This is the first of four optional modules in which I am going to share a demo at it that I did of a student's work from a previous course. These modules are optional. They're not essential for the course, but it will give you a sense of how I approach editing an entire essay. Also, on these demo edits, I will be providing the text of the original essay. If you have enough time, and you run a really challenge yourself, you could try to edit the essay on your own before watching the demo edit.

The next thing I would like you to do, actually, is to pause the video and take a few minutes to read this first paper. If you've read it through once, it'll be easier to sort of follow my thought process on the editing.

Now that you've had a chance to read through the paper, I'm going to walk you through how I would edit it. It has a really, a lot of nice elements to the paper. So first of all, the beginning starts out really well. It's a great hook for the reader. It goes into this concept of uploading your brain into a computer so that you can live forever. That's a really cool concept. It's a nice hook. And hopefully that hooked you in as the readers out there. Uh, to reading the whole thing. I'm actually not going to touch that first paragraph. Then there's two things I'm going to look at when I'm editing a paper like this. I'm going to look at the structure in the organization, and I'm also going to look at the line-by-line type of editing, making the pros clean and clear.

So actually, the writing in this paper is quite clean. There are some minor lines in it I'm going to do here and there. There’re a few places where I'm going to point out to the author that it's a little bit jargony and ask them to unpack some concepts for us. But as a whole, this is pretty the writing in this paper is pretty clean. There's a little bit of organizational reorganizing that I'm going to do here, though. So one thing I'd like to see up a little bit higher. In this paper, we get this nice hook in the first paragraph, but we don't get to exactly what this paper is about in the third paragraph. So this paper is actually about a recently published study by Dr Kevin Briggman. But we don't get to that main point of this paper until the third paragraph. So that's a little bit too late, because the reader doesn't exactly know what this particular paper is going to be about. The reader needs to know a little bit. Sooner on, we know it's going to be something related to circuit, neural circuit mapping, but we need to know exactly specifically what this uh paper is about, and what this significance of this study is that they that the author is talking about. So we don't get that until the third paragraphs. I'm going to move up a little bit from the third paragraph. And actually, if you go all the way down to the end of the paper, the last paragraph, there's a really nice statement in this of the significance of Doctor Briggman’s work. So I'm going to move that up and make this this first sentence here the basis of the actual second paragraph of the essay. So I'm going to delete this and pop this right here, because this is the essence of the study. This is the significance of Dr brigmann's study. What did they do? Well, it is the first example of a relatively large neural circuit reconstruction. So what to make that point? Right up the front. This is the why I'm even bothering to write a paper about Doctor brigman's work, because this is why it's important. So let's make that statement right up front. Don't wait till the end and kind of keep the reader in the dark about what this is paper is about. State it right out front. And then we're going to need the details, of course, about the particular study. So I'm going to copy this whole bit about Dr Kevin Brigman and his team recently mapped the connections between these different types of cells in the mouse retina. So I'm going to just pull that up. So I'm going to say, in the first example of a relatively large neural circuit reconstruction, doctor Kevin Brigman and associates, I'm actually going to change associates to colleagues. Associate Sounds a little bit too much like a law firm. So colleagues recently mapped the connections between these two types of cells in the mouse retina, and I'm going to end the sentence there. Now, there is a little bit of jargon here. We got these two types of cells, the starburst amacrine cells in the bipolar gangly and cells. So I think the reader might need a little bit more clues as to what those are. I guessing those are neurons. So what do we say, key neurons in the mouse retina? And we can put with a dash. We can put the two types of cells in between a dash, so something like that. So that gives us a nice statement of the significance of the work. We get early on with this paper is going to be about it's going to be Dr bring about DR bringman's study, where he mapped the connections in the mouse red.

