

Stanford



Martin Fischer

Kumagai Professor in the School of Engineering and Senior Fellow at the Precourt Institute for Energy

Civil and Environmental Engineering

CONTACT INFORMATION

- **Administrator**

Sharyn Nantuna - Program Administrator

Email snantuna@stanford.edu

Tel (650) 723-4447

Bio

BIO

Professor Fischer's research goals are to improve the productivity of project teams involved in designing, building, and operating facilities and to enhance the sustainability of the built environment. His work develops the theoretical foundations and applications for virtual design and construction (VDC). VDC methods support the design of a facility and its delivery process and help reduce the costs and maximize the value over its lifecycle. His research has been used by many small and large industrial government organizations around the world.

ACADEMIC APPOINTMENTS

- Professor, Civil and Environmental Engineering

ADMINISTRATIVE APPOINTMENTS

- Director, Center for Integrated Facility Engineering - CIFE, (2001- present)

HONORS AND AWARDS

- Member, National Academy of Construction (2018)
- Peurifoy Construction Research Award, ASCE (2017)
- Honorary Senior Fellow, Design Futures Council (2006)
- Best Paper Award, Artificial Intelligence in Design (2000)
- Eugene L. Grant Award for Excellence in Teaching, Eugene L. Grant (1999)
- Hofer Prize for Excellence in Undergraduate Writing, Stanford University (1997,1998, 2005)
- Top 25 Newsmaker, Engineering News Record (1996)

PROFESSIONAL EDUCATION

- PhD, Stanford University (1991)

LINKS

- <http://www.stanford.edu/~fischer>: <http://www.stanford.edu/~fischer>

Teaching

COURSES

2018-19

- Artificial Intelligence Applications in the AEC Industry: CEE 329 (Spr)
- Autonomous Vehicles Studio: CEE 326 (Aut)
- Industrialized Construction: CEE 324 (Spr)
- Integrated Management of Fabrication and Construction: CEE 241P (Win)
- Managing Fabrication and Construction: CEE 241 (Aut)
- Managing Sustainable Building Projects: CEE 100 (Aut)
- Virtual Design and Construction: CEE 341 (Win)

2017-18

- Artificial Intelligence Applications in the AEC Industry: CEE 329 (Spr)
- Autonomous Vehicle Frameworks Developing and Applying Comparison Metrics: CEE 326 (Aut)
- Industrialized Construction: CEE 324 (Win)
- Integrated Management of Fabrication and Construction: CEE 241P (Spr)
- Managing Fabrication and Construction: CEE 241 (Win)
- Managing Sustainable Building Projects: CEE 100 (Aut)
- Seminar on Artificial Intelligence Applications in the AEC Industry: CEE 329S (Spr)
- Virtual Design and Construction: CEE 341 (Spr)

2016-17

- Design and Innovation for the Circular Economy: CEE 144 (Spr)
- Industrialized Construction: CEE 324 (Win)
- Integrated Management of Fabrication and Construction: CEE 241P (Win)
- Introduction to Real Estate Development: CEE 248 (Spr)
- Managing Fabrication and Construction: CEE 241 (Aut)
- Managing Sustainable Building Projects: CEE 100 (Aut)

2015-16

- Design and Innovation for the Circular Economy: CEE 144 (Spr)
- Industrialized Construction: CEE 324 (Spr)
- Integrated Management of Fabrication and Construction: CEE 241P (Win)
- Managing Fabrication and Construction: CEE 241 (Aut)
- Managing Sustainable Building Projects: CEE 100 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Chris Ford

Doctoral Dissertation Advisor (AC)

Forest Peterson

Master's Program Advisor

Brandon Jacobs

Doctoral (Program)

