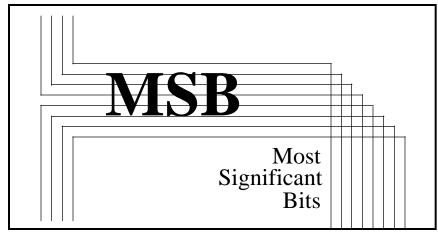


Department of Computer Science & Engineering University of Washington



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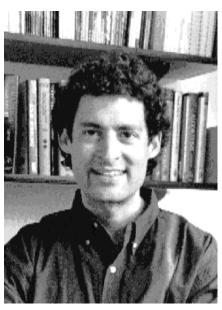
Salesin Named Presidential Fellow

President Clinton has named Assistant Professor David Salesin as a Presidential Faculty Fellow. The award, which recognizes young professors for excellence and promise in both research and teaching, carries with it a National Science Foundation grant for \$100,000 per year for five years. Salesin is a computer graphics expert.

The PFF is extraordinarily competitive. Only 30 professors were selected in 1995 from all areas of US science and engineering, and of those only two were computer scientists. Salesin is UW's third PFF and CSE's second, joining Brian Bershad who received a PFF in 1994.

Salesin's talent has impressed everyone. Earlier this year, he was named one of eight recipients of an Alfred P. Sloan Foundation Fellowship, and one of three Office of Naval Research Young Investigators in computer science. In 1993 he received the National Science Foundation's National Young Investigator award.

A native of Cleveland, Salesin was a national merit scholar at Brown University, where he won the prize for "Outstanding Undergraduate Research" for his work in computer graphics, and 3-and 4-dimensional mathematics. On graduating magna cum laude in 1983, he declined a Winston Churchill Fellowship



David Salesin

to join Lucasfilm Ltd. After spending 1986 in Paris as a graphics consultant, he entered graduate school at Stanford. His 1991 dissertation, titled *Epsilon Geometry: Building Robust Algorithms from Imprecise Computations*, was directed by Leo Guibas. Though hired by CSE on graduation, Salesin spent the 1991-92 academic year at Cornell as a visiting assistant professor working on topics in photorealistic rendering with Donald Greenberg's group.

Salesin continued on page 4

MSB's Home Page http://www.cs.washington.edu/ publications/msb.html Read MSB with live links!

CSE Ranked In The Top 10, Again

NRC Study Rates Faculty "Distinguished"

Graduate Program Ranked 6th of 108

While most Americans were following the progress of their favorite teams in the college football rankings, academics across the country were riveted by this autumn's publication of the National Research Council rankings of 3600 departments in 41 fields of study—the first NRC study since 1982. UW CSE placed in the top 10 among 108 US computer science departments in all three categories in the study.

The three categories were Faculty Quality, Doctoral Program Effectiveness, and Five Year Change.

- In Faculty Quality, CSE ranked 9th, as it did in 1982, though this time twice as many departments were evaluated.
- For Doctoral Program Effectiveness, CSE ranked 6th nationally, a 4 tick improvement over its 1982 Effectiveness score.
- And in the Five Year Change category, CSE ranked 5th in the nation, the best performance of any department ranked in the top 20 for either Quality or Effectiveness.

The single digit performance in all categories was unique.

Rankings continued on page 2



Rankings

continued from page 1

"The Department did really well," said CSE Chair Ed Lazowska. "We were especially pleased with our Effectiveness ranking, and think our alumni will be delighted, too. 'Effectiveness' is the grade our peers give us on our performance as teachers, advisors and researchers. Scoring 6th means a UW degree is valuable, and that our students are getting an excellent education in the opinion of people who know."

The NRC analysis, published in September, is called the "1993 Study" since the data was gathered in 1992/93. [See rankings table.] Full details on the computer science rankings are available in web spreadsheet form from the Computing Research Association WWW site:

http://cra.org/NRCStudy/.

The NRC ranking is "reputational," meaning that the results were determined by an opinion poll of 221 CS professors, rather than by objective data. For the Faculty Quality ranking, each respondent was asked to rate about 50 randomly selected departments using the scale:

- 5 = distinguished
- 4 = strong
- 3 = good
- 2 = adequate
- 1 = not sufficient for doctoral education

The average was reported after eliminating the top two and bottom two responses. All departments with a Faculty Quality average greater than 4.0 (UW and 8 others) were described by the NRC as "Distinguished."

