



## Tiffany Cheng – Curriculum Vitae

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Keplerstraße 11, 70174 Stuttgart, Germany

### EDUCATION

- 2017 - present      University of Stuttgart  
**Doctor of Engineering (Dr.-Ing) - Candidate** | *Submission Oct. 2023*  
Thesis: Material Programming for 4D-Printing  
Advisor: Achim Menges
- 2014 - 2016      Harvard University  
**Master in Design Studies (M.Des.)** | *May 2016*  
Graduate School of Design, Concentration: Technology
- 2007 - 2012      University of Southern California  
**Bachelor of Architecture (B.Arch.)** | *May 2012*  
School of Architecture, Honors in Multimedia Scholarship

### CURRENT POSITION

- 2017 - present      University of Stuttgart  
**Institute for Computational Design and Construction (ICD)**  
Research Associate | Prof. Achim Menges

### ACADEMIC EXPERIENCE

- 2014 - 2017      Harvard University  
**Material Processes and Systems (MaP+S) Group**  
Research Associate ('16-17), Research Assistant ('14-16) | Prof. Martin Bechthold
- 2010 - 2012      University of Southern California  
**Institute for Multimedia Literacy**  
Lab Assistant | Doney Joseph

### PROFESSIONAL EXPERIENCE

- 2012 - 2014      Los Angeles, USA  
**Fernando Vazquez/Studio**  
Project Designer | Fernando Vazquez, AIA
- 2010      Los Angeles, USA  
**P-A-T-T-E-R-N-S**  
Intern Architect | Marcelo Spina, AIA
- 2009      Taipei, Taiwan  
**CECI Engineering Consultants, Inc.**  
Intern Survey Engineer | Allen Chen

## PUBLICATIONS

- Cheng, T.**, Wood, D., Kiesewetter, L., Özdemir, E., Antorveza, K., Menges, A.: 2021, *Programming material compliance and actuation: hybrid additive fabrication of biocomposite structures for large-scale self-shaping*. Bioinspiration & Biomimetics, vol. 16, no. 5. (DOI: 10.1088/1748-3190/ac10af)
- Cheng, T.**, Thielen, M., Poppinga, S., Tahouni, Y., Wood, D., Steinberg, T., Menges, A., Speck, T.: 2021, *Bio-Inspired Motion Mechanisms: Computational Design and Material Programming of Self-Adjusting 4D-Printed Wearable Systems*. Advanced Science, vol. 8, no. 13. (DOI: 10.1002/advs.202100411)
- Cheng, T.**, Tahouni, Y., Wood, D., Stolz, B., Mülhaupt, R., Menges, A.: 2020, *Multifunctional Mesosstructures: Design and Material Programming for 4D-printing*. In Symposium on Computational Fabrication (SCF '20). ACM, New York, NY, USA. (DOI: 10.1145/3424630.3425418)
- Cheng, T.**, Wood, D., Wang, X., Yuan, P., Menges, A.: 2020, *Programming Material Intelligence: An Additive Fabrication Strategy for Self-Shaping Biohybrid Components*. Lecture Notes in Artificial Intelligence: Biomimetic and Biohybrid Systems [Proceedings of the Living Machines 2020 Conference], vol. 12413, pp. 36-45. (DOI: 10.1007/978-3-030-64313-3\_5)
- Cheng, T.**, Thielen, M., Poppinga, S., Tahouni, Y., Wood, D., Steinberg, T., Menges, A., Speck, T.: 2023, *Entwicklung bioinspirierter und selbstformender Orthesen per 4D-Druck*. Orthopädie Technik, vol. 74, no. 1. (DOI: 10.1007/978-3-030-64313-3\_5)
- Sahin, E.S., **Cheng, T.**, Wood, D., Tahouni, Y., Poppinga, S., Thielen, M., Speck, T., Menges, A.: 2023, *Cross-Sectional 4D-Printing: Upscaling Self-Shaping Structures with Differentiated Material Properties Inspired by the Large-Flowered Butterwort (Pinguicula grandiflora)*. Biomimetics, vol. 8, no. 2. (DOI: 10.3390/biomimetics8020233)
- Speck, T., **Cheng, T.**, Klimm, F., Menges, A., Poppinga, S., Speck, O., Tahouni, Y., Tauber, F., Thielen, M.: 2023, *Plants as inspiration for material-based sensing and actuation in soft robots and machines*. MRS Bulletin. (DOI: 10.1557/s43577-022-00470-8)
- Wood, D., **Cheng, T.**, Tahouni, Y., Menges, A.: 2023, *Material Programming for Bio-inspired and Bio-based Hygromorphic Building Envelopes*. In: Wang, J., Shi, D., Song, Y. (Eds.) Advanced Materials in Smart Building Skins for Sustainability. Springer Nature Switzerland AG. (DOI: 10.1007/978-3-031-09695-2\_4)
- Tahouni, Y., **Cheng, T.**, Lajewski, S., Benz, J., Bonten, C., Wood, D., Menges, A.: 2022, *Codesign of Biobased Cellulose-Filled Filaments and Mesosstructures for 4D Printing Humidity Responsive Smart Structures*. 3D Printing and Additive Manufacturing, vol. 10, no. 1. (DOI: 10.1089/3dp.2022.0061)
- Özdemir, E., Kiesewetter, L., Antorveza, K., **Cheng, T.**, Leder, S., Wood, D., Menges, A.: 2021, *Towards Self-shaping Metamaterial Shells: A Computational Design Workflow for Hybrid Additive Manufacturing of Architectural Scale Double-Curved Structures*. Proceedings of the 2021 DigitalFUTURES (CDRF 2021), pp. 275-285. (DOI: 10.1007/978-981-16-5983-6\_26)
- Tahouni, Y., **Cheng, T.**, Wood, D., Sachse, R., Thierer, R., Bischoff, M., Menges, A.: 2020, *Self-shaping Curved Folding: a 4D-printing method for fabrication of curved creased origami structures*. In Symposium on Computational Fabrication (SCF '20). ACM, New York, NY, USA. (DOI: 10.1145/3424630.3425416)