Cynthia Brosque, Dave Dixon, Hesam Hamledari, Forest Peterson

Publications

PUBLICATIONS

- **Parametric analysis of design stage building energy performance simulation models** *ENERGY AND BUILDINGS*
Shiel, P., Tarantino, S., Fischer, M.
2018; 172: 78–93
- **Construction Parts in Building Projects: Definition and Case Study** *JOURNAL OF MANAGEMENT IN ENGINEERING*
Zhao, N., Kam, C., Lo, J. Y., Kim, J., Fischer, M.
2018; 34 (4)
- **Guiding building professionals in selecting additive manufacturing technologies to produce building components** *MATERIALS TODAY COMMUNICATIONS*
Mrazovic, N., Baumers, M., Hague, R., Fischer, M.
2018; 15: 199–202
- **An analytical method to estimate the total installed cost of structural steel building frames during early design** *JOURNAL OF BUILDING ENGINEERING*
Barg, S., Flager, F., Fischer, M.
2018; 15: 41–50
- **4D BEYOND CONSTRUCTION: SPATIO-TEMPORAL AND LIFE-CYCLIC MODELING AND VISUALIZATION OF INFRASTRUCTURE DATA** *JOURNAL OF INFORMATION TECHNOLOGY IN CONSTRUCTION*
Zhang, Z., Hamledari, H., Billington, S., Fischer, M.
2018; 23: 285–304
- **Field Study on the Connection between BIM and Daily Work Orders** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT*
Song, M. H., Fischer, M., Theis, P.
2017; 143 (5)
- **Learning movement patterns of the occupant in smart home environments: an unsupervised learning approach** *JOURNAL OF AMBIENT INTELLIGENCE AND HUMANIZED COMPUTING*
Zhang, T., Fu, W., Ye, J., Fischer, M.
2017; 8 (1): 133-146
- **A method to estimate climate-critical construction materials applied to seaport protection** *GLOBAL ENVIRONMENTAL CHANGE-HUMAN AND POLICY DIMENSIONS*
Becker, A., Chase, N. T., Fischer, M., Schwegler, B., Mosher, K.
2016; 40: 125-136
- **BIM-based decision-support method for master planning of sustainable large-scale developments** *AUTOMATION IN CONSTRUCTION*
Kim, J. I., Kim, J., Fischer, M., Orr, R.
2015; 58: 95-108
- **Semiautomated Scaffolding Planning: Development of the Feature Lexicon for Computer Application** *JOURNAL OF COMPUTING IN CIVIL ENGINEERING*
Kim, J., Fischer, M., Kunz, J., Levitt, R.
2015; 29 (5)
- **Ranking appliance energy efficiency in households: Utilizing smart meter data and energy efficiency frontiers to estimate and identify the determinants of appliance energy efficiency in residential buildings** *ENERGY AND BUILDINGS*
Kavousian, A., Rajagopal, R., Fischer, M.
2015; 99: 220-230

- **Towards seaport resilience for climate change adaptation: Stakeholder perceptions of hurricane impacts in Gulfport (MS) and Providence (RI)** *PROGRESS IN PLANNING*
Becker, A. H., Matson, P., Fischer, M., Mastrandrea, M. D.
2015; 99: 1-49
- **Automated updating of space design requirements connecting user activities and space types** *AUTOMATION IN CONSTRUCTION*
Kim, T. W., Kim, Y., Cha, S. H., Fischer, M.
2015; 50: 102-110
- **Ontology for Representing Building Users' Activities in Space-Use Analysis** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT*
Kim, T. W., Fischer, M.
2014; 140 (8)
- **Fully Constrained Design: A general and scalable method for discrete member sizing optimization of steel truss structures** *COMPUTERS & STRUCTURES*
Flager, F., Soremekun, G., Adya, A., Shea, K., Haymaker, J., Fischer, M.
2014; 140: 55-65
- **Sharing of Temporary Structures: Formalization and Planning Application** *AUTOMATION IN CONSTRUCTION*
Kim, J., Fischer, M., Kunz, J., Levitt, R.
2014; 43: 187-194
- **Automated Generation of User Activity-Space Pairs in Space-Use Analysis** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT*
Kim, T. W., Fischer, M.
2014; 140 (5)
- **CAD-Centric Attribution Methodology for Multidisciplinary Optimization Environments: Enabling Parametric Attribution for Efficient Design Space Formulation and Evaluation** *JOURNAL OF COMPUTING IN CIVIL ENGINEERING*
Welle, B., Haymaker, J., Fischer, M., Bazjanac, V.
2014; 28 (2): 284-296
- **A bi-level hierarchical method for shape and member sizing optimization of steel truss structures** *COMPUTERS & STRUCTURES*
Flager, F., Adya, A., Haymaker, J., Fischer, M.
2014; 131: 1-11
- **A method to automate look-ahead schedule (LAS) generation for the finishing phase of construction projects** *AUTOMATION IN CONSTRUCTION*
Dong, N., Fischer, M., Haddad, Z., Levitt, R.
2013; 35: 157-173
- **A knowledge-based framework for automated space-use analysis** *AUTOMATION IN CONSTRUCTION*
Kim, T. W., Rajagopal, R., Fischer, M., Kam, C.
2013; 32: 165-176
- **Determinants of residential electricity consumption: Using smart meter data to examine the effect of climate, building characteristics, appliance stock, and occupants' behavior** *ENERGY*
Kavousian, A., Rajagopal, R., Fischer, M.
2013; 55: 184-194
- **Application of life-cycle assessment to early stage building design for reduced embodied environmental impacts** *BUILDING AND ENVIRONMENT*
Basbagill, J., Flager, F., Lepech, M., Fischer, M.
2013; 60: 81-92
- **BIM-Centric Daylight Profiler for Simulation (BDP4SIM): A methodology for automated product model decomposition and recombination for climate-based daylighting simulation** *BUILDING AND ENVIRONMENT*
Welle, B., Rogers, Z., Fischer, M.
2012; 58: 114-134
- **A study of virtual design and construction implementation and benefits using a bayesian approach** *REVISTA DE LA CONSTRUCCION*
Rischmoller, L., Fischer, M., Kunz, J.
2012; 11 (3): 74-87

