

“BUT NOBODY TOLD ME THIS!”



**Planning for success beyond your
PhD ... helping serendipity**

(The whiskey (beer) advise: *what I wish I had been told earlier*)



OUTLINE

- Setting goals
- The ideal student: things we look for
- Getting to your goals; it is more than physics:
 - Don't count on luck, help luck meet you
 - What to do, what to focus on, what to prioritize?
- The ideal advisor: questions to ask
- The ideal group: your scientific family
- You are ALWAYS interviewing
- The recommendation letter: we don't write it, YOU do!
- Self examining progress, seeking help when needed
- TAMU Physics: times are changing

SETTING GOALS

Tell us your long term goals early: **not all training is the same**

- R1 University

Top-5 Institution

Top-20 Institution

Top-60 Institution

- 4-year college (PUI)

- National Laboratory

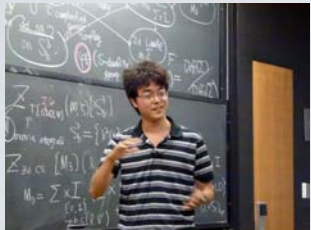
- Private sector: R&D, consulting, management, medicine, ...

THE IDEAL STUDENT: KEY SKILLS TO DEVELOP



- **COMPETENT** in her research field

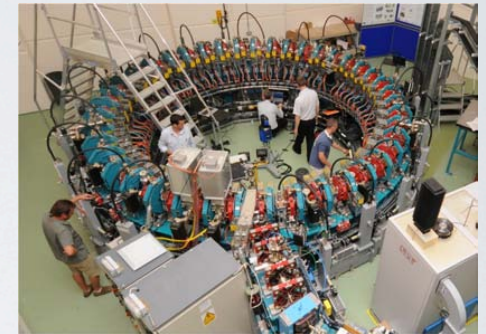
- Confident **CRITICAL THINKER**



- Skillful **COMMUNICATOR** at all levels



- Contributing **TEAM PLAYER**



- Is **CREATIVE** and **EXECUTES** new ideas



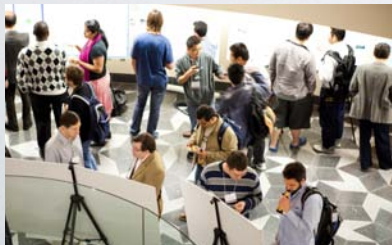
- Takes **INITIATIVE**, takes charge; measured risks



- has a **BROAD** research exposure



- **NETWORKS** efficiently and is value added to any group



GETTING TO YOUR GOALS: SKILLS ARE NOT INNATE



COMPETENT in her research field

- Courses are not things to just pass, it is **NEEDED** material to be **CREATIVE** and **EXECUTE**
- Go beyond courses: create a list of “WHAT I NEED TO KNOW” to complete projects and another list to be a complete researcher within your field
- Make a plan and a schedule to acquire that knowledge (mini-courses, reading club, organize other students, specialty course): **INITIATIVE**
- It is a **NEVER** ending endeavor. Keep on reviewing and revisiting; new connections will emerge as you get more and more professional.

GETTING TO YOUR GOALS: SKILLS ARE NOT INNATE

Confident **CRITICAL THINKER**



- Look up “Competent”, without it there is no confidence in your thinking; when reading articles ask: what is good, what is bad, what can be improved.
- DON'T be shy; you can not sharpen your critical thinking on your own
- CONNECT different subfields, need to be broad (read/study material in OTHER disciplines, be curious)

GETTING TO YOUR GOALS: SKILLS ARE NOT INNATE



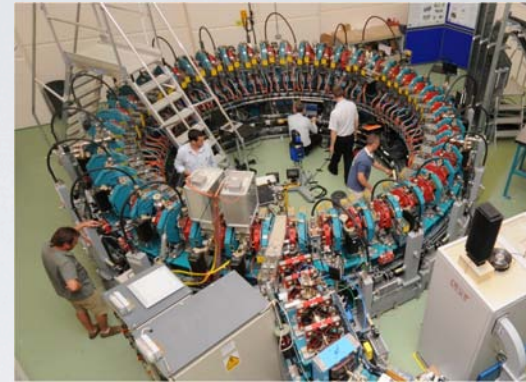
- Skillful **COMMUNICATOR** at all levels



