

Marleen de Bruijne

Date of Birth: 3 September 1972

Nationality: Dutch

### **Academic background**

March 1998 — June 2003: PhD in medical image analysis

Institute of Information and Computing Sciences, Utrecht University, The Netherlands

Thesis: Model-based Segmentation of Vascular Images

September 1990 — January 1997: MSc in physics

Utrecht University, The Netherlands

Thesis: Tangential Thomson scattering at the RTP tokamak

Propaedeutic exams in Physics (1992) and in Astronomy (1992)

### **Employment**

October 2006 — Present: Associate professor at the Image Group, IT-University of Copenhagen, Denmark

February 2004 — September 2006: Assistant professor at the Department of Innovation, IT-University of Copenhagen, Denmark

August 2003 — January 2004: Assistant research professor at the Department of Innovation, IT-University of Copenhagen, Denmark

April 2003 — June 2003: Research associate at the Division of Vascular Surgery, Department of Surgery, University Medical Center Utrecht, Utrecht, The Netherlands

March 1998 — December 2002: PhD student at Institute of Information and Computing Sciences and University Medical Center Utrecht, Utrecht, The Netherlands

January 1996 — December 1996: Research assistant at the Foundation for Fundamental Research on Matter (FOM) Institute for Plasma Physics, Nieuwegein, The Netherlands

### **Research**

August 2003 — Present: Image Group, IT-University of Copenhagen, Denmark

Model-based image segmentation; shape modeling; image appearance modeling; pattern classification; stochastic optimization; quantitative analysis of X-rays; vertebral morphometry; aortic calcification assessment

April 2003 — July 2003: Division of Vascular Surgery, Department of Surgery, University Medical Center Utrecht, The Netherlands

Measurements of aorta distensibility on dynamic MRI scans; elastic image registration; design of a tool for semi-automatic segmentation of abdominal aneurysms for clinical trial

March 1998 — March 2003: Institute of Information and Computing Sciences (March 1998 — February 2000) and Image Sciences Institute (March 2000 — March 2003), Utrecht University, The Netherlands

2D and 3D statistical shape modeling; image appearance modeling; feature extraction; statistical model-based segmentation; interactive image segmentation; level set segmentation; 2D-2D, 2D-3D and 3D-3D image registration; multi-scale image analysis techniques; applications in marker detection, blood vessel segmentation, graft segmentation, blood vessel axis detection, blood vessel and graft tortuosity measurements and aneurysm segmentation in MR and CT images

January 1996 — January 1997: Foundation for Fundamental Research on Matter (FOM) Institute for Plasma Physics, Nieuwegein, The Netherlands

Laser scattering experiments to measure temperature, density and current density in tokamak plasmas; design and evaluation of scattering experiment simulations; design and evaluation of data analysis methods for current density measurements; calibration of laser scattering set-up

September 1995 — December 1995: Department of Molecular Biophysics, Utrecht University, The Netherlands

Fluorescence depolarization measurements for the study of muscle physiology

## Teaching and Supervision

### Post-graduate level

August 2003 — Present: PhD student Lars Arne Conrad-Hansen  
project: Clinical Image Analysis — atherosclerosis  
IT-University of Copenhagen, Denmark  
Co-supervisor

August 2003 — Present: PhD student Michael Lund  
project: Clinical Image Analysis — osteoporosis  
IT-University of Copenhagen, Denmark  
Co-supervisor

May 2004: PhD course 'Shape Analysis in Medical Imaging'  
IT-University of Copenhagen, Denmark  
Principal lecturer and organizer

April 2004 — December 2004: Study group on Pattern Recognition (5 PhD students)  
IT-University of Copenhagen, Denmark  
Teacher

### Graduate level

Fall 2005: Image and Signal Processing  
IT-University of Copenhagen, Denmark  
Development of new course, course manager, and lecturer

Fall 2005: Seminar course Image Analysis (5 students)

IT-University of Copenhagen, Denmark

Supervisor

June 2004 & 2005: Medical Image Segmentation, Capita Selecta in Medical Imaging

Utrecht University, The Netherlands

Invited lecturer

Spring 2005: Image Analysis

IT-University of Copenhagen, Denmark

Course manager and lecturer

Fall 2004: Image Analysis

IT-University of Copenhagen, Denmark

Lecturer

May 2004 — Present: (Co-)supervisor of several student projects:

