



## 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.**

#### Speedy rEgion Growing for Unwrapping Estimated phase

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 we aim to upload a C++/python version soon.

To register your interest in a python version, please email [segueUCL@gmail.com](mailto:segueUCL@gmail.com).

#### For more information

Journal article and ISMRM abstract: Karsa, A. and Shmueli, K. SEGUE: a Speedy rEgion-Growing algorithm for Unwrapping Estimated phase. In Proceedings of the 26th Annual Meeting of the ISMRM, Paris (2018): p. 666.

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

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