- Public speaking is HARD: practice, practice, practice at every opportunity. GOOD ENGLISH is a must. Practice interactive teaching and direct engagement.
- STUDY good speakers, what they do, why they are successful, look at their lectures (videos) and try to reproduce them.
- The science and why it is exciting is key, but be flashy, engaging, use multimedia, outreach is not a waste of time. This is how people know about your science and abilities.
- Have your 1 min, 5 min, and 15 min talks describing your projects and interest ready, practice them often. After the 1 min talk the person should say “I want to hear more”, after the 5 min “I want to read about your work”, after the 15 min “I wish I was doing what you are doing”

GETTING TO YOUR GOALS: SKILLS ARE NOT INNATE

Contributing **TEAM PLAYER**



- Organize discussions within the group (and document them): **INITIATIVE**
- Exploit learning from other people's points of view.
- Contribute to other projects besides the ones you are leading (need several non-primary author paper); no one can work with a loner (by definition).
- Bring other people into your project to help (they will learn new skills and you will build up a better team).

GETTING TO YOUR GOALS: SKILLS ARE NOT INNATE

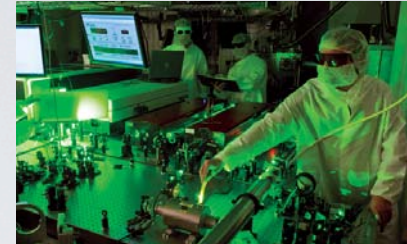


Is **CREATIVE** and **EXECUTES** new ideas

- # of papers indicate your ability to finish project
- # of 1st author papers indicate your leadership skills and competence
- Don't always ask, "what is next". Deliver on what is asked and THEN go beyond it; take **OWNERSHIP** of projects.
- You cannot be creative without being competent. The ideal progression is from beginner, to apprentice, to colleague. At the end of a project you should aim to know as much (or more) about the topic as your advisor.

GETTING TO YOUR GOALS: SKILLS ARE NOT INNATE

Takes **INITIATIVE**, takes charge; measured risks



- It is not only about the projects, it is about gaining the ability to lead. If you know it is a good idea or it will be good for you, DO IT.
- Search and exploit all opportunities offered (writing courses, search for suitable conference, apply for external support); don't wait for them to fall on your lap.
- If you need a broader perspective, **ORGANIZE** things, lead the changes and take charge.
- DON'T be afraid that an idea will not work. Examine the idea, if it is a good one and has risk but it is worth it, DO IT. Failure can teach more than success. But constant failure indicates lack of judgement.

GETTING TO YOUR GOALS: SKILLS ARE NOT INNATE



has a **BROAD** research exposure

- Most of your future colleagues will be in another discipline. Learn about them, **NEVER MISS A COLLOQUIUM**; browse through the topics **BEFORE** attending talks you are not familiar with.
- You will not be able to bridge between disciplines (and become the ultimate scientist) without a broad knowledge. Knowing about other people's research can help connect your research to theirs (better communicator).
- The fun is always in learning something new. Without exposure to new science it is difficult to come up with new ideas.
- Read about disciplines from **OUTSIDE PHYSICS**.

GETTING TO YOUR GOALS: SKILLS ARE NOT INNATE



- **NETWORKS** efficiently and is value added to any group

- You need to be liked. Social skills ARE IMPORTANT.
- Develop PEER relationships for the future.
- Be ready to connect to other researchers in other institutions and in other nations; the broader your connections are, the broader your possibilities will be.
- Do you inject energy and enthusiasm when you are in a group? Be positive, build teams.

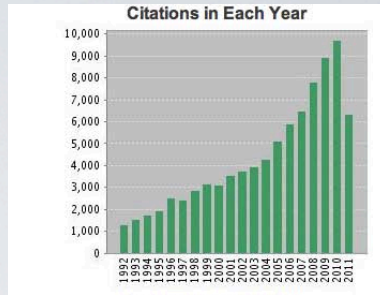
THE IDEAL ADVISOR: THINGS TO ASK BEFORE YOU SIGN ON



- **EARLY CAREER or ESTABLISHED CAREER?**



- **WHO ARE YOU?** Has national and international recognition (commensurate with career stage)



- **GOOD ADVISING RECORD:** how many people have you advised? where are they now? How many have you supported as RAs?

