

SDSC celebrated 25 year anniversary October 12, 2010

www.sdsc.edu/Gallery/images/vs_timeline_hi.jpg

on the campus of UCSD which was 50
<http://libraries.ucsd.edu/historyofucsd/>



SDSC 25 year timeline 1985-92 – 1 of 8

GA Technologies wins an NSF cooperative agreement in collaboration with UCSD to establish a supercomputer center.

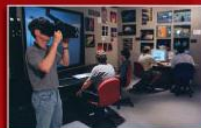


SDSC opens doors; Sid Karin is SDSC's founding director.

SCS-40 supercomputer installed at SDSC.

SDSC, through SDSCnet, becomes first NSF center to have NSFnet access.

In pioneering efforts in drug design, Paul Bash, et. al., using SDSC supercomputers, determine free energies of solvation for proteins and nucleic acids, and relative free energies for binding, published in *Science*.



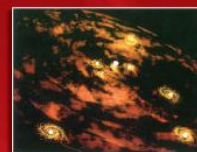
Governor George Deukemejian signs legislation, introduced by Assemblyman Dominic Cortese, giving SDSC \$6 million to develop state-of-the-art visualization lab at SDSC.

NSFnet backbone becomes a production network.

CERFnet officially dedicated at SDSC; Vinton Cerf (no relation to the network) conducts dedication.



CRAY Y-MP8/864 supercomputer arrives at SDSC and made available December 22.



Dave Nadeau and Holliday Horton at SDSC create an animation of accretion disks – the fiery nebulae and spinning clouds in a primordial solar system – for a planetarium show at S.D.'s Reuben H. Fleet Space Center and Theatre.



UCSD/SDSC researchers solve the structure for protein kinase, likened to the body's transistor, and considered one of the Grand Challenges in biological sciences; research makes cover of *Science*.

SDSC becomes first site to send messages cross country through the NSFNET T-3 backbone; at 45 Mb/s, it's the fastest openly available network for research and education.

Computer studies of corannulene, a bowl-shaped molecule that constitutes one-third of the molecular shell of the Bucky Ball, is subject of cover story of *Chemical and Engineering News*; research by Kim Baldridge and Jay Siegel from SDSC/UCSD.

SDSC launches STEP (Supercomputer Teacher Enhancement Program) to develop education outreach programs for K-12 with local educators.