The Doctoral Program Effectiveness category was determined using a similar methodology, but with the scale ranging from "extremely effective" to "not effective." Fifteen of the 108 departments were described by the NRC as "extremely effective," though only 6 (including UW) scored greater than 4.0.

The Five Year Change ratings were computed from a tripartite classification of opinions:

- 1 =better than 5 years ago
- 0 = little or no change
- -1 = poorer than 5 years ago

CSE's Change score of 0.58 indicates more of our peers perceive improvement at UW than at other top departments.

In addition to the reputational survey, the NRC also compiled objective data reflective of scholarly activity, such as the proportion of faculty who are actively publishing. Though this information was not used in computing the rankings, it is a secondary means for judging quality. In these catagories the CSE faculty also show well.

UW departments ranked in the top 10% in a dozen of the 41 fields considered by the NRC study:

Program	Position	# Progs
Molecular & Cell Bi	ology 8	180
Botany/Zoology	7	129
Physiology	7.5	140
Psychology	12	185
Pharmacology	9.5	127
Bioengineering	3	38
Computer Science	9	108
Biostatistics	6	65
Biochemistry	18	194
Physics	14	147
Sociology	10	95
Oceanography	3	26

Several strong UW programs are not in the list, either because of anomalies in the survey (Astronomy), or the subject area was not covered (Nursing).

Gathering and interpreting data of this type is always difficult. For example, Lazowska noticed CSE's "Median Years to Doctorate" was reported by the NRC to be 8.6 years, several years higher than our figures indicate. *MSB* reported in 1990, for example, that CSE PhDs average 5.5 years. "Our numbers measure time spent in grad school at UW," said Lazowska, "but NRC's numbers measure the time from first entering any school after a bachelor's degree until graduating with a PhD. This includes time getting a Masters degree at another school, possibly in

Rankings continued on page 3

RANKINGS AND DATA FOR DISTINGUISHED CS DEPARTMENTS

Source: National Research Council's study, *Research-Doctorate Programs in the United States: Continuity and Change*, ranking 108 computer science programs for quality and effectiveness.

INSTITUTION	QUALITY RATING (1993)	Effectiveness Rating (1993)	5-YEAR CHANGE RATING (1988-93)	TOTAL FACULTY (FALL 1992)	% FACULTY WITH RESEARCH SUPPORT (1986-92)	% Faculty who published (1988-92)
Stanford	4.97	4.60	0.12	31	84%	90%
MIT	4.91	4.62	0.07	39	72%	77%
Berkeley	4.88	4.58	0.31	40	73%	95%
Carnegie Mellon	4.76	4.38	-0.04	42	71%	83%
Cornell	4.64	4.47	0.23	36	92%	83%
Princeton	4.31	3.84	0.27	18	89%	83%
Texas, Austin	4.18	3.81	0.17	56	57%	73%
Illinois	4.09	3.93	0.12	59	61%	76%
Washington	4.04	4.05	0.58	29	90%	86%
Wisconsin	4.00	3.87	0.42	35	83%	97%

Datagrams

Fellows Named

Professor Hank Levy and Visiting Professor Mary Vernon, from the University of Wisconsin, have been named Fellows of the Association of Computing Machinery. They will be among 53 inductees honored at the Annual Computer Science Conference held this year in Philadelphia.



Mary Vernon and Hank Levy

CSE Hosts Programming Contest

The 19th Pacific Regional semi-finals of ACM's Programming Contest attracted 24 3-person teams to Sieg Hall on November 18, 1995. (A parallel Pacific Region round with 24 teams was held at Diablo Valley College, Calif., the same day.) CSE fielded two teams coached by Assistant Professor Steve Burns. Team 1: Corey Anderson, Paul Franklin and Yih-Chun Hu. Team 2: Casey Anderson, Jim Evans and Trent Piepho. Team 1 finished 3rd in the 48 team field, behind Berkeley Team 1 and Simon Fraser. The event, organized by Associate Professor Steve Hanks with generous help from the CSE Lab staff, came off flawlessly.

Outstanding Teaching Assistants

Kingsum Chow, Dave Dion, and Rex Jakobovits won the 1995 Bob Bandes Memorial Award honoring outstanding teaching assistants in CSE classes.