- **CLEAR (HIGH) EXPECTATIONS:** sets goals (reasonable), a fair opportunity, rewards, and consequences of failure

- **Good COMMUNICATOR**



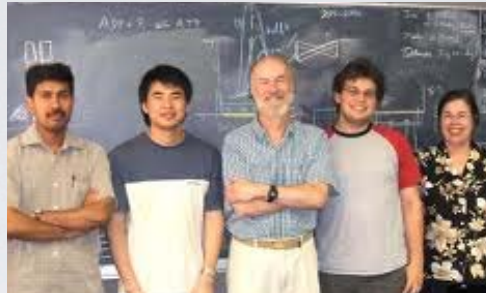
- **STUDENT FOCUS, not CLONING FOCUS**

- **TEAM BUILDER**

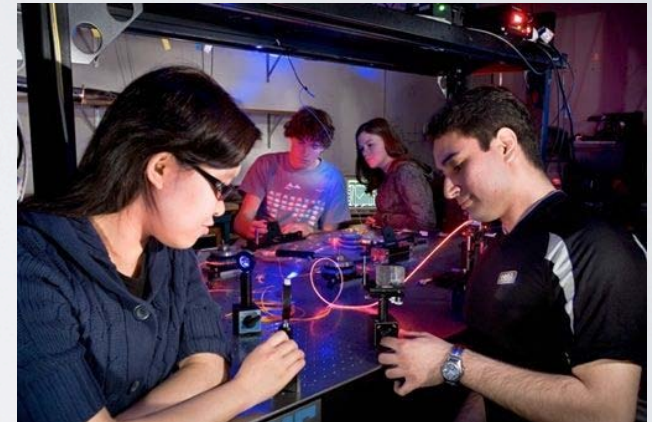


THE IDEAL GROUP: YOUR PHYSICS FAMILY

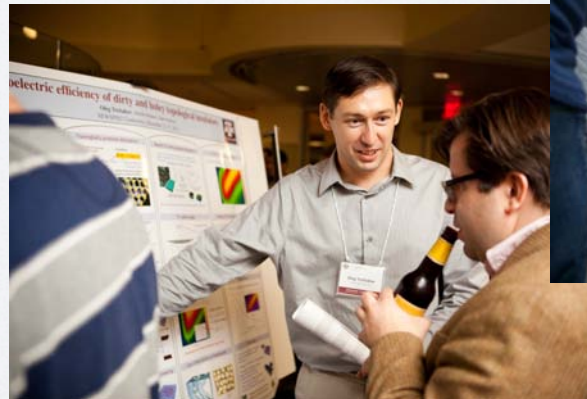
- Positive atmosphere



- Group members help each other: mutual benefit



- Social gatherings, facilitates networking,



YOU ARE ALWAYS INTERVIEWING

You never know where the next potential employer, colleague, collaborator, will come from.

When talking in public, when in conferences, when talking to a visitor, when talking to a fellow student,
you are ALWAYS ON.

How to be always on? be **COMPETENT**, be **COMMUNICATIVE**,
be **CREATIVE**, be **BROAD**, take **INITIATIVE**

THE RECOMMENDATION LETTER

COLLEGE OF SCIENCE

DEPARTMENT OF PHYSICS

Jairo Sinova
Professor



Dear Top Professor and Selection Committee:

I am writing in support of Sara Smith's application for the open (postdoctoral fellow position/ junior researcher position/ top fellowship). Sara has been my student since 20## and she plans to graduate in the spring of 20##. Sara joined our group from HERE.

The N initial projects that she was given were MEDIUM CHALLENGE #1, MEDIUM CHALLENGE #2, etc. In the first case she completed the project in (TIME HERE IF REASONABLE), learning in the process (on her own) the basic DESCRIPTION OF THE PROJECT'S PROGRESS AND ITS CONCLUSION (EMPHASIZE INDEPENDENT CONTRIBUTIONS, IF ANY), WHERE WAS IT PUBLISHED. Sara immediately followed this project with DESCRIPTION OF PROJECT #2, etc. During this time she was also involved in helping N other projects lead by other students, DESCRIPTION OF SUPPLEMENTARY CONTRIBUTIONS HERE.

Her next and principal project was MAJOR CHALLENGE HERE, which required her to learn THIS, THIS, and THAT. DESCRIPTION OF THE PROGRESS, HOW SHE TOOK CHARGE OF THE PROJECT (IF SHE DID) AND HER KEY CONTRIBUTIONS (BESIDES FOLLOWING INSTRUCTIONS) THAT GUIDED THE PROJECT TO COMPLETION. Her new theory explains these puzzling experiments and has new surprising predictions and implications that will be a guide for future experiments. She has joined efforts with the experimental group of HERE and HERE to explore these new regimes. She has visited and collaborated with these groups to understand fully any experimental artifacts and test all the consequences of the theory.

Motivated from this work, she proposed to study THIS. She planned this project fully on her own and enlisted several students, which she guided in performing some of the calculations. DESCRIPTION OF RESULTS. This work was published HERE.

