

Curriculum Vitae – Thomas Speck

Name Thomas Speck	Male or Female: Male
Birth date: 20 th November 1957	Nationality: German
Married with Dr. Olga Speck	Two Children
Present home address	Im Winkel 1B D-79227 Schallstadt-Mengen Germany
Present affiliation:	Plant Biomechanics Group Freiburg Botanic Garden Faculty of Biology University of Freiburg Schänzlestr. 1 D-79104 Freiburg, Germany
Title:	Dr. rer. nat., Dipl.-Biol.
Profession:	Full Professor for Botany: Functional Morphology & Bionics Director of the Botanic Garden
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Final school career: 1963-1968 Primary School (Karlsruhe-Beiertheim)
1968-1969 High School (Goethe-Gymnasium, Karlsruhe)
1968-1976 High School (Markgrafen-Gymnasium, Karlsruhe-Durlach)
1976 High School Graduation (Abitur)

Military Service: 10'01'1976 – 12'31'1977

Diploma: 1986 Diploma thesis at the Botanic Garden – Department of Systematics and Palaeobotany at the University of Freiburg on 'Biomechanics and functional morphology of early land plants'

Doctor's degree: 1990 Ph.D.-Thesis at the at the Botanic Garden – Department of Systematics and Palaeobotany at the University of Freiburg on 'Biomechanics of extant and fossil plants with different growth habits'

Habilitation: 1996 Habilitation and Venia Legend in 'Botany / Biophysics'

Career of occupation: 2006 until present Full Professor for 'Botany: Functional Morphology and Bionics' and Director of the Botanic Garden of the University of Freiburg
2006 Offer of a Full Professorship 'Systematic Botany and Plant Geography' at the Freie University Berlin combined with the Directorship in General of the Botanic Garden and Botanic Museum Berlin-Dahlem

2002-2006 Associate Professor for 'Botany: Functional Morphology and Biomechanics' and Director of the Botanic Garden of the University of Freiburg

2001 Offer of a Professorship 'Paleobotany' at the Humboldt University Berlin combined with a Deput's Directorship at the Museum of Natural History in Berlin

2000-2002 Reader for Botany and Biophysics, University of Freiburg (Hochschuldozent)

1999-2000 Visiting Professor, Faculty of Formal & Natural Sciences, University Vienna (Winter Term 99/00)

1993-1999 Assistant Professor for Botany and Paleobotany, University of Freiburg (Hochschulassistent)

1990-1993 Research Scientist (Plant Biomechanics), University of Freiburg

1986-1990 Research Associate - Biomechanics of Plants & Paleobotany (DFG-Project)

1978-1986 Study of Biology, University of Freiburg (Diploma 1986)

01'01'1978-'09'30'1978 Management-Assistant, Ambassador Inc. (Germany and USA)

Supervised PhD-, Diploma-, Master-, Magister- and Bachelor-Theses and Scientific Theses for College Teachers

PhD-Theses: University of Freiburg: 24 completed / 8 ongoing

Co-Supervision at other Universities: 6 completed / 1 ongoing

Diploma-Theses (until 2015): 29 completed

Theses for College Teachers: 43 completed

Magister-Theses: 7 completed

Master-Theses (since 2013): 12 completed

Bachelor-Theses (since 2011): 62 completed

Awards and Grants

(16) **2019 'Materialica Design+Technology Gold Award 2019 - Category Surface & Technology'**

Produkt: Sensor mounting for washing machines

Preisträger: Prof. Dr. Thomas Speck, Dr. Georg Bold, Dr. Tim Kampowski, M.Sc. Max Langer, Dr. Tom Masselter D. Marc Thielen (Plant Biomechanics Group Freiburg / Botanischer Garten der Universität Freiburg), Dipl.-Ing. Christian Seidler, Dipl.-Ing. Uwe Schauman (E.G.O. Elektro-Gerätebau)

(15) **2017 AVK-Innovationprice 2017 – 3rd in the Category „Research/ Science“**

Product/Project: Biomimetic, joint-free, facade-shading system „Flectofold“ inspired by the trap of the waterwheel plant and wing-folding of the shield bug *Graphosma lineatum*

Laureates: Prof. Dr. Thomas Speck, Dr. Simon Poppinga & M.Sc. Anna Westermeier (Plant Biomechanics Group Freiburg / Universität of Freiburg), M.Sc. Larissa Born

