

ATTACHMENT 2: Profile and Detailed Achievements of the Group B Recipient of the 2017 C&C Prize

Prof. Alfred V. Aho

Current Position:
Professor, Columbia University

Personal History (born in 1941):

1963 B.A.Sc in Engineering Physics, University of Toronto
1967 PhD in EECS, Princeton University
1967-1991 Computing Sciences Research Center, Bell Labs
1995- Lawrence Gussman Professor of Computer Science, Columbia University
1995-1997 Chair, Department of Computer Science, Columbia University
1997-2002 Vice President, Computing Sciences Research Center, Bell Labs
1991-1995 GM, Information Sciences and Technologies Research Laboratory, Bellcore
2003 Chair, Department of Computer Science, Columbia University

Major awards:

1984 Fellow, Bell Labs
1986 Fellow, American Association for the Advancement of Science
1988 Fellow, IEEE
1996 Fellow, ACM
2003 IEEE John von Neumann Medal
2003 Great Teacher Award, Columbia University
2014 Distinguished Faculty Teaching Award, Columbia Engineering Alumni Association
2013 Fellow, The Royal Society of Canada
1999 Member, NAE
2003 Member, American Academy of Arts and Sciences
1986 Honorary Doctorate, University of Waterloo
1986 Honorary Doctorate, University of Helsinki
2015 Honorary Doctorate, University of Toronto

Prof. John E. Hopcroft

Current Position:
Professor, Cornell University

Personal History (born in 1939):

1961 BS in EE, Seattle University
1962 MS in EE, Stanford University
1964 PhD in EE, Stanford University
1964-1967 Assistant Prof. EE, Princeton University
1967-1971 Associate Prof. CS, Cornell University
1970-1971 Visiting Associate Prof., Stanford University
1972- Professor, CS, Cornell University
1987-1992 Chair, CS, Cornell University
1992-1993 Associate Dean for College Affairs, Cornell University
1994-2001 The Joseph Silbert Dean of Eng., Cornell University
2004- IBM Professor, Cornell University

Major awards:

1986 A.M. Turing Award (w/Dr. Tarjan)
1987 Fellow, American Association for the Advancement of Science
1987 Fellow, IEEE
1989 Member, NAE
1994 Fellow, ACM
2005 IEEE Harry H. Goode Memorial Award
2008 Honorary Doctor of Engineering, University of Sydney
2008 ACM Karl V. Karlstrom Outstanding Educator Award
2010 IEEE John von Neumann Medal
2010 Ralph S. Watts 72 Excellence in Teaching Award
2016 China Gold Medal Friendship Award
Holds Many Honorary Doctorates

Prof. Jeffrey D. Ullman

Current Position:

Professor Emeritus, Stanford University

Personal History (born in 1942):

1963 BS in Eng. Math., Columbia University
1966 PhD in EE, Princeton University
1966-1969 Technical Staff, Bell Laboratories
1969-1974 Associate Professor, Princeton University
1974-1979 Professor, Princeton University
1979-2002 Professor, Stanford University
1990-1994 Chair, Department of CS, Stanford University
1994-2002 S. W. Ascherman Prof. of Eng., Stanford University
2003- Professor Emeritus, Stanford University
2003- CEO, Gradiance Corp

Major awards:

1975	Honorary doctorate, Free University of Brussels
1989	Member, NAE
1992	Honorary doctorate, University of Paris-Dauphine
1994	Fellow, ACM
1996	ACM SIGMOD Contributions Award
1996	Best paper award, SIGMOD
1998	ACM, Karl V. Karlstrom outstanding educator award
2000	Knuth Prize
2006	Test-of-Time Award, SIGMOD
2010	IEEE John von Neumann Medal
2012	Member, American Academy of Arts and Sciences
2016	Honorary doctorate, Ben Gurion University

Achievements

In recent years, many of the remarkable changes and advances that have taken place in people's lifestyles and social environments can be attributed to information technology (IT). IT has not only transformed the hardware of our social systems, but also played a huge role in bringing about innovations in software that are crucial to building a comfortable society, which is the ideal embodied in the Computers and Communications (C&C) concept.

Professor Alfred V. Aho, Professor John E. Hopcroft, and Professor Jeffrey D. Ullman have made major contributions to the core fields of theoretical computer science—that provide the foundation in the academic study of IT—through their many outstanding research achievements in automata, formal languages and compilers, and have also co-authored numerous influential publications in these fields. The three doctors have received many prestigious awards and honors in recognition of these achievements as well as for their remarkable work in the fundamental academic fields of data structures and algorithms. In addition to their research work, Professor Aho, Professor Hopcroft, and Professor Ullman have been heavily involved in educational programs, such as producing publications and lectures, and mentoring doctoral students in thesis writing. They have also been responsible for fostering many leading researchers and entrepreneurs in the field of computer science. Their outstanding contributions to the development and education of researchers in the software field—the foundation upon which today's information and communication society is built—is truly worthy of recognition.

