

An Oral History of Computer Science at Cornell University

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Gates Hall, Cornell University

Twelve senior faculty members share their personal journeys and their recollections of the early days of computer science at Cornell University and the leadership role in bringing a new field of study into existence.

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Ken Birman discusses the origins of cloud computing.

A Conversation with Ken Birman

Interviewed on September 10, 2015 by
Robbert Van Renesse
Computer Science

1. KEN BIRMAN

Ken Birman, who joined CS in 1981, exemplifies the successful synergy of research and entrepreneurial activities. His research in distributed systems led to his founding ISIS Distributed Systems, Inc., in 1988, which developed software used by the New York Stock Exchange (NYSE) and Swiss Exchange, the French Air Traffic Control system, the AEGIS warship, and others. He started two other companies, Reliable Network Solutions and Web Sciences LLC.

This entrepreneurship has in turn generated new research ideas and has also led to Ken's advising various organizations on distributed systems and cloud computing, including the French Civil Aviation Organization, the north-eastern electric power grid, NATO, the US Treasury, and the US Air Force.

Ken has received several awards for his research, among them the IEEE Tsutomu Kanai Award for his work on trustworthy computing, the Cisco "Technology Visionary" award, and the ACM SIGOPS Hall of Fame Award. He also has written two successful texts.

Here, Ken and interviewer Robbert Van Renesse discuss the origins of cloud computing.

Running Time: 46 min. <http://hdl.handle.net/1813/41207>



Claire Cardie discusses the role of Gerard Salton, natural language processing and the creation of the Information Science Department.

A Conversation with Claire Cardie

Interviewed on September 9, 2015 by
Bob Constable
Computer Science

2. CLAIRE CARDIE

Claire Cardie joined CS in 1994, helping CS get a foothold in Artificial Intelligence. Part of her research was in statistical machine learning methods to identify opinions and other subjective language in online text. This led to the social media startup Appinions Inc., which provided services that let people see the web through the lens of peoples' opinions. Appinions was sold in 2015 to ScribbleLive.

Her achievements include a Faculty Early CAREER award from the NSF, election as a Councillor of the Association for the Advancement of AI, election as Secretary of the Association for Computational Linguistics, and selection as an ACL Fellow.

Claire has done her share of service to Cornell. With the support and urging of CS, Claire led the development of the IS (Information Science) major in three colleges and the founding of the Department of IS, serving as first chair.

Along with interviewer Bob Constable, Claire discusses what the department was like when she joined it, including her interactions with Gerry Salton (father of Information Retrieval), natural language processing, the creation of the IS Department, and more.

Running Time: 53 min. <http://hdl.handle.net/1813/41216>



A discussion of automated reasoning and software verification and the Faculty of Computing and Information Science.

A Conversation with Robert L. Constable

Interviewed on July 21, 2015 by

David Gries

Professor Emeritus
Cornell University

3. BOB CONSTABLE

Over 40 years ago, Bob Constable and his students started designing a logical language for specifying programming tasks and mathematical problems. The system, called Nuprl, is known since 1984 for being able to synthesize correct-by-construction programs from formal proofs in constructive type theory.

The Nuprl Library holds over 15,000 mathematical theorems, with a database of 450,000 proof steps, dealing with pure mathematics as well as proofs of programs. Bob received the 2014 Herbrand Award for this pioneering research in automated reasoning.

Bob was also the leading force in Cornell's creation of CIS ---the Faculty of Computing and Information Science ---which has helped bring computing and computer science into every Cornell college. Bob served as first dean of CIS for ten years.

Bob and interviewer David Gries talk about the old days in CS.

Running Time: 47 min. <http://hdl.handle.net/1813/40560>



A Discussion of the Formation of Cornell's Computer Science Department

A Conversation with Richard W. Conway

Interviewed on July 21, 2015 by

David Gries

Professor Emeritus
Cornell University

4. DICK CONWAY

Dick Conway came to Cornell in 1949, as a freshman. He received the first PhD from Operations Research and Industrial Engineering (1958), was instrumental in the creation of the CS Department (1965) and was a founding member, spent two years as the first Director of Cornell's Office of Computer Services, and later joined the Johnson Graduate School of Management. In all these positions, he made significant contributions.

