

# Data Science *for the* Public Good

IOWA STATE UNIVERSITY

**Implementation Guide**  
**Spring-Summer 2020**



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## DSPG@ISU 2020 Overview

Planning for the DSPG@ISU 2020 program implementation began in 2018, with summer 2020 specific planning occurring from January 2020 through the end of the program in August 2020. This guide outlines the activities, strategies, and tools used by the DSPG@ISU leadership team to implement the program. This guide also includes resources and recommendations for program implementation for DSPG@ISU 2021.

## Leadership Team

The DSPG@ISU leadership team includes Iowa program directors Dr. Cass Dorius, Dr. Chris Seeger, and Dr. Shawn Dorius. This team also includes curriculum team members Dr. Heike Hofman, Dr. Adisak Sukul, and Todd Abraham. All members of the leadership team participated in program preparation, curriculum development, was the lead supervisor of a DSPG summer project, and collaborated across project teams across the summer. Please review their bios below:

### Iowa Program Directors:



Dr. Cass Dorius is an Associate Professor at Iowa State University in the Department of Human Development and Family Studies. She earned her Ph.D. in Sociology and Demography from the Pennsylvania State University and was a postdoctoral fellow at the University of Michigan. Her research on vulnerable families investigates how relationships and childbearing experiences shape the unequal distribution of social and economic resources within and between generations. She translates her scholarship into practice through a broad range of state and national collaborations centered on Evidence-Based Policy Making. In coordination with Early Childhood Iowa stakeholders from Iowa's Departments of Education, Health, Human Services, Management, Workforce Development, and Human Rights, she helped develop an integrated administrative data system for the state of Iowa designed to advance policies that improve the lives of vulnerable children and their families. In partnership with the Department of Public Health, she has worked to advance substance use recovery resources in the state. Dr. Dorius serves on numerous state and university boards focused on data quality, community outreach, and evidence-based policy-making.



Christopher J. Seeger, PLA, GISP is a Professor and Extension Specialist at Iowa State University. Trained as a landscape architect focusing on spatial and community data, he has integrated his interests of geospatial technologies, collaborative design technologies, crowdsourcing (Public Participation GIS and Volunteered Geographic Information) and data visualization to develop local and current datasets that can be used as indicators in the community planning, design, and decision-making processes. His current research includes the utilization of crowdsourcing technologies to document and model the built environment to create healthy, sustainable communities that include multimodal transportation systems and environments/programs that promote healthy lifestyles. In addition to this research, Professor Seeger leads the development of the ISU Extension and Outreach Indicators Program. This program aims to provide community demographic, health, transportation, and other economic data resources to the public and local decision-makers. Seeger teaches courses in GIS and Web Mapping. He is a licensed landscape architect, certified GIS professional and increasingly finds himself wearing the hat of a spatial data scientist.



Dr. Shawn Dorius is an Associate Professor of Sociology at Iowa State University, teaching courses in demography, international development, research methods, and community sociology. He earned his Bachelor of Science and Master's in Sociology from Brigham Young University and his Ph.D. in Sociology and Demography from Pennsylvania State University. He completed a postdoctoral scholar position with the Population Studies Center at the University of Michigan. He was a research associate with the Survey Research Center in the Institute for Social Research. His research interests include social demography, community well-being, computational social science methods, and comparative attitudes towards China. In addition, he is currently interested in studying the landscape of substance use in Iowa and working with The Substance Abuse Bureau of the Iowa Department of Public Health to evaluate substance use recovery networks across the state and country.

## Iowa Curriculum Team:



Todd Abraham is the Assistant Director of Data & Analytics for the Iowa Integrated Data System housed in the Department of Human Development and Family Studies at Iowa State University. His research focuses on the interplay between individual differences, personal life event experiences, and contextual/environmental factors that influence psychological and physical well-being. Within the Data Science for the Public Good Young Scholars Program, he brings expertise in areas related to data ingestion that include assessment of data quality, data cleaning strategies, and linkage methods. Todd's interest in participating in a program specifically centered on the public good stems from his career-long aspirations to assist in the rapid transformation and dissemination of existing data into actionable information for successful use by agencies, policy makers, and citizens to improve the lives of individuals and families within their communities.



Heike Hofmann is Professor of Statistics and Interim Professor in Charge of the Data Science Program at Iowa State University. Dr. Hofmann is an internationally recognized expert on data visualization. Her research on visual inference provides a framework to evaluate the statistical significance of a graphical finding, thereby establishing a p-value for a chart. Some of her most recent work is as part of the Center for Statistics and Applications for Forensic Evidence, where her focus is on techniques for matching striae on bullet lands. She has been a key contributor to the work that received the ASA SPAIG (Statistical Partnerships Among Academe, Industry, and Government) award in 2018. She is an elected Fellow of the American Statistical Association.

