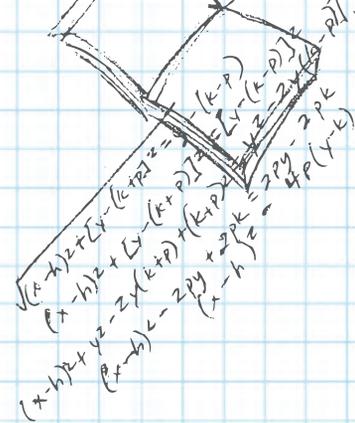




RESEARCH COMMUNICATION 101



Six tips for communicating your research project outside of the lab

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As a physics student, you rightfully spend most of your time assimilating centuries of general physics knowledge, which your professors try to cram into your brain in four years. Acquiring this foundation is your top academic priority. But in the midst of absorbing all of these “old” ideas, you also need to foster the skill of originating new ideas.

At the next level (graduate school or a job), one’s creative skills differentiate excellence from mediocrity. Nobody solves textbook problems or takes exams for a living. Soon, others will judge you on your research initiative, your imagination, and your ability to communicate in writing and in presentations.

01 TAKE FULL ADVANTAGE OF EVERY OPPORTUNITY TO IMPROVE YOUR COMMUNICATION SKILLS. When professors require you to write reports or a senior thesis, they add a significant burden to themselves by agreeing to mentor you and edit your reports. They know that writing is essential, and good writing comes only with experience. When participating in a research group, seek to publish with your advisor in an academic journal or to present a talk or poster at a professional meeting. Some professional meetings even sponsor travel for undergraduates. It never hurts to inquire.

02 START THE WRITING PROCESS AS SOON AS YOU IDENTIFY YOUR PROJECT, EVEN BEFORE YOU HAVE RESULTS. If you can’t write about your project, you probably haven’t done enough homework in defining it. Writing can expose weaknesses in your plan and force you to get some real ideas. Writing will clarify the scope and direction of your project.

03 WRITE AS MUCH AS POSSIBLE AS YOU DO YOUR RESEARCH. Begin by outlining section titles of your document and by sketching in information as you gather it. Describe the motivation for your research. Place it in the context of prior work. Make a list of references as you read academic papers and give appropriate credit as you summarize the works of others. Not doing so is a form of plagiarism.

04 OBTAIN FEEDBACK AT EVERY STEP. Go over your outline with your research mentor and rearrange, add, and delete sections. This is much less painful in outline form before you write full paragraphs. Make brief notes indicating what will go into each section (e.g., a summary of research by Group X, a schematic of an experiment, a blowup view of a critical component, etc.). Generate professional-looking figures, schematics, and tables while they are fresh in

your mind. These will help refine the structure of your writing. Schematics and graphs should be simple, well organized, and labeled.

05 REMEMBER THAT THE SEQUENCE OF INFORMATION PRESENTED IN EACH SECTION AND PARAGRAPH SHOULD FOLLOW A LOGICAL FLOW. Continually ask yourself which paragraphs and sections should appear before others. Use a key sentence in each paragraph, usually near the beginning, to define the ideas that the paragraph conveys. Don’t hesitate to split long paragraphs at logical places.

06 EDIT YOUR WORK. Learn to fix mechanical and grammatical errors yourself. If you think you don’t have a problem, ask yourself whether you understand the difference between “effect” and “affect.” Should the period in the previous sentence be placed before or after the quotation mark? Have your work reviewed by someone in your campus writing center or a writing tutor. You don’t want people to miss your message because they don’t understand what you mean! Before asking others to review your document, have the common courtesy to reread it yourself first, preferably after setting it aside for some time. Expect to go through multiple drafts.

Good talks have much in common with good writing. If possible, write a report before you give a talk. It will crystalize your ideas. When introducing your talk, never underestimate the pleasure that it gives your audience to hear something they already know; if they get lost in the beginning, they will be lost for the entire presentation. Put a title or a concise descriptive sentence at the top of each slide, which helps wandering minds rejoin you. Use large fonts and high contrast (e.g., dark text on white background). Label your graphs and keep your slides free of extraneous information. Remember, the talk is not about you; don’t dwell on early attempts or failures. Get to the good stuff. Speak clearly. Speak loud enough. No “uhms.” Smile.

Good writing and excellent presentations require clarity of thought. Communicating your work should never be an afterthought. Everyone has experienced the frustration of being on the receiving end of poor communication. Don’t be that person! No matter how well you understand physics and no matter how imaginative your research, if you cannot communicate your ideas clearly, they benefit no one. //

ADDITIONAL RESOURCES

- AIP Publishing Author Resources Center
<http://publishing.aip.org/authors>

