Project Title: Connect Across Tacoma: devices, skills, and service expansion for digital equity

A. Executive Summary

This proposal will launch a comprehensive project to address digital divides in Tacoma, WA, improving broadband access, adoption, and education for students of the University of Washington Tacoma--an eligible Minority Serving Institution--and patrons in its anchor community. Solutions to the digital divide are often framed somewhat simplistically, as the process of extending Internet infrastructure to communities that remain on the other side of the divide. Indeed, there is significant unmet need in our community around both device and service access, where too many students and patrons are dependent on only cell phones for digital access, and where service speeds, availability, and accessibility are frequently inadequate. Yet, research shows that attaining digital equity is much more complex and also involves building the social and educational capacity of communities to effectively make use of their access to the Internet. We see these dynamics play out in Tacoma as well, and have planned a workforce development program and community education program to strengthen broadband adoption and build capacity in digital skills development.

Digital equity is a pressing concern in the University and community, where many students face challenges related to financial need. Just over 50% of University of Washington Tacoma (UWT) students are Pell-eligible, and over 68% receive need-based financial aid. Students whose parents do not have college degrees make up 56% of students, and 54% of students arrive via transfer, most from one of five community colleges within commuting distance. In the anchor community within a 15-mile radius of the university, there are 44 census tracts that are CMC eligible, meaning that their median household income does not exceed 250% of the weighted poverty threshold. In numerous of these tracts, over 30% of households lack any home Internet subscription. To meet the needs we see in Tacoma, we will address three key components of digital equity: device access, service access, and digital skills.

To address device access, our program will deliver 500 tablet computers to low-income students and patrons within the 15-mile radius of the University of Washington Tacoma. We will prioritize students and patrons according to unmet financial need. For students, we will assess unmet financial need according to Pell eligibility and need-based financial aid qualifications. For community members, we will assess need both in terms of individual need and in terms of community need, as we know that the spatial concentration of poverty worsens individual outcomes through impacts on social capital. Devices will therefore be distributed to patrons in CMC-qualifying census tracts, with further prioritization of patrons in tracts according to the Pierce County Equity Index developed by the City of Tacoma.[1] To address service access, we will similarly provide subsidies to 500 low-income students and patrons to purchase broadband service, using the same prioritization criteria as for device distribution. Service enrollment will be available for up to 18 months of service, giving us the first six months of the grant period to identify areas of greatest need and to conduct outreach and recruitment for the program. In the third quarter of year 1 of the grant period, we will distribute 250 devices and enroll 250 households for service subsidies. This will allow us to address built-up unmet need. In the remainder of the program, we will distribute

[1] https://www.cityoftacoma.org/cms/One.aspx?portalId=169&pageId=175030

devices and enroll for service 50 households per quarter, for five remaining quarters, in alignment with UWT's quarterly academic term schedule. This will allow us to serve newly enrolled and newly in-need students and patrons on a regular basis.

Digital skills are another cornerstone of our work. We are concerned with not only everyday skills for using broadband, but also professional skills for building and expanding broadband access, using a community Internet model. To address both of these skills gaps, we propose a workforce development program called Digital Stewards training, available to both students and patrons. Digital Stewards are trained in a 16-week program to develop skills in network engineering, IT support, community organizing, and public pedagogy to be able to build community wireless networks to expand connectivity in their communities and to teach and support their neighbors in effectively making use of that connectivity. We adapt this model from one developed and successfully deployed by the Detroit Community Technology Project and the Open Technology Institute. Our consortium members have trained two cohorts of Digital Stewards in King County, WA, and we propose this project to bring that effort to scale in Pierce County in order to serve students and patrons in UWT's anchor community. We will train four cohorts of 35 Digital Stewards to train 140 total Stewards. Fifteen (15) Stewards from each cohort will also be selected to complete a 14-week internship after their training to help support the device distribution and service enrollment aspect of the program, and to help foster digital skill development in target communities. All 140 Stewards will be certified as Certified Professional Installers through the program.

Using this comprehensive approach to address digital divides in device access, service access, and digital skills, our project will achieve key goals of the Connecting Minority Communities Pilot Program, including: providing broadband equipment, service, training, and support to in-need students and patrons; delivering workforce development training to build broadband and IT capacity in the anchor community; and improving the use of broadband services by key community partners to deliver digital skills and inclusion. Further, we will use a participatory approach to collect and analyze data to evaluate the digital inclusion, broadband access and adoption, and workforce development programs funded by the grant in order to determine their effectiveness and document best practices. This will ensure that the knowledge and practices developed through the grant can be scaled up to benefit not only our own community, but digitally marginalized communities beyond the University of Washington Tacoma area.

In addition to the consortium partners, we have secured the collaborative support of key community stakeholders who will assist with program outreach (the Black Collective, Harriet Tubman Foundation for Safe Passage), provide technical expertise as needed (Local Connectivity Lab), and help us evaluate the project and plan for its sustainability (Detroit Community Technology Project).

B. Eligibility and Qualifications

The University of Washington Tacoma (UWT) is the eligible MSI applying for funds from NTIA. UWT's OPEID is 00379801. Black Brilliance Research Project is an MBE applying in consortium with UWT. A complete table of funded and unfunded project participants and unfunded informal collaborators is included at the end of this section.

