 2016 to February 2018 and before that directed the NSF TUES *Center for Performative Design* grant from 2012 to 2015. She is an Associate Professor and heads the department of Architectural Technology's digital media and fabrication program. She will bring perspectives from her background in architectural technology and history to the grant.

Sean P. MacDonald (Fellow) is an Associate Professor of Economics at the New York City College of Technology, CUNY. She earned her PhD in Economics from the New School for Social Research in New York. Her work has included several collaborative interdisciplinary projects. She was a fellow in the NEH grant program, *Making Connections: Engaging the Humanities at a College of Technology* where she collaborated with other faculty on the development of interdisciplinary course modules and contributed to a collaborative journal article on interdisciplinary course collaboration across the humanities and

STEM disciplines. As a fourth-year fellow in the Title V grant, *A Living Laboratory: Revitalizing General Education for a 21st Century College of Technology*, she developed place-based learning activities for interdisciplinary learning. As a participant with another NEH grant, *A Cultural History of Digital Technology*, she designed a digital mapping module for Environmental Economics, an interdisciplinary course. She has published several papers and book chapters on the U.S. housing market, the 2008–2009 financial crisis and interdisciplinary teaching. In 2017, her co-edited book, (with R. D. Lansiquot) *Interdisciplinary Place-based Learning in Urban Education: Exploring Virtual Worlds* (New York: Palgrave) was published. She and Dr. Lansiquot are currently collaborating on another volume that explores the many interpretations of virtual place-based learning applied to teaching in an interdisciplinary context.

Ashwin Satyanarayana (Fellow) is currently an Associate Professor with the Department of Computer Systems Technology, New York City College of Technology, CUNY. Prior to this, Dr. Satyanarayana was a Research Scientist at Microsoft in Seattle from 2006 to 2012, where he worked on several data mining problems including query reformulation on Microsoft's search engine Bing. He holds a PhD in Computer Science from SUNY, with particular emphasis on big data analytics. He is an author or co-author of over 25 peer reviewed journal and conference publications. He has four patents in the area of search engine research. He is currently serving as Vice Chair of the ASEE (American Society of Engineering Education) Mid-Atlantic Section. His big data analytics background and expertise will help in the interdisciplinary collaboration with architecture technology to better analyze and visualize georeferenced data about the environment of South Brooklyn.

Satyanand Singh (Fellow) is an Associate Professor of Mathematics at New York City College of Technology. His research interests include number theory, cryptography, probability, and algebra. His research appears in The Electronic Journal of Combinatorics, The International Journal of Number Theory, CMJ, and the International Journal of Mathematical Education in Science and Technology. He is a Project Codirector of the NEH-funded *Cultural History of Digital Technology* project and a recipient of the prestigious Mathematical Association of America distinguished teaching award in Mathematics in recognition of extraordinarily successful teaching and commitment to students.

Maura A. Smale (Advisory Board) is Chief Librarian and Professor at New York City College of Technology and faculty in Interactive Technology & Pedagogy at the CUNY Graduate Center. She received her PhD in Anthropology from New York University and her Masters of Library and Information Science degree from Pratt Institute. In addition, she has worked as an online editor, web producer, and project manager in interactive media at companies including Disney Online, Scholastic Publishing, and American Express Publishing. Dr. Smale served as Project Director for the U.S. Department of Education Title V grant-funded *Living Laboratory*, and Codirector of the City Tech OpenLab, an open digital platform for teaching, learning, and collaboration. Her research interests include undergraduate scholarly habits and information-seeking behavior, open scholarship and teaching, and game-based learning. She blogs actively for the Association of College & Research Libraries, and has published numerous articles and book chapters. Her book, with Prof. Mariana Regalado (Brooklyn College), on how CUNY students use technology in their academic work, *Digital Technology as Affordance and Barrier in Higher Education*, was published in 2017. Their edited volume *Academic Libraries for Commuter Students: Research Based-Strategies* was published in May 2018. Her expertise in using digital technology for teaching, scholarship, and collaboration will support the work of this grant.

Peter Spellane (Codirector) is an Associate Professor, member of the Chemistry department, and instructor in organic chemistry at the New York City College of Technology. Having participated in

several projects that integrate humanities with education in science and technology, he began to study the history and environmental legacy of chemicals production and petroleum refining in Brooklyn and Queens. With colleague Ann Leonard, he published "Using old maps and new methods to discover the early chemicals and petroleum industries of Newtown Creek," *Journal of Map and Geography Libraries*, 9, 25-43 (2013).

