

# Zhao MA

COMPUTATIONAL DESIGNER · COMPUTER SCIENTIST · ENGINEER · ARCHITECT

Chair of Being Alive, ETH Zurich

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“It was the best of times, it was the worst of times.”

## 🎓 Education

Sep./2017–Sep./2020	<b>ETH Zurich (Swiss Federal Institute of Technology)</b> <b>Doctor of Sciences</b> <i>Institute of Technology in Architecture</i> <i>(to recruiters: 90% computer science, but located in arch. department for Disney-ETH collaboration.)</i>	Zürich, Switzerland
Sep./2013–Jun./2017	<b>Massachusetts Institute of Technology (MIT)</b> <b>Master of Architecture</b> <i>School of Architecture and Planning</i> <b>Master of Engineering (High Performance Structure)</b> <i>School of Civil &amp; Environmental Engineering</i>	Cambridge, MA, US
Sep./2008–Jun./2012	<b>Beihang University (Beijing University of Aeronautics and Astronautics)</b> <b>Bachelor of Engineering</b> <i>Honors College School (School of Advanced Engineering) – Industrial Design</i> <i>Honors College School (School of Advanced Engineering) – Physics</i> <b>Bachelor of Arts</b> <i>School of Foreign Languages – English Literature</i>	Beijing, China

## 📖 Academic Experience

RESEARCH ASSOCIATE 02/2021–now	<b>Chair of Being Alive</b> <ul style="list-style-type: none"><li>Developed the BeingAliveLanguage visualization system for environmental data visualization.</li><li>Developed various algorithms to facilitate the design tasks of various projects.</li></ul>	ETH Zürich, Switzerland
PH.D. RESEARCHER 09/2017–08/2020	<b>Disney Research   Zürich</b> <ul style="list-style-type: none"><li>Developed a design &amp; optimization system for fabricating large scale rebar frames with ABB robot.</li><li>Developed a design &amp; optimization system for making clay sculpture with Universal Robot.</li></ul>	Zürich, Switzerland
RESEARCH ASSISTANT 04/2017–08/2017	<b>MIT Media Lab</b> <ul style="list-style-type: none"><li>Developed origami-based fabric knitting simulation.</li><li>Developed geometric transformation rules for a specific type of linkage-structure.</li></ul>	MIT, Cambridge, MA, US
RESEARCH ASSISTANT 01/2016–03/2017	<b>Web Development for Prof. Anne W. Spirn</b> <ul style="list-style-type: none"><li>Developed documentary website “Marnas” (MIT Library Funded).</li><li>Redeveloped varies website for Prof. Anne W. Spirn.</li></ul>	MIT, Cambridge, MA, US
RESEARCH ASSISTANT 04/2015–06/2017	<b>Digital Structure Group</b> <ul style="list-style-type: none"><li>Researched on Topological Interlocking System.</li><li>Researched on Drone-Based Additive Manufacturing (Casting &amp; 3D printing).</li></ul>	MIT, Cambridge, MA, US

RESEARCHER <i>05/2015-08/2015</i>	<b>Block Research Group</b> • Conducted a research on large deformation problems on elastic material. • Analysed the design strategy of Traversina bridge. • Implemented parametric graphic statics for Traversina bridge analysis.	<i>ETH, Zürich, Switzerland</i>
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REPRESENTATIVE <i>07/2010</i>	<b>2010 Asian Science Camp</b> • Representative of China (1 of 22 undergraduate) in natural science subject.	<i>Mumbai, India</i>
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## Working Experience

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COMPUTING CONSULTANT <i>10/2020-now</i>	<b>OPT Industries Inc.</b> • Developed an interactive system for designing meta-material (both frontend GUI and backend algorithms). • Developed FEM analysis algorithm for fibre-intensive polymer 3DP application. • Developed lattice support generation algorithm for fibre-intensive polymer 3DP application.	<i>(remote) Boston, MA, US</i>
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STRUCTURE CONSULTANT <i>06/2016-08/2016</i>	<b>Ferentinos Design</b> • Conducted FEM structural analysis & optimization for lectern design.	<i>Boston, MA, US</i>
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JUNIOR ARCHITECT <i>09/2012-06/2013</i>	<b>Tianjin Architecture Design Institute, Binhai</b> • Cooperated with BIG as LDI on Rose Rock International Financial Centre. • Co-designed Information Centre in Tanggu, Tianjin.	<i>Tianjin, China</i>
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DESIGN CONSULTANT <i>06/2011-07/2011</i>	<b>Beijing Always Flying Technology Co., Ltd.</b> • Designed structure and visualized DB-1 UAV for Autodesk's World Successful Cases.	<i>Beijing, China</i>
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## Teaching Experience

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LECTURER <i>06/2021-now</i>	<b>Master of Science in Landscape Architecture</b> • Principal lecturer of 061-0113-00L Digital Design Methods I. • Co-taught class 063-0704-23L Cartographies of Living Systems: A Critical Approach. • Co-taught class 061-0141-22L Foundation Studio I.	<i>ETH, Zürich, Switzerland</i>
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LECTURER <i>09/2018-12/2018</i>	<b>Master of Advanced Studies in Architecture and Digital Fabrication</b> • Taught computational methods and parametric tools for design synthesis.	<i>ETH, Zürich, Switzerland</i>
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TEACHING ASSISTANT <i>09/2016-12/2016</i>	<b>4.215J/11.306 Sensing Place</b> • Co-taught photography class with Prof. Anne W. Spirn. • Taught web development for personal photography website.	<i>MIT, Cambridge, MA, US</i>
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TEACHING ASSISTANT <i>12/2015-01/2016</i>	<b>4.109 2016: The Architect's Foundry</b> • Researched on and instructed aluminium casting, lost-foam casting.	<i>MIT, Cambridge, MA, US</i>
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RPL ASSISTANT <i>02/2014-01/2016</i>	<b>Rapid Prototyping Lab</b> • Conducted 3/4 axis CNC milling research. • Conduct general fabrication job and provide guidance for students.	<i>MIT, Cambridge, MA, US</i>
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## Selected Honors & Awards