Description of UW Tacoma's mission, facilities and resources

The University of Washington Tacoma is a growing, urban-serving university that is deeply invested in its local communities. It is the most diverse of the three campuses that make up the University of Washington and has been designated as an AANAPISI-eligible institution since 2017. As one of three campuses of a world-class university, UW Tacoma is dedicated to interdisciplinary and innovative teaching and scholarship, and to engaging the community in mutually beneficial partnerships. Building bridges between the community and UWT is at the core of the University's mission and strategic plan. This is evidenced by its membership in the Coalition of Urban-Serving Universities (since 2011), its Carnegie Community Engagement Classification (since 2020), and the resources it dedicates to its Office of Community Partnerships (since 2019).

A university whose mission focuses on serving primarily urban students, most of whom are commuters, UWT was founded in 1990 and is located in historic downtown Tacoma, Washington, in Pierce County. UWT offers 30 undergraduate programs in the arts, sciences, and social sciences. Offerings include professional certificates, 10 Master's Degree graduate programs, and two Doctoral programs in Educational Leadership and Mechanical Engineering. UWT is accredited as a unit of the University of Washington by the Northwest Commission on Colleges and Universities.

Research and scholarship are central to UW Tacoma's mission. To realize this mission, UWT provides extensive pre- and post-award research support to its faculty, centrally located with the UW Tacoma Office of Research. In addition, UWT faculty have full access to the University of Washington's robust research infrastructure and facilities, including the Human Subjects Division, which administers the UW Institutional Review Board; the Office of Sponsored Research, which reviews and submits proposals to external sponsors and ensures compliance with UW and sponsor policies; and Grants and Contract Accounting, which supports post-award management and fiscal compliance. The UWT campus consists of 22 buildings on 46 acres, with over 1 million square feet of active campus space. UWT has 72 classrooms, including 20 computer classrooms that faculty are able to schedule for their classes. Faculty, staff, and students have access to a variety of software licenses on UW Tacoma Library desktop computers and in two large drop-in computer labs. Faculty and staff are also provided with individual computing stations or laptops. Available software programs include Microsoft Office Suite, Adobe Suite, ArcGIS, SPSS Statistics, Python, R and RStudio, and Wolfram Mathematica.

Description of the Black Brilliance Research Project's mission, facilities, and resources

The Black Brilliance Research Project (BBR) is a Black queer-led community research collaborative dedicated to changing the material conditions of the lives of Black, Indigenous, and People of Color communities. BBR is a Minority Business Enterprise, and its MBE self-certification form is attached to this application. BBR has experience implementing cohorts of large workforce development programs with low-income and Black and Brown community members, including people who were previously unemployed and people who receive public assistance services. In 2020, BBR successfully trained over

one hundred community members to complete community-based research in support of a participatory budgeting process that is directing the distribution of $30M of the City of Seattle's municipal budget and $10M of the King County budget. BBR's team spans diverse areas of expertise and lived experience, including: race, incarceration status, gender, education, immigration status, disability, language, age, religion, caregiving, national origin, healthcare, foster care, artistic expression, and professional research.

Expanding access to devices, digital skills, and Internet access is the cornerstone of BBR's Digital Equity project, one of its main initiatives. It has trained two cohorts of Digital Stewards in King County and helps operate four community wireless networks in the region. Prior to this proposal, BBR has partnered with researchers from the University of Washington on research projects funded by the National Science Foundation (Smart and Connected Communities; Convergence Accelerator) and the New America Foundation (Public Interest Technology - University Network) to advance understanding and technology development in the areas of digital equity programming, digital infrastructure building, and digital misinformation. BBR focuses on participatory action research and participatory evaluation, favoring processes where low-income and marginalized communities help direct the implementation and evaluation of a program. This method of community-driven action will guide the evaluation of the proposed program, which will build on existing relationships and partnerships in Tacoma and the South Puget Sound region.

Qualifications of key personnel

Key personnel on the project include Dr. Emma Slager from the University of Washington Tacoma, and Shaun Glaze and Chris Webb from Black Brilliance Research. All three have collaborated extensively prior to this proposal and have experience as Co-PIs or senior personnel on federally funded projects on related topics.

Dr. Emma Slager (they/them), Assistant Professor in the School of Urban Studies at UWT, will lead aspects of the work for the UWT project activities and support program evaluation and instruction. Dr. Slager is trained as an urban geographer, with expertise in geospatial analysis and telecommunications infrastructure and extensive experience with community-engaged research and public pedagogy. Their experience includes an NSF graduate research fellowship and collaboration on grants funded by the National Science Foundation, New America Foundation, Antipode Foundation, and more. Dr. Slager's one-page resume is included in the application.

Shaun Glaze (they/them), Research Director at Black Brilliance Research, will direct program evaluation and outreach partnership development, and support instruction and project management. They have worked in the equity space for over ten years and have collaborated and directed funds on several multi-million dollar grant research projects prior to this proposal. Their speciality in participatory action research and education psychology are invaluable to the success of this program.

Chris Webb (he/him) leads the BBR Digital Equity Team and is a faculty member in the STEM+B Department of Seattle Central College. He will lead the Digital Stewards training program and internships. He has 12 years experience teaching digital and information literacy in both community and

university settings. His experience includes two NSF-funded projects, a PIT-UN grant, and local grants funded by the Marguerite Casey Foundation and the City of Seattle.

