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## **Spatio-temporal gene expression analysis from 3D in situ hybridization images**

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Stellingen behorend bij het proefschrift  
Spatio-temporal gene expression analysis from 3D *in situ* hybridization  
images

1. Tyramid Signal Amplification (TSA) based fluorescent *in situ* hybridization is superior to detection compared to ISH with Alkaline Phosphatase detection. Complex expression patterns, even those obtained with weak probes are well captured with this method (this thesis Chapter 2 and 3; Jowett, 2001; Zaidi et al. 2000).
2. 3D modeling establishes accurate spatial mapping of gene expression patterns during embryonic development, even before morphological changes in anatomical structures are visible (this thesis Chapter 3 and 5). Resulting 3D models are essential for a quantitative approach in spatio-temporal functional analysis (this thesis Chapter 2; Diks et al. 2006)
3. 3D imaging of gene expression patterns with confocal laser scanning microscopy (CLSM) is less time-consuming than tissue sectioning and subsequent 3D modelling. However, for accurate characterization of specific tissues and anatomical structures, tissue section and of the embryos is preferable (this thesis Chapter 2, 3, 4).
4. A multilateral approach, comprising molecular biology, imaging and computation, is required to show that zebrafish 14-3-3 gamma 1 and 2 isoforms have both complementary and overlapping gene expression patterns (Welten et al, in preparation).
5. The anterior *sox9* expressing domain in the chicken wing is the presumptive digit I domain (Welten et al. 2005, this thesis Chapter 5).
6. In order to test and validate algorithms for spatio-temporal analysis, the spatio-temporal colinearity of the *hox* genes provides an excellent model (Meuleman, Welten and Verbeek 2006).
7. Projection of developmental events on a relative time scale of development allows better comparison of developmental events in species and renders new insights (this thesis Chapter 6).
8. Spatio-temporal gene expression databases are required for co-localization and co-expression analysis for larger numbers of genes. Such will not be possible with multiple color *in situ* experiments (Belmamoune and Verbeek 2007).
9. When scientists from different research backgrounds work together in a multidisciplinary setting, research takes place across subject boundaries and at the edges of disciplines. Therefore, multidisciplinary research leads to new discoveries and innovative solutions where edges meet.
10. Career change contributes to improvement of the quality of life.  
*Verandering van loopbaan draagt bij aan een hogere levenskwaliteit.*