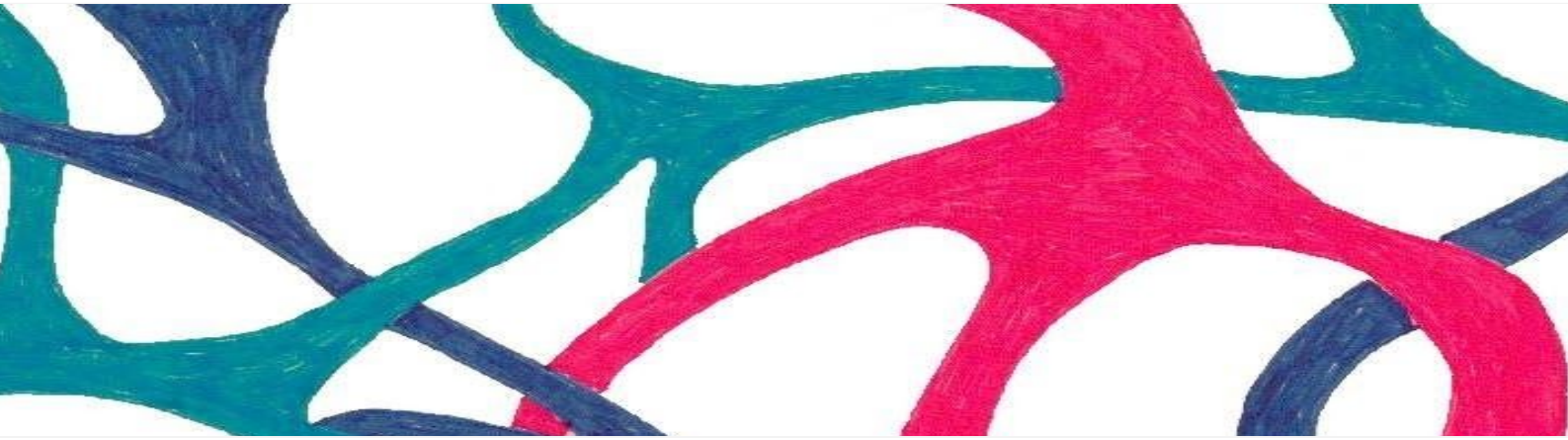
GenHET Newsletter
Issue 3, October 2020.



Mentoring in HET: Interviews

In this annex, we collect the three interviews regarding mentoring and supervision by prominent figures in high energy theory. We are extremely grateful to

Professor Luigi Del Debbio, University of Edinburgh
Professor Andrew Strominger, Harvard University
Professor Anne Taormina, Durham University

for their valuable contribution to this section! Each of them has an outstanding trajectory and record when it comes to mentoring and supervision. We thank them for sharing with us their insight, experience, and wisdom on this subject! The interviews were either carried out by email or virtually via Zoom.

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Professor Luigi Del Debbio, University of Edinburgh (website)

Are you proactive in any way about recruitment? At the PhD or Postdoc level? The context: A common scapegoat we hear in this regard is that the pool of applicants is not diverse, so it is no-ones fault that their groups are homogenous, and in particular male-dominated.

Yes, absolutely! Because the pool of applicants is not diverse (mostly white males) we need to be proactive to achieve diversity (be it for gender or race). We do look specifically for good candidates from underrepresented groups, encourage them to apply well in advance of deadlines, provide help with applications, and logistic problems: all the things that normally skew the playing field. When I think about it, I have to admit that it is harder for me to be proactive at the level of PhD recruitment. I manage to scrutinise carefully our own undergraduate students and encourage them to apply, but the bulk of the candidates are often completely unknown and it becomes harder to spot opportunities. I think I should work harder when sifting through applications. Having little time for this process of scrutiny is likely to reinforce unconscious bias.

A feeling of belonging, of having a voice, tends to be an important way to gain confidence and prominence in our field. What do you think is the role of the supervisor to empower students? Do you play an active role in giving students confidence? And if so, how?

This is a difficult one... I think students need to 'own' their projects, they need to develop a feeling that they are working on 'their' project — not on the supervisor's project. (Which is not a polite way of saying that I ignore my students!) Some of my students have become very rapidly trustworthy collaborators, leading their projects almost independently of my busy schedule, and thereby growing in confidence. Whether I manage to give them confidence... I honestly don't know. I give them a lot of responsibility and they usually try to respond. Each student is different, as you can imagine there isn't a magic recipe that will work in all cases. So we need to be constantly aware of how things are going, remember that we deal with complex, intelligent human beings. Very challenging. Sometimes it works beautifully, sometimes it doesn't. I feel this is also true for postdocs — maybe even more so.

