Hello everyone! It’s an honor to be with you all on this wonderful morning. So yeah, like John said, I’m a cartographer for the US National Park Service currently based out of Harpers Ferry, WV. I want to talk with you all today, however, about a map I made before I began working at the NPS—in fact, it’s that really big green map over there that keeps trying to fall over.
So this map, as the title implies, shows the US state of Alabama and the landforms and natural features which define it. Now back in 2018, when I was still a student at the University of Alabama, this map ended up being my ticket to attending my first every cartography-related conference, that conference being NACIS 2018 in Norfolk, VA. And it was there where I made my introduction to the wider cartographic community, which embrace me with open arms and convinced me that I was very much on the right path in life. Oh... and to my surprise, my map ended up being voted the winner of that year’s Student Map Competition.

But of course, there’s much more to any map than one sees at a first glance. And I’d be remiss if I didn’t point out that this map was not made in a vacuum—as a matter of fact, I had a very direct source of inspiration when making it...
Before even then, back in 2016, when I was a lost geography student who still didn’t quite know what he wanted to know what to do with his life, I stumbled across the blog of Daniel Huffman, and more importantly I came across their walkthrough on making this marvelous map of their own home state of Michigan. I need to point out, first and foremost, that their map was the map which convinced me that there still is very much a demand for maps that are simultaneously effective and beautiful, even in this day and age.

Now, I will be frank: at this point I had basically no experience making a proper terrain map, so it’s probably no surprise that I followed Daniel’s online walkthrough to a tee. Of course, if you look at the two maps long enough you’ll spot some fundamental differences—and by that I mean things Daniel did better than me—but at the end of the day, in the back of my mind I wanted to treat this map as a companion work to their own fantastic map.
Now what struck me most about Daniel’s map was how it managed to take the landforms of a relatively flat state like Michigan, and yet still yield an end result which makes it clear that there’s more than meets the eye when it comes to its landscape. And in a similar vein, I’d come to feel just the same way about Alabama’s own physical geography. While Alabama lacks the glacially-formed topography that defines much of Michigan, what it does have is the Appalachian Mountains, or at least a piece of them, in the northeast.

And it didn’t take long for me to get a sense of vindication, if you will, for tackling the map from this approach. Something I found out when I presented the map at NACIS 2018 was that quite a few people didn’t realize the Appalachian Mountains actually end in Alabama, and not in Georgia—a fair misconception, I reckon, given that the Appalachian Trail ends in Georgia (despite the original proponent of the AT once expressing his hope that it would someday have the city of Birmingham as its southern terminus). But, hey, what can you do!
Of course, by the standards of other mountainous areas, like right here in Colorado, you might call Alabama’s mountains rather tame. But I think their relatively modest heights and eroded appearance betrays the fact that, on the ground, these still very much feel like mountains—particularly this grouping here in east-central Alabama. This particular ridge, informally known together as the Talladega Mountains, contains Alabama’s most prominent peaks, including its highest peak on Cheaha Mountain, with a height of 2,407 ft or 734 meters. This area represents the southernmost reaches of the Appalachian Mountains, with Flagg Mountain down in the bottom left of the image being the southernmost summit with a height greater than 1,000 ft in the Appalachian region.
And like I alluded to, though these mountains are modest at best from a numerical standpoint, their presence on the landscape is unmistakable when viewing them, not from above, but from ground level. And, speaking now from personal experience, whenever I’ve seen these mountains, or any peaks in the Appalachians for that matter, I can’t help but try to imagine what these mountains must have looked like tens of millions of years ago, when they were still as prominent and majestic as those found in the Rockies or the Alps, for example.
Now, from a mapping perspective, the mountains just to the west of the Talladega range might be some of my favorite on Earth to look at—something about the fold geology of Appalachia’s Ridge-and-Valley system is particularly beautiful to me when rendered in shaded relief. Alabama’s portion of the Ridge-and-Valley province is of particular interest, however, because of what lies *underneath* it. This image specifically highlights the city of Birmingham, Alabama’s largest metropolitan area, which owes much of its very existence to these mountains. Birmingham is particularly unique because it is one of, if not the only, places on Earth where all the ingredients needed to produce iron and steel—coal, iron ore, and limestone—can all be found in extremely close proximity to one another, and this stroke of geographic luck made Birmingham the unquestioned industrial heart of the American South during the late 19th and early 20th centuries.
Again, from the ground, the mountains in and around Birmingham may not be the most impressive. But their presence is most certainly felt when you’re there, not just from how they rise up around surrounding valleys but also from the metropolitan area of more than a million people that sprung up, really, because of them.
Onto northeast Alabama, where we now leave behind the Ridge-and-Valley topography and venture onto the Cumberland Plateau, the southern portion of the wider Appalachian Plateau province. In Alabama, the Cumberland Plateau is essentially defined by Sand Mountain, an enormous sandstone plateau that is arguably the single most dominant geological feature in the entire state, and its smaller, but perhaps more famous, cousin to the east: Lookout Mountain, a similar sandstone plateau that possesses one feature in particular that is especially unique: the Little River.
The Little River holds the distinction of being what has been called one of, if not the longest mountaintop rivers in the United States. Additionally, over millions of years, the river has carved out an impressive canyon—one that, granted, might not seem terribly impressive compared to something like the Grand Canyon, for example, but one that certainly stands in its own right as one of the largest—not to mention one of the most biodiverse—in the eastern United States.
However, on the other side of Sand Mountain, the Cumberland Plateau has eroded into a complex mosaic of sandstone ridges divided by relatively sharp valleys and hollows. Here, in the rather frankly-named Jackson County Mountains, in many places the uppermost layers of sandstone have eroded away entirely, exposing the underlying limestone to the onslaught of nature. And the prominence of limestone in this remarkably wet area has made Jackson County, Alabama a hotspot for cave formation—so much so, in fact, that its more than 3,500 charted caves makes it the county with the most caves per square mile in the United States.
And some of these caves are utterly remarkable: here, for example, is Neversink Pit (which actually isn’t on my map for some reason), an old limestone sinkhole which over time has grown into a full-on cave system. And as you can imagine, the various crags and ledges along the edges of the 160 ft high cave entrance have led to the development of numerous micro-biomes that are home to, among other things, many rare and endangered fern species.
Eventually, however, the Cumberland Plateau peters out into a relatively mountainless—though still very hilly—expanse at its southwestern tip. That said, here it is still very much filled to the brim with, shall we say, “mountain-adjacent” features. Notably, this includes the Sipsey Wilderness portion of Bankhead National Forest—locals refer to the Sipsey Wilderness, which was the first federally-designated wilderness area east of the Mississippi River, as the “Land of 1,000 Waterfalls” due to, unsurprisingly, the dozens of waterfalls that dot the landscape—only a few of which I was able to fit on the final map.

