

Cover

Federal Agency and Organization Element to Which Report is Submitted:

4900

Federal Grant or Other Identifying Number Assigned by Agency:

1955256

Project Title:

Meeting Workforce Needs for Skilled Geospatial Technicians through Virtual Geospatial Information Science Technology Education

PD/PI Name:

- **Jonathan Little, Principal Investigator**
- **Catherine M DuBreck, Co-Principal Investigator**
- **Heather Pierce, Co-Principal Investigator**

Recipient Organization:

Monroe Community College

Project/Grant Period:

06/01/2020 - 05/31/2023

Reporting Period:

06/01/2021 - 05/31/2022

Submitting Official (if other than PD/PI):

N/A

Submission Date:

N/A

Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions):

N/A

Accomplishments - What was done? What was learned?

If there is nothing significant to report during this reporting period, please check "Nothing to Report" if applicable.

* Required fields

* **What are the major goals of the project?**

Meeting Workforce Needs for Skilled Geospatial Technicians through Virtual Geospatial Information Science Technology will support the growing GIST industry across Upstate New York with the development of: (1) a 60-credit online Associate in Applied Science (A.A.S.) degree, and (2) a GIST micro-credential that is designed to upskill incumbent GIST technicians. The project goal is to meet the region's rapidly growing demand for geospatial technicians with advanced skills through program development and improvement by expanding the existing certificate program into an online A.A.S. GIST degree and developing a 9-credit micro-credential designed for on-the-job educational needs across Upstate New York. The development of the A.A.S. degree in GIST will require curriculum and educational materials development, which includes creation of three new courses and updating of all existing courses to meet current GIST education guidelines. In addition, six courses will be converted to an online format.

Meeting Workforce Needs with Virtual GIST will offer students unique online mentoring support by faculty and four alumni who are in the GIST workforce. It will also develop virtual GIST internships providing students with the skills needed to work remotely. Outreach to rural libraries, high schools, digital marketing campaign, and presentations at various Upstate New York GIST conferences will spread awareness and increase enrollment.

The six key objectives for this project are:

Objective 1: Build A.A.S. Degree in GIST by adding new courses and updating existing courses


Objective 2: Augment A.A.S. Degree in GIST with online course development

Objective 3: Provide "Open" GIST lab with Virtual Student Mentors and Alumni GIST Mentors

Objective 4: Provide virtual GIST internships

Objective 5: Deliver innovative outreach and enriched virtual support from Public Librarians

Objective 6: Recruitment of Introductory GIST students and GIST Professionals

- *** What was accomplished under these goals and objectives (you must provide information for at least one of the 4 categories below)?** 

Major Activities:

The Meeting Workforce Needs through Virtual GIST PI's taught three new courses, facilitated the approval of the A.A.S. in GIST as well as the GIST Micro-credential. The PIs taught Geospatial Data Acquisition and Management fall of 2021. The PIs taught Web Mapping, and Introduction to Geospatial Programming spring of 2022. These three courses make up the GIST micro-credential. The course material leveraged materials from the GeoTech Center, and use GIS industry survey results and the guidance of the GIST Advisory board to align with local workforce needs.

Students began enrolling in the A.A.S. in GIST. Although students began taking courses with the intention of completing the GIST micro-credential, the college is finalizing the micro-credential enrollment/graduation process. Micro-credentials are new to the college and to the State University of New York. Students are expected to complete the GIST micro-credential end of spring semester 2022, and receive the graduation certificate by June 2022.

The PI's have updated or revised at least one lab in each of our original GIST courses. The original GIST courses (Introduction to GIS, Introduction to Remote Sensing, Spatial Analysis, and GIST Capstone Course) were updated and continue to be taught online. The new GIST courses used the latest software. For example, Jupyter Notebooks, ArcGIS Pro, and Python were used in Introduction to Geospatial Programming. In Web Mapping, Esri Dashboards, Field Maps, MapBox, Esri's Hub, and more were utilized in Web Mapping. While in Geospatial Data Acquisition and Management, PostGRES was used along with ArcGIS Pro and QGIS.

The PI's have taught the three new GIST micro-credential courses in an online environment for the first time. Web Mapping was developed and taught in an asynchronous online model, while the other two courses were taught online in a hybrid synchronous (2 hrs/week) and asynchronous model (2 hrs/week).

The Virtual GIST team provided students with virtual student mentors and alumni mentors for a second year. The same four alumni mentors provided online support over the course of the 2021-2022 academic year. Prior to providing support, the PIs provided a short discussion to on the lessons learned in the past year (e.g., PIs require more time with alumni, rather than making it optional). For a second year in a row, each alumni mentor provided one Ask Me Anything session, with an audio recording available. Ask Me Anything sessions allow students to ask alumni any GIST and career related questions. In addition, four student mentors provided online support during this same time period.

