

Curriculum Vitae Bart Koopman

(shortened version, not including list of publications)

2019, March

Prof.dr.ir. H.F.J.M. Koopman (Bart)

Function	Head, Department of Biomechanical Engineering
Faculty	Engineering Technology, University of Twente Vice-Dean Research
Research Institute	Technical Medical Centre (TechMed Centre), Univ. of Twente Board Member
E-mail	h.f.j.m.koopman@utwente.nl
Phone	+31 (53) 4892465
Study	Mechanical Engineering
Ph.D.	November 3, 1989
Dissertation	The three-dimensional analysis and prediction of human walking
Date of accession	September 1, 2007
Inaugural lecture	February 12, 2009 De menselijke maat
Subject	Biomechanical Engineering

Keywords

Biomechanics, Control Engineering, Tissue mechanics, Rehabilitation Robotics, Prosthetics and Orthotics

Focus

Bart Koopman worked on various topics related to the co-ordination of movement and with applications in rehabilitation, orthopaedics and neurology. The research of the Biomechanical Engineering Group is focussed in three themes: Neural mechanics, Tissue mechanics and Movement mechanics. The most important technological areas that are integrated in the research are control engineering, mechanics of materials, dynamics and design engineering. All research is facilitated by a strong cooperation with various technological and clinical partners.

Research

PhD research

PhD received at the working group on Biomechanical Engineering, Faculty of Mechanical Engineering, University of Twente in November 1989, on 'The three-dimensional analysis and prediction of human walking', promoters prof. H. Grootenboer and prof. H. de Jongh.

Current projects:

Wearable Robotics: TTW Perspectief (project leader); 2018-2022; 4,3M€

Symbionics: Adaptive Robotics to support arms, head and trunk. STW Perspectief (program leader); 2014-2019; 4,0 M€ (1,2 M€ at UT), 9 PhDs and 2 PDEngs at UT, VU, TUD, RUN, RUG and UM, promotor for Kostas Nimzanis, Stergios Verros and Bob Giesbers.

Sofie: Safe bicycling for the elderly. PIDON; 2011-2015; 0,8 M€ (0,4 at UT), supervising 1 PhD and 1 PDEng, promotor for Vera Bulsink

eNHANCE: Intention based enhancement of reaching and grasping. EU H2020; 2015-2019 (coordinator, program leader); 3,9 M€ (0,7 at UT), 3 PhDs at UT.

MyLeg: Smart and intuitive osseointegrated transfemoral prostheses embodying advanced dynamic behaviors. EU H2020; 2017-2021 (project leader); 1,4 M€ (0,4 M€ at UT).

Vascarmor: Consolidator Grant to J. Rouwkema (EU ERC). 1,5 M€, 4 PhDs, 1 PD at UT

TIPS: prosthesis selection process. NWO (co-applicant with H. Rietman); 2011-2015; supervising and promotor for Erik Prinsen at RRD.

Spine modelling: Personalized musculo-skeletal modelling of the spine. NUTS-OHRA (main applicant); 2013-2017; 0,3 M€, supervising and promotor for Riza Bayoglu.

Surface for Health: Decubitus prevention, STW (co-applicant with H. Rietman); 2013-2017; 3 PhDs, supervising and promotor for Iris Hoogendoorn.

Lab on a chip: Systematic load variations for cell growth. STW Veni (J. Rouwkema); 2012-2015; supervising and promotor for Ravi Sinha.

Knee modelling: prosthetic knee implants. EU ERC (N. Verdonschot); 2014-2018; Supervising and promotor for Marco Marra at RUN.

Selection of past projects:

Flexension: An arm support to meet the growing need of Duchenne muscular Dystrophy patients. STW (main applicant), 2011-2015, 1,4 M€ (0,6 M€ at UT), supervising 4 PhD's at UT, VU, TUD and RUN, promotor for Joan Lobo Pratt.

TLEMSafe: Personalized musculo-skeletal modelling. EU FP7 (co-applicant with N. Verdonschot); 2010-2014; 4,3 M€ (1,2 M€ at UT); 6 PhD's, promotor for Rene Fluit and Vincenzo Carbone.

