## Publications dr.ir.R. Duits until 2021

| Type of Publication | # |
|---|---|
| peer-reviewed international journals | **42** |
| peer-reviewed conferences proceedings | **49** |
| special issue int. journal | **1** |
| book chapters | **6** |
| books | **2** |
| lecture notes | **1** |
| peer-reviewed abstracts with code release | **2** |

Total number of peer-reviewed international publications: **102**.
Google scholar (h-ind: **29**, i-10 ind: **60**, cit: **2834**).

All publications contain novelties both on the theoretical as on the application side. Close multi-disciplinary collaborations helped me to bring novel mathematical theory to medical imaging applications. For a categorization of the publications see
www.win.tue.nl/~rduits.

### Peer-reviewed Journal Publications:

[**RD 1**] R. **Duits**, L. M. J. Florack, J. de Graaf, and B. M. ter Haar Romeny, "On the axioms of scale space theory," *Journal of Mathematical Imaging and Vision*, vol. 20, pp. 267–298, 2004.

[**RD 2**] R. **Duits** and M. van Almsick, "The explicit solutions of linear left-invariant second order stochastic evolution equations on the 2d-Euclidean motion group," *Quarterly of Applied Mathematics, American Mathetical Society*, vol. 66, pp. 27–67, April 2008.

[**RD 3**] R. **Duits** and E. M. Franken, "Left invariant parabolic evolution equations on $SE(2)$ and contour enhancement via invertible orientation scores, part I: Linear left-invariant diffusion equations on $SE(2)$," *Quarterly of Applied mathematics, AMS*, vol. 68, pp. 255–292, June 2010.

[**RD 4**] R. **Duits** and E. Franken, "Left invariant parabolic evolution equations on $SE(2)$ and contour enhancement via invertible orientation scores, part II: Nonlinear left-invariant diffusion equations on invertible orientation scores," *Quarterly of Applied mathematics, AMS*, vol. 68, pp. 293–331, June 2010.

[**RD 5**] R. **Duits**, M. Felsberg, G. Granlund, and B. M. ter Haar Romeny, "Image analysis and reconstruction using a wavelet transform constructed from a reducible representation of the Euclidean motion group," *International Journal of Computer Vision*, vol. 79, no. 1, pp. 79–102, 2007.

[**RD 6**] B. J. Janssen* & F. M. W. Kanters* & R. **Duits*** (joint first authors), L. M. J. Florack, and B. M. ter Haar Romeny, "A linear image reconstruction framework based on Sobolev type inner products.," *International Journal of Computer Vision*, vol. 70, no. 3, pp. 231–240, 2006.

[**RD 7**] R. **Duits**, M. Duits, M. van Almsick, and B. M. ter Haar Romeny, "Invertible orientation scores as an application of generalized wavelet theory," *Image Processing, Analysis, Recognition and Understanding*, vol. 17, no. 1, pp. 42–75, 2007.

[**RD 8**] R. **Duits** and E. M. Franken, "Left-invariant diffusions on the space of positions and orientations and their application to crossing-preserving smoothing of HARDI images.," *International Journal of Computer Vision* vol. 92, pp. 231–264, March 2011.

[RD 9] R. **Duits**, B. Janssen, A. Becciu, and H. van Assen, "A variational approach to cardiac motion estimation based on covariant derivatives and multi-scale helmholtz decomposition.," *Quarterly of Applied Mathematics, American Mathematical Society* 71, p.1–36, 2013.

[RD 10] B. J. Janssen and R. **Duits**, "Linear image reconstruction by Sobolev norms on the bounded domain.," *International Journal of Computer Vision*, vol. 84, no. 2, pp. 205–219, 2009.

[RD 11] E. M. Franken and R. **Duits**, "Crossing preserving coherence-enhancing diffusion on invertible orientation scores," *International Journal of Computer Vision (IJCV)*, vol. 85, no. 3, pp. 253–278, 2009.

[RD 12] M. Felsberg, R. **Duits**, and L. M. J. Florack, "The monogenic scale space on a bounded domain and its applications.," *International Journal of Computer Vision*, vol. 2–3, no. 64, pp. 187–201, 2005.