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07/2021	DigitalFUTURES 2021 "InclusiveFUTURES", YOUNG Award (1 of 4 recipients)	Shanghai, China
08/2018	ASLA Professional Awards, Honor Award	MIT, Cambridge, MA, US
04/2017	MIT Graduate School Leadership Fellow,	MIT, Cambridge, MA, US
05/2016	Marvin E.Goody Award, recipient	MIT, Cambridge, MA, US
02/2016	Bill Mitchell Design Award, recipient	MIT, Cambridge, MA, US
01/2016	Make Me++ Hackathon (DDI 2016), Top 1 winner	MIT, Cambridge, MA, US
12/2015	Harold Horowitz (1951) Student Research Fund, recipient	MIT, Cambridge, MA, US
06/2015	Zeno Karl Schindler Foundation Grant, recipient	ETH,Zürich, Switzerland
2013-2017	MIT Merit Scholarship (8 semester Tuition Grant), recipient	MIT, Cambridge, MA, US
11/2011	Scholarship of scientific innovation, 1st Prize	Beihang Uni., Beijing, China
12/2008	Scholarship of excellent freshmen, 1st Prize	Beihang Uni., Beijing, China

## Selected Publications

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10/2022	<b>Beingalivelanguage: Visualizing Soil System from a Design Perspective (preprint, under review)</b> Ma, Z., Gali-Izard, T., <i>SSRN</i> , 2022.
06/2021	<b>Stylized Robotic Clay Sculpting</b> Ma, Z., Duenser, S., Schumacher, C., Rust, R., Bächer M., Gramazio, F., Kohler, F., Coros, S., <i>Computers &amp; Graphics</i> , 2020.
11/2020	<b>RobotSculptor: Artist-Directed Robotic Sculpting of Clay</b> Ma, Z., Duenser, S., Schumacher, C., Rust, R., Bächer M., Gramazio, F., Kohler, F., Coros, S., <i>Symposium of Computational Fabrication</i> , 2020.
06/2020	<b>Designing Robotically-Constructed Metal Frame Structures</b> Ma, Z., Walzer,A., Schumacher, C., Rust, R., Gramazio, F., Kohler, F., Bächer, M., <i>Computer Graphics Forum (Eurographics Special Issue)</i> , Vol:39-2, 2020.
08/2018	<b>KinetiX – designing auxetic-inspired deformable material structures</b> Ou, J., Ma, Z., Peters, J., Dai, S., Vlavianos, N., Ishii, H., <i>Computers &amp; Graphics</i> , Vol:75, 72-81, 2018.
09/2016	<b>Grammar-based Rhombic Polyhedral Multi-Directional Joints and Corresponding Lattices</b> Ma, Z., Latteur, P., and Mueller, C., <i>Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium 2016</i> .
08/2015	<b>Drone-Based Additive Manufacturing of Architectural Structures</b> Lateur, P., Goessens, S., Breton, J.S., Leplat, J., Ma, Z. and Mueller, C., <i>Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium 2015</i> .
08/2011	<b>Elasticity analogy of plane incompressible inviscid flows</b> Ma Zhao, Jiang Chi-ping. <i>Mechanics in Engineering</i> , 2011, 33(4): 63-65.

## Public Design Tools

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03/2022	<b>IG-Mesh</b> <a href="https://github.com/xarthurx/IG-Mesh">https://github.com/xarthurx/IG-Mesh</a> <i>A mesh processing library on the Rhino/Grasshopper platform.</i>
08/2022	<b>BeingAliveLanguage</b> <a href="https://beingalivelanguage.arch.ethz.ch">https://beingalivelanguage.arch.ethz.ch</a> <i>A environmental-related diagrammatic data visualization tool on the Rhino/Grasshopper platform.</i>

## Skills

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### Languages

Chinese (Native), English

### Programming Language (orderly)

C++, Python, C#, Javascript, HTML, CSS

### 3D modelling & Data manipulation

Rhino/Grasshopper, Houdini

### Structural Analysis

Karamba, GSA

### 3 & 4-Axis Machining

Shobot 3 & 4 Router, Onsrud, OMAX WaterJET

### 6-Axis Robot

Kuka KR Agilus, ABB IRB 4600, Universal Robot

## Thesis Advisory

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06/2019-09/2019

### Robotic Claygraphy

Student: Ying-Shiuan Chen

*Zürich, Switzerland*

06/2018-09/2018

### Rebar Assemblies: A framework for the generation of stress-aligned rebar layouts

Student: Rafael Pastrana Jimenez Armando (*currently a Ph.D at Princeton Univ.*)

*Zürich, Switzerland*

## Exhibitions

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06/2019

### DESIGNLABOR: MATERIAL + TECHNIK

*Museum für Gestaltung, Zürich*