Profiles in Computers

Affiliate Professor Burton Smith, Chairman of Tera Computer Corporation, is one of the field's pioneers profiled in *Out of their minds: the lives and discoveries of 15 great computer scientists*, by Dennis Shasha and Cathy Lazere, published by Springer-Verlag. Burton says, "My misspent youth is revealed."

Lazowska Testifies

CSE Chair Ed Lazowska testified to the House Science Subcommittee on Research on October 31, 1995, in his capacity as chair of the Computer Research Association's Governmental Affairs Committee, at hearings on the High Performance Computer and Communications Act. The testimony can be found at: http://cra.org/testimony/lazowska.html.

UW Grads: The Choice of Top High-Tech Firms

Where do leading high-tech firms find the talent they need to continue the innovation so characteristic of America's computer industry? In 1995, Intel and Microsoft found the largest fraction in Seattle. Each company hired more graduates from UW than from any other university.

"Intel has been particularly active in recent years as a patron of the CSE and EE departments," said Ed Lazowska, CSE Chair. "These closer ties between the company and the two departments may explain their successful recruiting." The number one ranking includes all UW graduates, though CSE and EE account for the majority of the new hires.

It might seem natural that a local company should recruit from the local college, but Microsoft scours North America for top talent. The software giant hired almost as many graduates from MIT and from the University of Waterloo in Ontario, Canada, as it did from the UDub. Like Intel, Microsoft has also developed closer relationships with CSE in recent years.

Other companies like UW CSE graduates, too. Of 28 engineers at GeoWorks/Seattle, 24 are current or former CSE students. GeoWorks manufactures the Zoomer Personal Digital Assistant. At DECWest Engineering, CSE grads account for 23 of 27 recent college hires. And 14 of Tera Computer Company's 55 employees are from CSE. Tera is a Seattle supercomputer startup.

Rankings continued from page 2

an unrelated field, time spent working between a Masters and PhD, etc. So, Haim Mizrahi, who received his UW PhD in 3 years, counted as 15-20 years in NRC's computation, since he came back to school after many years of working."

Loren Carpenter

Distinguished Engineering Alumnus

Loren Carpenter, who earned an MS in Computer Science in 1976, became the second graduate of the department to win a Distinguished Alumnus Award from the College of Engineering. The award was made at the College's annual banquet in May.

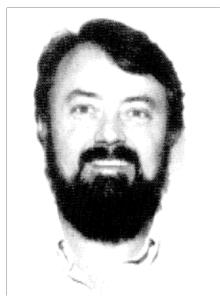
Carpenter, who is currently Chief Scientist for Pixar in San Rafael, California, is a well recognized pioneer in the field of computer graphics. He is the author of numerous fundamental papers in computer image synthesis and display algorithms. He holds several patents, personally and through Pixar. His technical awards include the third SIGGRAPH Technical Achievement Award in 1985 and an Academy Award for Scientific and Technical Achievement in 1992, recognizing the contributions of Render-Man to the film industry. He is also an ACM Fellow.

Alumni Profile

While working for the Boeing Company, from 1966 to 1980, Carpenter developed a family of methods for synthetically generating realistic images using fractal geometry. His 1980 film Vol Libre, the world's first fractal movie, received wide acclaim. He continued his pioneering work with Lucasfilm's Computer Division. He was a major contributor to the computer generated scenes in four Star Trek movies. Pixar was formed by Carpenter and his colleagues in 1986 to further advance the production of computer animated movies. Pixar's Tin Toy won an Academy Award for best animated short film in 1989. Pixar's RenderMan image synthesis software system has been used, for example, by Lucasfilm's ILM to render the dinosaurs in Jurassic Park.

In collaboration with Disney Films, Pixar has currently completed the first full-length computer animated feature, *Toy Story*, just released for the Christmas 1995 season.

Several years ago Loren and his wife Rachel founded CINEMATRIX Interactive Entertainment Systems, Inc., to explore the intersection of computers and art. Currently the company is focusing on the development of interactive audience participation technology, first demonstrated by Carpenter at SIGGRAPH 91 in Las Vegas. It enables thousands of people to simultaneously communicate with a computer, making possible an entirely new class of human-computer interaction.