[RD 13] R. **Duits**, H. Führ, B.J. Janssen, M. Bruurmijn, L.M.J. Florack and H.A.C. van Assen, "Evolution Equations on Gabor Transforms and their Applications", *Applied and Computational Harmonic Analysis*, vol.35 (3), p.483–526, 2013.
https://www.win.tue.nl/~rduits/article_DFJBFvA.pdf

[RD 14] F. M. W. Kanters, L. M. J. Florack, R. **Duits**, B. Platel, and B. M. ter Haar Romeny, "Alpha scale spaces in practice," *Pattern Recognition and Image Analysis*, vol. 17, no. 1, pp. 42–75, 2007.

[RD 15] R. **Duits**, "Schaal partituren," *NAW*, vol. 5/9, no. 3, pp. 224–232, 2008.

[RD 16] E.J. Creusen* & R. **Duits*** (joint first authors), A. Vilanova and L.M.J. Florack, "Numerical Schemes for Linear and Non-linear Enhancement of DW-MRI", NM-TMA vol. 6, no.1, p.138–168, 2013 *Numerical Methods–Theory and Applications*, .
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[RD 17] R. **Duits**, T.C.J.Dela Haije, E.J. Creusen and A. Ghosh, "Morphological and Linear Scale Spaces for Fiber Enhancement in DW-MRI", *Journal of Mathematical Imaging and Vision*, vol.46, no.3, pp. 326–368, 2013. www.win.tue.nl/~rduits/JMIVDuits2011final.pdf,

[RD 18] U. Boscain, R. **Duits**, F. Rossi and Y. Sachkov, "Curve Cuspless Reconstruction via sub-Riemannian Geometry" *ESAIM-COCV Control Optimization and Calculus of Variations.*, vol. 20, pp.748–770, 2014. https://www.win.tue.nl/~rduits/1203.3089v2.pdf.

[RD 19] E. Bekkers, R. **Duits**, T. Berendschot, B.M. ter Haar Romeny, "A Multi-Orientation Analysis Approach to Retinal Vessel Tracking."
https://link.springer.com/article/10.1007/s10851-013-0488-6
*Journal of Mathematical Imaging and Vision* , vol. 49, no. 3 pp. 583–610, 2014.

[RD 20] R. **Duits**, U. Boscain, F. Rossi and Y. Sachkov, "Association Fields via Cuspless Sub-Riemannian Geodesics in SE(2)." *Journal of Mathematical Imaging and Vision* , vol. 49, no. 2 pp. 384–417, 2014. https://www.win.tue.nl/~rduits/cusp.pdf.

[RD 21] C.M.W. Tax, R. **Duits**, A. Vilanova, B.M. ter Haar Romeny, P.Hofman, L.Wagner, A.Leemans and P. Ossenblok, "Evaluating Contextual Processing in Diffusion MRI: Application to Optic Radiation

Reconstruction for Epilepsy Surgery"
PLOSone Open Access Vol 9, no. 7, p.1–19, 2014.
https://www.win.tue.nl/~rduits/TaxDuitsetal.pdf.

[**RD 22**] U. Sharma and R. **Duits**. *Left-invariant evolutions of wavelet transforms on the Similitude Group*. ACHA *Applied and Computational Harmonic Analysis*, Vol. 39, p.110–137, 2015.
https://www.win.tue.nl/~rduits/rana13-17.pdf.

[**RD 23**] J. Zhang* & R. **Duits*** (*joint main authors), G.R. Sanguinetti, B.M.ter Haar Romeny. "On Numerical Approaches for Linear Left-invariant Diffusions on SE(2), their Comparison to Exact Solutions, and their Applications in Retinal Imaging." vol. 9, p.1-50, 2016.
https://www.win.tue.nl/~rduits/ZhangDuits.pdf

[**RD 24**] J.Portegies, R.Fick, G.R.Sanguinetti, S.P.L.Meesters, G.Girard and R.**Duits**. *Improving Fiber Alignment in HARDI by Combining Contextual PDE flow with Constrained Spherical Deconvolution.* Accepted for open access publication in PlosOne 2015.