Christopher Swift (Project Director) is an Associate Professor of theatre history and performance studies at the New York City College of Technology, CUNY. He has published on material culture and technologies of performance in medieval Iberia, affective devotion, and phenomenology of place for Oxford University Press, Routledge, Palgrave, Bloomsbury, Theater Journal, PAJ, and Preturnature. As a fellow in the Title V grant, *A Living Laboratory: Revitalizing General Education for a 21st Century College of Technology,* Dr. Swift developed collaborative, project-based coursework on the digital platform OpenLab. He also participated in the NEH grant programs *Making Connections: Engaging the Humanities at a College of Technology* and *A Cultural History of Digital Technology*. As a fellow on these projects, he co-created a place-based course on New York City places of performance with Architecture Technology and designed a digital mapping module for interdisciplinary sections of History of Theatre: Stages and Technology. He has mentored a number of student research projects, including *Richard III: An Eidophusikon for the 21st Century* and *The City Performs: An Architectural History of Theater in New York City*.

5. BUDGET

BUDGET 2

6. APPENDICES

Appendix I. Symposium Agenda

GIS Tools for Understanding Society and Place
A Symposium on Digital Deep Mapping
April 17-18, 2020 (tentative)
Supported by an NEH Digital Humanities Advancement Grant

New York College of Technology, CUNY, New Academic Center, 285 Jay Street, Brooklyn

The theme of the symposium is "deep mapping" in the humanities and digital technology. The following quote will serve as touchstone for the two-day symposium:

> How do we bring home—and bring emotionally to life—threats that take time to wreak their havoc, threats that never materialize in one spectacular, explosive, cinematic scene? Apprehension is a critical word here, a crossover term that draws together the domains of perception, emotion, and action.
>
> - Rob Nixon, *Slow Violence and Environmentalism of the Poor*

In addition to Nixon, selected articles from Bodenhamer, Corrigan, Harris (2015) and Roberts (2016) will frame roundtable discussions about the integration of mapping into The invited speakers will broaden the discussion of examples from these readings to address these themes.

FRIDAY, APRIL 17

WELCOME
Christopher Swift, Principal Investigator
10:00am-10:15am

KEYNOTE ADDRESS
Robert K. Nelson, Director, Digital Scholarship Lab, University of Richmond (*confirmed*)
10:15am-11:00am

WORKSHOP: Identifying Viable GIS Projects for the Greater Social Good
Steven Romalewski, Director, CUNY Center for Urban Research (*invited*) will present on past projects of the Center and lead a workshop exploring PLUTO.
11:00am-12:30pm

Lunch: Janet Leffler Dining Room

Sponsored by the Department of Hospitality Management
12:30pm-2:00pm

PLENARY SPEAKER
Wendy Kellog, Research in Cognitive and Social Computing, IBM (*invited*)
2:00pm-2:45pm

RESPONDENT'S PANEL: What next? The Potentials of Digital Activism
Nelson, Kellog, and Hyman respond to questions about the future of GIS mapping for documenting urban problems.
2:45-4:00pm

BREAKOUT DISCUSSION GROUP
Fellows discuss connections among the themes of the day and record ideas for GIS modules
4:00pm-5:00pm

SATURDAY, APRIL 18

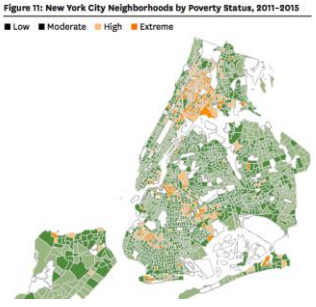
PLENARY SPEAKER
Christy Hyman, University of Nebraska-Lincoln (*confirmed*)
10:00-10:45am

WORKSHOP: Interactivity and Engagement in GIS Mapping
Nick Shatan, CoLab, M.I.T., (*invited*) will demonstrate effective strategies for interactive mapping
10:45-12:30pm

Lunch Break
12:30-2:00pm

WORKSHOP: Multimedia and GIS Mapping: The Frontier of Spatial Representation
Heidi Boisvert, Codirector, will lead a creative workshop with conference attendees.
2:00-3:30pm

Informal discussion and wine bar
3:30pm-5:00pm



Poverty in New York City report, NYU Furman Center

Appendix II. GIS Module Abstracts

A Spatiotemporal Model of the Development of the Brooklyn Tech Triangle

Ting Chin (Architecture Technology), Satyanand Sinh (Mathematics)