- **A genetic algorithm-based method for look-ahead scheduling in the finishing phase of construction projects** *ADVANCED ENGINEERING INFORMATICS*
Dong, N., Ge, D., Fischer, M., Haddad, Z.
2012; 26 (4): 737-748
- **A method to compare simulated and measured data to assess building energy performance** *BUILDING AND ENVIRONMENT*
Maile, T., Bazjanac, V., Fischer, M.
2012; 56: 241-251
- **Method to produce field instructions from product and process models for cast-in-place concrete operations** *AUTOMATION IN CONSTRUCTION*
Mourgues, C., Fischer, M., Kunz, J.
2012; 22: 233-246
- **SUSTAINABILITY RATING SYSTEMS** *JOURNAL OF GREEN BUILDING*
Mehdizadeh, R., Fischer, M.
2012; 7 (2): 177-199
- **GENERATING A NETWORK OF INFORMATION DEPENDENCIES AUTOMATICALLY** *14th International Design Structure Matrix Conference*
Senescu, R. R., Head, A. W., Steinert, M., Fischer, M. A.
CARL HANSER VERLAG.2012: 139–152
- **Climate change impacts on international seaports: knowledge, perceptions, and planning efforts among port administrators** *CLIMATIC CHANGE*
Becker, A., Inoue, S., Fischer, M., Schwegler, B.
2012; 110 (1-2): 5-29
- **Research in Visualization Techniques for Field Construction** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT-ASCE*
Kamat, V. R., Martinez, J. C., Fischer, M., Golparvar-Fard, M., Pena-Mora, F., Savarese, S.
2011; 137 (10): 853-862
- **Can we grow buildings? Concepts and requirements for automated nano- to meter-scale building** *ADVANCED ENGINEERING INFORMATICS*
Rebolj, D., Fischer, M., Endy, D., Moore, T., Sorgo, A.
2011; 25 (2): 390-398
- **Teaching construction project management with BIM support: Experience and lessons learned** *AUTOMATION IN CONSTRUCTION*
Peterson, F., Hartmann, T., Fruchter, R., Fischer, M.
2011; 20 (2): 115-125
- **Closure to "Areas of Application for 3D and 4D Models on Construction Projects" by Timo Hartmann, Ju Gao, and Martin Fischer** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT-ASCE*
Hartmann, T., Gao, J., Fischer, M.
2010; 136 (8): 932-934
- **Implementing information systems with project teams using ethnographic-action research** *ADVANCED ENGINEERING INFORMATICS*
Hartmann, T., Fischer, M., Haymaker, J.
2009; 23 (1): 57-67
- **Integrated Scope-Schedule-Cost Model System for Civil Works** *1st International Conference on Improving Construction and Use Through Integrated Design Solutions*
Peterson, F., Fischer, M., Tutti, T.
TECHNICAL RESEARCH CENTRE FINLAND.2009: 176–199
- **Areas of application for 3D and 4D models on construction projects** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT-ASCE*
Hartmann, T., Gao, J., Fischer, M.
2008; 134 (10): 776-785
- **Quantitative analysis of workflow, temporary structure usage, and productivity using 4D models** *AUTOMATION IN CONSTRUCTION*
Jongeling, R., Kim, J., Fischer, M., Mourgues, C., Olofsson, T.
2008; 17 (6): 780-791
- **Formalization of construction Sequencing rationale and classification mechanism to support rapid generation of Sequencing alternatives** *JOURNAL OF COMPUTING IN CIVIL ENGINEERING*

