Research Statement Worksheet

What is your big picture research question? Rewrite this in TEN words or fewer.

Why is your research question important?

What specific areas do you plan to focus on?

What results have you obtained thus far?

What are your future directions?

1.

2.

3.

Worksheet format developed by Christina Petersen 2015
Impromptu talks
from The Chicago Guide to Your Career in Science | Victor Bloomfield & Esam El-Fakahany

Effective speaking means having something to say, and making it fit both the occasion and the audience. Having something to say is (or at least seems) obvious - if your speech is empty, a knowing audience will soon catch on. It will be much more damaging than not being there at all. But just what to say - how much, in what detail and depth - depends on both the occasion and the audience. It's been amusingly and usefully pointed out that, in addition to the familiar 50 minute lecture hour, there are several other kinds of typical "talks": the "elevator talk", the "corridor talk", and the "office talk". In each case, imagine someone has asked you "What are you working on?" You want to impress them with your ambition, insight, and accomplishments, but have only a limited time.

In all such encounters, whether thirty seconds or thirty minutes it's important to quickly gauge the degree of knowledge and expertise of your audience. Adjust the level or your talk to the level of your listener. You listeners' expertise is the key issue here, not their degree of interest.

Elevator Talk
Imagine you're in the elevator, riding between the second and sixth floors of your research building, and someone asks what you're up to. You have thirty second - maybe 50 words - to summarize your work. Could you boil your answer down to a couple of sentences? What's it about? What's interesting and new? Why do you think it's important? [Why should others think it's important?] A tough task, but sometimes you'll have just a few moments to chat with someone important, and if you come out with something that they can understand and that piques their interest, the follow-up could be significant.

Corridor Talk
The corridor talk might be five-minute-long encounter in the hall with a colleague you haven't seen in a while, who might have a visitor in tow. You have no visual aids or blackboard, just your voice, demeanor, and gesturing hands. You can go into more detail than in the elevator, but not too much more. Can you capture the essence of your research, put it in context, indicate the key problems and puzzles, sketch your approach, summarize results to date and what you hope for next, all in five minutes? You can't go into a lot of details, but you want your listeners to come away with a good sense of your problem and its scientific importance, of your clever and thoughtful approach to the project, and of the contributions you've made and hope to continue to make.

Office Talk
In the office talk, you have twenty minutes and a blackboard but no other props. This is fairly typical for a meeting with a visiting speaker, who goes around the department before his or her talk, learning what the faculty and students in the department are doing. Anyone who has participated in these exchanges, from either side, knows that it's a challenge to stay interested...while someone drones on about their research. How can you keep the visitor interested, so they will leave with some recollection of what you do, a feeling that you do it well...? You have more time, but again, you don't want to get bogged down in details. You want to put the problem in context, then spend some time on what work you and others have done up to this point; what the major unresolved issues are, how you're addressing them, what the progress is so far, and what you think the next steps are. Some well-conceived diagramming on the board may make things clearer.

Just as important, you now have time to engage the visitor in dialog, to make this a two-way discussion among scientific peers, each of whom has something to contribute. In classroom instruction, we call this "active learning", a situation in which the students are not passive by standers and recipients of information but instead are engaged in trying to formulate, understand, and find solutions to a problem. It's a good way of keeping people interested and getting them involved so they will remember what went on....

Where can I use my statements?
Research "Elevator Talks"

In the job search and interview process you will have some very brief, yet critical, opportunities to describe your research to departmental faculty, institutional administrators, and students. You'll want to be able to convey the nature and significance of your work to other academicians, who will have a wide range of areas of expertise. As with many situations, it's important to hook your audience early on, to convince them that what you do is important and that they want to hear more about it. To that end, it may help you to think about what you could say in the time of an elevator ride. Participants from our Preparing for an Academic Career in the Geosciences Workshops have found it helpful to draft such statements in preparing for the interview process.

Examples from "Preparing for An Academic Career" Workshop Leaders

- Kurt Friehauf, Professor of Geology, Kutztown University of Pennsylvania

**Version 1:** I am an economic geologist, so I deal with the geology of economic mineral deposits. Most of my work is in copper and gold mines, but I also study molybdenum, iron, and rare earth elements deposits. My research helps mining companies discover the metals we use in our everyday lives.

