

# Curriculum Vitae

## Personal Data

Rasmus Reinhold Paulsen  
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Born: January 26, 1972

## Education

- 2004 Ph. D. (Eng). *Technical University of Denmark, Dept. of Mathematical Modelling and Oticon A/S* Thesis *Statistical Shape Analysis of the Human Ear Canal with Application to In-the-Ear Hearing Aid Design*
- 1998 M. Sc. (Eng). *Technical University of Denmark, Dept. of Mathematical Modelling*. Master thesis *On the estimation of bone status*. Supervisors M. Grunkin, B. Ersbøll and K. Madsen.
- 1991 Graduated from Amtsgymnasiet i Roskilde. High level mathematics, physics and chemistry.

## Employment

- 2009-Present Associate Professor in Medical Image Analysis. *Technical University of Denmark. Informatics and Mathematical Modelling*
- 2008-2009 Assistant Professor in Medical Image Analysis. *Technical University of Denmark. Informatics and Mathematical Modelling*
- 2004-2008 Development Engineer. *Oticon A/S*.
- 2001-2004 Industrial Ph. D. Student. *Technical University of Denmark. Informatics and Mathematical Modelling and Oticon Research Centre, Eriksholm. Kongevejen 243. DK-3070 Snekersten. Denmark*
- 1998-2001 Research Engineer. *Pronosco A/S*.
- 1998 Instructor, Statistical Image Processing. *DTU/IMM*
- 1997-1998 Part-time image-processing researcher/programmer. *Torsana A/S*.
- 1992-1997 Part-time programmer. *Risø National Laboratory, Wind Energy and Atmospheric Physics Department*.
- 1991 Programmer. *Danish Technological Institute, Energy Division*.

## Managerial Activities

2009-Present	Member of the study planning committee for the Danish Radiographer Education (Metropol)
2008-2016	Member of the study council for IT og Sundhed.
2016-present	Member of the board of the Danish Bioimaging network.

## Organisational Activities

2015	Technical program chair of EACD 2015
2015	Program chair of SCIA 2015
2014	Scientific committee of compIMAGE 2014
2014	Program committee in MICCAI workshop on Computational Methods for Molecular Imaging
2013-2015	Program Chair for Scandinavian Conference on Image Analysis 2015
2013-2015	Organiser of 27th annual meeting of European Academy of Childhood Disability 2015
2013	Organiser of MICCAI Workshop on Mesh Processing in Medical Image Analysis. Nagoya. September 26.
2012	Organiser of MICCAI Workshop on Mesh Processing in Medical Image Analysis. Nice. October 1.
2012	Organiser of DTU Visiondag. Kgs. Lyngby. May 30.
2011	Organiser of MICCAI Workshop on Mesh Processing in Medical Image Analysis. Toronto, September 18.
2009	Organiser of summer school on manifold learning with 70 participants.

## Funding

2016	Research grant for PhD David Norsk from REVUS with Associate Professor Lars Konge.
2014	Research grant of 1.580.000 DKR from the Oticon Foundation (Stine Harder PostDoc)
2014	Research grant of 1.050.000 DKR from the Lundbeck Foundation. (Gudmundur Einarsson PhD)
2012	Research grant of 800.000 DKR from <i>Region Hovedstadens forskningsfond til Sundhedsforskning</i> together with Professor Anders Fink-Jensen (300.000 DKR to DTU)
2012-2015	Research grant of 1.2 million DKR from the Helena Elsass Foundation (Mikkel D. Olsen PhD).
2012-2015	Research grant of 3.7 million Euro from the EC (HEAR-EU one of five partners, 1 PhD and 2 years PostDoc for DTU)

2011-2014	Research grant of 1.8 million DKR from the Oticon Foundation (Stine Harder PhD).
2008-2011	Research grant of 1 million DKR from the Oticon Foundation.

