

COVER SHEET

This page is included merely for automatic insertion into the Table of Contents. Use the Cover Sheet supplied by Faculty Affairs.

KRIS_PDS_final.doc (10/14/98 printer at home)

TABLE OF CONTENTSCONTENTSCONTENTS

	<u>Page</u>
COVER SHEET.....	1
TABLE OF CONTENTS.....	2
LETTERS OF RECOMMENDATION/REBUTTALS	3
ACADEMIC ACHIEVEMENTS	4
I. Candidate's Statement	4
II. Teaching Effectiveness	7
Five significant items	7
Courses taught during the last three years.....	8
Theses chaired, all special study projects.....	9
III. Professional Growth.....	11
Five significant items	11
IV. Service for the University and the Community.....	12
Five significant items	13
FULL CURRICULUM VITAE	15

LETTERS OF RECOMMENDATION/REBUTTALS

Behind this page place in reverse chronological order (most recent on top) the current year's letters of recommendation from department peer review committee, department chair, college peer review committee, dean, university panel, and rebuttals, if any, from the candidate.

Letters of recommendation, final award letters, and periodic evaluations from previous years' deliberations should be placed in a folder entitled "File 1 - Previous Years' RTP Letters," which should be placed in the front of the candidate's One-of-a-Kind file. Candidates shall include all letters since appointment or last promotion at SDSU. (Please include letters from department peer review committee, department chair, college peer review committee, dean, university panel, Vice President for Academic Affairs, the President, and rebuttals, if any, from the candidate.)

ACADEMIC ACHIEVEMENTS:

I. Candidate's Statement. (Maximum of three pages).Candidate's Statement; (Maximum of three pages)'. Candidate's Statement; (Maximum of three pages)'

The candidate's view of the relationship between teaching, professional growth and service. This portion of the form is an opportunity for the candidate for formulate a narrative statement describing the candidate's approach toward teaching and perhaps amplifying on classroom style and objectives. In a similar manner, the candidate has the opportunity to develop a statement that describes research interests and goals, and plan for achieving those goals. Likewise, the service activities of the candidate should be discussed in terms of a particular pattern or focus. An important part of this overall statement is the inter-relationship between these three aspects of the applicant's professional life. The candidate may wish to discuss past accomplishments, current efforts, and future plans in terms of a comprehensive and long-term career approach. This statement should be written so that a reader outside the specific discipline can understand the candidate's accomplishments. See the Senate Policy File II-E-1, 10 for an extended discussion of the above.

My teaching, professional growth and service activities have been focused on undergraduate curriculum development in computational science at SDSU and on using the emerging computing technologies for the benefit of my students. This is important for students who seek the Bachelors degree to prepare them for the workforce, for students who view the Bachelors degree as pre-service training for teaching and for students who will go on for advanced degrees if they are to be competitive in the quickly evolving, technology intensive world today.

The field of computational science has emerged over the past ten years as an academic discipline combining applied mathematics, computer science and science disciplines to form the *third leg* of science. The first two legs are theoretical investigations and laboratory experiments. Computational science uses computers, math models and software to reliably simulate experiments, reducing the financial and personal risk possible in the science laboratory. Simulation of the crash worthiness of vehicles and oil reservoir detection and monitoring are examples from industry. This has provided research and job opportunities for faculty and graduate students. I feel there is a compelling need to introduce undergraduate students to this exciting field as a way to motivate their academic career and prepare them for the sophisticated job market. I have developed two undergraduate courses, CS 575 Supercomputing for the Sciences and CS 205 Computational Programming and Visualization, which first appeared in the undergraduate catalog in 1993/4 and 1994/5, respectively.