Table of Funded Project Participants and Unfunded Informal Collaborators

Organization	**Address**	**Role**	**Scope of Work**	**Funding**
Black Brilliance Research Project	4501 15th Ave S, #103, Seattle WA 98108	Subrecipient (MBE)	Training instruction; device distribution and service enrollment; outreach lead; evaluation lead	$2,446,046
Detroit Community Technology Project	4126 Third St. Detroit, MI 48201	Contractor	Sustainability plan development	$6,000
Harriet Tubman Foundation for Safe Passage	2029 S 18th St, Tacoma, WA 98405	Collaborator	Outreach support	NA
Local Connectivity Lab	3800 E Stevens Way NE, Rm 384 Seattle, WA 98195	Contractor	Technical and instructional support	$96,000
The Tacoma-Pierce County Black Collective (also known as The Black Collective)	2316 S Yakima Ave, Tacoma, WA 98405	Collaborator	Outreach support	NA
University of Washington Tacoma	1900 Commerce Street Tacoma, WA 98402	Applicant (MSI)	Grant administration; provision of lab and classroom space; data analysis; instructional and evaluation support	$425,820

Letters of commitment from each of the consortium partners are included in this application, along with letters of support from the contractors and informal collaborators.

C. Project Justification

Project goals

The primary short-term goals of this project are three-fold:

- To expand access to Internet-enabled devices for in-need students and patrons;

- To expand access to Internet service for in-need students and patrons;
- To provide digital skills training to in-need students and patrons.

Achieving these three goals will enable students and patrons to more effectively take part in remote learning opportunities, access e-Government services, and prepare for employment opportunities.

The longer-term goal of the project is to build community capacity to create sustainable, community-driven digital equity solutions for minority communities. In particular, the train-the-trainer model utilized by the Digital Stewards program will produce a critical mass of trained community members who can continue expanding Internet service provision in the region, help others navigate existing programs to gain access to digital devices and service, and teach community members how to use digital technologies safely and effectively to meet the unique needs of the community.

These short-term and long-term goals are intertwined. Together, they will make a dramatic difference in the digital equity landscape surrounding the UWT campus, both immediately within the grant period and for years beyond. Without a multi-pronged strategy, attempts to connect low-income students and patrons will be incomplete and have limited impact.

Community needs and challenges

There is demonstrable financial need and digital access need among both students and patrons in UWT's anchor community. These challenges are discussed in relation to student statistics and ACS community statistics below.

<u>UW Tacoma needs, challenges, and opportunities</u>

UW Tacoma is a four-year institution that serves a diverse student population who come from a broad range of ethnic and family backgrounds. More than 54% of students come via transfer, the majority from one of five community colleges located within commuting distance. Ten percent of students receive veterans benefits, and 17% of students are military affiliated. Students whose parents do not have college degrees make up 56% of students. In the 2019-2020 academic year, UW Tacoma awarded $51.8 million in financial aid. Students' ages vary considerably, with many non-traditional students; in Fall Quarter 2021, the average student age was 24.6. Fall 2021 enrollment statistics show that 24% of students are Asian or Asian-American, 15% are Hispanic/Latino, 13% are Black or African American, 3% are Hawaiian or Pacific Islander, and 2% are American Indian. Ninety-four percent of students are Washington residents, and 4% are International students.

Student data from academic year 2020-2021 is below:

1. Student population size: **5,181 (Undergraduates: 4,543)**
2. Number and percentage of students eligible for Pell Grants: **2,302 (50.1% of undergraduates)**
3. Number and percentage of students that receive other need-based financial aid (federal, state, or institution: **3,201 (61.8% of all students)**

4. Number and percentage of students that are low-income consumers: ***See below****
5. Number and percentage of students that are low-income individuals: ***See below****
6. Number and percentage of students that have been approved for unemployment insurance since March 1, 2020: ***See below.*****

*While UW Tacoma has not collected data on the number of students who are low-income consumers or low-income individuals, a 2014 survey conducted by Dr. Christine Stevens found that 32% of UWT students met the federal definition of food insecurity, and 14% faced homelessness. These findings led to the development of the Campus Pantry, which distributes free food and hygiene products to students year around. A 2019 study conducted across all three campuses of the University of Washington supports the findings of the 2014 survey and estimates that 12% of UWT students have accessed the on-campus food pantry.[2]

**While UW Tacoma has not collected data on the number of students who have been approved for unemployment insurance since March 1, 2020, the Office of Student Financial Aid processed 171 revisions to student income since that time. Not all of these students would have received unemployment, but this gives some insight into students who may have been eligible for it. This number does not include students who were already receiving maximum financial aid before their employment/income status changed, as those already at maximum aid eligibility would not have submitted a change to income.

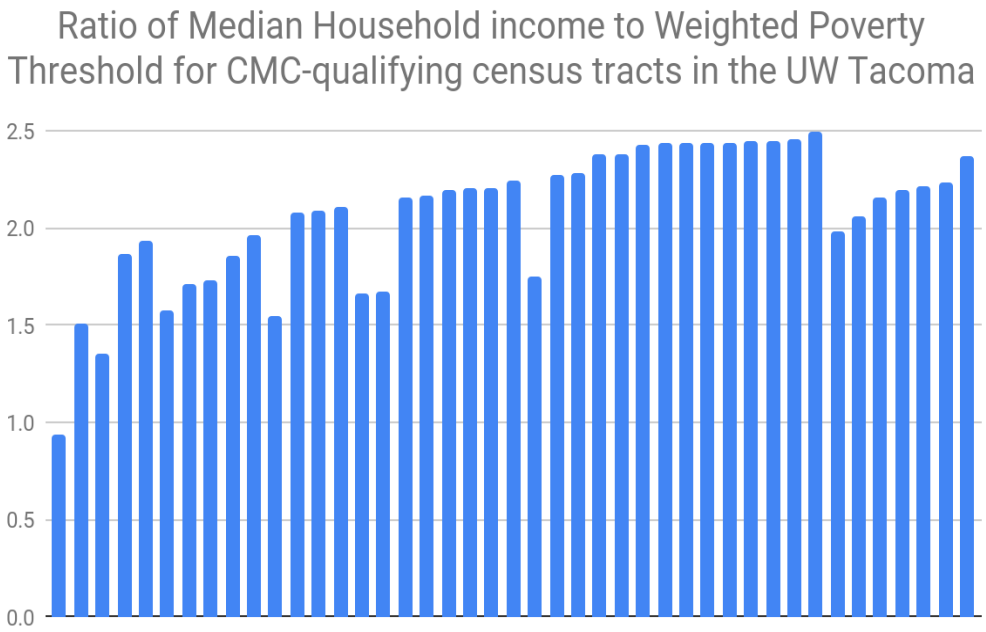
Anchor community needs, challenges, and opportunities