### Studies Abroad

2003-2004	Ph.D. Student at INRIA, Project Epidaure, 2004 Route des Lucioles BP 93, 06902 Sophia-Antipolis Cedex, France. 16 months.
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### Teaching Experience

2013-	DTU Course 02515 Health Care Technology. 10 ECTS. Master level.
2009-	DTU Course 02511 Introduction to Medical Image Analysis. 10 ECTS. Bachelor level. (course responsible) (50-90 students)
2011-Present	DTU Course 02505 Medical Image Analysis (Guest lecturer)
2011-Present	DTU Course 02503 Advanced Image Analysis (Guest lecturer)

### Supervision

9 Ph.D. Students  
40+ Master students

### Reviewer

- Medical Image Analysis (Journal)
- Computer-Aided Design (Journal)
- IEEE Transactions on Image Processing (Journal)
- IEEE Transactions on Medical Image Analysis (Journal)
- ACM transactions on graphics (Journal)
- IEEE Transactions on Pattern Analysis and Machine Intelligence (Journal)
- Scandinavian Conference on Image Analysis
- European Conference on Computer Vision
- IEEE International Symposium on Biomedical Imaging
- Medical Image Computing and Computer Assisted Intervention (Conference)

## Key Research Topics

RP is an expert in medical image analysis. Currently he is focusing on 3D surface based image analysis, with special attention to the human face and skull. RP did his PhD in the industry and has worked as a development engineer, where he acquired a structured approach to implementation and applied research. Key research topics are implicit surface representations, geometry processing, statistical shape models, deep learning, facial feature analysis, and the general connection between genetics and biometric measurements. In 2008 RP received a research grant from the Oticon Foundation, where the goal was to create an open 3D database of human heads and torsos. These models are for example used for sound field simulation in the hearing aid industry. Furthermore, RP has developed a set of algorithms for patient motion tracking during PET scanning. These are also based on his work on surfaces.

## Peer Reviewed Publications

The updated list can be found here: <http://www.dtu.dk/service/telefonbog/person?id=9612&tab=2&q=dtupublicationquery#tabs>.

Google scholar profile: <http://scholar.google.dk/citations?user=Uk0aTWAAAAAJ&hl=en>. Google scholar H-index (September 2017) is 13.

- S. Vera et al. *Medial structure generation for registration of anatomical structures*. Part of *Skeletonization: Theory, Methods and Applications*. Science Direct. 2017.
- N. Gerber et al. *Data Descriptor: A multiscale imaging and modelling dataset of the human inner ear*. *Nature Scientific Data*. 2017.
- N. M. Lopez et al. *Automatic Model Generation Framework for Computational Simulation of Cochlear Implantation*. *Annals of Biomedical Engineering*. 2016.
- S. Harder et al. *A framework for geometry acquisition, 3-D printing, simulation, and measurement of head-related transfer functions with a focus on hearing-assistive devices*. *Computer-Aided Design*. 2016.
- J. Fagertun et al. *Predicting facial characteristics from complex polygenic variations*. *Forensic Science International: Genetics*. 2015.
- H. M. Kjer et al. *Free-form image registration of human cochlear micro-CT data using skeleton similarity as anatomical prior*. *Pattern Recognition Letters*. 2015.
- R. R. Paulsen and K. S. Pedersen (eds). *Proceedings of the 19th Scandinavian Conference on Image Analysis*. 2015.
- Carlotta P. et al. *The effect of gender on eye colour variation in European populations and an evaluation of the IrisPlex prediction model*. *Forensic Science International: Genetics*. 2014.
- O. V. Olesen, J. Wilm, R. R. Paulsen, L. Højgaard, R. Larsen. *DLP technology application: 3D head tracking and motion correction in medical brain imaging*. *Proc. SPIE Optical Eng.* 2014.

