Development of the Science Gateways Community Institute Workforce Development Documentation and Communication Site Pages

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ABSTRACT |

The Center of Excellence in Remote Sensing Education and Research (CERSER) program on the campus of Elizabeth City State University is part of the Science Gateways Community Institute (SGCI) led by the San Diego Supercomputing Center (SDSC). SGCI was created to provide resources, expertise, community support, and education to the creators of gateways serving science and engineering research and education. SGCI is one of two Scientific Software Innovation Institutes funded by the National Science Foundation (NSF). SGCI was created to provide a resource that would bring together gateway creators from a wide variety of fields of research providing technologies and strategies so that designers can focus on development needed by their specific user communities.

SGCI is divided into five sections: Incubator, Extended Developer Support, Scientific Software Collaborative, Community Engagement & Exchange, and Workforce Development. Dr. Linda Hayden, the CERSER Principal Investigator, leads the Workforce Development Section. The Workforce Development goals are to increase the development pipeline of science gateway young professionals and educators with an emphasis on increasing involvement of students from underrepresented groups.

Documentation and communication with Workforce Development participants have been divided between during the first years of this project between the web site maintained by CERSER and the site utilized by the SGCI team. The goal of this year's undergraduate research project was to consolidate these pages with the SGCI site where the server now has a dedicated space to construct this set of pages. Utilizing HTML and graphics packages, the team developed content within the Liferay Content Management System utilized by SGCI.

SGCI Workforce Development |

Science Gateways Community Institute (SGCI) was founded in 2016 in reaction to a large-scale survey that identified the hardships that gateway developers faced at the time. The National Science Foundation funds its flagship software in two phases, implementation, and conceptualization. SGCI chose to utilize their award to work both the conceptualization and implementation phases. In doing so, they were able to build strong working relationships and a shared understanding of the institute's components in Figure 1.
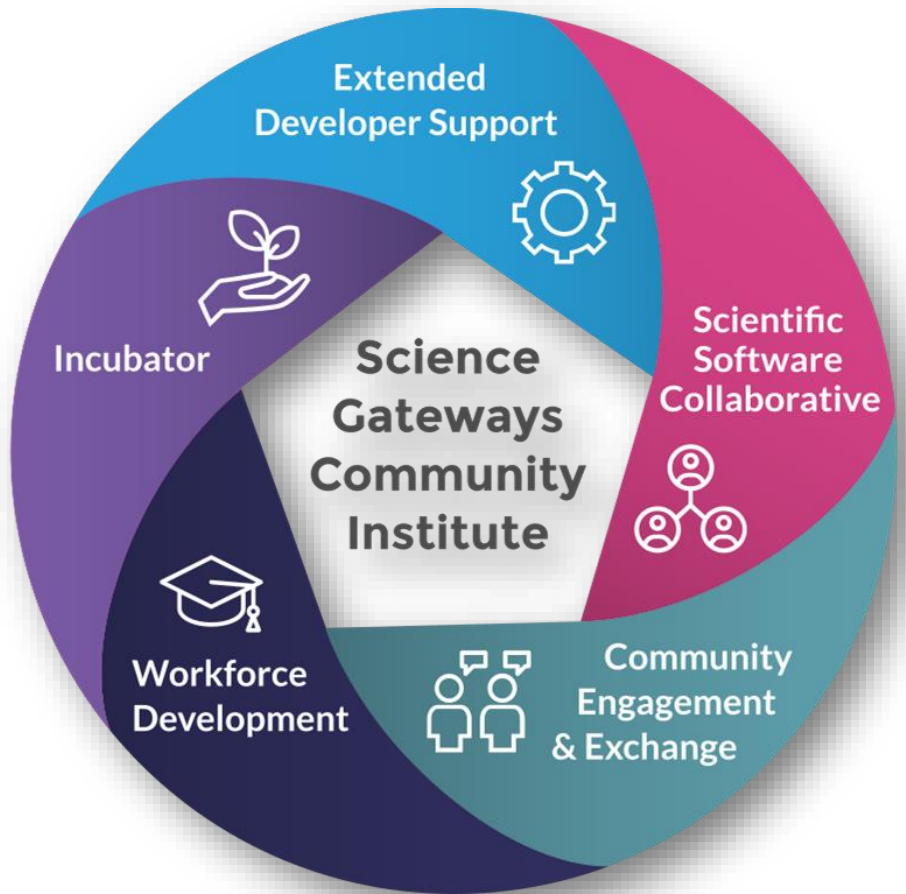
Dr. Linda Hayden leads the SGCI Workforce Development team. Dr. Hayden is the head of Elizabeth City State University's Center of Excellence in Remote Sensing Education and Research (CERSER) program. She and her workforce development team have worked to create opportunities for students. Any students willing to get connected with SGCI and its workforce development team will be given many opportunities to hone their skills for the specific job they are searching for. Students are encouraged to apply for recommended internships and to venture out and apply for ones that are not offered. Invitations are also sent out for conferences, which provide networking opportunities for students. These contacts provide entry into research, academic, and employment openings.

