Title

Geospatial Opportunities: From Humanitarian Work to the UCs & Bhutan

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UC GIS Week
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1 PM - 2:30 PM
Geospatial Opportunities: From Humanitarian Work to the UCs & Bhutan

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Well, hello, welcome everyone and happy GIS day. And we are right in the middle of GIS day and we're right in the middle of UC GIS week. So hope everybody has enjoyed the sessions that they've attended so far. We've got another great session for you this afternoon. It's geospatial opportunities from humanitarian work to the UCs and Bhutan.

So this session is being recorded. The recording will be available at some point in the future. And if you've registered through Eventbrite, you'll get an email saying where you can find those recordings when they're available.

We have a Slack channel and if you haven't already joined that, it would be great if you want to join the conversation.

And today's session, we have a total of four presentations. It might go past two o'clock. We're scheduled to last until 2:30 if we need it, but chances are we will at least go past two o'clock.

You're welcome to ask questions. You can post them in the chat at any time. However, we are going to save time until the very end when people can ask questions of all the presenters at once. So just keep that in mind. We just want to make sure we give all of our presenters adequate time for their presentation.

So I think that is all the housekeeping.

We would like to start today with Liam Bhajan, who is going to speak to us about NASA Lifelines.

So Liam, when you're ready, the floor is yours.

NASA Lifelines Introduction

Speaker: Liam Bhajan - UC Davis

Abstract:

This talk will introduce NASA Lifelines - a recent initiative to bridge the gap between geospatial data and humanitarian action.

Transcript: Video Timestamp: 1:55

Sweet, okay, awesome. Thank you, Janet. Let me do the whole, let me share my screen, see if everyone can see it.

Okay, is that, did that look okay for everyone?

That's good. Okay, awesome.

Okay, hi everybody. My name is Liam Bhajan. I'm currently a PhD student at the University of California Davis. And I'm also a Data Series Fellow at the NASA Lifelines Initiative. And so today I'm super excited to introduce to you all what exactly NASA Lifelines is and the initiative that is supported by the Dev Global Team.

Launched in October, 2023, NASA Lifelines is a series of a community building experiments

designed to bring together humanitarian scientists, policymakers, frontline communities, and others to accelerate the use of satellite data and tools in support of the most vulnerable.

And so our mission is to build a community of the future using Earth science to improve humanitarian action by bringing together affected communities, humanitarians, scientists, and policymakers in mission-driven collaborations. NASA Lifelines will unlock the value of satellite data for humanitarian crises before, during, and after the event.

And so then why this specific mission? And so currently there's still significant unrealized potential for Earth science to help humanitarian save lives and reduce human suffering. Over 5,000 humanitarian organizations that are saving 362 million people are currently experiencing humanitarian emergencies around the world. Furthermore, only 1% of humanitarian aid budgets go towards innovation. However, there are over 500 humanitarian applications already powered by Earth science and a growing demand for satellite-derived data across sectors and geographies.

And so what needs to happen for humanitarians to use more with science? Here's what we sort of heard from the community.

Firstly, awareness building. While humanitarians acknowledge that satellite data and derived tools are valuable, most humanitarians don't know how to take advantage of it. Secondly,

access to expertise. Again, though humanitarians are willing to adopt new approaches, the access to technical expertise to use this data can be limited and not equitable across organizations.

Thirdly, humanitarians need fit-for-purpose Earth science. And what that means is that they need data tools and trainings that are catered specifically for the complex and fast-paced environments that arise during crises. And then lastly, humanitarians need data translators, funders, and community innovators across the diverse stakeholder ecosystem to scale their use of Earth science to maximize its benefits.

And so then on the other hand, what needs to happen for scientists to better support humanitarian needs?

Firstly, international, intentional network scientists,

intentional networking. Scientists want more time and opportunities to meet collaborators and interact with humanitarians in order to share and refine their work to be more impactful for their intended audience. They also need more funding opportunities to pursue innovative interdisciplinary humanitarian research and scale-proven interventions with their partners.

Additionally, scientists want opportunities to educate and also be educated. They can learn from humanitarian partners and also be their technical guides. Lastly, scientists want their work to have a societal impact, and humanitarian work can be a pathway to do that.

So what does that partnership between humanitarian and scientists actually look like? What it looks like is a community of the future that solves challenges together. Where humanitarians need access to expertise, scientists are also seeking ways to work with communities and build partnership. Where humanitarians need awareness building, scientists also want those opportunities to educate and share their work. So lastly, by tackling these challenges together, what we're saying is humanitarians and scientists can work together on solutions that will have sort of a broader impact on the world.

To achieve these goals, the Lifelines team have created 10 different programs to help increase the use and visibility of aid science data in the humanitarian sector.

These programs address this goal using different pathways, such as public engagement, creating networking events, and designing opportunities to give interested parties the ability to work with aid science data. And so for this presentation, I'll briefly mention four different programs and their recent achievements in this year. The Mural Contest, the Humanitarian Simulations, the Aid Science Review Board, and the Fellowship Program, which I'm a part of.

And so for the Mural Contest, Lifelines brought together local artists, community organization, and residents to creatively showcase how with science makes communities more resilient.

This makes aid science more accessible while highlighting the stories and voices of vulnerable communities that benefit from innovations. And so this year, final artists from five different US

cities were chosen and created their murals. And so in the next two slides, I'll highlight two of these examples.

For the Washington DC mural entitled Satellites of Hope in DC, artist Joel Boogner showcases the impact of satellite technology by highlighting three different themes. One of these themes is the idea of green and resilient communities that show the role of satellite technology in assisting cities with planning urban growth and environmental sustainability. The central section of the mural showcases the second theme, the youth connectivity and future generation of scientists. This section celebrates the curiosity of the next generation and the new skills they are learning. The final theme illustrates the role of satellites in humanitarian work with the artwork showing how this type of data can support finding displaced populations, shelter, provide food and medical care and also navigate complex contexts. Sorry, my slides seem to be on a timer.

Okay, and then...

