CURRICULUM VITAE

Johannes T. B. Overvelde
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WORK EXPERIENCE

2016-present: FOM Instituut AMOLF (NL)
Group Leader - Soft Robotic Matter group

2011-2012: Femto Engineering (NL)
Consultant, R&D and FEM engineer

2009-2010: Department of Industrial Design, TU Delft (NL)
Warehouse and Personnel Manager

EDUCATION

2012-2016: School of Engineering and Applied Sciences, Harvard University (US)
PhD in Applied Mathematics
PhD dissertation: 'Embracing Compliance and Instabilities to Achieve Function in Mechanical Metamaterials and Devices'. Advisor prof. Katia Bertoldi.

2012-2013: School of Engineering and Applied Sciences, Harvard University (US)
SM in Applied Mathematics

2009-2012: TU Delft (NL)
MSc in Mechanical Engineering
Cum laude (GPA 4.0 - 8,7/10).
Specialization: Solid and Fluid Mechanics.
Extracurricular graduate course - Collective Intelligence, ParisTech (FR).
Master's thesis: 'The Moving Node Approach in Topology Optimization - An Exploration to a Flow-inspired Meshless Method-based Topology Optimization Method'. Advisors prof. dr. ir. Fred van Keulen and dr. ir. Matthijs Langelaar. [pdf]
Research Internship: 'The Effect of Shape on Periodic Structures Undergoing Elastic Instability' and 'Reversible and Reprogrammable Tuning of Two-Dimensional Photonic Structures Triggered by Shape Memory Effect', Harvard University (US).

2006-2009: TU Delft (NL)
BSc in Mechanical Engineering
Cum laude (GPA 3.9 - 7,9/10).
Bachelor's thesis: 'Cavitation-treatment Times of a Liquid'. [pdf]

2004-2009: TU Delft (NL)
P (propaedeutic exam) in Applied Physics

1998-2004: CSG het Noordik, Almelo (NL)
VWO (preparatory scientific education)

TEACHING

Spring 2014: School of Engineering and Applied Sciences, Harvard University (US)
Teaching Fellow ES128 Computational Solid and Structural Mechanics

2008-2009: Department of Industrial Design, TU Delft (NL)
Lab Instructor WBTP113-07 and WBTP115 drilling, milling, turning and welding

2008-2009: Cultural Center Delft (NL)
Instructor weekly juggling workshops

SCHOLARSHIPS & AWARDS

2015:	1st prize winner of the Gallery of Mechanics at New.Mech 2015, Boston University
2014:	Certificate of Excellence and Distinction in Teaching for the course ES128, Derek Bok Center for Teaching and Learning, Harvard University
2014:	Haythornthwaite Foundation Student Travel Award, ASME AMD
2014:	Robert L. Wallace Prize Fellowship, Harvard University
2013:	Robert L. Wallace Prize Fellowship, Harvard University
2012:	UfD-Best Graduate of 3mE Faculty Grant, TU Delft
2012:	Fulbright Grant, The Fulbright Center
2012:	University Fund Delft Grant, TU Delft
2011:	Employee of the Year Award, Femto Engineering
2010:	Justus & Louise van Effen Excellence Scholarship, TU Delft
2009:	Best Research Award, BSc thesis TU Delft

MENTORING

2016:	Alberico Sabbadini - Visiting **master student** Physics - Leiden University (NL) Experiments and simulations of multi-stable prismatic structures.
2015:	Martin Mixe - Visiting **undergraduate student** Mechanical Engineering - ICAM University (FR) Fabrication, experiments and programming of modular origami-like robots.
2015:	David Dykstra - Visiting **master student** Aerospace Engineering - TU Delft (NL) Analytics, numerics and experiments of porous structures undergoing tension instability.
2015:	Simon Shuham - **Undergraduate student** Mechanical Engineering - Harvard University (US) Fabrication of modular origami-like robots.
2014-2015:	Twan de Jong - Visiting **master student** Aerospace Engineering - TU Delft (NL) Fabrication, experiments and simulations of an actuated 3D origami-like metamaterial with tunable volume and stiffness.
2014:	Tamara Kloek - Visiting **master student** Mathematics - TU Delft (NL) Fabrication, experiments and simulations to amplify the response of soft actuators by harnessing instability.
2014:	Jonas D'haen - Visiting **master student** Aerospace Engineering - TU Delft (NL) Fabrication and simulations to amplify the response of soft actuators by harnessing instability.
2014:	Sergio Becerra - Visiting **undergraduate student** Mechanical Engineering - Columbia University (US) Fabrication of an actuated 3D origami-like metamaterial with tunable volume and stiffness.
2014:	Rijk de Rooij - Visiting **PhD student** Biomechanics - Stanford University (US) Analytics and simulations of porous structures undergoing tension instability.
2014:	Yunjie Wang - Visiting **undergraduate student** Mechanical Engineering - Tsinghua University (CN) Simulations of soft liquid-embedded deformation sensors.
2012:	Daan van Campen - **Intern** Aeronautical Engineering - Inholland University of Applied Sciences (US) Simulations of a superstructure on a Royal Netherlands Navy frigate design.

