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Research Interests

Biomimetics | Biomechanics | Impact Protection | Auxetics & Meta-Materials | Surfaces & Interfaces
Innovation & Ideation (industrial cooperation projects)

Patents

Kampowski T, Riffel M, Schaumann U, Speck T, Thielen M, Bold G, Masselter T. Sensorvorrichtung und Verfahren zur Untersuchung einer Flüssigkeit und Waschmaschine. *EP3553220 A1 / DE102018205502 A1 – (patent disclosure: 17.10.2019)*

Speck T, Bold G, Thielen M, Hesse L, Seidler C, Schaumann U. Blade for an impeller. EP3872350 A1 – (*patent disclosure: 01.09.2021)*

Bold G, Kampowski T, Langer M, Schaumann U, Speck T, Thielen M. Wasserführendes Haushaltsgerät und Verfahren zu seinem Betrieb. *DE102019203809 B3 – (patent publication: 02.07.2020)*

Peer-Reviewed Publications

29 **Mercer C, Speck T, Lee J, Balint DS, Thielen M (2022)** Effects of Geometry and Constraint on the Mechanical Performance of Auxetic Metamaterials. *International Journal of Impact engineering* (accepted)

28 **Jentzsch M, Becker S, Thielen M, Speck T (2022)** Functional anatomy, impact behavior and energy dissipation of the peel of *Citrus x limon*: a comparison of *Citrus x limon* and *Citrus maxima*. *Plants* 11(7): 991. doi.org/10.3390/plants11070991

27 **Klimm F, Schmier S, Bohn H, Kleiser S, Thielen M, Speck T (2021)** Biomechanics of tendrils and adhesive pads of the climbing passionflower *Passiflora discophora*. *Journal of Experimental Botany* 73(4): 1190-1203. doi.org/10.1093/jxb/erab456

26 **Surapaneni V A, Aust T, Speck T, Thielen M (2021)** Polarity in cuticular ridge development and insect attachment on leaf surfaces of *Schismatoglottis calyptrata* (Araceae). *Beilstein Journal of Nanotechnology* 12: 1326-1338. doi.org/10.3762/bjnano.12.98

25 **Higham TE, Hofmann MNS, Modert M, Thielen M, Speck T (2021)** Jumping with adhesion: The effects of landing surface incline on impact force and body kinematics in crested geckos (*Correlophus ciliatus*). *Scientific Reports* 11:23043. doi.org/10.1038/s41598-021-02033-4

24 **Meder F, Armiento S, Naselli G A, Thielen M, Speck T, Mazzolai B (2021)** Biohybrid generators based on living plants and artificial leaves: influence of leaf motion and real wind outdoor energy harvesting. *Bioinspiration & Biomimetics* 16: 055009. doi.org/10.1088/1748-3190/ac1711

23 **Cheng T, Tahouni Y, Wood D, Thielen M, Poppinga S, Steinberg T, Menges A, Speck T (2021)** Bio-inspired Motion Mechanisms: Computational Design and 4D-printing of Self-adjusting Wearable Systems. *Advanced Science* 2100411. doi.org/10.1002/advs.202100411

22 **Thielen M, Voigt D, Gallenmüller F, Speck T, Gorb S N (2021)** "Push and pull": biomechanics of the pollination apparatus of *Oncidium* spp. *Frontiers in Mechanical Engineering* 6:635694. doi:10.3389/fmech.2020.635694

21 **Surapaneni VA, Bold G, Speck T, Thielen M (2020)** Spatio-temporal development of cuticular ridges on leaf surfaces of *Hevea brasiliensis* alters insect attachment. *Royal Society Open Science* 7:201319. doi:10.1098/rsos.201319

20 **Gallentine J, Wooten M B, Thielen M, Walker I D, Speck T, Niklas K (2020)** Searching and Intertwining: Climbing Plants and GrowBots. *Frontiers in Robotics and AI* 7:118. doi:10.3389/frobt.2020.00118

19 **Meder F, Thielen M, Naselli G A, Taccola S, Speck T, Mazzolai B (2020)** Biohybrid Wind Energy Generators Based on Living Plants. In: Vouloutsi V, Mura A, Tauber F, Speck T, Prescott T J , Verschure P F M J, eds. *Biomimetic and Biohybrid Systems. Living Machines 2020. Lecture Notes in Computer Science*, vol 12413, Cham, Switzerland, Springer, 234-244. doi:10.1007/978-3-030-64313-3_23