Cleantools: Flexible surgical instruments, based on nitinol. EU FP7; 2012-2014; 1,1 M€ (0,3 at UT)

Fusion: data fusion in movement experiments. PIDON; 2010-2014; supervising and promotor for Bart Koning (still in the pipeline).

Reflexleg: Sensible and energy saving leg prosthetics. STW; 2010-2014; promotor for Ramazan Unal.

Dynasit, Active dynamic seating. Senter; promotor for Paul van Geffen.

FreeMotion, Development of ambulant measurements. Senter; promotor for Martijn Klein Horsman.

Gait control: Modelling of gait dynamics. Internal; promotor for Bart Verdaasdonk.

Biomechatronics. Stumbling during gait. Internal; assistant promotor for Arturo Forner Cordero.

Muscle dynamics. Muscle functions in several projects. assistant promotor for Can Yücesoy, Kenneth Meier, Bart van der Linden.

(Assistant or co) promotor:

- Belt, Ir. D. van de (1997, April 04). Simulation of walking using optimal control. Universiteit Twente, 160 pp. Promotor(en): H.J. Grootenboer. ISBN 90-365-0936-X.
- Linden, ir. B.J.J.J. van der (1998, May 28). Mechanical modeling of skeletal muscle functioning. Universiteit Twente, 151 pp. Promotor(en): H.J. Grootenboer, P.A.J.B.M. Huijting. ISBN 90-36511496.
- Meier, drs. K. (1998, June 11). Muscle mechanics. The effect of stretch and shortening on skeletal muscle force. Universiteit Twente, 151 pp. Promotor(en): P.A.J.B.M. Huijting, H.J. Grootenboer. ISBN 90-36511534.

- Kooij, ir. H. van der (2000, April 14). Human balance control in standing and walking. Computational models of standing, walking and perception of ego-motion. Universiteit Twente, 179 pp. Promotor(en): F.C.T. van der Helm, H.J. Grootenboer. ISBN 90-407-1963-2.
- Yücesoy, C.A. (MSc) (2003, June 27) Intra-, inter- and extramuscular myofascial force transmission. A combined finite element modeling and experimental approach. Universiteit Twente, 171 pp. Promotor(en): P.A.J.B.M. Huijting, H.J. Grootenboer. ISBN 90-365-1933-0.
- Forner Cordero, A. (MSc) (2003, June 13): Human gait, stumble and ... fall? Mechanical limitations of the recovery from a stumble. Universiteit Twente, 197 pp. Promotor: F.C.T. van der Helm. ISBN 90-365-1912-8.
- Klein Horsman, M. (2007, Dec 21): The Twente lower extremity model. Consistent dynamic Simulation of the human locomotor apparatus. University of Twente, 159 pp. Promotoren F.C.T. van der Helm, H.F.J.M. Koopman. ISBN 978-90-365-2602-9
- Verdaasdonk, B. (2008, Feb 8): Towards efficient and robust control of bipedal walking. University of Twente, 227 pp. Promotoren F.C.T. van der Helm, H.F.J.M. Koopman. ISBN 978-90-365-2608-1
- Geffen, P. van (2009, Mai 14): Dynamic sitting. University of Twente, 207 pp. Promotoren H.F.J.M. Koopman, P.H. Veltink. ISBN 978-90-365-2840-5
- Ünal, Ramazan (2014, Jan 10): Walkmech. Design and control of an energy recycling transfemoral prosthesis. University of Twente, 102 pp. Promotoren H.F.J.M. Koopman, S. Stramigioli. ISBN 978-90-365-3606-6
- Fluit, René (2015, Feb 6): Functional outcome prediction after surgery: A Bridge too far? University of Twente, 145 pp. Promotoren H.F.J.M. Koopman, N. Verdonschot. ISBN 978-90-365-3833-6
- Carbone, Vincenzo (2016, May 26): Subject specific lower extremity modelling. University of Twente, 167 pp. Promotoren N. Verdonschot, H.F.J.M. Koopman. ISBN 978-90-365-4103-9
- Lobo Prat, Joan (2016, Sep 9): Control interfaces to actively support the arm function of men with Duchenne muscular dystrophy. University of Twente, 267 pp. Promotoren H.F.J.M. Koopman, P.H. Veltink. ISBN 978-90365-4170-1
- Prinsen, Erik (2016, Dec 8): Influence of a micro-processor-controlled prosthetic knee on gait adaptations. University of Twente, 182 pp. Promotoren H. Rietman, H.F.J.M. Koopman. ISBN 978-90-365-4206-7
- Sinha, Ravi (2017, Feb 16): Building gyms for cells – development of combinatorial screening platforms for mechanical stimulation. University of Twente, 156 pp. Promotor H.F.J.M. Koopman, N. Verdonschot. ISBN 978-90-365-4285-2
- Bulsink, Vera (2017, Dec 7): Bicycling Stability. Simulation and experiments to improve cycling stability for older cyclists. University of Twente, 119 pp. Promotor H.F.J.M. Koopman. ISBN 978-90-365-4443-6

