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## **Spatial Specification and Reasoning Using Grammars: From Theory to Application**

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Abstract:

This talk introduces grammatical formalisms that are capable of supporting spatial specification and reasoning and their wide range of applications. We will cover two typical grammars, i.e., Shape Grammar and Spatial Graph Grammar, as concrete representatives to consider connectivity and spatial relations in the parsing and generating processes, making them different from other types of grammar formalisms. The spatial-enabled grammars are especially useful in applications that are related to layout design and analysis, such as architectural design, floor plans, interface analysis etc. We use a set of six criteria to compare the commonality and differences among spatial-enabled grammars. The criteria include: direction of graph transformation, workflow, granularity of spatial specification, format of spatial specification, 2D and 3D modeling and application domains. Finally, future directions related to spatial-enabled grammars are discussed.



### **Short Biography:**

Kang Zhang is Professor and Director of Visual Computing Lab, Department of Computer Science, and Professor of Arts and Technology, at the University of Texas at Dallas. He is currently a Fulbright Distinguished Chair visiting Charles University. Zhang received his B.Eng. in Computer Engineering from University of Electronic Science and Technology of China in 1982, Ph.D. from the University of Brighton, UK, in 1990, and Executive MBA from the University of Texas at Dallas in 2011. Prior to joining UT-Dallas, he held academic positions in the UK, Australia, and China. Zhang's current research interests include generative art, visual languages, aesthetic computing, and software engineering; and has published 7 books, and over 240 papers in these areas. He is an ACM Distinguished Speaker and on the Editorial Boards of *Journal of Big Data*, *The Visual Computer*, *Journal of Visual Languages and Computing*, *International Journal of Software Engineering and Knowledge Engineering*, and *International Journal of Advanced Intelligence*. His home page is at: [utd.edu/~kzhang](http://utd.edu/~kzhang)