The Virtual GIST program offered 12 virtual internships to Capstone students to 14 students. Capstone students were given pre and post surveys, and were matched with hosts depending on the skills and interests. Virtual internships hosts included the Freshwater Future, New York State Department of Health – SUNY Albany, American Red Cross, River Area Council of Governments, National GeoTech Center of Excellence, New York Sea Grant, college librarians, Water for South Sudan, FLOW - Traverse City, Universidad Autónoma de San Luis Potosí, and the Genesee Land Trust. A couple of students shared a host, and one was provided a simulated workforce experience. Students presented their work on May 19, 2022.

Two GIST Certificate graduates participated in the first paid GIST internship summer of 2021. Hosts included the New York State Department of Health – SUNY Albany and Water for South Sudan.

Three GIST Certificate graduates were selected for the college's second annual paid GIST internship. Hosts include the New York State Department of Health – SUNY Albany and the Genesee Land Trust. Students will complete their work during the summer of 2022. In addition, two students will receive a paid internship as a result of a recent Skills Training in Advanced Research & Technology (START) Supplemental Funding Request for ATE at Monroe Community College (Award #1955256) with IUCRC Phase 3 at University of Maine - Center for Advanced Forestry Systems (CAFS).

The Virtual GIST PIs provided four workshops for Public and College Librarians. Sixteen Monroe Community College and public librarians attended a one-day training in September on: what is GIST,

virtual desktop access, how to support students, and introduction to ArcGIS Desktop and ArcGIS Pro. A follow up workshop was provided in October focused on supporting introductory students with spatial data. Librarians supported introductory students the following week in acquiring GIST data for their project. An additional public information session about the new GIST micro-credential were showcased in April (11 attendees) with to public and college librarians in the Capital District (Albany, NY).

The team recruited students through Upward Bound Summer Camps, new GIST web page, social media campaign (e.g., Twitter, email listserv), radio, and conferences. Twelve students attended a two-day virtual GIST summer camp led by PI DuBreck and Upward Bound. PI's were interviewed on radio (WXXI) focused on GIST program and humanitarian mapping (April 2022). A new GIST micro-credential landing page was created fall of 2021. A new A.A.S. GIST video was created fall of 2021.

PIs presented informally or formally at numerous conferences, including GeoEd June 2021 conference three virtual humanitarian mapping events (50+ attendees) held Nov 2021 and April 2022, National GeoTech's GIS Day (November 2022), Association of American Geographers (March 2022), NY State GIS Association webinar (March 2022), GIS SIG regional conference (April 2022), and American Association of Community Colleges annual conference (May 2022). In addition, the PI presented to the local county legislator (Sept 2021) on GIST needs and to the college's career services staff (January 2022).

Advisory Board: The GIST Advisory Board were updated April and May 2022 at the local GIS SIG conference and via email. The PIs plan to hold our next formal meeting September of 2022.

Unexpected Positive Results:

The college library staff put together a formal display at the entrance of the library to promote GIST books and maps.

Jonathon Little was selected for the American Association of Community College's Dale P. Parnell Faculty Distinction Recognition Award. The national award recognizes faculty who demonstrate both a passion for supporting students and for their exemplary work in the classroom. Little was honored May of 2022 in New York City at the AACC annual conference.

The program was awarded a new supplement titled: Skills Training in Advanced Research & Technology (START) Supplemental Funding Request for ATE at Monroe Community College (Award #1955256) with IUCRC Phase 3 at University of Maine - Center for Advanced Forestry Systems (CAFS) for \$84,306. The MCC-CAFS collaboration will give underrepresented two-year undergraduate researchers experience with emerging geospatial technology and research methodology to address cutting-edge forestry and remote sensing research.

Specific Objectives:

Objective 1: Build A.A.S. Degree in GIST by adding new courses and updating existing courses

The A.A.S. in GIST has been approved by the college's Board of Trustees and the State University of New York. Students have enrolled in the program. The micro-credential in GIST has also been approved and students will be completing it spring of 2022.

Objective 2: Augment A.A.S. Degree in GIST with online course development

Five GIST courses were updated, adapted to an online model, and taught in an online environment.

Objective 3: Provide "Open" GIST lab with Virtual Student Mentors and Alumni GIST Mentors

Student and alumni mentors provided online support throughout the fall 2021 and spring 2022 semester.