Loren Carpenter

Salesin

continued from page 1

Salesin's research projects are numerous and diverse. A sampling:

- Pen-and-ink illustration: automatically creating expressive illustrations from 3-D CAD models for application in the automatic creation of maintenance and repair manuals, both static and dynamic. [See cover for an example.]
- Wavelet representation of images: achieving different temporal and spatial resolutions for different parts of a video, so that fast moving objects, e.g. propeller blades, can have high temporal resolution without paying for it in other frames, or other parts of the same frame.
- Accurate duotone printing: a new form of inexpensive color reproduction, whereby only two inks (rather than four) are used, and the two inks are specially chosen to reproduce the specific image as accurately as possible.
- Automatic cinematography: an exploration of ways to encode and use the rules of cinematography, developed by filmmakers over the last century, to make

computer-generated 3-D animations more comprehensible for humans, say for interactive simulations.

These, and Salesin's other projects, are collaborative with undergrads, graduate students and faculty, especially Tony DeRose.

Salesin's graphics credits include several of the famous computer animations of recent years. For *Andre and Wally B*, and the stained glass window sequence in *Young Sherlock Holmes*, he contributed modeling and rendering software for facial animiation. For *Luxo Jr*. he developed a new rendering algorithm and software for shadows. The latter two films were nominated for Oscars. The 1988 Academy Award for Best Short Animated Film went to *Tin Toy*, created by Pixar using Salesin's mechanical dynamics software.

Salesin is just finishing the manuscript for a book, Wavelets for Computer Graphics: Theory and Applications, with Eric Stollnitz and Tony DeRose, and he has already graduated one PhD student, Per Christensen, whose thesis was titled, Hierarchical Techniques for Glossy Global Illumination.



Marcy Golde, Hellmut Golde, Gail Murphy

Gail Murphy Receives First Educator's Fellowship

Doctoral candidate Gail Murphy was named Hellmut Golde Graduate Fellow, becoming the first awardee from CSE's year old Educator's Endowment. Murphy is writing a dissertation in software engineering with David Notkin.

At a ceremony to recognize recipients of departmentally endowed fellowships, CSE Chair Ed Lazowska praised Golde. "Hellmut has contributed generously to CSE throughout his entire career. Not only was he one of the department's founders, a model teacher and the creator of the Pascal Fund, but since retirement he-and Marcy-established the Educator's Endowment by their substantial contributions." Among others who lauded Golde's generosity were Jerre Noe, the department's first chair, and J. Ray Bowen, Dean of Engineering. Lazowska noted that the Endowment had also received a substantial contribution from Rob Short (MS 87).

The recipient of the 1995 Minorities and Women Fellowship is Ruth Anderson, a doctoral candidate working on parallel compilation with John Zahorjan. The 1995 Microsoft Endowment fellowships have been awarded to undergraduates Ellen Cullom and Amin Mansuri. Both endowments are open to undergraduates and graduate students.

Golde's collaboration with five graduate students in the late 70's to produce a Pascal compiler for the VAX 11/780 had a most profound effect on the department. Licensed to Digital Equipment in an agreement that paid royalties, the compiler generated well over \$1M in revenue for CSE. As Lazowska noted, "The Pascal Fund has always provided the 'flexibility' for the department to move forward. It paid the salaries of new hires, for example, in years when the University gave us faculty positions, but couldn't seem to fund them."

Lazowska went on to explain that the Educator's Endowment recognizes the faculty in their most fundamental role. "Education is not just classroom teaching, but advising, mentoring, challenging, guiding, and collaborating with students." The Endowment will fund graduate fellowships named in honor of CSE faculty, selected on a rotating basis. Dean Bowen noted that the endowment coupled the university's most important resources, its faculty and its students.

Did a CSE teacher affect you deeply? To honor that person with an Educator's Endowment contribution, contact MSB.

— Ed.

Gail Murphy

Gail Murphy is a 4th year graduate student, who received her undergraduate degree from the University of Alberta. After graduation she worked five years on the staff of MPR Teltech Ltd. near Vancouver, BC.

Her thesis topic is "Lightweight Structural Summarization as an Aid to Software Evolution." According to Notkin, "One of the key ideas in her thesis is the 'software reflexion model.' The reflexion model tools have been applied by Microsoft as part of an experimental re-engineering of the Excel codebase, which consists of 1.2M lines of C code. The feedback from applying her software in industry greatly affected her research." The work is covered in one of two papers Murphy presented recently at SIGSoft's Third Symposium on the Foundations of Software Engineering.