Kliem, S., Tahouni, Y., **Cheng, T.**, Menges, A., Bonten, C.: 2020, *Biobased smart materials for processing via fused layer modeling*. AIP Conference Proceedings, vol. 2289, no. 1. (DOI: 10.1063/5.0028730)

Poppinga, S., Zollfrank, C., Prucker, O., Rühle, J., Menges, A., **Cheng, T.**, Speck, T.: 2018, *Toward a New Generation of Smart Biomimetic Actuators for Architecture*. Advanced Materials, vol. 30, no. 19. (DOI: 10.1002/adma.201703653)

## GRANTS AND FUNDED RESEARCH

- |             |  |
|-------------|--|
| 2023 - 2024 | University of Stuttgart – Technology Transfer Initiative   <b>15,000 €</b><br><b>Passive Adaptive Soft: Self-regulating, High-performance Apparel through Bio-based and Hygro-responsive 4D-printed Textile Hybrids</b><br><b>Collaborator:</b> Institut für Kunststofftechnik (IKT), University of Stuttgart<br><b>Role:</b> Co-author of grant – project lead, concept, and execution  |
| 2021 - 2022 | University of Stuttgart – Technology Transfer Initiative   <b>25,000 €</b><br><b>Zero-energy Self-shading: a Smart Facade Demonstrator via 4D-printed Hygro-responsive and Variable Stiffness Bioplastic Composites</b><br><b>Collaborator:</b> Institut für Kunststofftechnik (IKT), University of Stuttgart<br><b>Role:</b> Co-author of grant, project concept and execution  |
| 2021 - 2022 | Université PSL, La Chaire Beauté(s) – L'Oréal   <b>20,000 €</b><br><b>Adaptive Beauty: Transferring Natural Elegance to Architected Materials</b><br><b>Collaborator:</b> Physique et Mécanique des Milieux Hétérogènes, ESPCI-PSL, Sorbonne Université<br><b>Role:</b> Co-author of grant – project lead, concept, and execution  |
| 2020 - 2021 | MIT-Germany – MISTI Global Seed Fund   <b>24,000 \$</b><br><b>Smarter Smart Materials: Integrating Human Interaction with Environmentally Responsive Material Systems</b><br><b>Collaborator:</b> HCI Engineering Group, CSAIL, MIT<br><b>Role:</b> Co-author of grant – project concept and execution   |
| 2017-2020   | Baden Württemberg Foundation   <b>653,000 €</b><br><b>4DmultiMATS: Personalised 3D- and 4D-Printing of Programmable, Self-Adjusting and Multifunctional Material Systems for Sports and Medical Applications</b><br><b>Collaborator:</b> Institute of Macro Molecular Chemistry, Plant Biomechanics Group, University Medical Center; University of Freiburg<br><b>Role:</b> Ph.D. researcher – project lead, concept, and execution |