Objective 4: Provide virtual GIST internships

Capstone in Geospatial Technology students were provided a virtual internship.

Objective 5: Deliver innovative outreach and enriched virtual support from Public Librarians

Librarians participated in an all-day virtual workshop and provided remote support to introductory GIS students.

Objective 6: Recruitment of Introductory GIST students and GIST Professionals

High school students attended GIST Summer camps, PIs led a significant social media campaign and the program was at conferences.

○ Significant results:

- **Objective 1:** The A.A.S. in GIST has been approved by the college's Board of Trustees and the State University of New York. The micro-credential has been approved. Students are enrolling in the A.A.S. and a few that will graduate with the A.A.S. as early as spring of 2022. Three new courses were developed and offered for the first time: 1) Geospatial Data Acquisition and Management by senior personnel Howard, 2) Web Mapping by PI Little, and 3) Introduction to Geospatial Programming by SP Howard. Significant time was used in the development and implementation of these three courses.

- **Objective 2:** Introduction to GIS, Introduction to Remote Sensing, Cartography, Spatial Analysis and GIS, and Capstone in Geospatial Technology were updated, adapted to an online model, and taught in an online environment. To highlight, a new lab focused on redlining was developed by PI Pierce for Spatial Analysis and GIS, along with a site selection lab for a new cohort of Business students taking introduction to GIS. PI Little developed a new Lidar lab focused on crop health.
- **Objective 3:** Four student and four alumni mentors provided online support over the course of the 2021-2022 academic year.
- **Objective 4:** A total of 12 different virtual internships provided fourteen students with an internship in Capstone in Geospatial Technology. Twelve students completed the virtual internship May of 2022. Two students completed the competitive paid summer internship summer of 2021. Three students have been selected and are planning to participate in the competitive paid summer internship summer of 2022. Two of the students will be working with the New York State Department of Health, while the third will be working with the Genesee Land Trust. In addition, Due to the recently awarded (May, 2022) Skills Training in Advanced Research & Technology (START) with MCC & the University of Maine - Center for Advanced Forestry Systems (CAFS) project, two additional students will receive a paid internship summer of 2022, for a total of 5 in 2022 directly funded from NSF to MCC.

Funded externally from MCC, one of our recent GIST graduates received a paid internship with the Town of Greece, and two of our GIST students will be participating in a paid internship as a part of an NSF IRES Rwanda project led by the Rochester Institute of Technology this summer.

- **Objective 5:** Sixteen librarians participated in an all-day virtual workshop September of 2021. Seven of these participants completed a follow up workshop and provided introductory students with support. One public information in person workshop was implemented spring of 2022. Approximately 50 college students, faculty, and staff attended three virtual humanitarian mapping events, which included an overview of the GIST program (November 2021 and April 2022).
- **Objective 6:** Twelve high school students attended a two-day virtual Upward Bound led PI GIST Summer camp. Unfortunately, due to high school and college administrative requirements, no dual credit courses were offered over the 2021-2022 year. The PI has discussed this with all parties, and expects one dual credit course to be offered next academic year. In addition, the PI has reached out to new high schools (March and April 2022), and new connections are in development. Students were recruited into the program through social media and conferences.

- Key outcomes or Other achievements:

External evaluator Donna Lange reported that in year 2, "Meeting Workforce Needs for Skilled Geospatial Technicians through Virtual Geospatial Information Science Technology Education" has

- Implemented project components on time as planned
- Made excellent progress towards achieving project outcomes and is on track to realizing all project outcomes
- Created new courses using the ATE GeoTech Center's resources that meet the regional industry needs
- Received approval from the NYS DOE for the AAS Degree in GIST and 9-credit micro-credential programs
- Met target course enrollment numbers for the current project timeline
- Increased enrollment of students from underrepresented groups from 4% to 24%
- Offered professional development to librarians that was well received and created interest in supporting GIST students.
- Implemented an alumni mentoring program model that effectively supports students and provides role models for students.
- Established an effective mentoring model for college librarians to successfully support students in finding data for GIS projects

Year 2 Outcomes:

1. Projected Outcome (year 3): 20 students will enroll in online Web Mapping, UAS Data Acquisition, and Programming for GIS, and 16 will pass (Obj. 1 and 2)

Actual Outcome (Year 2): By the end of year two, 30 students enrolled in Web Mapping and 27 passed (90%), while 14 students enrolled in Geospatial Data Acquisition and Management with 100% passing (14/14), and 13 enrolled in Introduction to Geospatial Programming with 85% passing (11/13).

