

# Zhao MA

LECTURER · COMPUTATIONAL DESIGNER · COMPUTER SCIENTIST · ARCHITECT & ENGINEER

Chair of Being Alive, ETH Zürich

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## 🎓 Education

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|----------------------|--|---------------------|
| Sep./2017–Sep./2020  | <b>ETH Zurich</b><br><b>Doctor of Science</b><br>(to recruiters: 90% CS, led by DisneyResearch, located in DARCH due to collaboration reasons.)<br><i>Institute of Technology in Architecture</i>  | Zürich, Switzerland |
| Sep./2013–Jun./2017  | <b>Massachusetts Institute of Technology (MIT)</b><br><b>Master of Architecture</b><br><i>School of Architecture and Planning</i><br><b>Master of Engineering (High Performance Structure)</b><br><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><br><b>Bachelor of Engineering</b><br><i>Honors College School (School of Advanced Engineering) – Industrial Design</i><br><i>Honors College School (School of Advanced Engineering) – Physics</i><br><b>Bachelor of Arts</b><br><i>School of Foreign Languages – English Literature</i> | Beijing, China      |
| Apr./2022 (expected) | <b>Reinforcement Learning Specialization (Coursera)</b><br><i>Tutor: Adam White Four specialized courses in reinforcement learning.</i>  | Online              |
| Mar./2018            | <b>Machine Learning (Stanford Online   Coursera)</b><br><i>Tutor: Andrew Ng Credential ID: D9LAG4JW4593</i>  | Online              |

## 🏢 Academic Experience

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|--|---|-------------------------|
| RESEARCH ASSOCIATE<br>02/2021–now      | <b>Chair of Being Alive</b><br>• Developed computational drawing systems for environmental and biological system: root, tree, soil.<br>• Developed simulation tools for agriculture and ecological system: grazing, plant companion, crop rotation. | ETH Zurich, Switzerland |
| DOCTORAL RESEARCHER<br>09/2017–08/2020 | <b>Disney Research</b><br>• Developed a design & optimization system for fabricating large scale rebar frames with ABB robot.<br>• Developed a design & optimization system for making clay sculpture with Universal Robot.                         | Zürich, Switzerland     |
| RESEARCH ASSISTANT<br>04/2017–08/2017  | <b>MIT Media Lab</b><br>• Developed origami-based fabric knitting simulation.<br>• Developed geometric transformation rules for a specific type of linkage-structure.   | MIT, Cambridge, MA, US  |
| RESEARCH ASSISTANT<br>01/2016–03/2017  | <b>Web Development for Prof. Anne W. Spirn</b><br>• Developed documentary website “Marnas” (MIT Library Funded).<br>• Redeveloped various website for Prof. Anne W. Spirn.  | MIT, Cambridge, MA, US  |
| RESEARCH ASSISTANT                     | <b>Digital Structure Group</b>  | MIT, Cambridge, MA, US  |

|                                       |   |                          |
|---------------------------------------|---|--------------------------|
| 04/2015-06/2017                       | <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>   |                          |
| RESEARCHER<br>05/2015-08/2015         | <b>Block Research Group</b> <ul style="list-style-type: none"> <li>• Conducted a research on large deformation problems on elastic material.</li> <li>• Analysed the design strategy of Traversina bridge.</li> <li>• Implemented parametric graphic statics for Traversina bridge analysis.</li> </ul> | ETH, Zurich, Switzerland |
| RESEARCH ASSISTANT<br>06/2014-08/2014 | <b>Free-Form Concrete Design &amp; Fabrication</b> <ul style="list-style-type: none"> <li>• Conducted an independent research on fabric formwork casting for Prof. John Fernandez.</li> </ul>   | MIT, Cambridge, MA, US   |
| REPRESENTATIVE<br>07/2010             | <b>2010 Asian Science Camp</b> <ul style="list-style-type: none"> <li>• Representative of China (1 of 22 undergraduate) in natural science subject.</li> </ul>  | Mumbai, India            |

## Teaching Experience

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|---------------------------------------|--|--------------------------|
| LECTURER<br>06/2021-now               | <b>Master of Science in Landscape Architecture</b> <ul style="list-style-type: none"> <li>• Co-taught 061-0113-00L Digital Design Methods I.</li> <li>• Co-taught 061-0142-22L Foundation Studio II.</li> </ul>  | ETH, Zurich, Switzerland |
| LECTURER<br>09/2018-12/2018           | <b>Master of Advanced Studies in Architecture and Digital Fabrication</b> <ul style="list-style-type: none"> <li>• Taught computational methods and parametric tools for design synthesis.</li> </ul>            | ETH, Zurich, Switzerland |
| TEACHING ASSISTANT<br>09/2016-12/2016 | <b>4.215J/11.306 Sensing Place</b> <ul style="list-style-type: none"> <li>• Co-taught photography class with Prof. Anne W. Spirn.</li> <li>• Taught web development for personal photography website.</li> </ul> | MIT, Cambridge, MA, US   |
| TEACHING ASSISTANT<br>12/2015-01/2016 | <b>4.109 2016: The Architect's Foundry</b> <ul style="list-style-type: none"> <li>• Researched on and instructed aluminium casting, lost-foam casting.</li> </ul>  | MIT, Cambridge, MA, US   |
| RPL ASSISTANT<br>02/2014-01/2016      | <b>Rapid Prototyping Lab</b> <ul style="list-style-type: none"> <li>• Conducted 3/4 axis CNC milling research.</li> <li>• Conduct general fabrication job and provide guidance for students.</li> </ul>          | MIT, Cambridge, MA, US   |