I designed CS 575 Supercomputing (one-of-a-kind Section II.a) to attract students from different majors. The course builds on a student's programming background in Fortran or C, to introduce High Performance Computing (HPC) techniques which make effective use of the advanced computing platforms. CS 575 was developed through NSF funding in 1990-93 and was motivated by the availability of the San Diego Supercomputer Center

(SDSC) for use by the academic community. The funding also supported me to develop and present a week long summer workshop at SDSC for faculty who wanted to pursue Supercomputing and Undergraduate Education activities at their local institutions and began my national outreach in HPC education. In summer 1992 the workshop the workshop was attended by faculty from CSU campuses. In summer 1993, the workshop was attended by faculty from primarily undergraduate institutions nationwide. Coupled with my participation at the annual Supercomputing '92 and Supercomputing '93, I came to work with the Department of Energy's Undergraduate Computational Science and Engineering (UCES) program and in 1994 received their "Undergraduate Computational Science Award" (one-of-a kind Section II.e). Developing CS 575 allowed me to collaborate with faculty from different disciplines within the College of Sciences to provide interesting computational projects based on faculty interests.

In teaching CS 575, I became aware of the need for an introductory programming course that could be tailored to develop the scientific problem solving skills students need. I felt this student population was not served well by the standard CS 107 Introductory Programming which used PASCAL and was designed more for prospective Computer Science students. Therefore, I developed CS 205 (one-of-a-kind Section II.b). This course is recommended for the BS in Computational Physics and is one of the "programming options" required for the Single Subject Mathematics Certificate for future teachers approved by the California State Department of Education. The Geography Department Chair has recommended that their curriculum committee discuss requiring CS in their GIS certificate and two of their BS degrees (see note from Dr. Stow in one-of-a-kind file)

I formed a close professional relationship with the San Diego Supercomputer Center (SDSC), beginning as a user in 1986 when the Center was founded by NSF. I see SDSC as an extremely valuable resource for the academic community and have been a Senior Fellow since 1990, the SDSU representative for the SDSC Steering Committee since 1992 (one-of-a-kind Section IV.a), and SDSC's Computational Science Curriculum Coordinator since 1993.

A natural extension of my work with SDSC is reflected in the NSF funded grant, Supercomputer Teacher Enhancement Program (STEP) (one-of-a-kind Section IV.e). Begun in 1993, the three year grant to UCSD Extension and SDSC focused on enhancement for over forty high school science and math teachers, working as teams, from nearly 20 San Diego county schools. The three week summer workshop and six Saturday meetings during the academic year were held at SDSC. I was in charge of the curriculum to develop the teacher's skills with the tools of computational science that would be appropriate on the Macintosh or IBM/PC personal computers in the high school classroom. In May 1993, I represented Dr. Sid Karin of SDSC at the National Academy of Sciences Conference on "Reinventing Schools: The Technology is Now", concerned with the gap between the Nintendo Generation of our youth and the high tech world of the Internet, book publishers, software writers and education professionals. I felt this was valuable preparation for my working with STEP and gave me a new perspective that is applicable to SDSU and our future. STEP was successful in forming collaborations to use

computational examples to complement and extend the traditional curriculum approved at the state level in California. As recognition, STEP was nominated for the Computerworld/ Smithsonian Award in Information Technology. I traveled to Washington, D.C. in June 1996 to accept the recognition medal. Our materials are now a part of the permanent research collection of the American History Museum of the Smithsonian, available from my home page (one-of-a-kind Section II.c).

In the 1994 and 1995 academic years, SDSC chose to provide halftime support to SDSU to allow me to remain active at the national level in undergraduate curriculum for computational science. I attended the entire week of the Supercomputing '94 Conference in Washington, D.C., as I had only done for Supercomputing '92 in Minneapolis while on sabbatical leave. This conference has had a growing, and now extensive, education component for K12 and university educators and I have established, maintained and extended my contacts in this field through this participation. Supercomputing '95 was held in San Diego in December and I was on the Education Program Advisory Committee (one-of-a-kind Section IV.c). I performed extensive outreach to the San Diego Education and Industrial communities during Supercompting '95 describing my activities at SDSU and with STEP.