PROFESSIONAL SERVICE

Ad hoc reviewer

IEEE/ASME International Conference on Advanced Intelligent Mechatronics

Proceedings of the National Academy of Sciences

SIAM Journal on Scientific Computing

Professional membership

The American Society of Mechanical Engineers (ASME)

American Physical Society (APS)

Society of Engineering Science (SES)

MSME Committee member (2014-present), Harvard University (US)

Social and year-end event committee from the Materials Science and Mechanical Engineering department

Jury member (2013 & 2014), ENIAC Scholarship, University of Twente (NL)
Scholarship for international purposes for students of the University of Twente

INVITED TALKS & COLLOQUIA

2016:	3D Printing Materials Conference, Maastricht (NL) **Invited talk**: Embracing Compliance in Robots to Achieve Function
2015:	Designer Matter, AMOLF (NL) **Invited talk**: Controlling Soft Structures and Devices by Embedded Actuation and Sensing
2015:	Aerospace Structures and Computational Mechanics, TU Delft (NL) **Invited talk**: Actuated Materials, Smart Actuated Structures and Devices that Harness Compliance and Instabilities
2015:	Institute Lorentz, Leiden University (NL) **Soft Matter Physics Seminar**: Mechanical Metamaterials that Harness Instabilities and Folding
2015:	School of Engineering and Applied Sciences, Harvard University (US) **MSME Year End Event**: From Origami to Transformable Metamaterials
2015:	Graduate School of Design, Harvard University (US) **Guest Lecturer** in Computational Material Distributions and Gradients of Compliance (SCI 0642500)
2014:	Wyss Institute for Biologically Inspired Engineering, Harvard University (US) **Soft Robotics General Meeting**: Finite Element Analysis of Soft Liquid Embedded Strain Sensors
2014:	School of Engineering and Applied Sciences, Harvard University (US) **Mech & Math**: Instabilities in Pressure-Volume relation of inflatable Membranes
2014:	Graduate School of Design, Harvard University (US) **Guest Lecturer** in Computational Material Distributions and Gradients of Compliance (SCI 0642500)
2012:	School of Engineering and Applied Sciences, Harvard University (US) **Mech & Math**: Shape Optimization of Soft Periodic Structures
2010:	School of Engineering and Applied Sciences, Harvard University (US) **Abaqus Masterclass**

CONFERENCES

(11) **Overvelde, J. T. B.**, de Jong, T. A., Becerra, S. A., Shevchenko, Y., Whitesides, G. M., Weaver, J., Hoberman, C., Bertoldi, K., (2015). Transformable origami-inspired prismatic metamaterials. Wyss retreat. Boston, United States.

(10) **Overvelde, J. T. B.**, Bertoldi, K., (2015). Amplifying the Response of Soft Actuators by Harnessing Instability. New England Workshop on the Mechanics of Materials and Structures. Boston, United States.

(9) **Overvelde, J. T. B.**, Kloek, T., D'haen J., Bertoldi, K., (2015). Harnessing Instability in Soft Actuators. AMOLF Designer Matter Workshop International Mechanical Engineering Conference. Amsterdam, The Netherlands.

(8) **Overvelde, J. T. B.**, de Jong, T. A., Weaver, J., Hoberman, C., Bertoldi, K., (2015). Actuated Origami-like Structures with Tunable Volume and Stiffness. APS March Meeting. San Antonio, United States.

(7) **Overvelde, J. T. B.**, Kloek, T., D'haen J., Bertoldi, K., (2014). Harnessing Instability in Soft Actuators. ASME International Mechanical Engineering Conference. Montréal, Canada.

(6) **Overvelde, J. T. B.**, Bertoldi, K., (2013). Putting Soft Sensors to the Test. New England Workshop on the Mechanics of Materials and Structures. Amherst, United States.

(5) **Overvelde, J. T. B.**, Bertoldi, K., (2013). Topology Optimization of Inflatable Stretchable Structures. ASME International Mechanical Engineering Conference. San Diego, Unites States.

(4) **Overvelde, J. T. B.**, Shan, S., Bertoldi, K., (2012). Compaction Through Buckling in 2D Periodic, Soft and Porous Structures: Effect of Pore Shape. New England Workshop on the Mechanics of Materials and Structures. Providence, United States.

