Too many design and optimization choices
Too many tools with non-transparent interfaces
Slow time to market, low ROI
Slowing innovation in science and technology
Multiple user objectives vs. choices; benefit vs. costs

cTuning long term vision:
Making computer engineering a science - a physicist's view
Take the best of existing sciences that deal with complex systems:
computer science, physics, mathematics, chemistry, biology, etc.

Collective Mind infrastructure and repository for online auto-tuning and learning

Collective Mind is the first public framework to our knowledge that easily integrates various existing tools and techniques through plugins to crowdsource multi-objective auto-tuning and learning.

Empirical analysis and auto-tuning using interactive compilers

Novel concept to convert rigid tools into powerful interactive tools, using light-weight event-based plugin framework.

We developed Interactive Compilation Interface (ICI) to "open up" existing compilers such as Open64 and GCC, and to enable transparent for end-users empirical multi-objective auto-tuning on the fly (exploration of large optimization spaces) and extraction of program features to enable predictive modelling.

Continuous online learning of a behavior of computer systems at all levels using statistical analysis and predictive modeling

Collecting data from multiple users in a unified way allows to continuously apply and compare various machine learning techniques to correlate program and architecture behaviour, static and dynamic features, designs and optimizations.

Building self-tuning computer systems (combining static and dynamic approaches with online learning)

We developed a novel approach to statically enable dynamic optimizations (UNIDAPT framework) by combining a small set of pre-optimized versions of a code with online learning plugins to quickly select the most appropriate versions at run-time.

Join collaborative effort or invest!