So the second part is the humanitarian simulations, which is another program and event that we put on this year. And so another way to address the usage and visibility of eighth science data is to give stakeholders the opportunity to actually use, analyze and play around with the eighth science data. And so in October of this year, NASA Lifelines held a first of its kind online humanitarian simulation. Over the course of three days, 328 participants from over 53 different countries played roles on over 20 different teams wielding satellite data and their imaginations to address various crises scenarios. So if you've sort of done Model UN or sort of simulations like that, that was sort of the idea for this program. And so this dynamic and immersive experience united a diverse array of humanitarians, scientists, researchers, technologists, students and innovators as we uncovered the potential for satellite data to save lives and reduce human suffering. And so overall, participants really valued being able to work with geospatial data and interact with experts from around the world and then also team up with people that they don't normally usually get to collaborate with in their day to day, which exposed them to new ways of thinking and help them expose them to sort of what working with eighth science data was really like.

Another program that we have is this sort of eighth science review board that we've put together. So specifically for faculty and researchers, this might be a way that you guys can get involved in the initiative. And so the eighth science review board offers humanitarian decision makers an opportunity to engage a panel of interdisciplinary experts and hear their feedback on how to integrate satellite data and remote sensing data tools into their investments and programs. So if you're a geospatial expert wanting to work in the humanitarian space, you can sign up to become a reviewer for these projects. And so then when projects are submitted with sort of your expertise tagged in it, you will sort of be pinged and like asked if you want to sign up and help review this project. If you're a humanitarian decision maker and you want to be able to incorporate eighth science data into your work, but you're not really sure where to start, the eighth science review board is an ideal opportunity to get feedback from experts

about the best way to incorporate such data for your project needs. And so reviews occur on a rolling basis. So we encourage folks to actively sign up if you want to be an expert and be a part of the review board. Or if you have a project that you're trying to get off the ground and you just want some help trying to figure out where it sounds data can help play a role, you're encouraged to sort of submit those projects on a rolling basis. And at this point, I think around five of the submitted cases have been reviewed by experts that have been signed up to be part of the eighth science review board.

And so then lastly, for sort of graduate students and then early career professionals and then anybody who's interested in being part of the program, there's a fellowship program that allows participants to collaborate with a larger Lifeline's team to help build community and sort of explore the possibilities of eighth science in the humanitarian sector. Current fellows have worked on different roles in the Lifeline team from helping design the humanitarian simulation that happened earlier this year in October to conducting research working groups. So meeting with partners such as humanitarian orgs using it's science data to try and do some sort of focus group and sort of gathering information about what would be most useful. And then also fellows have also worked on the communication aspect and outreach and trying to get the word out about what the program is about and trying to encourage people to be a part of the community. And so if you're interested in being a fellow, you can check out the website. There's a current posting for new fellowship positions that will start in the new year. So if you're interested, you can go check it out and apply. And you can always feel free to shoot me an email and we can talk about my experience and any questions that you have. And so then lastly, what I would say is that if this all sounds super interesting and you're really interested in geospatial data and how we can help humanitarian action and crises, just feel free to check out our website at www.nasalifelines.org and then also through social media at NASA Lifelines.

And yeah, I'm happy to take any questions at the end. And then sorry, yeah, I know my slides are kind of going back and forth.

Technical difficulties.

Thank you very much, Liam. That was very interesting.

Appreciate your presentation there.

Next on our schedule is a team from UC Davis, I believe, Karen Beardsley.

Happiness is... GIS in Bhutan!

Speaker: Karen Beardsley - UC Davis

Abstract:

UC Davis offers its LDA/ABT 150 (Upper division "Introduction to GIS") course as a study abroad class in the mountainous Kingdom of Bhutan, which is also known as "The Land of the Thunder Dragon." Dr. Karen Beardsley has taught this 4-week course four times since its inception in

2018, most recently in the summer of 2024. The class is open to students from all UCs and will be held again August—September of 2025. Together with IT Manager Carlos Barahona, Dr. Beardsley will present the course syllabus, teaching methodology, and experience with the final group projects. In addition, they will share some advantages (and challenges!) of teaching GIS in a culturally and biologically rich environment, at over 8000 feet in elevation.

Transcript: Video Timestamp: 13:53

Yeah. Yes, you're here. Thank you. I'm here, yes. All right. And this presentation will be about happiness is GIS in Bhutan. So sounds like an interesting topic and looking forward to hearing it. Thank you. Great, thanks. I hope-- is the screen showing up OK? Yes, it is. OK, great. Well, again, happy GIS Day, everyone. And I'm happy to be here with Carlos Barahona. And we're both at UC Davis. It's going to be a little bit of a tag team. I'm going to start out for the first half, and then Carlos is going to take over and share some. So I'm going to be talking more about the academic side of a program that we ran last summer and that is coming up again this summer. And he's going to talk more about sort of the where we went and what we saw and what we did. So get ready to travel to the Himalayan mountains.

So I am the director of global professional programs at Global Affairs at UC Davis. And I run several different programs. It's mostly people that are coming for short term programs from around the world. And it includes the Fulbright programs, Humphrey fellowship programs, and Mandela Washington fellowship. I also teach GIS again for the summer course that we'll be talking about here. And I also teach for UC Davis continuing and professional education. And I teach short GIS courses for that. My master's, sorry, my bachelor's and PhD are both from UC Davis. First one was applied math. And then I saw the light of geography and went to UC Santa Barbara to get my master's. And then years later got my PhD at UC Davis, also in geography. I worked for 25 years as a researcher in environmental science and policy, which is actually where Carlos works. And then I actually did a Fulbright myself in Bhutan. And I'll show you where Bhutan is in a minute. Not everybody knows where Bhutan is. So I haven't heard of it. So we'll get there too. But I did that in 2015, 2016. And I basically set up the GIS software. They have ArcGIS, the full ArcGIS Pro and University site license with help from Carlos and his colleague Bob, who helped on the technical side of things. And then I developed curriculum, which is still being used today to teach GIS in Bhutan at what's called the Royal Timbukt College or RTC.

And then in 2018, I started-- after coming back from my Fulbright, I started taking a study abroad course to Bhutan every summer with the exception of three years during the pandemic. We've been doing it ever since. And that's what I really want to focus on today, is what that course is. It's actually a course that's available to, I just learned today, anybody who is going to a US-based college and can take this, apparently. I thought it was just University of California's, but apparently other colleges and universities can also attend the course if they want. So it's a four-week course. This is a picture of the lab from 2023. So it's got full-- ArcGIS Pro is loaded. So we covered theory and basically really intensive learning of ArcGIS Pro for two weeks.