- Koo, B., Fischer, M., Kunz, J.
2007; 21 (6): 423-433
- **A formal identification and re-sequencing process for developing sequencing alternatives in CPM schedules** *AUTOMATION IN CONSTRUCTION*
Koo, B., Fischer, M., Kunz, J.
2007; 17 (1): 75-89
 - **Supporting the constructability review with 3D/4D models** *BUILDING RESEARCH AND INFORMATION*
Hartmann, T., Fischer, M.
2007; 35 (1): 70-80
 - **Formalizing construction knowledge for concurrent performance-based design** *13th International Workshop of the European-Group-for-Intelligent-Computing-in-Engineering*
Fischer, M.
SPRINGER-VERLAG BERLIN.2006: 186–205
 - **Capitalizing on early project decision-making opportunities to improve facility design, construction, and life-cycle performance - POP, PM4D, and decision dashboard approaches** *19th International Symposium on Automation and Robotics in Construction*
Kam, C., Fischer, M.
ELSEVIER SCIENCE BV.2004: 53–65
 - **Perspectors: composable, reusable reasoning modules to construct an engineering view from other engineering views** *ADVANCED ENGINEERING INFORMATICS*
Haymaker, J., Kunz, J., Suter, B., Fischer, M.
2004; 18 (1): 49-67
 - **Knowledge and reasoning for MEP coordination** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT-ASCE*
Korman, T. M., Fischer, M. A., Tatum, C. B.
2003; 129 (6): 627-634
 - **An ontology for relating features with activities to calculate costs** *JOURNAL OF COMPUTING IN CIVIL ENGINEERING*
Staub-French, S., Fischer, M., Kunz, J., Paulson, B.
2003; 17 (4): 243-254
 - **The benefits of virtual building tools** *CIVIL ENGINEERING*
Fischer, M.
2003; 73 (8): 60-67
 - **Distributed coordination of project schedule changes using agent-based compensatory negotiation methodology** *AI EDAM-ARTIFICIAL INTELLIGENCE FOR ENGINEERING DESIGN ANALYSIS AND MANUFACTURING*
Kim, K. S., Paulson, B. C., Levitt, R. E., Fischer, M. A., Petrie, C. J.
2003; 17 (2): 115-131
 - **A feature ontology to support construction cost estimating** *AI EDAM-ARTIFICIAL INTELLIGENCE FOR ENGINEERING DESIGN ANALYSIS AND MANUFACTURING*
Staub-French, S., Fischer, M., Kunz, J., Ishii, K., Paulson, B.
2003; 17 (2): 133-154
 - **A generic feature-driven activity-based cost estimation process** *ADVANCED ENGINEERING INFORMATICS*
Staub-French, S., Fischer, M., Kunz, J., Paulson, B.
2003; 17 (1): 23-39
 - **Automated generation of work spaces required by construction activities** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT-ASCE*
Akinci, B., Fischer, M., Kunz, J.
2002; 128 (4): 306-315
 - **Representing work spaces generically in construction method models** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT-ASCE*
Akinci, B., Fischer, M., Kunz, J., Levitt, R.
2002; 128 (4): 296-305