2. Projected Outcome (year 3): 60 students will enroll in online Cartography and Spatial, and 48 will pass. (Obj. 2)

Actual Outcome (YR2): During year 2, 30 college students enrolled in Cartography and 87% passed (26/30). For a combined year 1 and 2, 89% (49/55) have passed. During year 2, 18 college students enrolled in Spatial Analysis and 89% passed (16/18).

3. Projected Outcome (year 3): 48 students will enroll in the online GIST Capstone Course, 42 will pass. (Obj. 2)

Actual Outcome (YR2): By the end of year 2, twenty-nine college students enrolled in online GIST Capstone Course and 86% passed (25/29). Three students dropped spring of 2022 due to personal reasons.

4. Projected Outcome (year 3): 16 students will enroll in approved micro-credential and 14 will graduate. (Obj. 2)

Actual Outcome (YR2): By the end of year 2, six students enroll in the micro-credential and six graduated. Years 2 was the first year the micro-credential program was offered.

5. Projected Outcome (year 3): 15 new students will enroll annually into the AAS degree, attain an 80% retention rate in the programs first year (year 2 of grant) and a 85% retention rate the second year (year 3 of grant), graduating 14 students per year from the program (obj. 1 and 2).

Actual Outcome (YR2): Twelve students enrolled into the AAS degree, and one will graduate from the program in year 2. The other 11 are on track to graduate spring of 2023. This is the first year the A.A.S. GIST program has been offered. Since this is the first year, retention rate data is not included.

6. Projected Outcome (year 3): 360+ hours of online support will be provided from Alumni GIST/student mentors

Actual Outcome (YR2): Four alumni supported students for 15 weeks in the fall 2021 semester, and an additional 15 weeks spring of 2022 for a total of 120 hours. Two additional hours were provided during the alumni's ask me anything sessions for a total of 122 hours in year 1, and by year 2.

7. Projected Outcome (year 3): 18 students will complete a virtual internship (Obj. 4).

Actual Outcome (YR2): By year 2, twenty-five students completed a virtual internship and presented as of May of 2022. Students were matched to their host based on their skills, and interests. The instructor in Capstone in Geospatial Technology met virtually with the hosts multiple times during the semester.

8. Projected Outcome (year 3): Ten recent graduates will receive a paid internship. (Obj. 4).

Actual Outcome (YR2): Two recent graduates completed a paid internship summer of 2021, and three more were selected for the program summer of 2022. Due to the recently awarded (May, 2022) Skills Training in Advanced Research & Technology (START) with MCC & the University of Maine - Center for Advanced Forestry Systems (CAFS) project, two additional students will receive a paid internship summer of 2022, for a total of 5 in 2022.

9. Projected Outcome (year 3): 40 public and MCC librarians will participate in PD. (Obj.5)

Actual Outcome (YR2): A second cohort of sixteen librarians from local public libraries, the college library, and Syracuse University Library Information Science graduate students completed the all-day professional development workshop in year 2. In year 1, there were 12 that completed the all-day fall workshops for a two-year total of 28. In addition, 11 more attended a two-hour training in the spring of year 2 and over 50 in year 1 for a two-year total of 89.

10. Projected Outcome (year 3): Enrollment of underrepresented students in program will increase to 25% (Obj. 6)

Actual Outcome (YR2): Enrollment of underrepresented students increased above 25%. In the GIST program*, in 2019, there was a total of 21 students with one minority. In 2020, there were a total of 21 students and 3 minorities. In 2021, there were a total of 29 students, with a total of 7 minorities, an increase of 600% since 2019, and 133% since 2020. Although students have enrolled in the new A.A.S. in GIST late 2021 and in 2022, there is no data to compare to from the 2020-2021 academic since the program was approved Sept 28, 2021.

* The GIST program refers to students in the AS in Geography with a concentration in Geospatial technology and the 24 credit GIST Certificate.

11. Projected Outcome (year 3): 10% of introductory GIST students will be retained and 30 attend GIST summer camp (Obj. 6)

Actual Outcome (YR2): 20 high school students attended a virtual summer camp in year 1, an additional 12 in year 2 for a two-year total of 32. Unfortunately, since these are minors, we have been unable to track these students.

*** What opportunities for training and professional development has the project provided?**



A six-hour professional development workshop (Sept 16) for sixteen librarians spread geospatial awareness and the background needed to support introductory GIST students in their search for geospatial data. A 1.5 hour workshop on Oct 7 was held to review and prepare librarians as they support introductory GIST students with acquiring spatial data for their project. A two-hour in person workshop on the basics of GIST and MCC's GIST program was held on April 28, 2022 in Albany, NY.