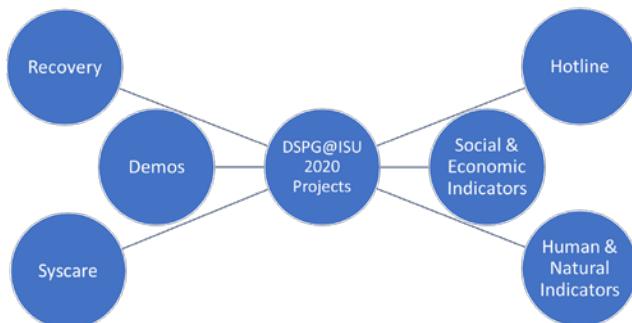


Adisak Sukul is an Associate Teaching Professor in the Department of Computer Science at Iowa State University. Dr. Sukul teaching Computer Science and Data Science courses. His research includes Data Science, Machine Learning, Deep Learning for Computer Vision, and Text. His skills in python, scikit-learn, TensorFlow, and Cloud Computing. He is working on a Big Data research project which collects ad data from Youtube, then creates an end-to-end data project pipeline by analyzes the pattern and classifies and visualizes it on the dashboard. Dr. Sukul has selected as a member of the Google Cloud Faculty Expert team.

## DSPG@ISU 2020 Summer Projects

DSPG@ISU 2020 projects began with recruitment of community projects. In response to COVID-19, the projects shifted from community based to departmental based projects with the Iowa Department of Public Health and Iowa State's Community Extension and Outreach. This transition occurred in response to feedback that communities were in crisis related to COVID-19 response and that this may impact community's ability to fully participate in the summer project experience. As a result, DSPG@ISU started with 6 summer projects that merged into 4 final products. These final products are listed at the top of the next page.

*Figure 1: DSPG@ISU summer projects:*



**Title:** Expand the Iowa State University Extension Community Helpline Services Across the State

**Final Product:** <https://dsgptools.shinyapps.io/dspg20helpline/?type=economic>

**Project Leaders:** Adisak Sukul & Shawn Dorius

**Stakeholders:** Iowa State Community Extension & Outreach

Iowa State University's Extension and Outreach program provides resources for communities, businesses, and nonprofits through six help and support hotlines: Iowa Concern, Teen Line, Beginning Farmer Center, Iowa 2-1-1, AnswerLine, Iowa Healthy Families, and Hortline. These hotlines let Iowa residents directly contact scientific and educational staff, and access resources. Hotline use has increased dramatically with the onset of COVID-19 and hotline staff have difficulty meeting demand. Iowa State University Extension professionals and university researchers are working with hotline managers to understand the hotline system architecture and uses of the hotline data to develop data-science tools to capture customer service, monitor success, and auto-generate reports. This will allow hotline workers to spend more time helping citizens and less time filling out paperwork.

**Title:** Identify Communities in Greatest Need of Excessive Alcohol-Prevention Efforts

**Final Product:** <https://dsgptools.shinyapps.io/dspg20alcohol/?type=economic>

**Project Leaders:** Chris Seeger & Shawn Dorius

**Stakeholders:** Iowa Department of Public Health

Iowa ranks in the top 10 among U.S. states for binge drinking. The economic costs of alcohol drinking are estimated to be almost \$2 billion per year or \$635 per person in Iowa. The Substance Abuse Bureau of the Iowa Department of Public Health wants to understand who is at risk for excessive alcohol use and where they reside in the state so it can better target intervention dollars to reduce high-risk alcohol use. Iowa State University Extension professionals and researchers are developing interactive maps and analytic tools to identify where additional prevention resources are needed to manage alcohol-related problems.

**Title:** Pilot 'Systems of Care' Data Infrastructure to Inform a Health Information Platform

**Final Product:** [https://dsgptools.shinyapps.io/dspg20systems\\_of\\_care/?type=economic](https://dsgptools.shinyapps.io/dspg20systems_of_care/?type=economic)

**Project Leaders:** Shawn Dorius, Heike Hofman, & Cass Dorius

**Stakeholders:** Iowa Department of Public Health

In Iowa, state agencies often develop programs and policies within institutional silos, making it difficult to support "whole person" and "whole community" responses to problems. To combat this, the state created the Iowa Linkage to Care Advisory Board with representatives from public health, the justice system, higher education, the Substance Abuse and Mental Health Administration, workforce development, and economic development. Iowa State University Extension professionals and university researchers are developing interactive data tools and insights to improve public awareness of available resources. These tools will inform the board's ongoing work to develop a health information platform, with specific focus to the substance use recovery infrastructure in Iowa.

