

ijtiff: An R package providing TIFF I/O for *ImageJ* users

Rory Nolan¹ and Sergi Padilla-Parra^{1, 2}

¹ Wellcome Centre Human Genetics, University of Oxford ² Department of Structural Biology, University of Oxford

DOI: [10.21105/joss.00633](https://doi.org/10.21105/joss.00633)

Software

- [Review](#) ↗
- [Repository](#) ↗
- [Archive](#) ↗

Submitted: 16 March 2018

Published: 16 March 2018

Licence

Authors of papers retain copyright and release the work under a Creative Commons Attribution 4.0 International License ([CC-BY](#)).

Summary

ImageJ (Schindelin et al. 2015) is the image viewing and processing GUI of choice for many in the fields of biology and microscopy. It is free and open-source. *ij*tiff is an R package which can correctly import TIFF files that were saved from *ImageJ* and write TIFF files than can be correctly read by *ImageJ*. Due to the sometimes strange way that *ImageJ* writes TIFF files, the original R *tiff* package (Urbanek 2013) may not correctly recognise their channel structure. *ij*tiff also goes beyond *tiff* in facilitating the writing of floating point (real-numbered) TIFF files from R.

*ij*tiff reads TIFF pixel values in their native (usually integer) form, whereas *tiff* scales pixel values to the range [0, 1] by default. Hence and for other reasons, *ij*tiff should be viewed as a package with different capabilities and behaviours from the original *tiff* package, and not as an extension thereof.

TIFF files are not always enough: they have maximum allowed values and their 32-bit floating point real-number representation can lack precision. For these extreme cases, *ij*tiff also supports text image I/O. Text images have no such limitations and are completely compatible with *ImageJ*.

References

- Allaire, JJ, Yihui Xie, Jonathan McPherson, Javier Luraschi, Kevin Ushey, Aron Atkins, Hadley Wickham, Joe Cheng, and Winston Chang. 2017. *Rmarkdown: Dynamic Documents for R*. <https://CRAN.R-project.org/package=rmarkdown>.
- Bache, Stefan Milton, and Hadley Wickham. 2014. *Magrittr: A Forward-Pipe Operator for R*. <https://CRAN.R-project.org/package=magrittr>.
- Douglas Nychka, Reinhard Furrer, John Paige, and Stephan Sain. 2015. “Fields: Tools for Spatial Data.” Boulder, CO, USA: University Corporation for Atmospheric Research. <https://doi.org/10.5065/D6W957CT>.
- Eddelbuettel, Dirk, and Romain Francois. 2011. “Rcpp: Seamless R and C++ Integration.” *Journal of Statistical Software* 40 (1):1–18. <https://doi.org/10.18637/jss.v040.i08>.
- Henry, Lionel, and Hadley Wickham. 2017. *Purrr: Functional Programming Tools*. <https://CRAN.R-project.org/package=purrr>.
- Hester, Jim. 2017. *Covr: Test Coverage for Packages*. <https://CRAN.R-project.org/package=covr>.

- Lang, Michel. 2017. “checkmate: Fast Argument Checks for Defensive R Programming.” *The R Journal* 9 (1):437–45. <https://journal.r-project.org/archive/2017/RJ-2017-028/index.html>.
- Linkert, M., C. T. Rueden, C. Allan, J. M. Burel, W. Moore, A. Patterson, B. Loranger, et al. 2010. “Metadata matters: access to image data in the real world.” *J. Cell Biol.* 189 (5):777–82.
- Nolan, Rory, and Sergi Padilla-Parra. 2017a. “filesstrings: An R Package for File and String Manipulation.” *The Journal of Open Source Software* 2 (14). <https://doi.org/10.21105/joss.00260>.
- . 2017b. “Examplerestr - an Easy Start to Unit Testing R Packages.” *Wellcome Open Research* 2 (June). F1000 Research, Ltd.:31. <https://doi.org/10.12688/wellcomeopenres.11635.2>.
- R Core Team. 2017. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. <https://www.R-project.org/>.
- Rouault, Even, Bob Friesenhahn, Frank Warmerdam, Andrey Kiselev, Joris Van Damme, and Lee Howard. 2017. *LibTIFF - TIFF Library and Utilities*. <http://http://www.simplesystems.org/libtiff>.
- RStudio Team. 2016. *RStudio: Integrated Development Environment for R*. Boston, MA: RStudio, Inc. <http://www.rstudio.com/>.
- Schindelin, J., C. T. Rueden, M. C. Hiner, and K. W. Eliceiri. 2015. “The ImageJ ecosystem: An open platform for biomedical image analysis.” *Mol. Reprod. Dev.* 82 (7-8):518–29.
- Urbanek, Simon. 2013. *Tiff: Read and Write Tiff Images*. <https://CRAN.R-project.org/package=tiff>.
- Wickham, Hadley. 2011. “Testthat: Get Started with Testing.” *The R Journal* 3:5–10. http://journal.r-project.org/archive/2011-1/RJournal_2011-1_Wickham.pdf.
- . 2017. *Stringr: Simple, Consistent Wrappers for Common String Operations*. <https://CRAN.R-project.org/package=stringr>.
- Wickham, Hadley, and Winston Chang. 2017. *Devtools: Tools to Make Developing R Packages Easier*. <https://CRAN.R-project.org/package=devtools>.
- Wickham, Hadley, Jim Hester, and Romain Francois. 2017. *Readr: Read Rectangular Text Data*. <https://CRAN.R-project.org/package=readr>.
- Xie, Yihui. 2015. *Dynamic Documents with R and Knitr. 2nd Edition*. Chapman; Hall/CRC.