This project will chart the historical development of the urban fabric of the Brooklyn Civic Center (Tech Triangle) over the past two decades. The study seeks to develop a methodology for digitally mapping, analyzing, and representing the multifaceted forces that impact infrastructural and architectural development to better understand the decision making that led to the existing civic ensemble in which our college is embedded. Graphically representing these forces on ArcGIS will model how rapid economic development of urban spaces impacts human life, and could potentially guide design and planning practitioners, academics, and students to consider environmental impacts such as noise, population density, and livability in future urban development projects. We will use the open source mathematical software R to create GIS maps using the Plotly and Leaflet libraries. This will give students the mathematical tools to create and interpret maps from a socio-economic perspective that are driven by political and economic influences. As the Brooklyn Tech Triangle rapidly densifies around City Tech, faculty, in collaboration with students, can begin to plot a vision of the civic center that encourages diverse expressions of culture and infrastructures that support a contemporary expression of society.

Mapping the Lives of Brooklyn

Anne E. Leonard (Information Literacy), Candido Cabo (Computer Systems Technology)

We propose to develop a suite of multidisciplinary, flexible, and accessible digital mapping activities that place undergraduate students in authorship roles, as they collect, organize, and geocode data, and then produce vector narratives across Brooklyn topographies. In addition to providing instruction on digital mapping, assignments will pursue research questions on quality of life and social interaction. We will initiate the construction of an interactive, extendable mapping application using the open-source, integratable GIS tool ESRI Story Maps. Once the mapping tool is fully operable, it can be used in coursework in sociology, history, English, African American studies, and urban studies to trace spatial pathways and networks that represent the peregrinations of students or historical figures across the social fabric of the borough. In the course of their research, students will be provided with access to relevant data sources, such as the NYPL Digital Mapping Collection, ESRI Open Data, and NYC Open Data. They will then learn how to navigate, collect, and recombine data in spreadsheet form, and then publish georeferenced vectors and event locations across the urban geography. An example of an introductory classroom activity would involve gathering and georeferencing information commuter routes between home, work, and the campus. A second, scaffolded activity would involve collecting and geocoding open-source data about ridership on the MTA and overlaying and integrating this information visually with the commuter stories. This will provide opportunities to understand the relationships between transportation infrastructures and events and experiences on subways and buses. Based on these analyses, students can begin to imagine safer, more efficient, and more humane experiences traveling through the borough of Brooklyn.

The Brooklyn Waterfront

Richard Hanley (English), Sean MacDonald (Economics)

Fellows from English and Economics will develop a digital mapping module for Environmental Economics (ECON 2505). A teaching module will be designed to analyze the economic viability of current NYC proposals for addressing environmental challenges along the waterfront. Using the multimedia open-source mapping application Story Maps (ArcGIS) student researchers can publish summaries of their findings alongside interoperable digital maps. PLUTO tax lot data and information previously collected and held at the Brooklyn Waterfront Research Center on the history of waterfront industrialization will

provide content for student researchers. The interactive map will communicate research findings and provide multimedia curriculum enhancements. The team will design and build interactive elements that will allow non-specialists to create additional layers of georeferenced written narratives by linking to data in shared .csv files.

Understanding Climate, Health Risks, and Environmental Sustainability in South Brooklyn through Data Mapping

Anne Leonhardt (Architectural Technology), Aswhin Satyanarayana (Computer Systems Technology)

We propose to develop of a Brooklyn-based interactive map of Climate, Health Risks and Sustainability for students of architectural technology, physics, biology, and computer science. We will take as inspiration the iconic model of IBM and Charles and Ray Ames' context-rich 1964 Minds of Modern Mathematics project, and like the IBM project, our interactive map, developed with the ArcGIS Pro application and SQL, will include a timeline linked to georeferenced maps of key South Brooklyn environmental data over time. Subjects of study for the prototype mapping tool include air pollution, health data, climate risk, health service access, and food deserts. Users of the interactive map will be able to select points on a timeline for comparing historical urban topographies, while also accessing resources and artifacts that are embedded in specific sites. The mapping tool will allow students to perform qualitative analyses of quantitative information between the graphic and data layers of the map. The mapping tool will direct users to data sets that have become widely available in the past decade through governments, non-profit organizations, and multinational technology companies, such as Google and Twitter. The team will create a teaching module for design and computer technology students on statistics, data cleaning, and data scraping (acquisition), as well as queries.

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Appendix IV. GIS Module Assessment

Dear Fellows:

In considering the stages of the grant, from readings and symposium, to collaborative module design and classroom module piloting, please respond to the questions below. Your input is important for gaining a greater understanding of how to proceed to the next steps: development of OER on OpenLab and forward looking proposals for a DH hub at City Tech.