And during those two weeks, at the end of the middle end of those two weeks, we also take a five-day field trip where we learn things like ArcGIS field maps. We use that for when we hike and stuff, so learn how to capture data using that.

We also learn about gross national happiness and work on group projects. Well, first we do about--

I don't know, not quite a week, but we kind of start learning ArcGIS online as well, and then work on these projects that focus on this concept of gross national happiness, which is Bhutan's philosophy around how happiness is more than just economics. It includes social well-being, mental well-being, social programs, biodiversity, all sorts of different aspects that make up what it is to be happy.

So again, then we do get-- we go into rural Bhutan. It's a very cultural-based program as well as intensive GIS program.

OK. You're supposed to-- there we go. So it's in August into September, and it's basically the Landscape Design and Architecture 150 and ABT as well as Applied Biological Systems Technology program for four units. And then there's the whole cultural aspect of things which are covered under this directed group study, which is a pass-no-pass piece. Students who have already had advanced GIS or, I guess, intro GIS, who've already had sort of the similar equivalent course can instead sign up for LDA 199, which is basically they come in and they work on a specific project while all the other students are doing the intro to GIS. So they can get four units for that plus the four units for 198. So it's actually open to students who have already taken a GIS course, and there's no prerequisite. So they can start out without knowing anything about GIS. So Bhutan is a Buddhist parliamentary monarchy. They have been a monarchy for over 100 years. They're now on the fifth king.

And it's sandwiched between India and China, the Tibetan part of China, in the Himalayan mountains.

As I mentioned, their population is only about 750,000. The capital city where we're based, Timpu, has about 150,000 people in it. So it's a very small, low-population country, very rich in culture.

They embrace their culture very much, the Buddhist culture.

And not just Buddhists, though Bhutan has its own specific culture, which is fascinating. Rich biodiversity, they have 72% forest cover. A little over 50% of the land is protected with biological corridors and such. So it's a fascinating place that is anywhere from 100 to 7,500 meters. So very high up in--

down near India, it's low elevation, and then it just gets higher and higher and higher until you go to the very north of the country. We do the program at Royal Timpu College, which is where I had been a Fulbrighter. And so this is the main college. And then we do a homestay. So we go

out into the village and stay in farmhouses. And this is just kind of an overview of the capital city of Timpu. So it's the safest place I've ever been. It's a very safe and welcoming place for the students. We visit a number of really interesting cultural sites,

which I won't go through each of them. But again, you can get a sense from the photos of how rich the place is in its scenery, its culture, and so on.

I think with that, I'm going to just jump over to the website. I'm hoping-- is this showing up now, the Global Learning Hub website? OK.

And that's what that link on the last slide, which I think you'll be provided with those slides, takes you to this place.

So we basically have the program overview.

And there's a nice video that shows kind of what it's like to be traveling around Bhutan and learning GIS there. On the second page, there's more information about the syllabus.

So you can kind of see how the course is organized.

So what we talk about in week one, week two, week three, and then the grading, which is mostly based on lab and homework assignments, have a very high 20% of the grade. There's two midterm exams, 15% each. And then the final project is what really is most of the grade.

So the final projects can be found here, the student projects from 2024, 23, 24, and even back to 2019.

So these have all been put together. They're story maps that-- so the students do all their analysis in ArcGIS Pro. They then bring it over to ArcGIS Online and show it in story maps. So feel free to-- this is a great place to just click on any of these. We actually work with Bhutanese students. So these are the two Bhutanese students who helped out and worked with the two students from the program, the UC Davis students. So they were kind of work as consultants. So they get that perspective of working with the Bhutanese students who have had some GIS courses themselves. So it ends up being a really nice partnership. So again, the students have to collect a lot of the data. So learn how to do mapping and show this off. I don't have enough time to go through it more than that. But feel free to look at those and see what it's about. So with that, I'm going to give Carlos enough time because I know he's going to be sharing some additional information. So I will stop my share and pass it over to Carlos.

Carlos?

(Audio Out) Am I disconnected?

It looks like Carlos might have accidentally dropped off. Oh, OK.

That's interesting.

See if he comes back. Or I can go on and show you some more things, I guess.

Yeah, let's give it maybe a minute. And if he doesn't come back, if you do have more material, maybe that would be good. Yeah, I can just go through and show some more of the slides. Or I can also take any questions. Yeah, I do have another five, six minutes. Let me see if he texted me or something.

No.

Oh, yeah. His computer just crashed. Oh, OK. I bet he's going to bring it back. He's a computer guy.

Well, shoot, he had a whole story map to show you. OK, well, in that case, I will go back to sharing my screen.

One sec, sorry.

No problem.

There we go. Let's pull that up. Let's go back to here.

(Audio Out) I was so good at-- OK, am I sharing the right screen?

We can see the website, yeah. Great, OK. So I'm going to go back and I will share another one. Just to get a sense of what the program is like, I will share a little bit about--

this is from 2023, the project. So anything from the Cordycep trade to maternal childhood health to heritage sites and agricultural use. So there's a lot of variety in the projects that the students do. So these have been put together in a story map collection.

I would like to just-- since Carlos was going to give a run-through of some of the cultural things that we do, I thought I would share the trip from 2023.

This is-- Sorry, Karen? Carlos is back? He's back. OK, I will stop sharing and let him take it away. Stop just like crashed right as you're finishing up. And so I'm switching to my laptop. OK, well, you're on.

So really, my background, I'm actually the information systems manager for environmental science and policy. So that's actually how I know Karen. I am the ArcGIS Esri service manager for Davis. So I manage all of the infrastructure and licensing for ArcGIS products at UC Davis.

Karen and actually my predecessor, who had been the on-site coordinator in the past, approached me this last year. And having heard so much about Bhutan for the last five or six years, they brought this to me if I wanted to join as the on-site coordinator. So I wanted to speak a little bit to my perspective of the program, not knowing a lot about Bhutan, but knowing a lot about GIS

and just provide some level setting of things that I found interesting and didn't know about the country and the program before joining this.