Figure 1.
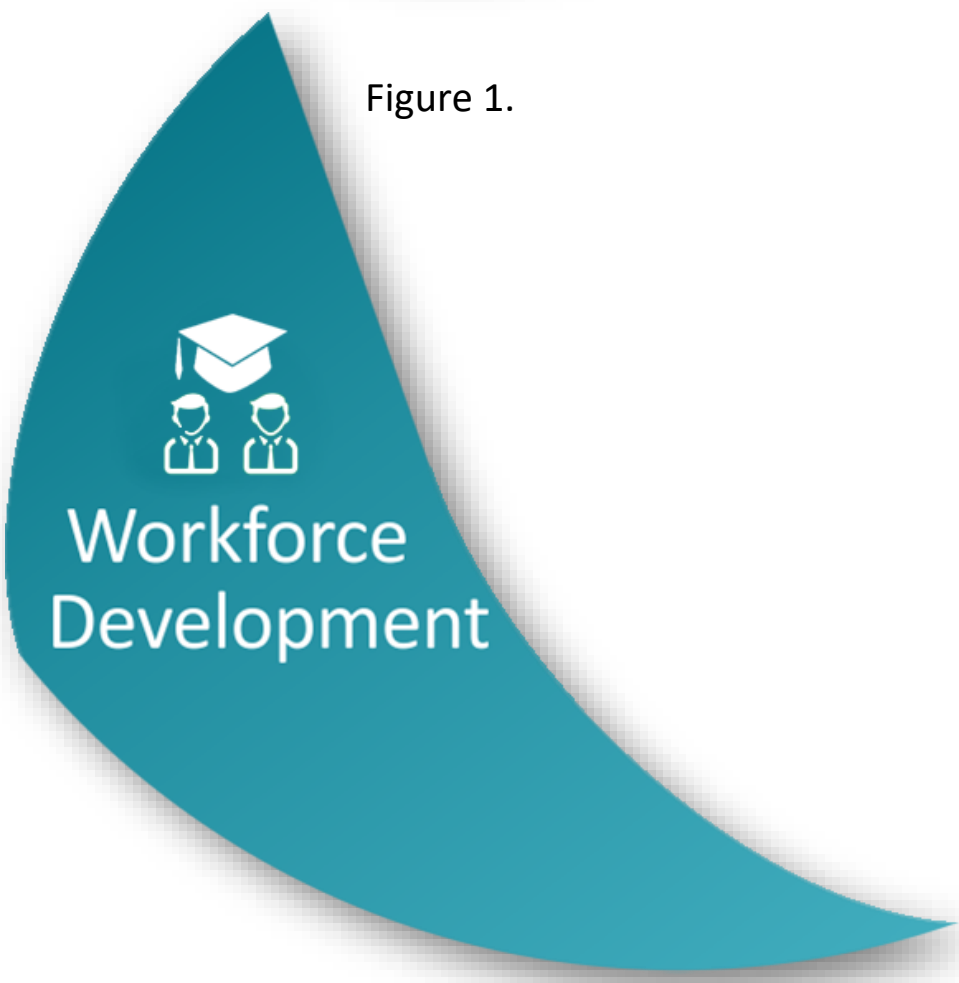
METHODOLOGY |

Goal
The goal of this project is to transfer science gateways workforce development content from the CERSER website to the science gateways official site. To do this, the team had to implement HTML code and place it within the content management system Liferay. This code was derived from pages previously developed on the CERSER website and rewritten to conform to responsive web design using DIV tags. The responsive design enables the pages to be utilized on various platforms ranging from desktop computers to cell phones.

