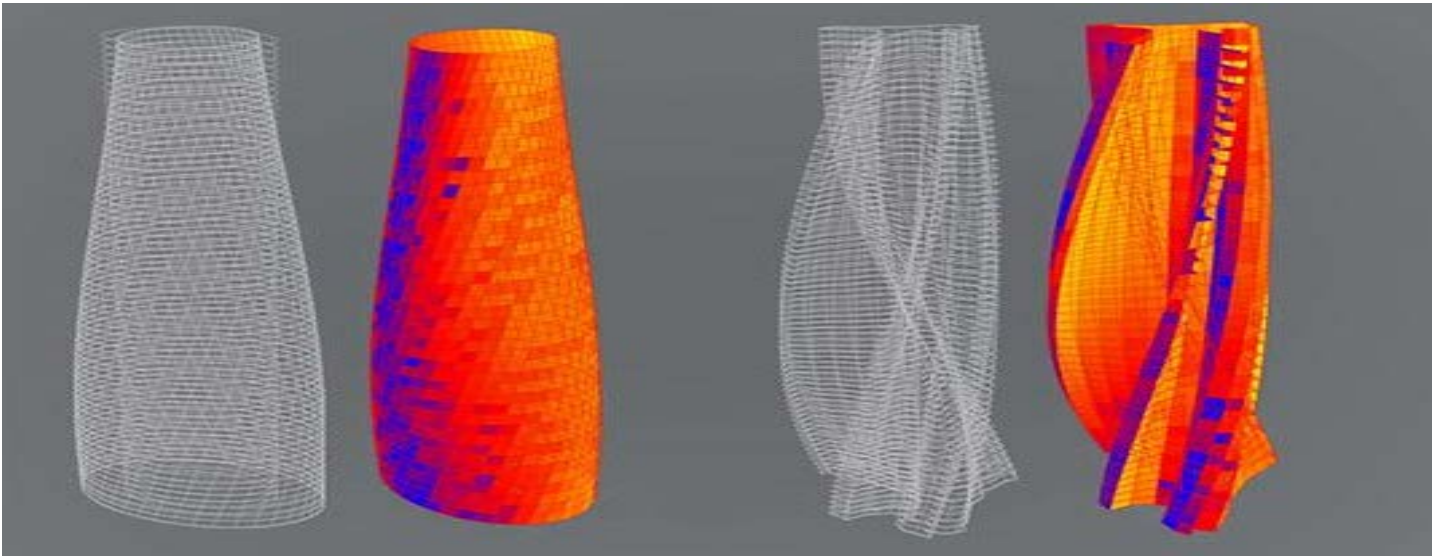


# PARAMETRIC DESIGN



Parametric Design uses defined parameters to generate numerous designs with the aid of algorithms. This can help with productivity as well as innovation to create multiple designs and configurations of products and architecture which would have not surfaced using traditional methods, not to mention all done in a fraction of the time needed with the power of computers. This reading list has an emphasis in architectural design and features literature from 1981 to present to help give an idea of the beginnings of parametric design to current methods.

The Library will periodically add new resources to this list. Links to the full-text are indicated. If you encounter any problem in retrieving the materials, please contact [library@sutd.edu.sg](mailto:library@sutd.edu.sg) for assistance.

Please also forward us titles that you would like to share with others in this list.

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- ☒ FLOOR PLAN & LAYOUT
- ☒ DESIGN PROJECTS
- ☒ SUSTAINABLE DESIGN

## INTRODUCTION

Basic description and fundamentals of parametric design thinking and methods

[Burry, M. \(2013\). \*Scripting Cultures : Architectural Design and Programming\* \(1.st ed., Architectural Design Primer\). Hoboken: Wiley.](#)

[Derenoncourt, P. \(2015\). Parametric design and modeling. Retrieved November 28, 2016, from <http://blog.digitaltutors.com/parametric-design-modeling/>](#)

[Dunn, N. \(2012\). \*Digital fabrication in architecture\*. London: Laurence King Publishing.](#)

[Garcia, M. \(2010\). \*The diagrams of architecture\* \(AD reader\). Chichester: Wiley.](#)  
Main Library General Lending (NA2700 DIA)

[Gero, J. \(2014\). \*Studying Visual and Spatial Reasoning for Design Creativity\*. Dordrecht: Springer Netherlands.](#)  
Chapter: Raising the i-Factor: Bridging Parametric Shape and Parametric Design Pages 67-88  
Chapter: Spatial Computing for Design—an Artificial Intelligence Perspective Pages 109-127