When conducting her projects, she learned most of the advance techniques that are not taught in regular courses, almost entirely on her own or by interactions with other colleagues. Whenever there was some important tool that she needed to learn or developed, she made sure she found all the necessary reviews and people to consult, not just myself. Very often, if the techniques were general enough and useful for other team members to learn, she would organize joint mini-lectures among the students in which other faculty member participated.

Beyond these research and leadership skills, her communication skills are superb. Her enthusiasm for physics and her passion for the science that she creates is always present in any discussion, lecture, or seminar. Her writing style is very clear and structured, emphasizing the key physical points early in any manuscript and developing the details in the subsequent discussion. When giving seminars she focuses on communicating the physical picture, aided by multi-media and graphical representations, leaving many of unnecessary details for post-seminar discussions. Her preparation for public presentations is impressive; I have not seen her not be ready for a question, answering them with confidence and perfect clarity. She is particularly good in bringing the talk at a level that all graduate students, regardless of background and level, can understand the key challenges, how they were tackled, how they fit on the overall context of the field, why it is important, and what are the future directions.

She managed to reach this level of proficiency by attending many workshops offered within the university, which she convinced many of the other students to attend as well.

Ability
to finish

Creative,
Critical Thinker

Competent,
Initiative,
Creativity,
Execute

Initiative

Skillful
Communicator

Initiative

Team
Player

Creativity,
Leadership,
Initiative

Team
builder

THE RECOMMENDATION LETTER

COLLEGE OF SCIENCE

DEPARTMENT OF PHYSICS

Jairo Sinova
Professor



Likable, can
network

At a personal level Sara has an extremely pleasant character and is always keen on group collaborations and in helping others. She has been a very reliable member of my group and any time I ask her to do something I know it will get done and that she will take it far beyond what I asked for. I have felt that over the last years she has been one of my post-docs rather than my student.

Sets the
scale

During my career I have graduated several students, most going to postdoctoral positions such as Harvard University (Student 1), University of Maryland (Student 2), and Penn State (Student 3). Sara is (the top/ among the top / one of the better) students I have had and (easily in the top 5 / among the top half /above the average) that I have interacted with outside my group (which includes people such as NAME, now an assistant professor at Princeton, NAME, an associate professor at Berkeley, NAME, a postdoctoral fellow at Yale, and NAME, a Pappalardo Fellow in Physics at MIT). Sara is now ready for one of the top postdoctoral positions in the country, particularly one that will allow her to interact with several teams and have a commanding leadership of her projects.

She is very much ready to start a new more independent career, which I will watch with pleasure and not a small measure of pride. I recommend Sara Smith to you in the strongest possible terms. She is one of the best students I have had and I consider among the top graduate students that I have interacted with in my career. Please feel free to contact me directly if I can be of any further assistance or require any other information.