Determining Pages
The original selection of pages to be completed was determined during the initial phone conference held on January 10, 2019. Representatives at this meeting included Nancy Wilkins-Diehl (Director, SGCI), Katherine Lawrence (Associate Director, CEE), Linda Hayden (Associate Director, WD), David Montoya (Website Development, SSC Staff), Nayiri Mullinix (Community Engagement Coordinator), and Jeff Wood (WD Staff). During this conference an initial set of files was laid out as a starting target for the Workforce Development section. These files were initially set up by David Montoya at TACC with content blocks left blank. Later, additional pages were added and deleted as the team worked toward its goal. This outline is as follows:

```
Initial outline:
1. Young Professionals Network
    a. Young Professionals Network
        i.  Mentoring
        ii. Special Events
    b. Events (Set up like Blog/News)
        i.   Young Professional of the Year Award
        ii.  YPN Liaison/Spotlight/Webinars
        iii. Mentoring
        iv.  Special Events
2. Events Workshops
    a. From CERSER menu
3. Internships
    a. About
    b. Application
    c. Current & Past Interns
4. Coding Institute
    a. Application
    b. 2017
    c. 2018
```

Rewriting Pages to HTML Code
The first step in the transfer process involved learning HTML code using exercises from W3Schools. Next, the team completed a series of tutorials on Cascading Style Sheets (CSS). Liferay depends heavily on these style sheets to maintain a constant look and feel throughout the website.

The next step was analyzing a web page and rewriting it into HTML code. This was done utilizing Google Documents for the initial code development. Once the code was written, it was tested in W3Schools' testing window. After the code was tested and reviewed it was then imported into the Lifeway content window under the source code editor. Minor flaws were seen once it was based into the component such as double apostrophes, unneeded spaces, and incorrect URLs.