## AWARDS AND HONORS

- |      |   |
|------|---|
| 2022 | <b>Mobility Grant</b> , Cluster of Excellence IntCDC, University of Stuttgart       |
| 2022 | <b>Best Poster (Construction Robotics)</b> , The Future of Construction, ETH Zürich |
| 2022 | <b>Finalist</b> , 3D Pioneers Challenge, Rapid.Tech 3D                              |
| 2021 | <b>Finalist</b> , Purmundus Challenge, Formnext                                     |
| 2020 | <b>2<sup>nd</sup> Best Poster</b> , Forschungstag, Baden-Württemberg Foundation     |
| 2020 | <b>1<sup>st</sup> Best Paper</b> , Living Machines, University of Freiburg          |
| 2016 | <b>Thesis R&amp;D Award</b> , MDes, Harvard GSD                                     |
| 2014 | <b>Runner up for Best Project</b> , CS171 – Hall of Fame, Harvard SEAS              |
| 2012 | <b>Raymond S. Kennedy Award</b> , University of Southern California                 |

## EXHIBITIONS

6.2023	<b>The Global Game: Remapping Collaborations</b> London Design Biennale, London
3.2020 - 5.2020	<b>Learning from Nature: The Future of Design</b> MODA Museum of Design, Atlanta
11.2019 - 3.2020	<b>Future and the Arts: How Humanity Will Live Tomorrow</b> Mori Art Museum, Tokyo
9.2019 - 11.2019	<b>Exhibition of the 130<sup>th</sup> Anniversary of the Eiffel Tower</b> Eiffel Tower, Paris
4.2019 - 10.2019	<b>Materials Labyrinth: Material Innovations for the Future of Construction</b> Bundesgartenschau, Heilbronn
7.2018 - 8.2018	<b>Cyborg Futures</b> Digital FUTURES, Shanghai
1.2015 - 2.2015	<b>Material Practice: Ceramic Material Formations</b> Gallery 224, Cambridge

## SERVICE

**Symposium Chair:** BE-AM 2023 Deep Dive Session  
**Scientific Review Committee:** Wood Science and Technology, Quantitative Plant Biology, Living Machines 2023, ACM CHI 2024  
**Evaluation Panel:** Validation of Lund University's MSc Architecture and Digital Process programme  
**Invited Studio Critic:** UCL Bartlett B-Pro Architectural Design (AD) SuperCrit  
**Admissions Committee:** Selection of students for the University of Stuttgart's MSc ITECH programme  
**Board Member:** Early Career Board of the University of Stuttgart's Cluster of Excellence IntCDC

## CONFERENCE PRESENTATIONS

2023	<b>Advances in Architectural Geometry (AAG)</b> , University of Stuttgart
2022	<b>The Future of Construction</b> , ETH Zürich
2020	<b>ACM Symposium on Computational Fabrication (SCF)</b> , Boston University
2020	<b>Forschungstag</b> , Baden-Württemberg Foundation
2020	<b>Living Machines</b> , University of Freiburg
2020	<b>Living Materials</b> , Saarland University
2019	<b>EUROMAT</b> , Stockholm

## INVITED TALKS

2023	<b>Tirana Design Week 2023 (Keynote)</b> , Tirana   hosted by Santina di Salvo
2023	<b>Harvard University CGBC</b> , Cambridge   hosted by Ali Malkawi
2023	<b>digitize wood Network Meeting</b> , Freiburg   hosted by Moritz Mahlke
2022	<b>Formnext 2022</b> , Frankfurt   hosted by CEAD B.V.
2022	<b>EPFL Biorobotics Laboratory (BioRob)</b> , Lausanne   hosted by Auke Ijspeert
2022	<b>Discours de la Méthode</b> , Hochschule Pforzheim   hosted by Steffen Reichert
2022	<b>4D Printing &amp; Meta Materials Conference</b> , Jakajima   hosted by Pieter Hermans
2022	<b>Hasso Plattner Institute</b> , Berlin   hosted by Thijs Roumen
2022	<b>Digital FUTURES</b> , Virtual event   hosted by Neil Leach
2022	<b>Walt Disney Imagineering</b> , Los Angeles   hosted by Michael Hopkins
2021	<b>GDR MéPhy</b> , Paris   hosted by Benoît Roman
2021	<b>Harvard University GSD</b> , Cambridge   hosted by Rachel Vroman
2021	<b>Transsolar KlimaEngineering</b> , Stuttgart   hosted by Michelle Hur
2021	<b>University of Michigan DART LAB</b> , Ann Arbor   hosted by Mania Aghaei Meibodi