Other:

Member of a promotion committee at various occasions at Universiteit Twente, TU Delft, VU Amsterdam, UvA Amsterdam, RU Groningen, Radboud Universiteit Nijmegen, TU Eindhoven (at least 50 times in total).

Reviewer for 'Journal of Biomechanics', 'Clinical Biomechanics', 'Biological Cybernetics' and several other journals.

Reviewer for project applications of Dutch and Belgian funders (STW, NWO, Rheumafonds etc.).

Organising (sessions of) international conferences or member of the organizing committee, such as the Biomechanics congress, 19-21 April 1999, Enschede; International Society of Biomechanics congresses (2-yearly); European Society of Biomechanics Congresses (was 2-yearly, now each year); International Society of Prosthetics and Orthotics (2 yearly), Biorobotics (2-yearly). Conference co-chair of Biorobotics 2018 in Enschede.

Keynote and invited lectures (about 10)

Member of the board of the International Society of Biomechanics (from 2013)

Member of Management team IMDI core SPRINT (from 2011)

Visiting professor, Tarcot, University of Tanzania in Moshi (2012-2016).

Visiting professor, University of Aalborg, fac. Mechanical Engineering, 2008

Visiting professor, University of Melbourne, fac. Engineering, 2018.

Member research review committee, mid-term review fac. 3ME, TU Delft, 2016

Member research review committee, graduate school Biomedical Engineering and Medicine, University of Aalborg, Denmark, 2018.

Awards:

- The Forchheimer Prize for the best paper in Prosthetics and Orthotics International 1989-1991:
H.W.L. van Jaarsveld, H.J. Grootenboer, J. de Vries, H.F.J.M. Koopman (1990): Stiffness and hysteresis properties of some prosthetic feet. *Prosthetics and Orthotics International* 14, pp 117-12
- Young Investigator Award ISB 1997 for K. Meier: K. Meijer, H.J. Grootenboer, H.F.J.M. Koopman & P.A.J.B.M. Huijing (1997). Modelling of post-shortening force deficit and post-lengthening force enhancement with a Hill type muscle model. *Proceedings XVIth Congress of the International Society of Biomechanics*, Tokyo, Japan.
- KIVI-Oost afstudeerscriptie prijs 2000 voor M. Rekveldt (1999): Finite Element Modeling of aponeurotomy. D-verslag BW-129, vakgroep Biomedische Werktuigbouwkunde, Universiteit Twente.
- Grand Challenge 2014 to estimate in vivo forces in the knee. Marra, Marco A; Vanheule, Valentine; Fluit, René; Koopman, Bart H. F. J. M.; Rasmussen, John; Verdonschot, Nico; Andersen, Michael S (2014): A Subject-Specific Musculoskeletal Modeling Framework to Predict in Vivo Mechanics of Total Knee Arthroplasty. *Journal of Biomechanical Engineering* (2015, 137-2)

