A brief history of Edward K. Blum and the Journal of Computer and System Sciences

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	This paper gives an appreciation of Edward "Ed" Blum, with accolades and stories from family and colleagues. It also gives a brief description of the situation of computer science in the 1960s, at the time Ed founded the Journal of Computer and System Sciences. © 2018 Published by Elsevier Inc.

1. Introduction

In this paper we celebrate Edward (Ed) K. Blum and his vision and hard work in founding the Journal of Computer and System Sciences (JCSS) and establishing it as one of the leading journals of theoretical computer science from its origin through to today. Included are memories from his devoted daughters, who all worked on the Journal at some part of their childhood, whether it was licking envelopes, typing up letters, or actually working as the secretary for the editor. Also included are some examples shared by colleagues who have had the privilege of knowing Ed personally, showing that Ed was "intensely curious intellectually and stubbornly persistent in his professional work". This article will use the familiar name "Ed" (instead of only the surname "Blum") as an acknowledgment of the friendliness and kindness of this amazing scientist.

At the time of Ed's passing in 2014, of natural causes following a bout with cancer, the University of Southern California (USC) Dornsife published a beautiful Memorial [5] which contains the following facts about his life. He was born in Brooklyn, N.Y., in 1923, to Jewish immigrant parents, and grew up loving books and mathematics.

In 1944, Blum graduated from Cooper Union in New York with a bachelor of science degree in mathematics. During World War II he served in the United States Navy as an Electronic Technician Mate 2nd Class. After the war, he received his Ph.D. in Mathematics from Columbia University in New York. Edward Blum's adviser at Columbia was Edgar Lorch. His dissertation title was "The Theory of Analytic Functions in Banach Algebras."

His first job was in a government laboratory in Washington, D.C., where he met his wife Dolores "Lori" Shaw. They married in 1953 and three years later, moved to Los Angeles, California. Blum had accepted an engineering post at TRW, an American automotive and aerospace corporation (acquired by Northrop Grumman in 2002) where he worked on rocket thrust trajectories for travel to Mars.

Ed joined the faculty of the University of Southern California (USC) Dornsife in 1966 as Professor of Mathematics, with a joint appointment at USC Viterbi School of Engineering. He was 43 years old and already had academic experience as an Instructor at the University of Maryland, in the Massachusetts Institute of Technology Cooperative Program, and at UCLA

Extension. He had also served as Professor of Mathematics and Director of the Computer Center at Wesleyan University, Ohio. While at USC, Ed supervised six students of his own. A search on MathSciNet showed a publication list of 43 items. The earlier papers were in the general areas of functional analysis, operator theory, calculus of variations and control theory. Later papers were primarily in numerical analysis and computer science. Although Ed was a mathematician, his avid intellectual curiosity drew him towards the new field of computing.

2. The heart of Computer Science

The Journal of Computer and System Sciences (JCSS) is a living memorial of Ed's dedication and passion for computer science in its many manifestations. Only a few years before he died, Ed wrote about his vision of computer science. In 2011, with co-author Alfred Aho, Ed published the book, *Computer Science: The Hardware, Software and Heart of It* (Springer publication). The Introduction and Prologue and many chapters written or co-authored by Ed, provide a window on his view that computer science is a *Union (with a capital U) of its two major "constit-uents", hardware and software.* Ed writes: Admittedly, this Union is diverse and rapidly evolving and defies precise characterization. In several chapters, Ed gives a history of computation, and describes the two major constituents of the Union. Along with JCSS, this lovingly-written, interesting book is Ed's legacy, showing that his initial passion for computer science grew ever stronger during his life.

3. Computer Science in the United States in the 1960s

The 1960s were a dynamic era for the new field of computing. The earlier conversations (1940s–1950s) between Alan Turing, Alonzo Church, John von Neumann and other heroes of computing were bringing about revolutionary developments in the design of software and hardware. In 1957, the computer programming language Fortran, created by I.B.M. under the leadership of John Backus, had been released to the public. By the origin of JCSS in 1967, there were already the programming languages ALGOL, APL, PL/1, BASIC (not implemented on microcomputers until 1975), Fortran, and the beginnings of Pascal. The Unix operating system, released in 1969, was being developed by project leader Ken Thompson at Bell Laboratories. The United States had benefitted enormously from the talent that had sought its refuge during WWII. The country was galvanized around the prospect of putting a man on the moon. Readers interested in the early situation of computing in the United States may wish to read The Computer Science and Engineering Research Study (COSERS) [2], with the theme "What can be automated?," which was published in 1980 by MIT Press and engaged 80 contributors supported by the National Science Foundation. The book by Blum and Aho mentioned earlier, *Computer Science: The Hardware, Software and Heart of It* [1] is Ed's attempt at COSERS II, with 18 contributors, including himself. The article by Rosamond, "Statistics of the Field," [3] also in the Blum and Aho book, provides a statistical summary of the state of Computer Science as of 2011.

In 1966, there were only fourteen computer science departments or programs offering a Ph.D. in computer science [4]. One could speculate that each of these universities had a dynamic individual such as Ed Blum that pushed the vision of computing to the forefront.

1. University of Pennsylvania, Graduate Group in Computer and Information Sciences, founded in 1959 in the Electrical Engineering Department. The Computer and Information Sciences Department was started by 1972.
2. Princeton University's Digital Systems program was founded in the late 1950s or early 1960s in the Electrical Engineering Department. A joint Electrical Engineering and Computer Science Department started in the mid 1970s. The current Computer Science Department began in 1985.
3. Purdue University, Department of Computer Sciences, 1962, was the first Computer Science Department in the United States.
4. University of Wisconsin – Madison, Computer Sciences Department, 1964.
5. University of North Carolina, Information Sciences Department, 1964.
6. University of Virginia, Applied Mathematics and Computer Science Department, 1964. The current Computer Science Department dates to a 1986 separation.
7. University of Michigan, Communication Sciences Graduate Program, 1957. Communication Sciences Department, 1964, renamed Computer and Communication Sciences Department, 1967. The current Electrical Engineering and Computer Science Department is a 1984 merger of Electrical and Computer Engineering with Computer and Communication Sciences.
8. University of Illinois, Computer Science Department started 1964 and added graduate degrees 1966.
9. Carnegie Mellon University, Computer Science Department, 1965. The Systems and Communications Sciences interdisciplinary program, 1961, with the degree through Mathematics.
10. Cornell University, Computer Science Department, 1965
11. University of Iowa, Computer Science Department, 1965.
12. University of Utah, Computer Science Department, 1965
13. Washington University in St. Louis, Applied Mathematics and Computer Science Department, 1965.
14. Stanford had a Computer Science Division in the Mathematics Department starting in 1961. Ph.D.s apparently continued as standard mathematics degrees until the Computer Science Department started in 1965.