# Tutorial: An Example-Driven Hands-on Introduction to Rcpp

**Dirk Eddelbuettel**[*]

[*]Debian and R Projects
Email: Dirk.Eddelbuettel@R-Project.org

**Goals:**  The focus of the tutorial will be on applying **Rcpp** in order to extend *R*, as well as to accelerate execution of simple C++ functions. It aims to enable R users to deploy the **Rcpp** package for both one-off tasks and experiments implemented in C++ (and done most easily using `cppFunction()` or `sourceCpp`), as well as simple packages using C++ to extend and/or accelerate R programming with data (using RStudio for the package building steps)

**Outline:**  The tutorial will be split in roughly three parts. The first third will be devoted to getting first things right: how to compile simple C++ functions containing just one or two lines. This will at the same time assert that the working environment is set up correctly and provide familiarity with the toolchains.

The second part will build on this to cover simple package building as package are the standard unit of code organisation, deployment and distribution within the R world. This process is much aided by both a helpful environment such as RStudio as well as by helper functions such as `Rcpp.package.skeleton()` (and also called by RStudio).

The final part will be devoted to a more detailed study of a recent, simple, small-enough yet complete and meaningful package deploying Rcpp. A possible and recent example is **RcppZiggurat** which brings a simple yet faster normal random number generator to R.

**Justification:**  **Rcpp** has become the most widely-used language extension for the R system, and permits users a painless deployment of C++ code from R in order to do new things, as well as to do existing tasks much faster.

**Prerequisites:**  Knowledge of *R* as well as general programming knowledge; prior *C* or *C++* knowledge is helpful but not required. A laptop with RStudio and working package-building setup (Rtools, Xcode, ... as needed, see the Package Development Prerequisites post).

**Potential Attendees:**  Beginning-to-intermediate R users interested in expanding R with C++ for improved performance and capabilities.

### References

[1]  Eddelbuettel, D. (2013a). *RcppZiggurat: Rcpp integration of different Ziggurat Normal RNG implementations*. R package version 0.1.1.

[2]  Eddelbuettel, D. (2013b). *Seamless R and C++ Integration with Rcpp*. Use R! New York: Springer.

[3]  Eddelbuettel, D. and R. François (2013). *Rcpp: Seamless R and C++ Integration*. R package version 0.10.6.