



## SEGUE

### Speedy rEgion Growing for Unwrapping Estimated phase

#### Notice:

**An applicant for an academic licence must provide the full name of their relevant organisation otherwise the application will be rejected.**

**The .p version has different licence terms to the .m version. If the .m version is downloaded and improvements are made to the code or a Python (or other) version is developed, the licensee is obliged to notify us and include an acknowledgement of the Authors and UCL.**

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SEGUE is software designed to quickly unwrap 3D Magnetic Resonance Imaging (MRI) phase images which suffer from  $2\pi$  phase wraps. It performs 3D spatial phase unwrapping without affecting the total magnetic field distribution. This means that the resulting unwrapped phase images can be used for distortion correction and as an input for [magnetic susceptibility mapping \(QSM\)](#).

SEGUE has been shown to perform up to 80 times faster than [FSL PRELUDE](#) and with equivalent accuracy in MRI phase images of the brain, head-and-neck region, and pelvis (see figure below), especially at longer echo-times where more wraps are present.

SEGUE could be used for spatial phase unwrapping in other applications such as X-ray phase contrast imaging, synthetic aperture radar interferometry, and 3D shape measurement or profilometry.

The current release is Matlab-based (tested in versions 2013a, 2015a, 2015b, 2016b, and 2017a) and two versions (.p and .m) are available for download.

For more information

Karsa, A, and Shmueli, K (2019). "SEGUE: A speedy rEgion-growing algorithm for unwrapping estimated phase." IEEE transactions on medical imaging vol 38 issue 6: 1347-1357.

## References

1. Shmueli, Karsa(2019) , <http://ieeexplore.ieee.org/abstract/document/8572756>,  
<http://ieeexplore.ieee.org/Xplore/home.jsp>, vol 38 issue 6, 1347-1357