**Title:** Develop a Community Capitals Data Infrastructure to Support Community Economic Mobility

**Final Product:** <https://dsgp-isu.shinyapps.io/community-capitals/> &

<https://datascienceforthepublicgood.org/economic-mobility/community-insights/em-data-infrastructure>

**Project Leaders:** Cass Dorius & Todd Abraham

**Stakeholders:** Iowa State Community Extension & Outreach

Iowa's Extension and Outreach leadership identified the need for a statewide community data infrastructure to support precision funding and targeted education in response to COVID-19. This project utilized the Community Capitals Framework to identify, collect, and spatially map county-level indicators of human, financial, natural, and social assets related to upward economic mobility. Interactive data tools were designed to support Extension leadership in identifying and monitoring the impact of COVID-19 on rural community recovery. Dashboards are intended to be paired with CES administrative files, so leaders can visually identify opportunities to more effectively match resource/programming supports with community needs.

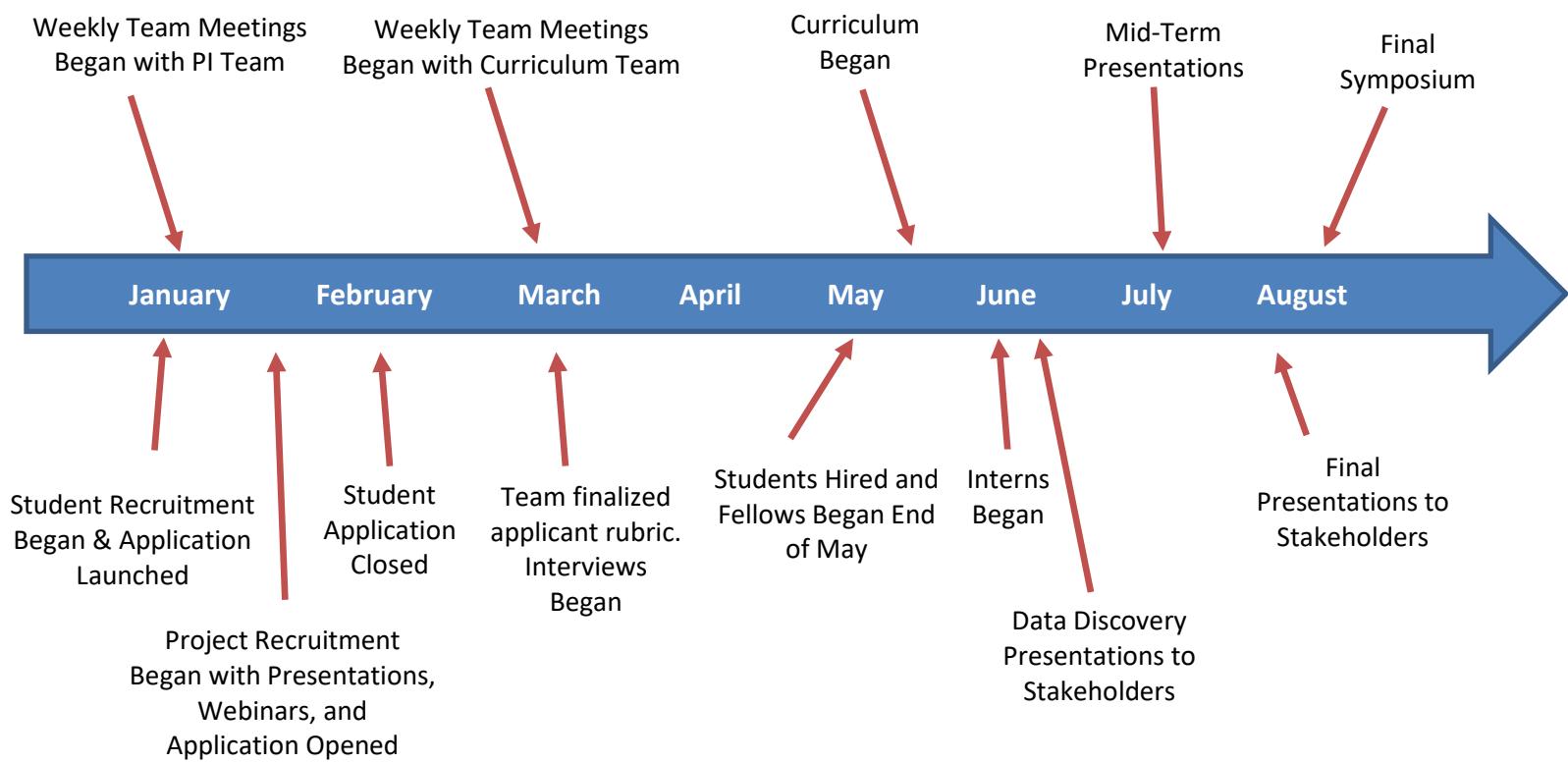
# Timeline

## Overview

Figure 2 below is a high-level overview of the timeline of the DSPG 2020 summer program. Largely, student, project, faculty, and staff recruitment began in January 2020 and ended in April 2020. Curriculum and program development occurred between January 2020 and June 2020, with curriculum beginning at the end of May for DSPG Fellows and the beginning of June for DSPG Interns. Please click on the links below to navigate to some of the materials developed during this time. A more detailed description and timeline of activities related to student recruitment activities, project recruitment activities, and program development activities can be found in the following pages.