18 **Schmier S, Jentzsch M, Speck T, Thielen M (2020)** Fracture mechanics of the endocarp of *Cocos nucifera*. *Materials & Design (195) 108944.* doi:10.1016/j.matdes.2020.108944

17 **Meder F, Thielen M, Mondini A, Speck T, Mazzolai B (2020)** Living plant-hybrid generators for multidirectional wind energy conversion. *Energy Technology* 2000236. doi:0.1002/ente.202000236

16 **Bergmann JB, Moatsou D, Surapaneni A, Thielen M, Speck T, Wilts BD, Steiner U (2020)** Polymerisation-induced wrinkled surfaces with controlled topology as slippery surfaces for insects. *Advanced Materials Interfaces* 2000129. doi:10.1002/admi.202000129

15 **Kampowski T, Langer M, Bold G, Riffel M, Ose L, Seidler C, Schaumann U, Masselter T, Speck T, Thielen M (2020)** Rinse, Sense, Adjust, Repeat: Biomimetic Continuous Process Water Analysis in Washing Machines Based on the Hammerhead Shark's Olfaction Hydrodynamics. *Advanced Intelligent Systems* 1900152. doi:10.1002/aisy.201900152

14 **Kumar C, Palacios A, Surapaneni VA, Bold G, Thielen M, Licht E, Higham TE, Speck T, Le Houérou V (2019)** Replicating the complexity of natural surfaces: technique validation and applications for biomimetics, ecology, and evolution. *Proceedings of the Royal Society of London A: Mathematical, Physical and Engineering Sciences* 377 (2138): 20180265. doi:10.1098/rsta.2018.0265

13 **Speck T, Bold G, Masselter T, Poppinga S, Schmier S, Thielen M, Speck O (2018)** Biomechanics and Functional Morphology of Plants – Inspiration for Biomimetic Materials and Structures. *In: Geitmann A, Gril J, eds. Plant Biomechanics.* Cham, Switzerland, Springer, 399-433. doi:org/10.1007/978-3-319-79099-2_18

12 **Masselter T, Bold G, Thielen M, Speck O, Speck T (2018)** Bioinspired Materials and Structures: A Case Study Based on Selected Examples. *In: Yang G, Xiao L, Lamboni L eds. Bioinspired Materials Science and Engineering.* Hoboken, NJ, USA, John Wiley & Sons, 253-266.

11 **Speck T, Thielen M, Speck O (2018)** What can be learnt from ageing in biology and damage tolerant biological structures for long-lasting biomimetic materials? *In: van Breugel K, Koleva D, van Beek T, eds. The Ageing of Materials and Structures.* Cham, Switzerland, Springer, 27-38. doi:10.1007/978-3-319-70194-3_3

10 **Schmier S, Lauer C, Schäfer I, Klang K, Bauer G, Thielen M, Termin K, Berthold C, Schmauder S, Speck T, Nickel KG (2016)** Developing the experimental basis for an evaluation of scaling properties of brittle and 'quasi-brittle' biological materials. *In: Knippers J, Speck T, Nickel KG eds. Biomimetic Research for Architecture and Building Construction: Biological Design and Integrative Structures. Biologically-Inspired Systems 9,* Cham, Switzerland, Springer, 277-294

9 **Bührig-Polaczek A, Fleck C, Speck T, Schüler P, Fischer S, Caliaro M, Thielen M (2016)** Biomimetic cellular metals – using hierarchical structuring for energy absorption. *Bioinspiration & Biomimetics* 11: 045002. doi:10.1088/1748-3190/11/4/045002

8 **Thielen M, Speck T, Seidel R (2015)** Impact behaviour of freeze-dried and fresh pomelo (*Citrus maxima*) peel: influence of the hydration state. *Royal Society Open Science* 2: 140322. doi:10.1098/rsos.140322

7 **Fischer SF, Thielen M, Weiß P, Seidel R, Speck T, Bührig-Polaczek A, Bünck M (2014)** Production and properties of a precision-cast bio-inspired composite. *Journal of Materials Science* 49: 43-51. doi:10.1007/s10853-013-7878-4

6 **Thielen M, Schmitt CNZ, Eckert S, Speck T, Seidel R (2013)** Structure-function relationship of the foam-like pomelo peel (*Citrus maxima*) - an inspiration for the development of biomimetic damping materials with high energy dissipation. *Bioinspiration & Biomimetics* 8: 025001. doi:10.1088/1748-3182/8/2/025001