And then there’s that really odd looking map symbol in the lower left part of this image...
That symbol is meant to mimic the shape of Alabama’s Natural Arch. This remarkable double arch, the remnants of an ancient cave that collapsed on itself long ago, is in fact—depending on who you ask—one of, if not the longest natural arch found east of the Rockies, spanning about 150 feet or 45 meters in length. It’s an absolutely stunning landform, though I acknowledge that in hindsight it doesn’t really make for the best map symbol either... oh well!
And now for one last feature, one that’s also not a mountain, or for that matter not even in the Appalachians! Just north of the state capital of Montgomery is the 4-mile or 6.5-kilometer wide Wetumpka Crater, which was created about 67 million years ago, back when this portion of the state was underwater in fact.
Historically, some locals believed the unusually rugged terrain of the Wetumpka Astrobleme—or “star wound”—was the southernmost terminus of the Appalachian range—but today, we know that it’s in fact something which is, at least to me, even more remarkable!
Anyway, that’s just a quick tour of some of the map’s highlights. Yeah, to be honest, I could talk about it for literally hours if I wanted to, but last I checked, I don’t have that sort of time allotted to me, so I’ll leave it at though! Though, before moving on to my retrospective, I do want to say this much: this map was the final step, if you will, on my journey from merely tolerating the state I grew up, to appreciating it, and finally to loving and proudly claiming it as my home. For all its many, many flaws, there are also many redeeming aspects of Alabama, and this map evolved into my way of expressing just some of those things that I believe are worth celebrating.
But! It’s been five years since I made that map. And lots has changed in those five years! Let’s see… in that time…

I finished getting my undergraduate degree (here’s a picture of my graduation picture, courtesy of my mom),

Then in 2020 I got finished my master’s degree—here’s my other graduation photo… yeah, just kidding, I didn’t get to take a photo for that one—I graduated just two months after the start of the COVID pandemic.

And then in 2021, I started working for the National Park Service! All of these events, but especially that last one, have transformed the way I approach cartography.
And with the benefit of hindsight, I can now comfortably admit that my beloved Alabama map, for all its strengths, likewise has many things on it that could be tweaked or refined to make it even better—some things major, other things minor or downright unnoticeable, but all things which together would combine to make the map just that much better, at least in my opinion.

And full disclosure: some of these next few slides are basically going to sound like mini-Tom Patterson tutorials, only much worse, so you have been warned in advance.
One of the biggest pieces of feedback I received back in 2018 was that the shadows created by those pesky Jackson County Mountains were distracting and gave that portion of the state a noticeable “chasm”-like appearance, which is, in fairness, not entirely accurate. This is actually a good time to point out that this map’s relief was made in Blender—and Blender reliefs are fairly notorious, I’d say, for making some terrains look a lot more like the Grand Canyon than they actually are. At the time, I had no idea how to manually edit the terrain shadows in just specific parts of a map—to me, back then it was an all-or-nothing affair.

