Lawrence Livermore National Laboratory Project Report

4/16/2018
4/18/18
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1   Introduction

1.1   Purpose

The purpose of this project is to improve the website https://www.llnl.gov/ by using principles from the field of human computer interactions. This is the main website for the Lawrence Livermore National Laboratory located in Livermore, California. The purpose of the website is to provide information to those who are interested in general information about the laboratory, those who are interested in touring the laboratory, and those who wish to apply for a job/internship opportunity.

After performing a heuristic evaluation on the website, I found that it is failing to provide the user with information about general lab information/tour information/job opportunities in a few areas. I will create a prototype website with the aim of improving the areas where the actual website is lacking. Due to the fact that the purpose of the website is to provide information, I will compare my redesign with the original website by comparing the time it takes users to find their desired information.

1.2   Tasks Identified

The tasks that the participants of the study will be executing are to find specific information or features of the website. The list below shows the tasks they will be asked to do.

1. Find the phone number and email that you need to call in order to schedule a tour of the laboratory.
2. Find the list of items that you are not allowed to bring into the laboratory when you are visiting/touring.
3. Find the links to the LLNL social media accounts.
4. Locate the search field to find internships at LLNL.

1.3   Assumptions

The only assumption that I am making is that the users know how to navigate a typical website.

2   Analysis

2.1   Personas

Name:	Aaron Pico
Occupation:	Stay at home father
Demographic:	• Father of 5 • 45 Years Old
Goal:	Wants to schedule a tour for himself and his five children and find what items he is not allowed to bring inside.
Environment:	He is very busy and is easily distracted

Quote:	"What is the phone number I need to call in order to schedule a tour and what can I bring?"

Name:	Helen Maroulis
Occupation:	High school student
Demographic:	• 15 Years Old • Interested in science
Goal:	Wants to find links to the LLNL social media accounts so she can follow.
Environment:	She very young and tech savvy.
Quote:	"How can I find the LLNL social media pages?"

Name:	Jordan Burroughs
Occupation:	College student studying computer science
Demographic:	• 20 years old
Goal:	Wants to apply for an internship at LLNL
Environment:	Very tech savvy but is busy with course work and needs to be able to find information quickly
Quote:	"Where can I find open internship positions at LLNL?"

2.2   Task Analysis Tools

The tools that I used for this project include a heuristic evaluation (Appendix 6.1) and a cognitive walkthrough (Appendix 6.2). After conducting the heuristic evaluation on http://www.llnl.gov I found that it received a score of 85 which is described as "good". Overall, the site is fine and gets the job done, yet there are some puzzling issues all revolving around the ability (or lack of ability) to find desired information. It seems to me as though there was little effort put into where commonly-searched-for information should be placed. I found that important information, such as phone numbers, were buried in walls of text, which will cause extraneous cognitive load on the user when they are trying to find such information. Some of the many issues I found were chosen to be improved upon and are explained in detail in the subsequent sections.

2.3   Task #1

2.3.1   Task Detail #1

The user first needs to find the top navigation bar which has drop-down links to various sub-pages of the website. Next, they will need to click the "Community" tab and then click the "Tours" link. This will present this user with a few paragraphs of text in which they will need to read through in order to find the phone number they must call to schedule a tour.

2.3.2   Task #1 Analysis

Although this is a simple process to complete, it is riddled with stray paths that the user can go down. Firstly, the correct link for information about visiting the laboratory is buried in eight tabs worth of links. Along with this, once the user finds the correct link under the correct tab on the navigation bar, they must then subsequently search through the paragraphs of text to find the phone number. This process from start to finish, requires that the user is very motivated to finding the phone number because they will most likely go to a few incorrect pages and read a couple paragraphs of unnecessary text before they find the desired information.

2.3.3   Task #1 Discussion

For information as simple as a phone number to call in order to schedule a tour, the process to find said information is somewhat tedious and prone to missteps along the way. The design of the website is too spread out, in a way that much of the separated information can be consolidated into a single page. Along with this, the important information is not prominently displayed.

2.4   Task #2

2.4.1   Task Detail #2

The user first needs to find the top navigation bar which has drop-down links to various sub-pages of the website. Next, they will need to click the "About" tab and then click the "Visiting" link. This will present this user more tabs in which they must click the "Restricted Items" tab. The list of restricted items is then promptly displayed to the user.

2.4.2   Task #2 Analysis

This task follows the theme of finding important information that the typical user might want to know when visiting the website. It also false into the same rut of presenting the user with too many possible paths in which only one is correct. For instance, the restricted items list is not paired with information about task 1 which is where one would go to get information about touring. This could lead to extraneous cognitive load on the user.

2.4.3   Task #2 Discussion

This task can be improved if it is consolidated with the information about touring. Splitting information that are directly relevant to each other will create extraneous cognitive load and will frustrate the user. If the information was underneath for instance the information about what number to call for touring and what hours they are open for tours, the amount of page click that the user would have to do would be reduced.

2.5   Task #3

2.5.1   Task Detail #3

The user must scroll down to the very bottom of the website. There they can find the links to the social media pages.

2.5.2   Task #3 Analysis

The LLNL.org website contains a lot of moving parts, with distracting images and tabs. Since the user must scroll down to the absolute bottom of the page, they will most likely be distracted by the information in front of them. Along with this, the icons for the social media accounts are small and in the bottom corner, allowing them to be easily passed over if the user is not looking carefully.

2.5.3   Task #3 Discussion

This can be improved if the icons were displayed prominently closer to the top of the website. As it stands now, the website requires the user to be focused and diligent in their search for the required information or else they can be easily diverted. This is a common theme of this website unfortunately.

2.6   Task #4

2.6.1   Task Detail #4

The user first needs to find the top navigation bar which has drop-down links to various sub-pages of the website. Next, they will need to click the "Careers" tab and then click the "Interns" link. This will present this user with a search field that searches for internships with the desired key words.

2.6.2   Task #4 Analysis

The difficulty of this task lies once again the realm of extraneous cognitive load. Once the user clicks the "Careers" tab, they have a couple options, one is click the "Search Opportunities" link, and the other Is click the "Interns" link. What is not clear from this is that the "Search Opportunities" link is aimed at people who wish to apply for a full-time employee position, whereas the "Interns" link is meant for those who wish to find an internship opportunity. Both internships and full-time positions are opportunities, so the user must initially guess as to which one is meant for them.

2.6.3   Task #4 Discussion

Once again, information is divided among multiple subpages for unnecessary or unclear reasons. This would be fine in this case if the two pages were clear in their purpose. For instance, if the one page was labels "Search Job Opportunities" and the other labeled "Search Internship Opportunities". As the website is now, it is ambiguous as to which one to click because both are opportunities.

3   Prototype and Design

3.1   Overview of Prototype and Design Features

The prototype design's main purpose is to combine features/information that is related so that the user has to visit the least number of pages as possible to find their desired information and so that they can find their desired information in the shortest amount of time possible. In terms of human computer interaction, the prototype should reduce extraneous

cognitive load that is introduced by the original site from the dispersion of related information across multiple pages.

3.2   Task #1

3.2.1   Task #1 Design

The original site required the user to successfully choose between two links that both appear to be related to scheduling a tour of the laboratory. In the redesign, the user is presented with one option which is a link that presents the user with the combined information from both of the link on the original site. This change will impact the user experience because they will be less frustrated if they have one simple choice, compared to two choices where only one is correct and they have the possibility of clicking the wrong one.

3.2.2   Task #1 Design Justifications

The decision to consolidate the two pages into one was motivated by the goal to reduce extraneous cognitive load. The original site had two links, one titled "Visiting" and one titled "Tours" which are on separate tabs. When they user first visits the site and is trying to find the correct link, they will notice both of these links and will have to think about which one is correct, increasing extraneous cognitive load. Since both of these subpages are directly related to each other, consolidating these two pages became a clear choice.