5 **Thielen M, Speck T, Seidel R (2013)** *Viscoelasticity* and compaction behaviour of the foam-like pomelo (*Citrus maxima*) peel. *Journal of Materials Science* 48: 3469–3478. doi:10.1007/s10853-013-7137-8

4 **Van Opdenbosch D, Thielen M, Seidel R, Fritz-Popovski G, Fey T, Paris O, Speck T, Zollfrank C (2012)** The pomelo peel and derived nanoscale-precision gradient silica foams. *Bioinspired, Biomimetic and Nanobiomaterials* 1: 117–122. doi:10.1680/bbn.11.00013

3 **Masselter T, Barthlott W, Bauer G, Bertling J, Cichy F, Ditsche-Kuru P, Gallenmüller F, Gude M, Haushahn T, Hermann M, Immink H, Knippers J, Lienhard J, Luchsinger R, Lunz K, Mattheck C, Milwich M, Mölders N, Neinhuis C, Nellesen A, Poppinga S, Rechberger M, Schleicher S, Schmitt C, Schwager H, Seidel R, Speck O, Stegmaier T, Tesari I, Thielen M, Speck T (2012)** Biologically inspired products. *In: Bar-Cohen Y, ed. Biomimetics. Nature-based innovation.* Boca Raton, Fla: CRC Press, 377–429.

2 **Fischer SF, Thielen M, Loprang RR, Seidel R, Fleck C, Speck T, Bührig-Polaczek A (2010)** Pummelos as Concept Generators for Biomimetically Inspired Low Weight Structures with Excellent Damping Properties. *Advanced Engineering Materials* 12: B658–B663. doi:10.1002/adem.201080065

1 **Seidel R, Thielen M, Schmitt C, Bührig-Polaczek A, Fleck C, Speck T (2010)** Fruit walls and nut shells as an inspiration for the design of bio-inspired impact resistant hierarchically structured materials. *In: Brebbia CA, Carpi A, eds. Design & Nature V: Comparing Design in Nature With Science and Engineering.* Ashurst, UK: WIT Press, 421–430. doi:10.2495/DN100371

Further Publications

38 **Klimm F, Speck T, Thielen M (2022)** Biomechanics of climbing plant attachment: The tendrils and adhesive pads of the passionflower Passiflora discophora. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2021,* FIT, Freiburg, 44-46.

37 **Speck T, Thielen M, Klimm F, Mazzolai B et al. (2022)** GrowBot – Towards a new generation of plant-inspired growing artefacts. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2021,* FIT, Freiburg, 89-90.

36 **Surapaneni VA, Speck T, Thielen M (2021)** Physics and mechanics of plant surfaces with cuticular folds and other microstructures. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2020,* FIT, Freiburg, 38-40.

35 **Klimm F, Modert M, Neugebauer D, Speck T, Thielen M (2021)** The plant role models: A spring-damped adhesive system and self-stiffening braided support structures. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2020,* FIT, Freiburg, 40-41.

34 **Speck T, Thielen M, Rühe J, Reiter G (2021)** PlaMatSu – Plant-inspired materials and surfaces. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2020,* FIT, Freiburg, 86-87.

33 **Speck T, Thielen M, Klimm F, Mazzolai B et al. (2021)** GrowBot – Towards a new generation of plant-inspired growing artefacts. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2021,* FIT, Freiburg, 87-88.

32 **Klimm F, Modert M, Neugebauer D, Speck T, Thielen M (2021)** GrowBot – Eine neue Generation pflanzen-inspirierter wachsender Soft Robots: Ein Haftsystem mit Federdämpfung und verflochtene Suchertriebe. *In: Freiburger Materialforschungszentrum (FMF) Report 2020,* FMF, Freiburg, 44-46. (English & German Version)

31 **Surapaneni VA, Speck T, Thielen M (2021)** Physik und Mechanik von Pflanzenoberflächen mit Kutikular-Falten und anderen Mikrostrukturen. *In: Freiburger Materialforschungszentrum (FMF) Report 2020,* FMF, Freiburg, 93-95. (English & German Version)

30 **Thielen M, Speck T (2020)** Bionische Forschungs- und Entwicklungsprojekte im Botanischen Garten Freiburg. *Botanischer Garten der Albert-Ludwigs-Universität. Freiburg i. Br., Germany.*