Then we get this statement about how Dr brigman's work solved a controversy about exactly how these cells are wired in a certain direction. Well, that's a really interesting fact. So this paper is also this, study, Dr brigman's study was also very important because it solves a particular controversy. Now, one thing that's missing from the rest of this paper is we never get any details about this controversy. The author and the original draft just kind of dropped it in the last bag of Oh, and it solved this controversy. But that's a really important point. So we're going to tease the reader with that early on, say, hey, they solve this, controversy, and we can unpack that. We can give all the details of that later. So I'm going to ask the author of this paper to add a paragraph as the second, a last paragraph, where they give the specific details about how they solve this controversy. So let's kind of, uh give a read the reader a little hint about it in the second paragraph, and then we'll go into all the details about it in the third pair, in the second to last paragraph. So I'm going to make this a complete sentence the work solves. And I'm going to make this in the present tense, because we're talking about this is the first example, and it solves something. So I'm going to keep this all in the present tense as we're giving kind of the big picture significance the work solve. I'm going to have long standing, maybe that makes it sound a little bit more dramatic, a long-standing controversy, if that's correct, about exactly how these cells are wired to be directionally selective. Now, I'm going to highlight something here this are wired to be directionally selective. I can kind of guess what the author means here, but I think this is probably a place where a little bit cleaner, clearer, direct prose might be helpful. We can use a little bit more technical pros down in this paragraph that the author is going to add about the controversy later, but might if there's a way to say it just slightly simpler here. Um, if there's a way to make that prose just a little bit simpler to, you know, directionally selective, as a little jargony, a little technical, if there's way to simplify the language there just a little bit, I'm going to leave that for the author, and ask the author to try to do that in their revision.

Now, we ended up leaving a little bit down in this 4th paragraph, where I had cut the details about Dr. Brigman study and moved it up here. I'm actually going to cut all of this, because there really isn't anything in this remaining material that we haven't already covered elsewhere. So, you know, they were trying to better understand the wiring. Well, we've already said it's about mapping the circuits. So I and, you know, and elucidating cellular circuit, we've already said that in this second paragraph here. And this directional selectivity about the particular types of cells that's already mentioned here. So actually, I don't think any of this is adding anything. So I think we can delete all of that information, get rid of that third paragraph. So now the second paragraph gives an overview of the of the paper and states the significance of Doctor brigman's work. Is sort of the big picture. Then we get to now what is the third paragraph, which is this whole paragraph about electron microscopy. Now, we get an awful lot of details about electron microscopy here, and so one of the things I might ask the author to think about in their revision is to say, well, do we really need all of these specific details? So there's a particular type of electron microscopy, this serial block face scanning electron microscopy, and that's very important for being able to map these neural circuits. If you didn't have that technology, you couldn't do it. But the Doctor, brigman and his colleagues, this paper that the author is describing, is not the one who invented this technology, so they're putting it to good use. But we can see here that it was invented by somebody else in 2004. So we may not need quite all of the details. So I'm going to streamline this paragraph a little bit, cut a little bit of the details, and I'll ask, would ask the author to, in their revision, think about, do we even need to give so many details about why this type of electron microscopy versus other types? So I'm going to move a few things around. So let's state exactly what happened while Dr Brigman and his team used this type of electron microscopy to visualize the synapses and map the neural circuitry. So we can state that right from the beginning. So I'm going to say, brigman's team used this cereal lock face scanning electron. My cross could be I'm going to move this up to hear. And the author here did use an abbreviation, an acronym, SBEM. I'm going to let it go for this paper, because it's the only acronym they use that it is awfully long to write out cereal block face scanning electron microscopy. But as I mentioned before, do watch acronyms to make sure you don't have too many. So bring them. Brigman's team use cereal block face scanning electron microscopy. And then what did they use it for? Well, they used it to visualize synapses and follow neural processes. So I'm actually going to change that first sentence a little bit to just go right into what brigham's team used the electron microscope before. So I've changed it a little bit, but I think it works.

So they used it to visualize synapses and follow neural processes. That was the goal of this type of, microscopy. So I've started specifically with what brigham's team done, and then I can go into some of the details about the different types the microscopy if it's needed. I'm also going to cut where it says, volumetric reconstruction. Notice this very you know, this kind of jargony of neural tissue using electron microscopic resolution is necessary to map neural circuitry. Well, I think we can just say, if we're getting into why we use electron microscopy at all, electron microscopic resolution is necessary to map neural circuitry. I don't think we need any of the other there. So I can, we can cut a few words there. Then we get, uh, the author introduces two types of electron microscopy, I think, to say, well, these types weren't used because, uh, they have various problems if you're trying to map neural circuits. So let's just point out why they don't work for mapping neural circuits, and get rid of e.g. focused on ion beam scanning, electron microscopy. We don't need to say that it gives excellent quality images, because it fails, in this case, to be sufficient for this particular problem. So we could just say it fails to process tissue pieces larger than 40 microns in diameter. Uh. And then I'm going to connect this to this next type of microscopy that also doesn't work for this situation and transmission electron microscopy. It's problematic because it requires thin sections and thin samples that often succumb to the damaging effects of manual handling and section distortion. So this whole sentence then becomes the reasons that we don't use these alternative types of electron microscopy. If, again, if this is determined to be important enough to put in the paper, thus its most prudent to use a method that images the block face directly and is capable of imaging large block faces. And of course, this technique that Brigman use, S-B-E-M provides both necessary components.