- R. R. Jensen, S. S. Thorup, R. R. Paulsen, T. A. Darvann, N. V. Hermann, P. Larsen, S. Kreiborg, R. Larsen. *Genus Zero Graph Segmentation: Estimation of Intracranial Volume*. Pattern Recognition Letters. 2014.
- R. R. Jensen, S. S. Thorup, R. R. Paulsen, T. A. Darvann, N. V. Hermann, P. Larsen, S. Kreiborg, R. Larsen. *Genus Zero Graph Segmentation: Estimation of Intracranial Volume*. Proc. SCIA. Springer 2013.
- J. D. Andersen, P. Johansen, S. Harder, S. R. Christoffersen, M. C. Delgado, S. T. Henriksen, M. M. Nielsen, E. Sjørensen, H. Ullum, T. Hansen, A. B. Dahl, R. R. Paulsen, C. Børsting, N. Morling. *Genetic analyses of the human eye colours using a novel objective method for eye colour classification*. Forensic Science International: Genetics. 2013
- O. V. Olesen, J. M. Sullivan, T. Mulnix, R. R. Paulsen, L. Højgaard, B. Roed, R. E. Carson, E. D. Morris, R. Larsen. *List-Mode PET Motion Correction Using Markerless Head Tracking: Proof-of-Concept With Scans of Human Subject*. IEEE Transactions on Medical Imaging. 2013.
- S. Harder, R. R. Paulsen, M. Larsen, S. Laugesen. *A three dimensional children head database for acoustical research and development*. Proc. Meetings on Acoustics 2013.
- S. Harder, L. K. H. Clemmensen, A. L. Dahl, J. D. Andersen, P. Johansen, S. R. Christoffersen, N. Morling, C. Børsting, R. R. Paulsen. *Correlation of Iris Biometrics and DNA*. Proc. IWBF Workshop 2013.
- J. Fagertun, T. Andersen, T. Hansen, R. R. Paulsen. *3D Gender Recognition using Cognitive Modelling*. Proc. IWBF Workshop 2013.
- O. V. Olesen, R. R. Paulsen, L. Højgaard, B. Roed, R. Larsen. *Motion Tracking for Medical Imaging: A Non-Visible Structured Light Tracking Approach*. IEEE Transactions on Medical Imaging. 2012.
- J. A. Levine, R. R. Paulsen, Y. Zhang. *Mesh Processing in Medical-Image Analysis-a Tutorial*. IEEE Computer Graphics and Applications. 2012
- J. A. Levine, R. R. Paulsen, Y. Zhang. *Mesh Processing in Medical-Image Analysis (Eds)*. Springer Proc. MICCAI MeshMed Workshop . 2012
- R. R. Jensen, O. V. Olesen, R. R. Paulsen, M. van der Poel, R. Larsen. *Statistical Surface Recovery: A Study on Ear Canals*. Proc. MICCAI Workshop MeshMed. 2012.
- S. R. Christoffersen, S. Harder, J. D. Andersen, P. Johansen, A. L. Dahl, N. Morling, R. R. Paulsen. *Automatic quantification of iris color*. Proc. meeting ESWG of ISFG 2012.
- J. Fagertun, T. Andersen, R. R. Paulsen. *Gender Recognition using Cognitive Modelling*. Proc. ECCV 2012.
- M. Kjer, O. V. Olesen, R. R. Paulsen, L. Højgaard, B. Roed, R. Larsen. *Geometric calibration between PET scanner and structured light scanner*. MICCAI MeshMed Workshop 2011.

- R. R. Jensen, M. van der Poel, R. Larsen, R. R. Paulsen. *Ultra Fast Optical Sectioning: Signal preserving filtering and surface reconstruction*. MICCAI MeshMed Workshop 2011.
- O. V. Olesen, R. R. Paulsen, R. R. Jensen, S. H. Keller, M. Sibomana, L. Højgaard, B. Roed, R. Larsen. *3D Surface Realignment Tracking for Medical Imaging: A Phantom Study with PET Motion Correction*. MICCAI MeshMed Workshop 2011.
- R. R. Paulsen, R. Larsen, B. K. Ersbøll, K. Conradsen. *Project Supervision - An Engineering Approach*. International CDIO Conference 2011.
- J. Wilm, O. V. Olesen, R. R. Paulsen, L. Højgaard, B. Roed, R. Larsen. *Real Time Surface Registration for PET Motion Tracking*. SCIA 2011.
- J. Fagertun, D. D. Gomez, M. F. Hansen, R. R. Paulsen. *Sparse Similarity-based Fisherfaces*. SCIA 2011.
- R. R. Paulsen and R. Larsen. *Anatomically Plausible Surface Alignment and Reconstruction*. Proc. Eurographics UK conference on Theory and Practice of Computer Graphics. pp. 249-254, 2010 (Best paper prize).
- O. V. Olesen, R. R. Paulsen, L. Højgaard, B. Roed, R. Larsen. *Motion tracking in narrow spaces: a structured light approach*. MICCAI 2010
- S. S. Thorup, T. A. Darvann, N. V. Hermann, P. Larsen, H. Ólafsdóttir, R. R. Paulsen, A. A. Kane, D. Govier, L.-J. Lo, S. Kreiborg, R. Larsen. *Dealing with difficult deformations: Construction of a knowledge-based deformation atlas*. SPIE Medical Imaging 2010
- O. V. Olesen, L. Højgaard, M. R. Jørgensen, R. R. Paulsen, B. Roed, R. Larsen. *Structured light 3D tracking system for measuring of movements in PET brain imaging*. SPIE Medical Imaging 2010.
- O. V. Olesen, R. R. Paulsen, L. Højgaard, B. Roed, R. Larsen. *External motion tracking for brain imaging: structured light tracking with invisible light*. Proc. IEEE Nuclear Science Symposium and Medical Imaging. 2010.
- M. Durey, R. R. Paulsen, G. Matessi, T. Dabelsteen. *Semi-automated tracking of behaviour of *Betta splendens**. Proc. SSIAB8, The 8th French-Danish Workshop on Spatial Statistics and Image Analysis in Biology. 2010.
- S. S. Thorup, H. Ólafsdóttir, T. A. Darvann, N. V. Hermann, P. Larsen, R. R. Paulsen, C. A. Perlyn, G. Morriss-Kay, S. Kreiborg, R. Larsen. *Multivariate Analysis of Variance: Finding significant growth in mice with craniofacial dysmorphology caused by the Crouzon mutation*. Proc. SSIAB8, The 8th French-Danish Workshop on Spatial Statistics and Image Analysis in Biology. 2010.
- R. R. Paulsen, J. A. Barentzen, and R. Larsen, *Markov Random Field Surface Reconstruction*. IEEE Transactions on Visualization and Computer Graphics, pp. 636-646, 2010