29 **Bold G, Kampowski T, Langer M, Thielen M, Riffel M, Ose L, Seidler C, Schaumann U, Masselter T, Speck T (2020)** Biomimetic continuous process water analysis in washing machines. *In: Freiburger Materialforschungszentrum (FMF) Report 2019,* FMF, Freiburg, 32-35. (English & German Version)

28 **Klimm F, Speck T, Thielen M (2020)** GrowBot - Towards a new generation of plant-inspired growing artefacts: The plant role models. *In: Freiburger Materialforschungszentrum (FMF) Report 2019,* FMF, Freiburg, 35-36. (English & German Version)

27 **Surapaneni V A, Aust T, Bold G, Speck T, Thielen M (2020)** Physics and Mechanics of Plant Surfaces with Cuticular Folds and Other Microstructures PlaMatSu - Plant-Inspired Materials and Surfaces. *In: Freiburger Materialforschungszentrum (FMF) Report 2019,* FMF, Freiburg, 96-98. (English & German Version)

26 **Surapaneni V A, Aust T, Bold G, Speck T, Thielen M (2020)** Physics and Mechanics of Plant Surfaces with Cuticular Folds and Other Microstructures – Characterization and Quatification of the Ontogenetic Development. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2019,* FIT, Freiburg, 77-78.

25 **Klimm F, Speck T, Thielen M (2020)** Towards a new generation of plant-inspired growing artefacts: The plant role models. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2019,* FIT, Freiburg, 79-80.

24 **Thielen M, Kampowski T, Langer M, Bold G, Riffel M, Ose L, Seidler C, Schaumann U, Masselter T, Speck T (2020)** Rinse, sense, adjust, repeat: Smart, resource-efficient washing machines. *Advanced Science News (online) 27.01.2020*. (https://www.advancedsciencenews.com/rinse-sense-adjust-repeat-smart-resource-efficient-washing-machines/)

23 **Surapaneni V A, Bold G, Speck T, Thielen M (2019)** Physics and Mechanics of Plant Surfaces with Cuticular Folds and Other Microstructures – Ontogenetic Development of the Microstructures. *In: Freiburger Materialforschungszentrum (FMF) Report 2018, FMF*, Freiburg, 38-42. (English & German Version)

22 **Thielen M, Poppinga S, Speck T (2019)** Personalized 3D and 4D printing of programmable and switchable as well as self-regulating multifunctional material systems for sports and medicine (4DmultiMATS) – Inspiration by winding climbers and butterworth. *In: Freiburger Materialforschungszentrum (FMF) Report 2018,* FMF, Freiburg, 33-35. (English & German Version)

21 **Speck T, Thielen M, Mazzolai B, et al. (2018)** GrowBot - Towards a new generation of plant inspired growing artefacts. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2018*, FIT, Freiburg, 60-61.

20 **Surapaneni V A, Bold G, Speck T, Thielen M (2018)** Physics and mechanics of plant surfaces with cuticular folds and other microstructures – ontogenetic development of the microstructures. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2018*, FIT, Freiburg, 31-33.

19 **Kampowski M, Langer M, Thielen M, Masselter T, Bold G, Speck T (2018)** Bio-inspired household appliances and how they may profit from nature. *In: Freiburger Materialforschungszentrum (FMF) Report 2017, FMF,* Freiburg, 29-33. (English & German Version)

18 **Surapaneni V A, Thielen M, Bold G, Speck T (2018)** Physics and mechanics of plant surfaces with cuticular folds and other microstructures: PlaMatSu – Plant-Inspired Materials and Surfaces. *In: Freiburger Materialforschungszentrum (FMF) Report 2017, FMF*, Freiburg, 33-37. (English & German Version)

17 **Schmier S, Bold G, Thielen M, Speck T (2018)** Bioinspired energy dissipation in load bearing systems and facades for building construction: Scaling of properties of porous biological and biomimetic constructions. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2017, FIT*, Freiburg, 39-45. (English & German Version)

16 **Thielen M, Speck T, Bauer G, Reiter G, Reiter R, Rühe J, Prucker O (2017)** PlaMatSu - Plant-Inspired Materials and Surfaces (www.plamatsu.eu). *In: Freiburger Materialforschungszentrum (FMF) Report 2016,* FMF, Freiburg, 50-52. (English & German Version)

15 **Bauer G, Schmier S, Thielen M, Speck T (2017)** Plants and animals as source of inspiration for energy dissipation in load bearing systems and facades III – Scaling of properties of Highly Porous Biological and Biomimetic Constructions III. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2016,* FIT, Freiburg, 78-85. (English & German Version)

14 **Speck T, Masselter T, Poppinga S, Thielen M, Bauer G, Bunk K, Hesse L, Schmier S, Westermeier A (2016)** Fibres in biology and technology: smart fibre-reinforced materials and structures inspired by plants and animals. *In: Proceedings of the ECCM17 - 17th European Conference on Composite Materials*. Munich, Germany.

