References/resources:
Russell/Morrison Grant Writer's Handbook
George Gopen & Judith Swan, The Science of Scientific Writing
https://www.americanscientist.org/blog/the-long-view/the-science-of-scientific-writing
Strunk & White, Elements of Style

(1) What is your goal? (2) Know your audience, know your audience, know your audience.
Where do you need to start your story so they're ready for your big idea?
What do they need to learn or see along the way?
Focus your argument
It's not about everything YOU know, rather, what THEY need to know (including what they need to know you know – controversies, alternatives, potential problems).
Give hard-headed reviewers room to hold onto their biases AND have room for your idea.

Keep it simple.
Active voice is preferable.
Own the work or statement when you need to – I/We/Our is okay when it's YOUR work or YOUR idea
Simple sentences create stronger points.

Make every word work.
Simple sentences create stronger points.
Test a word's workload (and your thought process) by cutting your text in half and then in half again:

"are planned/designed to" = will	"It is our expectation that" = We expect
"will allow" = enable	"are dependent upon" = depend on
"the question of whether or not"	"all of the members of the Center" = "all Center members"
= whether	"the Department of Whatever at Duke" = Duke's Department of Whatever

Doing this makes a stronger case and saves space, allowing you to share more of what the reviewers need to know.
Say what you mean, mean what you say….

Recap of "Gopenization":
Put a backwards link at the beginning of sentences – at very beginning, start from common ground
Make the "whose story is it" the SUBJECT
Put the ACTION in the verb
Put the important, new information at the end of the sentence (the "stress position").
Put the important, new information at the end of the main clause. Let the main clause end with the period.
Relate the next sentence to that important information with a quick backwards link.

Paragraph Structure:

DO EITHER:
Topic Sentence. Old information ACTION new information. Old ACTION new. Old ACTION new.

Topic Sentence. First supporting statement. Second supporting statement. Third supporting statement.

DO NOT:
"Topic" Sentence. New ACTION Old. New ACTION Old. New ACTION Old.   I'm dizzy – going backwards too much
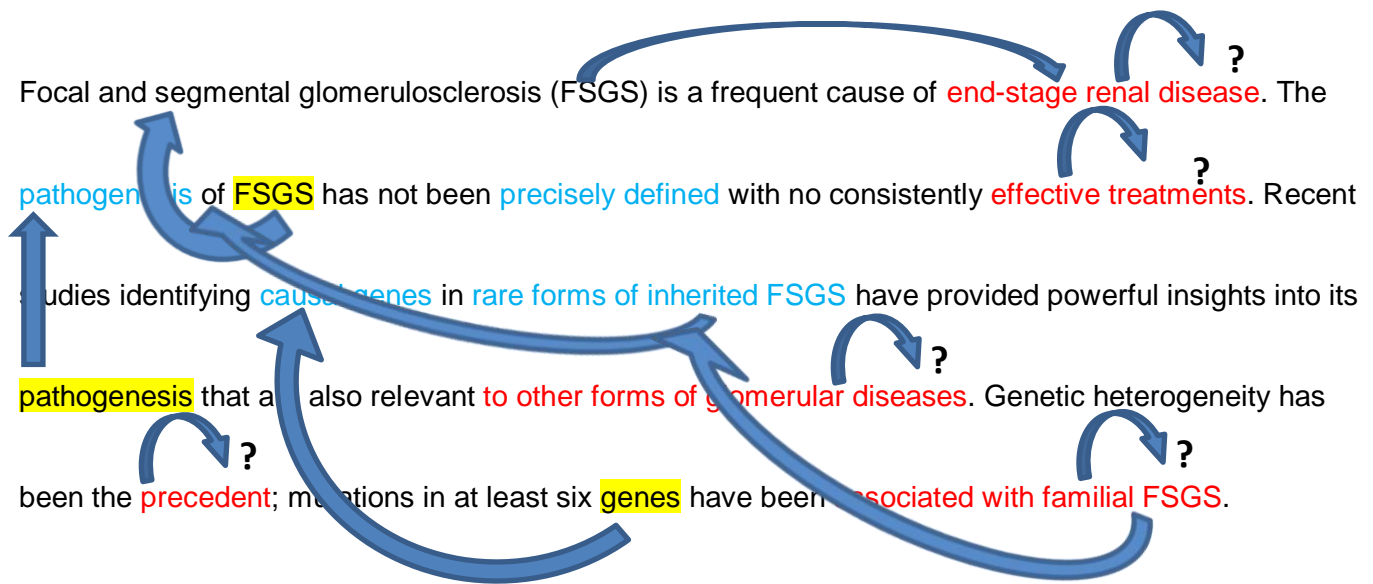
2 – where did I see this before?