- [Student Application](#)
- [Presentation to Extension Specialists](#)
- [Webinar for Project Application](#)
- [Project Application](#)
- [Student Interview Questions](#)
- [Student Rubric](#)
- [Team Selection Form](#)
- [Project Selection Form](#)
- [Weekly Wrap Up Form](#)
- [Learning Contract for Fellows](#)
- [Learning Contract for Interns](#)
- [Data Use Agreement](#)
- [Communication Platform Access](#)
- [Preferences for Communication](#)

Figure 2: DSPG 2020 Timeline



## Detailed Timeline: January & February

	<b>Student Recruitment Activities</b>	<b>Project Recruitment Activities</b>	<b>Program Development Activities</b>
January 2020	<ul style="list-style-type: none"> <li>• PI team began speaking with students in their classes and disseminating flyers within departments</li> <li>• Team drafted, finalized, and launched <a href="#">student application</a></li> </ul>	<ul style="list-style-type: none"> <li>• PI team met with CES leadership</li> <li>• <a href="#">PI team presented to CES professionals during CES staff development day</a></li> <li>• Iowa League of Cities attended meeting to share community selection strategies for pilot DSPG program</li> </ul>	<ul style="list-style-type: none"> <li>• PI team began meeting weekly to discuss curriculum, summer scheduling, recruitment, as well as roles &amp; responsibilities of team members</li> <li>• Project manager (PM) and communications intern onboarded to team</li> <li>• Communications intern tasked with flyer design and developing contact lists for student requirement</li> <li>• CES undergraduate research assistants (X2) and CES staff (X3) continued on task sheet development</li> <li>• PIs and PM participated in monthly three state meetings</li> <li>• PIs and PM participated in monthly meetings with Advisory Team</li> <li>• PI and PM participated in weekly evaluation meeting</li> <li>• Website 1.0 launched: <a href="https://dspg.iastate.edu/">https://dspg.iastate.edu/</a></li> </ul>
February 2020	<ul style="list-style-type: none"> <li>• Student recruitment emails sent to department heads and leadership within ISU, University of Iowa, and University of Northern Iowa, as well as students that had applied for DSPG staff positions, Leader of ISU Data Science Club, and all students that had contacted <a href="mailto:DSPG2020@iastate.edu">DSPG2020@iastate.edu</a> account with questions or comments from flyers/websites</li> <li>• Reviewed student recruitment rubrics from other universities and updated for ISU</li> <li>• Finalized student recruitment rubric and strategy to review applications</li> <li>• Applications closed 2/29</li> </ul>	<ul style="list-style-type: none"> <li>• Extension leader and League of Cities representative attended weekly PI team to recommend projects</li> <li>• Team drafted, finalized, and launched <a href="#">project application</a></li> <li>• PI team contacted projects decided by team</li> <li>• <a href="#">Cass led and recorded webinar of how to fill out community project application for extension specialists. Recording was launched to website</a></li> <li>• Team drafted and finalized CES engagement strategy</li> <li>• Finalized project recruitment rubric and strategy to review applications</li> </ul>	<ul style="list-style-type: none"> <li>• Curriculum team member recruitment confirmed</li> <li>• Launched Website 2.0</li> <li>• Purchased DSPG pens with logo, pamphlets, poster, and presentation for Day at the Capital event</li> <li>• Prepped for Media releases</li> <li>• Draft of national evaluation strategy shared with ISU PI team</li> <li>• Prepped materials local events</li> <li>• Developed curriculum and software preferences</li> </ul>