As UWT has only very limited on-campus housing (128 units), the vast majority of students live off-campus in the anchor community. Thus the needs and challenges related to economic and digital opportunity in the anchor community are relevant to both the student population and to non-student patrons.

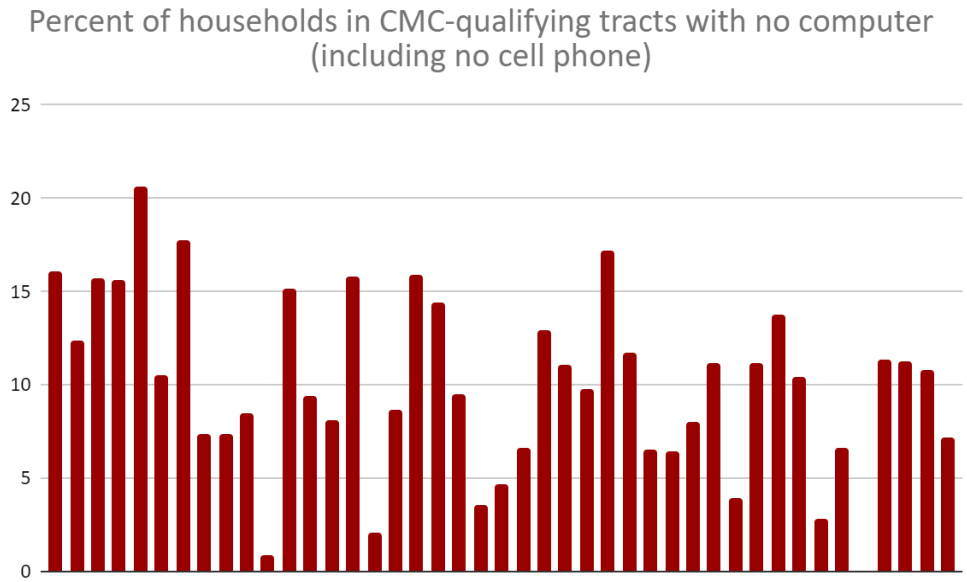
According to the CMC Anchor Community Eligibility Dashboard and the ACS data from which it was constructed, 44 census tracts[3] within the 15-mile radius of UW Tacoma are CMC eligible, meaning that their median household income does not exceed 250% of the weighted poverty threshold. Fifteen of these do not have a median household income that exceeds even 200% of the weighted poverty threshold (represented by bars under 2.0 on the chart below), and two do not exceed 135%.

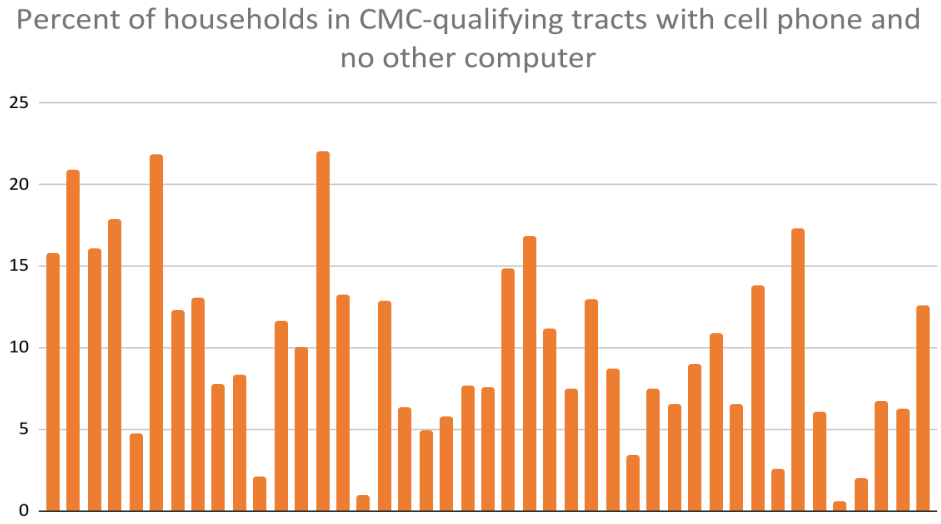
[2] Fyall, Rachel, Christine Stevens, and Lynne Manzo. "Understanding Housing and Food Insecurity Among University of Washington Students: An Internal Report." *Seattle, WA* (2019). Retrieved from https://evans.uw.edu/wp-content/uploads/files/student_housing_and_food_insecurity_report_may2019.pdf

