

## CV Petter Ranefall



Petter Ranefall, born in 1968, received a B.Sc. in Mathematics, and an M.Sc. in Applied Computer Science from Uppsala University in 1991, and 1992, respectively. In 1998 he defended his PhD thesis “Towards Automatic Quantification of Immunohistochemistry Using Color Image Analysis” at the Centre for Image Analysis, Uppsala University. After that he started working in industry developing image analysis software targeted for microscopy. He has also worked with image analysis, image processing and software development in relation to MRI and radiotherapy. In August 2013 he returned to Uppsala University to join the Quantitative Microscopy research group led by Carolina Wählby. His main focus is research support on image analysis for microscopy applications.

### Experience

#### August 1998 – December 1998

*Programmer, Image Connectivity AB*

Creating a prototype for portal image registration in radio therapy.

#### January 1999 – December 2001

*Programmer, Bergström Instrument AB. (Bergström Instrument was bought by Tekno Optik AB)*

Development of software for image analysis and measurements in microscopy. Continued development of existing software called EasyImage.

#### January 2002 – July 2004

*Programmer, Tekno Optik AB*

Development of software for image analysis and measurements in microscopy. Created a new image analysis software, called EasyImage3000, from scratch and incorporated several of the methods from my PhD thesis.

#### August 2004 – December 2007

*Consultant, Rainfall Image Analysis (My own consultant company)*

Software development and education in Image Analysis.  
Continued the development of EasyImage3000.

#### January 2006 – August 2007

*Imaging informatician, AstraZeneca R&D*

Image analysis mainly on MRI and CT. Including method development and implementation.

- Automatic segmentation of fat in MR images of mice.
- Segmentation of inner organs such as liver and kidneys.

#### September 2007 – June 2013

*Software engineer, RaySearch Laboratories*

Developed new methods for use in a radiation treatment planning system called RayStation.

- Automatic segmentation of the outline of the body in CT volumes.
- Interactive 3D region growing.
- Automatic femoral head detection in CT and MR volumes.
- Conversions between voxel volumes, triangle meshes and contours using fuzzy voxel representation.
- Manual and semi-automatic contour drawing.
- Beam Entry Validation sanity checks.

#### August 2013 – Present

*Bioinformatician, Uppsala University, Centre for Image Analysis/SciLifeLab*

Working in several different research projects.

- Zebra fish (stationary lipids, beta cells, fish volume).
- In situ sequencing. Building a “Google maps”-like tool for visualization and post analysis.
- Compactation of rolling circle amplification products. Segmentation of fluorescent spots.
- Vessel segmentation.
- Quantification of neurons.
- Time lapse analysis of bacteria.
- Cell proliferation analysis.

## **Publications**

### **In Ph. D Thesis “Towards automatic quantification of immunohistochemistry using colour image analysis” (1998)**

Ranefall P, Nordin B, Bengtsson E (1997) A New Method for Creating a Pixelwise Box classifier for Colour Images. *Machine Graphics and Vision*, **6**, 305–323.

Ranefall P, Egevad L, Nordin B, Bengtsson E (1997) A new method for segmentation of colour images applied to immunohistochemically stained cell nuclei. *Analytical Cellular Pathology*, **15**, 145–156.

Ranefall P, Wester K, Bengtsson E (1998) Automatic quantification of immunohistochemically stained cell nuclei using unsupervised image analysis. *Analytical Cellular Pathology*, **16**, 29–43.

Ranefall P, Wester K, Andersson AC, Busch C, Bengtsson E (1998) Automatic quantification of immunohistochemically stained cell nuclei based on standard reference cells. *Analytical Cellular Pathology*, **17**, 111–23.

Ranefall P, Wester K, Busch C, Malmström PU, Bengtsson E (1998) Automatic quantification of microvessels using unsupervised image analysis. *Analytical Cellular Pathology*, **17**, 83–92.

## Other

Ranefall P, Nordin B, Bengtsson E (1995) Finding Facial Features Using an HLS Colour Space. In, *8th International Conference on Image Analysis and Processing*. Springer Verlag, pp. 191–196.

Hellström M, Ranefall P, Wester K, Brändstedt S, Busch C. (1997) Effect of androgen deprivation on epithelial and mesenchymal tissue components in localized prostate cancer. *British Journal of Urology*, **79**, 421–426.

Thurfjell L, Ranefall P, Bengtsson E (1998) A Deformable Atlas of the Chest Based on the Visible Man. *Machine Graphics and Vision*, **7**, 176–186.

Wester K, Ranefall P, Bengtsson E, Busch C, Malmström PU. (1999) Automatic quantification of microvessel density in urinary bladder carcinoma. *British Journal of Cancer*, **81**, 1363–1370.

Wester K, Andersson AC, Ranefall P, Bengtsson E, Malmstrom PU, Busch C (2000) Cultured human fibroblasts in agarose gel as a multi-functional control for immunohistochemistry. Standardization of Ki67 (MIBI) assessment in routinely processed urinary bladder carcinoma tissue. *JOURNAL OF PATHOLOGY*, **190**, 503–511.

Wester K, Wahlund E, Sundstrom C, Ranefall P, Bengtsson E, Russell PJ, Ow KT, Malmstrom PU, Busch C (2000) Paraffin section storage and immunohistochemistry - Effects of time, temperature, fixation, and retrieval protocol with emphasis on p53 protein and MIB1 antigen. *APPLIED IMMUNOHISTOCHEMISTRY & MOLECULAR MORPHOLOGY*, **8**, 61–70.

Ranefall P, Bidar AW, Hockings PD (2009) Automatic segmentation of intra-abdominal and subcutaneous adipose tissue in 3D whole mouse MRI. *J Magn Reson Imaging*, **30**, 554–60.

Clausson CM, Arngården L, Ishaq O, Klaesson A, Kühnemund M, Grannas K, Koos B, Qian X, Ranefall P, Krzywkowski T, Brismar H, Nilsson M, Wahlby C, Söderberg O (2015) Compaction of rolling circle amplification products increases signal integrity and signal-to-noise ratio, *Sci Rep*. 2015 Jul 23;5.

Sadanandan SK, Baltekin O, Magnusson KEG, Boucharin A, Ranefall P, Jalden J, Elf J, Wahlby C (2015) Segmentation and Track-analysis in Time-lapse Imaging of Bacteria. *Selected Topics in Signal Processing, IEEE Journal of* (Volume:PP , Issue: 99)

Ranefall P, Wahlby C. Global Gray-level Thresholding Based on Object Size (Accepted for publication in *Cytometry: Part A*).