(ITFT University of Stuttgart), Prof. Dr. Götz Gresser (ITFT University of Stuttgart / ITV Denkendorf), Prof. Dr. Markus Milwich (University Reutlingen / ITV Denkendorf), Prof. Dr. Manfred Bischoff & M.Sc. Renate Sachse & (IBB University of Stuttgart), Prof. Dr. Jan Knippers, M.Sc. Axel Körner, M.Sc. Anja Mader, M.Sc. Saman Saffarian & Dipl.-Ing. Gundula Schieber (ITKE University of Stuttgart) und Prof. Dr. Oliver Betz & M.Sc. Paavo Bergmann (University of Tübingen)

(14) **2016 Materialica Design+Technology Gold Award 2016 - Category Surface & Technology'**

Product/Project: Biomimetic 3-arm branch made of fiber-reinforced material

Laureates: Prof. Dr. Thomas Speck & Dr. Tom Masselter (Plant Biomechanics Group University of Freiburg), Prof. Dr. Markus Milwich, Dr. Simon Küppers & Dipl.-Ing. Lena Müller (ITV Denkendorf) and Prof. Dr. Christoph, Prof. Maik Gude & Dipl.-Ing. Andreas Gruhl (ILK & Botany TU Dresden).

(13) **2015 European Cluster Excellence Initiative - Bronze Label Certificate**

Competence Network Biomimetics – Plants and Animals as Concept Generators for Biomimetic Materials and Technologies Baden-Württemberg (Kompetenznetz Biomimetik) represented by T. Speck as Speaker of Competence Network and O. Speck as Manager of the Competence Network (period: 2015-2017).

(12) **2013 Gips-Schüle-Forschungspreis**

Product/Project: Biomimetic facade-shading system inspired by the Bird of Paradise flower (Flectofin®)

Laureates: Prof. Dr. Thomas Speck (University of Freiburg), Prof. Dr.-Ing. Jan Knippers (University of Stuttgart), Dr. Markus Milwich (ITV Denkendorf)
Together with: Dr. Tom Masselter, Dipl.-Biol. Simon Poppinga (Plant Biomechanics Group University of Freiburg), Simon Schleicher M. Arch., Dipl.-Ing. Julian Lienhard (ITKE University of Stuttgart), Dipl.-Ing. Lena Müller (ITV Denkendorf).

(11) **2012 European Cluster Excellence Initiative - Bronze Label Certificate**

Competence Network Biomimetics – Plants and Animals as Concept Generators for Biomimetic Materials and Technologies Baden-Württemberg (Kompetenznetz Biomimetik) represented by T. Speck as Speaker of Competence Network and O. Speck as Manager of the Competence Network (period: 2012-2014)

(10) **2011 Best of Certificate 'Materialica Design+Technology Award 2011 - Category CO₂-Efficiency'**

Product/Project: Biomimetic impact damping palette

Laureates: Prof. Dr. Thomas Speck & Dr. Deane Harder (Plant Biomechanics Group University of Freiburg), Dr. Markus Milwich & Dipl.-Ing. Dagmar Yilmaz (Institut für Textil- und Verfahrenstechnik (ITV) Denkendorf), Dipl.-Ing.M. Hartel (Rittal GmbH & Co. KG), Dipl.-Ing. Henrike Monnerat (Hochschule für Gestaltung Offenbach), Firma Winter and Firma I.S.T. Ficotex.

(9) **2011 Techtexsil – Innovationprize 2011 - Architecture**

Product/Project: Biomimetic facade-shading system inspired by the Bird of Paradise flower

Laureates: Prof. Dr. Thomas Speck, Dr. Tom Masselter, Dipl.-Biol. Simon Poppinga (Plant Biomechanics Group University of Freiburg), Prof. Dr.-Ing. Jan Knippers, Simon Schleicher M. Arch., Dipl.-Ing. Julian Lienhard (ITKE University of Stuttgart),

Prof. Dr. Heinrich Planck, Dr. Markus Milwich, Dr. Thomas Stegmaier, Larissa Born B.Eng., Dipl.-Ing. Anja Walter, Julian Sartori B. Sc. (ITV Denkendorf)

- (8) **2011 Award for the ‚Biomimetic Cabinet‘ [„Bionik-Vitrine“] as ‚Contribution to the World Decade of the United Nations 2005-2014: Education by Sustainable Development‘ [„Beitrag zur Weltdekade der Vereinten Nationen 2005-2014: Bildung für nachhaltige Entwicklung“]**

Laureates: Dr. Olga Speck, Florian Antony, Florian Mai, Dipl.-Biol. Stefan Heyl, Ulrike Hertel, Prof. Dr. Thomas Speck (University of Freiburg)

- (7) **2009 Zander - Medal of the Society of Botanic Gardens Germany** (Zander-Medaille des Verbands Botanischer Gärten e.V.)