[**RD 25**] E.J. Bekkers* and R.**Duits*** and A.Mashtakov* and G.R.Sanguinetti* (*joint main authors). "A PDE Approach to Data-Driven Sub-Riemannian Geodesics" SIAM Journal on Imaging Sciences (SIIMS), vol 8, (4), p.2740–2770, 2015. https://www.win.tue.nl/~rduits/siims.pdf

[**RD 26**] R. **Duits*** & M.H.J. Janssen* (*joint main authors), J. Hannink, G. Sanguinetti. *Locally Adaptive Frames in the Roto-translation Group and their Applications in Medical Imaging*,
JMIV 56(3), p.367–402, 2016.
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[**RD 79**] B.M. ter Haar Romeny, E.J. Bekkers, J. Zhang, F. Fuang, R. **Duits**, B.Dashtbozorg et al. *Brain Inspired Algorithms for Retinal Image Processing*, Machine Vision and Applications, p.1–16, 2016.

[**RD 80**] J. Zhang, B. Dashtbozorg, E.J. Bekkers, J. Pluim, R. **Duits**, ter Haar Romeny, B.M. *Robust Retinal Vessel Segmentation via Locally Adaptive Derivative Frames in Orientation Scores*
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[**RD 89**] A. Mashtakov, R. **Duits**. *A cortical Based Model for Contour Perception on the Retinal Sphere* Program systems: Theory and applications, 2016, 7:4(31), p.231–247.
http://psta.psiras.ru/read/psta2016_4_231-247.pdf

[**RD 90**] A. Mashtakov, R. **Duits**, Yu. Sachkov, E. Bekkers, I. Beschastnyi. *Sub-Riemannian Geodesics in SO(3) with Application to Vessel Tracking in Spherical Images of Retina* Doklady Mathematics. 2017. https://www.dropbox.com/s/x45v8ik3a9wgk5y/SO3_dan.pdf?dl=0

[**RD 81**] R. **Duits**, A. Ghosh, T.C.J. Dela Haije and A. Mashtakov. *On sub-Riemannian Geodesics within $SE(3)/(\{0\} \times SO(2))$ whose spatial projections do not have cusps.* Journal of Dynamical Control Systems (JDCS), 22(4), p.771–805, 2016.
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[**RD 82**] S. Meesters, P. Ossenblok, L. Wagner, P. Hofman, O. Schrijns, P. Boon, L.M.J. Florack, A. Vilanova, and R. **Duits**. *Stability metrics for optic radiation tractography: towards damage prediction after resective surgery.*

Journal of Neuroscience Methods, 288, p.24–34, 2017.
For preprint see http://www.sciencedirect.com/science/article/pii/S0165027017301620

[RD 83] E.J. Bekkers, M. Loog, M., B.M. ter Haar Romeny, B. and R. **Duits**, *Template Matching on the Roto-Translation Group*, Published in IEEE-PAMI, Pattern Recognition and Machine Intelligence, 40(2), 1–12, Februari 2018.
DOI: 10.1109/TPAMI.2017.2652452
For article and code see https://erikbekkers.bitbucket.io/TMSE2.html

[RD 85] Abbasi-Surehjani, S., Zhang, J., **Duits**, R. and ter Haar Romeny, B.M. *Retrieving challenging vessel connections in retinal images by line co-occurence statistics*
Biological Cybernetics 111(3), pp. 237–247, 2017.
https://www.win.tue.nl/~rduits/samaneh.pdf

[RD 84] A.Mashtakov, R.**Duits**, Y.L.Sachkov, E.J.Bekkers,and I.Beschastnyi, *Tracking of Lines in Spherical Images via Sub-Riemannian Geodesics in SO(3)*, JMIV, 58(2), pp.239–264, 2017.
https://link.springer.com/article/10.1007/s10851-017-0705-9

