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## Compilation and Code Optimization for Data Analytics

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### Abstract

The trade-offs between the use of modern high-level and low-level programming languages in constructing complex software artifacts are well known. High-level languages allow for greater programmer productivity: abstraction and genericity allow for the same functionality to be implemented with significantly less code compared to low-level languages. However, the use of high-level languages comes at a performance cost: increased indirection due to abstraction, virtualization, and interpretation, and superfluous work, particularly in the form of temporary memory allocation and deallocation to support objects and encapsulation. As a result of this, the cost of high-level languages for performance-critical systems may seem prohibitive. The vision of "abstraction without regret" argues that it is possible to use high-level languages for building performance-critical systems that allow for both productivity and high performance, instead of trading off the former for the latter. In this talk, we realize this vision for building different types of data analytics systems. Our means of achieving this is by employing compilation. The goal is to compile away expensive language features -- to compile high-level code down to efficient low-level code.

### Biography

Amir Shaikhha is a Departmental Lecturer in Computer Science at Oxford University. His research focuses on the design and implementation of data-analytics systems by using techniques from the programming languages, compilers, and databases. He earned his Ph.D. from EPFL in 2018, for which he was awarded a Google Ph.D. Fellowship in structured data analysis, as well as a Ph.D. thesis distinction award.

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