Memories of Professor Kenneth G. Wilson
and his critical role in the creation of a national computer network
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Dr. Lawrence H. Landweber, Professor Emeritus of Computer Science at the University of Wisconsin at
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numerous other networking organizations worldwide since 1977.

Dr. Dennis M. Jennings, Chairman of the Oversight Board of the Irish Centre for High-End Computing,
Venture Capitalist, and former Program Director for Networking at the National Science Foundation.

I am honored to have this opportunity to expand on this important issue this afternoon and I thank Debra
Ann Hatfield and Professor Parpia for their kind assistance today. I was pleased to hear that Alison is
expected to be in the audience today and I wonder if she might recognize the names associated with
these reflections after all these decades.

I was only an undergraduate at Cornell in the Fall of 1983 who started with the intention to graduate with
a computer science degree. Thanks to an accidental discovery in early February 1984 that the Computer
Science department was secretly monitoring the usage of the mainframe accounts of their own students
(think of the parallels with George Orwell’s famous book), I developed a career interest in the concept,
development and applications of computer networking. It was this interest that brought me occasionally
and tangentially into contact with both Ken and Alison in Olin Hall and a few times in Washington where I
had the good fortune to work full-time for the Office of Advanced Scientific Computing at the National
Science Foundation in the second half of 1985 while simultaneously participating in the Cornell-in-
Washington academic program. The creation of this office was driven by the work of Ken and others
deriving from concentrated efforts that started in 1981.

It is little-known by the general public that the high energy physics community drove the creation of
access to domestic supercomputer resources for American researchers linked together by a national
network backbone. Separately, the CERN community did the same for Western Europe.

Dr. Smarr writes: “Ken and I worked closely together to convince the Federal government that
supercomputers needed to be brought into American universities. While Ken and I had both been
Harvard Junior Fellows, Ken was 12 years older than me and had a Nobel Prize, so I definitely was
second fiddle. Ken and I were both members of the 1981 NSF Subcommittee On Computational
Facilities For Theoretical Research led by Bill Press, which helped create a core group inside the NSF
advocating for the establishment of NSF-funded Supercomputer Centers.”

[Gligor continues here:] I remember learning that Ken successfully led a delegation to a 1982
Congressional hearing and testified that America was losing its competitive edge in science and
technology because American scientists had to travel to Japan and Germany to use their supercomputers
(and thus share their original ideas and research) -- and that this early National Security-related testimony
coupled with the Lax Report led to the creation of the Office of Advanced Scientific Computing at the
NSF.
Dr. Smarr adds: “Ken was a member of the December 1982 seminal Report on Large Scale Computing in Science and Engineering better known colloquially as the Lax Report (www.pnl.gov/scales/docs/lax_report1982.pdf) which was named after its chairman, NYU Professor and National Science Board Member Peter D. Lax. Both of us wrote pieces for the Appendices: Ken wrote four essays entitled “On Supercomputing,” “Examples and Needs of Supercomputers,” “Roles and Needs for Large Scale Computing for Theoretical Physics,” and “Priorities for Funding Current Needs,” while I wrote “Some Examples of Supercomputing Projects,” and “The Supercomputer Famine in American Universities.” Both of us organized our universities to submit proposals to the NSF which ultimately led to the Cornell Theory Center and the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign in 1985.

Daniel VanBelleghem remembers “when Ken joined our Advisory Committee at the Office of Advanced Scientific Computing at the National Science Foundation. Of the many policies he helped to bring to fruition, perhaps none was greater than his quick and solid support of a high speed network to match the needs of high performance computing. There were not many who had the foresight in 1983 to see that a fast, multi-vendor network was needed. Thirty years later we can see what his perspicacity has realized: Billions of people have access to fast communications to one another and the world, although not all use it properly. Oh well!!”

Professor Landweber recalls a 1984 subcommittee meeting of this Advisory Committee which “was asked to make a recommendation on networking for the supercomputer centers. Members included Tony Hearn and Ken Wilson. I remember a lively discussion with the prevailing sentiment being whether to adopt DECNET direct links or MFENET technologies. Ken was adamant in supporting the networking members of the subcommittee: without his support, I doubt that the Internet technology would have been chosen. In early 1985, the US government began a program to develop supercomputer centers for use by university scientists throughout America. A prevailing view was that these centers would be similar to other large facilities like telescopes and that scientists would mostly travel to the center locations to use their computing resources. There was also an understanding that some level of remote access would be useful. However, a significant group in the scientific community favored access via leased telecommunications lines from designated universities to the supercomputer centers. The networking community, on the other hand, believed that a general purpose network could provide even better support to a wider research community. With the help of Ken Wilson, a Nobel prize winner in physics and others, the decision was made to build such a network.”

Dr. Jennings concludes: “Ken was a great supporter of the networking agenda and a great advocate for a general purpose network for all science and engineering -- one of the key principles that empowered us in the development of NSFnet as a U.S. national research network, rather than as an exclusive network for supercomputer users. If I remember correctly, Ken was part of the Cornell delegation to the NSF Supercomputer Centers Review meeting in Boulder, Colorado on 16/17 September 2005 along with Cornell Vice Provost Ken King and Bill Schrader. Larry Smarr was there for Illinois and Sid Karin for San Diego.” It was at this meeting that the concept of a National Science Foundation-funded network backbone (NSFnet) was initially rejected at the end of Day 1. However, by the end of Day 2, following some concerted overnight lobbying by Ken Wilson and others, everyone came around as they understood that a national backbone would serve a national audience of researchers rather than a small subset of supercomputer users. The date of September 17th, 1985 now serves as a marker for Washington-based reunions every five years for those of us involved in national networking activities.

As we reflect back on that decision for a moment, it might be amusing to consider that the speed of the soon-thereafter implemented NSFnet backbone was 56 kilobits/second with the intent that it be replaced by a T1 speed (1.544 megabits/second) backbone as soon as the technology was evenly implemented across the country. Today, most people with internet access in America enjoy minimum speeds of T1 right to their home. All Americans unknowingly owe a lifetime of thanks to Professor Wilson for his highly constructive influence in this regard.

Thank you.