# Contents

**Workshop (Computational Methods and Clinical Applications for Spine Imaging)**

Automated Pedicle Screw Size and Trajectory Planning by Maximization of Fastening Strength .................................................. 3  
   *Dejan Knez, Boštjan Likar, Franjo Pernuš, and Tomaz Vrtovec*

Automatic Modic Changes Classification in Spinal MRI .................. 14  
   *Amir Jamaludin, Timor Kadir, and Andrew Zisserman*

Patient Registration via Topologically Encoded Depth Projection Images in Spine Surgery ...................................................... 27  
   *Songbai Ji, Xiaoyao Fan, Jonathan D. Olson, Linton T. Evans,  
   Keith D. Paulsen, David W. Roberts, Sohail K. Mirza, and S. Scott Lollis*

Automatic Localisation of Vertebrae in DXA Images Using Random Forest Regression Voting .................................................. 38  
   *Paul A. Bromiley, Judith E. Adams, and Timothy F. Cootes*

Robust CT to US 3D-3D Registration by Using Principal Component Analysis and Kalman Filtering ........................................ 52  
   *Rebeca Echeverría, Camilo Cortes, Alvaro Bertelsen, Ivan Macia,  
   Óscar E. Ruiz, and Julián Flórez*

Cortical Bone Thickness Estimation in CT Images: A Model-Based Approach Without Profile Fitting ........................................ 64  
   *Oleg Museyko, Bastian Gerner, and Klaus Engelke*

Multi-atlas Segmentation with Joint Label Fusion of Osteoporotic Vertebral Compression Fractures on CT ................................. 74  
   *Yinong Wang, Jianhua Yao, Holger R. Roth, Joseph E. Burns,  
   and Ronald M. Summers*

Statistical Shape Model Construction of Lumbar Vertebrae and Intervertebral Discs in Segmentation for Discectomy Surgery Simulation ..................... 85  
   *Rabia Haq, Joshua Cates, David A. Besachio, Roderick C. Borgie,  
   and Michel A. Audette*

Automatic Intervertebral Discs Localization and Segmentation:  
A Vertebral Approach ............................................................. 97  
   *Amir Jamaludin, Meelis Lootus, Timor Kadir, and Andrew Zisserman*
**Challenge (Automatic Intervertebral Disc Localization and Segmentation from 3D T2 MRI Data)**

Segmentation of Intervertebral Discs in 3D MRI Data Using Multi-atlas Registration ........................................... 107  
*Chunliang Wang and Daniel Forsberg*

Deformable Model-Based Segmentation of Intervertebral Discs from MR Spine Images by Using the SSC Descriptor ........................................... 117  
*Robert Korez, Bulat Ibragimov, Boštjan Likar, Franjo Pernuš, and Tomaž Vrtovec*

3D Intervertebral Disc Segmentation from MRI Using Supervoxel-Based CRFs. ........................................... 125  
*Hugo Hutt, Richard Everson, and Judith Meakin*

Automatic Intervertebral Disc Localization and Segmentation in 3D MR Images Based on Regression Forests and Active Contours ........................................... 130  
*Martin Urschler, Kerstin Hammernik, Thomas Ebner, and Darko Štern*

Localization and Segmentation of 3D Intervertebral Discs from MR Images via a Learning Based Method: A Validation Framework ........................................... 141  
*Chengwen Chu, Weimin Yu, Shuo Li, and Guoyan Zheng*

Automated Intervertebral Disc Segmentation Using Probabilistic Shape Estimation and Active Shape Models ........................................... 150  
*Aleš Neubert, Jurgen Fripp, Shekhar S. Chandra, Craig Engstrom, and Stuart Crozier*

**Author Index** ........................................... 159
Computational Methods and Clinical Applications for Spine Imaging
Third International Workshop and Challenge, CSI 2015,
Held in Conjunction with MICCAI 2015, Munich, Germany,
October 5, 2015, Proceedings
Zheng, G.; Li, S. (Eds.)
2016, X, 159 p. 61 illus., Softcover
ISBN: 978-3-319-41826-1