- **Closure to "Feasibility study of 4D CAD in commercial construction"** by Bonsang Koo and Martin Fischer *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT-ASCE*
Koo, B., Fischer, M.
2002; 128 (3): 274-275
- **Importance of capacity constraints to construction cost and schedule** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT-ASCE*
O'Brien, W. J., Fischer, M. A.
2000; 126 (5): 366-373
- **Feasibility study of 4D CAD in commercial construction** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT-ASCE*
Koo, B., Fischer, M.
2000; 126 (4): 251-260
- **Into the fourth dimension** *CIVIL ENGINEERING*
Staub, S., Fischer, M., Spradlin, M.
1999; 69 (5): 44-47
- **Project-modelling in AEC to integrate design and construction** *COMPUTERS IN INDUSTRY*
Luiten, G. T., Tolman, F. P., Fischer, M. A.
1998; 35 (1): 13-29
- **IT support of single project, multi-project and industry-wide integration** *COMPUTERS IN INDUSTRY*
Fischer, M. A., Waugh, L. M., Axworthy, A.
1998; 35 (1): 31-45
- **Factors affecting contractors' risk of cost overburden** *JOURNAL OF MANAGEMENT IN ENGINEERING*
Akinci, B., Fischer, M.
1998; 14 (1): 67-76
- **Construction method models: the glue between design and construction** *International Computing Congress Held in Conjunction with ASCE Annual Convention and Exposition on Information Technologies in Civil Engineering - Leading the World*
Aalami, F., Fischer, M. A.
AMER SOC CIVIL ENGINEERS.1998: 376-378
- **Characteristics of design-relevant constructability knowledge** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT-ASCE*
Fischer, M., Tatum, C. B.
1997; 123 (3): 253-260
- **Collaborative production modeling and planning** *IEEE COMPUTER GRAPHICS AND APPLICATIONS*
Frohlich, B., Fischer, M., Agrawala, M., Beers, A., Hanrahan, P.
1997; 17 (4): 13-15
- **Scheduling with computer-interpretable construction method models** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT-ASCE*
Fischer, M. A., Aalami, F.
1996; 122 (4): 337-347
- **Rapid conceptual design evaluation using a virtual product model** *ENGINEERING APPLICATIONS OF ARTIFICIAL INTELLIGENCE*
Clayton, M. J., Kunz, J. C., Fischer, M. A.
1996; 9 (4): 439-451
- **CE4: Concurrent engineering of product, process, facility, and organization** *CONCURRENT ENGINEERING-RESEARCH AND APPLICATIONS*
Kunz, J. C., Luiten, G. T., Fischer, M. A., Jin, Y., Levitt, R. E.
1996; 4 (2): 187-198
- **Requirements for industry applicability of knowledge-based Schedulers** *3rd Congress on Computing in Civil Engineering (III-CCCE)*
Aalami, F., Fischer, M. A.
AMER SOC CIVIL ENGINEERS.1996: 774-780
- **Interactive 4D-CAD** *3rd Congress on Computing in Civil Engineering (III-CCCE)*
McKinney, K., Kim, J., Fischer, M., Howard, C.

AMER SOC CIVIL ENGINEERS.1996: 383-389

- **THE CIRCLE - ARCHITECTURE FOR INTEGRATING SOFTWARE** *JOURNAL OF COMPUTING IN CIVIL ENGINEERING*
Fischer, M., Kunz, J.
1995; 9 (2): 122-133
- **Behavior follows form follows function: A theory of design evaluation** *2nd Congress on Computing in Civil Engineering (II-CCCE)*
Clayton, M. J., Fischer, M., Kunz, J. C., Fruchter, R.
AMER SOC CIVIL ENGINEERS.1995: 310-317
- **MANAGERIAL ASPECTS OF INFORMATION-TECHNOLOGY STRATEGIES FOR A/E/C FIRMS** *JOURNAL OF MANAGEMENT IN ENGINEERING*
Breuer, J., Fischer, M.
1994; 10 (4): 52-59
- **STRATEGY FOR COMPUTER-INTEGRATED CONSTRUCTION TECHNOLOGY** *JOURNAL OF CONSTRUCTION ENGINEERING AND MANAGEMENT-ASCE*
Teicholz, P., Fischer, M.
1994; 120 (1): 117-131