[Jabi, W. \(n.d.\). \*Parametric design for architecture\*.](#)  
Main Library General Lending (NA2728 JAB)

[Kolarevic, B. \(2005\). \*Architecture in the digital age : Design and manufacturing\*. New York: Taylor & Francis.](#)  
Main Library Reference (NA2543 ARC)

[Peters, B., & De Kestelier, Xavier. \(2013\). \*Computation works : The building of algorithmic thought\* \(Architectural design \(London, England : 1971\) ; . 83, no. 2\).](#)  
Main Library Reference (NA1 COM)

[Rybczynski, W. \(2013, July 11\). Parametric Design: What's Gotten Lost Amid the Algorithms. Retrieved November 28, 2016, from \[http://www.architectmagazine.com/design/parametric-design-whats-gotten-lost-amid-the-algorithms\\\_o\]\(http://www.architectmagazine.com/design/parametric-design-whats-gotten-lost-amid-the-algorithms\_o\)](#)

[Sakamoto, T., & Ferr?e, Albert. \(2008\). \*From control to design : Parametric/algorithmic architecture\*. Barcelona ; New York: Actar-D.](#)  
Main Library General Lending (NA2728 SAK)

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## DESIGN SYSTEMS, TOOLS, TECHNIQUES AND AUTOMATION

Various parametric design methods, software to generate architecture design

[Aelion, V., Cagan, J., & Powers, G. \(1992\). Input Variable Expansion: An algorithmic design generation technique. \*Research in Engineering Design\*, 4\(2\), 101-113.](#)

[Andia, A., & Spiegelhalter, Thomas. \(2015\). \*Post-parametric automation in design and construction\*.](#)  
Main Library General Lending (TH437 AND)

[Caldas, L. \(2008\). Generation of energy-efficient architecture solutions applying GENE ARCH: An evolution-based generative design system. \*Advanced Engineering Informatics\*, 22\(1\), 59-70.](#)

[Caldas, Luisa Gama, & Norford, Leslie K. \(2002\). A design optimization tool based on a genetic algorithm. \*Automation in Construction\*, 11\(2\), 173-184.](#)

[Ciftcioglu, Ö, Durmisevic, S., Durmisevic, E., & Sariyildiz, S. \(1999, June 11\). ARTIFICIAL INTELLIGENCE IN BUILDING DESIGN. Retrieved December 10, 2015, from \[http://www.bk.tudelft.nl/fileadmin/Faculteit/BK/Onderzoek/Projecten/Computational Intelligent Design/doc/ISAMA99F.pdf\]\(http://www.bk.tudelft.nl/fileadmin/Faculteit/BK/Onderzoek/Projecten/Computational\_Intelligent\_Design/doc/ISAMA99F.pdf\)](#)

[Corne, D., & Bentley, Peter J. \(2001\). \*Creative Evolutionary Systems\* \(The Morgan Kaufmann Series in Artificial Intelligence\). Burlington: Elsevier Science.](#)

[Estkowski, T. \(2014\). \*Towards a Generative Design System Based on Evolutionary Computing\*.](#)

[Goertzel, B., & Wang, P. \(2007\). \*Advances in Artificial General Intelligence Concepts, Architectures and Algorithms\*. Amsterdam: IOS Press.](#)

[Kalay, Y. \(1985\). Redefining the role of computers in architecture: From drafting/modelling tools to knowledge-based design assistants. \*Computer-Aided Design\*, 17\(7\), 319-328.](#)

[Sakamoto, T., & Ferr?e, Albert. \(2008\). \*From control to design : Parametric/algorithmic architecture\*. Barcelona ; New York: Actar-D.](#)

[Sönmez, N. Onur. \(2015\). Evolutionary design assistants for architecture.](#)

[Terzidis, K. \(2006\). \*Algorithmic architecture\* \(1st ed.\). Oxford ; Burlington, MA: Architectural Press.](#)

[Terzidis, K., Mainzer, Klaus, Gleiniger, Andrea, Feichter, Johann, Vrachliotis, Georg, Bellut, Clemens, . . . Venturi, Robert. \(2012\). \*Complexity Design Strategy and World View\*. Basel: De Gruyter.](#)

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## STRUCTURES

Design of architecture structures utilizing algorithms

[Geem, Z., & SpringerLink. \(2009\). \*Harmony Search Algorithms for Structural Design Optimization\* \(Studies in Computational Intelligence, 239\).](#)

[Kociecki, & Adeli. \(2015\). Shape optimization of free-form steel space-frame roof structures with complex geometries using evolutionary computing. \*Engineering Applications of Artificial Intelligence\*, 38, 168-182.](#)