IT-University of Copenhagen, Denmark

Towards automated quantification of vertebral fractures in radiographs, MSc thesis, 1 student

Active shape modeling in medical image analysis, MSc thesis, 1 student

Interactive segmentation tool, MSc thesis, 1 student

Shape analysis in medical imaging, 4-week, 5 students

Pixel classification in medical images, 4-week, 3 students

(Semi)-automatic image segmentation, 16-week, 4 students

A 2D Surface Construction Algorithm for the Visualization of 3D Data, 12-week project, 1 student

Fish feature extraction and analysis, 16-week project, 1 student

Face synthesis, 4-week project, 2 students

Shape and appearance modeling, 4-week project, 2 students

Active shape models for face recognition, 4-week project, 1 student

Spring 2004: Image Analysis

IT-University of Copenhagen, Denmark

Lecturer

Spring 2000 and 2001: Physics of medical imaging

University Medical Center, Utrecht, The Netherlands

Teaching assistant

### **Undergraduate level**

Spring 1999: Algorithms and datastructures

Institute of Information and Computing Sciences, Utrecht, The Netherlands

Teaching assistant

Spring 1999: Introduction to Image Analysis

Institute of Information and Computing Sciences, Utrecht, The Netherlands

Teaching assistant

Fall 1998 and 1999: Biomedical modeling; Mathematica practical  
Institute of Information and Computing Sciences, Utrecht, The Netherlands  
Teaching assistant

Fall 1998: Biomedical modeling; Elementary differential equations  
Institute of Information and Computing Sciences, Utrecht, The Netherlands  
Teaching assistant

### **Pedagogical training**

2005—2006: Course “Higher Education Teaching and Learning”  
pedagogical course for assistant professors at the IT University of Copenhagen  
9-day course + project (300 hrs), *passed*

### **Awards and grants**

January 2007—December 2009  
Robust Multi-Object Segmentation  
Principal Investigator  
VENI grant of the Innovational Research Incentives Scheme, funded by the Netherlands Organization for Scientific Research (NWO) with university co-financing  
(208 K€ of which 140,608 € from NWO)

September 2006—February 2010  
Computer-Aided Assessment of COPD from CT Images  
Principal Investigator  
Funded by the Danish government through the strategic research council for nano-, bio- and information technologies (NABIIT), with industrial and university co-financing  
Collaboration with University of Copenhagen and Astra Zeneca R&D, Lund  
(16,808,085 DKK (ca. 2.253 M€) of which 7,230,528 DKK (ca. 969 K€) from NABIIT)

November 2004—October 2007  
Clinical Applications and Theory of Image Analysis (CATIA)  
Co-applicant  
Industrial grant, funded by Center for Clinical and Basic Research (CCBR A/S), Ballerup, Denmark (8.0 M DKK, ca. 1.067 M€)

November 2003, Travel grant for oral presentation at MICCAI 2003  
Awarded by the Girard de Miolet van Coehoorn Foundation (1200 €)

December 2002, Best technical paper award 2002  
Awarded by the Röntgen Stichting Utrecht (450 €)

February 2001, Travel grant for oral presentation at SPIE Medical Imaging 2001  
Awarded by the Whitaker Foundation (1000 USD)

### **Professional activities**

Associate editor for Medical Physics

## Reviewer for journals

- IEEE Transactions on Medical Imaging
- Medical Image Analysis
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Information Technology in BioMedicine
- IEEE Transactions on Biomedical Engineering
- Medical Physics
- Pattern Recognition Letters
- Journal of Computer Science and Technology

## Program Committee member

- Medical Image Computing and Computer-Assisted Intervention (MICCAI) 2006
- International Workshop on Computer Vision Approaches to Medical Image Analysis (CVAMIA) 2006
- IEEE Workshop on Mathematical Methods in Biomedical Analysis (MMBIA) 2006
- MICCAI Joint Disease Workshop 2006

## Scientific Review Committee member

- Computer Vision and Pattern Recognition (CVPR) 2007
- Medical Image Computing and Computer-Assisted Intervention (MICCAI) 2004, 2005
- Information Processing in Medical Imaging (IPMI) 2005, 2007

## Ad hoc reviewer

- British Machine Vision Conference (BMVC) 2004
- IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2004