13 **Schmier S, Bauer G, Thielen M, Speck T (2016)** Plants and animals as source of inspiration for energy dissipation in load bearing systems and facades – scaling of properties of highly porous biological and biomimetic constructions. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2015, FIT*, Freiburg, 15-20. (English & German Version)

12 **Thielen M, Speck T (2015)** How the pomelo peel (*Citrus maxima*) absorbs impact energy by distributing stresses. *In: Proceedings of the 8th Plant Biomechanics Conference.* Nagoya, Japan, 198–201.

11 **Bauer G, Schmier S, Thielen M, Speck T (2015)** Energy dissipation in plants – from puncture resistant seed coats to impact resistant tree barks. *In: Proceedings of the 8th Plant Biomechanics Conference*. Nagoya, Japan, 190–195.

10 **Thielen M, Speck T (2015)** Kinematics of planar, curved and corrugated plant surfaces as concept generators for deployable systems in architecture. *In: Freiburger Zentrum für interaktive Werkstoffe und bioinspirierte Technologien (FIT) Report 2014, FIT,* Freiburg, 23-27. (English & German Version)

9 **Thielen M, Speck T (2015)** BISS – Bio-inspired Safety Systems: Biomimetic safety gear for sports, leisure activities and protection. *In: Freiburger Materialforschungszentrum (FMF) Report 2014,* FMF, Freiburg, 49-51. (English & German Version)

8 **Speck T, Thielen M, Speck O (2014)** Biomimetic materials: long-lasting and self-repairing. *In: van Breugel K, Koenders EAB, eds. Proceedings of the 1st International Conference on Ageing of Materials & Structures.* Delft, The Netherlands: Delft University of Technology, 27–30.

7 **Schüler P, Fleck C, Fischer SF, Bührig-Polaczek A, Thielen M, Seidel R, Speck T (2013)** Bionisches Engineering: Von Frucht- und Nussschalen zur Entwicklung neuer Materialien. *GIT Labor-Fachzeitschrift* 1: 26–28.

6 **Schüler P, Fleck C, Fischer SF, Bührig-Polaczek A, Thielen M, Seidel R, Speck T (2013)** Biomimetic Engineering: Fruit Walls and Nutshells as Inspiration for the Development of Novel Materials. *G.I.T. Laboratory Journal* 2-3: 16–19.

5 **Bührig-Polaczek A, Fleck C, Speck T, Fischer SF, Thielen M, Seidel R, Schüler P (2013)** Impact resistant hierarchically structured materials based on fruit walls and nut shells. *In: Progress Report 2011 – 2013, DFG Priority Programme 1420 „Biomimetic materials Research: Functionality by Hierarchical Structuring of Materials:* 51-58.

4 **Thielen M, Speck T, Seidel R (2012)** The ecological relevance of the pomelo (*Citrus maxima*) peel acting as an effective impact protection. *In: Moulia B, Fournier M, eds. Proceedings of the 7th Plant Biomechanics International Conference.* Clermont-Ferrand, France, 99–101.

3 **Bührig-Polaczek A, Fleck C, Speck T, Seidel R, Fischer SF, Huang J, Loprang RR, Schmauder S, Schüler P, Weber U, Thielen M (2011)** Impact resistant hierarchically structured materials based on fruit walls and nut shells. *In: Progress Report 2009 – 2011, DFG Priority Programme 1420 „Biomimetic materials Research: Functionality by Hierarchical Structuring of Materials:* 15-19.

2 **Thielen M, Schmitt C, Speck T, Seidel R (2010)** The peel of *Citrus maxima* as a role model for hierarchically structured foams. *In: Tschegg S, Seidel R, eds. Proceedings of the COST Strategic Workshop: Principles and Development of Bio-Inspired Materials. Vienna, Austria: BOKU – University of Natural Resources and Applied Life Sciences Institute of Physics and Materials Science,* Vienna, 185–186.