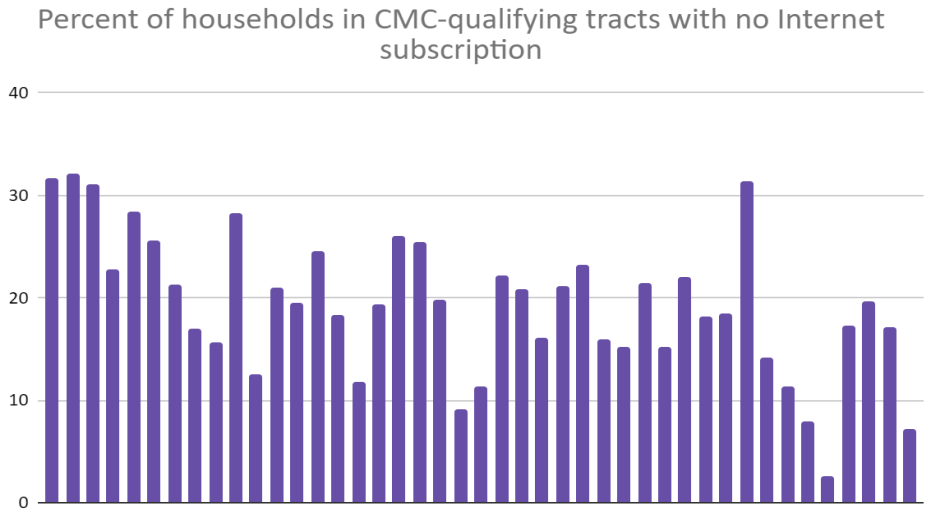
[3] One of these tracts contains Joint Base Lewis-McChord, so we have excluded it from our planned outreach and our analysis.



We also accessed ACS data from Table S2801: Types of Computers and Internet Subscriptions (2019 5-year estimates), and extracted data for the CMC-qualifying tracts in the UWT anchor community to understand existing computer and Internet access. Results are depicted in a series of bar charts below. The number of households represented by all tracts shown in these charts is 75,793.







As these data show, there are numerous tracts in our anchor community where over 15% of households have no computer (including no cell phone), and others where over 20% of households depend only on a cell phone for Internet access. In four tracts, over 30% of households have no Internet subscription, much less a high-speed broadband connection. These numbers represent tens of thousands of households in our anchor community with unmet digital connectivity needs. Our project will address this, beginning with the individuals and communities with greatest need.

Project beneficiaries

Direct beneficiaries of the proposed project include students and patrons who will receive laptop devices (500) and funds to pay for Internet subscriptions (500) and students and patrons who will be trained as Digital Stewards and earn Certified Professional Installer credentials (140). Additional beneficiaries include the University of Washington Tacoma, which will benefit from the increased capacity of its

students to engage in remote learning, and the collaborating community organizations (those who will assist with outreach) who will similarly benefit from the increased capacity of their members and patrons to engage digitally with their programming and services. Students and patrons who are not selected to be participants for device distribution or service enrollment may still benefit from the advising they receive from Digital Stewards interns, who will provide digital skills workshops and individually help potential participants navigate existing device access programs and Internet subsidy programs for which they may qualify.

D. Project Activities

The proposed project will involve three main components--device distribution, service enrollment, and Digital Stewards training--which are described in detail below.

Device distribution program

The project aims to distribute 500 tablet/laptop computers to in-need students and patrons. The devices will be purchased, catalogued, and distributed by the Black Brilliance Research team. We will prioritize students and patrons for device distribution according to unmet financial need, and recipients will be required to self-certify that they do not otherwise have access to a personal computer. For students, we will assess unmet financial need according to Pell eligibility and need-based financial aid qualifications. For community members, we will assess need both in terms of individual need and in terms of community need, as we know that the spatial concentration of poverty worsens individual outcomes through impacts on social capital. Devices will therefore be distributed to patrons in CMC-qualifying census tracts, with further prioritization of patrons in tracts according to the Pierce County Equity Index developed by the City of Tacoma. Analysis in support of this prioritization will be conducted by a graduate student assistant, with oversight from Dr. Slager.

To recruit participants into the program, we will conduct on-campus outreach by advertising via listservs, flyers, digital ads on campus televisions, and presentations to select Registered Student Organizations. To recruit anchor-community participants, we will conduct outreach via listservs and presentations to the collaborating non-profits (The Black Collective, Harriet Tubman Foundation for Safe Passage) and their members and allied organizations, and via door-to-door canvassing in the qualifying census tracts that we have prioritized using the Equity Index. After an initial period of grant set-up, outreach, device purchasing, and cataloguing, we will begin distributing devices in the third quarter of year 1 of the grant period. In the initial distribution, we will deliver 250 devices, in order to address built-up unmet need. In the remainder of the program, we will distribute devices to 50 households per quarter, for five remaining quarters. This will align with UWT's quarterly academic term schedule and allow us to serve newly enrolled and newly in-need students and patrons on a regular basis.

Initially, this work will be led by the BBR Project Manager, with support from the UWT personnel and volunteers from the collaborating community organizations. As Digital Stewards are trained and begin their internships, interns will assist with outreach and device distribution. Digital Steward Interns will meet with potential participants and help determine if they qualify for the program. If they do not qualify,

Interns will help them identify other programs for which they may qualify for and help them navigate sign up and onboarding for such programs. We aim to reach at least 10% of Pell-eligible students (230) with this program, with additional devices being distributed to other students in-need and community members. Participants in the Digital Stewards Program will also be prioritized for device distribution if they are otherwise qualified.