So it's arguing why cereal blockface scanning, electron my cross, can be so important here, and telling you why other types of my cross could be weren't used. All right, so I think that works. Of course, again, I would question whether we need even all of these details about why are, you know, one type of my cross bee versus the other. But maybe that's very important. I'll leave that to the author to judge in their revision. Then we get to, OK, so this is what they use, the technology they use. Then we get to the details of this particular study. So we're sort of giving all the details of exactly how they reconstructed this large neural circuit and solved this controversy. The next two paragraphs actually are related to one another, and what I'm going to do is I'm going to shorten them a bit, cut out a few pieces of words and things that were a little repetitive, and actually can bring these two paragraphs into a single paragraph. I think they're related enough that it really all belongs in one paragraph. So it says, by standing a 200 micron piece of retina, which contain the entire arborization field. That's a little jargony right there. I think that has to do with the branching of neurons. I'm going to highlight that, and in the revision, encourage the author to see if they can come up with a simpler way to say that. I know that's a technical term in the field, but remember, you're writing for the whole class, so that has something to do with branching of neurons. Maybe there's an easier way to say that. I'm also going to make a few edits to this sentence. So of a stabber cell with an extracellular stain that could outline cells and neural processes in SBEM, this is kind of a long sentence, , I'm going to just notice that the author rights by staining with an extracellular stain. I thought maybe we could change that to treating So I said, brigman's team treated a 200-micron piece of retina to get rid of A word here, instead of which contained, I'll put including the entire arborization field of this particular type of cell.

And I'm going to set that little extra detail off with, uh, with commas here, because we could, actually, you don't need that whole detail. We can just say, brigman's team treated a 200-micron piece of retina. We have an extra cellular stain. So this is just an extra little detail. So it seems like an important detail, but we can put in with commas, set it off with commas, with an extracellular stain. I think neural processes probably needs a little bit of unpacking to I'm going to highlight that for the other it's a little jargoning, or something. Could you explain it kind of quickly with some simpler terms there?, And I'm going to end the sentence there. So briggerman's team treated the retina with this. They were able to outline the cells and neural processes using this extracellular stain and this electron microscopy technique. Next we get to, we don't need to say Brigham was then able to reconstruct neural processes that's repetitive, so we can just cut that. Let me get this sentence. Based on morphology, he assessed the locations and sizes of putative synapses on these processes. All right? Well, basically the idea here is that he's inferring where the synapses are based on what he can see. He can't see the synapses, but he can see shapes that, suggest where the synapses might be. So I actually like better than assessed. Here's a really an example of using a good verb. I really like the word inferred here rather than assessed. That's what he's doing, is inferring where those synapses are. Based on this mereological data. I don't think we need to say a putative synapses on these processes. I think we can delete that, and we won't lose anything. In the next sentence, that's in the next paragraph here, it's talking about why he has to infer that is why he can't directly see this synapsis. So basically the synapses have intracellular features, and the stain is an extracellular stain. So I thought, actually, that this whole concept is directly related to the to this sentence about inferring where the synapses are. So I thought we could kind of tie this all together. I actually want to put the idea in first, so the need to infer comes in first, , so we could add due to there many interest cellular features, I'm just bringing this condom up from below. Brigman's team could not directly visualized synapses. I think that's the idea. So I'm trying to say it just slightly more directly than the author had in the original Virgin So because they have many intercellular features, and this is an extracellular stain, which we've just said in the previous sentence, so we don't need to repeat Brigham students could not directly see the visualize the synapses. And I'm going to add here what a synapse is, a neural connection, maybe a little kind of simple explanation in parentheses, in case a reader doesn't know. So now we've gotten rid of all of the material in this we don't need to repeat that and then this transition. In an effort to address this ambiguity, I don't think we need that either. So due to their many intercellular features, brigman's team could not directly visualize synapses. I'm going to add the word butt ear, but so they can't directly visualize them, so they're going to infer them. But based on morphology, he inferred the locations and sizes of putative synapses. I'm actually going to change that today, because it's not one person that was working on this