Statement on Doctoral Student Mentoring

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It gives me a great pleasure to describe my integrated mentoring philosophy and its impact on the doctoral professional development and accomplishments, with some success stories.

I am proud to be a teacher and above all a mentor. In my opinion, *in-class teaching* and *outside-class teaching* (often called *mentoring*) are two sides of a coin and hence inseparable. Indeed class teaching has significantly enriched my professional and mentoring skills, and helped me hand-pick outstanding graduate students. I strongly believe real mentoring starts in classrooms that provide semester-long platform for cultivating a wide variety of students and judging their potentials, strengths and weaknesses. Similarly, students get an opportunity to evaluate without obligation their instructors as well as their expectations and teaching or mentoring styles. Therefore, I take class teaching very seriously and make it a top priority. According to several of my students, they were first inspired by my class lectures before deciding on PhD study. I sincerely try to bring cutting-edge knowledge, often from scientific literature, to the classrooms and pose thought-provoking questions. Students feel extra motivated when challenged beyond textbooks and engaged in activities that stimulate intellectual curiosity. With such an integrated view of teaching and research, my mentoring philosophy has followed a fascinating journey over 23 years of academic tenure.

Educating and nurturing curious young minds is my love and passion. My goal is to help them build stronger foundation, aptitude, and problem solving skills for successful career. I encourage original, out-of-the-box thinking with deep fundamental concepts and insights. Unless students are trained to face challenges in the classrooms, how could we expect them to do serious research in doctoral study? I enjoy class teaching as much as supervising PhD dissertations because a classroom is an ideal place for *mutual learning*. My teaching philosophy has been guided by Rabindranath Tagore (Nobel Laureate Poet, 1913):

"A teacher can never truly teach unless he is still learning himself. A lamp can never light another lamp unless it continues to burn its own flame. The teacher who has come to the end of his subject, who has no living traffic with his knowledge but merely repeats his lesson to his students, can only load their minds, he cannot quicken them."

Thus, my mentoring philosophy is a holistic approach to developing students to the next level of excellence, motivating them in creative research, helping them make fundamental contributions with confidence. According to Swami Vivekananda, an Indian philosopher, *"Education is the manifestation of perfection already in man."* With an open door policy, I regularly spent significant time with my students (one on one and as a group). I expect high of them by realistic goal setting, performance review and assessment. Although I hand hold them at the beginning, eventually I expect them to be independent. I promote a dynamic learning environment at the Center for Research in Wireless Mobility and Networking (CReWMaN) that nurtures individuals of differing perspectives and cultural backgrounds to pursue higher academic goals with mutual respect, trust, dignity and integrity. Learning with humility is very important. I also strongly encourage team work and collaboration. Many of my students have jointly published research articles, won best papers and patents.

Students are my academic children and their success is my success. I have been fortunate to recruit, retain and work with outstanding students around the world, including some under-

represented groups. It's fun to guide them to reach for the stars. I have graduated 32 doctoral students including 7 females, 25 of which are from UTA. Additionally, 10 received the CSE Outstanding Doctoral Dissertation Award; 6 received *Best Paper Awards* in flagship conferences like ACM MobiCom'99, IEEE PerCom'06 and EWSN'08; and 5 received *Best Intern of the Year Award* at Nokia Research, Nortel Networks, SUN Microsystems Lab, and Pfizer R&D Lab. I have also mentored 28 MS thesis, 6 postdoctoral researchers and 7 international exchange PhD students. Currently 8 PhD students are working with me.

Aiming high and quality work is the key. I maintain an average target of 3-4 journal papers and 5-6 conference papers before my students graduate. I insist them to work very hard and help them produce high quality research. With UTA students, I have published 114 peer-reviewed journal and 163 conference papers, 19 invited book chapters, and 3 US patents.

My doctoral students have established well in academics and industry. Currently, 12 of them hold academic positions: 9 in the US and 3 in foreign countries. I am delighted to see them progressing fast, including senior administrative ranks. Full professors: Ranette Halverson (CS Chair, Midwestern State Univ), Marrie-Anne Demuynck (CS Graduate Coordinator, Texas Womans Univ), Daniel Harvey (Southern Oregon Univ), Calvin Chen (Tam Kang Univ, Taiwan). Associate professors: Mainak Chatterjee and Damla Durgut (Univ Central Florida), Amiya Bhattacharya (Arizona State Univ), Wook Choi (Univ Foreign Studies, Korea). Assistant professors: Habib Ammari (Hofstra Univ), Preetam Ghosh (Univ Southern Mississippi), Zhijun Wang (Hong Kong Polytechnic Univ), Afrand Agah (CS Associate Chair, Westchester Univ). They have also been successful in grant activities. Habib recently received the prestigious *NSF CAREER Award* and Mainak earlier received *AFOSR Young Investigator Award*. Others received competitive grants from NSF, Army Research, Air Force of Scientific Research, Department of Education and foreign agencies. Some have already produced their own doctoral students and received Best Paper Awards with them.