[Mora, Rodrigo, Bédard, Claude, & Rivard, Hugues. \(2008\). A geometric modelling framework for conceptual structural design from early digital architectural models. \*Advanced Engineering Informatics\*, 22\(2\), 254-270.](#)

[助川, 結花子, 岸本, 達也, SUKEGAWA, Yukako, & KISHIMOTO, Tatsuya. \(2010\). Study on Automatic Generation Algorithm of Architecture Façade Design Using Flutuation. \*Journal of Architecture and Planning \(Transactions of AIJ\)\*, 75\(652\), 1639-1645.](#)

[Svoboda, Ladislav, Novák, Jan, Kurilla, Lukáš, & Zeman, Jan. \(2013\). A framework for integrated design of algorithmic architectural forms. \*Advances in Engineering Software\*, 72, 109-118.](#)

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## FLOOR PLAN & LAYOUT

Using various methods requiring parametric input to generate variations of layouts

[Dutta, K., & Sarthak, S. \(2011\). Architectural space planning using evolutionary computing approaches: A review. \*Artificial Intelligence Review\*, 36\(4\), 311-321.](#)

[Galle, Per, & Ashenurst, Robert. \(1981\). An algorithm for exhaustive generation of building floor plans. \*Communications of the ACM\*, 24\(12\), 813-825.](#)

[Jo, Jun H., & Gero, John S. \(1998\). Space layout planning using an evolutionary approach. \*Artificial Intelligence in Engineering\*, 12\(3\), 149-162.](#)

[Michalek, J., Choudhary, R., & Papalambros, P. \(2002\). Architectural layout design optimization. \*Engineering Optimization\*, 34\(5\), 461-484.](#)

[Rodrigues, Eugénio, Gaspar, Adélio Rodrigues, & Gomes, Álvaro. \(2014\). Improving thermal performance of automatically generated floor plans using a geometric variable sequential optimization procedure. \*Applied Energy\*, 132, 200-215.](#)

[Rodrigues, Eugénio, Gaspar, Adélio Rodrigues, & Gomes, Álvaro. \(2014\). Automated Floor Plan Design: Generation, Simulation, and Optimization.](#)

[Wong, Samuel S.Y., & Chan, Keith C.C. \(2009\). EvoArch: An evolutionary algorithm for architectural layout design. \*Computer-Aided Design\*, 41\(9\), 649-667.](#)

[Xuejun Cao, Zhijun He, & Yunhe Pan. \(1990\). Automated design of house-floor layout with distributed planning. \*Computer-Aided Design\*, 22\(4\), 213-222.](#)

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## DESIGN PROJECTS

Feature projects that utilize parametric design methods

[Abt, C., Bade, S.D., Birk, L., & Harries, S. \(2001\). Parametric Hull Form Design — A Step Towards One Week Ship Design. In \*Practical Design of Ships and Other Floating Structures\* \(pp. 67-74\).](#)

[Award and Prizes. \(n.d.\). Retrieved December 11, 2015, from \[http://algodeq.org/?page=award\\\_list\]\(http://algodeq.org/?page=award\_list\)](#)

[Doublenegatives uses computer algorithm to design house in nagohara. \(2014, December 8\). Retrieved December 10, 2015, from <http://www.designboom.com/architecture/doublenegatives-sota-ichikawa-house-in-nagohara-japan-12-08-2014/>](#)

[Georgiou, M., & Jaworski, P. \(2009\). Retrieved November 28, 2016, from <http://www.parametricdesign.net/>](#)

[Moss, R. \(2015, February 23\). Creative AI: Algorithms and robot craftsmen open new possibilities in architecture. Retrieved December 10, 2015, from <http://www.gizmag.com/creative-ai-algorithmic-architecture-robot-craftsmen/36212/>](#)

[Williams, A. \(2015, March 17\). Here comes the sun: NBBJ unveils shadow-reducing concept towers. Retrieved December 10, 2015, from <http://www.gizmag.com/the-no-shadow-tower-nbbj/36555/>](#)

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## SUSTAINABLE DESIGN

Methods used for sustainable design using algorithms and parameters

[Gu, Y. \(2011\). \*Order of Buildings and Cities A Paradigm of Open Systems Evolution for Sustainable Design\*. Bern: Lang, Peter, AG, Internationaler Verlag der Wissenschaften.](#)

Chapter 4.4 Parametric design of intelligent sustainable design 186

[Hubers, J. C. \(2011\). Collaborative Design of Parametric Sustainable Architecture. \*Computing in Civil Engineering \(2011\)\*. doi:10.1061/41182\(416\)51](#)

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