study. It was a team, so let's keep it to team. And they infer the location in sizes of the punitive synapses. And then, um, I'm going to just wrap this around and again include it in this paragraph here. They also staying a second piece of tissue with and I'm going to add they stay in a second piece of tissue with an intracellular saying, I'm inferring this, I'm guessing that they must have used an intracellular stain, because they were able to stain those intercellular features. So they also stained a second piece of tissue with an intracellular stain that revealed synapse associated features. In the original sentence, there was um to there was they stained, and then synapse features worse, stained. So there was a repetition of stained there. So I think, uh, this works just a little bit more smoothly. So they also stained a second piece of tissue with an intracellular stain that revealed synapse associated features. And then there's this last thought here. I'm actually going to pull this into make this a complex sentence. So they state they did this experiment with the second piece of tissue to reveal the synapse associate features. And I think the idea is here to then to try to use that information to confirm what they found with the first stain based on morphology. So I think we can tie these two ideas together with a semicolon, and they correlate it. And I'm just going to say they correlated the synapse maps, because we're getting a synapse map that we, um guess that using morphology with the first aid, and we have a synapse map based on actual intercellular standing with a second piece of tissue. So we can say something like and they correlated the synapse maps between the first and second piece of tissue. We can get kind of get rid of a few extra words there, and I think synapse maps is sufficient. Again, I'm going to ask the author to then add in a paragraph here that goes into that controversy that they solved about the directionality of the particular cells. So explain that a little bit more for the reader. And that seems like a really important part of Dr bringman's study. So let's get some details on that. Then we get to the last paragraph. The last paragraph has a nice thought. It's tying up kind of where we started. So we started on this whole idea of uploading a whole brain onto a computer, and we're getting back to that in that last paragraph. So I'm just going to tweak it a little bit to even bring out that connection, to kind of wrap back to the beginning even a little bit more strongly, to have a nice finish. And I'm going to just tweak a few things in the language here. So, uh, notice that there's a few, you know, the last sentence has a little, it has a little bit academic, because we're getting a lot of nouns like reconstruction, preparation, imaging, mapping. Those are all nouns that could be verbs. So I thought it could streamline this a little bit by turning some of those, nouns back into verbs. So the next steps in whole brain circuit reconstruction, I'm going to leave the reconstruction will be, and then let's, instead of saying, large sample preparation, we don't need to say large sample, because we're talking about whole brain. So that sort of implied. So we'll be too prepared. Say, not preparation, but prepare. Be to prepare to image, rather than imaging to image and map, to prepare image and map the first or to in map the whole male spring using SBEM .That type of microscopy. So I think we can connect all of this and imaging and mapping on a whole brain sbm four mapping the whole now spring, I think we can get rid of all of that and just say the next steps in whole brain circuit reconstruction will be to prepare image and map the whole mouse brain using SBEM. So that, I think that's a lot cleaner and faster. And you're using those good verbs there, you can get the whole idea across more quickly. And then we want to say that this is the first mammalian complete connectome. And I'll leave that term connectome in there. It's like the buzz word these days. So even though it's a little technical, I think most people are familiar with the buzzword. So we could say this would be represent the first mammalian complete connectome. So that's getting to the idea of the whole brain, all the connections in the brain. I'm going to add that little last thought that ties us back to the beginning, and would be the closest anyone has ever come to immortalizing. So I'm tying back to that idea of immortalization a mammalian brain. So I think that's probably a fair thing to say, and it just kind of not sending. That ties us back to the beginning. So I think this paper was reading really well. I've done a few little things to streamline the writing here and there, condense a few things. I've changed the organization just slightly. I'd go back to the author and say, for the revision, you know, all those words that I've highlighted, probably see if you can say it a little bit more simply or in passing, give a little definition for the readers, especially who aren't coming from neurology, add a paragraph about the controversy that we solve. And other than that, there's not too much else to do on this one. Maybe go back to that electron microscopy paragraph and see if there's any details that could be cut there. But I think it's reading really well with really good paper to start with and hopefully going to the editing process and this has been helpful for your own to approach the papers.