Internet service enrollment program

The program also aims to enroll 500 households with Internet subscriptions who would not otherwise have home broadband service. Qualification for the service enrollment program will mirror that for device distribution: student need will be assessed according to Pell eligibility and need-based financial aid qualifications, and patrons in CMC-qualifying tracts will be assessed according to both individual need and community need based on the Equity Index. Though the qualifications for both device distribution and service enrollment are the same, we do not expect that all recipients of devices will also participate in the service enrollment program, or vice versa, as some individuals may have existing access to a laptop but not have home Internet service, or they may have home Internet service but only have a mobile phone from which to connect. Participants in the service enrollment program will be paid stipends to purchase their Internet service. Based on price estimates from three ISPs that provide service in the anchor community area (CenturyLink, Comcast, and Rainier Connect), we have estimated the average amount of a stipend to be $65/month, with some expected to fall above and some below that amount. The exact amount of each payment will depend on factors such as the cost of service in each participant's location and the amount of bandwidth needed to fit the household's needs (calculated based on household size). Payments will not exceed the actual cost of service, and are not expected to exceed in any individual case a maximum amount of $85/month. Actual costs of participants' monthly service will be evaluated against stipend payment amounts in the program evaluation.

The roll-out for the Internet service program will match that of the device distribution program, where after six months of outreach and set-up, 250 households will be enrolled in the third quarter of year 1, then 50 additional households for every remaining quarter of the grant period. Stipend payments will be made by BBR and will be managed by the BBR Project Manager. Outreach and recruitment will be handled in the same manner as the device distribution program, where Digital Steward Interns will eventually lead recruitment and will provide individual guidance to interested students and patrons who do not qualify for the program. As with the device distribution program, we aim to reach at least 10% of Pell-eligible students (230) with this service enrollment program, and participants in the Digital Stewards Program will also be prioritized for service enrollment if they are otherwise qualified.

Digital Steward Training Program

While device distribution and service enrollment will allow us to address infrastructural elements of digital access in the immediate short-term, attaining sustainable digital equity requires building the social and educational capacity of communities to effectively make use of their access to the Internet. Further, to achieve the highest return on investment, we must design a program that can create a longer-term solution to infrastructural inadequacies. To achieve both of these goals, we propose the Digital Stewards Training

Program. The Digital Stewards program has two components: a 16-week training program in which we will train 140 students and patrons as Digital Stewards, and a 14-week internship in which a subset of those Stewards will deliver digital literacy training, user support, and broadband adoption support to the broader student and anchor community, including participants in the device distribution program and the service enrollment program.

The 16-week workforce development program will prepare four cohorts of 35 Digital Stewards (140 total) to be able to build community wireless networks in their communities and to teach and support their neighbors and classmates in effectively making use of the connectivity that community networks afford. Though we will not deploy community wireless networks as part of the grant activities, since construction is not an eligible activity under the grant program, the Digital Stewards program will prepare trainees to plan, deploy, and maintain community wireless networks in the anchor community that will address ICT infrastructure disparities well beyond the grant period. Specifically, the Connect Across Tacoma project will prepare Stewards to build Cooperative Cellular Networks (CCN). CCN is an innovative model for wireless networking designed to lower barriers to entry to participate, increase competition in service provision, and empower communities to build and manage their own telecommunications. Thanks to its use of inexpensive hardware, recent advances in spectrum coordination, and the efficacy of LTE signal propagation in urban environments, the model has proven highly effective in our past and on-going community-led efforts to expand Internet service access.

To enable Digital Stewards to successfully deploy CCNs, the training program includes modules in network engineering, asset management, geospatial analysis, IT support, community organizing, and public pedagogy. Graduates of the program will also earn credentials as Certified Public Installers. We adapt this model from one developed and successfully deployed by the Detroit Community Technology Project and the Open Technology Institute. BBR has trained two cohorts of Digital Stewards in King County, WA prior to this proposal, and this project will bring that effort to scale in Pierce County in order to serve students and patrons in UWT's anchor community. Graduates of the program will be able to seek employment not only as network installers, but also in a variety of related IT fields, as they will gain skills in coding, customer support, and IT project management.

The Digital Stewards Training Program will be managed by BBR's Chris Webb, and BBR will also provide instructors and curriculum for the program. UWT will purchase the equipment necessary for training--both shared equipment that includes LTE base stations, panel antennas, routers, and minicomputers--and individual equipment that each student will need. UWT will also provide lab space and meeting space, and Dr. Slager will provide instructional support. The Local Connectivity Lab (LCL) will provide consulting support for the software and hardware used in training and provide instructional support for the network engineering portions of the curriculum. Participants in the program will receive $1,200 stipends for their participation. This stipend is necessary as a recruiting tool, particularly as we aim to recruit trainees from economically disadvantaged communities who may otherwise be unable to participate due to financial need. Stipends will be paid by UW Tacoma.

In addition to the 16-week training, 15 Stewards from each cohort will be selected for 14-week internships. Interns will help support the device distribution and service enrollment programs, and will

help foster digital skill development in the anchor community. Students and patrons who express interest in the device distribution or service enrollment programs will be matched with Interns who will provide one-on-one support to help them determine if they qualify for the programs. Regardless of program qualification, Interns will work with these clients to help them find solutions for their access needs and take advantage of digital connectivity skillfully, safely, and confidently. In this way, they will serve as community tech support, growing the technological capacity of the UWT student body and anchor community. Students and patrons who are helped by the program will be encouraged to refer others who they believe may benefit, allowing us to leverage community expertise and peer relationships as we continue to grow capacity.

