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IEEE Transactions on Computational Imaging Special Issue
Computational Imaging for Earth Sciences

From the core of the earth to the farthest reaches of our planets magnetic fields, the earth sciences are concerned with all aspects of monitoring, exploration, explanation, and exploitation of natural events and resources in the geo-sphere. Revolutions in computational imaging over the past two decades have had profound implications across this field, bringing new modalities into common use and impacting application domains from weather monitoring and prediction, subsurface sensing, seismic imaging and exploration, to the production of minerals, oil and gas. In all these areas, reliable information extraction by collecting and processing sensor data increasingly hinges on integrated sensor design, system modeling, and efficient computational methods. The scope of such models and methods have more recently integrated statistical pattern recognition and machine learning systems to account for variability that cannot be completely captured by physical models or simulation. Enabling most all of these processing methods are concomitant developments in optimization theory both in Euclidean spaces as well as on more general manifolds.

This special issue seeks to compile relevant contributions from researchers in signal and image processing, inverse problems, machine learning, and related areas as applied to problems of image formation and analysis arising in the context of earth science applications covering the wide range of application domains. Within the broad context of computational imaging for earth sciences, topics of interest include but are not limited to the following.

- Computational image formation and tomographic processing
- Full Waveform Inversion (FWI)
- Inverse scattering methods
- Computational hyperspectral imaging
- Advanced machine learning methods for computational imaging
- Dimensionality reduction
- Joint inversion / sensor fusion
- Probabilistic modeling including random field and graphical models
- Multilinear/tensor methods
- Sparse representations and compressive sensing
- Computational imaging methods for change and target detection

Timeline

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<th>Event</th>
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<tr>
<td>Manuscript submission due</td>
<td>June 30, 2016</td>
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<tr>
<td>First review completed</td>
<td>August 7, 2016</td>
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<tr>
<td>Revised manuscript due</td>
<td>Sept 30, 2016</td>
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<td>Second review completed</td>
<td>November 1, 2016</td>
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<td>November 15, 2016</td>
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<td>Final manuscript due</td>
<td>December 15, 2016</td>
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<td>Tentative publication date</td>
<td>January 15, 2017</td>
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3. Melba Crawford, Civil and Electrical and Computer Engineering/Chair of Excellence in Earth Observation, Purdue University
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5. Andreas Reigber, German Aerospace Center (DLR), Microwaves and Radar Institute, SAR Technology Department.