Yours Sincerely,

Jairo Sinova
Professor of Physics
Texas A&M University

SELF EXAMINING YOUR PROGRESS

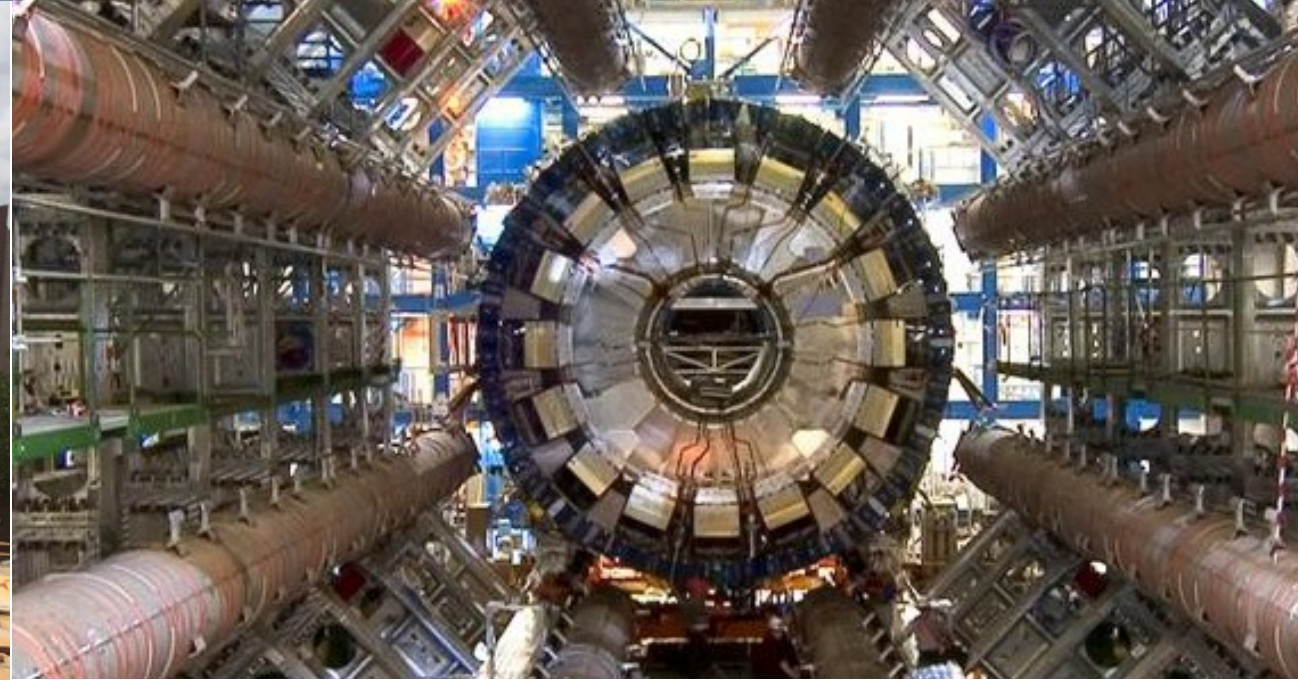
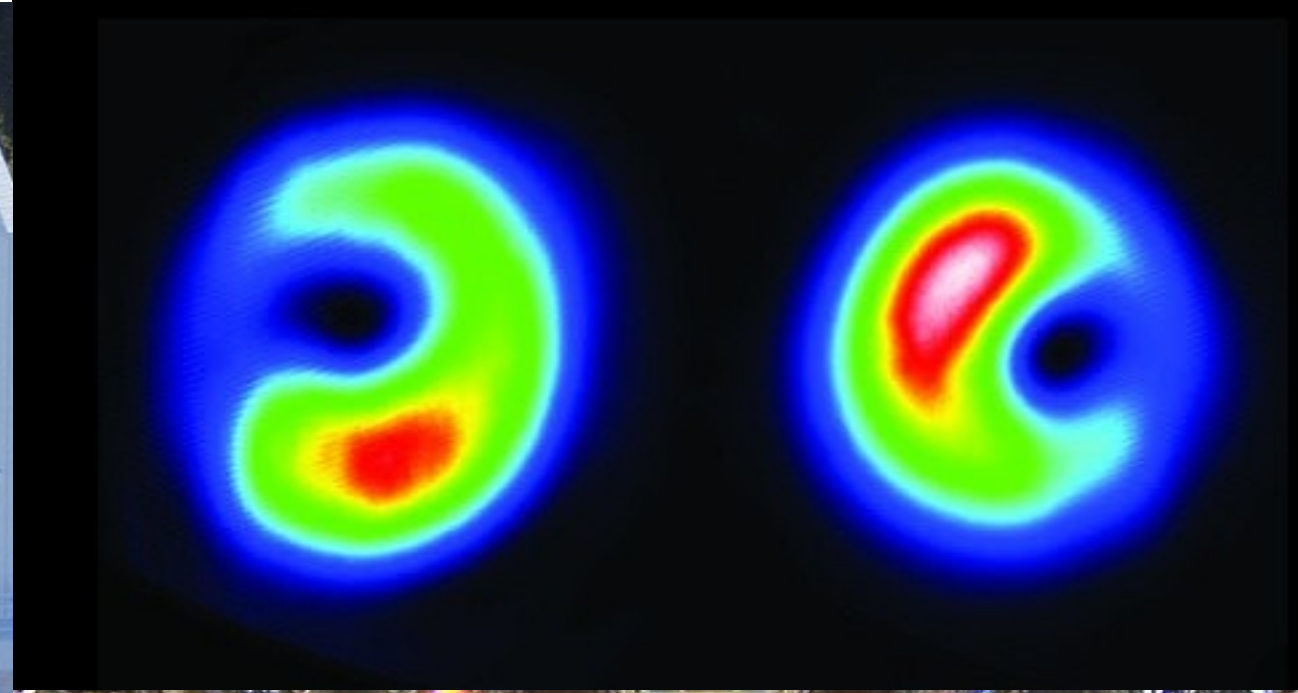
Work on your weaknesses

Improve your strengths

Do it while you enjoy it, never late to change



Physics at OU



Plenty of directions to go!

Acknowledgements: Many thanks to Jairo Sinova for providing the slides of this presentation, and making them publicly available.