2021	<b>Ehrlich Yanai Rhee Chaney Architects</b> , Los Angeles   hosted by Jessica Chang
2020	<b>Volkswagen Group</b> , Wolfsburg   hosted by Rut Sawodny
2020	<b>Interzum</b> , Cologne   hosted by Sascha Peters
2020	<b>Technologieland Hessen</b> , Darmstadt   hosted by Sascha Peters
2020	<b>Digital FUTURE Symposium</b> , Tongji University   hosted by Philip Yuan
2020	<b>USC Architecture Generation Next</b> , Los Angeles   hosted by Alvin Huang

## MENTORING

University of Stuttgart, M.Sc. ITECH  
**Master Thesis Projects** | Thesis Tutor

2021	Ryan Daley, Mahdi Rasasani: <b>Non-planar 3D printing on fabric formwork</b> Supervisors: J. Knippers, A. Menges   co-advised with M. Pérez
2020	Karen Antorveza, Laura Kiesewetter, Eda Özdemir: <b>Hybrid Additive Manufacturing for Self Shaping Building Components</b> Supervisors: A. Menges, J. Knippers   co-advised with S. Leder
2020	Vaia Tsiokou: <b>Functional Multi-Material Systems</b> Supervisors: A. Menges, J. Knippers   co-advised with D. Wood
2019	Rob Faulkner, Samantha Melnyk, Tamara Rosales, Naomi Tashiro: <b>Haptic Reality</b> Supervisors: K. Kuchenbecker, A. Menges   co-advised with D. Wood, Y. Tahouni
2018	Maria Razzhivina, Hosna Shayani, Jacob Zindroski: <b>Recrete</b> Supervisors: A. Menges, J. Knippers   co-advised with O. Bucklin
2018	Jacob Russo: <b>Integrated Architectural Water Systems</b> Supervisors: A. Menges, J. Knippers   co-advised with D. Wood

## TEACHING

University of Stuttgart, M.Sc. ITECH  
**Architectural Biomimetics** | Seminar Instructor  
ca. 10 students (master)  
Winter 2021-22 / Summer 2023 / Winter 2023-24 – Co-taught with A. Körner and M. Mühlich

University of Stuttgart, M.Sc. ITECH  
**Thesis Prep. and Research Structure** | Seminar Instructor  
ca. 20 students (master)  
Winter 2018-19 / 2019-20 / 2020-21 / 2021-22 – Co-taught with D. Wood, K. Dierichs, S. Leder and K. Rinderspacher

BMBF, Girls' Day  
**Robots that Build, Feel, and Interact with Humans** | 1-day Workshop Instructor  
ca. 15 students (high school)  
2021 / 2022 – Co-taught with Y. Tahouni, E. Sahin, K. Rinderspacher, L. Orozco, D. Wood

BMBF, Girls' Day  
**Selbst-formendes Holz: Material science meets architecture** | 1-day Workshop Instructor  
ca. 15 students (high school)  
2021 / 2022 – Co-taught with L. Kiesewetter and D. Wood

Tongji University, Inclusive FUTURES  
**Autonomous Origami** | 5-day Workshop Instructor  
ca. 20 students (undergrad, master, PhD)  
2021 – Co-taught with Y. Tahouni and D. Wood

ABK Stuttgart, Living Matter Industrial Design Studio  
**Paper Programming** | 2-day Workshop Instructor  
ca. 15 students (undergrad)  
2020 – Co-taught with Y. Tahouni

ACADIA 2020, Distributed Proximities  
**DualAdditive Manufacturing** | 2-day Workshop Instructor  
ca. 15 students (undergrad, master, PhD)  
2020 – Co-taught with J. Wagner, D. Wood, C. Hua, L. Orozco

Tongji University, Digital FUTURES  
**Programming Material Intelligence** | 9-day Workshop Instructor  
ca. 15 students (undergrad, master, PhD)  
2018 – Co-taught with D. Wood