His 1967 co-authored text "Theory of Scheduling" placed the study of production scheduling on a formal foundation. INFORMS lists the book as a landmark in the timeline of Operations Research. He developed and implemented the programming languages CORC (1958) and CUPL (1962). In the 1970's, he developed and implemented PL/C, with an emphasis on error correction in the compiler, and co-authored a programming text. In the Johnson Graduate School, Dick introduced and implemented the idea of an immersion course, where students took one 15-credit course, "Semester in Manufacturing", spending half the time visiting manufacturing plants and the other half in the classroom.

Dick is a member of the National Academy of Engineering.

Dick and David Gries discuss the beginnings of CS at and what it was like in the 1970s.

Running Time: 58 min. <http://hdl.handle.net/1813/40564>



A discussion of compilers, textbooks, teaching, the collegial nature of his department and the “early years of computing”

A Conversation with David Gries

Interviewed on July 21, 2015 by

Robert L. Constable

Professor

Cornell University

5. DAVID GRIES

David Gries joined Cornell in 1969. He was chair of CS in the 1980s and associate dean of engineering for 8 years in the 2000s.

His research was on compiler writing and areas related to formal programming methodology. He is known for his texts on programming, on compiler writing (the first such text, in 1971), on the science of programming, and on logic and discrete math.

He has two honorary doctorates and four awards from the leading computing societies for contributions to education. He was among the first ten Cornell faculty to receive the Weiss Presidential Fellow award for contributions to undergrad education. He was Chair of the Computer Science Board when it became the CRA (Computing Research Association) and opened an office in Washington to represent the interests of computing in academia. He received the CRA award for service to the computing community.

David and Bob talk about David's time as a grad student at the Munich Institute of Technology and the early days in the Cornell CS Department.

Running Time: 51 min. <http://hdl.handle.net/1813/40576>

Chapters of the Interview

Juris Hartmanis
& David Gries



1. Family & Background [22:33]
2. Career Trajectory & Passion [05:32]
3. Beginning a New Field [17:42]
4. Computers Arrive [09:16]
5. A National Role: NSF [09:18]
6. Return to Cornell [01:43]
7. Concluding Comments [02:24]

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6. JURIS HARTMANIS

Juris Hartmanis joined Cornell in 1965 as the founding chair of the new Department of Computer Science. One of the first CS departments (the first started in 1964), CS was embedded in two colleges, Engineering and Arts & Sciences. Under his leadership, CS matured into a robust, national leader with a strong theoretical emphasis.

Juris came from GE, where he collaborated with Richard Stearns on pioneering research that was later recognized by ACM's prestigious, highest honor: the Turing Award. Fittingly, Juris is known as "the father of computational complexity". He is a member of the NAE and NAS, has honorary doctorates, and received the Grand Medal of the Latvian Academy of Sciences.

Like most of the CS faculty, Juris spent time in the service of the CS community. He chaired a National Research Council Study, resulting in the book "Computing the Future". In 1996-1998, he was Assistant Director of the NSF Directorate of Computer and Information Science and Engineering (CISE).

In this conversation (70 minutes), Juris and David talk about his childhood, his family background, his immigration to the US, and his career.

Running Time: 70 min. <http://hdl.handle.net/1813/14934>



This ACM Turing Award recipient talks about research, textbooks, working with graduate students, his role as a senior statesman of his field and concludes with some words of wisdom.

A Conversation with John E. Hopcroft

Interviewed on July 21, 2015 by

David Gries

Professor Emeritus
Cornell University

7. JOHN HOPCROFT

John E. Hopcroft has contributed massively to research, education, and service like no other.