The remaining doctoral students are employed at major industry and R&D, some in senior ranks: Falguni Sarkar (CTO, T-Mobile/Lucent) and Sanjoy Sen (VP Technologies, Aricent Networks); 6 others are senior researchers/managers at places like IBM Research, Nokia, Nortel Networks, Juniper Networks, Fujitsu, CISCO and RIM. I am truly proud of their outstanding achievements, persistency and leadership.

In my academic journey, I have encountered extremely talented and motivated students who were independent and required minimal supervision. While I am too happy to mentor them, perhaps my real contribution where it made a difference, lies in those who came half-baked, often unclear how to go about research, but were eager to learn and work hard. My success stories integrated with mentoring philosophy (plus recruiting) abound for both categories of students. Let me share some of them, all from academic community.

My 2nd doctoral student, **Ranette Halverson**, was a full-time lecturer at Midwestern State University and a part time PhD student at UNT. She enrolled in my graph theory course in fall 1990. I found her quite diligent and disciplined with excellent performance. At semester end, she approached if I would gladly supervise her PhD thesis. Next semester she took my parallel computing course when I defined her thesis topic in parallel algorithms. Ranette used to commute twice a week, 100 miles each way. Her time was also limited due to teaching load at MWSU. So we often met during weekends. She wrote an excellent dissertation and graduated in Dec 1993. She got promoted to assistant professor, became full professor in 8 years and subsequently the department chair. Ranette annually organizes the North Texas CS Students Conference. Recently, UNT CSE newsletter featured her as outstanding alumni.

Daniel Harvey was already an assistant professor at Dallas Baptist University and also a part time PhD student at UNT. Impressed by his performance, dedication and commitment in my parallel computing course, I offered him to work with me for his doctoral thesis. In a short time he published a couple of top quality papers in cluster and grid computing. When I moved to UTA in 1999, he followed me. This allowed us to meet more often. I engaged Dan in a NASA funded project on Information Power Grid. Due to his outstanding performance, he was invited to spend two summers at NASA Ames Research Center. His research in high performance computing was highlighted in the NASA magazine. By then he had published several papers in top journals and conferences. In fact, he was more productive than many full time students despite high teaching load (4 courses per semester) and coaching athletic team at DBU. Dan is extremely disciplined with excellent time management skill. After graduation in 2001, he joined Southern Oregon University as Associate Professor and became full professor in 2008. Now he passionately works with native Indian community. His novel acoustic and software technologies to revive lost Indian languages made news.

In fall 1998, I recruited **Mainak Chatterjee** from Indian Institute of Science, Bangalore. Next year he moved to UTA with me. While he was enjoying initial success in research and a few conference publications, I gave him a challenging problem in 2000 to deal with optimal resource management in mobile networks that required not only strong foundations in EE and CS, but also mathematical maturity. A hard working individual, Mainak made some observations and derived preliminary results, but still could not see the end of the tunnel and a few months passed by without tangible progress. *(Doctoral) research is full of uncertainties that bring unbounded joy when tackled. However, at times, it could be frustrating too – so much so that quitting seems the only option for some.* Faced with such a crisis, Mainak came to my office early 2001 desperate to quit PhD study. Although shocked, I could feel his agony but how to bring back his confidence? How to encourage him to be tenacious and optimistic? After a month long counseling, I could finally convince him. In his own account later, *"That was when I witnessed the benevolent side of Dr. Das. What followed for days was a tug-of-war – my frustration versus his constant persuasion to continue with my studies. Though I gave up on myself, he never gave up on me. Eventually, I lost to him – a loss that I will embrace, anytime and every time. Now I realize that would have been the greatest blunder of my life. Dr. Das saved me – he did what no other advisor would do."* The rest is Mainak's journey through success trails. As a student, he published outstanding papers in top IEEE and ACM conferences and journals; received Nokia's 2002 Best Intern Award (one among 3 worldwide); Outstanding CSE Outstanding Dissertation Award. (He has already produced 2 PhD graduates and 2 Best Paper Awards with them.) One paper from his PhD dissertation received over 630 citations according to Google Scholar. A recipient of AFOSR Young Investigator Award and a well-known expert in wireless cognitive radio networks, Mainak is a tenured Associate Professor of CSE at the University of Central Florida.