3.2.3   Task #1 Prototype

The two "Original website" pictures below show the ambiguity of having two extremely similar links two separate subpages listed in the navigation bar, namely the "Visiting" and "Tours" links. The two "Redesigned website" pictures below shows the missing "Visiting" link under the "About" tab and instead replaces the "Tours" link under the "Community" tab.
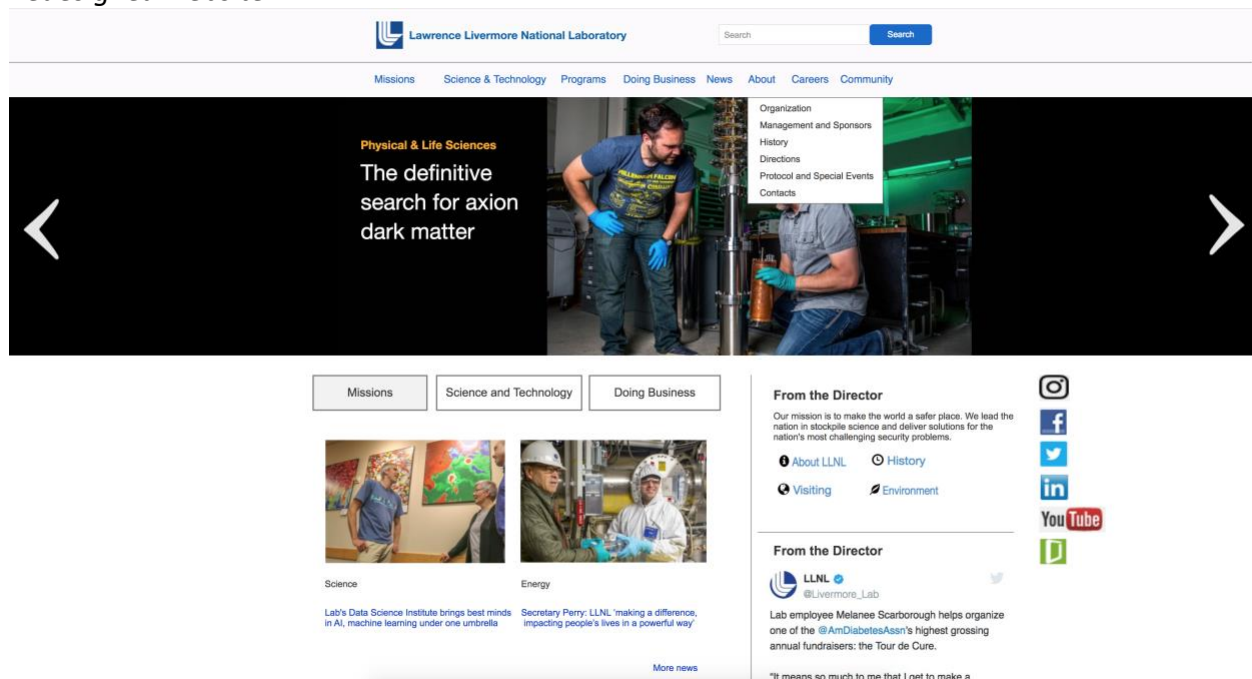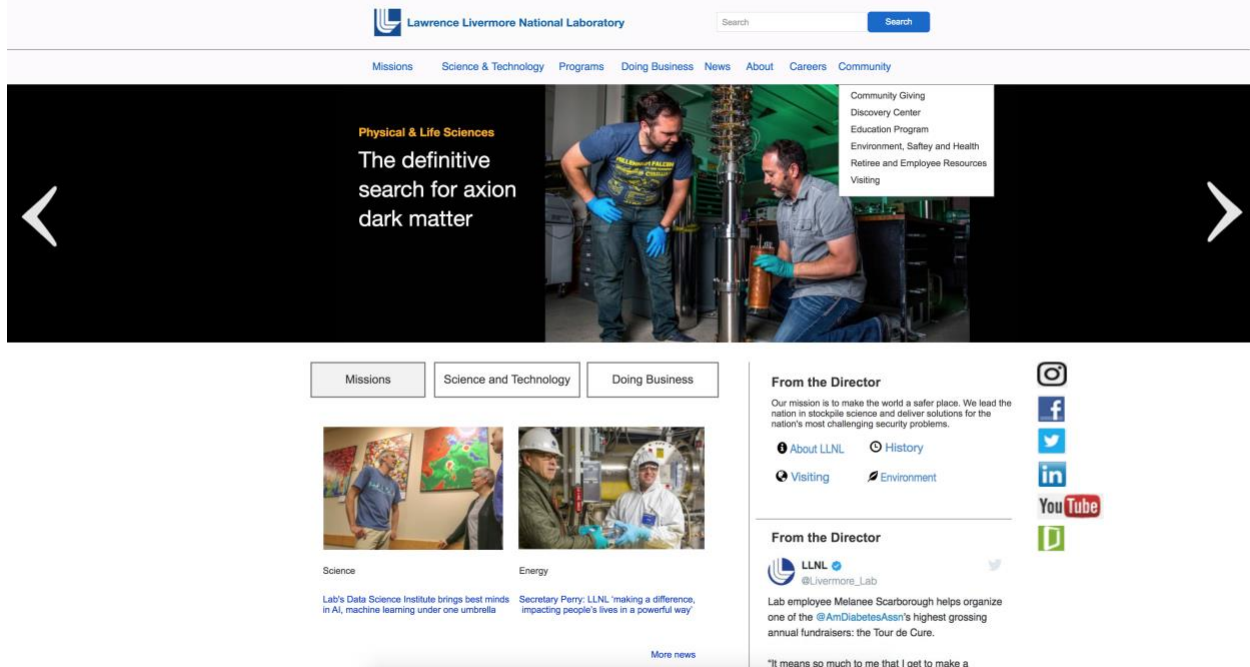*Original website*
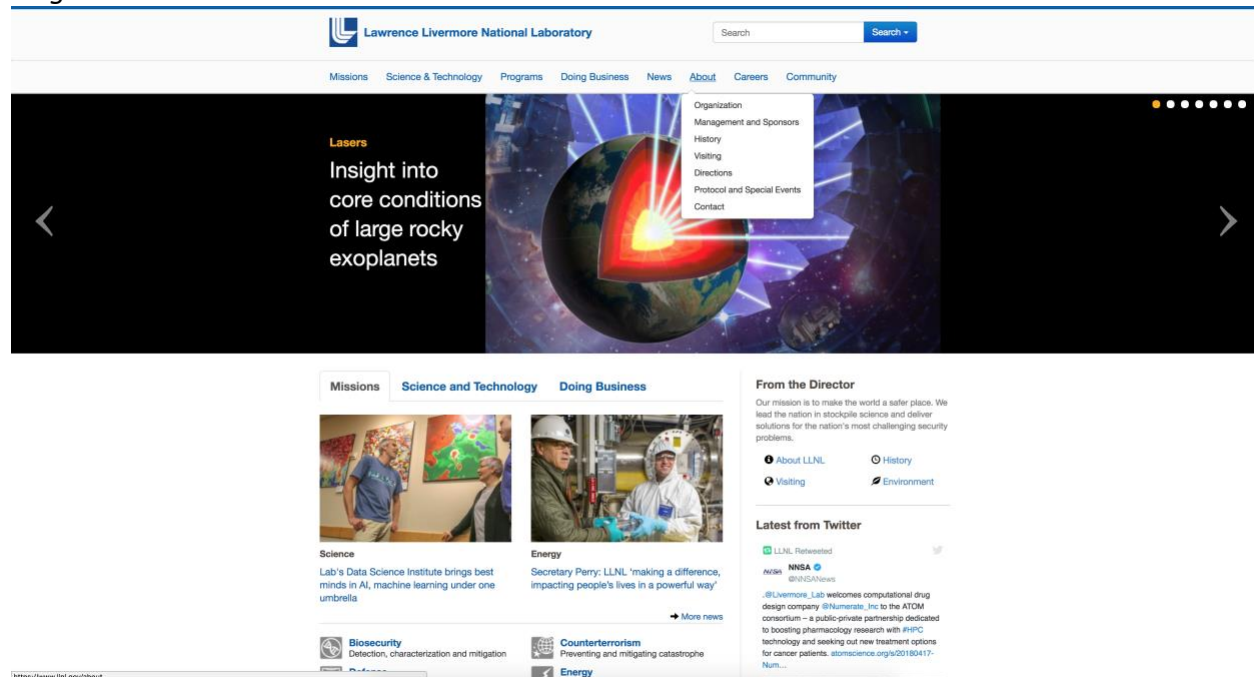
*Original Website*
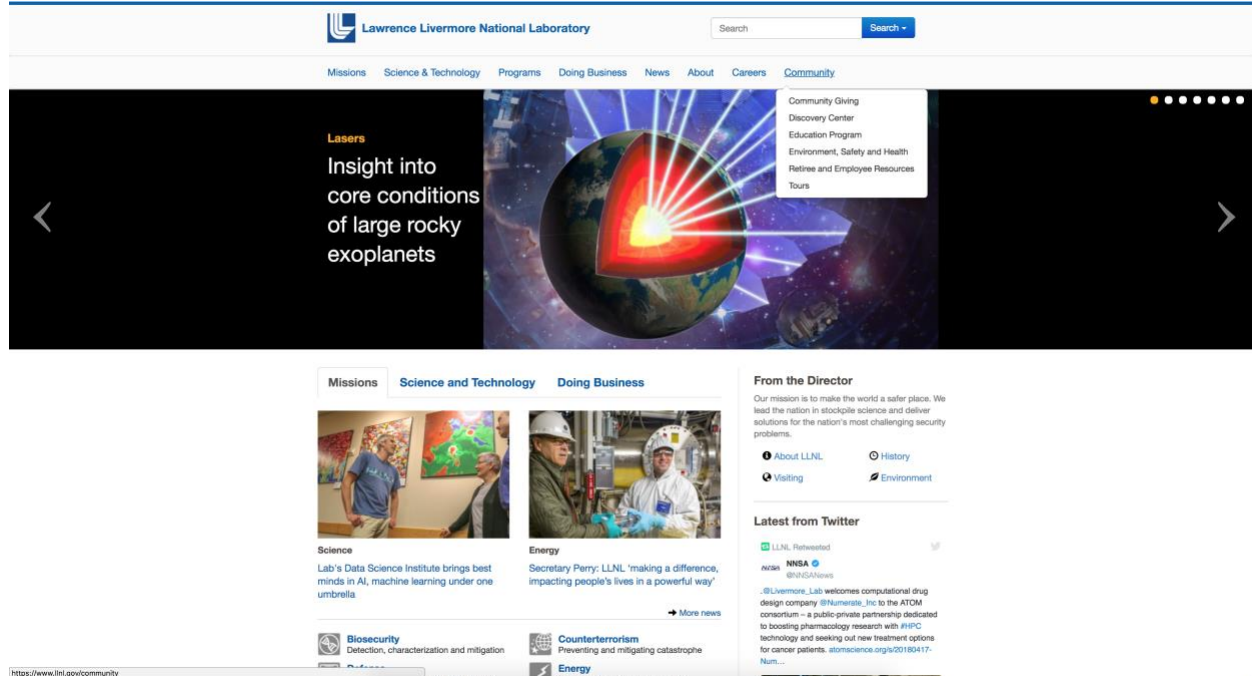
Redesigned website

The below screenshot shoes the *single* link that the user has to choose from called "Visiting". The title is relevant to those coming to the laboratory on business and those who are interested in coming for a tour.

Redesigned website

Once the user (using the redesigned website) clicks the "Visiting" link, it will take them to the website shown in the screenshot below which has consolidated both of the original subpages' information into one.