1985

1986

1987

1988

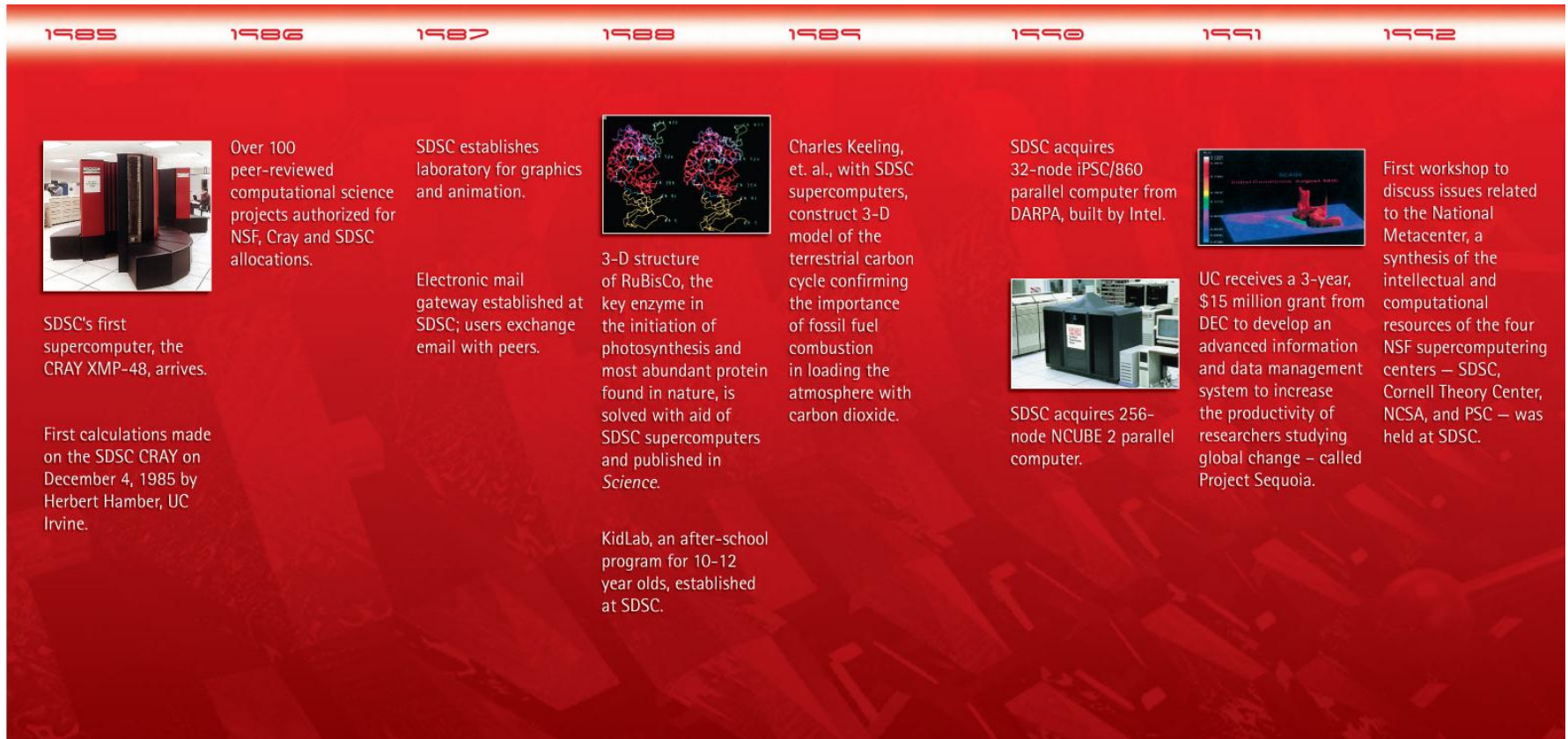
1989

1990

1991

1992

SDSC 25 year timeline 1985-92 -1bof8



SDSC 25 year timeline 1993-99 – 2 of 8

$$\begin{aligned} \vec{F} &= m \vec{a} + \frac{d\vec{m}}{dt} \vec{v} & \nabla \times \vec{E} &= -\frac{\partial \vec{B}}{\partial t} \\ \vec{f} &= -\nabla^2 \vec{u} + \lambda \nabla (\nabla \cdot \vec{u}) & \nabla \cdot \vec{D} &= \rho \\ \frac{dU}{ds} &= \left(\frac{\partial U}{\partial V} \right)_s dV & \nabla \times \vec{H} &= \frac{\partial \vec{D}}{\partial t} + \vec{j} \\ \nabla \cdot \vec{B} &= 0 \end{aligned}$$

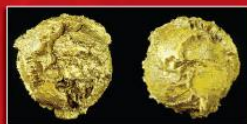
SDSC unveils "Grand Challenge Equations" exhibit.



Intel Paragon supercomputer arrives at SDSC.

A data transfer speed record of 630 Mb/s is achieved across the 100-mile CASA Gigabit Testbed link between SDSC and Caltech, accelerating solution of the reaction of atomic hydrogen with molecular heavy hydrogen (deuterium) by a factor of 3.3.

Tsutomu Shimomura, SDSC Senior Fellow, collaborates with federal agents to track down alleged "notorious cybercriminal" Kevin Mitnick, then considered the "most-wanted computer criminal in the United States."



SDSC establishes the telemanufacturing facility to rapidly prototype 3D models from digital geometry data.

