

PhD Forum Extended Abstract Jose M Monsalve Diaz

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I am Jose Manuel Monsalve Diaz, a 4th year PhD student in the department of Electrical and Computer Engineer of the University of Delaware. I have had a long and broad research path throughout my doctoral studies on the area of parallel computing architecture, computer systems and high performance computing. Although my principal area of interest is dataflow systems, runtimes and programming frameworks, I am currently also part of a project that is part of the large ECP effort which aims to provide a test suite that allows the assessment of multiple compiler implementations of the OpenMP 4.5 specifications.

I obtained my bachelor degree in Electrical Engineer in 2013 from the Pontificia Unviersidad Javeriana in Bogotá, Colombia. After initiating my research experience during my undergraduate working with robotic systems (from where I hold multiple publications), I moved to the University of Delaware to pursue my graduate studies. Ever since I changed my path to the field of Computer Engineer, leveraging my previous knowledge on electrical systems, and focusing my attention in computer architecture and design.

Ever since I started, I have had the pleasure to work with Professor Guang R. Gao of the Electrical and Computer Engineer department during most of my PhD. In addition, I have also had the pleasure to work collaboratively, as well as of being co-advised by professor Sunita Chandrasek from the Computer and Information Science department. My experience with both has allowed me to explore High Performance Computing, and parallel computing from multiple perspectives, ranging from the architectural design of a parallel machine, with emphasis of dataflow microarchitectures, to applications and programming frameworks for high performance computing. Covering multiple layers of the complex infrastructure and environment of this field.

Multiple publications as first and second author are proof of my broad path, while they also show the different knowledge I have obtained throughout my graduate studies. I am currently compiling my experience to use it to define a particular PhD topic that should result in the completion of my degree. My current focus covers heterogenous computation and dataflow systems. Lately, I have been studying the literature from the 70s, 80s and 90s of many proposed microarchitectures based on the ideas of Dataflow introduced by Jack Dennis in 74. I am comparing these knowledge with the currently growing interest on dataflow by programming frameworks (e.g. Tensorflow and OpenMP) and architectures (e.g. Latest NVIDIA Volta synchronization features, and Google's TPUs chips). In addition, my current project has allowed me to obtain a deep knowledge in OpenMP as one of the mostly used programming frameworks, which has been adapting to heterogenous computation and tasking in the recent versions.

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