For the activities for Botanic Gardens and for the Society of Botanic Gardens Germany

- (6) **2007 TechTextile Innovationprize – New Materials**

Project/Product: Development of the ‘Technical Plant Stem’ a Biomimetic, Structurally Optimized Fibrous Compound Material

Laureates: Prof. Dr. Thomas Speck and Dr. Olga Speck (Plant Biomechanics Group University of Freiburg), Dr. Markus Milwich, Dr. Thomas Stegmaier & Prof. Dr. Heinrich Planck (ITV Denkendorf)

- (5) **2007 Prize Winner of the ‘Ideenwettbewerb Bionik – Innovationen aus der Natur’ (Federal Ministry of Education and Research, Germany)**

Product/Project: From Biological Templates to Biomimetic Products: Wound Healing in Plants as Concept Generators for Self-Repairing Technical Materials

Laureates: Dr. Olga Speck (University of Freiburg, Project Manager), Prof. Dr. Thomas Speck (Plant Biomechanics Group Freiburg), Prof. Dr. Rolf Mülhaupt (FMF, University of Freiburg), and Dr. Rolf Luchsinger (EMPA Dübendorf, Switzerland)

- (4) **2007 Prize Winner of the ‘Ideenwettbewerb Bionik – Innovationen aus der Natur’ (Federal Ministry of Education and Research, Germany)**

Product/Project: From Gradient Materials in Plants to Optimized Fibrous Compound Materials

Laureates: Prof. Dr. Ingo Burgert (MPI Potsdam/Golm, project manager), Prof. Dr. Thomas Speck (Plant Biomechanics Group University of Freiburg) and Markus Milwich (ITV Denkendorf)

- (3) **2007 ‘ExpoNaTe 2007 - Award’ of the ‚Baden-Württemberg Stiftung for ‘Didactic Experiments on Biophysics of Water Conduction in Plants’**

Laureates: Prof. Dr. Thomas Speck, Dr. Olga Speck, Dr. Deane Harder, Dr. Friederike Gallenmüller, Dipl.-Biol. Tina Steinbrecher (Plant Biomechanics Group University of Freiburg)

- (2) **1990 Hans Spemann Award** (Prize for best PhD-Thesis of the Faculty of Biology, University of Freiburg)

- (1) **1980-1984 Scholarship of the ‘German National Merit Foundation’ (Studienstiftung des Deutschen Volkes)**

Scientific Boards and Honorary Offices

- (15) Member of the Integrative Board of the Excellence Cluster *livMatS* Living, Adaptive and Energy-autonomous Materials Systems (EXC 2193) [since 2019]
- (14) Member of the spokesperson-team of the Excellence Cluster *livMatS* Living, Adaptive and Energy-autonomous Materials Systems (EXC 2193) [since 2018]
- (13) Jury Member of the „Steven Vogel Young Investigator Award“ awarded by the IOP Journal Bioinspiration & Biomimetics [since 2017]
- (12) Member of the International Advisory Board of the Conference series “Living Machines” [seit 2016]
- (11) Member of the Coordinating Committee of the Research Network “Functional Nanostructures” (Kompetenznetz Funktionelle Nanostrukturen - Baden-Württemberg) [since 2015]
- (10) Member of the Scientific Advisory Board of the “State Agency for Lightweight Constructions Baden-Württemberg” (Landesagentur für Leichtbau Baden-Württemberg – Leichtbau BW GmbH) [since 2014]
- (9) Member of the Scientific Advisory Board of the B CUBE - Center for Molecular Bioengineering Technical University of Dresden [since 2013]
- (8) Member of the Board of Directors and Associate Managing Director of the ‘Freiburg Centre for Interactive Materials and Bio-Inspired Technologies – FIT’ (Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien) [since 2012]
- (7) Vice-President of ‘B/OKON international – The Biomimetics Association’ [since 2009]
- (6) Jury member of the ‘International Bionic-Award’ of the Schauenburgstiftung awarded bi-annually by the ‘Germany Economy Foundation’ (Stiftung der Deutschen Wirtschaft e.V.) and ‘The Association of German Engineers’ (Verein Deutscher Ingenieure e.V. - VDI) [since 2008]
- (5) Member in the Advisory Board ‘Bionics’ of ‘The Association of German Engineers’ (Verein Deutscher Ingenieure e.V. - VDI) Development of VDI-Guidelines on Bionics / Head of the Task Group: Bionic Construction Materials & Structures [since 2007]
- (4) Scientific Member of the ‘Freiburg Materials Research Center – FMF’ (Freiburger Materialforschungszentrums) [since 2007]
- (3) Speaker of the Competence Network Biomimetics – Plants and Animals as Concept Generators for Biomimetic Materials and Technologies (Ministry of Science, Research, and Art of the Federal State of Baden-Württemberg) [since 2006; Board Member since 2002]
- (2) Fellow of the Linnean Society London [since 2000]
- (1) Vice-president of the ‘Society for Technical Biology and Bionics – GTBB’ (Gesellschaft für Technische Biologie und Bionik) [since 1999]