## Detailed Timeline: March & April

	<b>Student Recruitment Activities</b>	<b>Project Recruitment Activities</b>	<b>Program Development Activities</b>
March 2020	<ul style="list-style-type: none"> <li>• Student interviews completed</li> <li>• Student recruitment strategy shifted to UVA hiring ISU students due to COVID-19</li> <li>• ISU identified students to hire based on student rubric, compiled packet of applications, and sent to UVA to approve and hire students</li> </ul>	<ul style="list-style-type: none"> <li>• Project application advertised via extension newsletter, webinar, and extension staff meeting.</li> <li>• Project recruitment shifted from community projects to departmental projects due to COVID-19</li> </ul>	<ul style="list-style-type: none"> <li>• Attended 'Day at Capital' event to advertise DSPG program to community and legislators.</li> <li>• Weekly meetings began with curriculum team. Team actively reviewed and adjusted curriculum schedule specific for ISU</li> <li>• CLD3 process introduced to curriculum team</li> <li>• All activities transitioned to Zoom due to COVID-19</li> <li>• ISU moved programming virtual through summer session I</li> <li>• Curriculum shifted to national curriculum implementation due to COVID-19</li> <li>• ISU sent curriculum draft to UVA</li> </ul>
April 2020	<ul style="list-style-type: none"> <li>• ISU students finalized from ISU and UVA</li> <li>• CPT process for international students began</li> </ul>	<ul style="list-style-type: none"> <li>• IDPH projects established around substance abuse bureau/substance use and recovery topics</li> <li>• PI team met with CES to brainstorm development of CES projects</li> <li>• Project development occurred during weekly leadership and curriculum meetings.</li> </ul>	<ul style="list-style-type: none"> <li>• Survey sent to potential students to assess availability of computers/machines</li> <li>• Hired GRA support for labs/project support</li> <li>• Submitted faculty summer pay</li> <li>• Faculty program responsibilities assigned (faculty assigned to be national representatives for infrastructure support, curriculum, administration and locally for project lead and R support)</li> <li>• Team reviewed tools for virtual learning (data camp, Moodle, google classroom, YouTube, canvas)</li> <li>• Best practices for virtual learning discussed including providing materials asynchronous, providing videos of 8-10 minutes, adding quizzes, and establishing times for connection.</li> </ul>

## Detailed Timeline: May & June

	<b>Student Recruitment Activities</b>	<b>Project Recruitment Activities</b>	<b>Program Development Activities</b>
May 2020	<ul style="list-style-type: none"> <li>• Hiring started via UVA</li> <li>• 3 Fellows onboarded to summer program at end of May</li> </ul>	<ul style="list-style-type: none"> <li>• IDPH and CES projects introduced to staff/faculty team</li> <li>• Leadership team finalized project outlines, presentations, and received sponsor approval</li> <li>• Curriculum and leadership team assigned staff/faculty leadership and co-leadership to each project</li> <li>• Each staff/faculty leader presented project overview to Fellows</li> <li>• </li> </ul>	<ul style="list-style-type: none"> <li>• DataCamp tutorial provided to leadership and curriculum team</li> <li>• Team confirmed use Slack and launched group for team communication</li> <li>• Team began to login/problem solve accounts associated with UVA infrastructure</li> <li>• Curriculum/Leadership team reviewed CLD3 process</li> <li>• Curriculum team developed and sent assigned topic outline and learning objectives to UVA</li> <li>• Evaluation materials approved by national team</li> <li>• Contact assigned to monitor Git</li> <li>• Fellows began infrastructure training and curriculum</li> <li>• Scheduling began by following UVA calendar and creating weekly syllabus</li> <li>• CES undergraduate research assistants (X2) ended work as UGA</li> <li>• <a href="#"><u>Finalized weekly wrap-up form for students</u></a></li> </ul>
June 2020	<ul style="list-style-type: none"> <li>• 9 Interns onboarded to summer program</li> </ul>	<ul style="list-style-type: none"> <li>• Each Fellow presented project overview to interns</li> <li>• Leadership team matched students with projects based on</li> <li>• Students, staff, and faculty began team meetings (twice per week for each project)</li> <li>• Students met sponsors for the first time and began Data Discovery sessions</li> </ul>	<ul style="list-style-type: none"> <li>• Interns began infrastructure training and curriculum</li> <li>• Scheduling transitioned to inviting individual students/faculty to DSPG 2020 calendar events</li> <li>• Survey sent to program members to assess communication preferences</li> <li>• Coffee Check-ins and Weekly wrap up meetings began.</li> <li>• ISU staff restructuring curriculum to fit students needs</li> <li>• PM &amp; R support met weekly with Leadership to discuss scheduling, lab attendance, and team needs</li> </ul>

## Detailed Timeline: July & August

	<b>Project Recruitment Activities</b>	<b>Program Development Activities</b>
July 2020	<ul style="list-style-type: none"><li>• Project curriculum starts to slow down and students transition to more project work</li><li>• Recovery/Syscare and Indicators teams collapsed projects-reducing the number of total projects from 6 to 4.</li></ul>	<ul style="list-style-type: none"><li>• DSPG leadership connected with students for individual 30-minute check ins</li><li>• Team began additional team building activities such as movie nights, care packages, etc</li><li>• Team started to explore licenses (Git, google, Shiny) and copy rights related to final datasets</li><li>• Details related to final symposium materials shared with team</li><li>• Recovery/Syscare and Indicators teams collapsed projects-reducing the number of total projectss from 6 to 4.</li></ul>
August 2020	<ul style="list-style-type: none"><li>• Final projects presented to stakeholders during series of presentations and work shops</li></ul>	<ul style="list-style-type: none"><li>• Final projects presented in end of summer national symposium</li></ul>

# Description of Weekly Program Structure & Activities

Below is a brief description of activities included in the summer 2020 program, along with an example of how a normal week was scheduled. All meetings were held over zoom on varying channels.