Redesigned website
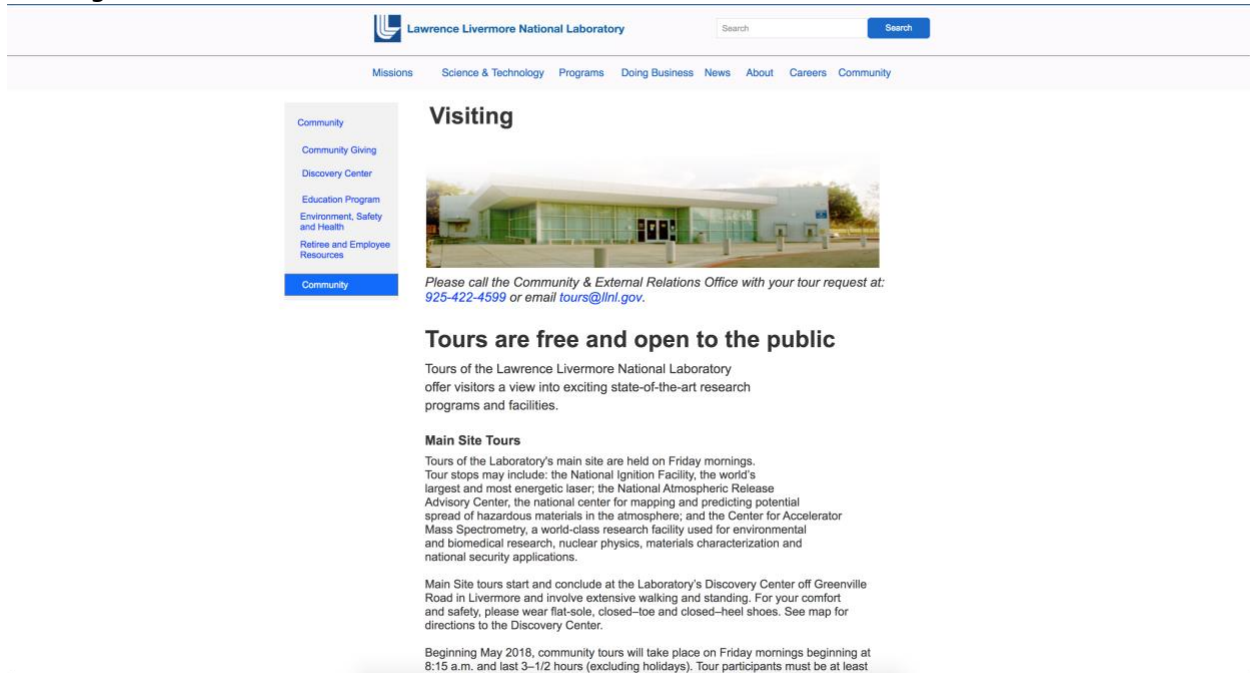
3.2.4   Task #1 Prototype Rational

The prototype design eliminates the possibility of the user clicking the Incorrect link and thus reduces the extraneous cognitive load that the user will experience when navigating the website.

3.3   Task #2

3.3.1   Task #2 Design

This task is very closely related to Task #1. This task will be improved by adding the restricted items list to the information related to tours as well as visiting. As the original website stands, if the user was interested in touring and clicked the "Tours" link, they would not be presented with the list of restricted items that are not allowed on the tour. The user must click the "Visiting" link in order to be presented with this information. The redesign will consolidate the two pages like Task #1 explains, and as a part of that consolidation, will present the restricted items on the newly created subpage. This will impact the user experience and not the usability because in terms of usability, the redesign does not offer anything new, but the user experience will increase because the user will not have to navigate to multiple subpages and search for information that is related to information they have already found yet is on a different page.

3.3.2   Task #2 Design Justifications

The decision to add the restricted items list to a consolidated page that holds information related to visiting and touring the website was motivated by the fact that if a person were to schedule a tour of the laboratory, they would not be presented with the crucial information of what to and not to bring on the tour. This is extremely important information that if not adhered to, can result in repercussions. Therefore, the restricted items list must be presented alongside the visiting/touring information.
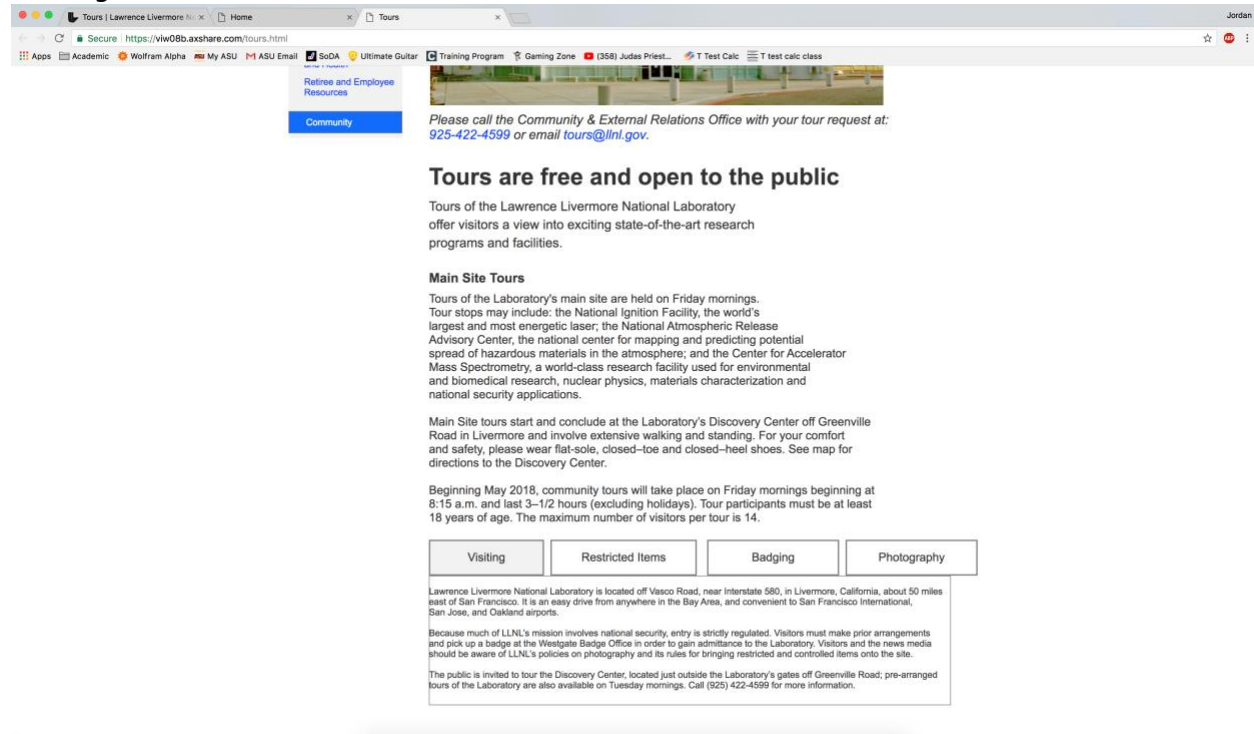
3.3.3   Task #2 Prototype

The screenshots below compare the original website compared to the redesigned website.

Original website
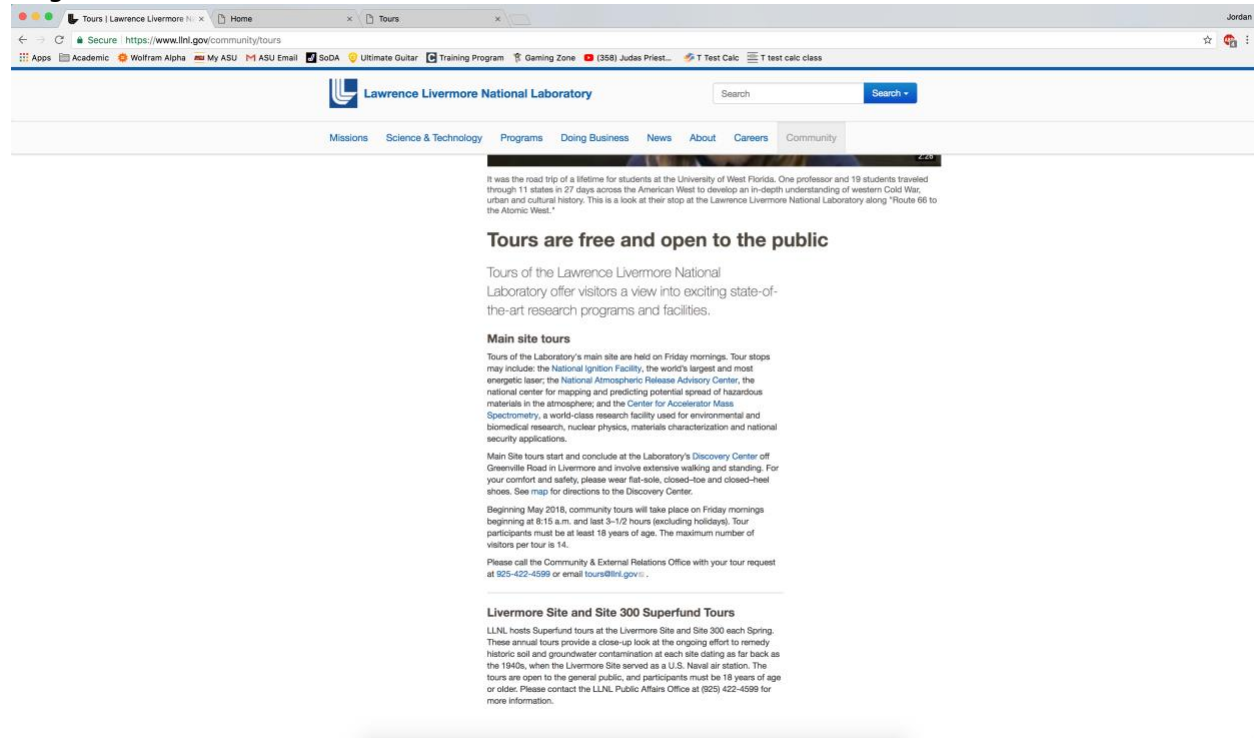
Redesigned website

The redesigned website provides the restricted items in tab form and makes it clear, regardless of whether the user is taking a tour or visiting on a business trip, that there are items not allowed inside the laboratory.