这是四个可选模块中的第一个，我将在其中分享我对学生在上一门课程中的作业所做的演示编辑。这些模块是可选的。它们对课程来说不是必不可少的，但它可以让你了解我是如何编辑整篇文章的。同样在这些演示编辑中，我将提供原始文章的文本。如果你有足够的时间并且想真正挑战自己，你可以在观看演示编辑之前尝试自己编辑文章。接下来我想让你做的就是暂停视频，花几分钟时间阅读第一篇论文。如果你通读过一次，那么在编辑时遵循我的思考过程会更容易。现在你有机会通读了这篇论文，我将带你了解如何编辑它。论文中有很多不错的元素。因此，首先，开局非常顺利。这对读者来说是一个很好的吸引力。它涉及将你的大脑上传到计算机的概念，这样你就可以永远活下去。这是一个非常酷的概念。这是一个不错的钩子，希望它能吸引你作为读者阅读整篇文章。其实我不会触及第一段。然后，当我编辑这样的论文时，我要考虑两件事。我将研究结构和组织，我还将逐行研究编辑的类型，使散文变得干净明了。所以实际上这篇论文的文字很干净。我将在这里和那里做一些细微的台词编辑。有几个地方我要向作者指出，这有点行话，请他们为我们解开一些概念，但总的来说，这篇论文的写作很干净。不过，我将在这里进行一些组织重组。因此，我想在这篇论文中稍微提高一点，我们在第一段中得到了这个漂亮的钩子，但是直到第三段我们才确切地了解这篇论文的内容。因此，这篇论文实际上是关于凯文·布里格曼博士最近发表的一项研究，但是直到第三段我们才谈到这篇论文的要点。所以现在为时已晚，因为读者并不完全知道这篇特别的论文将是关于什么的。读者需要早点知道。我们知道这将与神经回路映射有关，但我们需要确切地知道这篇论文是关于什么的，以及作者所说的这项研究的意义是什么。所以我们要等到第三段才明白，所以我将从第三段向上移动一点。实际上，如果你一直走到论文的结尾，最后一段，其中有一个非常好的陈述，说明了布里格曼博士的工作的重要性。所以我要把它向上移动，让这个，这里的第一句话，成为这篇文章实际第二段的基础。所以我要删除这个然后把它放在这里，因为这是研究的本质。这就是布里格曼博士研究的意义。他们做了什么？好吧，这是相对较大的神经回路重建的第一个例子。所以想在前面提出这个观点。这就是为什么我甚至想写一篇关于布里格曼博士工作的论文，因为这就是为什么它很重要。因此，让我们事先发表这样的声明。不要等到最后，让读者对这篇论文的内容一无所知。在前面说出来。当然，我们需要有关特定研究的细节。因此，我要复制一整篇关于凯文·布里格曼博士和他的团队最近绘制的小鼠视网膜中这些不同类型的细胞之间的联系的内容。所以我就把它拉起来。所以我要说，在第一个相对较大的神经回路重建的例子中，凯文·布里奇曼博士和同事，我实际上要把同事换成同事。同事们听起来有点像律师事务所，所以同事们。最近绘制了小鼠视网膜中这两种细胞之间的联系，我将结束这句话。现在，这里有一点行话。我们得到了这两种类型的细胞，星爆的amacrine细胞和双极神经节细胞。因此，我认为读者可能需要更多线索来了解这些是什么。我猜那些是神经元。那么，为什么我们不说，小鼠视网膜中的关键神经元，然后我们就可以冲刺了。我们可以将这两种类型的单元格放在短划线之间，所以类似的东西。因此，这很好地说明了我们很早就了解这篇论文将要讨论的内容的工作的重要性。这将是关于布里格曼博士的研究，他在那里绘制了小鼠视网膜中的连接图。然后我们得到这样的陈述，讲述了布里格曼博士的研究是如何解决关于这些细胞究竟如何朝某个方向连接的争议的。嗯，这是一个非常有趣的事实。因此，这项研究，布里格曼博士的研究，也非常重要，因为它解决了一个特定的争议。现在，本文其余部分缺少的一件事是，我们从来没有得到有关这场争议的任何细节。原始草稿中的作者只是把它丢在了最后一段中。它解决了这个争议，但这是一个非常重要的一点。因此，我们要尽早用这个来取笑读者。说嘿，他们解决了这个争议，我们可以解开这个争议。我们可以稍后提供所有细节。因此，我要请这篇论文的作者添加一段。作为倒数第二段，他们在其中提供了有关如何解决这场争议的具体细节。因此，让我们在第二段中给读者一些提示，然后我们将在倒数第二段中详细介绍有关它的所有细节。