In August 1995, I was invited to participate on the "High Performance Computing and Communications in Research and Education Panel" at the Seminars on Academic Computing in Snowmass, Colorado (on-of-a-kind Section III.d). This conference made me aware of many of the issues currently facing the CSU and SDSU in dealing with Information Technology for the learning environment of our students. Therefore, I was eager to work with a variety of faculty this past spring 1996 on the Ad Hoc Committee on Emerging Technologies. I chaired the subcommittee on Trends and Opportunities (one-of-a-kind Section IV.b) which had members from the Colleges of Arts and Letters, Professional Studies and Fine Arts, Health and Human Services, Business Administration, Education as well as the College of Sciences. I established collaborations with faculty across the disciplines and identified tasks where my computer science and HPC background could contribute.

As a Computer Science faculty member, I serve as Undergraduate Advisor and sponsor of the student chapter of the ACM. We have worked to have our BS re-accredited and have participated in forming the Computer Science Industrial Advisory Board. As an on-going demonstration of my concern for recruitment and retention of students for the Computer Science degree, I am teaching a University Seminar for Freshman Success this Fall.

Regarding my future plans, I would like to briefly mention my work with the National Partnership for Advanced Computing Infrastructure (NPACI), the recently submitted proposal to NSF for the next five years funding of SDSC under the leadership of Dr. Sid Karin, now of UCSD. After lengthy discussions with Dean Frick of Engineering and Dean Short of Sciences, I have proposed the Education Center for Computational Science and Engineering to promote undergraduate curriculum development using the evolving tools of computational science. The Center's role will be to share the technological and educational projects of the NPACI Partnership and facilitate adapting these projects for the

undergraduate curriculum through the personalized assistance for interested faculty. As one example, I recently attended the California Academic and Research Libraries "Information Competence in the Emerging Digital World" Conference in San Diego. If NPACI is funded, I plan to facilitate the use of the Digital Libraries, part of the NPACI partnership, by this community. In developing the plan for the Education Center, I was able to build on contacts made with San Diego City Schools, with the Charter High School at UCSD proposed by Provost Cecil Lytle of Thurgood Marshall College and with SDSU's Colleges of Education, of Arts & Letters, of Engineering and of Sciences to fashion a broad-based plan to impact curriculum at all levels for the benefit of our students. I obtained strong support and matching funds from the CSU Chancellors Office and as well as from President Stephen Weber and Vice President Ethan Singer.

II. Teaching Effectiveness.. Teaching Effectiveness. Teaching Effectiveness

1. List and provide a brief explanation of no more than five significant items (a teaching award, a new course, a teaching aid, a teaching innovation, a lab manual, a study guide, etc.) since appointment or the last three years, whichever is longer. Provide appropriate documentation in the one-of-a-kind file.

a) CS 575 Supercomputing for the Sciences

With a prerequisite of a programming background in C or Fortran, this course develops students' ability to effectively program their own scientific computations. Students learn the capabilities of the High Performance Computing platforms available at the San Diego Supercomputer Center and how to evaluate performance through their own use of these resources. Through written reports on their computational experiments, the technical writing skills are also enhanced.

b) CS 205 Computational Programming and Visualization

This course builds on the prerequisite of Calculus to introduce programming and problem solving in the MATLAB environment. The MATLAB software is available on an extensive variety of computing platforms and is used extensively in industry for computational investigations. MATLAB provides both programming and sophisticated graphics capabilities which are valuable for later courses.

c) Use of World Wide Web for Delivery of Course Material

I requested and received my Web page <<http://www.stewart.cs.sdsu.edu>> in June 1994. This immediately replaced using anonymous ftp to share curricular and research materials with my peers. Subsequently, I have found this an effective way to share lectures and examples with students because they can have access to them at their own convenience. My courses use this (<www.stewart.cs.sdsu.edu/cs205/> and similarly for cs575, cs524, math693). I would like to point out a lab exercise I wrote on **Information Overload** (<<http://www.stewart.cs.sdsu.edu/infolab/>>, available in the

one-of-a-kind Section II.c). The Web is not a peer review medium and demands personal critical assessment by the students

d) Computational Science Masters Degree new program

I have been an active participant for several years with the group of interdisciplinary faculty, led by Dr. Jose Castillo, to craft a degree program that can draw primarily from existing courses (including CS 575) to prepare students at the Masters Level for a career in computational science. The committee consists of J. Castillo, S. Day, R. Pozos, P. Salamon, H. Shore, R. Steckler and K. Stewart. The proposal has received approval at all levels at SDSU and was forwarded to the CSU Chancellors Office on October 16, 1996.