3.3.4   Task #2 Prototype Rational

The purpose of this design is to make it easier for the user to find the information about restricted items regardless of their reason for coming to the laboratory. By consolidating the "Tours" and "Visiting" pages and adding the restricted items list to the consolidated page, it will reduce extraneous cognitive load and increase the speed of which the user finds the desired information.

3.4   Task #3

3.4.1   Task #3 Design

The user is asked to find the links to the social media accounts. The links to the accounts are very small and in the bottom corner of the website. A redesign of this will focus on making them more visible so that the user has a higher chance of finding them in a short period of time.

3.4.2   Task #3 Design Justifications

The heuristic evaluation showed that the website is somewhat lacking in organization. A factor of this is that links to things such as social media accounts are small and somewhat hidden. The decision to bring these links up near the top of the page and display them prominently will help bring them to the attention of the user and keep the page less cluttered with small and seemingly useless links.
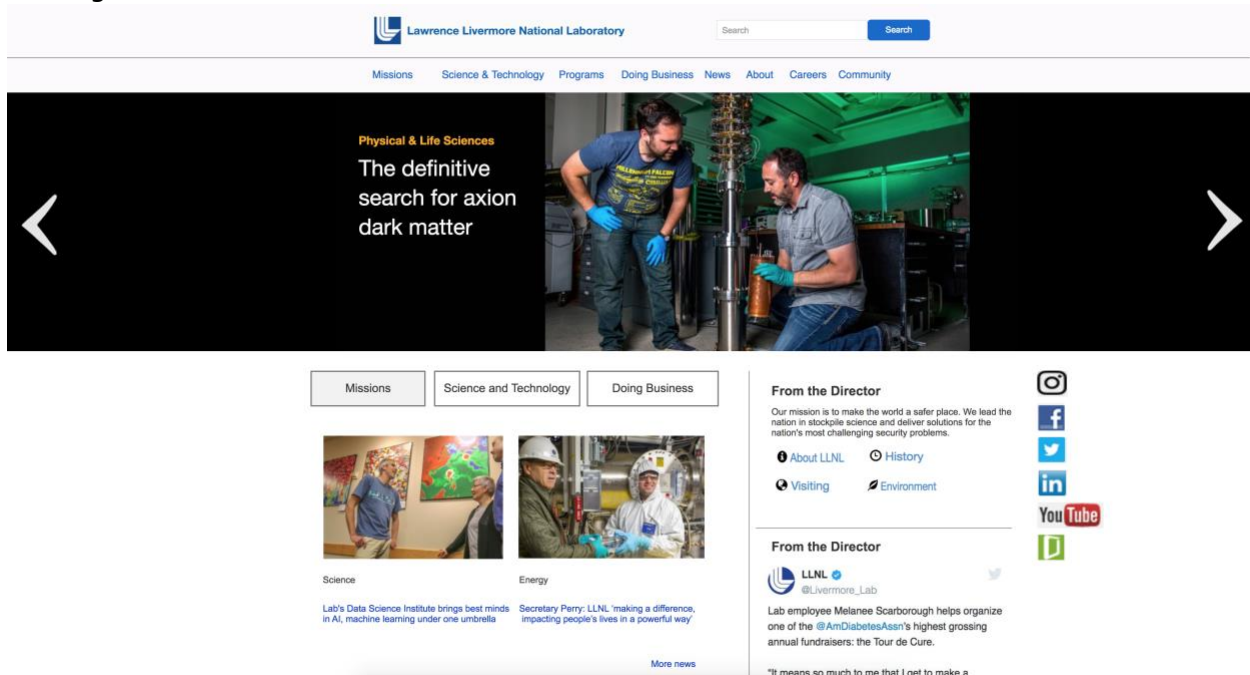
3.4.3   Task #3 Prototype

The screenshots below compare the original website to the redesigned website. The main difference is that the links to the social media accounts are brought up near the top of the website. Another small difference is that the size of the links are slightly enlarged. The links are off to the side of the website which keeps them out of the way from interfering with other information on the page.

Original website
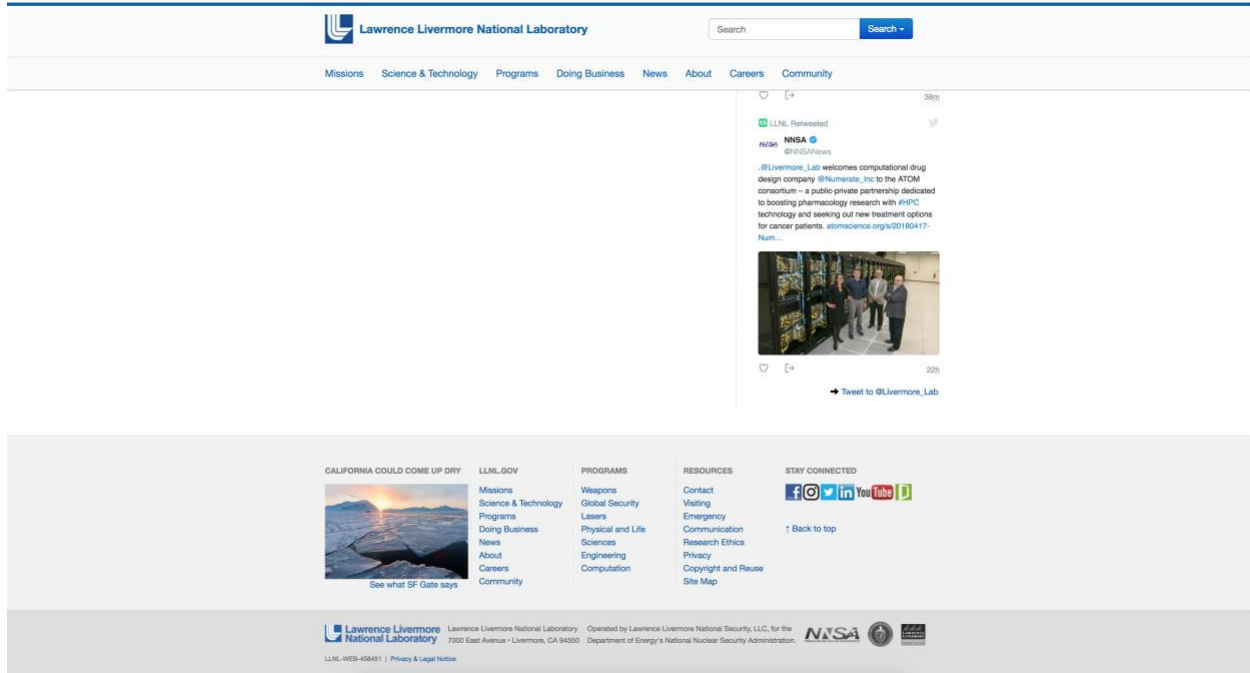
Redesigned website

3.4.4   Task #3 Prototype Rational

This prototype design was decided upon because it puts the social media links in a position that is obvious and clear for the user. By having the links near the top of the page, the user is more likely to see them when they first arrive at the page. This practically completely

reduces the extraneous cognitive load of the user as they barely need to search for the links once they arrive at the site. Along with this, it frees up space near the bottom of the site and gives the page a less cluttered and more organized feel.

3.5   Task #4

3.5.1   Task #4 Design

This task asks the user to find the search field for internship opportunities at the laboratory. The original website has two search fields, one for job opportunities and one for internships, both located on different pages. This can be improved if the two pages are consolidated and the subpage labeled "Search Opportunities" which will apply to both full time jobs and internships. This will impact the user experience by reducing the extraneous cognitive load on the user when they are looking for an internship opportunity and are not sure whether to click the "Search opportunities" link or the "Interns" link on the original website.

3.5.2   Task #4 Design Justifications

The heuristic evaluation revealed that much information that is directly relevant to one another on the original website is dispersed across multiple subpages. This increases extraneous cognitive load on the user because they expect the related information to be on the same page with its similar information.
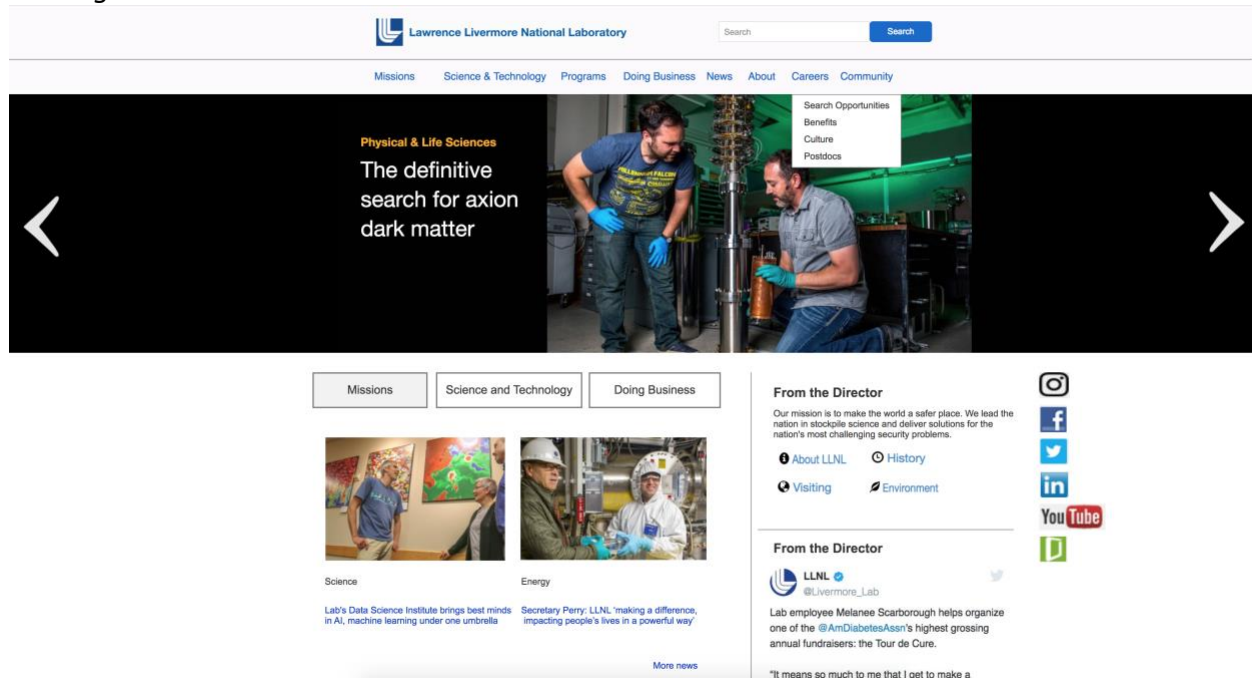
3.5.3   Task #4 Prototype