(3) **Overvelde, J. T. B.**, Langelaar, M., Keulen, F. van, (2012). The Moving Node Approach in Topology Optimization - An Exploration to a Flow-inspired Meshless Method-based Topology Optimization Method. New England Workshop on the Mechanics of Materials and Structures. Providence, United States.

(2) **Overvelde, J. T. B.**, Shan, S., Bertoldi, K., (2012). Non-linear Response of Soft Porous Structures: Effect of Pore Shape on their Response. Society of Engineering Science – 49th Annual Technical Meeting. Atlanta, United States.

(1) **Overvelde, J. T. B**., Langelaar, M., Keulen, F. van (2012). Influence of the Nodal Distribution on Element-Free Galerkin Accuracy in a Topology Optimization Context. European Congress on Computational Methods in Applied Sciences and Engineering. Vienna, Austria.

SELECTED MEDIA COVERAGE

(29) Van Kasteren, Joost. (2016) "Dichte muur krijgt gaten met een keertje vouwen." NRC Handelsblad 16 April. [pdf]

(28) Cookson, Clive. (2016) "Origami comes into the tech fold." Financial Times 26 March. [pdf]

(27) Hansman, Heather. (2016) "A New Material Could Make Medical Devices That Expand and Collapse." Smithsonian 18 March. [web]

(26) Joosten, Carla. (2016) "Zachte Robotica." Elsevier 17 March. [pdf]

(25) Knapton, Sarah. (2016) "Bizarre shape-shifting material invented by Harvard." The Telegraph 11 March. [web]

(24) Web editor (2016) "Researchers design versatile shapeshifting material." ResearchGate 11 March. [web]

(23) Ceurstemont, Sandrine. (2016) "Shape-shifting matter could let houses crumple themselves away." New Scientist 11 March. [web]

(22) Reader, Ruth. (2016) "Researchers Have Created a Shapeshifting Material Inspired by Origami." Mic 11 March. [web]

(21) Web editor (2016) "Harvard team develops origami-inspired 3D structural material." The Engineer 11 March. [web]

(20) Wassink, Jos. (2016) "Transforming materials." DELTA 11 March. [web]

(19) Burrows, Leah. (2016) "Transforming materials." Harvard News and Views 11 March. [web]

(18) Web editor (2015) "Delft Students Help Make More Dextrous Robots." TU Delft Robotics Institute 27 August. [web] and other TU Delft web publications [EWI][LR][3ME]

(17) Edelman, Peter. (2015) "Niet-lineair gedrag handig gebruikt in kunstmatige spier." Mechatronica & Machinebouw 21 August. [web]

(16) Wassink, Jos. (2015) "Ballooning muscles for robots." DELTA 20 August. [web]

(15) Web editor (2015) "Soft actuator could remove need for robotic tethers." The Engineer 18 August. [web]

(14) Burrows, Leah. (2015) "Controlling the uncontrollable." Harvard News and Views 17 August. [web]

(13) Wright, Katherine. (2015) "Runaway buckling." APS Physics 21 July. [web]

(12) Zegers, Gabby. (2015) "Metamaterial undermines 250-year-old construction principles." FOM 21 July. [web]

(11) Morad, Renee. (2015) "Jumping, Froglike Robot Takes a Big Leap Forward." Robotics, Discovery 9 July. [web]

(10) Ackerman, Evan. (2015) "3D-Printed Explosive Jumping Robot Combines Firm and Squishy Parts." IEEE Spectrum, 9 July. [web]

(9) Burrows, Leah. (2015) "Harvard Researchers Create Jumping Soft Robot Using 3-D Printer." Harvard Gazette 9 July. [web]

(8) Feltman, Rachel. (2015) "This Jumping, Squishy Robot Looks Like a Tiny UFO." Speaking of Science, The Washington Post 9 July. [web]

(7) Herkewitz, William. (2015) "Nearly Unbreakable Soft Robot Ignites Explosions to Jump." New Technology, Popular Mechanics 9 July. [web]

(6) Ball, Philip. (2014) "Soft-hearted Robots." News and Views, Nature Materials Vol. 13 April. [pdf]

(5) Martiradonna, Luigi. (2014) "Heart Twists." Research Highlight, Nature Materials Vol. 13 January. [pdf]

(4) Aan de Brugh, Marcel. (2014) "Een nieuwe hartkamer van zachte kunststof." NRC Handelsblad 28 February. [pdf]

(3) Kusek, Kristen. (2014), "Artificial muscles do the twist." Wyss Institute 26 February. [web]

(2) Bosman, Annemieke. (2013) "Vliegende Hollander." Transfer Magazine, 4. [pdf]

