Dr. Shang-Hua Teng has twice won the prestigious Gödel Prize in theoretical computer science, first in 2008, for developing the theory of *smoothed analysis*, and then in 2015, for designing the groundbreaking nearly-linear time *Laplacian solver* for network systems. Both are joint work with Dan Spielman of Yale — his long-time collaborator. Smoothed analysis is fundamental for modeling and analyzing practical algorithms, and the *Laplacian paradigm* has since led to several breakthroughs in network analysis, matrix computation, and optimization. Citing him as, "one of the most original theoretical computer scientists in the world", the Simons Foundation named Teng a 2014 Simons Investigator, for pursuing long-term curiosity-driven fundamental research. He and his collaborators also received the best paper award at *ACM Symposium on Theory of Computing* (STOC) for what's considered to be the "first improvement in 10 years" of a fundamental optimization problem — the computation of *maximum flows and minimum cuts* in a network. In addition, he is known for his joint work with Xi Chen and Xiaotie Deng that characterized the complexity for computing an approximate Nash equilibrium in game theory, and his joint papers on market equilibria in computational economics. He and his collaborators also pioneered the development of well-shaped Dalaunay meshing algorithms for arbitrary three-dimensional geometric domains, which settled a long-term open problem in numerical simulation, also a fundamental problem in computer graphics. Software based on this development was used at the University of Illinois for the simulation of advanced rockets. Teng is also interested in mathematical board games. With his former Ph.D. student Kyle Burke, he designed and analyzed a game called *Atropos*, which is played on the Sperner's triangle and based on the beautiful, celebrated Sperner's Lemma. In 2000 at UIUC, Teng was named on the "List of Teachers Ranked as Excellent by Their Students" for his class, "Network Security and Cryptography". He has worked and consulted for Microsoft Research, Akamai, IBM Almaden Research Center, Intel Corporation, Xerox PARC, and NASA Ames Research Center, for which he received fifteen *patents* for his work on compiler optimization, Internet technology, and social network analysis.

Teng grew up during the tumultuous Chinese Cultural Revolution, which virtually stopped its entire educational system. However, he received the opportunity to study during the early stages of China's Reform & Opening Up: In 1981, just four years after China resumed the *National Higher Education Entrance Examination*, that reopened higher education to public, he was accepted to Shanghai Jiao Tong University. In 1985, he received dual bachelor's degrees in *Computer Science* and *Electrical Engineering*, and was part of the university's inaugural class of (eighteen) "Outstanding Graduates." Crucial to his career, the award also earned him a scholarship from the *World Bank*, which supported his application to study Ph.D. abroad. In the Fall of 1985, he entered the Computer Science Department at the University of Southern California (USC), where, twenty-four years later in 2009, he returned as the chair of the department.

As a graduate student at USC, Teng solved several open questions in parallel algorithms and cryptography, and was selected by the university as a"Student of Outstanding Academic Achievement" upon receiving his Master degree. In 1988, when his Ph.D. advisor, Professor Gary Miller, moved to Carnegie Mellon University (CMU), Teng tranferred to CMU with him. There, he began to conduct interdisciplinary research at the intersection of graph algorithms, scientific computing, and optimization. In 1991, he became the second ever mainland-Chinese-born Computer Science Ph.D. graduate from CMU. He completed a well-recognized Ph.D. thesis, *"Points, Spheres, and Separators: A Unified Geometric Approach to Graph Partitioning."* In his thesis, Teng developed the first linear-time algorithm for partitioning several important classes of three-dimensional graphs, including the nearest neighborhood graphs and finite-element meshes. He also gave the first randomized O(log n) time parallel algorithm for the construction of the nearest neighborhood graphs in any fixed dimension, solving a fundamental problem in computational geometry.

Upon graduation, Teng obtained a much sought-after postdoctoral position at Xerox Palo Research Center (PARC). It was Xerox PARC that started his active participation in industry. His experiences in real-world computer science problems also taught him to value the interaction between theory and

practice. He has been passionately pursuing academic-industry collaborations ever since: He worked with NASA Ames Research Center to develop a software system for fast fluid dynamic simulation, when he was an instructor of Mathematics at MIT from 1992 - 1994; he worked with Intel to build an industry-strength transistor-level circuit validation and simulation software, when he was an Assistant Professor at the University of Minnesota from 1994 - 1997; he collaborated with an IBM Almaden research team to develop one of the first systems for web-crawling and Internet applications, when he was an Associate Professor at the University of Illinois at Urbana-Champaign from 1997 - 2001; he worked with Akamai Technologies to develop its data analysis system for Internet content delivery, and with Microsoft on spam detection and social network analysis, when he became a Full Professor at Boston University and USC. He received multiple patents ranging from compiler techniques to Internet algorithms, from his collaboration with engineers and scientists in developing real-world products.

The academic-industry collaboration not only makes it possible for a theoretician like Teng to have a direct impact on real-world applications, but also helped him to initiate new theoretical research. Particularly, an encouraging interdisciplinary interaction at NASA Ames Research Center with Horst Simon — the current Deputy Director of Lawrence Berkeley National Laboratory — jump-started his work with Dan Spielman on spectral graph theory. Simon's question led the pair to obtain their famous mathematical proof cencerning the eigenvalues of planar graphs, demonstrating why spectral partitioning methods work in practice. Their 1996 work solved a major challenge in combinatorial optimization and numerical linear algebra, and in the process, established a new connection between the geometry of graphs and their eigenvalues. More importantly, this work eventually led the pair to their award-winning work in smoothed analysis and Laplacian paradigm. The industry experiences also have tremendous impact on Teng's educational innovation. He has designed several new interdisciplinary courses to encourage students to think beyond the traditional scope of their current discipline.

In the last two decades, Teng worked on several challenging and fundamental problems at the intersection of Theoretical Computer Science, Network Sciences, Game Theory, Economics, Scientific Computing, and Optimization. He obtained numerous significant and breakthrough results in these areas, which won him multiple awards. In addition to his Gödel Prizes in theoretical computer science, he also received the prestigious *Delbert Ray Fulkerson Prize* in 2009, a high honor presented only every three years for outstanding papers in the area of discrete mathematics, jointly sponsored by the *American Mathematical Society* (AMS) and the *Mathematical Programming Society* (MPS). Teng is also an ACM Fellow, Alfred P. Sloan Fellow, winner of Senior Xerox Award for Outstanding Faculty Research, and NSF CAREER Award. Several times, the National Science Foundation cited Teng's joint work in its annual budget requests to Congress, as examples of significant accomplishments funded by the Computer Science Division.

After successfully becoming a 'former' chair, Teng currently holds the Seely G. Mudd professorship of Computer Science and Mathematics at University of Southern California.