e) Department of Energy Undergraduate Computational Science Award, 1994.
[<http://uces.ameslab.gov/uces/awards/ugcsa94/stewart.html>]

I began working with the DoE Undergraduate Computational Science and Engineering (UCES) program in 1993. Materials from their web site, <http://uces.ameslab.gov/uces/>, give an overview of the pedagogic goals that this diverse group of faculty came to identify. A subset of these materials are contained in the one-of-a-kind file. We identified the path from problem statement to computational solution, with the continual interaction of assessment for a viable education module.

2. List courses taught during the last three years during the last three years during the last three years during the last three years, the number of students in each course, the average class grade, the average student evaluation for each class and the departmental average student evaluation for each respective semester. Include student evaluations, student comments, and grades for classes taught at other universities within the last three years.

<u>Course No., Title, and Semester/Year</u>	<u>Number Students Enrolled</u>	<u>Students Completing Evaluation</u>	<u>Average Class Grade</u>	<u>Student Evaluation</u> ¹	<u>Student Dept Evaluation</u> ²
CS-575	13	9	3.08 (B)	4.4	3.9 (b)

¹The average student evaluation score for this class.

²Departmental average of student evaluations for the semester. Please indicate if the average student evaluation is the departmental average or another appropriate average such as the average for lower division courses in the department, upper division courses, graduate courses, or the average for a multi-section course.

Supercomputing for the Sciences
Spring 1996

CS-205	15	11	3.14 (B)	4.2	3.7 (a)
--------	----	----	----------	-----	---------

Introduction to Computational Analysis
Fall 1995

CS-575	23	21	2.93 (B-)	4.5	3.6 (b)
--------	----	----	-----------	-----	---------

Supercomputing for the Sciences
Spring 1995

Math-693B	6	4	4.00 (A)	3.8	4.0 (c)
-----------	---	---	----------	-----	---------

Advanced Numerical Analysis
Spring 1995

CS-205	9	4	4.00 (A)	4.5	3.6 (a)
--------	---	---	----------	-----	---------

Introduction to Computational Analysis
Fall 1994

Math-693A	11	9	3.97 (A-)	3.9	4.1 (c)
-----------	----	---	-----------	-----	---------

Advanced Numerical Analysis
Fall 1994

CS-575	13	10	3.15 (B)	4.1	4.0 (b)
--------	----	----	----------	-----	---------

Supercomputing for the Sciences
Spring 1994

CS-624	7	3	3.67 (B+)	3.6	4.0 (c)
--------	---	---	-----------	-----	---------

Advanced Compiler Construction
Spring 1994

Math-542	15	17	3.39 (B+)	3.9	4.0 (b)
----------	----	----	-----------	-----	---------

Introduction to Numerical Solutions of Differential Equations
Spring 1994

Did not teach Spring 1993, On 100% Grant Release

- (a) Departmental lower division average
- (b) Departmental upper division average
- (c) Departmental graduate level average

3. List all theses chaired, all special study projects, all special study projects, all special study projects, all special study projects directed, and membership on any thesis committee for the last three years. Provide the title and a one sentence

description of each.

Stewart as Chair:

Mike Ferguson, "Investigation of a Parallel Cyclic Reduction Implementation for Positive Definite Tridiagonal Matrices", 1995.

Thorough investigation and documentation of the performance of the algorithm on the Intel Paragon parallel computer confirming that parallel cyclic reduction provides a practical improvement over Gaussian elimination for large problems and meets the requirements for scalability.