*** Have the results been disseminated to communities of interest? If so, please provide details.**

Dissemination has occurred at local events, regional, and national conferences.

- Senior Personnel Howard led a drone day introduction to interested students and the public Sept 18, 2022.

- On GIS Day, (Nov 17, 2021), PI Little moderated a webinar titled led by a Rochester Institute of Technology professor: GIS and Video Games: A New Paradigm for Geographic Visualization and Interaction
- MCC's student led mapping club held two virtual mapathons during geography awareness week, one on November 15, and the other November 18, 2022. The event was co-sponsored by the college's Global Education and International Services Office and Holocaust, Genocide, and Human Rights Project. An additional mapping event was held in person (1st time since pandemic) April of 2022. PI Little is the advisor for the club.
- In the fall of 2021, PI Little met with County Legislators George Hebert (15th District – Penfield, Webster) and Steve Brew (12th District – Chili, Henrietta, Riga, Wheatland) along with select MCC faculty and administrators—about the important role technology plays in MCC academic programs. As a result of the meeting the Monroe County Legislature unanimously approved a resolution to add \$700,000 to MCC's restricted to provide relief of the MCC technology fee increase to all credit students enrolled in the 2021-2022 academic year. The PI also had a chance to briefly share about MCC's geospatial program.
- PI Little led an in-person presentation to MCC's Career Center (Jan. 14, 2022).
- PI Little led a webinar to the NY State GIS Association titled (March 24, 2022): Meeting Workforce Needs with Virtual GIST: The story of one community college's quest to create remote access to GIST education in Upstate New York
- PI DuBreck led a workshop for a local high school on dual credit opportunities Feb, 2022. This was followed up with a formal discussion with the entire team for a new dual credit course May of 2022.
- A new State University of New York Micro-credential page was developed, and highlighted our GIST micro-credential. Go to: <https://www.suny.edu/microcredentials/> and scroll down. On Feb 15, 2022, New York State's Governor Hochul highlighted the expansion of SUNY micro-credentials for in-demand job fields.
- MCC's marketing team sent a media release (Feb, 2022) titled: *MCC is First College in State to Offer Online Associate Degree in Geospatial Information Science and Technology New program addresses demand for technicians in a high-growth industry that is driving the Finger Lakes region's and our national economies.* As a result, PI Little was interviewed by the local public radio station along with a GIST student and local GIST company. The radio spot and web article were released April 2022 in time to spread the news about our April mapathon.
- On May 10, 2022, two MCC GIST students were showcased at the college's Scholars' Day. The first presentation focused on: Using Remote Sensing to Examine Mangrove Change: A Service-Learning Internship at Monroe Community College, while another created a poster titled: Using GIS to look at R/ECAP Rochester: Poverty and Struggling Schools. PI Little served as an advisor on both projects.
- The GIST Advisory Board was updated about the program's progress May of 2022. The Advisory Board plans to meet formally September or October of 2022.
- An MCC student and mapping club president, along with PI DuBreck and PI Little presented at the Association of American Geographers. The presentation was a part of the Putting "Community" in the Research session and was titled: Meeting Workforce Needs with Virtual GIST (Geospatial Information Science Technology): The story of one community college's quest to create remote access to GIST education in Upstate New York (Feb 28, 2022).