## IPMI 2005 Young Researcher Committee member

## Publications

### Papers in international journals

- M. de Bruijne, B. van Ginneken, M.A. Viergever, and W.J. Niessen, "Interactive segmentation of abdominal aortic aneurysms in CTA images," *Medical Image Analysis* 8(2), pp. 127–138, 2004.
- M. de Bruijne, W.J. Niessen, J.B.A. Maintz, and M.A. Viergever, "Localization and segmentation of aortic endografts using marker detection," *IEEE Transactions on Medical Imaging* 22(4), pp. 473–482, 2003.
- F.A. Karelse, M. de Bruijne, C.J. Barth, M.N.A. Beurskens, G.M.D. Hogewei, and N.J. Lopes Cardozo, "Measurements of the current density profile with tangential Thomson scattering in RTP," *Plasma Physics and Controlled Fusion* 43(4), pp. 443–468, 2001.

### Papers in conference proceedings (peer reviewed)

- M. de Bruijne, P.C. Pettersen, L.B. Tankó, and M. Nielsen, "Vertebral fracture classification," in *Medical Imaging: Image Processing*, J.P. Pluim and J.M. Reinhardt, eds., *Proceedings of SPIE 6512*, SPIE Press, 2007. Accepted for oral presentation.
- L.A. Conrad-Hansen, M. de Bruijne, and M. Petrou, "Calcification detection in the lumbar aorta using nonlinear stretching on lateral X-ray images," in *Medical Imaging: Computer-Aided Diagnosis*, M.L. Giger and N. Karssemeijer, eds., *Proceedings of SPIE 6514*, SPIE Press, 2007. Accepted for poster presentation.
- F.B. Lauze and M. de Bruijne, "Toward automated detection and segmentation of aortic calcifications from radiographs," in *Medical Imaging: Image Processing*, J.P. Pluim and J.M. Reinhardt, eds., *Proceedings of SPIE 6512*, SPIE Press, 2007. Accepted for poster presentation.
- M. de Bruijne, M.T. Lund, L.B. Tankó, P.C. Pettersen, and M. Nielsen, "Quantitative vertebral morphometry using neighbor-conditional shape models," in *Medical Image Computing & Computer-Assisted Intervention*, R. Larsen, M. Nielsen, and J. Sporring, eds., *Lecture Notes in Computer Science 4190*, pp. 1–8, Springer, 2006.
- M. de Bruijne, "Shape particle guided tissue classification," in *IEEE Workshop on Mathematical Methods in Biomedical Image Analysis*, P. Golland and D. Rueckert, eds., 2006.
- L.A. Conrad-Hansen, M. de Bruijne, F.B. Lauze, L.B. Tankó, and M. Nielsen, "A pixelwise inpainting based refinement scheme for quantizing calcification in the lumbar aorta on 2D lateral X-ray images," in *Medical Imaging: Image Processing*, J.M. Reinhardt and J.P. Pluim, eds., *Proceedings of SPIE 6144*, pp. 474–484, SPIE Press, 2006.
- M. de Bruijne, "A pattern classification approach to aorta calcium scoring in radiographs," in *Proceedings of the ICCV Workshop on Computer Vision for Biomedical Image Applications: Current Techniques and Future Trends (CVBIA)*, Y. Liu, T. Jiang, and C. Zhang, eds., *Lecture Notes in Computer Science 3765*, pp. 170–177, Springer, 2005.