- R. R. Jensen, R. R. Paulsen, and R. Larsen, *Analysis of gait using a treadmill and a Time-of-flight camera*. Workshop on Dynamic 3D Imaging. 2009.
- C. Seiler, P. Büchler, N-P. Nolte, M. Reyes, and R. R. Paulsen. *Hierarchical Markov Random Fields Applied to Model Soft Tissue Deformations on Graphic Hardware*. Workshop on 3D Physiological Human. 2009
- R. R. Jensen, R. R. Paulsen, and R. Larsen, *Analyzing gait using a time-of-flight camera*. SCIA 2009.
- R. R. Paulsen, J. A. Bærentzen, and R. Larsen, *Regularisation of 3D Signed Distance Fields*. SCIA 2009.
- S. S. Thorup, T. A. Darvann, N. V. Hermann, H. Ólafsdóttir, P. Larsen, R. Larsen, R. R. Paulsen, C. A. Perlyn, S. Kreiborg, *Automatic assessment of craniofacial growth in a mouse model of Crouzon syndrom*. ACPA 2008
- S. Darkner, M. R. Sabuncu, P. Golland, R. R. Paulsen, R. Larsen, *Analysis of Surfaces Using Constrained Regression Models*. MICCAI 2008.
- S. Darkner, D. W. Hansen, R. R. Paulsen, R. Larsen, *Robust Registration for Change Detection*. SPIE - Medical Imaging 2008.
- S. Darkner, R. R. Paulsen, M. Vester-Christensen, R. Larsen, *Non-rigid surface to surface matching for open and closed 2D manifold in 3D Euclidian space*. SPIE - Medical Imaging 2008.
- S. Darkner, R. R. Paulsen, R. Larsen, *Analysis of Deformation of the Human Ear and Canal Caused by Mandibular Movement*, Medical Image Computing and Computer-Assisted Intervention 2007
- S. Darkner, M. V. Christensen, R. Larsen, R. R. Paulsen, *Evaluating a method for automated rigid registration*, SPIE -Medical Imaging 2007
- S. Darkner, M. Vester-Christensen, R. Larsen, C. Nielsen, R. R. Paulsen, *Automated 3D Rigid Registration of Open 2D Manifolds*, MICCAI 2006 Workshop "From Statistical Atlases to Personalized Models"
- R. R. Paulsen, *Statistical Shape Analysis of the Human Ear Canal with Application to In-the-Ear Hearing Aid Design*. Ph. D. Thesis. Informatics and Mathematical Modelling, Technical University of Denmark. 2004.
- K. B. Hilger, R. R. Paulsen, R. Larsen, *Markov Random Field Restoration of Point Correspondences for Active Shape Modelling*, SPIE - Medical Imaging 2004
- R. R. Paulsen, C. Nielsen, S. Laugesen, R. Larsen, *Using a Shape Model in the Design of Hearing Aids*, SPIE - Medical Imaging 2004
- R. Larsen, K. B. Hilger, K. Skoglund, S. Darkner, R. R. Paulsen, M. B. Stegmann, B. Lading, H. Thodberg, H. Eiriksson, *Some Issues of Biological Shape Modelling with Applications*, Scandinavian Conference on Image Analysis 2003