- Four virtual Ask Me Anything webinars were led by MCC's GIST alumni two fall of 2021, and two more September of 2022. Audio recordings are available on the program's NSF ATE web site. These were led by PI DuBreck.
 - On May 4 (2022), a guest speaker from George Washington University presented on Open Street Map. MCC students and faculty attended.
 - PI Little and SP Howard are planning to present at the National GeoTech Center's GeoEd virtual conference June of 2022. The focus will be on virtual internships.
 - Pi DuBreck sent emails to many list serv fall of 2021, highlighting the new GIST program opportunities, including the: New York State GIS Association, Esri, other state affiliated GIS Associations, LinkedIn, Higher ed Facebook groups (Esri), and the AAG GIS specialty group. Local media highlighted MCC's geospatial program through social media, from twitter to Facebook.
 - The Monroe Community College (MCC) program web site has been updated, and now includes several pages, including one for the new A.A.S. in GIST, GIST Certificate program, and micro-credential. PI Little continues to update the NSF ATE Virtual GIST web site which includes all important events since the start of this grant.
- *** What do you plan to do during the next reporting period to accomplish the goals?**
 - Geospatial Data Acquisition and Management will be offered at Monroe Community College for the second time fall of 2021. The class will be offered as a remote live/hybrid course. An alumni plans to support students in the class for two hours each week fall of 2022. An additional lab focused on drone processing using open source WebODM may be added to the course fall of 2022.
 - Introduction to Geospatial Programming will be offered again for the second year, in the remote live/hybrid format during spring of 2023. Web Mapping will be offered a second time as well, completely online during spring of 2023. A new module and lab will be developed for spring of 2023 using open source mapping software called MapBox's scrolly telling, similar to Esri's Story Map.
 - Introduction to GIS, Cartography, and Remote Sensing curriculum will be fine-tuned and modified as needed based on new materials from the 2022 GeoEd conference. A new lab focused on forests and sustainability will be developed in the remote sensing course. A new lab focused on mountain glacier and/or sea ice change will be designed over the summer for our introductory GIS course.
 - Alumni and students will continue to provide 120 hours of online support to students in Introduction to GIS, Remote Sensing, as well as Spatial Analysis and GIS. A second year of online alumni support will be given to students in Data Acquisition and Management as well as Introduction to Geospatial Programming.
 - A new cohort of students will complete virtual internships in Capstone in Geospatial Technology. The instructor of this course will continue to fine-tune its content.
 - The GIST Advisory Board will meet in person September or October of 2022 to provide an update and fine tune the new courses and program.
 - A third group of ten librarians primarily from the Albany, NY region will receive professional development September 2022 and then will support introductory GIST students. The plan is to provide an in-person event. Some introductory

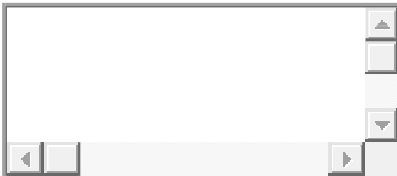
students may visit public libraries to complete their GIST work as well. A follow up virtual workshop will provide these librarians with the tools needed to support introductory GIST students acquire spatial data for their project October of 2022.

- A GIST Summer camp may be offered summer of 2022, led by PI DuBreck. The plan is to present at several local and regional conferences fall of 2022 and spring of 2023 to spread information about the new GIST program opportunities.
- PI DuBreck plans to send more emails to listservs summer of 2022 and the next academic year highlighting our program.

Supporting Files

You may upload pdf files with images, tables, charts, or other graphics in support of this section. You may upload up to 4 pdf files with a maximum file size of 5 MB each.

- **Please select a file.**
- Description (required if uploading a file). Please provide a description of the content contained in the attached file.



- Evaluation
External evaluator Donna Lange reported that in year 2, “Meeting Workforce Needs for Skilled Geospatial Technicians through Virtual Geospatial Information Science Technology Education” has Implemented project components on time as planned.
- Current GIST partnerships & GIST Employment
- Accessible A.A.S. in GIST flyer
- Student application for paid virtual internship

Products

[Submit New Product\(s\)](#)

Select the type of product you want to add to your report or upload multiple products using BibTex file.

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Product:

--OR--

Supporting Files

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- **Please select a file.**
- Description (required if uploading a file). Please provide a description of the content contained in the attached file.
- Association of American Geographers Conference presentation PDF: The story of one community college's quest to create remote access to GIST education in Upstate New York
 - MCC's GIST web site
<http://www.monroecc.edu/go/geospatial>
The college's new GIST home page.
 - NSF ATE Virtual GIST Main Web Site
https://atecentral.net/msites/MCC_GIST/home

Meeting Workforce Needs for Skilled Geospatial Technicians through Virtual Geospatial Information Science Technology Education activities in 2020-2021.
- The Monroe Community College (MCC) program micro-credential.
<https://www.monroecc.edu/special-programs/geospatial-information-and-technology/>
- MCC's A.A.S. in GIST homepage <https://www.monroecc.edu/academics/majors-programs/stem/geospatial-information-science-and-technology-associate-of-applied-science/>

Participants & Other Collaborating Organizations - Who has been involved?

For NSF purposes, for separately submitted and awarded collaborative proposals, the PI should report progress on his/her institution's portion of the collaborative effort only.

In each of the subsections below, note which collaborators or contacts are involved in data contribution and/or management.

- * Required fields
 - * **What individuals have worked on the project?**

What individuals have worked on the project?