1 **Ludwig F, De Bruyn G, Thielen M, Speck T (2009)** Plant stems as building material for living plant constructions. *In: Thibaut B, ed. Proceedings of the 6th Plant Biomechanics Conference. Cayenne,* French Guyana, France: ECOFOG, 398–405.

Lectures and Conference Contributions

Presenter(s) is/are underlined when several authors are listed.

2022: Mercer C, Speck T, Lee J, Balint D, Thielen M (2022) *Abstract*
An Investigation of the Effects of Loading Condition, Boundary Constraint and Geometry Optimization on the Mechanical Response of Auxetic Metamaterials. *Asian Congress of Structural and Multidisciplinary Optimization, Matsue, Japan (22.05.-26.05-2022)*

2021: Speck T, Neugebauer D, Klimm F, Thielen M (2021) *Abstract*
Intertwined searcher stems of climbing plants as concept generator for a new generation climbing soft robots. *EUROMAT 2021, Virtual Conference (13.09.-17.09-2021)*

Klimm F, Speck T, Modert M, Thielen M (2021) *Abstract*
Attachment and coiling of tendrils in the climbing passion flower Passiflora discophora. *SEB Annual Conference 2021, Virtual Conference (29.06.-02.07.2021)*

2019: Thielen M, Hesse L, Speck T (2019) *Lecture*
Bionik: Lernen von 3,8 Milliarden Jahren Evolution für die Technik und Architektur der Zukunft. *Lebenswissenschaftliches Kolleg VIII, Naumburg, Germany (22.09.-27.09-2019)*

Thielen M (2019) *Lecture*
Die Schale der Pomelo (*Citrus maxima*) als Vorbild für die Entwicklung von bionischen Impaktprotektoren und auxetischen Materialien. *Lebenswissenschaftliches Kolleg VIII, Naumburg, Germany (22.09.-27.09-2019)*

Thielen M, Gallenmüller F, Speck T (2019) *Lecture*
Formoptimierung und Spannungsoptik: CAO & Zugdreiecksmethode.
Lebenswissenschaftliches Kolleg VIII, Naumburg, Germany (22.09.-27.09-2019)

Speck T, Thielen M, Schmier S (2019) *Abstract*

Das Kokosnuss-Endokarp als Ideengeber für bioinspirierte bruchzähe und durchstoßfeste Materialsysteme. *Werkstoffwoche, Dresden, Germany (18.09.-20.09-2019)*

Speck T, Thielen M, Mazzolai (2019) *Abstract*
GrowBot: Kletterpflanzen als Ideengeber für ein neuartige Bewegungs- und Verankerungsparadigmen von bioinspirierten kletternden Robotern. *Werkstoffwoche, Dresden, Germany (18.09.-20.09-2019)*

Speck T, Schmier S, Thielen M (2019) *Abstract*
The coconut endocarp as role model for bioinspired fracture tough and puncture resistant materials systems. *EUROMAT 2019, Stockholm, Sweden (01.09.-05.09-2019)*

Cheng T, Tahouni Y, Thielen M, Poppinga S, Menges A, Speck T (2019) *Abstract*
Smart Structure: Computational Design for 4D-Printed Material Systems Inspired by the Butterwort (*Pinguicula grandiflora*). *EUROMAT 2019, Stockholm, Sweden (01.09.-05.09-2019)*

Surapaneni V A, Thielen M, Bold G, Speck T (2019) *Abstract*
Plant surface microstructures – insect adhesion and biomimetics.
EUROMAT 2019, Stockholm, Sweden (01.09.-05.09-2019)

Mercer C, Speck T, Lee J, Balint D, Thielen M (2019) *Abstract*
Investigation of the effects of geometry and constraint on the mechanical performance of bio-inspired 3-D laser printed auxetic structures. *EUROMAT 2019, Stockholm, Sweden (01.09.-05.09-2019)*

Thielen M, Speck T (2019) *Invited Talk*
Damping in plants: mechanics and underlying structures. *GrowBot Tutorial: Plant-Like Robots Are Growing Up, Tel Aviv, Israel (01.09.-05.09-2019)*

2018:

Thielen M, Poppinga S, Speck T (2018) *Poster & Abstract*
4D-printed material systems for sports and medicine inspired by the deformation of Butterwort (*Pinguicula* sp.) leaves. *9th Plant Biomechanics Conference, Montreal, Canada (09.08.-14.08-2018)*

Thielen M, Magalhaes L, Speck T (2018) *Short talk & Poster*
Springs and dashpots: rheological models in plant biomechanics. *9th Plant Biomechanics Conference, Montreal, Canada (09.08.-14.08-2018)*