Table 1: Example Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
9am	Coffee Check-In Team A Meeting	Coffee Check-In Team B Meeting	Coffee Check-In Team A Meeting	Coffee Check-In Team B Meeting GRA Meeting	Coffee Check-In Faculty Meeting
10am	National Training	National Training	National Training	National Training	National Training
11am	National Training	National Training	Brownbag Lecture	National Training	National Training
12pm	National Training	National Training	National Training	National Training	National Training
1pm	National Training	National Training	National Training	National Training	National Training
2pm	R Lab	R Lab	National Training	R Lab	R Lab
3pm	R Lab	R Lab	R Lab	R Lab	R Lab
4pm			R Lab		Weekly Wrap Up

## Coffee Check In:

Coffee check-in was scheduled from 9am-9:15am Monday through Friday throughout the entirety of the summer program. This time block was required for students to attend and was led by the Data Science for the Public Good leadership team. The curriculum staff and program staff were optional attendees, although most of the curriculum team attended coffee check-in daily. Coffee check-in was used as a time to review the schedule of the day, ask clarifying questions about the program or projects, and to build relationships as a group. This was also a time leadership and the curriculum team solicited feedback from students and clarified program deliverables, as coffee check-in overlapped with the weekly leadership and curriculum team on Friday mornings.

## Wrap Up & Report Back:

Wrap up & Report Back was scheduled on Fridays from 4pm-5pm. This was a time for Fellows to present their teams' findings, progress, and barriers for the week. Team members prepped for the meeting by completing [weekly wrap up forms](#) in which they reported the tasks they completed individually, reported feedback they received, and recorded issues related to code. This meeting was attended by all members of the Data Science for the Public Good summer program. Team leadership provided updates related to any stakeholder meetings. Program staff also delivered updates and reported progress from technical lab times during the week and any administrative needs related to project management.

## **Team Meetings:**

Data Science for the Public Good students worked on an A team (Community Extension Services projects) and B team (Iowa Department of Public Health projects). A teams met on Monday and Wednesdays from 9:15am-10am within their different project groups (X3) and B teams met on Tuesday and Thursdays from 9:15am-10am within their different project groups (X3). Team meetings included the project's 3 interns, 1 fellow, and 1 curriculum team leader. At times, program support team members and other faculty/staff joined the meetings when necessary. Also at times, teams met together to share data or consult on each other's projects.

## **Lab Hours:**

Lab hours were scheduled regularly throughout the week to help students trouble shoot code or questions related to R. The lab hours were facilitated by graduate student program support. Initially, R lab hours were scheduled in 1 to 4 hour blocks 1 to 4 times a week. As curriculum subsided, they were offered in 4-hour blocks 5 days a week. Graduate student support was also available via Slack to troubleshoot any questions that arose outside of lab hours. The Slack channel allowed for students to see each other's question sand review answers from program staff, curriculum team, and leadership team

## **Faculty Meeting:**

Faculty meetings included members from the leadership team, curriculum team, and project management support. These meetings were held on Fridays from 9am-10am. Students attended the first 15 minutes to provide feedback from the week. Students exited at 9:15 and the group discussed items related to program needs, team needs, curriculum feedback, and overall project needs.

## **Brownbag:**

Brownbag lectures occurred approximately once a week and were attended by Data Science for the Public Good interns and fellows from across Oregon, Virginia, and Iowa. Students and fellows were required to attend. It was optional for the program leadership, support, and curriculum team to attend. Topics of the summer of 2020 Brownbag series included Data Journalism, Visualization, Media Writing, Assessing Social Determinants of Health and Impact on Health Outcomes, Public Speaking and Media Training, Economic Mobility, Team Science, and an overview of Community Extension System. Brownbags were scheduled for 60-minute time blocks and intended to expose students to topics and trainings in short lectures that included the opportunity for Question and Answer

## **National Trainings:**

Due to the transition to online learning in response to COVID-19, the Data Science for the Public Good program decided to offer its program specific training nationally across the three states. As a result, the training was coordinated by The University of Virginia and scheduled in 1 to 4-hour blocks Monday through Friday. The training was scheduled more

## **GRA Meeting:**

The Principle Investigator of the project met with the program support graduate research assistants weekly to discuss scheduling, project assignments, and R lab needs. This meeting allowed program support and a member from DSPG leadership team to identify and problem solve needs related to student participation and project needs. Graduate research assistants also participated in live curriculum and monitored Slack for questions related to curriculum content and R Studio.