His research in theory and algorithms won him the Turing Award in 1986. His early texts set the direction and tone for the new field of CS. His service as Dean of Engineering, member of the National Science Board, and advisor on education and research to universities and governments around the world is mind boggling. With too many awards and society memberships to mention (including at least 5 honorary degrees), in 2016, 52 years after entering the field, John is still going strong.

Here, John talks about research, textbooks, working with graduate students, and his role as a senior statesman, concluding with some words of wisdom.

Running Time: 37 min. <http://hdl.handle.net/1813/40568>



Kozen discusses his experiences at Cornell – his research and teaching experience, textbooks, participation in sports & music, etc.

A Conversation with Dexter Kozen

Interviewed on September 9, 2015 by
Bob Constable
Computer Science

8. DEXTER KOZEN

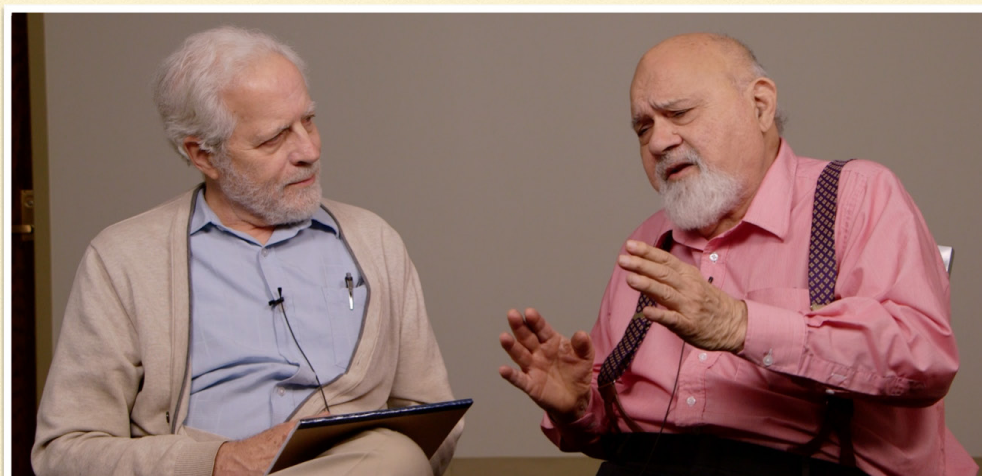
Dexter Kozen got his PhD from CS at Cornell in 1977. After he spent time doing research at IBM, we drew him back to the faculty in 1985.

Dexter has made lasting, fundamental contributions to diverse areas such as algorithms, complexity, logics, semantics of programming languages, and computer security. The CS Department's environment, which encourages collaboration of people in different areas, both experimental and theoretical, has had a synergistic effect on both his and others' research.

One computer scientist said that: a winning combination of brilliance, depth, and elegance captures the essence of Kozen's work over the years. And it shows in the influence Dexter has had. He received the LICS Test-of-Time Award for one of his papers, the EATCS Award from the European Association for Theoretical Computer Science, the W. Wallace McDowell Award from the IEEE Computer Society, and two prizes from the Polish Ministry of Education. He also has several teaching awards from Cornell. Further, he has written textbooks on the theory of computation, automata theory, dynamic logic, and algorithms.

With interviewer Bob Constable, Dexter discusses his research and teaching experience, textbooks, participation in sports and music, and more.

Running Time: 45 min. <http://hdl.handle.net/1813/41206>



A CONVERSATION WITH ANIL NERODE

An Interview at Cornell by David Gries on October 16, 2014

9. ANIL NERODE

Anil Nerode is the Goldwin Smith Professor of Mathematics. He joined the Cornell Math Department in 1959. His interests are in mathematical logic, the theory of automata, computability and complexity theory, the calculus of variations, distributed systems, and artificial intelligence. CS people know him for the very early Myhill–Nerode theorem, which gives necessary and sufficient conditions for a formal language to be regular.

Anil has long been a friend of CS. He was acting director of the Center for Applied Math from 1964-1965, when the formation of the CS Department was underway. That put him on the committee that worked to start the CS Department. He was the one who suggested Juris Hartmanis for the first chair of CS and, about 35 years later, he said that Juris “was far and away the best chairman of any department”.