HTML to CMS
After the team finish scripting the HTML code, the code was moved from the google documents into the Liferay content management system. This was accomplished by utilizing the edit window shown in Figure 2. Once this window is opened, the source button is selected allowing the HTML code to be edited for the content as shown in Figure 3. The code developed in Google Documents is then pasted into this window and the content is either "Saved as a Draft" or "Published." The page is then reviewed to ensure that the pasted code is interpreted correctly by the browser. If edits are needed, then the edit window is reopened and the code accessed again.
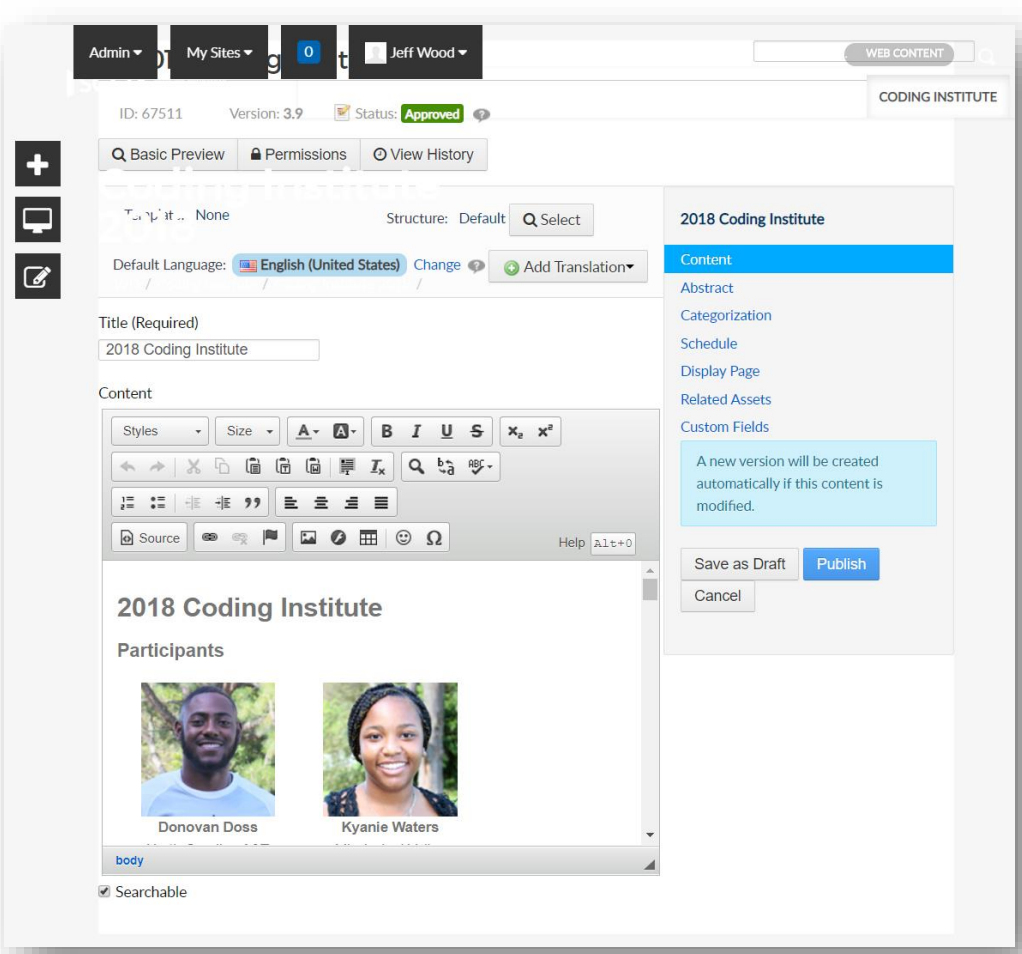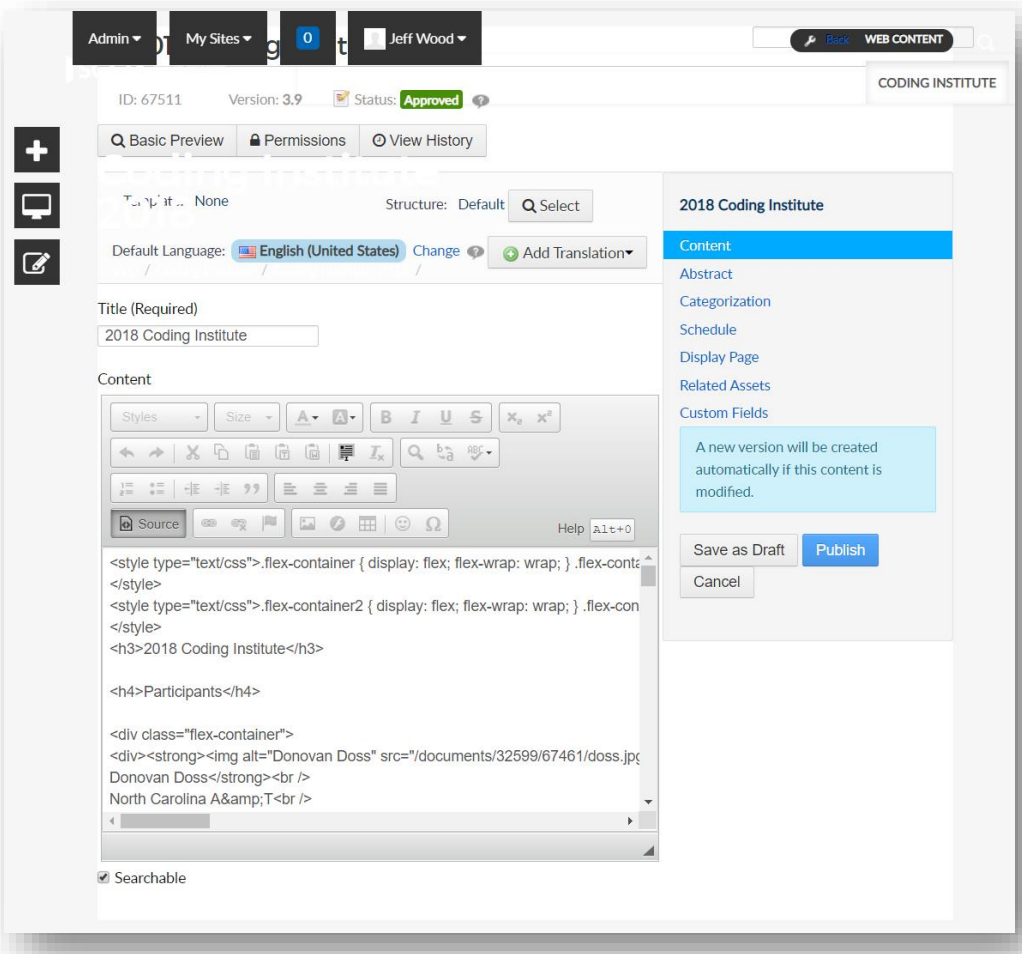

Figure 2: Liferay Editor Window

Figure 3: Liferay Editor with Source Code Window

Other Assets
Content developed for these pages not only needed text, but also Portable Document Formats (PDF) and images. These resource files were uploaded to specific locations before being accessed by the developed code (Figure ##). PDF and image files were placed in multiple directories for better content management. These files addresses could be coded into the HTML or inserted through the WYSIWYG window.