# Description of Program Presentations & Deliverables

## Data Discovery:

After Fellows and Interns were placed on their teams they participated in a National training to learn to facilitate Data Discovery Workshops with project stakeholders. Students prepared brief presentations related to their projects and presented them during

## Mid-Term Presentations:

Students presented mid-term presentations to the national Data Science for Public Good Program in the beginning of July. All teams across the three states gave a fifteen-minute presentation using the national teams mid-term presentation template.

## Final Presentations:

Student teams with active stakeholder engagement shared their final results during workshops and presentations during the first week of August.

## Final Symposium:

Each of the project teams prepared materials for a national website for the final symposium. The websites include brief text overviewing the project, a link to a dashboard that showcased the projects findings, and a short video that described the projects goals and findings. For a link to the 2020 symposium page click [here](#). To view the final project pages presented during the symposium, please scroll through the project pages [here](#). Please note, project teams also had an option to complete a poster to present during breakout room sessions during the final symposium. Iowa State did not choose to create posters but walked breakout room visitors through the data dashboards created by the teams.

# General Strengths, Challenges, & Recommendations

## Strengths:

DSPG leadership and curriculum team noted the below strengths related to implementation of the summer 2020 program at ISU:

- Small team structure worked well for some teams and allowed students to work across multiple team members
- Students shared positive feedback on training (specifically for ISU trainings)
- Students benefitted from local infrastructure (Slack, local R Studios, etc)
- Students benefitted from training that was 'chunked' with quizzes
- Work was meaningful
- Overall students enjoyed R and learning about the full data pipeline
- 10-week program allowed students to leave with products for their CV
- Program allowed other disciplines to apply
- Online training allowed flexible scheduling
- Coffee check ins allowed for team/faculty to build relationships
- Projects delivered on time and sponsors were happy with final items
- Students liked symposium speaker
- Faculty team was strong/supported each other
- Leadership was organized/positive
- Program support critical to project success

## Challenges:

DSPG leadership and curriculum team noted the below challenges related to implementation of the summer 2020 program:

- Not all training had 'hands on' exercises
- Not all students used DataCamp, R Lab, or asked for help
- Working across 2 teams was challenging for some students
- Summer was heavily scheduled
- Not all teams may have reported wrap-up/progress accurately
- Faculty felt disconnected from student's day to day work and were not always able to attend national trainings

## Recommendations:

DSPG leadership and curriculum team noted the below recommendations for 2021 programming:

- Students may benefit from hybrid model of virtual & in person learning
- Increase time for weekly faculty/team check ins
- Faculty/Staff should attend training if able
- Keep ISU training modules/curriculum
- Add 'sign ups' for R labs to track usage
- Teams may benefit from 2 intern/1 fellow composition
- Teams may benefit from more clearly defined roles/responsibilities
- Fellows and interns may benefit from more leadership training
- Teams may benefit from having earlier and multiple deadlines that allow opportunity for feedback or grading (such as due date for data acquisition, coding, preliminary analysis etc.)
- Consider using the dashboard or final product to structure deadlines
- Explore integrating Capstone projects or recruiting students from data science courses
- Future DSPG programs may benefit from participating in a Spring prep course or class
- Align projects and trainings more closely
- Students may benefit from observing faculty coding sessions and collaboration
- Final deliverable could have more flexibility (does not have to be a Shiny app)
- Consider more local trainings (potential to start local then join national-or only join national for Brownbags)
- Teams may benefit from differing deadlines between A projects/B projects

## Anticipated Costs

### Funding for DSPG 2020:

Funding for the DSPG 2020 program from ISU came from the *Big Data in Small Places: Building a Data Science for the Public Good Program to Support Rural Economic Mobility* sub-award from the University of Virginia's and the Bill and Melinda Gates Foundation. A project team was also sponsored from the Iowa Department of Public Health's *Advancing Substance Use Recovery in Iowa* award. The Iowa State undergraduate interns and graduate student fellows were paid for by The University of Virginia at the rate of \$6,000 for graduate students and \$5,000 for undergraduate students. In 2020, graduate students were paid an additional \$800 because they arrived 1 week earlier than undergraduate students.