- L.A. Conrad-Hansen, M. de Bruijne, F.B. Lauze, L.B. Tankó, and M. Nielsen, "Quantizing calcification in the lumbar aorta on 2-D lateral X-ray images," in *Proceedings of the ICCV Workshop on Computer Vision for Biomedical Image Applications: Current Techniques and Future Trends (CVBIA)*, Y. Liu, T. Jiang, and C. Zhang, eds., *Lecture Notes in Computer Science* 3765, pp. 409–418, Springer, 2005.
- M. de Bruijne and M. Nielsen, "Multi-object segmentation using shape particles," in *Information Processing in Medical Imaging*, G.E. Christensen and M. Sonka, eds., *Lecture Notes in Computer Science* 3565, pp. 762–773, Springer, 2005.
- M.T. Lund, M. de Bruijne, L. Tankó, and M. Nielsen, "Shape regression for vertebra fracture quantification," in *Medical Imaging: Image Processing*, M.J. Fitzpatrick and J.M. Reinhardt, eds., *Proceedings of SPIE* 5747, pp. 723–731, SPIE Press, 2005.
- M. de Bruijne and M. Nielsen, "Shape particle filtering for image segmentation," in *Medical Image Computing & Computer-Assisted Intervention*, C. Barillot, D.R. Haynor, and P. Hellier, eds., *Lecture Notes in Computer Science* 3216, pp. 186–175, Springer, 2004.
- M. de Bruijne and M. Nielsen, "Image segmentation by shape particle filtering," in *International Conference on Pattern Recognition*, J. Kittler, M. Petrou, and M. Nixon, eds., pp. III:722–725, IEEE Computer Society Press, 2004.
- M. de Bruijne, B. van Ginneken, W. Bartels, M.J. van der Laan, J.D. Blankensteijn, W.J. Niessen, and M.A. Viergever, "Automated segmentation of abdominal aortic aneurysms in multi-spectral MR images," in *Medical Image Computing & Computer-Assisted Intervention*, T. Peters and R. Ellis, eds., *Lecture Notes in Computer Science* 2879, pp. 538–545, Springer, 2003.
- M. de Bruijne, B. van Ginneken, M.A. Viergever, and W.J. Niessen, "Adapting active shape models for 3D segmentation of tubular structures in medical images," in *Information Processing in Medical Imaging*, C. Taylor and A. Noble, eds., *Lecture Notes in Computer Science* 2732, pp. 136–147, Springer, 2003.
- M. de Bruijne, B. van Ginneken, W.J. Niessen, M. Loog, and M.A. Viergever, "Model-based segmentation of abdominal aortic aneurysms in CTA images," in *Medical Imaging: Image Processing*, M. Sonka and M.J. Fitzpatrick, eds., *Proceedings of SPIE* 5032, pp. 1560–1571, SPIE Press, 2003.
- B. van Ginneken, M. de Bruijne, M. Loog, and M.A. Viergever, "Interactive shape models," in *Medical Imaging: Image Processing*, M. Sonka and M.J. Fitzpatrick, eds., *Proceedings of SPIE* 5032, pp. 1206–1216, SPIE Press, 2003.
- M. de Bruijne, B. van Ginneken, W.J. Niessen, J.B.A. Maintz, and M.A. Viergever, "Active shape model based segmentation of abdominal aortic aneurysms in CTA images," in *Medical Imaging: Image Processing*, M. Sonka and M.J. Fitzpatrick, eds., *Proceedings of SPIE* 4684, pp. 463–474, SPIE Press, 2002.
- M. de Bruijne, W.J. Niessen, J.B.A. Maintz, and M.A. Viergever, "Semi-automatic aortic endograft localisation for post-operative evaluation of endovascular aneurysm treatment," in *Medical Imaging: Image Processing*, M. Sonka and K.M. Hanson, eds., *Proceedings of SPIE* 4322, pp. 395–406, SPIE Press, 2001.

- F.A. Karelse, C.J. Barth, M.N.A. Beurskens, M. de Bruijne, G.M.D. Hogeweij, N.J. Lopes Cardozo, H.J. van der Meiden, F.J. Pijper, and the RTP-team, "First current density measurements with tangential Thomson scattering at RTP," in *Proceedings of the 8th International Symposium on Laser-aided Plasma Diagnostics*, pp. 253–258, 1997.
- F.A. Karelse, M. de Bruijne, M.N.A. Beurskens, C.J. Barth, G.M.D. Hogeweij, N.J. Lopes Cardozo, H.J. van der Meiden, F.J. Pijper, and the RTP-team, "Current density profiles measured with multi-position tangential Thomson scattering in the RTP tokamak," in *Proceedings of the 24th EPS Conference on Controlled Fusion and Plasma Physics*, M. Schittenhelm, R. Bartiromo, and F. Wagner, eds., *Europhysics Conference Abstracts 21A Part II*, pp. 621–624, 1997.