Past activities:

Co-spokesperson (Freiburg) of the Collaborative Research Center 141 (SFB-Transregio 141) „Biological Design and Integrative Structures - Analysis, Simulation and Implementation in Architecture“, Universities of Stuttgart, Freiburg and Tübingen (2014-2019)

Member of the Scientific Advisory Board of the INM Leibniz-Institut für Neue Materialien gGmbH Saarbrücken (Leibniz-Institut für Neue Materialien gGmbH) (2011-2019)

Board member of the “Biomechanics Group” of the Society for Experimental Biology U.K. (2002-2018)

Jury Member of the „Casio-Vektoria Award 2016/2017“ awarded for the topic Bionics by Casio Europe [2016/2017]

Member of the Board of the ‘Bionic Competence Network *B/OKON*’ (Ministry of Education and Research of the Federal Republic of Germany) [2004-2016]

Member in the Program-Committee of the Priority Program 1420 ‘Biomimetic Materials Research: Functionality by Hierarchical Structuring of Materials’ (German Research Foundation – DFG) [2008-2016]

External Scientific Advisor of the Arts-based Research Project: “Growing As Building” at the Universität für Angewandte Kunst (Vienna), funded by the Fonds zur Förderung der wissenschaftlichen Forschung (FWF) [2013-2015]

Member of the Advisory Board for the ‘BIONA’ (Bionic Inspirations for Sustainable Products and Technologies) in the HighTech-Strategy of the Ministry of Education and Research of the Federal Republic of Germany [2007-2014]

Chairman of the ‘Bionic Competence Network *B/OKON*’ (Ministry of Education and Research of the Federal Republic of Germany) [2010-2013]

Coordinator of the Priority Grant-Programme ‘Bionics’ of the Deutsche Bundesstiftung Umwelt (DBU) (together with C. Neinhuis, TU Dresden) [2004-2013]

Member of the „Spiegelgremium“ ISOBIONIK des DIN, Deutsches Institut für Normung e. V., Normenausschuss Materialprüfung (NMP) (2011-2012)

Member of the Founding Commission of ‘Freiburg Center for Interactive Materials and Bio-Inspired Technologies – FIT’ (Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien) [2010 - 2012]

Liaison Professor of the ‘German National Merit Foundation’ (Studienstiftung des Deutschen Volkes) [2005-2012]

Member of the Scientific Advisory Board of the Joint-Research Project ‘BioSkin’, Austrian Institute of Technology (AIT), Austria [2008-2011]

Jury member for the international biomimetic prize ‘BionikStar’, Bozen, Italien [2011]

Scientific Member of the ‘Centre for Applied Biological Sciences Freiburg’ (Zentrum für angewandte Biowissenschaften Freiburg) [1999-2011]

President of the Society of Botanic Gardens of Germany (Präsident des Verbands Botanischer Gärten e.V. [2003-2009]

Patents:

- (10) Invention disclosure ERM 2018-034 – Filteranordnung für die Analyse im Waschprozess. ID: Inventors: Georg Bold, Tim Kampowski, Max Langer, Uwe Schaumann, Thomas Speck, Marc Thielen. Invention disclosure: 19.10.2018
- (9) P 57143 DE / PAT 11700 DE – Sensorkammer für Waschmaschine, Inventors: Georg Bold, Tim Kampowski, Max Langer, Tom Masselter, Michael Riffle, Uwe Schaumann, Thomas Speck, Marc Thielen, Grant of Patent: 10.04.2018 / Amtliches Kennzeichen 102018205502.5 (patent applicant: E.G.O. Elektrogerätebau GmbH).
- (8) Erfindungsmeldung 2015/1838 VW AG – Plasmanitrieren von Aluminium (Al) und anderen Werkstoffen mit bionisch inspirierter Mikrostrukturierung der Oberfläche,

Erfinder: Jürgen Olfe, Florian Schmich, Jochen Brand, Peter Kästner, Thomas Speck. Invention disclosure: 10.11.2015.

- (7) Invention disclosure (Erfindungsmeldung) 2015/0224 VW AG – Druckbegrenzungsventil mit integrierter Pulsationsdämpfung, Inventors: Erik Engelen-Krause, Jessica Wolf, David Bach, Thomas Speck, Tom Masselter. Invention disclosure: 02.02.2015 / 27.04.2015.

[published in: Prior Art Publication, 18. Juni 2015]

- (6) EP 2 320 015 – Hingeless, infinitely deformable folding mechanism, Inventors: Jan Knippers, Julian Lienhard, Simon Schleicher, Simon Poppinga, Tom Masselter, Thomas Speck, Grant of Patent: 10.11.2009, EP20060743126 / Disclosure of Patent: 11.05.2011, EP 2 320 015 A2

[see also: 378003P-EP – Gelenkloser, stufenlos verformbarer Klappmechanismus]

- (5) DE102009043103 – Kraftumlenkung in Faserverbundbauteilen, Inventors: D. Dullenkopf, T. Groß, W. Kornprobst, T. Speck, O. Speck, T. Masselter, M. Milwich & C. Neinhuis, Patent Application: 26.09.2009, DE102009043103 / Disclosure of Patent: 31.03.2011, DE102009043103

[see also: Chinese Patent ZL 201080042993.9 – Fibre Composite Structure – Patent Publication No: CN 102596546B, Grant of Patent: 24.09.2014, and EP Patent 2,480,399 – Fibre Composite Structure, Grant of Patent: 01.08.2012 and WO2011035860, Disclosure of Patent: 01.04.2001]

- (4) DE 02007017151 – Palette II, Inventors: M. Hartel, D. Harder, H. Monnerat, M. Milwich & T. Speck, Patent Application: 11.04.2007 / Grant of Patent: 16.10.2008, DE102007017151 A1 / Disclosure of Patent: 19.08.2010, DE102007017151 B4

[see also: US Patent 7712421 – Pallet II, Grant of Patent: 11.05.2010]

- (3) DE 10 2006 037 482 – Palette I, Inventors: M. Hartel, T. Steinbrecher, T. Speck, & D. Harder, Patent Application: 10.08.2006 / Disclosure of Patent: 21.02.2008, DE 10 2006 037 482 A1 / Grant of Patent: 13.11.2008, DE202006020532 U1

[see also: US Patent 7637219 – Pallet I - Pallet having strip-like support elements made of plastic with embedded fibers, Grant of Patent: 29.12.2009]

- (2) DE 10 2005 027 879 A1 – Stabförmiger Faserverbundwerkstoff, Verfahren und Vorrichtung zu seiner Herstellung, Inventors: M. Milwich, C. Linti, T. Stegmaier, H. Planck, T. Speck, A. Herrmann & O. Speck, Patentanmeldung: 09.06.2005, DE200510027879/ Disclosure of Patent: 14.12.2006, DE102005027879 A1

[see also: EP1902167 – Stabförmiger Faserverbundwerkstoff, Verfahren und Vorrichtung zu seiner Herstellung, Grant of Patent: 11.09.2013 and WO2006131344, CA2611189, and US Patent 8104392 – Rod-shaped fibre composite, and method and device for the production thereof, Grant of Patent: 31.01.2012]

- (1) 01179/05 CH – Selbstheilende Membran, Inventors: R. Luchsinger, T. Speck & O. Speck, Patent Application: 12.07.2005 / Disclosure of Patent: 2006 / Grant of Patent: 2006

[see also: EP 1904291 Disclosure of Patent: 02.04.2008 and WO2007009280, and US20090035551 A1 – Method of producing a self-healing membrane, Grant of Patent: US8822024 B2]