Brons Larson, "A Test Problem to Compare the Performance of Numerical Solvers for Hamiltonian Equations", 1993

Numerical methods based on symplectic techniques had been made available at this time. There was a need to compare the different solvers using a standard, but adaptable test problem, that would exhibit quantifiable problem properties so that performance assessment could be accomplished. These performance results were gathered for a variety of numerical solvers and their characteristics and properties analyzed.

Robert Morris, "Using Broyden's Algorithm to Generate Preconditioners", 1993

Numerical solution of partial differential equations by iterative methods benefit by effective preconditioners which transform the linear system being solved. Typically the user is required to provide this problem-dependent information. The inexpensive rank one update provided by Broyden's Algorithm was investigated to automatically determine this information at run-time and the performance enhancements gained thoroughly documented.

Eric Reichelt, "Implementing FORTRAN ODE Solver LSODE using MATLAB", 1993

A careful translation and implementation in the MATLAB environment of the large Fortran solver was investigated. Savings due to using the MATLAB vector operations was documented. The thesis focused on detailed considerations of the software engineering issues raised in adapting to an alternate computing environment.

Eric Haas, "Investigations of Prony Methods to Enhance Stability of the Backward Differentiation Formulas", 1993

Prony's method allows estimation of parameters for exponential fitting, which was the basis for explorations of run-time fitting for nonlinear problems to determine their eigenvalues. Since the linear stability of numerical methods for ordinary differential equations depends on the "active" eigenvalue of the problem, we proposed to use this information to select the appropriate numerical technique and method order.

Stewart as Member:

Robert Cademy, "Implementing an On-line Directory of Women in Technological Fields", MALA Project, (Dr. Stephen Roeder, Chair), 1996

Gabrielle Gillota, "On-Line Directory of Women in Technological Fields", MALA Project, (Dr. Kathleen Jones, Chair), 1996

Sharon Rhoades, "Singularly Perturbed Boundary Value Problems", Applied Mathematics (Dr. Steve Kirschink, Chair), 1994

Bruce Sears, "Numerical Study of Fluctuations in the Energy Level Spectrum of the Anderson Model", Physics (Dr. Herb Shore, Chair), 1992

Kristofer Timmerman, "Kraftwork: A Flowchart Generation System", Computer Science (Dr. Carl Eckberg, Chair), 1992

James Crawford, "A Photometric and spectroscopic analysis of the Eclipsing Variable Star RT Lacertae", Astronomy (Dr. Paul Etzel, Chair), 1992

Brian Nguyen, "An Upwind Axisymmetric Euler Solver", Aerospace Engineering (Dr. Allen Plotkin, Chair), 1992

4. In chronological order, place the following items in the one-of-a-kind file for the last six (6) semesters:
 - a. Include peer visitations/evaluations, including any written remarks, if applicable.
 - b. Include the written student evaluations of faculty and a copy of the computer printout of the summary of student evaluation forms for each course.
 - c. Include a copy of each course syllabus.
 - d. Include a copy of all major or final exams for each course.

III. Professional Growth.. Professional Growth. Professional Growth

List and provide a brief explanation of no more than five significant itemssignificant itemssignificant items (a refereed journal article, a grant, an award, critique of a performance or exhibition, an honor, etc.) since appointment or the last three years, whichever is longer. Professional growth activities may include the above-listed items and any other appropriate activities. Provide documentation in the one-of-a-kind file.

a) Minisymposium on Education Issues in Computational Science at the 1995 Scientific Computing and Differential Equations (SciCADE95) Conference, Stanford University, April 1995 [<http://www.stewart.cs.sdsu.edu/scicade95/>]

The organizers of this conference asked me to assemble this minisymposium and I was able to bring together a representative from DoE's Sandia Labs (since the government labs are the largest employer of computational scientists), from Genentech Corp (since industry is frequently the source of the problems computational scientists investigate), from academia (addressing the changing nature of education), as well as a representative from UCES and the person who has been keeping thorough track of the emerging education activities in this field (available from Dr. Swanson's Web page for Cray Research at http://www.cray.com/PUBLIC/HPC/ind/univ/Comp_Sci_Paper.html).