Give me one second to share my screen.

I can't share my screen on the Mac.

Karen, would you mind? So I put the link in.

Well, we're seeing your screen. OK. It gave me a warning, so I wasn't sure what showed up. Yeah, Journey of the Land. Perfect. Yeah, we're seeing it. All right. So this is very much based around the non-coursework part of the program. So this was just, again, level setting. So I put this together. It was actually something I was already working as a travel blog for the trip. But if you wanted to travel-- if you wanted to follow along, I put the link into chat where you can scan right here. But I think Karen mentioned this a little bit, but just level setting of where is Bhutan and how much of an ordeal it is to get there. There is a lot beyond just flying here, but I just want to put this into perspective that just getting the first leg of this is really us getting into Bangkok. So we're flying from California and meeting all of our students for the first time in person in the airport just outside of Bangkok at 2 AM. So this is-- we're all groggy and tired meeting at 2 AM for our 5 AM flight over the Himalayas into Bhutan. So this is a brief look at what we're flying into and what we're flying over. You see there that is the one and only airline that flies into Bhutan. This is Jhuk Airlines. Jhuk is a very common concept. In Bhutan, it basically means dragon. And again, we're flying into the land of the Thunder Dragon.

I'm not sure why that is not loading. But yeah, we land in Paro, which is just about an hour outside of the capital city, and load up onto the bus. And this is basically the start of our journey.

We really-- most of our time in Bhutan is in-- I mean, we're really only in Western Bhutan.

But a little bit about the geography of Bhutan, it's broken up to essentially states, but what are called zonkags.

Our entire trip is based out of these four zonkags. It is Paro, where we fly into.

Timbu, which is the capital city, and just outside of Timbu is our home base. It is Royal Timbu College.

We do a homestay outside in the Popchika Valley, which is a little bit more central and a bit higher.

And finally, in Punaka.

I just want to-- if you saw these little hotspots here, this is actually created using my Google timeline. So I'm actually-- I'm collecting data any time I'm going anywhere. It's stored

specifically on my device, and it's something that I was able to pull. So those hotspots more or less reflect where we were spending time and how much time we're spending in each area.

So yeah, a little bit about the capital city. Karen mentioned again that there's 750,000 people in the country. This is the most populous part of the country, which

has about 150,000 people in it.

So this dives into a little bit of what we're actually going there and seeing outside of the classroom. So we have little points of interest. A lot of this is about the cultural aspects of it, but we're also doing things like looking at environmental points of interest and--

I think what else did I have in here?

I'm not going to jump back into that. But yeah, just a brief look at what life is like here.

She mentioned a bit about the clothing. So everybody, including our students, are basically wearing traditional clothing either goes for men or kiras for women. So you'll see a little bit about examples of when we first started. And this is like-- I don't know why. Nothing is loading for me today. Sorry.

A little bit about the homestay. So we get a chance to do about two days with a homestay and living with a family in rural Bhutan and seeing a little bit about countryside farms or staying in farms for two days, eating with locals, eating fresh foods.

So yeah, a little comes into that. We do spend a lot of time hiking. And so that's actually where we got to tie this into our GIS coursework. Because I'm a little bit late, I'm going to jump through this real quick. But we're actually able to use this as an opportunity to teach our students offline in field maps. So we're gathering our tracks through field maps. But we're also able to have them collect-- do some basic data collection. So we have little things like these are their points of interest and categorization. So this is tying in our extracurricular activities with the GIS coursework. And they were actually able to get a lot of that out of this.

Kind of going to leave it there, but just to kind of overall of what things we saw outside of the classroom, if you wanted to look around in this. And finally, I put together-- sorry, I did not put together-- RTC put together a brief video montage of our program.

Great. Thank you. I think that does it for us. Great. Well, thank you so much. Sorry that you had those technical difficulties. But it was fascinating to see what you've experienced. And I'm hoping we'll have more questions for you at the end.

So thank you so much.

Next up, we have Maggie from UCLA, who is going to talk to us in a brief talk about Geoconnect Project. So Maggie, when you're ready.

GeoConnect: Centralizing Geospatial Resources Across the UC System

Speaker: Maggie Tarmey - UC Los Angeles

Abstract:

GeoConnect is a group of Librarians and GIS staff from across the University of California system. We were awarded a two-year research grant from the Librarians Association of the University of California (LAUC). GeoConnect will assess what GIS users on our campuses seek with regards to geospatial resources and support and to collaboratively organize these resources. We aim to examine our existing LibGuides to assess the current content, conduct a survey across the UC System to assess what patrons are seeking, and finally create a centralized resource hub to support the UC community. This presentation will discuss what has been done thus far and long-term goals for the project.

Transcript: Video Timestamp: 32:59

Thanks so much, Shannon. I'm going to keep my camera off while I'm sharing my screen because sometimes I don't have very good luck with my Wi-Fi if I try to have both. But promise me, I'm on the other side of screen. So yes, my name is Maggie Tarmey. I'm a UCLA librarian for geography, maps, and economics. And I'm going to talk about a project today called Geoconnect, Centralizing Geospatial Resources Across the UC System. And most importantly, this is not a me project. This is very much a team project of folks all over the UC system. We call ourselves the Geoconnect Working Group. And you likely recognize some of these names from today. Janet is our moderator right now. Danielle is here. We've seen Amy and Erin throughout the week as well.

We are all geospatial related folks. But as you can see from our different titles, some of us work as librarian. Some of us work as GIS managers or other styles of GIS support staffs. So while we all work with GIS in various capacities, most of us are at least within or affiliated with our library systems. But we all bring a big range of expertise to the table. And I want to point out too that all of us are from different campuses as well. So we've got really great representation from a large chunk of the UC system.