### **Published abstracts (peer reviewed)**

- M. de Bruijne, P.C. Pettersen, M.T. Lund, P. Alexandersen, L.B. Tankó, M. Nielsen, and C. Christiansen, "A novel computer-based quantitative measurement of vertebral deformity in postmenopausal women: Implications for diagnosis and monitoring," in *American Society for Bone and Mineral Research (ASBMR) 28th Annual Meeting*, 2006.
- M. de Bruijne, M.T. Lund, L.B. Tankó, P.C. Pettersen, and M. Nielsen, "Quantitative vertebral morphometry using neighbor-conditional shape models," *MICCAI 2006 Workshop Proceedings*, p. 41, 2006.
- M.T. Lund, L.B. Tankó, M. de Bruijne, M. Nielsen, and C. Christiansen, "Initial experience with a new computerized method for clinical assessment of vertebral deformations," in *American Society for Bone and Mineral Research (ASBMR) 27th Annual Meeting*, 2005.

### **Patents**

- M. de Bruijne, M. Nielsen, C. Christiansen, L.A. Conrad-Hansen, and F.B. Lauze, "A method of deriving a quantitative measure of a degree of calcification of an aorta."W.I.P.O. Patent Application, filed 2nd June 2006.
- M.T. Lund, M. de Bruijne, P.C. Pettersen, and M. Nielsen, "Vertebral fracture quantification."W.I.P.O. Patent Application No PCT/EP2006/001407, filed 16th February 2006.
- M. de Bruijne, M. Nielsen, C. Christiansen, L.A. Conrad-Hansen, and F.B. Lauze, "A method of deriving a quantitative measure of a degree of calcification of an aorta."US Continuation-in-Part Patent Application No. 11/247,809, filed 10th October 2005.
- L.A. Conrad-Hansen, M. de Bruijne, F.B. Lauze, C. Christiansen, and M. Nielsen, "A method of deriving a quantitative measure of a degree of calcification of an aorta."US Patent Application No 11/144,488 filed 2nd June 2005.
- M.T. Lund, M. de Bruijne, P.C. Pettersen, and M. Nielsen, "Vertebral fracture quantification."UK Patent Application No 0503236.2 filed 16th February 2005.

## Theses

- M. de Bruijne, *Model-based segmentation of vascular images*. PhD thesis, Utrecht University, 2003. ISBN 90-393-3396-3.
- M. de Bruijne, "Tangential Thomson scattering at the RTP tokamak," Master's thesis, Utrecht University, 1997. Tech. Rep. IR 97/003 FOM Institute of Plasma Physics, Nieuwegein.

## Technical Reports

- M. de Bruijne, B. van Ginneken, W. Bartels, M.J. van der Laan, J.D. Blankensteijn, W.J. Niessen, and M.A. Viergever, "Automated segmentation of abdominal aortic aneurysms in multi-spectral MR images," Tech. Rep. UU-CS-2003-014, Institute of Information and Computing Sciences, Utrecht University, 2003.
- M. de Bruijne, B. van Ginneken, W.J. Niessen, and M.A. Viergever, "Active shape model segmentation using a non-linear appearance model: application to 3D AAA segmentation," Tech. Rep. UU-CS-2003-013, Institute of Information and Computing Sciences, Utrecht University, 2003.
- M. de Bruijne, B. van Ginneken, M.A. Viergever, and W.J. Niessen, "Three-dimensional point distribution models for tubular objects," Tech. Rep. UU-CS-2003-012, Institute of Information and Computing Sciences, Utrecht University, 2003.
- M. de Bruijne, B. van Ginneken, M.A. Viergever, and W.J. Niessen, "Interactive segmentation of abdominal aortic aneurysms in CTA images," Tech. Rep. UU-CS-2003-011, Institute of Information and Computing Sciences, Utrecht University, 2003.
- M. de Bruijne, B. van Ginneken, W.J. Niessen, J.B.A. Maintz, and M.A. Viergever, "Active shape models exploiting slice-to-slice correlation in segmentation of 3D CTA AAA images," Tech. Rep. UU-CS-2001-61, Institute of Information and Computing Sciences, Utrecht University, 2001.
- M. de Bruijne, W.J. Niessen, J.B.A. Maintz, and M.A. Viergever, "Semi-automatic aortic endograft localisation for post-operative evaluation of endovascular aneurysm treatment," Tech. Rep. UU-CS-2001-60, Institute of Information and Computing Sciences, Utrecht University, 2001.