所以我要把这句话写成一句完整的句子，作品解决了。我要用现在时做这个，因为我们说的是第一个例子，它解决了一些问题。因此，我们将把这一切保持现在时态，因为我们要从大局的角度来看待这部作品的意义。解决一个，我要补充一个长期存在的，也许这会让它听起来更具戏剧性，这是一场长期存在的争议，如果这是正确的话。关于这些细胞到底是如何连接成定向选择性的。现在，我要在这里重点介绍一些内容。这个，是有方向选择性的，我可以猜出作者在这里的意思。但我认为，在这个地方，更干净、更清晰、更直接的散文可能会有所帮助。我们可以在本段中使用更具技术性的方法，作者稍后将补充关于争议的内容，但如果有办法说的话，这里稍微简单一点。如果有办法让那篇散文简单一点，那么定向选择有点行话，有点技术性。如果有办法稍微简化一下语言，我就把它留给作者，然后请作者在修订版中尝试这样做。现在，我们最后在第四段中稍微向下留了一点，在那里我删掉了布里格曼博士研究的细节，然后把它移到了这里。实际上，我要把所有这些都删掉，因为剩下的材料中确实没有任何内容是我们在其他地方还没有介绍过的。因此，他们想更好地了解接线。好吧，我们已经说过，这是关于绘制电路图和阐明蜂窝电路。我们在第二段中已经说过了。这里已经提到过这种针对特定类型细胞的方向选择性。所以实际上我认为这些都不会添加任何东西，所以我认为我们可以删除所有这些信息。把第三段删掉。因此，现在第二段概述了这篇论文，并陈述了布里格曼博士的工作作为大局的重要性。然后我们来看第三段是什么，这是关于电子显微镜的整段话。我们在这里得到了很多关于电子显微镜的细节，所以我可能会请作者在修订版中考虑的一件事是，我们真的需要所有这些具体细节吗？因此，有一种特殊类型的电子显微镜，即串行方块扫描电子显微镜。这对于能够绘制这些神经回路非常重要。如果我们没有这项技术，我们就做不到。布里格曼博士和他的同事们，作者描述的这篇论文不是发明这项技术的人。所以，他们正在充分利用它，但我们可以在这里看到它是其他人在2004年发明的。因此，我们可能不需要所有的细节。因此，我将稍微简化一下这段话。剪掉一点细节。我想请作者在修订版中考虑一下，我们是否需要提供这么多细节，说明为什么这种类型的电子显微镜与其他类型的电子显微镜相比。所以我要四处走动几件事。所以我要从一开始就陈述，因为再说一遍，这篇论文是关于布里格曼博士的研究的，所以让我们确切地说明一下布里格曼博士和他的团队使用这种电显微镜来可视化突触并绘制神经回路地图时发生了什么。因此，我们可以从一开始就这么说。所以我要说，Brigmann的团队使用了这个串行方块人脸扫描电子显微镜，我要把它移到这里。这里的作者确实使用了缩写和首字母缩略词FBEM。我将放手写这篇论文，因为这是他们使用的唯一首字母缩略词，而且写出串行方块人脸扫描电子显微镜的时间太长了，但是正如我之前提到的，一定要看首字母缩略词，确保你没有太多。那么Brigmann的团队使用了串行方块人脸扫描电子显微镜然后，他们用它做了什么？好吧，他们用它来可视化突触并跟踪神经过程，所以我实际上要稍微修改一下第一句话，直接进入布里格曼的团队使用电子显微镜的目的。所以我稍微改了一下，但我认为它行得通，所以他们用它来可视化突触并跟踪神经过程，这就是这种显微镜的目标。因此，我专门从布里格曼团队的所作所为开始，如果需要，我可以详细介绍不同类型的显微镜的一些细节。我还要切掉它所说的体积重建，注意这有点像行话，使用电子显微镜分辨率对神经组织进行映射是绘制神经回路图所必需的。好吧，我想我们可以说，如果我们要了解为什么要使用电子显微镜，那么电子显微镜分辨率是绘制神经回路图的必要条件。我认为我们不需要其他任何单词，所以我们可以在那里简短地说几句话。然后我们明白，作者介绍了两种类型的电子显微镜。我想说，好吧，这些类型没有被使用，因为如果你想绘制神经回路图，它们会遇到各种各样的问题。因此，让我们指出为什么它们不适用于映射神经回路，并摆脱例如聚焦离子束扫描电子显微镜。我们不必说它提供了高质量的图像，因为在这种情况下，它不足以解决这个特殊问题。因此，我们可以说，它无法处理直径大于40微米的组织碎片。然后我将把它与下一类显微镜联系起来，这种显微镜也不适用于这种情况。