But what are we actually doing? What is the Geoconnect project and what are we doing? As we know, GIS is a rapidly evolving field. I feel like every week there is a new software tool that comes out and new data sets and new updates and new things to learn, new processes, rapidly changing, rapidly evolving. It's really, really hard to keep up with. And we meet often our GIS related folks in the UC system. And we talk a lot about how we can support one another, challenges we run into. And we were talking about how we really have a lack of centralized solutions to actually provide GIS support on our campuses. So we have 10 separate campuses in the UC system. And we are all maintaining 10 separate campus specific resource guides related to GIS that we are individually updating and maintaining. But we said, why are we doing that? When we could instead perhaps try to collaborate on a shared system-wide UC wide resource

guide and share that labor, pool our knowledge and pool our expertise to make one super strong guide and super strong resource for our users.

And I think this is great for a few reasons. Being able to share that labor is really important. Being able to pool that knowledge is really important as well. And we're also fulfilling some of the stated system-wide goals for the University of California Libraries, two of them being optimize and develop shared services for operational efficiency and system-wide impact and to maximize discovery of and access to information resources. So not only are we going to be able to hopefully be more efficient with the support we provide, but we want to make life easier for you all. Almost everyone here is UC affiliated in some capacity. And we want to make your life easier when it comes to working with GIS resources and getting the help and support that you need.

So, so far we proposed this in late summer, early fall of last year, 2023. We spent a lot of time really narrowing in on what exactly we wanted to do and accomplish and wrote a grant application. We also applied for and got IRB approval that December. And we were awarded our grant in January. Super exciting. It's a grant from Lao Kadi Librarians Association of the University of California. This is going to help us. These funds are going to help us support some student workers that will assist with our data cleaning and management, as well as resource gathering and some gift cards for focus group participants, which I'll talk about in a moment. And most recently, we deployed a survey last month for our UC GIS users.

And we have some really great initial survey takeaways. So our survey only just closed a few weeks ago, and we're still really working through the meat of our results. But a couple of initial higher level takeaways, we got 119 responses from all 10 UC campuses and UC ANR, which is the Agricultural and Natural Resources Research Campus.

Anyone who wants to survey knows it's really hard to get people to do a survey. There's a lot of survey fatigue out there. And we're really psyched with the amount of responses that we were able to get. And these come from all over, everything from faculty, different classifications of staff, and students as well.

And we had a huge variety in departments and majors. This is something we're seeing a lot here in UC GIS week, but it was really sort of promising for me to see skimming through our initial results. Just the huge variety that we had. You know, it's not just-- GIS is not just for geography, land use, urban planning. We have respondents from these heavy GIS users, everywhere from English and ethnic studies, to business and economics, emergency medicine, biology, everything you could think of, we had folks responding from. And then some of our areas that we were trying to get information about included what sort of softwares people are using for different types of GIS work, whether that's data analysis, visualization, and a few other things. And what resources are people using for GIS support? Where are they going to get help? Is their first call to their local GIS librarian? Are they going straight to Google? Are they going to product documentation, like Esri documentation?

And then also, what formats are people preferring when they're learning new concepts? Do you like to have video walkthroughs? Do you like to do a live interactive workshop? Do you want to read text from an example? We're running into people who are really starting to like using Chat GPT for learning new GIS concepts. So it's interesting to see where that falls as well. And ultimately, this initial survey was to help us determine what tools are patrons using for various GIS tasks, and what are their information seeking behaviors when they go and get help.

So what lies ahead? We're next going to run some focus groups in the late winter, early spring, around February, March, April. This is going to give us the opportunity to ask our stakeholders some more in-depth questions about their needs, partially based on our survey results. We really want to get into the meat of where are you going when you need help? What's most frustrating to you when you try to get help and are struggling? And what can we do to make it easier for you? And then that'll be followed with more data analysis, combining those survey results and these focus group information that we're going to get, compiling resources, building this research guide, trying to figure out what form we want it to take in, whether it be a library research guide that folks may be familiar with, a standalone website, something else. That's something we really want to try to work with the focus group participants on. And then, of course, presentation and publication. We are, of course, not the only system or consortium of universities around.

Hopefully other areas, other consortiums, other institutions who are asking these same questions can perhaps use our model as an example for their own work in the future. And our goal is to have this guide completed and ready to go by the end of 2025. So hopefully, fingers crossed, next year's UC GIS Week we'll be presenting to you our finished research guide, which will be really, really exciting.

And just really briefly, this has been a great project to work on, really bringing us together across the system, learning more about our users, their needs, their wants, their frustrations,

and getting to work more closely with my colleagues across the system has really been a pleasure as well. So it's been a great project. And again, this is here to help you all.

We're really excited and I think this is going to turn out really good. So stay tuned for more updates from the GeoConnect group. I'll drop this link in the chat as well. You can learn more about our project. It's actually part of the UC GIS Week website. We have a page on there. And you can read our full grant proposal and some more detailed information there as well. So thank you all. I'm happy to take questions later on at the end of the session.

Great. Thank you so much, Maggie. That was a great synopsis of what we've been up to.

So our last presentation for this session is from Edil and Emma from NASA talking about equity and environmental justice. So when you are ready, please feel free to begin. Thank you.

NASA Equity and Environmental Justice Introduction

Speaker(s): Edil A. Sepúlveda Carlo and Emma L. Yates - NASA

Abstract:

NASA's EEJ program helps ensure Earth data can benefit everyone, regardless of race, color, national origin or income. We help communities across the U.S. make informed decisions about issues affecting them. The program also builds new partnerships to support community outreach, training, and information and tools that use Earth observations. We aim to create opportunities for people to support community empowerment with Earth observation information.

Transcript: Video Timestamp: 42:06

Thank you. Let me see. I've been having some connectivity issues. So I might turn the camera off if that is happening. So just let me know.

Can you see the slides?

We're seeing presenter mode. Yes. Thank you. Perfect. So thank you again for the invitation. My name is Edil Sepúlveda. I'm in NASA headquarters.

We were called to comment present here about give basic introduction about NASA's equity and environmental justice program.

So we're going to be doing a tactic here. Emma from our program is also here. So we'll start talking about more big picture where this program stands within the Earth Science Division of NASA and then talk about some of the solicitations and funding mechanisms that we have had. And then Emma is going to go more in depth into a couple of examples of some of the funded projects that we have and some of the impact that they have had. And then I'm going to finish with highlighting a couple of opportunities around the topic of EEA and then happy to answer any questions.

So let's see. Next slide.