- b) "HPC Undergraduate Curriculum Development at SDSU using SDSC Resources", refereed Conference Paper for Innovative Education Issues, Proceedings of the 1995 ACM/IEEE Supercomputing '95, San Diego, December '95. (<http://www.stewart.cs.sdsu.edu/sc95/>)

Supercomputing '95 had a totally electronic proceeding, so my paper describing the work at SDSU is available from my web page, above, or from the conference proceedings archive at <http://www.supercomp.org/sc95/proceedings/SC95MAIN.HTM> where you can select **Search by Author** for a description consistent with the contents of this document.

- c) IEEE Computer Science and Engineering facilitator for Focus Group Meeting at Supercomputing '95 on "What should IEEE CS&E Cover? How can it better serve the CSE Community", December 1995

Dale Strock, managing editor of the only journal in this field, and I had extensive discussions on how to organize this meeting at Supercomputing '95. The invitation was published prominently in the Fall 1995 issue and I personally contacted appropriate professionals to ensure their participation. The discussion was useful to both the journal and myself since it broadened the group of contacts for future collaborations.

- d) "High Performance Computing in Research and Education Panel", invited presentation at the Seminars on Academic Computing '95 Tough Choices/Radical Opportunities, Snowmass, Colorado, August 1995. (<http://www.stewart.cs.sdsu.edu/snowmass>)

The panel consisted of Robert Borchers, Director, NSF Division of Advanced Scientific Computing; George Strawn, NSF Networking and Communications Research and myself. This long-standing conference attracts the Department Chairs from Information Technology organizations and academic computing centers. Besides presenting at this meeting, I attended many of the panels, discussions and demonstrations which made me aware of the new possibilities, responsibilities and problems that await higher education in the rapidly changing world.

- e) Co-organizer and presenter at "Academic Programs in Computational Science and Engineering Education", Albuquerque NM, February 1994 [<http://www.stewart.cs.sdsu.edu/doehpcme.html>]

There were extensive meetings in Albuquerque planning and organizing this conference

which was reviewed in the IEEE CS & E journal (enclosed in my one-on-a-kind Section III.e). Joan Francioni and I had the responsibility to invite and coordinate the appropriate faculty to discuss issues for undergraduate education. At the conference itself, I was also a presenter and Joan moderated the panel.

IV. Service for the University and the Community.

List and provide a brief explanation of no more than five significant itemssignificant itemssignificant items (a committee assignment, an office in a professional organization, an office in a relevant community organization, a lecture, participation in a service activity, a student outreach program, etc.) since appointment or the last three years, whichever is longer. The service activities may include the above-listed items and other appropriate activity. Provide documentation in the one-of-a-kind file.

- a) Member of SDSC Consortium Steering Committee representing SDSU

The Steering Committee consists of twenty seven distinguished research and education institutions which meets quarterly and provides feedback to SDSC on its operations, plans and user activities. SDSU is the only CSU campus. When I was appointed, I consulted with the Deans of Sciences, Engineering and Business Administration to obtain their recommendation for an allocation committee to formulate policy for how the Block Grant of computer time should be allocated. With the administrative help of the Library, I manage this resource for SDSU (<http://www-rohan.sdsu.edu/CRAY.html>)

- b) SDSU Ad Hoc Committee on Emerging Technologies, Chair for Trends and Opportunities Subcommittee, Spring 1996

Given the background I had developed through the Snowmass Conference and the Reinventing the Schools Conference and other activities involving education and information technology, I was happy to participate with this group. I was able to organize a panel discussion involving representatives from many of the campus laboratories - from Music, SSRL, Sciences, Library and Academic Computing to discuss their available resources with faculty from a broad range of disciplines. Other activities are discussed in the One-of-a-Kind.

- c) Supercomputing '95 Education Program Advisory Committee coordinating STEP activities for outreach to educational community.