1. Title of GIS Module:

2. Mapping application:

3. Databases accessed:

4. If additional digital tools (data management, graphic design) were incorporated in your project, identify those tools and explain how.

5. Resources.
a. Describe technological, digital, administrative, and human resources used for the study.
b. Identity additional resources that would support further development of your GIS map.

6. Collaboration.
a. How did the interdisciplinary collaboration enhance the technological capacities of the study?
b. How did the interdisciplinary nature of the collaboration inform the inquiry into urban habitus?
c. Did the collaboration reveal new or unexpected lines of inquiry, difficulties, or conclusions? Explain.
d. Discuss role of other collaborators (Codirectors, students, consultants).

7. Humanistic inquiry.
a. What research questions does the mapping module pursue?
b. How were assignments structured? Describe how assignments are designed to meet learning outcomes.
c. Were students able to successfully plot georeferenced data into a graphic geographical display? Explain.
d. Describe how well students were able to integrate spatial and written narratives into a cohesive report on an urban problem.
e. In at least 300 words, describe how successful the piloted module worked in the classroom. What were unexpected outcomes or hurdles? If you were unable to satisfactorily accomplish the goals of each assignment, how might you restructure the scaffolded work and/or amend the assignments themselves?

Appendix V. Previous NEH Projects

National Endowment for the Humanities					
Award Number	**Project Title**	**Date**	**Program**	**Principal Investigator**	**Amount**
	A Cultural History of Digital Technology	2016	Humanities Projects at Hispanic Serving Institutions	Anne Leonhardt	$99,998
EH-50437-14	New York-City of Print	2015	Summer Institutes for College and University Teachers	Mark Noonan	$163,893
	Making Connections: Engaging the Humanities at a College of Technology	2013	Faculty Development at HHEs	Geoff Zylstra	$99,958
	Comparative Perspectives: Illness, Health and Healing	2013	Faculty Development at HHEs	Mary Sue Donsky (Barbara Grumet)	$74,986
	Along the Shore: Landmarks of Brooklyn's Industrial Waterfront	2012	Summer Workshop for Community College Faculty	Richard Hanley	$153,042
HD 508669	Looking for Whitman II	2009	Digital Humanities Start-Up Grants	Matthew Gold	$33,325
	Looking for Whitman	2008	Digital Humanities Start-Up Grants	Matthew Gold	$24,959
	Water and Work	2008	Faculty Development at HHEs	Richard Hanley	$29,959
	Retentions and Transfigurations: Social Change and Technological Progress in Five NYC Neighborhoods	2006	Faculty Development at HHEs	Marta Effinger-Critchlow	$30,000

7. LOS: Bonne

LOS: Christie Hyman

LOS: Matt Gold

LOS: Robert Nelson

8. DATA MANAGEMENT PLAN

Data Formats & Dissemination

The teaching modules on multimedia presentation of data (spatial and written narrative) built using open-source ArcGIS tools. The groups will be using different strategies to gather and store data due to the diverse nature of the data sets. To streamline the technology pipeline, each group will create a GitHub repository to share code, data models, and libraries as well as to link to source documents (images, audio files, text & pdfs of articles and ground plans) stored on Google Drive. Source documents will be in various formats, (including but not limited to .png, jpeg, .mp3, pdf, POIs with GPS coordinates) and will be organized via custom .csv, json or xml for importing into a consolidated database. Each repository will also use the GitHub Wiki to provide a coding and query guide for on boarding other academics and analysts to deploy our tools.

Data Storage and Preservation of Access

With supplemental funding from IMLS, the GitHub repository can be replaced by a permanent digital repository built and maintained by the college library. In future grants, the stakeholders will seek funding to support a permanent DH hub for data storage and organization, project curation, and online publication. Maura Smale (Library Chair and Advisory Board) and Matthew Gold (Advisory Board) will help the PI and Codirectors shape a vision of a DH Hub for the college, which will be articulated in the final white paper. The college library is committed to expanding the use of Open Educational Resources (OERs) that will provide a repository for DH research products and link the research to broader scholarly networks.

Links to open-source interactive maps and module lesson plans will be made available for wide access on OpenLab and OER Commons. Information stored in the linked databases will be protected within the domain of the college and accessible to faculty and students.

Period of Retention

The database will be designed flexibly to scale and accumulate through use by faculty and students each semester, and therefore, are not intended for a fixed collection period.

Roles and Responsibilities

In conjunction with City Tech Library IT staff, the PI and Codirectors will be responsible for setting up GitHub and Library repositories, gathering, storing and consolidating data, as well as documenting processes for reproducibility and scaling.