One of the members of our network was particularly interested in the supervision of mid-career researchers, for example mentoring an assistant professor that is transitioning to leading larger groups, applying for large grants, etc. This is a topic less discussed, and the guidelines for more senior faculty are not always so clear. We find this relevant to avoid having, e.g., women getting stuck at mid-level and not raised to full professor in some systems. Do you have any advice on mentoring in this case?

It's impossible to give guidelines for senior faculty… this should be evident to anyone who has ever attended a faculty meeting!

Having said that, there are a few things that can be tried. Intellectual input is reasonably democratic: a good idea will come from anyone. Having a very horizontal structure in a group, where members share tasks, is very helpful, albeit challenging. When possible it is good to be able to apply for several smaller grants, rather than monolithic grants spearheaded by senior faculty. When this is not possible, let the less senior members of a group be PIs on grants. Prioritise PhD positions for new staff joining the group.

Encourage junior faculty to engage gradually with admin tasks. The sooner they learn the mechanisms of the institutions they belong to, the sooner they will be able to progress inside these institutions. Finding the balance between research, teaching, and admin is a challenging task for newly-appointed staff members. A gentle start in a supportive environment is a good way to get to know the system. Talk to junior staff. More importantly, listen to junior staff.

When it comes specifically to women, we have a policy in Edinburgh that staff returning from maternity leave have a buy-out from teaching for one year. It proved very useful for staff to gather momentum in their research activity, apply for grants, etc. Small statistics of course, but it seems to work.

In your early days as a supervisor, were there aspects of the role that you were nervous or worried about? All of them!
Did you seek advice from more senior members, or had a model of supervision you were trying to follow? A mix of both, and several models I was trying to avoid following.
If you had to advise a young version of you, what would you say?
As I said above, the only advice that comes to my mind is to try to be constantly aware of the progress and the difficulties of the students. Engage with them.

Is there something we are obviously not asking you and missing?
"*No teaching has ever been taught*
[…]
here at Fuyuan we don't restrain the ox".
Shih-Wu — Buddhist monk, 14th century.
OR: The above are just a few ideas that came to my mind. If they push other people to think along these lines, most likely getting to different conclusions, then we are probably making progress.

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Professor Andrew Strominger, Harvard University (website)

This interview was performed over Zoom on September 7, 2020. The transcription here includes the main parts of the conversation. Edits were done to provide clarity and context.

Andy has supervised several (many!) PhD and postdocs that are currently leaders in our field. This list is impressive for many reasons: scientific scope and impact, and incredibly diverse group of people (e.g. in terms of gender, nationality, ethnicity, among other factors). When we asked him for an interview our questions were targeted to see if we can figure out the secret behind his success, and learn from it.

The first part of our conversation regarded recruitment and hiring. And in particular aspects that affect the evaluation and judgment of applicants:

Perhaps I read applications and people differently than some others do. I think I have done well mentoring women and am very proud of it. I don't know exactly what it is that I have done that worked so well. But surely part of it is having four daughters. I learned a lot from them about how women are viewed in the world and how they express themselves. In particular, I saw a lot of discrimination already when they were in elementary school which really shocked and outraged me. Although all of my daughters have prospered, it made me more sensitive to the little ways people sometimes talk about women that are slight put-downs. Different adjectives are used for women and men. For example, studies have shown the word "brilliant" is often used for men but rarely for women, for which "super-smart" is more common. I have learned to filter those biases out when I read recommendation letters.

Women are kept back at every stage in life in subtle and different ways. A certain kind of aggressive male behavior (not that there aren't aggressive women) is sometimes practically identified with intelligence. It is expected that if you are intelligent you will behave in that aggressive way. If you don't --if you just sit in the back, think and don't feel comfortable speaking up-- then you are not intelligent. And maybe this is stereotyping on my part, but I have noticed that some of the women that I have worked with will often wait a while before they say what they think, while some men will jump in a kind of race to say it first and be the "smartest" and draw attention. Those are just social behaviors, not traits of intelligence. The ones who do wait longer to speak often have something very interesting to say when they finally do. I have been able to recognize that the skills that it takes to do theoretical physics are expressed very differently by different people.

When I look at the applications I do take gender into account insofar as it affects the way letters of recommendation are phrased. And I think many people don't. So that might sometimes be perceived

as my unduly favoring women, but I don't think it is. Many people can't see which women are good, so I am able to recruit better women to my group because other people aren't figuring it out. This has certainly worked to my advantage! In general many are unable to see that there is a difference between how a talented woman expresses themselves and how a talented man expressed themselves. This applies at all levels: grad students, postdocs, and faculty.

Our conversation then focused on daily interactions with students and the group dynamics…
In my opinion, in theoretical physics, we suffer from the "Einstein-Newton paradigm" that physics is done by the lone geniuses. You may hear people say things that all the progress in string theory in the last 4 decades came from 30 people and the rest are irrelevant. I think that's completely wrong: these 30 people on their own, without the exchange of ideas with the whole community, would have done very little. The reason I have so many students and postdocs is to foster the exchange of ideas: it's invigorating to me and it's invigorating to them. It's definitely work but I like them and it's fun.

