

Purely Functional GPU Programming with Futhark

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I present a pure functional array language, Futhark, along with its optimizing GPU-targeting compiler. I will focus on the language tradeoffs necessary to ensure the ability to efficiently generate high-performance GPU code from a high-level parallel language, as well as the compiler optimizations done to obtain good performance. I also demonstrate (nested) data-parallel array programming, a programming paradigm that enables concise programming of massively parallel systems. I show how Futhark code can be easily integrated with larger applications written in other language.