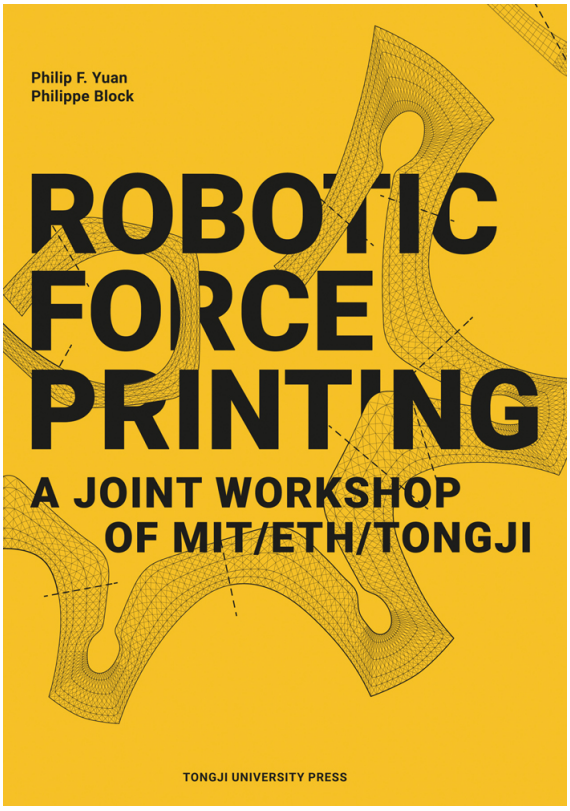
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Robotic Force Printing

A Joint Workshop of MIT/ETH/TJ

Philip F. Yuan

Philippe Block

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- This book is a documentation of the joint workshop of MIT, ETH and Tongji University, which integrates COMPAS and FURobotic to explore the advances in additive manufacturing and robotic fabrication

About ten years ago, Professor Stanford Anderson from MIT initiated the joint-workshop program with Tongji University in Shanghai and has continued his decade-long collaborations with us since then. The Robotic Force Printing Workshop this year can be seen as a respectful tribute and continuity to such tradition.

Philip F. Yuan, a professor of Tongji University and the founder of Fab-Union Technology was in collaboration with Professor Philippe Block of ETH throughout the 23-day workshop. In addition to the design-fabrication studios, the workshop also consists of three field trips in association with one academic forum, four public lectures and a series of teaching modules on fundamental concepts of COMPAS and FURobotic to explore the integration between novel structural designs and the advances in additive manufacturing and robotic fabrication.

Contents:
Introduction – Form Following Robotic Force: Philip F. Yuan
Preface- Digital Master Builders: Exploring Strength Through Geometry: Philippe Block
Precedents – Computation & Digital Fabrication-Enabled Geometrical: Gene Ting-Chun Kao, Mark Kam-Ming Tam
– Bending-Active Formwork For Shell Structures Based On 3D-Printing Technology: A Pre-Research: Xiang Wang
– Programming Of Robotic Fabrication: Liming Zhang
Methodology – Preliminary Groups: – Snake Rock Pavilion – Shell O – Fractal Shell – Folded Bridge – Eight-Legged Shell – White Hill – The Ribbon
Final Fabrication Works – Bending Shell – Fu Bridge

Philip F. Yuan is Professor of the College of Architecture and Urban Planning (CAUP) at Tongji University, Visiting Professor at MIT, Council Member of Architects Sector, Virtual and Automated Construction Sector as well as Academic Committee of Computational Design Sector at Architectural Society of China; Director of Academic Committee of Shanghai Digital Fabrication Engineering Technology Center, Founder of Archi-Union Architects and Fab-Union Technology. His research mainly focuses on the field of performance-based architectural tectonics, the application of robotic fabrication equipment as well as developments of robotic fabrication technologies and is able to realise many of his research theories in architectural practices.

Philippe Block is Professor at the Institute of Technology in Architecture at ETH Zurich. Co-director of the Block Research Group (BRG). Director of the Swiss National Centre of Competence in Research (NCCR) in Digital Fabrication. Founding partner of Ochsendorf DeJong & Block (ODB Engineering). Research at the BRG focuses on computational form finding, optimisation and construction of curved surface structures, specialising in unreinforced masonry vaults and concrete shells. Within the NCCR, BRG researchers develop innovative structurally informed bespoke prefabrication strategies and novel construction paradigms employing digital fabrication. With the BRG and ODB Engineering, Block applies his research into practice on the structural assessment of historic monuments in unreinforced masonry and the design and engineering of novel shell structures.

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