- R. R. Paulsen, K. Hilger, *Shape Modelling Using Markov Random Field Restoration of Point Correspondences*, Information Processing in Medical Imaging 2003
- R. R. Paulsen, R. Larsen, S. Laugesen, C. Nielsen, B. K. Ersbøll, *Building and Testing a Statistical Shape Model of the Human Ear Canal*, Medical Image Computing and Computer-Assisted Intervention 2002
- R. R. Paulsen, R. Larsen, B. K. Ersbøll, C. Nielsen, S. Laugesen, *Testing for Gender Related Size and Shape Differences of the Human Ear canal using Statistical methods*, Eleventh International Workshop on Matrices and Statistics 2002
- A. Rosholm, D. Arnbjerg, R. R. Paulsen, H. H. Thodberg, J. T. Jorgensen. *Digital X-ray radiogrammetry*. Osteoporosis International. 11S3:38, 2000
- H. H. Thodberg, J. K. Jensen, A. Rosholm, R. R. Paulsen. *BMD from Digital X-Ray Radiogrammetry: Sensitivity to Details of the Image Capture*. Journal of Bone and Mineral Research. 14S1:369, 1999.
- R. R. Paulsen, *On the Estimation of Bone Status*. Master Thesis. Informatics and Mathematical Modelling, Technical University of Denmark. 1998.

## Presentations and Talks

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| 2013 | Invited talk. <i>Group Based Supervision</i> . DTU Teaching Seminar. Kgs. Lyngby.   |
| 2013 | Invited talk. <i>3D Face Analysis</i> . Norwegian Biometry Forum. Oslo.   |
| 2012 | Invited talk. <i>Ear Canal Shape Analysis</i> . LocaPhoto workshop. Vienna.   |
| 2012 | Invited talk. <i>Automatic Quantification of Iris Colour</i> . Meeting of the English Speaking Working Group of the International Society of Forensic Genetics. Copenhagen. |
| 2012 | Talk. <i>The Spleen Challenge - Forskningsbaserede øvelser i et indledende kursus</i> . The DTU biannual teaching symposium.  |
| 2011 | Øregaard and Avedøre gymnasium. Videnskaben på besøg. <i>3D face scanning</i> .   |
| 2011 | Danish national radio P1 and P3. <i>Predicting facial features from DNA</i> . August 26.  |
| 2010 | TV Appearance. <i>Det Digitale Ansigt</i> . Danskernes Akademi. Danmarks Radio.   |
| 2010 | Promotion video for IT og Sundhed. <a href="http://itogsundhed.ku.dk">itogsundhed.ku.dk</a> .   |
| 2009 | Talk. <i>Human motion tracking in clinical environments</i> . Human Motion Motion Workshop  |



- 2009 Inaugural Lecture. *Surfaces in Medical Image Analysis*. DTU Informatics.
- 2009 Talk. *From Shapes to Manifolds*. Hven summer school on Manifold Learning.
- 2009 Talk. *Scanning, manipulation, and use of 3D surface models of the human head*. Medical Vision Day. DTU.
- 2008 Co-chair for the medical vision day at DTU.
- 2008 Talk. *Image Analysis for Hearing Aid Design*. Mini-symposium on Craniofacial Imaging and Image Processing. April 8, 2008. 3DLab. School of Dentistry, Faculty of Health Sciences, University of Copenhagen.
- 2004 Ph.D presentation at Oticon Research Centre Eriksholm.
- 2003 Oral presentation of paper at Conference on Information Processing in Medical Imaging.
- 2002 Invited speaker at Medical and Computer Graphics Visionday at DTU.
- 2002 Oral presentation of paper at Eleventh International Workshop on Matrices and Statistics.
- 2002 Oral presentation of paper at Conference on Medical Image Computing and Computer-Assisted Intervention.

Lyngby, 27. november 2017