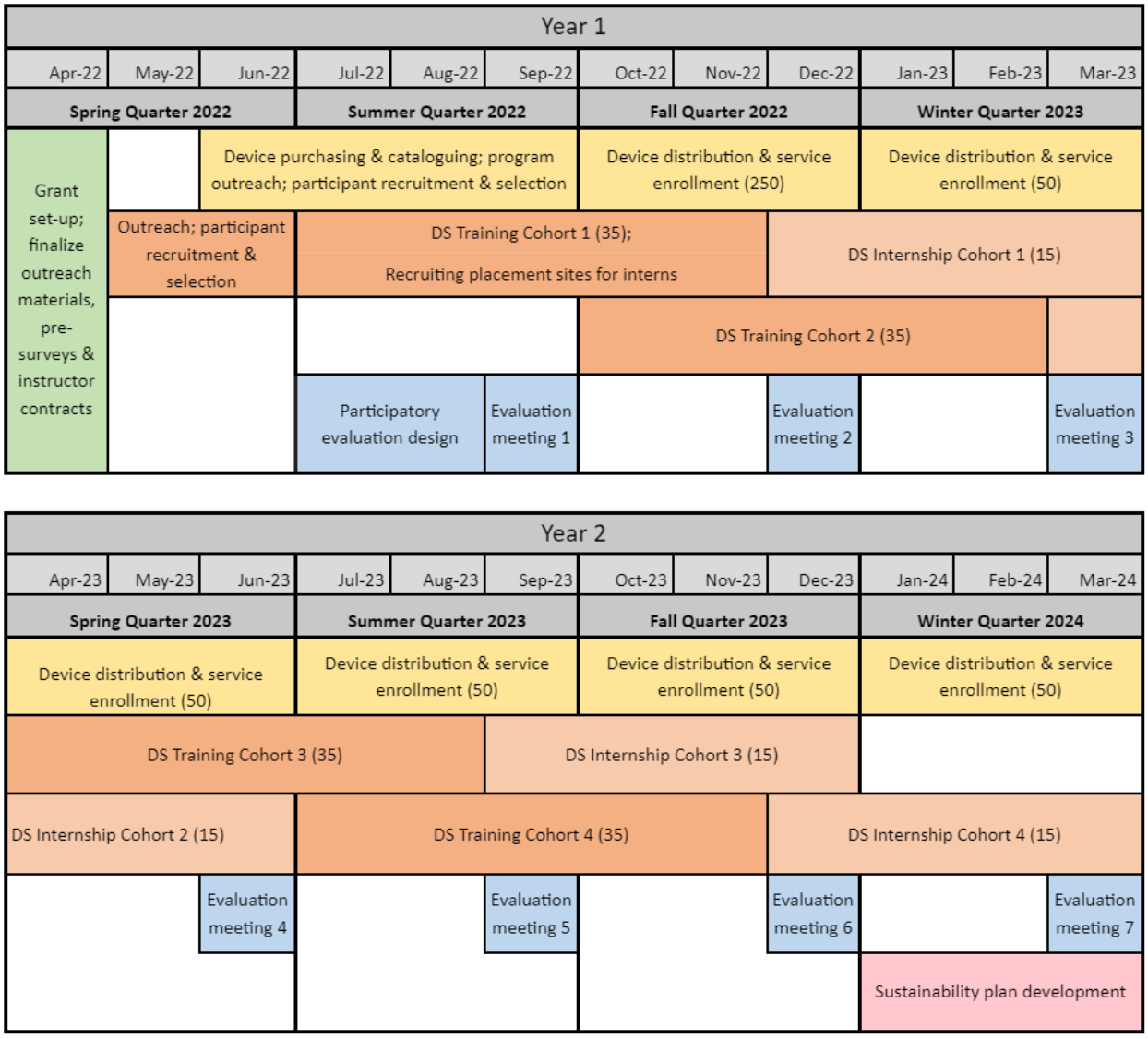
Internships demonstrate how our program implements a train-the-trainer model to promote digital skills acquisition and broadband adoption. We utilize this train-the-trainer model because those with direct experience of community-level digital divides are often the best suited to reach others who are similarly disconnected. The efficacy of this approach for addressing digital divides has been demonstrated by other digital equity projects around the country, such as Detroit's Equitable Internet Initiative.[4] Interns will receive an hourly wage for their work, which will be paid by BBR, and they will be supervised by Chris Webb and BBR's Training Coordinator.

Sustainability planning is particularly important to the long-term success of the Digital Stewards training program. As we reach the end of the grant period and Digital Stewards begin planning for the deployment of CCNs, we will draw on the expertise of the Detroit Community Technology Project (DCTP) to conduct a sustainability and feasibility review, and help develop a sustainability plan for potential CCN deployments. This will involve identifying community anchors (such as libraries, churches, and community centers) that can serve as hosts for LTE base stations, identifying funding sources, and identifying financial sustainability models for each CCN. DCTP has provided coordination for numerous community wireless networks in its home city of Detroit and will provide consulting services and administrative plans to help us achieve our sustainability goals.

Below is an overview of the project activities and the timeline on which they will be carried out. If necessary, the project timeline can be adjusted to push back the start to correspond with a later academic quarter.

Project Timeline

[4] https://detroitcommunitytech.org/eii



E. Project Results and Evaluation

The project will be evaluated using a participatory evaluation process. This will ensure that the specific measures used to evaluate success and benefits are decided in collaboration with the communities that are served through this project--that is, those who have most at stake in its success. This section will identify anticipated project results and describe the process we will use to evaluate the success of the project.

The evaluation team will be facilitated by the project's key personnel--Shaun Glaze, Emma Slager, and Chris Webb--and an evaluation advisory group member selected in the second quarter of the grant period. The evaluation team and our community partners will work together to determine the complete list of metrics used to evaluate the success of the project's interventions. Evaluation will be guided by focus groups made up of members of key stakeholder groups, including Digital Stewards, low-income students and patrons, instructors who teach UWT students, and participants in the programs that comprise the

Connect Across Tacoma project. This participatory design will allow those impacted by the project to have a seat at the table in its evaluation. Participants may be adjusted based on community feedback. The evaluation team will meet with the focus group quarterly and conduct its evaluation iteratively.