An example (first paragraph from a new U.S. National Institutes of Health R01 application):

Focal and segmental glomerulosclerosis (FSGS) is a frequent cause of end-stage renal disease. The pathogenesis of FSGS has not been precisely defined with no consistently effective treatments. Recent studies identifying causal genes in rare forms of inherited FSGS have provided powerful insights into its pathogenesis that are also relevant to other forms of glomerular diseases. Genetic heterogeneity has been the precedent; mutations in at least six genes have been associated with familial FSGS.

Let's examine the "Stress Positions" and the backwards links:

Focal and segmental glomerulosclerosis (FSGS) is a frequent cause of end-stage renal disease. The pathogenesis of FSGS has not been precisely defined with no consistently effective treatments. Recent studies identifying causal genes in rare forms of inherited FSGS have provided powerful insights into its pathogenesis that are also relevant to other forms of glomerular diseases. Genetic heterogeneity has been the precedent; mutations in at least six genes have been associated with familial FSGS.

NONE OF THESE STRESS POSITIONS LEAD THE READER ANYWHERE! The content that is in the stress positions is never referred to again. Backwards links are stretched at best.

Focal and segmental glomerulosclerosis (FSGS) is a frequent cause of end-stage renal disease. The

pathogenesis of FSGS has not been precisely defined with no consistently effective treatments. Recent

studies identifying causal genes in rare forms of inherited FSGS have provided powerful insights into its

pathogenesis that are also relevant to other forms of glomerular diseases. Genetic heterogeneity has

been the precedent; mutations in at least six genes have been associated with familial FSGS.

(blue = new information that isn't in the stress position; red = stress position; yellow highlight = possible
backward link)

LET'S RE-WRITE:

While focal and segmental glomerulosclerosis (FSGS) is a frequent cause of end-stage renal disease,

no consistently effective treatments exist. One reason for this is that the pathogenesis of FSGS is

unclear. However, in rare familial FSGS, our recent studies have identified causal mutations in at least

six genes. Each of these six genes clarifies the molecular mechanisms of glomerular injury and may

represent targets for developing novel therapies. Notably, because the FSGS genes found to date are

also relevant to other forms of glomerular diseases, discoveries made through genetic studies of FSGS

may offer opportunities both to improve treatment of glomerular disease more broadly and to help

Bingo!

prevent end-stage renal disease. Thus we propose to expand ….

Exercise:

Where should/could the following sentences lead?
(Hint: the next topic should be either the first thing mentioned (the subject), or the last thing mentioned (the stress position))

Erectile dysfunction affects most men over 70 years of age and is considerably more common in men with diabetes.

In atherosclerosis, an insult to the endothelium stimulates an inflammatory response that causes infiltration of immune cells into the arterial wall and subsequent formation of foam cells.

The VA healthcare system is the largest US cancer care provider.

Thoracic and abdominal aortic aneurysms are largely treated by surgery due to a lack of pharmacologic agents targeting specific pathogenic mechanisms.

Chronic stress has significant effects on the brain, including on its morphology, pathology, and function.

Only two approaches have been proven to help reverse chronic stress's effects on the brain – aerobic exercise and mindfulness.

WARNING: Do not "Gopenize" your sentences without carefully evaluating whether what's in the stress position is what NEEDS to be in the stress position! "Gopenizing" creates a path for the reader to follow – make sure it's the right one!

Out of all the words available, how do you pick the right ones to use?
    What is your story? What is your research story?
    Where do you need to start, and where do you need to end up?

