

PERSONAL HISTORY STATEMENT

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DECEMBER 1, 2016

Looking back at the last two years, it has been the most life-changing time of my life. In search of my interests and aptitude, I was in Canada in the spring of 2015, working as a teaching assistant, and in Denmark for my summer internship as a software developer. In the fall of 2015, my final year at university, I started working as a research intern. In 2016, I published a paper, attended conferences, met amazing people, and decided to pursue a doctoral degree.

In hindsight, it was almost coincidental how I delved into the field of programming languages, specifically program synthesis. When I worked as a teaching assistant for Basics of Computer Systems at the University of British Columbia, my colleagues and I spent a great deal of time grading weekly assignments which covered a wide range of topics such as programming in assembly and C, demonstrating synchronization with threads, and using sockets to communicate across the Internet. Due to the inconsistency in grading scales, it was difficult to give fair partial scores let alone to provide qualitative feedback on programming assignments.

My first impression of program synthesis, therefore, left me in awe of its potential for automating demanding tasks and resolving numerous issues caused by the error-prone nature of manual work. In fact, it was the very first paper I read, which proposed automated feedback generation for programming assignments, when I just started my research at the Programming Research Laboratory at Korea University the following year. As I continued the line of research, I became more and more interested in autograding, intelligent tutoring systems, computer-aided education, and computer science education in general.

Life at the laboratory was instructive and formative. As the first member to research program synthesis, I learned it by myself from technical papers. Because I took charge of briefing summaries of its previous work to my adviser, I learned to navigate through papers, summarize important points, and communicate my results effectively. Though it was different with undergraduate studies, I was highly motivated by the fact that I was dealing with real problems which would make an impact on the world.

Before graduating, I also wanted to have industrial experience. I did an internship at Smart and Innovative Technology, a company which builds automatic control systems for factories. I particularly focused on industrial protocols for the systems and developed prototypes for networking simulation using open source libraries. It was very different with my previous internship at Trap Danmark where I concentrated on the human-computer interaction aspect of a project, such as usability and design rather than technical reliability or practicability. I left both companies feeling positive about clear, goal-oriented processes, but realized that I wanted to solve more fundamental and curiosity-driven problems concerned with the foundations of computer science.

I found this in program synthesis. In my last semester at university, I was fascinated by program synthesis for its theoretical strength as well as its myriad applications. At that time, one of my friends kept asking me questions about regular expressions from his homework. It was interesting to see how the answers given by him, me, and the professor differed from each another. For instance, my regular expressions were sometimes much simpler and more intuitive than those of the professor. This was how I started my graduation project on finding the simplest regular expression from a set of examples.

Besides the research itself, it was delightful to show my work to my friends and see their reaction. I believe this formed a virtuous cycle: as a student, I could easily identify what students need, which soon became my research topic, and continue further research motivated by their feedback on my work. This was what made me confident about committing myself to academia. Also, I realized the important fact that I wanted to solve the problems people around me have.

Another main factor that made me decide to remain in academia was the experience of international conferences: presenting my work to others, having informative conversations over coffee breaks, learning cutting-edge techniques, listening to motivating keynote speeches, and so much more. All of the indirect knowledge and research agendas, which had felt so distant and ideal to me, turned into ambitious, achievable dreams.

I believe my experience has continued to confirm the importance of program synthesis and built up my strong interests to dedicate myself in further research on the subject. As my last two years have been full of unexpected joys and discoveries, I look forward to the next five years at the University of California, Berkeley, to have even more exciting and unforgettable learning experiences.