[RD 87] J.M.Portegies & R.**Duits**. *New Exact and Numerical Solutions of the (Convection-)Diffusion Kernels on SE(3).*
Journal of Differential Geometry and Applications (DGA), 53, p.182-219, 2017.
See https://www.win.tue.nl/~rduits/SE3JorgPortegiesDuits.pdf.
For extended version see https://arxiv.org/abs/1604.03843

[RD 92] M.H.J.Janssen & A.J.E.M. Janssen & E.J.Bekkers & J.Olivan Bescos& R.**Duits**. *Design and Processing of Invertible Orientation Scores of 3D Images*,
JMIV (Special Issue Scale Space and Variational Methods) 2018.
https://doi.org/10.1007/s10851-018-0806-0
See https://www.win.tue.nl/~rduits/CEDOS-3D.pdf.

[RD 98] J.Xing, Z.Li, B.Wang, B.Yu, Z.Fahrad, A.Zheng, R. **Duits** & T.Tan. *Automated Segmentation of Lesions in Ultrasound Using Semi-pixel-wise Cycle Generative Adversarial Nets*
Accepted for publication in IEEE/ACM Trans. on Comp. Biology and Bioinformatics 2020.
See https://ieeexplore.ieee.org/document/9025227

[RD 88] R.**Duits** & S.P.L.Meesters & J.M.Mirebeau & J.M.Portegies. *Optimal Paths for Variants of the 2D and 3D Reeds-Shepp Car with Applications in Image Analysis.*
Journal of Mathematical Imaging and Vision (JMIV).
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July, 60(6), p.816–848, July 2018.
See https://link.springer.com/article/10.1007/s10851-018-0795-z.

[RD 96] R.**Duits** & E.J.Bekkers & M.Mashtakov. *Fourier Transform on the Homogeneous Space of 3D Positions and Orientations for Exact Solutions to PDEs*
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[RD 99] B.M.N. Smets, J.M. Portegies and R. **Duits**. *Total Variation and Mean Curvature PDEs on the Homogeneous Space of Positions and Orientations*
JMIV Special Issue: Scale Space and Variational Methods, 63, 237-262, 2021.
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[**RD 100**] B.M.N. Smets, J.M. Portegies, E.J. Bekkers and R. **Duits**. *PDE-based Group Equivariant Convolutional Neural Networks with Medical Image Processing Applications*
ArxiV 2020: https://arxiv.org/abs/2001.09046v4.pdf.
Accepted for publication in JMIV. Invited for Special Issue SSVM 2022.

[**RD 101**] M.W.Lafarge, E.J. Bekkers, J.P.W. Pluim, R. **Duits** and M. Veta. *Roto-Translation Equivariant Convolutional Networks: Application to Histopathology Image Analysis.*
MEDIA, 68, 101849, 2019.
https://www.sciencedirect.com/science/article/pii/S1361841520302139

**Peer-reviewed proceedings/conference publications:**

[**RD 27**] R. **Duits**, T. C. J. Dela Haije, A. Ghosh, E. J. Creusen, A. Vilanova, and B. ter Haar Romeny, "Enhancement of DW-MRI," in *Scale Space and Variational Methods in Computer Vision (Lecture Notes in Computer Science)*, vol. 6667, pp. 1–13, September 2011.

[**RD 28**] R. **Duits**, B. Janssen, F. Kanters, and L. M. J. Florack, "Linear image reconstruction from a sparse set of $\alpha$ scale space features by means of inner products of Sobolev type," *Lecture Notes in Computer Science, Springer-Verlag*, vol. 3753, pp. 96–111, June 2005.

[**RD 29**] R. **Duits**, M. van Almsick, M. Duits, E. Franken, and L. M. J. Florack, "Image processing via shift-twist invariant operations on orientation bundle functions," in *7th International Conference on Pattern Recognition and Image Analysis: New Information Technologies* (N. Z. e. a. Geppener, Gurevich, ed.), (St.Petersburg), pp. 193–196, October 2004.