还有透射电子显微镜，这是有问题的，因为它需要薄切片和薄样品，这些样品通常会受到手动操作和截面失真的破坏性影响。因此，如果再说一遍，如果确定电子显微镜足够重要，可以写在论文中，那么整句话就成了我们不使用这些替代类型的电子显微镜的原因。因此，最谨慎的做法是使用一种能够直接对方块面进行成像并能够对大型方块面进行成像的方法。当然，还有布里格曼使用的这种技术，SBEM。提供了两个必需的组件。因此，他在争论为什么串行方块人脸扫描电子显微镜在这里如此重要，并告诉你为什么没有使用其他类型的显微镜。好吧，所以我认为这行得通，当然，我想再次质疑我们是否需要所有这些细节，说明为什么要使用一种显微镜而不是另一种显微镜，但也许这非常重要。我将把这个留给作者在修改时来判断。然后我们来看看，好吧，这就是他们使用的，他们使用的技术。然后我们来看看这项特殊研究的细节。因此，我们在给出所有细节，说明他们是如何重建这个庞大的神经回路并解决这个争议的。接下来的两段实际上是相互关联的。我要做的是，我将把它们缩短一点，删掉一些有点重复的单词和东西，实际上可以把这两个段落变成一个段落。我认为它们足够相关，以至于它们实际上都属于一个段落。因此，它说明了一块包含整个树艺场的200微米视网膜。这有点行话，我认为这与神经元的分支有关。我将重点介绍这一点，并在修订版中鼓励作者看看他们能否想出一种更简单的方法来说出来。我知道这是该领域的技术术语，但请记住你是在为全班同学写作。所以这与神经元的分支有关，也许有更简单的方法可以这么说。我还要对这句话做一些编辑。因此，对于一个具有额外细胞染色的更强的细胞，可以勾勒出SDM中的细胞和神经过程，这句话有点长。请注意，作者是通过用细胞外染色剂染色来写的。我想也许我们可以把它改成治疗。所以我说Brigmann的团队治疗了一块200微米的视网膜。为了删除这里的一个词，我将改为包含整个树艺的内容。这种特殊类型的单元格的字段，我将在此处用逗号设置一点额外的细节，因为实际上，我们可以，你不需要整个细节。我们可以说，布里格曼的研究小组用细胞外污渍处理了一块200微米的视网膜。因此，这只是一个外部细节。所以这似乎是一个重要的细节，但我们可以用逗号放进去，用逗号隔开。在SBEM中，有一种可以勾勒出细胞和神经过程的细胞外染色，我认为神经过程可能也需要一点解开，我要强调的是，对于其他人，稍微用一点行话之类的，你能否用一些更简单的术语快速解释一下。我要到此结束这句话。因此，Brigmann的团队用这种方法治疗了视网膜。他们能够使用这种细胞外染色剂和这种电子显微镜技术勾勒出细胞和神经过程的轮廓。接下来，我们不必说Brigmann当时能够正确地重建神经过程，这是重复的，所以我们可以剪掉它。然后我们得到句子，根据形态，他在这些过程中评估了惩罚性突触的位置和大小。好吧，好吧，基本上，这里的想法是，他是根据他能看到的东西来推断突触在哪里，他看不见突触但他能看到暗示突触可能在哪里的形状。所以实际上就像比评估更好，这里实际上是一个使用好动词的例子。我真的很喜欢这里推断的这个词，而不是经过评估。他就是这么做的，他是根据形态学数据推断这些突触在哪里。我认为我们不必说这些过程的假定突触。我想我们可以将其删除，我们不会丢失任何东西。在下一段的下一句话中，谈论的是他为什么要推断。这就是为什么他无法直接看到突触。因此，基本上，突触具有细胞内特征。而且污渍是一种细胞外污渍。所以我实际上以为整个概念与这句关于推断突触在哪里的句子直接相关。所以我想我们可以把这一切联系在一起。其实我想把这个想法放在第一位，所以推断的必要性是第一位的。所以我们可以补充一点，由于突触有许多细胞内特征，我只是从下面提出这个问题，布里格曼的团队，我想就是这样。所以我想比作者在原始版本中更直接地说出来。因此，由于它们具有许多细胞内特征，而且这是一种细胞外污渍，我们在前一句话中刚才说过，我们不需要重复布里格曼的团队无法直接看见、可视化突触。我要在这里补充一下突触是什么，一种神经连接，也许在括号里加一点简单的解释，以防读者不知道。因此，现在我们已经删除了其中的所有材料，我们不需要重复，然后是这种过渡，为了解决这种模棱两可之处，我认为我们也不需要那样。