**Version 2:** I am a geologist who studies the ways water and rocks interact with one another. The rocks in the earth's crust may seem solid, but they're actually more broken up than an old country road in a poor county. The cracks are generally filled with water that's squeezed into circulation by the earth's heat and pressure. As the water flows through cracks, it chemically reacts with the rocks on the sides of the fracture. In a sort of yin/yang way, the water causes new minerals to form in the rock and, at the same time, the rock changes the chemistry of the water. When the waters contain dissolved metals, changes in the chemistry can cause the metals to deposit to form valuable veins of gold, copper ores, and many other metal resources that we dig up to make the modern world in which we live.

I study the minerals in active copper and gold mines to deduce the chemical characteristics of ancient geothermal waters that form ore. Knowing how mineral deposits form helps us figure out where we can efficiently and responsibly explore for new mineral resources.

**Version 3:** I study the chemical interaction between water and rocks – especially when those reactions form mineable metal deposits. Most of my work integrates (count out on fingers for visual supplement):

1. Making geologic maps in active copper, gold, and molybdenum mines to determine the spatial distribution of minerals, with
2. Microscopic studies of samples to determine the timing relationships between mineral assemblages, and finally
3. Thermodynamic analysis of the minerals present to calculate the chemical composition of ancient ore-forming waters and deduce the chemical reactions that were key to depositing valuable metals.

By understanding what causes minerals to deposit, we can develop new models that predict where we might find new resources and mine them in an environmentally responsible way.

Kurt's explanatory comments:

- Version 1 is brief, but commonly leads the listener to think I'm an economist and not a geologist.
- Version 2 is more or less what I tell folks when they ask me what I do. The language is simple and attempts to be approachable by using the image of the country road. Most people seem to get what I do when they hear this. I have learned not to tell people that I study the geology related to mining right up front because most people have a very negative view of mining and so would stop listening as soon as I said the word "mining." This talk would likely be considered condescending to a scientist listener, so I would say something more technical if my audience was a scientist.
Version 3 would be what I would tell a scientist (biologist, chemist, physicist, fellow geologist, etc.).

Margot Gerritsen, Associate Professor of Energy Resources Engineering, Stanford University

I generally use something like the below for research related audiences. Note that I wrote it in really short and not too beautiful sentences because it is meant to be spoken and I speak much more simply than I write.

Depending on the audience, I may throw the information around a bit. Sometimes I start with the applications (wind, climate, ocean currents) and then mention computer modeling.

**Shortest version:** I am a computational engineer. I love building computer models that simulate natural or engineering processes. I particularly enjoy simulating fluid flows, such as wind, ocean current, but also the flow of water, oil or other fluids deep in the ground. The computer models are like "virtual laboratories" that allow us to observe the processes (which we cannot do in nature) and play with them. We can use this improved knowledge to better predict weather or climate, or improve the design of groundwater remediation or oil production systems.

... sometimes I go on like this: All of these processes are really complex. You have to pay close attention to how you model them mathematically so as not to give a false picture. This is a wonderful challenge. Also, the models are huge and really expensive to run. Figuring out how to implement the models on the computer so they run most efficiently is another great puzzle.

... and sometimes I add something like this: This research sits at the interface of mathematics, physics and computer science. I therefore get to work with very diverse teams of experts and that is really exciting.

**Examples from Stanford University Graduate Students and Postdocs**

The Stanford University L-RITE/L-SPEAK program teaches graduate students and postdocs to prepare and deliver highly understandable, compelling oral and written accounts of their research for non-specialized audiences. The examples below are geoscience examples taken from their archive.

- Jamie Elsila, *Extraterrestrial Messages: What Meteorites Can Tell Us About the Early Solar System*
- Nancy Grumet, *The Good, The Bad, and The Ugly: Climate Change*
- John Harrison, *Agriculture and Pollution in the Developing World: Understanding the Link Between Fertilizer Use, Greenhouse Gases, and Coastal Change in Soren, Mexico*
- Cari Johnson, *Dinosaurs in the Land of Genghis Khan: The Geologic Evolution of Southeastern Mongolia*
- Darcy Karakelian, *Electromagnetic Precursors to Earthquakes: Do They Exist?*
- Cynthia Martinez, *Understanding Mountains Out of Molehills: Why Looking at Old Dirt Can Tell Us How Mountains Form*
- Phil Resor, *How Does the Earth "Relax" After an Earthquake?*
- Kamini Singh, *Scanning the Earth to Help Predict the Movement of Contaminants in Groundwater*
- Kevin Theissen, *Interpreting Global Climate Change: Clues From the Past*