So here is the team of NASA's equity and environmental justice program, Michelle Hawkins. She's the program manager based at NASA headquarters in Washington, D.C. She came last year to NASA after 16 years in NOAA in the National Weather Service and like two years in the White House Council of Environmental Quality.

Myself, Edil Sepúlveda-Carlo, I'm the program coordinator and the program coordinator for equity and environmental justice program as well as the climate resilience program. A little bit about my background, I'm originally from Puerto Rico. I grew up in Puerto Rico. I did my bachelor's in geology. And then I went to law school. I practiced environmental law in Puerto Rico and Latin America. And then I came to do my grad studies to Columbia University in New York on climate science and policy.

And after that, I came 10 years ago to work at NASA at one of the centers, NASA solar space flight center outside Washington, D.C. There for nine years, I was the applications lead and the stakeholder engagement lead for a NASA program that is called carbon monitoring system.

So being the bridge between the scientists funded through this program and the users and decision makers of this data. And then I came earlier this year to NASA headquarters to be the program coordinator for this equity and environmental justice program. And then we have Emma here that you can introduce yourself, Emma.

Hi, my name is Emma Yates. Originally from the UK. I have an undergrad in chemistry and a PhD in atmospheric chemistry. I've been working at NASA Ames Research Center. So in California as a atmospheric scientist, looking at trace gases, greenhouse gases and ozone or the pollution. And for the last few years, I've also been an associate program manager for the NASA's EJ program.

Thank you, Emma. We also have Sabrina delgado Arias as one of the APM's. She's based at NASA Goddard and Nikki Tully, another of the associate program managers. She's also based in NASA Ames. And she works also with an IPI program that is the NASA's indigenous people initiative program. So with that, we're going to go and talk a little bit about the Earth's NASA Earth Science Division.

And sometimes we always like to start with this because there are many people that don't know that NASA has an Earth Science Division. And actually we study the planet Earth more than any other planet in the universe.

And this is the most up to date chart of the NASA's Earth fleet. We have at the moment, 25 missions that are orbiting the Earth.

And this include NASA satellites, partner missions with Europe, Japan and others, instruments on the International Space Station like EMMET or JEDI.

All these instruments are helping us better monitor from the unique vantage point of space the rapid changes that are happening on our planet.

And the data that they provide help disadvantaged communities address the environmental justice issues that they have, as we are going to highlight with some of the funded projects that we're going to talk about.

So within the Earth Science Division of NASA, we have different components. I'm not going to go into each one of those, but these are the main components in the Earth Science Division.

We have technology, we have flight, we have RNA, we have data and modeling, and then we have Earth action that was formerly known as applied sciences. And that's where the Equity and Environmental Justice Program sits.

And Earth action promotes the efforts to discover and demonstrate innovative, practical and beneficial uses of Earth science information.

The program supports applied science research and applications projects that advance the uses of Earth science information that inform organization decisions and resulting actions. And some of the programs that we have within Earth action include the disasters program. And the disasters program is the one that manages the lifeline program that Liam presented at the beginning of this session. We also have programs around water, fire, agriculture, as I mentioned climate resilience, and then also equity and environmental justice.

So here you can see the new Earth Science Division strategy that is called the Earth Science to Action Strategy. It was on build earlier this year. And this strategy builds off our foundation of science and engineering to enable action and impact.

We see this as an end-to-end capability, creating an open enterprise to incorporate innovation, scientific discovery, and emerging user needs to accelerate the use of Earth science and inform the next iteration of programs, missions, and initiatives.

Basically the goal here is that within a decade, we will advance and integrate Earth science knowledge to empower humanity and create a more resilient world.

So NASA's Earth Science Division not only aims to diversify Earth science research and applications communities with representation from all backgrounds, but also support the environmental justice communities by expanding awareness, accessibility, and use of the Earth science data. And here you can see the five goals that frame the Earth Science Division's EEG strategy.

And very important, all five, is to incorporate equity and environmental climate justice things across all of the Earth Science Division programs.

So how do we do that?

One of the main tasks that we have in the equity and environmental justice program is to fund projects through these solicitations that are called ROSES. And I imagine some of you have heard about this ROSES stands for Research Opportunity in Space and Earth Science.

And unlike some of the programs that I mentioned and that you can see in the bottom of the slide, these are programs that are part of Earth action within the Earth Science Division, ecological conservation, water resources, health and air quality, disasters, fires, agriculture.

The equity and environmental justice program is kind of new. The first solicitation that we had was back in ROSES 2021.

And those projects started in 2022. And some of them have started to finalize just now this year. And then we had a call, ROSES 2023, that we just made the selections a couple of months ago. And those projects were publicly announced maybe like two, three weeks ago. So those

are 10 new projects that we have in our portfolio. We're going to mention a little bit about that. Besides the ROSES calls from the equity and environmental justice program, we have also funded projects through other ROSES solicitations, including those ones that you see here, the interdisciplinary research in Earth Science, the NASA's Advanced Information Systems Technology,

the NASA's Earth Surface and Interior, and also not included there, the finest project that is part of the early career program of NASA.

That first solicitation in 2021, that is the A49 solicitation, it funded a total of 39 projects that you see there. You can see here 10 were landscape analysis, 13 were feasibility studies, and 16 were data integration studies. And the landscape analysis are short studies, less than a year, that they support the characterization of EJ communities and the environmental issues that they face.

The community-based feasibility studies, they are one year to one year and a half long, and they address community needs by co-designing with the community organizations projects that are tailored to community needs, and they test and validate the use of Earth observations for local decision making. And then the data integration projects, these are one to two year long projects, and they culminate in a GIS enabled products or tools for public dissemination to support the EJ communities.

And the one that I just mentioned, we recently made the announcement of 10 new projects that were funded through this A47 solicitation.

These are going to be three year projects that are going to end with the creation of geospatial tools that integrate Earth science and socioeconomic information, expand the communities of practice that use Earth observations to address environmental issues, and inform action.

For this round of proposals, we requested that they were developing collaboration with the underserved and overburdened communities, and that they involve a co-design process to address the community interest to use Earth science information in decisions. For that, it was a requirement to include a funded COI that is a co-investigator as part of the proposed investigator team, and that COI has to be part of the underserved community. The 10 projects that were selected, right now we're focusing just domestically. So they go from Hawaii to the West Coast, Central, Southern, and Eastern USA.