[**RD 30**] R. **Duits**, M. Felsberg, and L. M. J. Florack, "$\alpha$ scale spaces on a bounded domain," *Proceedings Scale Space Conference, Isle of Skye,UK.*, pp. 494–510, June 2003.

[**RD 31**] R. **Duits** and B. Burgeth, "Scale spaces on Lie groups," in *Scale Space and Variational methods* (M. Sgallari and Paragios, eds.), (Ischia, Italy), pp. 300–312, 2007.

[**RD 32**] R. **Duits**, L. Florack, B. ter Haar Romeny, and J. de Graaf, "Scale-space axioms critically revisited," in *Signal and Image Processing* (N.Younan, ed.), (Kauai), pp. 304–309, August 2002. Proceedings of the Fourth IASTED International Conference.

[**RD 33**] R. **Duits** and E. M. Franken, "Line enhancement and completion via left-invariant scale spaces on SE(2)," in *Scale Space and Variational Methods in Computer Vision (Lecture Notes in Computer Science)*, vol. 5567, (Heidelberg), pp. 795–807, Springer-Verlag, 2009.

[**RD 34**] R. **Duits**, F. Kanters, L. M. J. Florack, and B. M. ter Haar Romeny, "A comparison between the deep structure of alpha scale spaces," *Lecture Notes in Computer Science, Springer-Verlag*, vol. 3753, pp. 234–248, June 2005.

[**RD 35**] M. Felsberg, R. **Duits**, and L. Florack, "The monogenic scale space on a bounded domain and its applications," *Proceedings Scale Space Conference, volume 2695 of Lecture Notes of Computer Science, Springer, Isle of Skye, UK.*, pp. 209–224, June 2003.

[**RD 36**] L. M. J. Florack and R. **Duits**, "Regularity classes for locally orderless images," *Proceedings*

*Scale Space Conference, Isle of Skye, UK.*, pp. 255–265, June 2003.

[**RD 37**] L. M. J. Florack, R. **Duits**, and J. Bierkens, "Tikhonov regularization versus scale space: a new result," in *Proceedings IEEE Conference on Image Processing ICIP 2004*, vol. 1, (Piscataway, NJ: IEEE), pp. 271–274.

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[**RD 39**] K. Pedersen, R. **Duits**, and M. Nielsen, "On $\alpha$-kernels, lévy processes, and natural image statistics," in *Proc. on the 5th International Conference on Scale Space and PDE methods* (W. Kimmel, Sochen, ed.), (Hofgeismar, Germany), pp. 486–480, Springer, 2005.

[**RD 40**] B. Janssen, F. Kanters, R. **Duits**, L. M. J. Florack, and B. M. ter Haar Romeny, "A linear image reconstruction framework based on Sobolev type inner products," in *Proc. on the 5th International Conference on Scale Space and PDE methods* (W. Kimmel, Sochen, ed.), (Hofgeismar, Germany), pp. 85–95, Springer, 2005.

[**RD 41**] E. M. Franken, R. **Duits**, and B. M. ter Haar Romeny, "Non-linear diffusion on the Euclidean motion group," in *Proc. of the first International Conference on Scale Space and Variational Methods in Computer Vision, Lecture Notes in Computer Science, Vol. 4485, Springer* (M. Sgallari and Paragios, eds.), pp. 461–472, June 2007.

[**RD 42**] E. M. Franken, R. **Duits**, and B. M. ter Haar Romeny, "Curvature estimation for enhancement of crossing curves," in *Digital Proceedings of the 8th IEEE Computer Society Workshop on Mathematical Methods in Biomedical Image Analysis (MMBIA), held in conjuction with the IEEE International Conference on Computer Vision (Rio de Janeiro, Brazil)* (C.-F. W. W. Niessen and M. Nielsen, eds.), pp. 1–8, Omnipress, October 2007. Awarded the *MMBIA 2007 best paper award.*

[**RD 43**] B. J. Janssen, R. **Duits**, and B. M. ter Haar Romeny, "Linear image reconstruction by Sobolev norms on the bounded domain.," in *Proc. of the first International Conference on Scale Space and Variational Methods in Computer Vision, Lecture Notes in Computer Science, Vol. 4485, Springer* (M. Sgallari and Paragios, eds.), pp. 461–472, June 2007.