SDSC receives \$8.4M contract from DARPA to develop Distributed Object Computation Testbed (DOCT) for handling complex documents on geographically distributed data archives and computing platforms; to focus on the needs of the US Patent and Trademark Office.

The cover of *Chemical and Engineering News* features an image of cyclohexatriene molecule; research results from computational and experimental collaboration of Kim Baldridge at SDSC and Jay Siegel, at UCSD.



SDSC named leading-edge site for the National Partnership for Advanced Computational Infrastructure (NPACI), launched in October.



CAIDA established with a NSF seed grant to promote a more robust, scalable Internet infrastructure; principal investigator, kc Claffy.



The world's largest and most powerful transmission electron microscope is operated from UC San Diego and the National Center for Microscopy and Image Research (NCMIR) in a successful demonstration of trans-Pacific telemicroscopy by American and Japanese researchers.



The Research Collaboratory for Structural Bioinformatics (RCSB), under the management of Helen Berman at Rutgers University, and Phil Bourne at UCSD/SDSC, assumes primary responsibility for the Protein Data Bank – the world's largest archive for biomedical structures used in pharmacological and medical research.

1993

1994

1995

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1997

1998

1999

SDSC 25 year timeline 1993-99– 2bof8

1993



CRAY C90 supercomputer arrives at SDSC; officially installed during November press briefing.

1994

NIH approves \$3.286M to SDSC to fund the National Biomedical Computation Resource (NBCR).



Thinking Machines CM-2 arrives at SDSC to support UCSD education and research.

1995

For the first time, SDSC harnesses the power of a new very high-speed network (vBNS) by distributing portions of a computation across high-performance computers located on the east and west coasts.

Chris Mihos and Lars Hernquist of UC Santa Cruz collaborate with computer artists at NCSA, using computational resources at SDSC CRAY C90, to create high-resolution images of a galaxy encounter for IMAX cosmic voyage, which debuts at the Smithsonian National Air and Space Museum in D.C.

1996

A model of the nicotinic acetylcholine receptor is developed by Igor Tsigelny, Naoya Sugiyama and Palmer Taylor at UCSD/SDSC, in collaboration with Steven Sine at the Mayo Foundation; enzyme is a target for addictive activity from nicotine.



CRAY T3E supercomputer installed at SDSC.

1997



SDSC publishes "Women in Science," featuring bios of women who had a career in, or made significant contributions, to a scientific discipline.

1998

The Storage Research Broker (SRB) 1.1 is released as "middleware" to hold together data cache sites from NPACI, led by SDSC. The SRB software is built on work led by SDSC's Reagan Moore; Chaitan Baru, Michael Wan, Arcot Rajasekar and Wayne Schroeder are members of the original team that developed SRB.

With large-scale computer simulations run at SDSC, researchers led by J. Andrew McCammon at UCSD show how one of the fastest enzymes in the world, acetylcholinesterase, does its work; results are published in the *Proceedings of the National Academy of Sciences*.

SDSC 25 year timeline – 3 of 8

Animated visualizations made possible for the first time by SDSC's Galactic MPIRE volume-rendering software and *Blue Horizon* are displayed in the all new Hayden Planetarium of the American Natural History Museum on New Year's Eve.



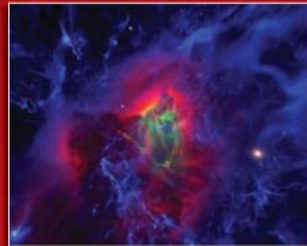
Using sophisticated "backscatter analysis", CAIDA researchers track the progress of a worm dubbed Code-Red Worm, which infected hundreds of thousands of Web servers around the world.



IBM's *Blue Horizon* is delivered to SDSC as the most powerful computer available to the US academic community – capable of 1 trillion FLOPS.

SDSC organizes the first San Diego TEACHERTECH, designed to allow San Diego K-12 teachers to explore and examine different multimedia and web applications for use in the classroom.

