

Mentoring Philosophy of Dr. Aswath

A traditional Mentor/Student relationship goes back several thousands of years. For example, in traditional Indian education system the system of “Guru” /”Shishia” or “Teacher”/”Student” was the fundamental basis of the educational system. This system is based on mutual trust and reciprocity between the teacher and the student and the teacher is vested in the success of the student as if it is his/her own success. Graduate study is still one of those educational endeavors where there is an opportunity for a close mentor relationship in all aspects of the educational and personal development of the mentee. Successful mentorship of Ph.D. students is critical in the long-term success of mentee in their career whether it is in academia, industry, national laboratory or entrepreneurship.

My approach to mentorship involves six basic principles (i) Educational traineeship (ii) Personal Development (iii) Creation of opportunities (iv) Mutual Respect (v) Setting up Clear Expectations (vi) Shared values.

*(i) **Educational Traineeship:*** At the graduate level of education, in particular Ph.D. traineeship involves a transfer of knowledge from the me (mentor) to the student (mentee) with the expectation that at the end of the traineeship the student has developed the knowledge and training required to function independently in an academic, research, industrial and/or entrepreneurial environment. This traineeship involves assisting the student with developing the tools to build a research portfolio with the appropriate skills, developing a hypothesis driven research problem that would form the basis of his/her Ph.D. dissertation, assisting the student in the development of research proposals and writing publications based on their work. Training the student on issues related to intellectual property, entrepreneurship and presenting their ideas in both scientific and business environments is a critical component of the mentorship process.

*(ii) **Personal Development:*** Development as an individual is probably the most important gift that I as a mentor can provide any of my students. A student in the Ph.D. program spends between 4-5 years in the program and it offers me the opportunity to mentor them not just in their scientific endeavors but also in helping them to develop as individuals. This involves spending time with them to understand what their passions are, what is it they cherish and help them in trying to achieve those goals. As they build their academic and research portfolio they also need to develop their portfolio of inter-personal skills and leadership skills. While it may be true that inter-personal skills and leadership skills are not easy to teach in a classroom, it is certainly possible to instill these traits by example as you mentor your students. I strongly believe, that this mentorship does not end when the student graduates but continues as you transition from a mentor/mentee relationship to one of equals as the students establish their own careers.

*(iii) **Creation of Opportunities:*** Creating opportunities and opening doors (metaphorically) for your students are as important as helping them acquire knowledge and develop as individuals. I strongly believe, it is the duty of the supervising professor to create opportunities for their students so that they can take those opportunities and run with them. This involves sending your students to conferences where they can present

their work in front of an international audience, sending them to workshops and tutorials to learn from the leaders in the field, create opportunities where they can intern and work in national laboratories to develop the technical and scientific skills they need. Lastly and probably the most important aspect of creating opportunities is to introduce them to leading researchers in the field and collaborators so that they can build on those relationships and develop their own. I have always made use of all my contacts and resources to make these opportunities available to not only my Ph.D. students but also anyone else in my research group, whether it is a master's student or an undergraduate.

(iv) **Mutual Respect:** Developing mutual respect and respect for individuals is the cornerstone of mentorship. Without mutual respect and responsibility there is no value in the training and knowledge. I have always treated my students with respect and expect all my students to treat me the same. Out of this relationship has arisen a common bond of trust and friendship between my students and me over the years that have resulted in a continued relationship beyond their time of residence as a student in our program. This was something I learned from my advisor as a graduate student and has passed this on to my students. My hope is that they treat their collaborators and their mentee's in the same fashion.

(v) **Setting up Clear Expectations:** One of the common reasons for discord and failure of the mentor/mentee relationship is the lack of common understanding of expectations of the mentor and the role of the mentee. I make it a point at the very early stages of when a student joins my group as to what is expected of him or her as a student, researcher and ultimately as a Ph.D. candidate. We lay out a framework of what a Ph.D. degree is all about, the principles of a hypothesis driven research, the importance of understanding the fundamentals and the value of intellectual curiosity and hard work. With these basic principles laid out at a very early stage we revisit these principles periodically to assess progress and what has to be still done and the path forward. By working through this exercise it has been possible to guide my Ph.D. and M.S. students through their dissertation or thesis.

(vi) **Shared Values:** Values of integrity, hard work, intellectual curiosity, sharing knowledge, helping other members in the team are integral to the success of not only the individual student but also other members of the research team. I strongly emphasize that personal integrity in research is the one invariant that I will not compromise on and this is something that my students take with them as they go on in their career. I also emphasize that learning is a shared endeavor and the more they share with their lab mates and colleagues the more they are likely to learn. By helping other students in their projects and mentoring students who have come into the group after them my students have been able to develop as strong scientists and engineers in their own right.

Over the years as a faculty member in the Materials Science and Engineering Department I have graduated 14 Ph.D. students and approximately 30 M.S. (Thesis) students and I currently have 4 Ph.D. students and 5 M.S. thesis students in my research group. My former students have gone on to distinguished careers in academia, national laboratories, industry and business. I would like to take the case of two of these students

who I would like to highlight and I hope I played a small role in their development as individuals:

(i) **Prof. Amit Bandyopadhyay:** Amit was my very first Ph.D. student a few years after I joined UT Arlington as an assistant professor. As an early career faculty member just a few years older than Amit, I was really not very sure whether my relation was one of a mentor/mentee or a friend or a colleague. I realized very quickly that it was all three at the same time. Working side by side with Amit I not only trained him to set up a laboratory but also provided him with many ideas to start working on his research project which he took and excelled in. I have one story in particular that I would like to share, where this close working relationship between mentor and mentee was very fruitful. Midway through Amit's Ph.D. we realized that we needed to run some experiments that we did not have the facilities to run at UT Arlington and the only place we had the equipment was in Oak Ridge National Laboratory. I wrote a proposal and got some time allocated for the use of the facilities, however, being an early career faculty member without a lot of resources, Amit and I had to drive to Tennessee and book rooms in the dorm there to save money. I had a family emergency and had to leave, Amit did not miss a beat, and he was trained and was able to handle the burden of getting all the experiments done resulting in the publication of several noteworthy papers in the field. Not only was Amit very productive as my graduate student but also he has turned out to be a distinguished researcher in his own right. Currently a Professor in Washington State University at Pullman he is a fellow of several international Professional societies and a very successful researcher. Amit is someone I continue to interact with on a regular basis to discuss career choices and research opportunities.

(ii) **Dr. Mihir Patel:** Mihir is one of my more recent Ph.D. graduates who graduated in 2012 and is currently a research scientist at RT Vanderbilt. Mihir joined me as a graduate student wanting to do a MS degree and had a background that was far away from Materials Science. However, very early in his time in my group, I observed a strong aptitude to do research, a natural curiosity and fearlessness to try new things. I took him aside and suggested that he consider a Ph.D., he was initially hesitant as his background was different from what he was learning now. However, it was evident that Mihir would excel in whatever he did and he maintained a perfect GPA and very soon recognized his passion for research. I nurtured his interests by recommending him for a Neutron Scattering School in Oakridge and Argonne National Laboratory, Brazilian Synchrotron School and for the American Society for Materials Leadership Academy, all of which he was selected for and excelled in. Mihir has turned out to be a leader in the field and in the short time he has been at RT Vanderbilt he has built a name for himself as a go-getter and a strong scientist. I hope I played a small role in shaping his career. He is someone I continue to discuss career and scientific issues on a regular basis.