The screenshots below compare the original website to the redesigned website. The original website has two links, "Search Opportunities" and "Interns". The redesigned website combines these two, replacing the original "Search Opportunities" page with the new page which contains the consolidated information, and removed the "Interns" page.
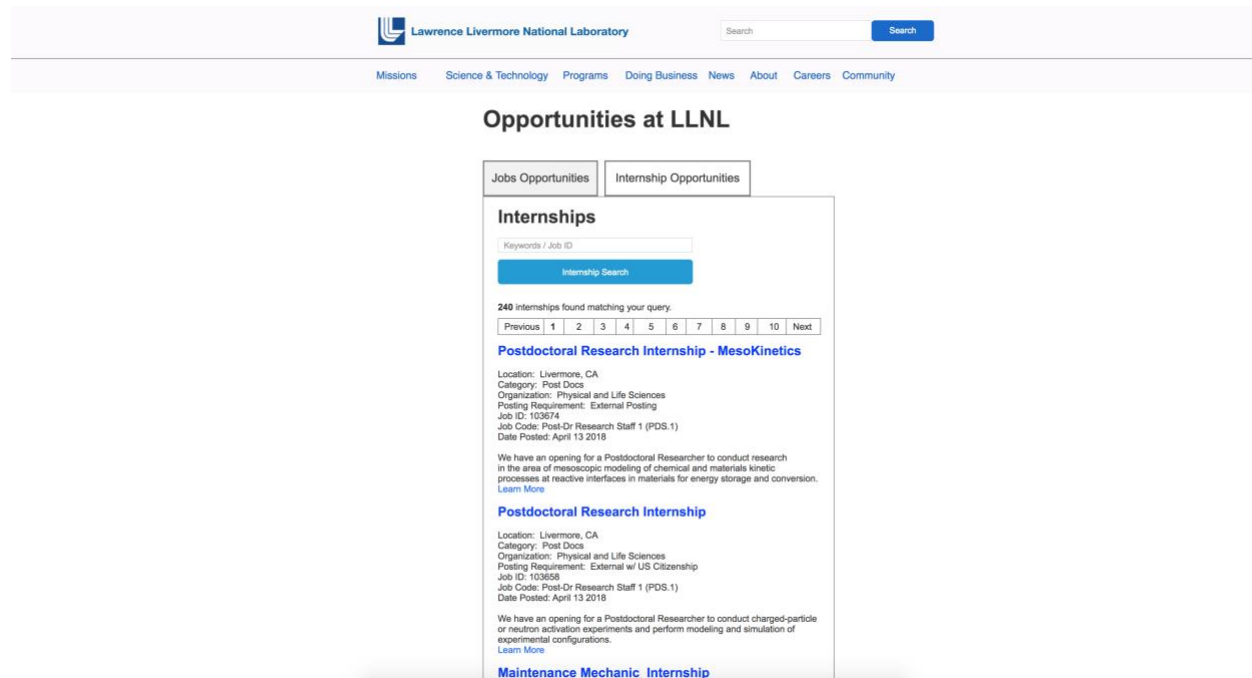
Original website
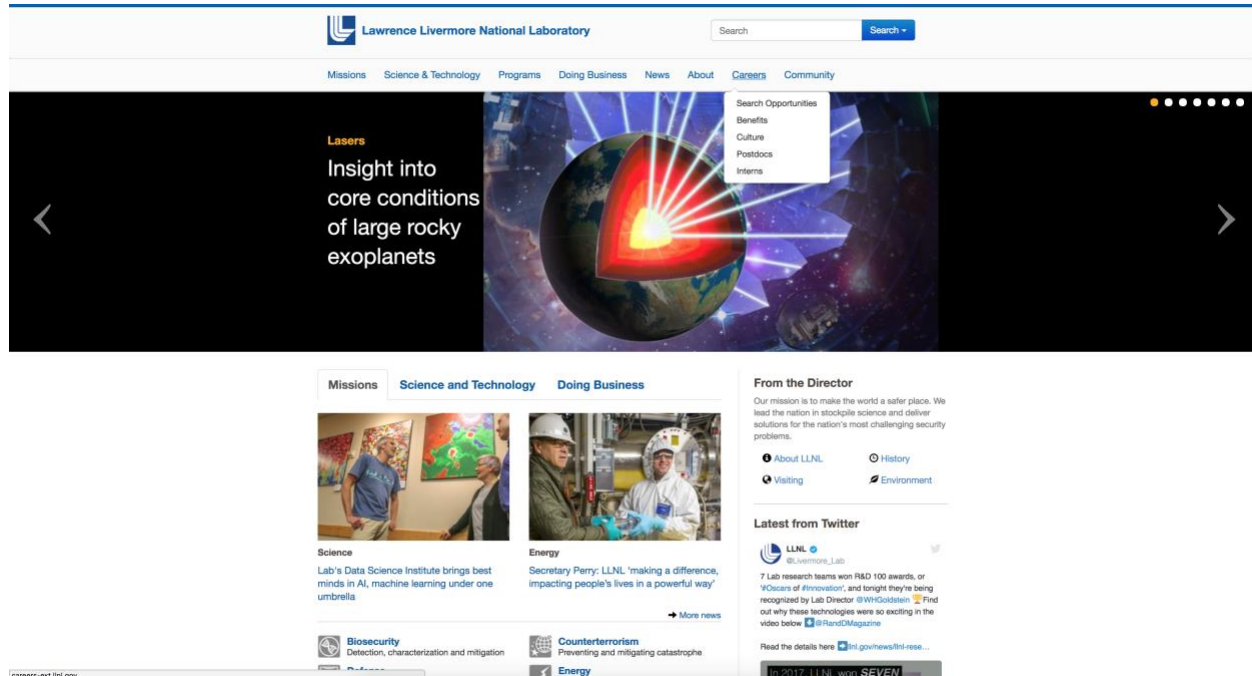
Redesigned website

The two screenshots below show how the information from the previously two subpages were combined onto one page. Since both jobs and internships are opportunities, both search fields were put into separate tabs on a single page called "Opportunities at LLNL". Depending on whether the user is looking for a job or internship, they can click the respective tab to find the relevant search field.

Redesigned website

Redesigned website
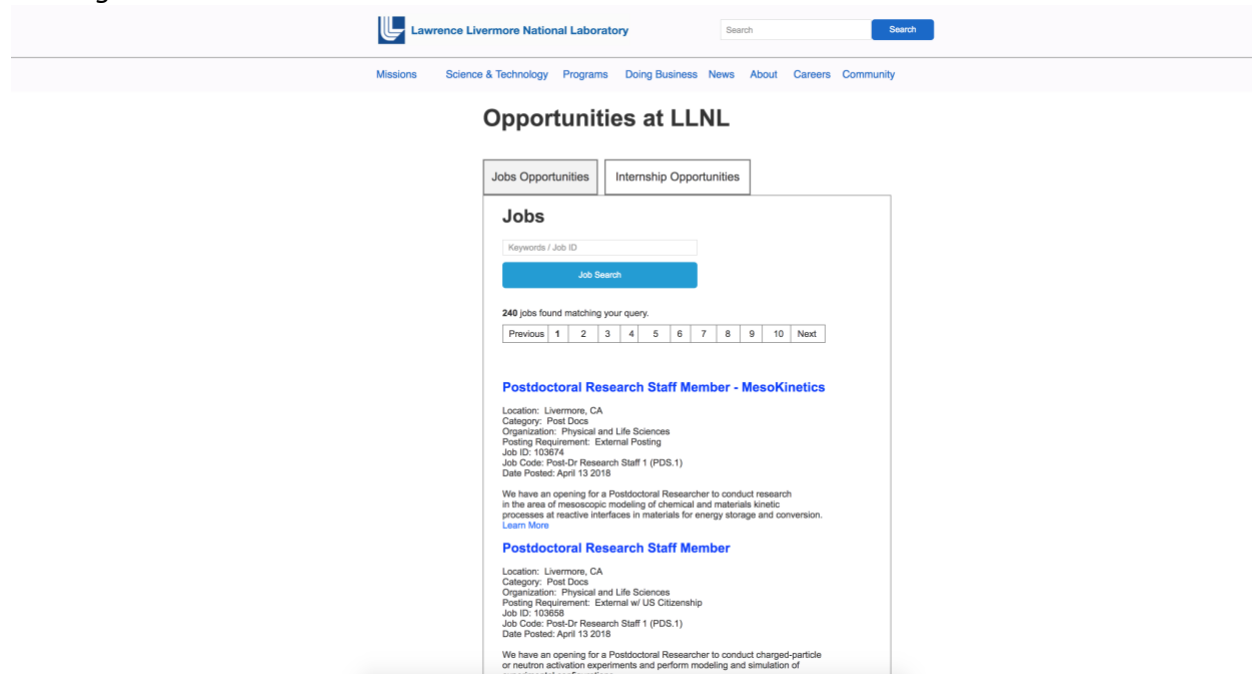
3.5.4   Task #4 Prototype Rational

This prototype design was decided upon because the original website introduces some ambiguity and subsequent extraneous cognitive load because of the inferred separation between "opportunities" and "internships" that it made by naming the subpage that contained the job search field "Search Opportunities" and the subpage that contained the search field for internships "Interns". By combining these two pages and giving the user the option to search

for either jobs or internship and naming the page "Search Opportunities" reduces the ambiguity and thus reducing the possible increase in extraneous cognitive load.