Associate Editor / Member of the Editorial Board of Scientific Journals & Book Series

- (1) Biomimetics - Open Access Journal MDPI - Open Access Publishing [since 2016]
- (2) Bioinspiration and Biomimetics, IOP Science, Bristol [since 2013]
- (3) Journal of Bionic Engineering, Elsevier, Amsterdam [since 2007]
- (4) Trees – Structure and Function, Springer-Verlag [since 2002]
- (5) Paläontographica, Abt. B - Palaeophytologie. E. Schweizerbart'sche Verlagsbuchhandlung [since 2001]

Past activities as Associate Editor:

Applied Physics A, Springer-Verlag [2018 - 2019]

The International Journal of Design & Nature and Ecodynamics, WIT-Press, Southampton-Boston [2006 - 2015]

Book Series: Design and Nature, WIT-Press, Southampton-Boston [2002 - 2014]

Main Research Areas

- Biomimetics (Especially Bio-Inspired Materials and Surfaces as: Self-Repairing Materials, Damping Materials, Branched and Un-Branched Fibrous Compound Materials, Adhesive Materials and Surfaces, Anti-Adhesive Surfaces, Self-Adaptive Materials, Biomimetics and Architecture)
- Biomechanics and Functional Morphology of Plants
- Evolution of Growth Forms and other Functional Parameters in Plants
- Early Evolution of Land-Plants
- Eco-Biomechanics of Plants in Tropical Rainforests
- Movements of Plants and Plant Organs (e.g. in Flowers and Carnivorous Plants)
- Functional Aspects of Pollination Biology (e.g. in Sage-Species (*Salvia* sp.) or Bird of Paradise Flowers (*Strelitzia* sp.), Structural and Mechanical Aspects of Co-Evolution between Flower and Pollinator)
- Didactics of Biomimetics and Biomechanics
- Botanic Gardens (Research, Education, Teaching)

Publications

More than 600 Publications, over 280 in Peer Reviewed Journal and Peer Reviewed Books

VDI-Guideline to Biomimetics:

- VDI-Richtlinie 6220: „Bionik - Konzeption und Strategie; Abgrenzung zwischen bionischen und konventionellen Verfahren/Produkten / Biomimetics - Conception and strategy; Differences between biomimetic and conventional methods/products“: A. Kesel (Leitung), O. Speck & T. Speck, I. Tesari, H. Beismann, J. Bertling, H.G. Beyer, I. Boblan, R. Erb, M. Fischer, M. Herdy, A. Jordan, S. Menzel, M. Mörtl, G. Pohl, H. Seitz, J. Tschernjaew, M. Wirth, 36 pp. – VDI-Gesellschaft Technologies of Life Sciences, Verein Deutscher Ingenieure e.V., Beuth-Verlag, Berlin.
- VDI-Richtlinie 6223: „Bionik: Bionische Materialien, Strukturen und Bauteile / Biomimetics: Biomimetic materials, structures and components“: T. Speck (Leitung), O. Speck, J. Bertling, I. Burgert, F. Horn, R. Kappel, S. Menzel, W. Michel, H. Seitz, T. Stegmaier, 51 pp. – VDI-Gesellschaft Technologies of Life Sciences, Verein Deutscher Ingenieure e.V., Beuth-Verlag, Berlin.

List of Most Important Publications in the Years 2015-2019:

Ten most Important Publications „Biomechanics and Functional Morphology as Basis for Biomimetics“:

- (1) Poppinga, S., Böse, A., Seidel, R., Hesse, L., Leupold, J. & Speck, T. (2019): A seed flying like a bullet: Ballistic seed dispersal in Chinese witch hazel (*Hamamelis mollis* OLIV., Hamamelidaceae). – Journal of The Royal Society Interface, 16: 20190327. DOI.org/10.1098/rsif.2019.0327
- (2) Hesse, L., Bunk, K., Leupold, J., Speck, T. & Masselter, T. (2019): Structural and functional imaging of large and opaque plant specimen. – Journal of Experimental Botany. DOI.org/10.1093/jxb/erz186
- (3) Kumar, C., Palacios, A., Surapanen, V.A., Bold, G., Thielen, M., Licht, E., Higham, T.E., Speck, T. & Le Houérou, V. (2019): Replicating the complexity of natural surfaces: technique validation and applications for biomimetics, ecology, and evolution. – Philosophical Transactions of the Royal Society London A, 377: 20180265 DOI 10.1098/rsta.2018.0265
- (4) Westermeier, A., Sachse, R., Poppinga, S., Vögele, P., Adamec, L., Speck, T. & Bischoff, M. (2018): How the carnivorous waterwheel plant (*Aldrovanda vesiculosa*) snaps. – Proceedings of the Royal Society London B, 20180012. DOI.org/10.1098/rspb.2018.0012
- (5) Speck, O., Schlechtendahl, M., Borm, F., Kampowski, T. & Speck, T. (2018): Humidity-dependent wound sealing in succulent leaves of *Delosperma cooperi* – An adaptation to seasonal drought stress – Beilstein Journal of Nanotechnology, 9, 175–186. DOI:10.3762/bjnano.9.20
- (6) Kampowski, T., Mylo, M.D., Poppinga, S. & Speck, T. (2018): How water availability influences morphological and biomechanical properties in the one-leaf plant *Monophyllaea horsfieldii* R.Br. – Royal Society Open Science, 5: 171076. DOI: 0.1098/rsos.171076.
- (7) Westermeier, A.S., Fleischmann, A., Müller, K., Schäferhoff, B., Rubach, C., Speck, T. & Poppinga, S. (2017): Trap diversity and character evolution in carnivorous bladderworts (*Utricularia*, Lentibulariaceae). – Scientific Reviews, 7: 12052. DOI: 10.1038/s41598-017-12324-4
- (8) Poppinga, S., Nestle, N., Šandor, A., Reible, B., Masselter, T., Bruchmann, B. & Speck, T. (2017): Hygroscopic motions of fossil conifer cones. – Scientific Reports, 7: 40302 DOI: 10.1038/srep40302.
- (9) Hesse, L., Masselter, T., Leupold, J., Spengler, N., Speck, T. & Korvink, J.G. (2016): Magnetic resonance imaging reveals functional anatomy and biomechanics of a living dragon tree. – Scientific Reports, 6: 32685, DOI:10.1038/srep32685
- (10) Kampowski, T., Eberhard, L., Gallenmüller, F., Speck, T. & Poppinga, S. (2016): Functional morphology of suction discs and attachment performance of the Mediterranean medicinal leech (*Hirudo verbana* Carena). – Journal of the Royal Society Interface, 13: 20160096. DOI.org/10.1098/rsif.2016.0096

Ten most Important Publications Dealing with Biomimetic Materials and Methods:

- (1) Esser, F., Masselter, T. & Speck, T. (2019): Silent pumpers: a comparative topical overview of the peristaltic pumping principle in living nature, engineering and

- biomimetics. – *Advanced Intelligent Systems*,1: 1900009 (16 pp). DOI: 10.1002/aisy.201900009
- (2) Correa, D., Poppinga, S., Mylo, M., Westermeier, A., Bruchmann, B., Menges, A. & Speck, T. (2020): Biomimetic 4D printed autonomous scale and flap structures capable of multi-phase movement. – *Philosophical Transactions of the Royal Society London A* (accepted).
 - (3) Speck, O. & Speck, T. (2019): An overview on bioinspired and biomimetic self-repairing materials. – *Biomimetics*, 4: 26 (37 pp.). DOI:10.3390/biomimetics 4010026
 - (4) Poppinga, S., Zollfrank, C., Prucker, O., Rühle, J., Menges, A., Cheng, T. & Speck, T. (2018): Towards a new generation of smart biomimetic actuators for architecture. – *Advanced Materials*: 1703653. DOI: 10.1002/adma.201703653
 - (5) Körner, A., Born, L., Mader, A., Sachse, R., Saffarian, S.; Westermeier, A.S., Poppinga, S., Bischoff, M., Gresser, G.T., Milwich, M., Speck, T. & Knippers, J. (2017): Flectofold – A biomimetic compliant shading device for complex free form facades. – *Smart Materials and Structures*, 27(1). iopscience.iop.org/article/10.1088/1361-665X/aa9c2f/meta
 - (6) Bach, D., Masselter, T. & Speck, T. (2017): Damping of pressure pulsations in mobile hydraulic applications by the use of closed cell cellular rubbers integrated into a vane pump. – *Journal of Bionic Engineering*, 14: 791 – 803. DOI: 10.1016/S1672-6529(16)60444-4
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