Though she is the first recipient of the Educator's Fellowship, Murphy is no stranger to teaching. She has taught the second course in computer science (CSE143) through UW's Extension, with all of the attendant responsibilities of lecturing, exam preparation, grading, etc.



Oren Etzioni and Erik Selberg

MetaCrawler Races Across the Internet

Unlike the image suggested by its name of a slow moving creature deliberately picking its way across the Web, the MetaCrawler is getting around very fast. Since the last *MSB* when MetaCrawler was described in the Softbots article, its daily usage has jumped from negligible to 30,000 accesses/day. The attention is generated by the news media, including the *Seattle Post-Intelligencer* and *Forbes*, highlighting the system.

Why all of the excitement? Finding information on the Wide World Web can be tough. Standard search engines can be ineffective because of limited coverage and stale data. MetaCrawler is a "meta search engine" that dispatches other searchers to look for the information, and then filters the responses, eliminating stale data and redundancies.

"MetaCrawler is higher up on the 'information food chain' than search engines," says Assistant Professor Oren Etzioni, co-developer of MetaCrawler with graduate student Erik Selberg. Forbes [October 23, 1995] used a different metaphor, "MetaCrawler piggy-backs its searches on six other services—those of Lycos, WebCrawler, InfoSeek, Open Text, Yahoo! and Galaxy." Since then, two

more searchers have been added: Excite and Inktomi.

U-Dub Web searching technology is big. In addition to MetaCrawler, WebCrawler, America Online's search engine, was developed by CSE graduate student Brian Pinkerton.

Forbes emphasized the key point about MetaCrawler's technology. "Because MetaCrawler lets other computers do the heavy lifting of searching, it can offer not only the advantages of combined search, but also a more intelligent querying system." Etzioni noted that although search engines must build, maintain and search huge databases, MetaCrawler is a comparatively tiny program. "It could reside on every PC in the country."

"We were gratified by the *Forbes* article," said Etzioni. But he was scrambling the day the article came out: *Forbes* got the URL (uniform resource locator) wrong! "We had to establish the erroneous address, and put in a link to the correct one," he said.

MetaCrawler can be found at http://metacrawler.cs.washington.edu:8080. So, drop in and see what the excitement is all about!

Postdocs Bring Expertise, Intensity

In other physicial sciences, there is a long tradition of PhDs spending a few years after graduation as postdoctoral research associates. Devoting a few years to a postdoc provides additional training and experience for the researcher, as well as bringing added vitality and research activity to the department. But computer science has not had a postdocking tradition until now.

As recently as three years ago CSE averaged fewer than one postdoc per year. But the numbers began to increase dramatically: Two years ago there were two postdocs, last year there were three. For 1995-96 there are ten:

- **Kevin Bolding**, PhD from Washington, visiting the Chaos Project, will be joining Seattle Pacific University.
- Marios Dikaiakos, PhD from Princeton, visiting ZPL Parallel Language Project and Astrophysics, will be joining the University of Cyprus.
- **Robert Doorenbos**, PhD from Carnegie Mellon, visiting the Artificial Intelligence Group.
- Steve Gortler, PhD from Princeton, visiting the Graphics and Imaging Lab and Microsoft's Graphics Research Group.
- Wilson Hsieh, PhD from MIT, visiting the SPIN Operating Systems Project.
- **Herve Jamrozik**, PhD from University of Grenoble, visiting Hank Levy and working on global memory management in workstation clusters.
- Calvin Lin, PhD from Washington, visiting the ZPL Parallel Language Project, will be joining the University of Texas, Austin.
- **Daniel Lischinski**, PhD from Cornell, visiting the Graphics and Imaging Laboratory.
- Francesmary Modugno, PhD from Carnegie Mellon, visiting Nancy Leveson and studying the effects of human error on system safety.

Postdocs continued on page 7

Grad Student Newsletter Online

Interested in UW computer science, but find MSB too staid for your tastes? Check out Mossy Bits, the graduate student newsletter. Previously available only to denizens of Sieg Hall, Mossy Bits has made its WWW debut: http://www.cs.washington.edu/publications/mossybits/autumn95.

In addition to art, poetry, music and travelogues, there is a special section devoted to pre-1970 photos of the faculty! Can you guess who's who?