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[**RD 45**] B. Janssen, R. **Duits**, and L. M. J. Florack, "Coarse-to-fine image reconstruction based on weighted differential features and background gauge fields," in *Scale Space and Variational Methods in Computer Vision (Lecture Notes in Computer Science)*, vol. 5567, (Heidelberg), pp. 377–388, Springer-Verlag, 2009.

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[**RD 47**] E. J. Creusen, R. **Duits**, and T. C. J. Dela Haije, "Numerical schemes for linear and non-

linear enhancement of DW-MRI," in *Scale Space and Variational Methods in Computer Vision (Lecture Notes in Computer Science)*, vol. 6667, (Heidelberg), pp. 14–25, Springer-Verlag, September 2011.

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[**RD 50**] E. Brunenberg, R. **Duits**, ter Haar Romeny, and B. Platel, "A Sobolev norm based distance measure for HARDI clustering – a feasibility study on phantom and real data," *Lecture Notes in Computer Science*, vol. 6361, pp. 175–182, 2010.

[**RD 51**] F. Kanters, L. M. J. Florack, R. **Duits**, and B. Platel, "$\alpha$-scale space kernels in practice," in *7th International Conference on Pattern Recognition and Image Analysis: New Information Technologies* (N. Z. e. a. Geppener, Gurevich, ed.), (St.Petersburg), pp. 260–263, October 2004.

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[**RD 53**] B. J. Janssen, L. M. J. Florack, R. **Duits**, and B. M. ter Haar Romeny, "Optic flow from multi-scale dynamic anchor point attributes.," in *Lecture Notes in Computer Science, Vol. 4141, Proc.3rd Int. Conf. ICIAR 2006*, (Portugal), pp. 767–779, Springer, 2006.

[**RD 54**] P. Ossenblok, C. Tax, A. Colon, C. Jacobs, R. **Duits**, L. Wagner, B. ter Haar Romeny, and A. Vilanova, "Reconstruction of the optic tract prior to an atlr using fmri-seeded DTI tractography." Abstract and Poster 29th Int. Epilepsy Congress Rome. Published online http://www.epilepsyrome2011.org/, September 2011.

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[RD 59] C.M.W. Tax, T.C.J. Dela Haije, A. Fuster, R. **Duits**, M. A. Viergever, L.M.J.Florack and A. Leemans. *Towards Quantification of the Brain's Sheet Structure: Evaluation of the Discrete Lie Bracket.* ISMRM 2014. https://www.win.tue.nl/~rduits/0975.pdf

[RD 60] H.B. Kause, O.G. Filatova, O.G. and R.**Duits**, L.C.M. Bruurmijn, A. Fuster, J. Westerberg, L.M.J.Florack, and H.C. van Assen, *Direct Myocardial Strain Assessment from Frequency Estimation in Tagging MRI* in "Statistical Atlases and Computational Models of the Heart. Imaging and Modelling Challenges", ed. Camara, O. and Masi, T. et al. LNCS 8333, p.212–219, 2014.

[RD 61] E.J. Bekkers, R. **Duits**, B.M.ter Haar Romeny, *Optic Nerve Head Detection via Group Correlations in Multi-Orientation Transforms*, ICIAR 2014, Part II, LNCS 8815, pp. 293–302, 2014.

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[RD 64] E.J. Bekkers, R. **Duits** and M. Loog. *Training of Templates for Object Recognition in Invertible Orientation Scores: Application to Optic Nerve Head Detection in Retinal Images*, EMMCVPR 2015 LNCS 8932, pp. 464–477, 2015.
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[RD 65] E.J. Bekkers*, R. **Duits***, A. Mashtakov*, G.R. Sanguinetti* (*joint main authors). *Sub-Riemannian geodesics with non-uniform cost*, SSVM 2015 (eds. Aujol, Nikolova, Papadakis), LNCS 9087, p.612-625, 2015.
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