## Working Experience

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|---|---|----------------|
| COMPUTATION CONSULTANT<br>10/2020-now   | <b>OPT Industries (MIT Media Lab Startup)</b> <ul style="list-style-type: none"> <li>• Managed the collaboration of material simulation and testing team for an ongoing commercial project.</li> <li>• Leading the design of specified material simulation toolkit for ongoing research projects.</li> <li>• Led the design &amp; implementation of general material design toolkit for material micro-structures.</li> </ul> | Boston, MA, US |
| STRUCTURE CONSULTANT<br>06/2016-08/2016 | <b>Ferentinos Design</b> <ul style="list-style-type: none"> <li>• Conducted FEM structural analysis &amp; optimization for lectern design.</li> </ul>   | Boston, MA, US |
| JUNIOR ARCHITECT<br>09/2012-06/2013     | <b>Tianjin Architecture Design Institute, Binhai</b> <ul style="list-style-type: none"> <li>• Cooperated with BIG as LDI on Rose Rock International Financial Centre.</li> <li>• Co-designed Information Centre in Tanggu, Tianjin.</li> </ul>  | Tianjin, China |
| DESIGN CONSULTANT<br>06/2011-07/2011    | <b>Beijing Always Flying Technology Co., Ltd.</b> <ul style="list-style-type: none"> <li>• Designed structure and visualized DB-1 UAV for Autodesk's World Successful Cases.</li> </ul>   | Beijing, China |

## Selected Honors & Awards

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

## Selected Publications

|         |   |
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| 06/2021 | <b>Stylized Robotic Clay Sculpting</b><br>Ma, Z., Duenser, S., Schumacher, C., Rust, R., Bächer M., Gramazio, F., Kohler, F., Coros, S.,<br><i>Computers &amp; Graphics, 2021.</i>  |
| 11/2020 | <b>RobotSculptor: Artist-Directed Robotic Sculpting of Clay</b><br>Ma, Z., Duenser, S., Schumacher, C., Rust, R., Bächer M., Gramazio, F., Kohler, F., Coros, S.,<br><i>Symposium of Computational Fabrication, 2020.</i>   |
| 06/2020 | <b>Designing Robotically-Constructed Metal Frame Structures</b><br>Ma, Z., Walzer,A., Schumacher, C., Rust, R., Gramazio, F., Kohler, F., Bächer, M.,<br><i>Computer Graphics Forum (Eurographics Special Issue), Vol:39-2, 2020.</i>                               |
| 08/2018 | <b>KinetiX – designing auxetic-inspired deformable material structures</b><br>Ou, J., Ma, Z., Peters, J., Dai, S., Vlavianos, N., Ishii, H.,<br><i>Computers &amp; Graphics, Vol:75, 72-81, 2018.</i>   |
| 09/2016 | <b>Grammar-based Rhombic Polyhedral Multi-Directional Joints and Corresponding Lattices</b><br>Ma, Z., Latteur, P., and Mueller, C.,<br><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><br>Lateur, P., Goessens, S., Breton, J.S., Leplat, J., Ma, Z. and Mueller, C.,<br><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><br>Ma Zhao, Jiang Chi-ping.<br><i>Mechanics in Engineering, 2011, 33(4): 63-65.</i>  |

## Skills

### Programming Language (orderly)

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

### 3 & 4-Axis Machining

Shopbot 3 & 4 Router, Onsrud, OMAX WaterJET

### 3D Printing

STL (FormLabs), PolyJet (Stratasys Connex Objet), Binder Jet (Z-Corp),  
General FDM printer

### 3D modelling (orderly)

Rhino, Houdini, ArchiCAD, SolidWorks

### 6-Axis Robot

Kuka KR Agilus, ABB IRB 4600, Universal Robot

### Languages

Chinese (Native), English

|                 |  |                     |
|-----------------|--|---------------------|
| 06/2019-09/2019 | <b>Robotic Claygraphy</b><br>Student: Ying-Shiuan Chen   | Zürich, Switzerland |
| 06/2018-09/2018 | <b>Rebar Assemblies: A framework for the generation of stress-aligned rebar layouts</b><br>Student: Rafael Pastrana Jimenez Armando ( <i>currently a Ph.D at Princeton Univ.</i> ) | Zürich, Switzerland |

## Exhibitions & Invited Talks

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| 07/2021 | DigitalFUTURES 2021 Closing Ceremony Award Wining Talk | Online                        |
| 06/2019 | DESIGNLABOR: MATERIAL + TECHNIK                        | Museum für Gestaltung, Zürich |

## Open-Source Library

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|---------|---|
| 02/2022 | <b>IG-Mesh</b><br>A low-level mesh processing plugin for the Rhino & Grasshopper platform.<br><a href="https://github.com/xarthurx/IG-Mesh">https://github.com/xarthurx/IG-Mesh</a> |
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