Professor Aho has achieved phenomenal results in theoretical research of formal languages, analysis and translation of programming languages, and compilers. Together with Margaret Corasick, he invented the Aho-

Corasick algorithm, a string-matching algorithm that constructs an automaton for finding words in an input string that are contained in a dictionary. The algorithm gained fame for its high-speed matching performance because after the matching engine has been constructed, its run time is linear in the length of the input string and does not depend on the size of the dictionary. The Aho–Corasick algorithm has since been applied to many compiler and network router designs. In 2003, Professor Aho was awarded the IEEE John von Neumann Medal for his contributions as a computer science researcher to the foundations of computer science and to the fields of algorithms and software tools. Professor Aho is not only renowned for his research works, but also has contributed significantly to computer science education through his textbooks and other academic writings. Two of his most famous books, "Principles of Compiler Design" and "Compilers: Principles, Techniques and Tools," which he co-authored with Professor Ullman, another recipient of this year's C&C Prize, have become standard textbooks in computer science. Professor Aho's works have been cited more than 50,000 times, indicating the regard in which his works are held worldwide and their importance to the field of computer science.

Professor Hopcroft has been a pioneering researcher in theoretical computer science fields such as automata and formal languages since the latter half of the 1960s. He has made outstanding results in theoretical research of the design and analysis of algorithms and data structures based on automata, formal languages and graph theory. His work on planar graphs in the latter field earned him and his partner, Dr. Robert Tarjan, the Turing award in 1986. His research on matching in bipartite graphs, which produced the Hopcroft–Karp algorithm, is also well known. A renowned educator, Professor Hopcroft has been lauded for his contributions to educating and mentoring next-generation researchers over many years—a role that the professor himself sees as one of his most important. In 2008 he received the ACM Karl V. Karlstrom Outstanding Educator Award, which is bestowed on excellent educators in the field of computer science. His most famous book, "Introduction to Automata Theory, Languages, and Computation," has been cited over 20,000 times, while the book he co-authored with the other two recipients of this year's C&C Prize, "The Design and Analysis of Computer Algorithms," is a standard textbook in algorithmic education programs. Together with Professor Ullman, co-recipient of this prize, Professor Hopcroft wrote "Formal Languages and Their Relation to Automata" which has been used for many years in educational institutions to introduce students to the field of computer science.

Professor Ullman has produced a remarkable body of research in automata, language theory and compilers, and is currently one of the

leading experts in database theory. In 2006 he was the sole recipient of the Edgar F. Codd Innovations Award for database theory research. In 2010 he was the co-recipient (with Professor Hopcroft) of the IEEE John von Neumann Medal for contributions to automata and formal languages. In addition, Professor Ullman has also made outstanding contributions as an educator through his books, academic papers and teaching; many of his students have gone on to become leading researchers in the fields of database theory and language theory, and entrepreneurs driving the development of IT today. In 1997, he was awarded the ACM Karl V. Karlstrom Outstanding Educator Award for his educational contributions in textbook publication and mentoring of doctoral students. In 2000, as a commendation for excellent research achievement, he received the Donald E. Knuth Prize for his contributions to the mathematical foundations of computing. Professor Ullman has published books in many fields. Among them, "Principles of Database Systems," a comprehensive description of the theory and principles of database systems, has become a classic in its field. His works, including the influential "Introduction to Automata Theory, Languages, and Computation," written with Professor Hopcroft, and "Compilers: Principles, Techniques and Tools," written with Professor Aho, have been cited more than 110,000 times. This demonstrates the remarkable contribution Professor Ullman has made to advancing computer science and educating and fostering the next generation of researchers and entrepreneurs in this field.

Professor Aho, Professor Hopcroft, and Professor Ullman have all conducted pioneering research in core computer science disciplines such as automata, formal languages, language theory, compilers, data structures, algorithms, database theory, and graph theory and have published numerous research papers and books about these subjects on their own and in collaboration. Books co-authored by all three doctors, such as "The Design and Analysis of Computer Algorithms" (1974) and "Data Structures and Algorithms" (1983), not only provided an expert and comprehensive summary of research findings in the field at the time, but were also highly influential from an educational point of view. In summary, in addition to their outstanding achievements in their specialist academic research fields, Professor Aho, Professor Hopcroft, and Professor Ullman, through their writings, teaching and mentoring, have made major contributions to computer science education, theoretical understanding, and fostering of talent, and have been instrumental in bringing about remarkable developments in computer science—the core of C&C—that we witness today. They are all most worthy recipients of the C&C Prize.