I first met **Amiya Bhattacharya** at an international symposium in Newport Beach, CA. As a 1st year PhD student at UC San Diego, he apparently enjoyed my presentation in the emerging field of wireless networks and mobile computing. During conference breaks, we have had exciting conversations and I found him quite curios. Afterwards he kept in touch with occasional e-mail. About 1.5 years later, he asked if I had an opening for a new PhD student because he wanted to pursue mobile computing. Thus I recruited him. In his recapitulation, *"I felt the warmth of Dr. Das' personality and an unusual level of comfort at our first meeting. When I really felt like working under the supervision of an advisor who would be my real mentor and a constant source of career guidance, I thought of nobody but him."* Amiya is very creative and skillful in computer science and mathematics. I would like

to mention an incident to exemplify our working relationship. Early 1999, he stopped by my office one afternoon to report a clever trick he discovered to tackle an *open problem* in user mobility (location) tracking in cellular wireless networks that I assigned him a couple of months earlier. After listening to his ideas, I jumped *"Aha! You have discovered a new solution framework with deep underlying theory."* However, I encouraged him to ponder more and work intensely to unfold the mathematical intricacies with elegant proofs. He too realized the potential for a new research direction in mobile computing. Our discussions continued as late as midnight for several days until he finished detailed proofs. This work led to the *Best Paper Award* in ACM MobiCom'99, the flagship conference with acceptance rate below 10%. It also formed the core part of his PhD thesis, earning him the CSE Outstanding Dissertation Award, and subsequently a patent jointly with Nokia Research. After graduation in 2002, Amiya spent 4 years at New Mexico State University and attracted three major grants from NSF and ARL totaling $1.8M. He later moved to Arizona State University where he is Research Associate Professor. His award-winning paper in personal mobility management has numerous citations, leading to led to many PhD theses and research articles.

Let me end this story telling with one more. At the end of my keynote talk at a mobile computing workshop in Santa Fe, New Mexico in spring 2004, **Habib Ammari**, a 2nd year CS doctoral student at SMU asked me a couple of questions. We met again during my keynote talk at another conference in Richardson later that year, when he expressed to visit me at UTA. He came prepared, "I would like to transfer to UTA if you agree to be my supervisor." Surprised, I explained the cons of starting from scratch which might take another 3-4 years. But he was determined and joined in spring 2005. I defined his PhD topic in the new area of wireless sensor networks. A conscientious person, Habib graduated in May 2008 with high quality publications: 5 in IEEE transactions and 8 in conferences. He also received two Best Paper Awards (EWSN'08 and PhD Forum-PerCom'08), CSE outstanding doctoral student award and Outstanding Dissertation Award. As an Assistant Professor at Hofstra University, he is on fast-track. His publication record already matches tenured associate professors. He just received NSF CAREER Award. Including another NSF grant, his total funding is about $1M, an excellent record for a 3rd year faculty. An excerpt from Habib's correspondence, *"Prof. Das, you involved me in grant proposal writing while at UTA. This training helped me a lot to secure significant NSF Research Grants from a teaching-oriented school like mine. Your outstanding mentoring approach has very positive impact on me and inspires me every day to excel. I try to mimic your teaching style which I have found extremely helpful at Hofstra University. I also must say I never regretted that I had to start my Ph.D. from scratch at UTA. You are simply my role model."*

All such success stories are touchy, nostalgic and emotional. I can recount numerous similar stories for every student – each one is a treasure and unique – which I hope to write one day. It is gratifying to note my students are doing great in their career paths. While I am proud for them, I am also humbled if my passionate mentoring made any difference in their life and career. Without doubts, they have contributed significantly to enrich me as an educator and mentor. Students and their success stories make our academic life enjoyable and truly complete. I keep in touch with many of my students on a regular basis and continue to collaborate with them. We are part of a big family tree that is constantly growing and flourishing. *My students are true ambassadors of UTA as well as my teaching and mentoring philosophy*. They made me what I am today as an academician!