What makes an easy-to-follow story? Let's look at Goldilocks and the Three Bears

Once upon a time, there was a young girl named Goldilocks. One day Goldilocks was skipping through the forest when she came upon a cottage that belongs to the Three Bears. She knocked, but upon receiving no answer, she went right in.

Once inside, she discovered bowls of porridge and realized she's hungry. She tried one bowl – this porridge is too hot. She tried another bowl – this porridge is too cold. She tried the third bowl – this porridge is just right – and she ate it all up.

She then decided to rest her tired feet and she sat down in a chair – this chair is too big. She tried another chair – this chair is too small. She tried the third chair – this chair is just right. But no sooner had she settled into the chair than it splintered into a thousand pieces.

Now very tired, Goldilocks went into the next room, where she saw three beds. She tried one bed – this bed is too hard. She tried another bed – this bed is too soft. She tried the third bed – this bed is just right. Goldilocks snuggled into the bed and fell asleep.

While she slept, the Three Bears returned. "Someone's been eating my porridge," said the Papa Bear. "Someone's been eating my porridge," said the Mama Bear. "Someone's been eating my porridge," said the baby bear, "and it's all gone!" In the next room, Papa Bear said, "Someone's been sitting in my chair." And Mama Bear said, "Someone's been sitting in my chair." And Baby Bear said, "Someone's been sitting in my chair, and they've broken it all to pieces!" They entered the sleeping room, and Papa Bear said, "Someone's been lying in my bed." And Mama Bear said, "Someone's been lying in my bed." And Baby Bear said, "Someone's been lying in my bed, and they're still there!"

At this, Goldilocks awoke with a start, leapt out of bed, and ran out of the house, never to return again.

Keys of an easy to follow story –

There's a beginning [set the stage], middle [what happens sequentially], and end [the stage clears]

Parallel construction lets the reader start to predict what's coming [too hot, too cold, just right; always Papa Bear, then Mama Bear, then Baby Bear]

Cues regarding time and place [bolded below]

Addresses the "who, what, when, where, why, how" at each step

Gives the bottom line [underlined below]

No surprises [dragons enter the house while Goldilocks sleeps!]

No "red herrings" [i.e., the narrator spends paragraphs and paragraphs describing the little bushes around the Bears' house, but the bushes never reappear in the story – she doesn't hide in them, the bears aren't hiding in them, Prince Charming isn't hiding in them, they didn't attract her attention…; time isn't spent describing how she's raised by her grandmother, or where she got her coat, etc.]

It starts in just the right place [the story would start "too early" if it began with what she did earlier that morning, and it would start "too late" if it began when she was already tasting porridge]

Goldilocks and the Three Bears

Beginning: Once upon a time, there was a young girl named Goldilocks. One day Goldilocks was skipping through the forest when she came upon a cottage that belongs to the Three Bears. She knocked, but upon receiving no answer, <u>she went right in</u>.

Middle: **Once inside,** she discovered bowls of porridge and realized she's hungry. She tried one bowl – this porridge is too hot. She tried another bowl – this porridge is too cold. She tried the third bowl – this porridge is just right – and <u>she ate it all up</u>.

She **then** decided to rest her tired feet and she sat down in a chair – this chair is too big. She tried another chair – this chair is too small. She tried the third chair – this chair is just right. But no sooner had <u>she settled into the chair than it splintered into a thousand pieces</u>.

Now very tired, Goldilocks went into the next room, where she saw three beds. She tried one bed – this bed is too hard. She tried another bed – this bed is too soft. She tried the third bed – this bed is just right. Goldilocks <u>snuggled into the bed and fell asleep</u>.

While she slept, the Three Bears returned. "Someone's been eating my porridge," said the Papa Bear. "Someone's been eating my porridge," said the Mama Bear. "Someone's been eating my porridge," said the baby bear, "and it's all gone!" In the next room, Papa Bear said, "Someone's been sitting in my chair." And Mama Bear said, "Someone's been sitting in my chair." And Baby Bear said, "Someone's been sitting in my chair, and they've broken it all to pieces!" They entered the sleeping room, and Papa Bear said, "Someone's been lying in my bed." And Mama Bear said, "Someone's been lying in my bed." And Baby Bear said, "Someone's been lying in my bed, and they're still there!"

