

Biography

Dr. Li Chen is an idealized computer scientist and applied mathematician. He is currently an associate (tenured) professor in computer science at the University of the District of Columbia. He was a visiting assistant professor in University of North Dakota. He has taught as an adjunct professor in Virginia Tech, Strayer University, and Trinity University at DC. He was a visitor of DIMACS (Rutgers-Princeton) and a visiting associate professor at Center for Automation Research at University of Maryland. He has been invited to give talks in NIH, Georgetown University, University of Utah, George Washington University, and etc. He is currently working on the problems in image segmentation algorithms, complexity analysis of algebraic groups, and the relationship between finite elements and gradually varied fitting.

In 1984, Chen published a regular research paper alone in *Chinese Journal of Computers*, the best journal in computer science in China during that time when he was 23 years old. Chen also received “The Award Research Fund of Chinese Academy of Science for Young Scientists (1987),” probably the first national research award for young scientists in China. Li Chen received several other awards and honors including Outstanding Junior Faculty Award of SEAS UDC (2005), Outstanding Teacher of Wuhan University (1990), Student Excellent Research Paper Award of Wuhan University (1981), and Who’s Who in America (1999). Li Chen received his BS, MS, and Ph.D. all in CS from Wuhan University (1982), Utah State University(1995), and University of Bedfordshire (Luton University, 2001), respectively.

Chen has worked in many research areas in computer science and applied mathematics. He has made a number of fundamental contributions to some of these research areas: (1) (1986) Designed the best algorithm for the check matrix of the world’s well-known error-correction Hsiao codes. The check matrix is the key element to the Hsiao codes. (2) (With Wang, 2003) Discovered the branch-point solution for fuzzy relation equations. This result makes its solution set, a tree, very clear. Solving fuzzy relation equations is always one of the hardest and hottest research topics in fuzzy systems. (3) (1985) Created lambda-connected search for image segmentation, a dual-technique to threshold segmentation, the most popular segmentation method. Image segmentation is one of the most important processes to image processing and computer vision. (With Cheng and Zhang, 1994) Generalized the method to multi-dimensional range. (4) (With Zhang and Cooley, 1993,1994,1999) Based on Rosenfeld and Kong’s work, discovered the simple, extendable, and total-discrete definition for digital surfaces. Determined there are only 6-types of digital surfaces points in 3D. These results are definitely in the center of digital geometry and topology---one of the newest research disciplines in CS and applied math. (5) (1989) Discovered the “pure” discrete surface interpolation algorithm---gradually varied surface fitting. This algorithm does not require a predefined mathematical formula for surface fitting. (6) (2004) Authored the monograph “Discrete Surfaces and Manifolds—A theory of digital-discrete geometry and topology.” This book was adopted by the US Library of Congress in Mathematics and Computer Science Category.

Some world famous scientists: Z. Pawlak (1997), L.A. Zadeh (2004), and J.E. Goodman (2005) have commented on Li Chen’s work as “of great importance,” “original,” and “very complete and authoritative treatment.” Professor Paul P. Wang, a world noted scientist at Duke University, has stated in an email (that Li Chen is) a “genuine scholar in mathematics and CS!” (Web address: <http://www.udc.edu/prof/chen>; email: lchen@udc.edu.)

Selected Publications

- G. Agnarsson and L. Chen, On the extension of vertex maps to graph homomorphisms, *Discrete Mathematics*, Vol 306, No 17, pp 2021-2030, Sept. 2006.
- L. Chen, D.H. Cooley and J. Zhang, Possibility functions based fuzzy neural networks and their applications to image processing, *IEEE Transaction on Systems, Man, and Cybernetics (B)*, Vol 29, 119-126, Feb. 1999.
- L. Chen, The necessary and sufficient condition and the efficient algorithms for gradually varied fill, *Chinese Science Bulletin*, 35:10(1990).

(1997) The email letter from Pawlak, the founder of Rough Sets:

“Thank you very much for your kind letter and the reprint of your paper on gradual variation.” “I am convinced that this is very important issue both philosophically and practically.”

“From the philosophical point of view it seems to me that idea of continuity, or in other words the concept of a real number, is not understood fully yet and the example of rough continuity (or gradual variation confirm this. There is kind of contradiction between how we think (real numbers) and how we measure and compute (rational numbers). We cannot measure or compute with real numbers. Thus it seems that there is a gap between how we think and how we compute or measure.”

“Of course the applications of gradual variation for image processing, control, measurement is of great importance, but I guess that the philosophical problems here is also important.”

Professor Zdzislaw Pawlak

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(2004) The email letter from Zadeh, the founder of Fuzzy Logic.

"I looked at chapters 8 [Ch8 gradually varied functions, in Li Chen, Discrete Surfaces and Manifolds, 2004] and 10 but made no attempt at following your exposition in detail since your theory extends beyond my competence. But what is quite obvious is that your ideas are original and highly interesting. Please accept my congratulations."

"P.S. I am taking the liberty of donating your book to our Math Library."

Lotfi A. Zadeh
Professor in the Graduate School, Computer Science Division
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(2005) The email letter from Goodman, one of the founders of Discrete and Computational Geometry:

“Thank you for giving me an opportunity to look into your book. Judging by its table of contents at least, it looks like a very complete and authoritative treatment of digital topology.”

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