Dr. John Ziebarth, Education Chair for Supercomputing '95, and I met several times prior to the conference and exchanged e-mail extensively in organizing the extensive education program. The STEP participants prepared and presented workshops during the national education portion of the conference, which was attended by educators nationwide on the weekend prior to the conference. STEP also worked with local school administrators and educators on the Education Days during the conference.

- d) "HPC Curriculum Development: Web Browser for Developing, Presenting and Sharing

Resources”, Minority University - Space Interdisciplinary Network (MUSPIN) Annual Users Conference Invited Presentation, October 1995. (<http://www.stewart.cs.sdsu.edu/muspin>)

Morgan State University was the site of this conference. This Historically Black University has obtained a Cray J90 and was interested in how to begin developing education activities and asked me to speak. I not only covered the work I have done at SDSU and SDSC, but also argued that HTML (the language of the WWW) is an effective, cross platform media for presentations since my actual presentation was done from my notebook computer attached to a projection device.

- e) San Diego Science Educators’ Association Award for Outstanding Contributions to Science Education at the University Level, 1994.

This local association recognized me for the work I had done with STEP due to its impact on the schools in San Diego county. As the school districts begin to take advantage of the Internet, they turn to the STEP participants from their district to provide staff development. Each year a special Saturday meeting during the academic year, we invited the administrators to SDSC to see a presentation on what their teachers had been accomplishing. In the early day of Internet use, the excellent connectivity to the Internet that SDSC had was used to effectively show the Principals and staff what could be accomplished.

FULL CURRICULUM VITAEVITAEVITAE

I. NAME

Kris Stewart

II. EDUCATION

A. <u>Institution</u>	<u>Years Attended</u>	<u>Degree</u>	<u>Major Field</u>
University of New Mexico	1981-1987	PhD	Applied Mathematics
SDSU	1976-1979	MS	Computer Science
UC San Diego	1969-1973	BA	Mathematics

B. Title of Dissertation

“Semi-Implicit Backward Differentiation Formulas”

III. TEACHING POSITIONS AND RANKS HELD

<u>Institution</u>	<u>Rank</u>	<u>Date</u>	<u>Major Subject</u>
SDSU	Associate Professor	1991-present	Computer Science
SDSU	Assistant Professor	1984-1991	Computer Science
SDSU	Lecturer	1982-1984	Numerical Analysis

IV. TEACHING EFFECTIVENESS

Curriculum Development and Teaching Innovations

Stewart, Kris. “CS 575 Supercomputing for the Sciences”. May 1996. <<http://www.stewart.cs.sdsu.edu/cs575/>>
Course developed and taught by Stewart first appeared in SDSU Undergraduate Catalog 1993

Stewart, Kris. “CS 205 Computational Programming and Visualization”. November 1996.
<<http://www.stewart.cs.sdsu.edu/cs205/>>
Course developed and taught by Stewart first appear in SDSU Undergraduate Catalog 1994

Stewart, Kris. “CS 524 Compiler Construction”. November 1996. <<http://www.stewart.cs.sdsu.edu/cs524/>>

Stewart, Kris. “Math 693 Advanced Numerical Analysis”. November 1996.
<<http://www.stewart.cs.sdsu.edu/math693/>>

Textbooks and Other Teaching Aids

See web pages above.

Teaching Awards

“Supercomputer Teacher Enhancement Program (STEP)”, Computerworld/Smithsonian nominee for Information Technology in Education and Academia. The recognition medal received by Stewart, June 1994, at Smithsonian Museum, Washington, D.C. STEP now included in permanent collection of the American History Museum of the Smithsonian Institution <<http://innovate.si.edu/1996/96short/96ea27s.htm>>

“Developing Undergraduate Computational Science, A Personal QUEST”, Undergraduate Computational Science Award, Department of Energy, Ames Laboratory, ceremony Washington, D.C., September 1994.