In this interview, Anil and interviewer David Gries discuss the start of the CS department.

Running Time: 55 min. <http://hdl.handle.net/1813/40527>



Fred Schneider, an expert in concurrent and distributed systems and in computer and cybersecurity, shares insights about how his professional interests evolved, and provides sweeping views about how his field and department have changed.

A Conversation with Fred B. Schneider

Interviewed on September 9, 2015 by
David Gries
Computer Science

10. FRED SCHNEIDER

Fred B. Schneider joined Cornell Computer Science in 1978 and is currently (2016) Chair of CS. His research has focused on various aspects of trustworthy systems, from operating systems to formal methods to legal and economic measures for improving trustworthiness.

Fred is a member of the National Academy of Engineering and a foreign member of the Norwegian Academy of Technological Science. He has an honorary doctorate from the University of Newcastle-upon-Tyne, and he received two awards for seminal research (IEEE Piore award and the SOSP Hall of Fame award).

Besides being recognized for technical contributions, Fred has served on numerous government and industry boards and committees, and he just received the “Service to CRA Award” for his contributions to the Computing Research Association.

Here, Fred shares insights about how his professional interests evolved and provides sweeping views about how his field and department have changed.

Running Time: 43 min. <http://hdl.handle.net/1813/41370>



A discussion of the teaching of large, introductory courses in programming in the early days—using the Terak and Macintosh computers—and the development of integrated programming environments that implement language-aware editing capabilities.

A Conversation with Tim Teitelbaum

Interviewed on September 10, 2015 by

David Gries

Professor Emeritus
Cornell University

11. TIM TEITELBAUM

Tim Teitelbaum carried a major load in the teaching end of the department, especially the intro programming courses. In the late 1970's, Tim, along with PhD student Tom Reps, took advantage of the new desktop computer, the Terak, to build the Cornell Program Synthesizer, a seminal, ground-breaking environment for developing and testing programs. Cornell immediately adopted it for their intro Pascal courses, and its use spread to many other universities. Tim and Tom went further to develop the Program Synthesizer Generator, to make it easier to create such environments for any language, and turned it into a general tool for static analysis of programs.

In 1988, they founded GrammaTech to promote its use. Now, Grammatech, with over 20 PhD employees, is a leading developer of software-assurance tools and advanced cyber-security solutions. Tim became Prof Emeritus in 2010 to devote full time to GrammaTech.

Tim and David talk about the teaching of large, introductory courses in programming in the early days using the Terak and Macintosh computers and the development of integrated programming environments that implement language-aware editing capabilities.

Running Time: 36 min. <http://hdl.handle.net/1813/40865>



Van Loan discusses his experiences with teaching, writing textbooks, administering degree programs, MatLab, matrices and more.

A Conversation with Charlie Van Loan

Interviewed on September 9, 2015 by
Kavita Bala
Computer Science and Computer Graphics

12. CHARLIE VAN LOAN

Charlie Van Loan, who joined the CS Department in 1975, is well known for his work in scientific computing, especially in “Matrix Computations”. His text with that title, written with Gene Golub and first published in 1983, is now in its fourth edition. Website scholar.google.com claims 52,900 citations! It’s one of the most highly cited texts in all of mathematics and computing.

Charlie has helped shape the direction and tone of the department in many ways. He served as chair for 7 years. He directed the undergrad program for 9 years, the MEng program for 3 years, and the PhD program for 5 years. He has several awards from Cornell for his teaching and advising, and two PhD advisees chose him for the Merrill Scholar Faculty Impact Award.

Even as he retires (June 2016), Charlie continues serving Cornell, for he was elected Dean of the Faculty and assumed that position on July 1.

Van Loan, with the help of interviewer Kavita Bala, discusses his experiences with teaching, writing textbooks, administering degree programs, MatLab, matrices, and more.

Running Time: 56 min. <http://hdl.handle.net/1813/41201>