Intended results of the device distribution program and service enrollment program:
It is the aim of the technology distribution and service enrollment programs to increase the number of in-need students and patrons who have adequate access to digital devices and connection to high-speed Internet. From this connectivity, UWT and BBR hope to build digital skills that result in students and patrons being able to participate robustly in online activities, including remote learning and civic participation.

Evaluation of device distribution and service enrollment:
To measure the success of the above outcomes, the group will evaluate the following metrics, for both students and patrons, disaggregated. Where appropriate, data for these metrics will be collected through interviews and pre- and post-surveys. It is expected that additional metrics and evaluation criteria will be developed in conversation with the focus groups as the project progresses:

1. Total count of low-income individuals who gained access to laptops or tablet devices through programmatic interventions (either through direct distribution or referral to other programs); the percentage of these individuals measured against appropriate base populations.
2. Total count and percentage of low-income individuals who self-report competence in using their internet-enabled device, before and after programmatic interventions.
3. Total count and percentage of low-income individuals who gained access to high-speed home Internet service (either through direct service enrollment or referral to other programs).
4. Results of regular Internet speed tests administered by program participants to determine if home Internet speeds and latency meet acceptable standards for broadband service.
5. Average actual monthly cost of home Internet service paid by program participants, compared to average monthly stipend payment for service.
6. Total count and percentage of students and patrons with limited English proficiency served through programmatic interventions.

Intended Results of the Digital Stewards Training Program:
It is the goal of the training program to develop students into Digital Stewards, equipped with the skills, knowledge, and certifications that will lead to high-wage jobs and strong communities. Trainees' skills will be measured through hands-on and online learning, as part of the class design. Many of the intended results coincide with those of the distribution program, including building digital literacy in the community. The training program will aim to develop the following skills in participants:

1. Infrastructure know-how: gain a deep understanding of broadband infrastructure, terminology, and network systems.
2. Infrastructure hard skills: hands-on knowledge of how to set-up and install radios, routers, and related technologies.
3. Digital equity soft skills and advocacy: learn the tools to provide expertise, support, and digital advocacy for members of the local community; demonstrate expertise in helping to make

technology more accessible to those who have historically been excluded from access or adoption.
4. Community support: learn how to use community organizing and advocacy skills to get people connected to Internet service and devices that are made available through changes in policies and practices.

Evaluation of the Digital Stewards Training Program:
We will measure the success of the training program and internships using both qualitative and quantitative measures, following a participatory design process with partners, students, and community members, and using tools such as pre- and post- surveys, semi-structured interviews, and participant observation. Data will be collected on:

1. Network engineering competence, as reflected in credentials,
2. Training participant graduation rates,
3. Training participant attrition rates,
4. Post-training job placement,
5. Internship outcomes, assessed through self-assessment and supervisor assessment,
6. Number and percentage of students who express interest in STEM careers.

In addition to this, the evaluation team will seek feedback via online and in-person methods on community-identified metrics of success. We will not know the full scope of evaluation metrics until we have started to work directly with students, patrons, and other stakeholders in the program. The focus groups will bring valuable insight into the successes of the programs and in developing best practices for future digital equity programs.

Tangible outcomes
Tangible products delivered through project activities and from program evaluation will include:

1. An updated curriculum produced after each cohort of Digital Stewards training;
2. Multilingual outreach materials;
3. Sustainability report;
4. Focus group deliverables, including:
    a. Focus group design considerations document;
    b. Focus group facilitation guides and note-taker templates;
    c. Focus group quarterly summary reports;
    d. Final summary report of focus groups.
5. Multilingual and multi-modal pre- and post- surveys instruments;
6. Evaluative interview scripts;
7. Final evaluation report.

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Professional Preparation

Calvin College, Grand Rapids, MI	Geography, History	B.A., 2011
University of Oregon, Eugene, OR	Geography	M.A., 2013
University of Washington, Seattle, WA	Geography	Ph.D., 2018

Appointments

2019-present	Assistant Professor, School of Urban Studies, University of Washington Tacoma, Tacoma, WA
2017 - 2018	Graduate Student Instructor, Dept. of Geography, Univ. of Washington, Seattle, WA
2013 - 2017	NSF Graduate Research Fellow, University of Washington, Seattle, WA
2016	Instructor, NextGen Apps, Detroit Community Technology Project, Detroit, MI

Products Related to this Proposal

Slager, E. J. 2021, November. "GIS for site selection of community wireless Internet notes." (Invited public lecture). City of Tacoma GIS Day. Tacoma, WA.

Slager, E.J. 2021, February. "Media Justice Education Workshop: Community Networks." (Invited panelist). KVRU FM Radio Station. Seattle, WA. February 2021.

Slager, E. J. 2019, October. "Infrastructures of digital justice." (Keynote presentation). Critical Geographies Mini-Conference. University of Oregon. Eugene, OR.

Slager, E. J. 2018. Infrastructures of survival: digital justice and Black poetics in community Internet provision (Doctoral dissertation). University of Washington, Seattle, WA.

Slager, E. J. 2015, April. "Comparing media framings of wireless mesh networks." American Association of Geographers Annual Meeting. Chicago, IL.

Synergistic Activities

- Advisor on master's capstone, **analyzing how LiDAR data can be leveraged to improve line-of-sight analyses in order to aid community network planning and accelerate deployment**.
- Member of the Board of Directors of the Telluride Association, focusing on programs aimed at **increasing access to higher education for underrepresented groups.**
- Contributor to curriculum development for the Detroit Community Technology Project's Digital Stewards program, **teaching community members how to map network nodes and community assets.**