But of course, thanks to the five additional years of experience I have now—and with some literal hands-on training with Tom Patterson...
These days I’d be much more inclined to tone down those shadows. I spent all of two minutes making this rather crude attempt to edit the shadows, which was done by simply applying some dark grey to a layer mask on the shadows layer. Simple, but effective, I think—while the shadows aren’t nearly as dark, they’re still able to cleanly define the rather sharp divisions between mountaintops and river valleys in this particularly unique section of Alabama.
In a similar vein, more precise edits to shadows can be made by simply using Photoshop’s Dodge and Burn tools—another handy trick Tom taught me. Here, for example, the eroded walls of Wetumpka Crater do get lost somewhat in the surrounding hills.
However, by applying just a little bit of dodging and burning to the map, we can better draw the crescent-shaped crater out from the rest of the terrain. Again, I did this in a matter of minutes just for demo purposes, so it could definitely be refined quite a bit more—but hopefully you get the idea!
Now, moving on to the land cover, and more specifically, my treatment of Alabama’s forests on the map. So one thing I had wanted to do with the forests was use them to help give the map some texture, rather than just having them be a flat layer of green draped over the terrain. So, back in the day, my solution was to use the Dissolve blending mode in Photoshop, which creates this sort of speckled pattern to represent the forests, but does so by removing some of the pixels in that layer to help give that “noisy” appearance.

Ultimately, this solution seems to work just fine when seen at small scales. However, once you zoom into the map, the effect sort of falls apart, and the forests start to feel rather disjointed and sparse, when in fact they should represent a near-continuous canopy of green in many parts of the state.
So, in the future, I might try something like retaining the forest cover layer in its entirety, but then adding visual noise to that layer to break up the monotony in green tones that might otherwise arise—since, after all, forests may generally be green, but they aren’t a monotone blanket of green either! For even more texture, that visual noise can then be used as a layer mask, which can then be used to develop an embossment effect that better mimics the various heights of trees you might see in a forest.
And then there’s the map labels. Now, to be perfectly honest, there’s always been something about them I’ve never quite like—maybe it’s the color, maybe it’s how big they are, or maybe it’s how much they seem to blur the underlying terrain, but I’ve always felt like this has been an aspect of the map that could use an overhaul someday.

Well, lucky me, Tom may have taught me a thing or two about how to clean those up as well...
Maybe into something more like this? Generally, I find these to be more elegant and easy on the eye. Admittedly, with this example I quickly mocked up, some of the labels in the Jackson County Mountains here might still be a bit tricky to make out, but if we were to say, combine these new labels with the lightening on the shadows I showed on the previous slide, I think we would ultimately end up with a solution that’s still easy to read, while overall less “destructive” to the underlying basemap.
And now I need to address something that, I’ll admit, kind of breaks my heart a bit—I’ve *kind of* become known as the place-names stickler within our office. But, five years ago, it would seem I wasn’t quite as careful with my map labels as I thought it was. So, just for some examples of what I mean, here’s Bear Creek Swamp...

Which isn’t actually called Bear Creek Swamp! It’s name is just Bear Swamp.

There’s some more swamps down by the Mobile River Delta that are also, shall we say, problematic as well...

That’s because they don’t actually *have* formal names! Though, in my defense, they do have features in them that are named Pigeon and Monger, respectively.

Okay, now for one related to a mountain: here’s Flagg Mountain, which is informally called the southernmost peak in the Appalachians higher than 1000 ft. The only problem?

Well, apparently its name shouldn’t actually have two “g’s” in it—just one! Old topo maps had it spelled with two “g’s”, but in the early 2000s its name was officially...
changed to have that second “g” dropped.

And finally, back in the corner of the state I grew up, here’s Rock Falls...

Well, Rock Falls has a little bit of a problem too. That’s because... apparently it probably doesn’t even exist!

However, for some reason, it’s listed as an existent waterfall in various databases, including federal ones, so it unfortunately managed to slip its way into the map. Oh well, what can you do...
And finally, getting down into the extremely nitpicky, I reckon I’d probably adopt some map symbols from the NPS onto the map if I were to remake it today. For example, I’d probably change out this waterfall symbol with the one we use on our park maps...

Which is generally nice because, among other reasons, it can show the direction the waterfall flows, and just seems to visually flow nicer.

I’d also probably switch out my little “x” symbol for the mountain peaks, which can be a little obstructive of the map terrain below...

With the small dots we typically use on NPS maps—simple and effective!
There are, of course, other things too I’d probably be interested in someday trying out on this map: implementing other pieces of software to render and refine the shaded relief, for example; or, getting down to the fundamental building blocks of any map, using a custom-made map projection—lucky me that Alabama just so happens to sit perfectly in the middle of a UTM zone! And, of course, having a map legend might also be useful.

But all in all, despite all its flaws that are now plainly obvious to me today, I still love this map dearly. That said, someday I would indeed like to make a version 2.0 of the map. When will I get around to doing that? Well, who’s to say... maybe I’ll just leave that as a surprise.
But anyway, thank you all so much, and let me know if you have any questions!