MSB is published semiannually by the **UW** Department of Computer Science & Engineering to provide current information about its undergraduates, graduate students, faculty and alumni. **MSB** is supported by the CSE Affiliates Program. Volume 9, Number 1 editors are Larry Snyder and Judy Watson. We thank contributors: Richard Ladner, Ed Lazowska, and David Notkin; computer graphic by Michael Salisbury, Sean Anderson, Ronen Barzel, and David Salesin; photos by Nancy Levin, Karen Orders and Judy Watson; photo of Loren Carpenter courtesy of Loren Carpenter.

Home Page Request

MSB will publish URL's for alumni home pages in a future issue. Send us your URL so your classmates can visit: email: *msb@cs.washington.edu*.

Postdocs continued from page 6

• Jon Reese, PhD from UC Irvine, visiting Nancy Leveson and developing engineering methodologies for safety critical systems.

Additionally, two Visiting Scholars join CSE this year.

- **Tao Jiang** from McMaster University, PhD from Minnesota, visiting Dick Karp.
- **Ann Tessadro**, PhD from Polytechnique, Grenoble, visiting Hank Levy.



Corey Anderson, Brad Chamberlain, Vikki Zarkovich

Husky Hot List

Contest Finds Best CSE Home Page

Graduate student Brad Chamberlain won the "Best Departmental Home Page" Contest sponsored by the ACM Student Chapter. His page, voted best from a hot list of five finalists [see box], features extensive coverage of Otter Pops, the frozen popsicle-in-a-tube snack.

"It was a close race, but Brad managed to freeze out the competition," said Vikki Zarkovich, chapter Co-Secretary, and self described Contest Czar. "It must have been the Otter Pops," she quipped.

Husky Hot List

Bradford Chamberlain, brad@rosalyn.cs.washington.edu
http://www.cs.washington.edu/homes/brad
Stuart Denman, sdenman@wolf.cs.washington.edu
http://www.cs.washington.edu/homes/sdenman
Jack Hill, jshill@u.washington.edu
http://www.cs.washington.edu/homes/jshill
Paul Kromann, pkromann@wolf.cs.washington.edu
http://weber.u.washington.edu/~kro/hstg/hstg.cgi
Richard Le, richle@grizzly.cs.washington.edu
http://www.cs.washington.edu/homes/richle

The hot list was chosen from thirteen entries "loosely judged on jazziness, originality, and usefulness by the ACM officers," according to Zarkovich. "We advertised the top five on CSE computer bulletin boards, and with flyers in Sieg Hall. The whole department was asked to vote for their favorite web page."

The ACM's goal according to Zarkovich is to recognize and reward the work of CSE students. "For example," she said, "I feel these entries illustrated complicated features including animation and audio, as well as a variety of student interests. Our next contest is a Computer Art Contest."



Computer Science As An Intercollegiate Sport

Intercollegiate sports regularly produce rankings of schools within a conference, based on different forms of competition. It is interesting to order schools by their NRC ranking in CS. Maybe the next Rose Bowl should pit Illinois against Stanford!

PAC-10	Ivy League	Big Ten
Stanford (1)	Cornell (5)	Illinois (8)
Berkeley (3)	Princeton (6)	Wisconsin (10)
Washington (9)	Harvard (11)	Michigan (21)
UCLA (14.5)	Brown (13)	Purdue (26)
USC (20)	Yale (14.5)	Indiana (36)
Arizona (33)	Columbia (22.5)	Northwestern (38)
Arizona State (61)	Penn (45)	Ohio State (39)
Oregon (64)	Dartmouth (56)	Minnesota (47)
Oregon State (70)		Michigan State (53)
Washington State (81)		Penn State (55)
. ,		Iowa (62)

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ADDRESS CORRECTION REQUESTED

Down Under Soincidence

Three of four overseas sabbaticals this past year took CSE faculty to Australia. Was it just coincidence? Apparently. Professors Kehl, Snyder and Somani, though all involved in hardware-related research, visited separate schools for unrelated scholarly purposes. The coincidence was widely discussed at the annual Australian Computer Science Conference in Adelaide. Ted Kehl visited Monash University, Melbourne, for six months. Larry Snyder spent a year at Sydney University. Arun Somani was a three month guest at the University of Newcastle, 200 km north of Sydney. And Alan Shaw, apparently preferring paté and brioche to shrimp on the barbie, spent six months on the opposite side of the world, in Paris.

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