(1) Elshof, Loes. (2009) "Excellence Program." TU Delft. [video]

JOURNAL PUBLICATIONS

(15) **Overvelde, J. T. B.**, Mixe, M., Hoberman, C., Weaver, J., Bertoldi, K., (2016). ReBot: Untethered Reconfigurable Multi-gate Robotic System Constructed from Foldable Building Blocks. *In preparation.*

(14) **Overvelde, J. T. B.**, Dykstra, D. M. J., de Rooij, R., Weaver, J., Bertoldi, K., (2016). Tensile Instability in a Thick Elastic Body. *Submitted.*

(13) **Overvelde, J. T. B.**, Weaver, J., Bertoldi, K., Hoberman, C., (2016). Rational Design of 3D Reconfigurable Prismatic Architected Materials. *Submitted.*

(12) Wang, Z., Galloway, K., **Overvelde, J. T. B.**, Polygerinos, P., Bertoldi, K., Walsh, C. J., (2015). Modeling and Force Prediction of Sensorized Soft Bending Actuators. *Submitted.*

(11) **Overvelde, J. T. B.**, de Jong, T. A., Becerra S. A., Shevchenko, Y., Whitesides, G. M., Weaver, J., Hoberman, C., Bertoldi, K., (2016). Actuated Three-dimensional Origami-like Metamaterial with Tunable Volume and Stiffness. *Nature Communications.* [NRC Handelsblad] [Financial Times] [Tech Insider] [Daily Mail] [The Telegraph] [Smithsonian] [ResearchGate featured article] [New Scientist] [Mic] [The Engineer] [TU Delta] [Harvard News][pdf]

(10) Pouya, C., **Overvelde, J. T. B.**, Kolle, M., Aizenberg, J., Bertoldi, K., Weaver, J. C., Vukusic, P., (2015).Characterisation of a Mechanically Tuneable Gyroid Photonic Crystal Inspired by the Butterfly *Parides sesostris. Advanced Optical Materials.* [pdf]

(9) **Overvelde, J. T. B.**, Kloek, T., D'haen J. J. A., Bertoldi, K., (2015). Amplifying the Response of Soft Actuators by Harnessing Instability. *Proceedings of the National Academy of Sciences.* [The Engineer][TU Delta][Harvard News][cover][pdf]

(8) Coulais, C., **Overvelde, J. T. B.**, Lubbers, L. A., Bertoldi, K., van Hecke, M., (2015). Discontinuous Buckling of Wide Beams and Metabeams. *Physical Review Letters.* [FOM News][pdf]

(7) Bartlett, N. W., Tolley, M. T., **Overvelde, J. T. B.**, Weaver, J., Mosadegh, B., Bertoldi, K., Whitesides, G. M., Wood, R. J., (2015). A 3D Printed, Functionally Graded Soft Robot Powered by Combustion. *Science* [The Washington Post][Discovery][Harvard News][Popular Mechanics][pdf]

(6) Polygerinos, P., Galloway, K., **Overvelde, J. T. B.**, Wang, Z., Wood, R., Bertoldi, K., Walsh, C. J., (2014). Modeling of Soft Fiber-reinforced Bending Actuators. *IEEE Transactions on Robotics* [pdf]

(5) **Overvelde, J. T. B.**, Mengüç, Y., Polygerinos, P., Wang, Y., Wang, Z., Walsh, C. J., Wood, R. J., Bertoldi, K., (2014). Numerical Mechanical and Electrical Analysis of Soft Liquid-embedded Deformation Sensors. *Extreme Mechanics Letters.* [pdf]

(4) **Overvelde J. T. B.**, Bertoldi K. (2014). Relating Pore Shape to the Non-linear Response of Periodic Elastomeric Structures. *Journal of the Mechanics and Physics of Solids.* [pdf]

(3) Roche, E. T., Wohlfarth, R., **Overvelde, J. T. B.**, Vasilyev, N. V., Pigula, F.A., Mooney, D. J., Bertoldi, K., Walsh, C.J., (2014). Bioinspired Soft Actuated Materials. *Advanced Materials.* [Research Highlight in Nature Materials][News & Views in Nature Materials][NRC Handelsblad][Harvard News][cover][pdf]

(2) **Overvelde J. T. B.**, Shan S., Bertoldi K. (2012). Compaction through Buckling in 2D Periodic, Soft and Porous Structures: Effect of Pore Shapes. *Advanced Materials.* [pdf]

(1) Li J., Shim J., **Overvelde J. T. B.**, Deng J., Zhu X., Bertoldi K., Yang S. (2012). Switching Photonic Membranes via Pattern Transformation and Shape Memory Effect. *Soft Matter.* [pdf]