Name Most Senior Project Role Nearest Person Month Worked

Little, Jonathan PD/PI 1

DuBreck, Catherine Co PD/PI 1

Pierce, Heather Co PD/PI 1

Full details of individuals who have worked on the project:

Jonathan Little

Email: jlittle@monroecc.edu

Most Senior Project Role: PD/PI

Nearest Person Month Worked: 1

Contribution to the Project: Jonathon Little led curriculum development for the new A.A.S. in GIST, the micro-credential, and online course conversions (Obj.1 & 2). He assisted with professional development for MCC and public librarians (Obj. 5). He oversees dissemination, recruitment efforts (Obj.6) and the lead GIST mentor (Obj. 3); updated Introductory Remote Sensing labs (Obj. 2); and developed, coordinated, and assisted in the implementation of the virtual GIST internships (Obj. 4). Little provided budget oversight, write annual and final reports, monitor all project activities, and interact with the external evaluator.

Funding Support: \$9,976, 1.5 months, Summer 2021. Grant pays Other Personnel for equivalent of 3 Release Hours in Fall 2021 (additional 1.5 release fall of 2021), and 3 Release Hours Spring 2022.

Catherine M DuBreck Email: cdubreck@gmail.com Most Senior Project Role: Co PD/PI Nearest Person Month Worked: 1

Contribution to the Project: Catherine DuBreck shared information about the GIST events as the public relations coordinator (Obj. 4, 5, & 6). She led the GIST Alumni mentors (Obj. 3), and disseminated information via social media (Obj. 6).

Funding Support: \$832 0.25 month Summer 2021, \$4,200 1.0 month Fall 2021 and Spring 2022.

Heather Pierce Email: hpierce@monroecc.edu Most Senior Project Role: Co PD/PI Nearest Person Month Worked: 1

Contribution to the Project: Heather Pierce reviewed all new course materials, aligned courses with industry standards, and course learning outcomes (Obj. 1 & 2). She updated and converted Cartography and Spatial Analysis to online and taught each course (Obj. 3). She also updated labs in Introduction to GIS (Obj. 2). She co-led the summer librarian professional development (Obj. 5).

Funding Support: \$1,391.58, 0.25 month, Summer 2021.

Grant pays Other Personnel for equivalent of 3 Release Hours in Fall 2021.

- *** What other organizations have been involved as partners?** Nothing to report

- ***Were other collaborators or contacts involved? If so, please provide details.** 

List any other people or organizations involved in the project that were not separately reported as participants or partner organizations.

- State Department of Health SUNY Albany
- River Area Council of Governments
- National GeoTech Center of Excellence
- Water for South Sudan
- Cornell University
- New York Sea Grant
- New York GIS Association
- Geographical Information Sharing – Special Interest Group (GIS-SIG)
- MRB Group
- FLOW - Traverse City
- Genesee Land Trust
- The Nature Conservancy
- NYS Department of Environmental Conservation
- New York Geographic Alliance
- SUNY Cortland Geography
- Syracuse University Information Library Sciences
- EagleView
- LaBella Associates
- Rochester City School District
- Webster Central School District
- University of Rochester
- Rochester Institute of Technology
- American Red Cross
- Youth Mappers (funded by The United States Agency for International Development)
- Upward Bounds
- Rochester Regional Library Council
- Pioneer Library System Monroe County Library System
- Capital District Library Council

Impact - What is the impact of the project? How has it contributed?

INSTRUCTIONS - This component will be used to describe ways in which the work, findings, and specific products of the project have had an impact during this reporting period.

For NSF purposes, include, where appropriate, discussion of data resources and the acquisition of data skills. Include the emergence of new career paths, such as data scientists, or new disciplines.

If there is nothing significant to report during this reporting period, please check "Nothing to Report" if applicable.

* Required fields

- *** What is the impact on the development of the principal discipline(s) of the project?**

Describe how findings, results, techniques that were developed or extended, or other products from the project made an impact or are likely to make an impact on the base of knowledge, theory, and research and/or pedagogical methods in the principal disciplinary field(s) of the project.

Outreach to local high schools has led to an increase in the interest of developing dual credit courses.

As a result of successfully bringing geospatial awareness to many public librarians for a second year, the New York GIS association and its education committee, as well as public librarians across the state, have indicated that they would like to see increased geospatial workshops for librarians. In addition, MCC Upward Bound partnered with the program to facilitate geospatial workshops for Upward Bound high school students in summer 2021. This is funded by a NSF INCLUDES grant.

- *** What is the impact on other disciplines?**

Describe how the findings, results, or techniques that were developed or improved, or other products from the project made an impact or are likely to make an impact on other disciplines.

As a result of a presentation at the American Association of Community Colleges on how virtual internships provide equitable experiences, individuals in other STEM fields, including robotics expressed an interest in collaborating and implementing their own virtual internships. The PI is beginning to consider writing a new NSF proposal focused on strategies to support diversity, equality and inclusion in STEM internships.