Education

- Contribution to the development of the educational program in Biomedical Engineering at the University of Twente (founding father).
- Contribution to the development of the educational program in Technical Medicine at the University of Twente (founding father).
- Setting up lectures on Biomechanics, Mens in Beweging, Robotics and navigation, Dynamica voor BMT, Biomechatronics, Revalidatietechniek, etc. Still responsible for the first two, smaller contributions to the other courses.
- Guest lectures and other small contributions (tutor, examiner etc.) to courses and projects for ME, IDE, TM, BME, AT and Atlas.
- Yearly guest lecture Biomechatronics at TUDelft, also in the past at RUGroningen and RUNijmegen.
- Supervision in approximately 300 master assignments and 100 bachelor assignments.
- Post graduate course for rehabilitation doctors (PaOG, Hoytema), Biomechanica voor revalidatie en orthopedie (2-days).

Management

- Head, department of Biomechanical Engineering (from 2003)
Over the years, the staff of Biomechanical Engineering grew from 20 (5.04 research fte) in 2007 to 57 (26.32 research fte) in 2012 (Mechanical Engineering Scientific report 200-2012, March 2014). The research review scores of the group for quality, productivity, relevance and viability improved from 4 – 4 – 3 – 3 in 2007 to 4,5 – 4 – 5 – 4 in 2014 respectively on a 5 points scale. At the next review in 2019, the staff will be further increased to about 75, and we expect an even better score. The department is one of the best scoring groups of the University of Twente when personal grants are considered: Veni (4x), Vidi (2x), Vici, IOF Marie Curie, ERC starting (2x), ERC consolidator, ERC advanced for 8 different researchers. Furthermore, we initiated and coordinated 2 TTW perspectief programs, and several European projects.
<https://www.utwente.nl/en/et/be/>
- Vice-dean research, Faculty Engineering Technology (from 2017)
Involved in coordinating research themes (including contribution to 'sectorplannen'), talent development and –management, stimulating cooperation between departments, research review.
<https://www.utwente.nl/en/et/>
- Interim Scientific Director, Mira Institute for Biomedical Engineering and Technical Medicine, University of Twente (from 2017 until 2018).
One of my tasks was to reorganize the Mira research Institute and to set up the Technical Medical Centre according to the themes and organizational structure of the University of Twente. In the new TechMed Centre, all biomedical research programs, educational programs

(Biomedical Engineering, Technical Medicine and Health Sciences) and some of the shared laboratory facilities are combined under one roof. The new building that facilitates all activities will be opened at the end of 2019 at the campus of the University of Twente.

<https://www.utwente.nl/en/techmed/>

Member, management team TechMed Centre, University of Twente (from 2018)
Member, University Committee on Research (UC-Oz) (from 2018)
Chairman, disciplinary council Health Cluster University of Twente (from 2014)
Member, board International Society of Biomechanics (from 2013)
Founding member, International Center on Rehabilitation Robotics (ICORR) (from 2018)
Member, management team Centre for Rehabilitation Technology (CeRT) (until 2003)
Member, management team Health (from 2015)
Member, examination committee Technical Medicine (until 2007 and from 2015)
Chairman, examination committee Biomedical Engineering (until 2012)
Chairman, educational committee Technical Medicine (until 2012)
Chairman, educational committee Mechanical Engineering (from 2011)
Chairman, examination committee Industrial Design Engineering (from 2011)
Member, UHD committee Engineering Technology (from 2014)
Member, tenure track committee Engineering Technology (from 2014)
Cluster leader for MIRA in the Twente Graduate School (from 2013)
Member, board Research school of Behavioural and Cognitive Science (BCN) Groningen (from 2016)
Member, management team IMDI centre of research excellence SPRINT (from 2012)
Member, management team National Graduate School for Systems and Control (DISC) (from 2016)

Publications

In total there are about 150 refereed journal papers, 150 refereed conference contributions, 4 patents and about 80 other written publications. The H-index is about 30.

A complete list can be provided upon request.