Additional expenses for the summer program included payment of tuition, salary, and benefits for five graduate research assistants. Four graduate research assistants worked for the program at 20 hours/week and one for 15 hours/week. Two graduate research assistants provided statistical support to teams through the R lab, one graduate assistant provided training expertise in the area of computer science, one graduate research assistant provided administrative and program support, and one graduate research assistant supported one of the project teams. Funding for this project in the summer of 2020 also included one month of five faculty members, as well as

half of a month for a sixth faculty member. Materials, supplies, and software licenses were also purchased for the program and are detailed in the table below.

*Table 2: Costs of the DSPG 2020 Summer Program at ISU*

<b>DSPG Summer Program Costs</b>		<b>May-August</b>
<b>Salary &amp; Fringe</b>		\$ 106,460
Summer PI/Curriculum Team (PI X3 & Curriculum X3)		\$ 64,509
Summer GRA Team (4 GRA @ 20 hrs/week & 1 GRA @ 15hrs/week)		\$ 38,080
Summer UGA Communication Intern		\$ 3,871
<b>Student Stipend Costs (No IDC)</b>		\$ 63,000
<b>Other Direct Costs</b>		\$ 5,426
<b>Summer Tuition</b>		\$ 3,444
<b>Software/licenses</b>		\$ 1,051
Mentimeter License X 1		\$ 180
Smartsheet License X 1		\$ 323
Shiny License X 1		\$ 440
Zoom Licenses X6 (\$18/each)		\$ 108
<b>Promotional Items</b>		\$ 931
Student care packages for team building		\$ 599
Promotional pens for Day at the Capital		\$ 207
Promotional brochures for Day at the Capital		\$ 125
<b>Total Directs</b>	\$ 174,886	
<b>Total Modified</b>	\$ 108,442	
<b>Total Indirects (10%)</b>	\$ 10,844	
<b>Total</b>	\$ 185,730	

### Funding for DSPG 2021:

Funding for the DSPG 2021 program at Iowa State is available from the United States Department of Agriculture's FACT: Three State Network award. The spending for this plan is outlined below:

*Table 3: Allocated Funding for the DSPG 2021 Summer Program at ISU*

<b>DSPG Summer 2021 Available Funding</b>		<b>May-August</b>
<b>Salary &amp; Fringe</b>		\$ 11,790
1 Month of Summer Faculty Time		\$ 11,790
<b>Participant Support Costs</b>		\$ 60,600
Graduate Student Fellows (X3 @\$5200 each)		\$ 15,600
Undergraduate Student Interns (X9 @\$5000 each)		\$ 45,000
<b>Other Direct Costs</b>		\$ 890
Shiny License		\$ 440
Materials & Supplies (\$75/project)		\$ 450
<b>Total Directs</b>	\$ 73,280	
<b>Total Modified</b>	\$ 12,680	
<b>Total Indirect (53%)</b>	\$ 6,720	
<b>Total</b>	\$ 80,000	

The below table is a projection of anticipated costs per project. This estimation suggests one month of faculty time to supervise two summer projects, one graduate research assistant 20 hours/week for project management to support four summer projects, and two graduate research assistants 20 hours/week for support with computer science, statistics, or R across four summer projects. Please note that the projection for tuition and graduate research assistants may vary by college, degree sought, and the number of credits enrolled in for the summer of 2021.

*Table 4: Anticipated costs per DSPG 2021 Project at ISU*

<b>Estimated DSPG Summer 2021 Funding Breakdown Per Project</b>		<b>May-August</b>
<b>Salary &amp; Fringe</b>		<b>\$ 8,913</b>
.5 months of summer faculty	\$	6,365
.125 GRA project management (1 GRA @ 20 hours/week across 4 projects)	\$	850
.25 GRA computer science, statistics, or R support (2 GRAS @20hours/week across 4 projects)	\$	1,698
<b>Participant Support Costs</b>	<b>\$</b>	<b>10,100</b>
Graduate Student Fellows (X .5 @ \$5200 each)	\$	2,600
Undergraduate Student Interns (X 1.5 @\$5000 each)	\$	7,500
<b>Other Direct Costs</b>	<b>\$</b>	<b>1,434</b>
GRA Tuition (calculated for 3 masters students for summer 2021 across 4 projects)*	\$	1,106
Material & Supplies (\$75 per project)	\$	75
Zoom License (1 license per project @ \$18)	\$	18
Mentimeter License (1 license per 4 projects @ 180 per license)	\$	45
Smartsheet License (1 license per 4 projects @ 323 per license)	\$	81
Shiny License (1 license per 4 projects @ 440 per license)	\$	110
	<b>Total Directs</b>	<b>\$ 20,447</b>
	<b>Total Modified</b>	<b>\$ 8,913</b>
	<b>Total Indirect (53%)</b>	<b>\$ 4,724</b>
	<b>Total</b>	<b>\$ 25,171</b>
<i>*This may fluctuate depending on the number of credits and degree level of summer GRAs</i>		