Fran Berman becomes director of SDSC.



"The Search for Life: Are We Alone?" – a new space show at the Hayden Planetarium in New York – premieres to rave reviews. SDSC plays a key role in creating a realistic animation showing the birth of our solar system

PRAGMA (Pacific Rim Applications and Grid Middleware Assembly), launched during a workshop at SDSC and funded by NSF, shows how relationships and expertise developed to tackle computational research could also help thousands of SARS patients in Taiwan.



SDSC's High Performance Storage System (HPSS) reaches the milestone of one petabyte of stored data.

Mike Norman, and colleagues at Center for Astrophysics and Space Sciences at UCSD, run the world's largest and most complex scientific simulation of the evolution of the universe ever performed.



Data experts at SDSC collaborate with American Red Cross to help locate missing loved ones in the wake of Hurricane Katrina; results in "Safe and Well" website.

CENIC announces that the first production 10 Gigabit Ethernet campus connection in the U.S. has been installed from UCSD.

SDSC launches DataCentral, the first program of its kind to support large community data collections and databases.

2000

2001

2002

2003

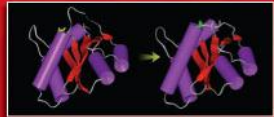
2004

2005

SDSC 25 year timeline – 3b of 8

1999

The HPC Systems group completes the first installation of a user file system that is greater than one terabyte in capacity.



Molecular dynamics simulations, led by J. Andrew McCammon at UCSD, show how to attack a third enzyme target integrase, a crucial enzyme used by HIV to replicate; research led to the development of Isentress, an anti-AIDS drug marketed by Merck.

2000

A map showing possible paths an email message might take in the Internet, created by the skitter tool developed at CAIDA at SDSC, makes the cover of *Nature*.

SDSC-developed storage and visualization technologies — integrated into a National Library of Medicine project — create one of the largest-ever medical image databases.

NSF awards \$2.3 million, three-year grant to UCSD to create, demonstrate, and evaluate a non-commercial prototype, high-performance wide-area wireless network for research and education (HPWREN)—a multi-institutional collaboration led by Hans-Werner Braun at SDSC and Frank Vernon at SIO.

2001



NSF establishes TeraGrid to support world-class scientific discovery and education through a grid-based cyberinfrastructure; SDSC is one of the founding sites.

A team led by Vincent Crespi at Penn State used computer simulations and resources at SDSC to discover carbon fibers with mechanical strength comparable to a diamond — strong and stiff carbon tubes called nanotubes.

2002

The first analysis of the potential impacts of climate change for an entire country, Mexico, is reported in a paper published in *Nature* by a team that included researches from SDSC.

2003



The TeraGrid enters production with two clusters installed at SDSC: IBM/Intel IA-64 TeraGrid Phase 1 Cluster and IBM/Intel IA-64 TeraGrid Phase 2 Cluster.

2004

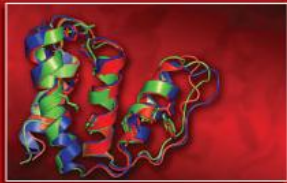
Scientists led by UCSD's J. Andrew McCammon use molecular simulations and SDSC resources to identify a potential mechanism underlying the drug resistance of the worst mutant HIV strain; in same work, the researchers identify a separate region of protease enzyme that might serve as new drug target.



SDSC is the first academic institution in the world to install the new IBM eServer Blue Gene Solution computing system.

SDSC 25 year timeline – 4 of 8

NARA and SDSC, with concurrence from NSF, sign a landmark MOU that provides an avenue for preserving valuable digital data collections; first time NARA establishes an affiliated relationship for preserving digital data with an academic institution.



Researchers at SDSC — working with colleagues at the University of Washington — achieve the largest-ever protein structure prediction and complete the simulation in less than three hours.