And they address some of the priority topics that we have in the EJ program that include air pollution impacts on human health, land color, land use change impacts on health and equity, and impacts caused by climate variability and change.

And with that, now I'm going to leave with Emma, who is going to go over some of the funded projects that we have.

Thanks, Edil.

So yeah, I'm just going to briefly go over three different projects, about two to three slides on each project, to show you some of the scope of the EJ funded work that we have. So the first project is one from San Antonio in Texas to investigate environmental justice through Earth observations, the use of socioeconomic data, and the use of ecosystem service models to help aid urban decision makers in their planning. The next slide.

The San Antonio faces major heat issue, and some neighborhoods benefit from natural cooling more than others. So it really highlights the kind of environmental inequalities across the city. And this project developed a web-based platform that combined Earth observations, ecosystem models, and socioeconomic data for the use of urban decision makers to help them assess their planning scenarios and examine their effects on environmental inequality.

So next slide, I'm going to discuss the key outcomes from this project. Oh, I think there was one more slide, was there?

Oh, maybe not. Okay. Well, the key out outcomings from the project included the tools designed in collaboration with the partners, as Edil mentioned, and with city officials and designed with feedback in mind to meet those kind of local needs so that they could prioritize their decisions based on green infrastructure and planning and environmental justice included in the decision. So the next slide, please. So the next project is a California-based project.

And so the image here kind of highlights the motivation behind the study. So you can see one of our many wildfires along the coast here and some of the kind of snapshots of some of the press releases regarding the quality, but also regarding heat impacts from the state. So this is really the main point of this project was to look at the compounding effects of both air quality and extreme heat on California. So the next study, please. Sorry, the next page. So this study focuses on looking at the compounding effects. And the reason why this is kind of interesting is that sometimes the public health guidance for smoke exposure and extreme heat can be conflicting. So for example, when it's smoky outside, people can be told to stay indoors and close their windows and their doors.

Whereas when it's hot, you can be told to go cool off in the shade. So what happens when there's both of these effects at the same time? So the image on the right shows the kind of framework that the study did where firstly they looked at aligning PM2.5 with wildfire smoke, assigning extreme heat exceedances, and then looking at the exposures over California of these individual parameters, but also of them combined, and then overlapping these exposures with vulnerable communities. So I think the last slide for this project just shows a screenshot of a tool that's been developed by this study. The tool on the left shows exposures to heat. And you can see that the Central Valley of California and the Southern California has most exposure to heat and concerns. And then the next one shows smoke. And here you see mostly it's the Northern part of the state and the Central Valley again exposed to smoke. And then the one on the right shows the compounding exposures to both smoke and heat. So increasing pink shows

more vulnerable areas to heat, I think. And then the blue is to smoke. And then the purple is where they have exposures to both.

And so then you can really, and you can click on this and go down to the census level and see kind of long-term trends in the area, but also communities can look at what exposures are most important to them and what they should be focusing on. And then I'm going to move on to the next and final example of one of our projects. And this one is from Maui County in Hawaii. And the goal of this project was to integrate Earth observations with other data sets, including socioeconomic data, but also price data to create this food security dashboard. And by doing so, they highlighted the need and the opportunities for small and indigenous farmers in Maui County to help, again, serve community decisions and actions.

Next slide.

So through their partnerships, the project data was created to measure and monitor agricultural production in Maui.

And they created this dashboard to serve community decision makers. Also in addition to this, in the aftermath of the devastating fires in Maui, the project scientists were already in touch with the community partners. And through that, kind of actually used their data to try and support wildfire response efforts and also look at future and anticipated fires and ways to prevent them. And they found that even though it was an abundance of data available to people, it's just getting this data into the hands of the community, into the decision makers where they can facilitate that.

So that was a side project this one. Okay. So that's all from my slides, Edil.

Thank you, Emma. And we just have two more slides here to highlight some of the resources that we have for the EGA community.

We have an EGA data background that provides information about how NASA data are being used to support environmental and climate justice efforts.

We have a new open source platform called VERA that stands for Visualization Exploration Data and Analysis. And it has multiple data sets available in the cloud. And it developed also a series of interactive stories related to environmental justice. And also we have an EGA data search interface that enables users to discover NASA data documentation and code related to environmental justice in one comprehensive interface.

We have included the links to each one of these resources there. And then finally, a little bit more, we have the Applied Remote Sensing Training or RSET program. Some of you may have heard about this.

Through these trainings, you can learn how to use NASA data for environmental management. You can search and access NASA resources relevant to your needs. It has from beginner trainings on how to use remote sensing data to more advanced trainings on how to use a

specific satellite data or remote sensing instruments for a specific applications, be in disasters, be related to climate or to agriculture or to water resources. And there is a new training available on satellite data for air quality environmental justice and equity applications. These trainings are generally both in English and Spanish available. And then we have a monthly newsletter, our EGA team, where we highlight some of the latest news from our program, some other NASA opportunities and resources that are available, and other news from the environmental justice field. And if you want to receive that monthly newsletter, you can just send us an email and we'll add you to the database. I'll include both of our emails here in the chat now when we finalize. And with that, I think we finish our presentation.

Well, thank you so much. And then Edil, that was really amazing to hear about that program.

Q&A

So virtual round of applause for all of our presenters for this session. Like I said, we are scheduled to go to 2.30 if we need to, but we have that time for any questions you may have for any of the presenters.

I have a few I'd like to maybe pose, but I sure want to let anybody else post their questions first to make sure we get to any that you would like to ask.

So just pause for a minute and see if anybody would like to put something in the chat or maybe unmute themselves to ask any of our presenters a question.

OK, well, I'll go ahead and ask mine then. I have one for Liam. You were talking about the connection between humanitarian organizations and earth science.

And I was wondering if you could maybe give an example or two of the type of humanitarian organization and what type of earth science information they were able to apply or would like to apply.