Another component of my interactions with students is to support their self-confidence. When they do something good, I make sure to let them know!

My group at Harvard is now half women. There is a snowball effect. Women feel comfortable when they see other women around in the group who feel comfortable. So that's been a huge benefit to us in recruiting extraordinarily talented women.

What advice would you give to a young supervisor?
I'd be hesitant to give advice because everybody has a different style. There are some people who just really want to primarily work by themselves. They shouldn't be told to do something different. We need every different style to make progress in our challenging field.

What I would tell young people is not to listen to anybody else and to think for themselves what is good physics and what isn't. I would encourage them to look hard at the social norms which I would argue misidentify talent (in men vs women): just to think about it.

Do you think you had a particularly good supervisor (forming your style of supervision)?
My thesis supervisor was Roman Jackiw. He was a great supervisor scientifically, gave me great problems, and of course is an extraordinary scientist himself. I started working on quantum gravity as a graduate student. He advised me not to, saying I would never get a job if I did. A few years ago, he introduced me for an MIT colloquium and graciously said it was a good thing I hadn't listened to him!

But he was also a pretty old-school tough advisor. He said things to me like, “How can you possibly be so stupid?” He never said anything encouraging, never told me I was doing a good job. Until one day, he said, “I think you’ve done enough for your thesis; I’m going to get you a good job .” which he’d did a few days later at IAS. I didn’t even apply. It was actually the first I knew he thought highly of me. But underneath his sometimes gruff exterior, he is a deeply nice and caring man. I really like and am grateful to him.

And this turned into a discussion about how our field evolved since then, how cultures and behaviors are changing…

You know there was a whole machismo tough guy thing going on then. When I was a grad student, seminars were vicious. Every institution would have an alpha male who would often attack whoever showed up to give a seminar. There was a cultural sea change when string theory came along. Though far from perfect, it’s much better now than it was! Still, it is not a culture that has proven welcoming to women.

There is a balance we should consider. Although, in that earlier period, people were more often obnoxious and rude in seminars, they truly cared about the science and would listen in the end. And indeed great science came out of it. I remember in those days feeling good when I got attacked, because I knew that it meant that my work was interesting. So there is a good part of the aggressive behavior, it’s not without merit. We shouldn’t let wrong assertions in seminars pass by out of politeness. I think the challenge to our community is to find an intermediate ground between always being nice and polite, recognizing a more diverse set of prior assumptions about what is and what isn’t good behavior, without compromising what is really important to us: namely finding the truth about nature.

Finally, some closing remarks about what mentoring and supervision entails:

The main thing that all of us want to do is to find a really good question and solve it, that’s our business. But also closely related to that having students, having postdocs being connected with the world that we have created and interacting with them intellectually over decades that it is just an incredibly satisfying and fulfilling experience who’s benefited you rip later on and I think the importance of that of creating a community of scholars with substantial intellectual exchanges is often underestimated. How important it is and how satisfying it is!

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Professor Anne Taormina, Durham University (website)

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As far as PhD student recruitment is concerned, we are proactive on two fronts.

(i) We encourage our own undergraduate students to apply. In the UK, each final year undergraduate must work on a year-long project, worth a third of the final year credits. The topics on offer spread the expertise of the whole department, and this is a golden opportunity to interest students in exciting aspects of theoretical particle physics in particular. It is important to phrase a project in a way that provides some structure but also makes clear that the student may take the project in a direction they are curious about. Weekly or bi-weekly meetings with project students provide an excellent opportunity to nurture interest and boost confidence and this results each year on PhD applications from students who had not envisaged to embark on a PhD prior to the project work. This helps female students who tend to lack confidence more often. Also, the students who achieve high scores in traditional exams are not necessarily cut for research, and vice versa. I have witnessed both types, across gender, during my career.

(ii) Within our Department, we have been able to recruit two women theoretical physicists at assistant professor level this year, bringing the total number of women in that discipline to five, i.e. to about 20% in our research group. We hope to continue this trend, as an increased number of role models for potential female graduate students is a positive factor in recruitment.

It is true that the pool of PhD applicants in our Theoretical Physics group is far from diverse, and we take the time to invite applicants for an informal chat with members of the group, in person whenever possible, to complement their written CV. This exercise definitely nuances judgments made on the CV alone and has been beneficial for applicants who lack confidence but are nevertheless talented, many of them being young women. We think it is well worth the effort, which spreads over several weeks each year.

It seems obvious to me that unless we attract more young women to a PhD program, the lack of diversity when it comes to Postdoctoral and Faculty recruitment will subsist.