因此，由于突触有许多细胞内特征，布里格曼的研究小组无法直接可视化突触。我要添加这个词，但在这里。但是，他们无法直接将它们可视化，因此他们要推断出来。但是根据形态学，他推断了假定的突触的位置和大小。其实我要把它改成他们，因为参与这项研究的不是一个人，而是一个团队。因此，让我们把它留给团队和他们。他们推断了假定的突触的位置和大小。然后我将把它总结起来，然后再次将其包含在本段中。他们还用第二块纸巾染色，我要补充一点，他们用细胞内污渍弄脏了第二块组织。我推断出来，我猜他们一定使用了细胞内染色剂，因为它们能够染色那些细胞内特征。因此，他们还用细胞内染色剂染色了第二块组织，该染色剂显示了突触相关特征。在最初的句子中，有，它们被弄脏了，然后突触特征被弄脏了。于是那里又被弄脏了。所以我认为这会更顺畅一些。因此，他们还用细胞间染色剂染色了第二块组织，该染色显示了与突触相关的特征。然后还有最后的想法，我实际上要把它放进来让它变成一个复杂的句子，所以他们用第二块组织做了这个实验，以揭示与突触相关的特征。因此，我认为这里的想法是尝试利用这些信息来根据形态学来确认他们在第一个污渍中发现了什么。所以我想我们可以用分号将这两个想法联系在一起，它们相互关联，我只想说它们关联了突触图。因为我们得到的突触图是用形态学来猜测第一块染色的，而且我们有一张基于第二块组织的实际细胞间染色的突触图。所以我们可以这样说，他们将第一块和第二块组织之间的突触映射关联起来。我们可以在那里多写几个单词，我认为突触映射就足够了。再说一遍，我要请作者在这里添加一段话，讲述他们解决的关于特定单元格方向性的争议。因此，为读者多解释一下，这似乎是布里格曼博士研究中非常重要的一部分，所以让我们来详细了解一下。然后我们进入最后一段。最后一段有一个不错的想法，它与我们的起点息息相关，对吧，所以我们开始了将整个大脑上传到计算机上的整个想法。我们将在最后一段中回过头来谈这个问题。所以我只想稍微调整一下，甚至可以将这种联系带回开头，甚至更强烈一点以获得不错的结局，然后我只想调整一下这里的语言中的一些内容。所以请注意有几个，最后一句话听起来有点学术性，因为我们有很多名词，比如重建、准备、成像、测绘。这些都是可能是动词的名词。所以我想我们可以通过转动其中一些名词和动词来简化这个问题。因此，全脑回路重建的下一步将是，我将离开重建，让我们不要说大样本的制备，而是不需要说大样本，因为我们说的是全脑，所以这有点暗示。因此，做好准备，不是准备，而是准备。使用SBEM对小鼠大脑进行成像，而不是成像，进行成像和映射，进行准备、成像和映射第一个小鼠大脑，或者绘制整个小鼠大脑的图像。那种显微镜。所以，我认为我们可以浓缩所有这些，在整个大脑SBEM上进行成像和映射，以绘制整个小鼠大脑的地图，我想我们可以摆脱所有这些。简而言之，全脑回路重建的下一步将是使用SBEM对整个小鼠大脑进行准备、成像和绘制地图。所以我认为这样更干净、更快，而且你在那里使用那些不错的动词，你可以更快地理解整个想法。然后我们想说这是哺乳动物第一个完整的连接体，我就把这个术语留在那里，现在这是一个不错的流行语。因此，尽管有点像流行语，但大多数人都熟悉流行语。所以我们可以说这将代表哺乳动物的第一个完整连接体，所以这就是整个大脑，大脑中的所有连接的概念。我还要补充一下将我们与起点联系在一起的最后一点想法。而且这将是有史以来最接近永生的一次，所以我回想起永生的概念，哺乳动物的大脑。所以我认为这可能是一个公平的说法，它只是一个不错的结局，可以将我们与起点联系起来。所以我认为这篇论文读得非常好，我做了一些小事来简化这里和那里的写作，浓缩了一些东西，我稍微改变了组织。我回过头来找作者说，在修订版中，我突出显示的所有单词都可能看看你能否更简单地说一点，或者顺便说一句，为读者提供一点定义，尤其是那些不是来自神经病学的读者。添加一段关于已解决的争议的段落。除此之外，在这个问题上没有太多其他事情要做。也许可以回到那个电子显微镜段落，看看那里有什么细节可以削减。但我觉得它读得非常好，一开始它是一篇非常不错的论文，希望通过这样的编辑过程对你自己的论文处理方法有所帮助。