Yeah, so one of the that's a great question, Janet. One of the programs that we also have at NASA Lifeline, just one that I haven't worked with extensively, is called the Impact Embassy. And so within that, different organizations, nonprofit organizations and other humanitarian organizations can apply for a small grant to sort of work on a project that will utilize

earth science information. So that can take many different forms, whether it's sort of mapping human settlements, so trying to use high resolution satellite imagery to create better maps of sort of refugee encampment settlements, that sort of thing.

And then just also related to sort of recovery and relief work after natural disasters. And so on the Lifeline's website, again, that specific initiative is called the Impact Embassy. And so there are some examples on there that I would encourage folks to check out. And then even if you're not an organization or even if you are an organization, but you're still sort of in the early onset

of maybe exploring what sort of the earth science data can help you do, I would recommend checking out the Earth Science Review Board, like I talked about, and just submitting a short write up of like what your project idea is. And it's a great way to have geospatial experts just give you some initial feedback of things that you might want to consider. And so having looked at some of those, some of the feedback that we give to folks is just like, what sort of data sets would you want to consider? What's open source versus what might not be open source where you can guide your analysis and try to just get the ball rolling for those different organizations to help give them the agency to sort of implement their own analyses? Hopefully that answered your questions.

Yes, it does. Thank you. Thank you.

So I do have a question for the next set of presenters, Karen and Carlos.

When I think of Bhutan and the high elevation and not super developed, I think about internet problems. And I was wondering how much that impacted what you were doing and yeah, any anything that you can comment on regarding that. Yeah, I mean, I'll start out and Carlos is probably a little better equipped to talk about it since he was he was working on that a bit more, keeping everybody connected. But the campus where we hold the course is it does it is about as good as you can get in the country. So we we also are working with ArcGIS Pro in a lab that well, I think that we were using the licenses directly on the computer. So we didn't rely on the internet for the licensing.

But yeah, we did. We also could tether on our phones quite a bit. So we could use our own sort of data on a cell phone. We could we could use it as a hotspot. So certainly in our rooms, we did that a lot.

But let me pass it to Carlos, because I think he might have some insight better than I do about that. Yeah, so this was actually something I was touching with their license coordinator there. So what she mentioned is that they're actually using concurrent licensing. So it wasn't going out to the Internet for licenses. They were still hosting a license server. And that's actually something going away. So we're kind of talking through how to address that. I think we have a plan, but we'll have to work that out. Really, what was more interesting that was network internet connectivity for like field maps. And so it's actually like that was a good exercise for us to be able to show how to package like offline maps are like our offline base layer for what we're doing on the hike. Because I mean, that is a real world experience. Like how do you do offline data collection and then submit later on so that while it was a problem, I guess we got it into a tour advantage in teaching and learning. I think we learned a lot ourselves. Absolutely.

Some areas that we haven't had to. But yeah, surprisingly, like while Wi-Fi and like wired internet is not great, we actually were having more trouble with power, I would say. Oh, yeah. So power was the bigger thing.

Cell phone coverage, actually, the network of our cell phone coverage was way more reliable than anything else.

Yeah, we did have a lot of power outages. That was that was challenging.

Thanks. Yeah, I know those kind of things can impact anybody anywhere in the world. So yeah, that's great. Thank you for sharing all that.

For Maggie on Geoconnect, it's not so much a question as like a thing that just came up yesterday. And maybe as you were going through your presentation, it made me think of maybe another outcome of all of what we information we're collecting and what we serve up.

A faculty member on my campus has been using ArcMap, but realized he can't keep using it anymore.

I was kind of and he has a Mac. So I was kind of pointing him to QGIS.

and he's like, oh, well, maybe I'll look into this. And he says, is there a QGIS community on our campus? And I was like, well, I know a couple people who use it, but it's not exactly what I would call a community. But then I thought, well, maybe across the UCs, there would be enough people.

You know, so maybe as part of the outgrowth of what we put together as a consortial resource, it might be a way to connect people who are using maybe a more specialized, if you want to call it, that GIS tool or platform across the campus and they can connect with each other.

Yeah, absolutely. And, you know, I mentioned the huge variety of like departments and majors that were represented.

And a lot of these folks are doing like very discipline specific usages of GIS in their work. And I think it would be really great to be able to help those folks connect across the system, particularly in like the less popular GIS fields and like the humanities, for example, where you might only have a few people at one campus doing it, whereas your geography department might have lots and lots of people using it. Giving people access to those connections, I think would be really, really valuable to help people not only like improve their research output, but to have that community to share and bounce ideas off of and connect with, troubleshoot with all of those good things.

Yeah.

Good. So thank you. And then for our last pair of presenters, I'm not sure if you said it and I missed it, but it was at the very end, you were talking about the R-set trainings and I just wanted to make sure, are those available to anybody or how does that work if somebody was interested in maybe having those trainings?

Thank you, Janet. Yes, they are. I'm going to put the link to the R-set website.

Their archive, all of the trainings that they have given are archived there and you can access them and they're either in English, Spanish, sometimes in Portuguese. And then you can see also what are the trainings that are coming up. Some of them are in person. I think they do like three or four trainings in person per year. I think this year they were actually in Bhutan or last year giving a training there. So yes, definitely they're available for anyone who wants to access them. Wow. That sounds like a really valuable resource for many people. So thank you for clarifying that.

Okay.

Last call for any questions or comments for any of our presenters. I'm curious for I-Dell, do you interface with GEO or UNGGIM or other international organizations to share and coordinate information? Yes, definitely. Not myself, but at the level of NASA headquarters, they have presence.

You mentioned GEO, the Group on Earth Observations.

Yes. And then they also, we participate in different international committees. For example, from the USGCRP, there are different international communities and

from the Council on Earth Observations. Yes. So yeah. And actually we have a couple of people from headquarters right now at the COP conference in Azerbaijan. So yeah, that's an important aspect of the work. Thank you.

Okay. Any other questions?

Well, I'd just like to thank all of our presenters one last time for this amazing session that we had. Wide variety of topics, but also very interesting. And thanks to all who attended. I hope you'll check out, we have four remaining sessions, one today at three o'clock and then three more tomorrow to round out the UC GIS Week offerings.

So thanks everybody. I hope to see you again sometime.

Thank you. Thank you.