Surapaneni V A, Thielen M, Bold G, Speck T (2018) *Abstract*
Ontogenic Variations of Plant Surface Microstructures and Insect Adhesion. *9th Plant Biomechanics Conference, Montreal, Canada (09.08.-14.08-2018)*

Schmier S, Bold G, Thielen M, Speck T (2018) *Poster & Abstract*
Hierarchical structure and mechanical properties of the endocarp of *Cocos nucifera* as inspiration for concrete based building components. *9th Plant Biomechanics Conference, Montreal, Canada (09.08.-14.08-2018)*

Thielen M, Bold G, Speck T (2018) *Poster & Abstract*
Pomelo peel and giant redwood bark: materials systems with pronounced damping capacity as concept generators for bioinspired energy dissipating systems as safety helmets and joint protectors. *8th World Congress of Biomechanics, Dublin, Ireland (08.-12.07.2018)*

Thielen M, Speck T, et al. (2018) *Invited Talk*
Inspirationen aus der Natur für innovative Materialien. *2. Jahrestagung der Gesellschaft für experimentelle Osteologie e.V. (GEXOS) 2018, Freiburg, Germany (02.06.2018)*

Thielen M, Speck T, et al. (2018) *Invited Talk*
Biomimetics – Some examples of nature inspiring technology. *ITN PlaMatSu & NCCR Bio-Inspired Materials Winterschool 2018, St. Moritz, Switzerland (28.01-03.02.2018)*

Higham TE, Rödder D, Thielen M, Speck T (2018) *Abstract*
Comparative adhesive capacity and morphology of day geckos (*Phelsuma)* in relation to native plant surface microstructure. *SICB 2018 Annual Meeting*

2017:

Thielen M, Surapaneni VA, Bold G, Speck T (2017) *Talk*
PlaMatSu – Plant-inspired Materials and Surfaces *25th FMF-colloquium, Schluchsee, Germany (09.-10.10.2017)*

2016:

Thielen M, (2016) *INVITED TALK*
Impact Protection Inspired by Nature. *International Symposium on Advanced Manufacturing Science for Future Systems "Biomimetics", Tokyo, Japan (05.12.2016)*

Thielen M, Speck T (2016) *SHORT TALK & POSTER*
Biomimetic Impact Protection. *8. Bremer Bionik Kongress, Bremen, Germany (21.-22.10.2016)*

Bauer G, Schmier S, Thielen M, Speck T (2016) *ABSTRACT*
Fibrous multilayered plant structures with high energy dissipation capacity as source of inspiration for impact protection in architecture. *25th FMF-colloquium, Schluchsee, Germany (10.-11.10.2016)*

Thielen M, Bauer G, Schmier S, Speck T (2016) *TALK*
Biomimetic Impact Protection. *Kompetenznetz Funktionelle Nanostrukturen: Statusworkshop 2016, Bad Herrenalb, Germany (06.-07.10.2016)*

Schmier S, Otters D, Bauer G, Thielen M, Speck T (2016) *ABSTRACT*
Biomechanical analysis of the endocarp of *Cocos nucifera*. *SEB Annual Main Meeting, Brighton, Great Britain (04.-07.07.2016)*

Thielen M, Magalhaes L, Speck T (2016) *POSTER & ABSTRACT*
Mechanical properties of hierarchically structured biological solid foams. *Euro Bio-inspired Materials 2016 - International school and conference on biological materials science Potsdam, Germany (22.-25.02.2016)*

2015:

Thielen M, Speck T (2015) *SHORT TALK & POSTER* ***BEST POSTER AWARD***
How the pomelo peel (*Citrus maxima*) absorbs impact energy by distributing stresses. *8th Plant Biomechanics Conference, Nagoya, Japan (31.11.-04.12-2015)*

Thielen M, Speck T (2015) *GENERAL LECTURE (INVITED TALK)*
Inspirationen aus der Natur für innovative Materialien.*Jahrestagung der Deutschen Gesellschaft für Biomaterialien, Freiburg, Germany (12.-14.11.2015).*

Thielen M, Speck T (2015) *TALK*
Biological and bio-inspired damping materials and structures. *24th FMF-colloquium, Schluchsee, Germany (15.-16.10.2015)*

2014:

Caliaro M, Thielen M, Speck T (2014) *POSTER & ABSTRACT* ***1ST POSTER PRIZE***
Impact damping using water displacement – protective properties of the pomelo fruit pulp. *SEB Annual Main Meeting, Manchester, Great Britain (01.-04.07.2014)*

Bührig-Polaczek A, Speck T, Seidel R, Caliaro M, Fleck C, Fischer SF, Thielen M, Schüler P (2014) *TALK & POSTER*
Impact Resistant Hierarchically Structured Materials Based on Fruit Walls and Nut Shells. *Bio-inspired Materials: International School and Conference on Biological Materials Science, Potsdam, Germany (18.-21.03.2014).*

Thielen M, Seidel R, Speck T (2014) *TALK*
Energy dissipation capacity of the pomelo (*Citrus maxima*) peel. *Bio-inspired Materials: International School and Conference on Biological Materials Science, Potsdam, Germany (18.-21.03.2014).*

2012:

Thielen M, Speck T, Seidel R (2012) *SHORT TALK & POSTER*
The ecological relevance of the pomelo (*Citrus maxima*) peel acting as an effective impact protection. *7th Plant Biomechanics Conference, Clermont-Ferrand, France (20.-24.08-2012)*

Thielen M, Fischer SF, Schüler P, Bührig-Polaczek A, Fleck C, Speck T, Seidel R (2012) *SHORT TALK & POSTER*
Impact protection inspired by the pomelo (*Citrus maxima*) peel. *Bionic 2012 – International School and Conference on Biological Materials Science, Deutsche Gesellschaft für Materialkunde e.V. (DGM), Potsdam, Germany (20.-23.03.2012).*

Schüler P, Thielen M, Fischer SF, Seidel R, Bührig-Polaczek A, Fleck C, Speck T (2012) *TALK*
Impact resistant hierarchically structured materials based on fruit walls and nut shells. *SPP 1420 Young Academy & Winter School 2012, DFG-Schwerpunktprogramm 'Biomimetic Materials Research: Functionality by Hierarchical Structuring of Materials', Potsdam, Germany (18.-20.03.2012).*

Thielen M, Gallenmüller F, Speck T (2012) *Invited Talk*
Spannungsoptische Untersuchungen im naturwissenschaftlichen Unterricht. *103. MNU Bundeskongress, Freiburg, Germany (01.-05.04.2012)*

2011:

Thielen M, Speck T, Seidel R (2011) *Talk*
The influence of hierarchical structuring on the impact behaviour of the pomelo (*C. maxima*) peel. *SEB Annual Main Meeting, Glasgow, UK (01.-04.07.2011)*

Thielen M, Speck T, Seidel R (2011) *Short Talk & Poster*
Impact protection – what can be learned from the pomelo (*Citrus maxima*) peel? *EUROMAT 2011, Montpellier, France (12.-15.09.2011)*

2010:

Thielen M, Schmitt C, Speck T, Seidel R (2010) *Poster*
The pericarp of *Citrus maxima*, a role model for impact protective devices. *MSE 2010, Darmstadt, Germany (24.-26.08.2010)*

Thielen M, Schmitt C, Speck T, Seidel R (2010) *Talk*
Biomechanics and functional morphology of the pummelo (*Citrus maxima*) and impact performance of its peel. *SEB Annual Main Meeting, Prague, Czech Republic (30.06-03.07.2010)*

Thielen M, Schmitt C, Speck T, Seidel R (2010) *Poster*
The peel of *Citrus maxima*, a role model for hierarchically structured biomimetics foams. *COST Strategic Workshop: Principles and Development of Bio-inspired Materials, Vienna, Austria (13.-15.04.2010)*

Thielen M, Fischer SF (2010) *Key Note*
Structure Characterising Methods: Optical Microscopy. *SPP1420 Winter School 2010, Kerkrade, The Netherlands (23.-26.03.2010)*

Seidel R, Thielen M, Schmitt C, Bührig-Polaczek A, Fleck C, Speck T (2010) *Abstract*
Functional Morphology and Biomechanics of Fruit Walls and Nut Shells: Concept Generators for Innovative Biomechanic Materials. *SICB 2010 Annual Meeting, Seattle, USA (03.-07.01.2010)*

Reviewer Activities

- Bioinspiration & Biomimetics
- Integrative and Comparative Biology
- Journal of Bionic Engineering
- Journal of Materials Science
- Journal of the Mechanical Behavior of Biomedical Materials
- Materials & Design
- MDPI Plants
- Scientific Reports
- Structures
- Frontiers in Robotics and AI