Asset Manager
Another tool that Liferay contains is the Asset Manager, which allows developers to develop dynamic pages and content. Once entered, content can be categorized allowing developers/users to select content based on tags assigned to the content. This tool is customizable using templates implemented by the developer. This tool was used to start a library of SGCI interns based on the year that they took attended their internship. The library is currently being housed at:
https://sciencegateways.org/engage/internships/about-our-interns
and had to be ported manually to the Workforce Development page at:
https://sciencegateways.org/web/wd/current-and-past-interns
Now that the intern information has been entered, a new template must be developed to obtain the desired output.

Analysis |

Implementation of pages in the new Workforce Development section of the SGCI site were completed utilizing the process discussed in the Methodology section. Gaining skills in HTML, CSS, and Liferay development were essential in completion of these pages. Further training is needed to implement higher level tasks in Liferay at this time.

Header images are not complete at this time as they must be implemented by David Montoya at TACC due to the permissions of the template. The team has begun gathering these images for when they can be placed into each file. The Interns page is also not complete due to further training needed to develop templates for the Asset Manager.

At this point pages exist in several states: not started, partially completed, and complete. The following list shows the state of the pages currently in the Workforce Development section:

```
Initial outline:
1. Home (Incomplete - Text/Images)
2. Young Professionals Network (Complete)
    a. Young Professionals Network (Complete)
    b. YPN Liaison/Spotlight/Webinars (Complete)
    c. Mentoring (On Hold)
    d. Special Events (On Hold)
3. Events (Incomplete - Images)
    a. Upcoming Events (Incomplete - Blog Development [Montoya])
    b. Past Events (Complete)
        i.   NOBBChE 14 (Incomplete - Images)
        ii.  NOBBChE 15 (Incomplete - Images)
        iii. PEARC17 (Complete)
        iv.  PEARC18 (Complete)
        v.   Hackathon 2018 (Complete)
4. Internships (Incomplete - Images)
    a. About (Complete)
    b. Applications (Complete)
    c. Current and Past Interns (Incomplete - Asset Management)
5. Coding Institute (Complete)
    a. Application (Complete)
    b. 2017 (Complete)
    c. 2018 (Complete)
```

CONCLUSION |

While the inclusion of HTML into Liferay is very straight-forward, the development of the code and resources is time consuming and requires a learning period to develop the skills necessary to work with the CMS. The initial set of pages developed by the SGCI team was a good starting point to begin with and allowed the team to add and delete pages as needed.

Liferay is a straightforward CMS with flexibility to enable adaptation to the developers needs. Developers can search through various resources online to find assistance and inspiration to solve technical difficulties when they arise. As the CMS is utilized more, the capabilities of the content developers will increase allowing for better communication of the Workforce Development team to its customers.

FUTURE WORK |

This project left much to be completed in the immediate future. Several of these tasks can be handled in-house, but several will need assistance of seasoned developers to complete.

The first task will be to add images to content where needed. This will entail selection of these images as well as formatting and production.

The next task will be completed with the assistance of David Montoya at TACC. He will be asked to set up a blog style page so that upcoming events can be inserted. This assistance has been offered during the initial phone conference so it is not a new request.

The home page text needs to be developed in conjunction with Dr. Hayden to ensure the correct message is delivered to customers. Once the text is added images can be added to enhance the page.

Now that the intern information has been added to the asset manager a new template needs to be developed to display the content in a catalog style with links to more detailed information. The layout goal can be viewed on the current SGCI site at:
https://sciencegateways.org/engage/internships/about-our-interns.

Each page in the site has a banner image at the top placed there by David Montoya. This must be done on his side of the production of Liferay. On our side the images must be selected and formatted to fit in the 1100x400 pixel format for the banner images.

Two pages initially suggested have no content: Mentoring and Special Events. It needs to be determined if these pages will move forward or be deleted from the Workforce Development section.

ACKNOWLEDGEMENTS |

References|

Full list of references can be found at:
http://nia.ecsu.edu/ur/1819/teams/sgt/2019_Gateways_Report.pdf