- *** What is the impact on the development of human resources?** 

Describe how the project made an impact or is likely to make an impact on human resource development in science, engineering, and technology.

Sixteen librarians received geospatial awareness and spatial data acquisition training. Of these 16, seven supported introductory GIST students with acquiring spatial data. In addition, eleven public librarians attended a two-hour workshop in Albany, NY.

PIs' teaching and mentoring in GIS science and technology areas deepened the skills of New York librarians.

***What was the impact on teaching and educational experiences?**

Describe how the project made an impact or is likely to make an impact on teaching and educational experiences.

The micro-credential in GIST was the college's first. Several micro-credentials have been submitted after others have noted strong student interest in micro-credentials. In addition, the State University has continued to reach out to the PI to support their efforts in expanding micro-credentials.

*** What is the impact on physical resources that form infrastructure?**

Describe ways, if any, in which the project made an impact, or is likely to make an impact, on physical resources that form infrastructure, including physical resources such as facilities, laboratories, or instruments.

As a result of the increased use of the virtual desktop, the college has used their own funds to purchase a virtual desktop failover system to avoid any student interruptions. In addition, the college has purchased 20 high end laptops for those students that have the need in the geospatial technology and geoscience program.

• *** What is the impact on institutional resources that form infrastructure?**

Describe ways, if any, in which the project made an impact, or is likely to make an impact, on institutional resources that form infrastructure,

Nothing to report

*** What is the impact on information resources that form infrastructure?**

Describe ways, if any, in which the project made an impact, or is likely to make an impact, on information resources that form infrastructure,

Nothing to report

*** What is the impact on technology transfer?**

Describe ways in which the project made an impact, or is likely to make an impact, on commercial technology or public use.

Nothing to report

*** What is the impact on society beyond science and technology?**

Describe how results from the project made an impact, or are likely to make an impact, beyond the bounds of science, engineering, and the academic world.

Geospatial technologies are increasingly important for understanding our complex world. Many specialize in areas such as agriculture, mining, health care, retail trade, urban planning, crime mapping, or military intelligence.

GIS awareness has increased in all of Upstate New York as a result over 89 librarians receiving professional development and a total of 14 (2-year total) supporting introductory GIST students.

Thirteen students completed the virtual internship spring of 2021. Two GIST students plan to take the complete and paid internship summer of 2021, four plan to seek GIST employment, four plan to transfer to a four year university, and the remaining students are undecided.

*** What percentage of the award's budget was spent in a foreign country?**

Describe what percentage of the award's budget was spent in foreign country(ies) for this reporting period. If more than one foreign country was involved, identify the distribution of funding between the foreign countries.

Nothing to report

Changes/ Problems

INSTRUCTIONS -

The PI is reminded that the grantee is required to obtain prior written approval from the awarding agency grants official whenever there are significant changes in the project or its direction. See agency specific instructions for submission of these requests.

If not previously reported in writing to the agency through other mechanisms, provide the following additional information or state, "Nothing to Report", if applicable:

* Required fields

Notifications and Request

For more information on Grantee Notifications to and Requests for approval from the National Science Foundation, please visit the Notifications and Requests section in FastLane or refer to Exhibit VII-1 of the Proposal & Award Policies & Procedures Guide (PAPPG).

- *** Changes in approach and reasons for change**

Nothing to report

- **Actual or Anticipated problems or delays and actions or plans to resolve them**

Nothing to report

- *** Changes that have significant impact on expenditures**

Due to personal reasons, one senior personnel did not complete their expected work summer of 2021. The senior personnel were charged to create curriculum materials for our new Web Mapping course. This course was offered spring of 2022. The senior personnel were budgeted \$3,600 summer of 2020, \$2400 summer of 2021, and \$1200 summer of 2022. The PI was granted approval by the college to use some of these funds to complete the development of this course. The PI developed the remaining course materials fall of 2021. Specifically, an additional (1.5) credit hours of reassigned time was assigned to the PI. Year 1 rate is \$1,162 per credit hour. This provided Jonathon Little with a total of (4.5) reassigned credit hours in fall of 2021.

- *** Significant changes in use or care of human subjects**

Nothing to report

- *** Significant changes in use or care of vertebrate animals**

Nothing to report

- *** Significant changes in use or care of biohazards**

Nothing to report

- *** Has there been a change in your primary performance site location from the originally proposed? If so, please provide the location of your new primary performance site and reason for the change in location.**

Nothing to report

Special Requirements

* Required fields

- **Respond to any special reporting requirements specified in the award terms and conditions, as well as any award specific reporting requirements.**

Nothing to report