End: **At this,** Goldilocks awoke with a start, leapt out of bed, and ran out of the house, <u>never to return again</u>.

Applying this to YOUR story:

Set the stage judiciously – start with "common ground" or shared understanding that will take you (and your readers) where you need to go as quickly as possible.

Focus the background on what's important to advance your story – **not** everything you know. Focus on:

- What do readers/reviewers NEED TO KNOW to keep up with you?
- What will allow them to be ready for your plan and embrace it?
- What will allow them to evaluate your plan?
    - This is an important problem/gap (what is known and what is unknown)
    - This is the right question to ask (directly solves that gap or contributes to the solution)
    - This is the right way to answer that question & help solve that problem/gap
    - You are the right person/people to do it. [track record, training, feasibility, preliminary data, thought process]

Use headings and subheadings to keep yourself focused and your reader oriented – This is your Significance section, these are the four or five or eight things that are significant about YOUR project. Restrict yourself to the indicated topic. If you find yourself going on about something else, evaluate whether the reader really needs to know it or it's just your favorite part. If the reader needs to know it, you might need to re-evaluate your subheadings.

The space occupied by a topic should be directly related to its relative importance – mention in passing the things that need to be mentioned but not explained, and explain all of the things that need to be explained. Remember that some people have tendencies to write more about the things they know best, and others to write about the things they know least – make sure to attain balance based not on your own familiarity but on the topic's importance to the Project & the reviewer.

Keep the reader oriented – with cues about time and place – when you shift topics, or timing, or who'll be doing what.

- Address the who, what, when, where, why, how at every step.

Never leave out the bottom line. Never force reviewers to draw the conclusion. Corollary: Always be sure your stated conclusion is fully supported by the evidence you have presented.

Be concise – Make every word work.

How to work through your own text:

Option/Step 1 (Joanna's tip):

Cut your text in half and then in half again (by word count).
- Make every word work. (Is this word or phrase working to advance the argument and story, or did it just let me keep typing while my brain caught up? How can I say the same thing (or something even stronger or more accurate) more efficiently? Beware of prepositional phrases. See Strunk & White – "Omit needless words." – for excellent examples.)
- Helps you focus on exactly what you need to convey and where you're going.
- Allows you to look at and weigh each word and each phrase separately.
- Provides a different perspective from which to read/review your text.

Option/Step 2, Gopen's instructions:

Take your raw, unedited document.

Consider a few of the reader expectations:
- New, important information in the stress position(s) – end of sentence, end of main clause
- Backwards link of "old information" at or very near the front of each sentence. (**Joanna's tip**: don't neglect regular transitions!)
- "Whose story" at the front.
- Action in the verb.

Now, consider your document:

- Look at what's in your stress positions – color each one red, for example. One by one, decide if that's the info in that sentence you want the reader to emphasize. If it's not, figure out what it is you want them to emphasize, and work to get it at the end of the sentence. **Joanna's tip**: Make the sentence simpler, with JUST ONE NEW IDEA per sentence.

- Look at your backwards links and highlight them – do you have them? Are they at the beginning of the sentences? Are the ideas/words to which they refer close by? Ideally, they should be adjacent (i.e., the backwards link refers to the preceding stress position) or the overall "whose story" for that paragraph, depending on the structure of that paragraph.

- Look at your subjects – is that "whose story" you're trying to tell?

- Look at your verbs – do they hold the sentence's action?

What are your habits? Fix it in this one, and then in the next document you write, or the one after that, try to catch yourself doing it again. You don't have to force yourself to stop doing those things, you just need to go back through and make it easier on the reader after you've gotten it all on paper. **Joanna's tip**: Do this with your emails and text messages so you get regular practice to make the process feel natural.

➢ When you read the final version, think about your audience and whether they'll be able to follow easily. Make sure your backwards links move them through the text like a bouncing ball. (Gopen calls this "leaning forward".)
➢ Say what you mean, mean what you say….
➢ Keep it simple – focus your argument, use parallel construction.