4   A/B Testing

4.1   Participants

The participants for the study were college students between 20 and 21 years of age. The participants were not compensated and were recruited by myself.

4.2   Scenarios

Below is the list of tasks of this experiment with a real-world example of a situation in which someone would execute each task. The paths of executing each task refers to the redesigned website and not the original website.

4.2.1   Task #1

The user is someone who is interested in the science being conducted at the Lawrence Livermore National Laboratory and wishes to take a tour in order to learn more about LLNL. There is only one path for the user to locate this information. The user would have to locate the "Community" tab on the menu bar at the top of the page and then locate the "Visiting" link under said tab.

4.2.2   Task #2

The user is someone who is visiting LLNL on a business trip and needs to know what items are not allowed in the laboratory. There is only one path of executing this task. The user would have to locate the "Community" tab on the menu bar at the top of the page and then locate the "Visiting" link under said tab. Once on the subpage, the user would have to click the "Restricted Items" tab in order to be presented with a list of restricted items.

4.2.3   Task #3

The user is someone who interested in the science and research being conducted at LLNL but lives too far away to get a tour. Instead they wish to follow LLNL on some social media platforms and is looking for links to the LLNL social media pages. There is only one way of executing this task. When the user arrives at the home page www.llnl.gov, they can click the social media platform of their choice on the right side of the page.

4.2.4   Task #4

The user is someone is in college and wishes to apply for an internship opportunity at LLNL. In order to execute this task, the user must locate the "Careers" tab on the menu bar at the top of the website, and then the "Search Opportunities" link under said tab. This brings them to a subpage where the user must click the "Internship Opportunities" tab. The user will then be presented with the desired internship opportunity search field.

4.3   Equipment

The users will use the original and redesigned website on my personal MacBook Pro laptop (running MacOS High Sierra with a screen resolution of 1900x1200) on the Google Chrome web browser. The users will be required to use the laptop trackpad. The user's actions will also be recorded with the QuickTime Player screen recorder feature.

4.4   Subjective Metrics

The participants for the study are given a questionnaire sheet before the study begins which will help me understand how familiar they are with the www.LLNL.org website, their familiarity with navigation using a MacBook trackpad, and their experience with navigating websites in general. (See Appendix 6.6)

The participants for the study will also be given a questionnaire sheet after the study is completed which will contain questions about the ease and satisfaction of each task. In addition, there will be questions asking the participant what they liked most about the site/what they liked least, and any recommendations for improving the website. (See Appendix 6.7)

4.5   Quantitative Metrics

Time will be the primary metric used to determine if the redesign of the website helps significantly or not. Deviations from the correct path of task execution will be recorded as well. Whenever a participant clicks on a link that is not a part of the correct path for that task, it will be recorded. Along with this, successful task completion, a binary value, will be recorded.
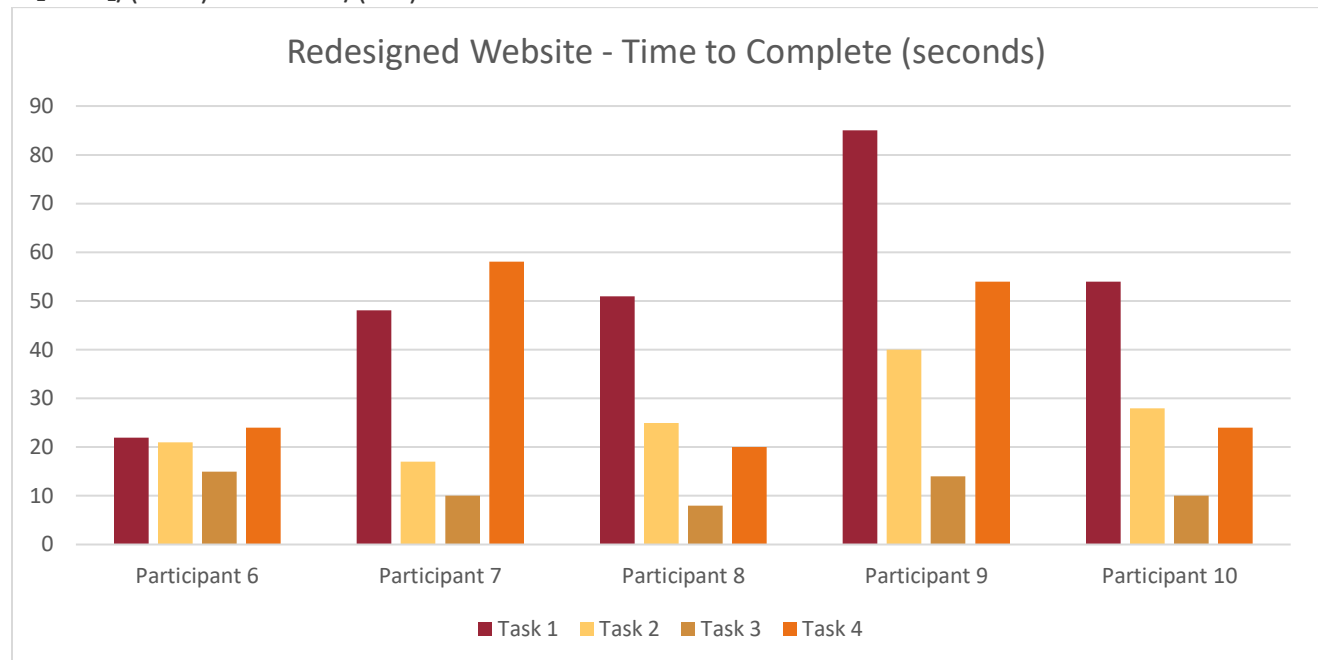
4.6   Test results
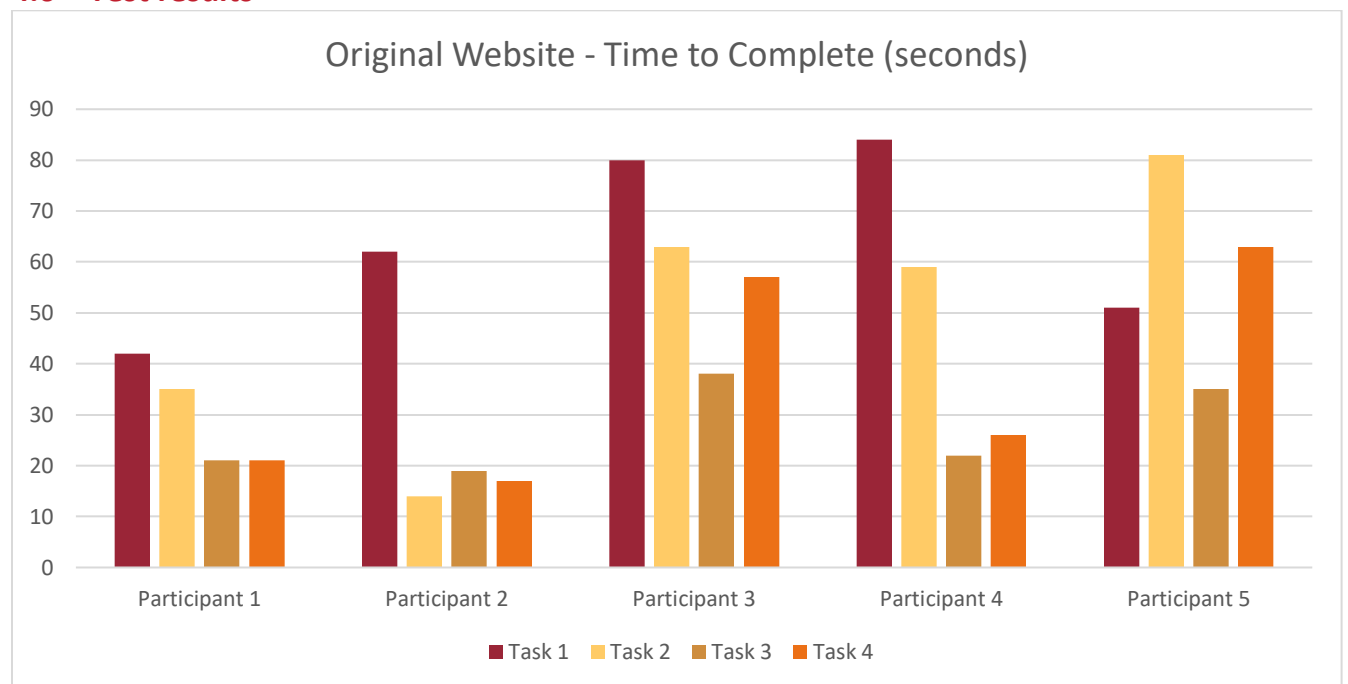
N_1: 5

$df_1 = N - 1 = 5 - 1 = 4$

M_1: 209.4

SS_1: 19097.2

$s^2_1 = SS_1/(N - 1) = 19097.2/(5-1) = 4774.3$

N_2: 5

$df_2 = N - 1 = 5 - 1 = 4$

M_2: 172.2

SS_2: 11254.8

$s^2_2 = SS_2/(N - 1) = 11254.8/(5-1) = 2813.7$

By running an independent sample two-tailed T-test on the total task times of both groups (the original website vs the redesigned website) with an alpha value of 0.05, the statement that the difference *is not significant* can be concluded with a t-value of 0.95491 and a p-value of 0.367581

Original	Task 1 errors	Task 2 errors	Task 3 errors	Task 4 errors
Participant 1	1	1	0	0
Participant 2	2	0	0	0
Participant 3	1	1	0	1
Participant 4	0	1	1	1

	Task 1 errors	Task 2 errors	Task 3 errors	Task 4 errors
Participant 5	0	0	0	1

N_1: 5
$df_1 = N - 1 = 5 - 1 = 4$
M_1: 2.2
SS_1: 2.8
$s^2_1 = SS_1/(N - 1) = 2.8/(5-1) = 0.7$

Redesigned	Task 1 errors	Task 2 errors	Task 3 errors	Task 4 errors
Participant 6	0	1	0	0
Participant 7	1	0	0	1
Participant 8	0	0	0	0
Participant 9	0	0	0	1
Participant 10	0	0	0	0

N_2: 5
$df_2 = N - 1 = 5 - 1 = 4$
M_2: 0.8
SS_2: 2.8
$s^2_2 = SS_2/(N - 1) = 2.8/(5-1) = 0.7$

By running an independent sample two-tailed T-test on the total task times of both groups (the original website vs the redesigned website) with an alpha value of 0.05, the statement that the difference **is significant** can be concluded with a *t-value of 2.64575* and a *p-value of .029449*.