UCSD/SDSC researchers zero in on causes of Parkinson's disease, Alzheimer's disease, and other neurological disorders with a computer model featured on cover of the *Federation of European Biochemical Societies Journal (FEBS)*.

SDSC releases version 0.5 of iRODS, the open-source Integrated Rule-Oriented Data System, which represents a new approach to digital data management.

The source of spider silk's strength, as strong as steel, is simulated by MIT scientists in collaboration with applications scientist Ross Walker at SDSC, on SDSC's IBM Blue Gene/L supercomputer.



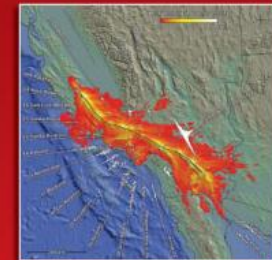
A team led by Laura Carrington at SDSC successfully completes a record-setting, petascale-level simulation of the earth's inner structure; a finalist for Gordon Bell Prize.



SDSC awarded 5-year, \$20 million grant from NSF to build *Gordon*, a powerful supercomputer featuring "flash memory" and "supernodes" to solve critical data-intensive science problems.

SDSC unveils *Dash*, a "flash-memory-based" supercomputer to accelerate solutions for data-intensive science problems.

The CIPRES portal, used to help researchers track evolutionary relations among species, becomes the most heavily used portal in the TeraGrid, accounting for 20% of active TeraGrid users during the first quarter of 2010.



Researchers at SDSC, SDSU and UCSD create the largest-ever simulation of a Magnitude 8 earthquake, primarily along the southern section of the San Andreas fault.

2006

2007

2008

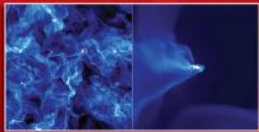
2009

2010

SDSC 25 year timeline – 4b of 8

2005

SDSC receives \$2.2M award from NIH to provide Next Generation Biology Workbench, building on the work of the "Workshop" concept developed by Shankar Subramaniam at UCSD/SDSC.



Astrophysicist Richard Klein from UC Berkeley and others use simulations run at SDSC to explode one of two competing theories about how stars form inside immense clouds of interstellar gas; results published in *Nature*.

2006



Firefighters facing fast-spreading wildfires urgently request cyberinfrastructure resources from HPWREN to help combat the "Horse Fire" in Cleveland National Forest.

The most true-to-life computer simulation ever made of our sun's corona — created by researchers at Science Applications International Corp., with the help of SDSC resources — successfully predicted its actual appearance during the total solar eclipse of March 29.

2007

A team of researchers from NCAR, SDSC, LLNL and IBM Watson, led by Allan Snaveley at SDSC, set U.S. records for size, performance, and fidelity of computer weather simulations, modeling the kind of "virtual weather" that society depends on for accurate weather forecasts; a finalist for Gordon Bell Prize.

Science is coming to the YouTube generation with the advent of "SciVee," a collaboration between the NSF and SDSC, under the direction of Phil Bourne, UCSD/SDSC.

2008



SDSC dedicates a new, energy-efficient building extension as a key resource for UC San Diego and beyond.

CAIDA researchers Dmitri Krioukov and kc Claffy, along with Marián Boguñá (Universitat de Barcelona), reveal in *Nature Physics* a previously unknown mathematical model called "hidden metric space" that may explain the "small world phenomenon," offering a potentially more efficient way to pass messages on the Internet.

2009

SDSC officially launches the *Triton Resource*, an integrated data-intensive computing system primarily designed to support UCSD and UC.



SDSC completes a comprehensive upgrade to its tape-based archival storage capacity, increasing its total to 36 petabytes, the largest digital storage capacity of any academic center in the world.

2010

Mike Norman named SDSC director.



SDSC launches a volunteer internship program for high school students – Research Experience for High School Students (REHS) – to help them gain experience in a particular area of computational research.

SDSC installs *Trestles*, a 100-Tflop/s computer funded by NSF and designed to increase productivity for a broad spectrum of users.