We face a big challenge at the postdoctoral level because our field remains extremely competitive and it does not usually offer stability before at least two postdoctoral positions, usually held in different countries, with a high level of uncertainty beyond the two- or three- year horizon. This impacts drastically on plans to start a family for instance and a number of young women are not prepared to postpone maternity beyond their late 20's or live apart from their partners for extended periods of time.

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A feeling of belonging, of having a voice, tends to be an important way to gain confidence and prominence in our field. What do you think is the role of the supervisor to empower students? Do you play an active role in giving students confidence? And if so, how?

I think it is important to encourage PhD students to interact scientifically with their peers within their department but also at the national and international level. This starts with allowing them to present the broader context and motivation of their research at journal clubs attended by staff and students within their department. Honest and constructive feedback on such presentations is gradually building up confidence, to the point they are ready to attend regional, national, or international schools or workshops where there are opportunities for them to talk about their results. I always feel a significant threshold has been reached when my students stand up and challenge some of the statements I make.
These instances are usually the start of a genuinely productive research phase, which undoubtedly boosts the morale of students and supervisors alike.

One of the members of our network was particularly interested in the supervision of mid-career researchers, for example mentoring an assistant professor that is transitioning to leading larger groups, applying for large grants, etc. This is a topic less discussed, and the guidelines for more senior faculty are not always so clear. We find this relevant to avoid having, e.g., women getting stuck at mid-level and do not raise to full professor in some systems. Do you have any advice on mentoring in this case?

The problem of women not progressing to full professor is a very delicate one. There are different scenarios, and each requires a slightly different approach.

Scenario one: the academic staff in question is dissatisfied with the situation but actively seeks help. A mentor should first listen carefully to the mentee to fully appreciate the cause of their dissatisfaction. Following this conversation, the mentor should aim at providing an objective assessment on how well the CV is aligned with the criteria for promotion. If some areas could benefit from being strengthened, the mentor should devise a strategy in partnership with the mentee in order to reinforce those areas over a period of one year or so and offer another conversation within six months to adjust the strategy if need be. In some very unfortunate situations, the CV is aligned with the promotion criteria, but there is negative publicity from a more senior academic blocking the process. The mentor should then alert the Head of Department or the Dean of Faculty to the problem, as there may be an alternative mechanism for processing promotion applications. In any case, a mentor should be as encouraging as possible and be prepared to help the mentee achieve further goals, for instance in offering help in the construction of a substantial grant application, or in suggesting a higher degree of citizenship within the department. In some cases, encouraging the mentee to apply for a full professor position elsewhere might be the best recommendation.

Scenario two: the academic staff in question is not seeking promotion as they are satisfied by the level

of responsibilities they have and consider their performance in research and teaching is not worthy of promotion. In other words, they 'cruise along' at their level of promotion and have achieved a work-life balance. A mentor still has a role to play, to ensure that the satisfaction level does not drop over the years, but also that underperformance does not creep up. Occasional conversations about research projects and future grant applications could be beneficial in such a scenario.

In my institution, the system of promotion has recently changed, in an effort to avoid situations like the ones addressed above: everybody's CV is scrutinised by a gender-diverse departmental promotion committee consisting of the Head of Department, the Director of Education and the Director of Research as well as senior academics drawn from all the disciplines researched in the Department, who recommend an application for promotion when the criteria for promotion are met, and who give constructive feedback to all the colleagues who are not yet ready or who do not wish be put forward. Furthermore, if someone is unhappy with that committee decision of not recommending promotion, they have the possibility to put an application forward directly to the faculty-level promotion committee.

In your early days as a supervisor, were there aspects of the role that you were nervous or worried about? Did you seek advice from more senior members, or had a model of supervision you were trying to follow? If you had to advise a young version of you, what would you say?

Of course I was nervous about supervision in my early days as a supervisor, but I still am now! This is because each PhD student has their own personality and mode of operation when it comes to research, and the supervisor has to develop a certain amount of flexibility to ensure the student realises their full potential. The big unknown at the beginning of a supervision is how the student will react to the research project offered, and how quickly progress will be made, given the length of PhD studies in the UK is three and a half years on average.

I certainly listened to senior colleagues reflecting on their supervision style, but quickly understood that there is no `one type supervision fits all'. The task also depends on whether there is a cohort of students studying the same broad topic (for instance, string theory) within your department, or whether there is only one. In the latter case, a supervisor must ensure the student does not become terribly isolated, especially in our field. Therefore sending them to regional and national conferences or workshops and encouraging them to establish links with their peers is a must.

As for advice to a younger version of myself, apart from encouraging critical thinking and independence, I would say that a degree of stubbornness in research is good, but too much of it is often counterproductive, and one should aim at developing a sense of when it is time to deviate from the initial direction of travel.