5   Conclusions

5.1   Discussion of Results

The test results showed that the total time that the participants took in order to complete all of the tasks between the original website and the redesigned website was not statistically significant. Now looking back at this project, the reason that this might be the case

is that the tasks themselves do not take that long to complete. If the tasks took longer to complete, these changes that I made might have made more of an impact. Fortunately, the number of mistakes made between the original website and the redesigned website was statistically significant. Though the changes that I made did not significantly reduce the time it took to complete the task, it did significantly reduce the amount of errors the users made because it reduced the options presented to the participants.

5.2   Lessons Learned

This project taught me that in order to adequately test the changes that you made to the original website, the tasks must take time to complete or else it might not be long enough to gather good data. I am confident that if I chose tasks that took longer, there would be a significant difference in the average task completion time, but since they don't take very long to complete, the results might not be very accurate.

5.3   Conclusion

In conclusion, the prototype did give the users a better experience with less mistakes made but did not accomplish the goal of significantly reducing the average task completion time. In future experiments, I will choose tasks that take longer to complete in order to gather more meaningful data.

6   Appendixes

6.1   Heuristic Evaluation

Heutistic Review Template (Source: http://www.uxforthemasses.com/)

www.LLNL.gov	Score	Comments
Hover over a guideline for more information, examples of good practice and importance to the overall user experience.	N/A = not applicable or can't be assessed	Optional - Provide a short rational for the score, such as a description of the issues found; examples of good practice and the likely impact for users.
Features & functionality		
1 Features and functionality meet common user goals and objectives.	Excellent	There is no missing information. No matter the reason you visit the site, it will be able to provide the desired info.
2 Features and functionality support users desired workflows.	Good	Depending on the user's desired workflow, it will either be excellent or close to it. Some of the information is in slightly odd areas.
3 Frequently-used tasks are readily available (e.g. easily accessible from the homepage) and well supported (e.g. short cuts are available).	Excellent	The top menu bar offers links to commonnly desired web pages.
4 Users are adequately supported according to their level of expertise (e.g. short cuts for expert users, help and instructions for novice users).	N/A	The level of expertise is irrelevant. This website mainly offers information, not functionality persay.
5 Call to actions (e.g. register, add to basket, submit) are clear, well labelled and appear clickable.	Excellent	The actions are all clear.

Homepage / starting page

#	Question	Rating	Comment
6	The Homepage / starting page provides a clear snapshot and overview of the content, features and functionality available.	Excellent	The hompage does a good job of showing pieces of the other pages you can go to.
7	The home page / starting page is effective in orienting and directing users to their desired information and tasks.	Excellent	The top menu bar gives clear links to different pages, depending on the users desired information.
8	The homepage / starting page layout is clear and uncluttered with sufficient 'white space'.	Moderate	I think that it is somewhere in the middle. It is slightly cluttered.

Navigation

#	Question	Rating	Comment
9	Users can easily access the site or application (e.g. the URL is predictable and is returned by search engines).	Excellent	LLNL.gov may be not the most intuitive, but is better than other options such as LawrenceLivermoreNationalLaboratory.gov
10	The navigational scheme (e.g. menu) is easy to find, intuitive and consistent.	Excellent	It is prominantly at the top
11	The navigation has sufficient flexibility to allow users to navigate by their desired means (e.g. searching, browse by type, browse by name, most recent etc…).	Excellent	The user can either use the search bar, or manually find the information through the menu links.
12	The site or application structure is clear, easily understood and addresses common user goals.	Excellent	It is similar to other websites in terms of structure.
13	Links are clear, descriptive and and well labelled.	Excellent	Self explanatory.
14	Browser standard functions (e.g. 'back', 'forward', 'bookmark') are supported.	Excellent	Self explanatory.
15	The current location is clearly indicated (e.g. breadcrumb, highlighted menu item).	Poor	The website has the breadcrumb feature and highlighted menu item feature… but only for certain menu links. Some links open sub site of the main website, while some open completely separate sites. Very inconsistent.
16	Users can easily get back to the homepage or a relevant start point.	Good	Depending on which link you click, it could take you to a completely separate website, where there are links to the home page but they are not always clear.
17	A clear and well structure site map or index is provided (where necessary).	Moderate	Some links open sub site of the main website, while some open completely separate sites. Very inconsistent. This does not allow for the structure site map or index.

Search

#	Question	Rating	Comment
18	A consitent, easy to find and easy to use search function is available throughout (where desirable).	Excellent	Self explanatory.
19	The search interface is appropriate to meet user goals (e.g. multi-parameter, prioritised results, filtering search results).	Very poor	The search function DOES NOT WORK in many cases.
20	The search facility deals well with common searchs (e.g. showing most popular results), misspellings and abbreviations.	Very poor	No "common searches" feature. No misspelling feature.
21	Search results are relevant, comprehensive, precise, and well displayed.	Poor	Search function does not work in most cases. But when it does, it is well displayed.

Control & feedback

#	Question	Rating	Comment
22	Prompt and appropriate feedback is given (e.g. following a successful or unsuccessful action).	Excellent	Self explanatory.
23	Users can easily undo, go back and change or cancel actions; or are at least given the chance to confirm an action before commiting (e.g. before placing an order).	N/A	Self explanatory.
24	Users can easily give feedback (e.g. via email or an online feedback / contact us form).	Excellent	Self explanatory.

	Forms			
25	Complex forms and processes are broken up into readily understood steps and sections. Where a process is used a progress indicator is present with clear numbers or named stages.	N/A		Self explanatory.
26	A minimal amount of information is requested and where required justification is given for asking for information (e.g. date of birth, telephone number).	N/A		Self explanatory.
27	Required and optional form fields are clearly indicated.	N/A		Self explanatory.
28	Appropriate input fields (e.g. calendar for date selection, drop down for selection) are used and required formats are indicated.	N/A		Self explanatory.
29	Help and instructions (e.g. examples, information required) are provided where necessary.	N/A		Self explanatory.
	Errors			
30	Errors are clear, easily identifiable and appear in appropriate location (e.g. adjacent to data entry field, adjacent to form, etc.).	N/A		
31	Error messages are concise, written in easy to understand language and describe what's occurred and what action is necessary.	N/A		
32	Common user errors (e.g. missing fields, invalid formats, invalid selections) have been taken into consideration and where possible prevented.	N/A		
33	Users are able to easily recover (i.e. not have to start again) from errors.	N/A		
	Content & text			
34	Content available (e.g. text, images, video) is appropriate and sufficiently relevant, and detailed to meet user goals.	Good		Some information is not directly relevant.
35	Links to other useful and relevant content (e.g. related pages or external websites) are available and shown in context.	Moderate		Some information is not directly relevant.
36	Language, terminology and tone used is appropriate and readily understood by the target audience.	Excellent		Self explanatory.
37	Terms, language and tone used are consitent (e.g. the same term is used throughout).	Excellent		Self explanatory.
38	Text and content is legible and scanable, with good typography and visual contrast.	Excellent		Self explanatory.
	Help			
39	Online help is provided and is suitable for the user base (e.g. is written in easy to understand langugage and only uses recognised terms). Where appropriate contextual help is provided.	N/A		
40	Online help is concise, easy to read and written in easy to understand language.	N/A		
41	Accessing online help does not impede users (i.e. they can can resume work where they left off after accessing help).	N/A		
42	Users can easily get further help (e.g. telephone or email address).	Excellent		Information is clearly provided to email or call.

Performance				
43	Site or application performance doesn't inhibit the user experience (e.g. slow page downloads, long delays).	Excellent		No delays. Everything is snappy.
44	Errors and reliabilty issues don't inhibit the user experience.	Moderate		Search function is not reliable.
45	Possible user configurations (e.g. browsers, resolutions, computer specs) are supported.	Excellent		Self explanatory.
Overall usability score (out of 100) *		85	-	Good

6.2   Cognitive Walk-through

Complete list of actions required for task 1:
1.   Click the "Community" tab at the top of the page on the menu bar
      a.   Will the user know the next step?
            i.   No
      b.   Will the user see the control?
            i.   Yes
      c.   Will the user understand the control?
            i.   Yes
      d.   If the correct action is performed, will the user see that progress is being made toward solution of the task?
            i.   Yes
2.   Click the "Tours" link
      a.   Will the user know the next step?
            i.   No
      b.   Will the user see the control?
            i.   Yes
      c.   Will the user understand the control?
            i.   Yes
      d.   If the correct action is performed, will the user see that progress is being made toward solution of the task?
            i.   Yes
3.   Scroll to the bottom of the page and locate the tours phone number
      a.   Will the user know the next step?
            i.   Yes
      b.   Will the user see the control?
            i.   Yes
      c.   Will the user understand the control?
            i.   Yes
      d.   If the correct action is performed, will the user see that progress is being made toward solution of the task?
            i.   Yes

Complete list of actions required for task 2:

1. Click the "About" tab at the top of the page on the menu bar
   a. Will the user know the next step?
      i. No
   b. Will the user see the control?
      i. Yes
   c. Will the user understand the control?
      i. Yes
   d. If the correct action is performed, will the user see that progress is being made toward solution of the task?
      i. Yes
2. Click the "Visiting" link
   a. Will the user know the next step?
      i. No
   b. Will the user see the control?
      i. Yes
   c. Will the user understand the control?
      i. Yes
   d. If the correct action is performed, will the user see that progress is being made toward solution of the task?
      i. Yes
3. Click the "Restricted Items" tab at the bottom of the page
   a. Will the user know the next step?
      i. Yes
   b. Will the user see the control?
      i. Yes
   c. Will the user understand the control?
      i. Yes
   d. If the correct action is performed, will the user see that progress is being made toward solution of the task?
      i. Yes
4. Locate the list of restricted items
   a. Will the user know the next step?
      i. Yes
   b. Will the user see the control?
      i. Yes
   c. Will the user understand the control?
      i. Yes
   d. If the correct action is performed, will the user see that progress is being made toward solution of the task?
      i. Yes

Complete list of actions required for task 3:
1. Scroll to the very bottom of the website
   a. Will the user know the next step?

            i. Yes
        b. Will the user see the control?
            i. Yes
        c. Will the user understand the control?
            i. Yes
        d. If the correct action is performed, will the user see that progress is being made toward solution of the task?
            i. Yes
    2. Click the desired social media platform
        a. Will the user know the next step?
            i. Yes
        b. Will the user see the control?
            i. Yes
        c. Will the user understand the control?
            i. Yes
        d. If the correct action is performed, will the user see that progress is being made toward solution of the task?
            i. Yes

Complete list of actions required for task 4:
    1. Click the "Careers" tab at the top of the website on the menu bar
        a. Will the user know the next step?
            i. No
        b. Will the user see the control?
            i. Yes
        c. Will the user understand the control?
            i. Yes
        d. If the correct action is performed, will the user see that progress is being made toward solution of the task?
            i. Yes
    2. Click the "Interns" link
        a. Will the user know the next step?
            i. Yes
        b. Will the user see the control?
            i. Yes
        c. Will the user understand the control?
            i. Yes
        d. If the correct action is performed, will the user see that progress is being made toward solution of the task?
            i. Yes

Recommendation: Due to some ambiguity as to which link is the correct link to successfully progress in the task, I recommend combining subpages that hold very similar information (which is very prevalent here).

6.3   New GUI snapshots

Homepage (broken into separate images so the full page is shown)

"Search Opportunities" subpage
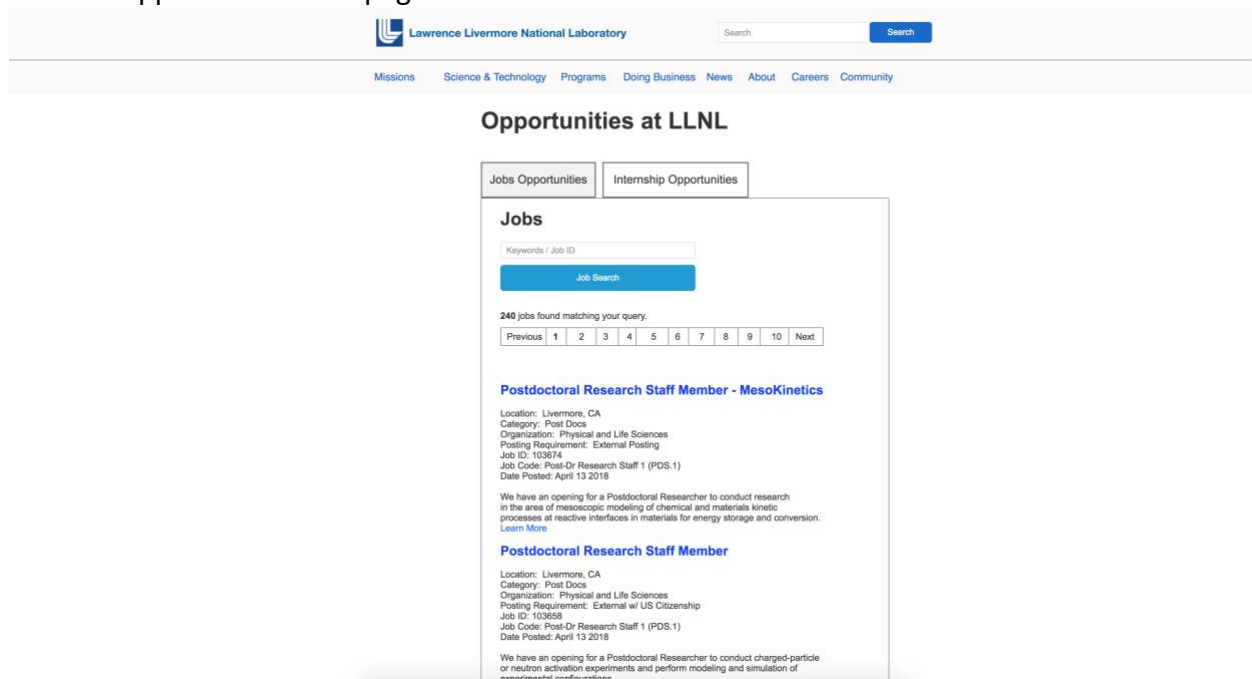
"Visiting" subpage (broken into separate images so the full page is shown)

6.4   Instructions for participants

Once you complete each of the following tasks, please return to the home page by clicking the banner at the top of the website.

1. Find the phone number that you must call in order to schedule a tour of the laboratory.
    a. 925-_____-_____
2. Find the list of restricted items that are not allowed in the laboratory with you when you are visiting or touring.
    a. _____
    b. _____
    c. _____
    d. _____
    e. _____
    f. _____
    g. _____
    h. _____
    i. _____
    j. _____
    k. _____
    l. _____
    m. _____
    n. _____
3. Find the links to the LLNL social media accounts.
4. Find the search field for internship opportunities at LLNL.

6.5   Researcher guidelines

Prior to the experiment

Thank you for participating. This experiment is intended to compare the time it takes for users to find information on an existing website and the time it takes users to find information on a modified version of that website which I created.

There are three parts to this process. For the first part, you will be asked to fill out a simple background questionnaire about your experience level with a few things. For the second part, you will be asked to find 4 things on a website. The final part of this process will involve another questionnaire in which you will be asked to provide feedback on the website.

While you interact with the website, they screen will be recorded so that I can document statistics about how fast it took you to find various information. This recording will promptly be deleted once I am completely done with the project. You will be kept anonymous and all of your answers will be kept confidential.

Do you have any questions?

Background questionnaire

The purpose of this questionnaire is so that I can understand your level of expertise with computers and the LLNL website. This will be helpful in comparing the results of those who are experts with computers and those who are not. Please answer the questions in order.

Do you have any questions?

Experiment

The sheet in front of you has a list of tasks to complete. Please complete them in order. Once you complete a task, fill in the blank if there is a blank for the task, return to the homepage, and proceed onto the next task. If you have a question during the experiment, let me know so I can clarify. Once you have completed all the tasks, let me know so I can give you the final part of this process.

After experiment

Thank you for completing the tasks. The last part of this process is for you to complete a feedback survey. Please be honest with your responses. Thank you for participating.

6.6   Background questionnaire

1. Roughly how many times have you ever visited www.llnl.gov?
    a. 0-10 times
    b. 10-25 times
    c. 25+ times
2. You are familiar with using a MacBook trackpad.
    a. Strongly agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly disagree
3. You are familiar with navigating websites.
    a. Strongly agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly disagree

6.7   Post-session questionnaire

1. The website is easy to use
    a. Strongly agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly disagree
2. I found everything that I was looking for easily
    a. Strongly agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly disagree

3. I found everything that I was looking for quickly
    a. Strongly agree
    b. Agree

  c. Neutral

  d. Disagree

  e. *Strongly disagree*

4. *The website was cluttered*
   a. *Strongly agree*
   b. *Agree*
   c. *Neutral*
   d. *Disagree*
   e. *Strongly disagree*

5. *The website was frustrating*
   a. *Strongly agree*
   b. *Agree*
   c. *Neutral*
   d. *Disagree*
   e. *Strongly disagree*

6. *The website was easy to navigate*
   a. *Strongly agree*
   b. *Agree*
   c. *Neutral*
   d. *Disagree*
   e. *Strongly disagree*

6.8 Participant videos

- Original
  - https://www.youtube.com/watch?v=xp50y11kFpw&index=3&list=PLmCEGCjAqdxIoYszToZ9LyQo5Y5A4bFS-&t=0s
  - https://www.youtube.com/watch?v=YXiia29ti9U&index=4&list=PLmCEGCjAqdxIoYszToZ9LyQo5Y5A4bFS-&t=0s
  - https://www.youtube.com/watch?v=DADwhDpl_bM&index=5&list=PLmCEGCjAqdxIoYszToZ9LyQo5Y5A4bFS-&t=0s
  - https://www.youtube.com/watch?v=XzhafKFHNJ4&index=6&list=PLmCEGCjAqdxIoYszToZ9LyQo5Y5A4bFS-&t=0s
  - https://www.youtube.com/watch?v=NSZ0flFPpT0&index=8&list=PLmCEGCjAqdxIoYszToZ9LyQo5Y5A4bFS-&t=0s
- Redesign
  - https://www.youtube.com/watch?v=e6ZS5tMQPOc&index=1&list=PLmCEGCjAqdxIoYszToZ9LyQo5Y5A4bFS-&t=0s
  - https://www.youtube.com/watch?v=wjbUMUL-ndI&index=2&list=PLmCEGCjAqdxIoYszToZ9LyQo5Y5A4bFS-&t=0s
  - https://www.youtube.com/watch?v=1_ypKMtHcuA&index=7&list=PLmCEGCjAqdxIoYszToZ9LyQo5Y5A4bFS-&t=0s

- o https://www.youtube.com/watch?v=pMnHg1U3_7A&index=9&list=PLmCEGCjAqdxIoYszToZ9LyQo5Y5A4bFS-&t=0s
- o https://www.youtube.com/watch?v=XvFv75dizEk&index=10&list=PLmCEGCjAqdxIoYszToZ9LyQo5Y5A4bFS-&t=0s

6.9 Axure Share Link
- Redesigned website: https://zm03s2.axshare.com/home.html
  - o Original website: https://www.llnl.gov/