<<http://uces.ameslab.gov/uces/awards/ugcsa94/stewart.html>>

San Diego Science Educators' Association award for Outstanding Contributions to Science Education, University Level, 1994.

TRW Excellence in Teaching Award for Outstanding Achievement in Teaching, 1988-89 (includes \$2,000 award)

SDSU Meritorious Performance and Professional Promise Award, 1989 and 1990

SDSU Outstanding Faculty Award Certification of Recognition, 1988.

V. PROFESSIONAL GROWTH

Articles in Refereed Journals

Geveci, T., and Stewart, K., "Numerical Experiments with a Nonlinear Evolution Equation which Exhibits Blow-up", *Applied Numerical Mathematics*, 10, pp. 139-147, 1992.

Stewart, K., "A Model for Stability of the Semi-implicit Backward Differentiation Formulas", *J. Computational and Applied Mathematics*, 33, pp. 245-259, November 1990.

Stewart, K., "Avoiding Stability-induced Inefficiencies in BDF Methods", *J. Computational and Applied Mathematics*, 29, pp. 357-367, 1990.

Long, D.D.E., Carroll, J.L. and Stewart, K., "The Reliability of Regeneration-based Replica Control Protocols", *IEEE Transactions on Computers, Special Issue on Computer System Performance*, 38, no. 12, pp. 1691-1702, December 1989.

Krogh, F.T. and Stewart, K., "Asymptotic Absolute Stability for BDFs Applied to Stiff Differential Equations", *ACM Transactions on Mathematical Software*, 10, pp. 45-57, 1984.

Articles in Refereed Proceedings

Stewart, K., "HPC Undergraduate Curriculum Development at SDSU using SDSC Resources", IEEE/ACM Supercomputing '95 Conference, San Diego, December 1995.
<http://www.supercomp.org/sc95/proceedings/704_KSTE/SC95.HTM> WWW site for Electronic proceedings available from IEEE/ACM site

Presentations Before Professional Conferences

"Lessons Learned from In-service Teacher Enhancement in Computational Science", SIAM Annual Conference, July 1996, Kansas City, MO <<http://www.stewart.cs.sdsu.edu/siam96>>

"STEP: Supercomputer Teacher Enhancement Program", poster presentation, Supercomputing '94, Washington, D.C., November 1994, Washington, D.C. <<http://www.stewart.cs.sdsu.edu/sc94.html>>

SIAM Annual Meeting, July 1994, San Diego. The San Diego Supercomputer Center was offered (through me) a "free" booth. Although SIAM regularly attends the Supercomputing meetings, this was the first participation by one of the NSF Supercomputer Centers at the SIAM Annual Meeting. (I organized/coordinated display)

"Computational Science Curricula and Programs: What is Out There and What Works?", panel organized by Dr. Lloyd Fosdick, U. Colorado Boulder, Supercomputing '93, Portland Oregon

"Student Edition of MATLAB as a Computational Tool for High Science Science", 1993 MATLAB Conference, October 1993, Boston, Massachusetts

"Supercomputing and Undergraduate Education at the San Diego Supercomputer Center" Poster Session, Supercomputing 92, November 1992, Minneapolis

"Exemplars of Undergraduate Supercomputing Research and Education Experiences" Panel participant, Supercomputing 92, November 1992, Minneapolis

"Computer vs. Computational Literacy: Investigations in Undergraduate Curricula", SIAM Annual Conference, 1992, Los Angeles, CA

"Computational Science Education: The Impact and the Issues at the Secondary and Undergraduate Levels, A Panel Discussion", EDUCOM '91, San Diego, CA, October 1991

"Using the Supercomputer in Advanced Computing - An Update", 1991 ICIAM Conference, Washington, D.C., July 1991.

"The Supercomputer as a Stimulant for Undergraduate Education", Computational Science in Industry and the Comprehensive University Conference, California Polytechnic University Pomona, November 1990.

"Using the Supercomputer to Enhance Undergraduate Education", 1990 SIAM Annual Conference Chicago, IL

"Semidiscretizations of PDEs using Adaptive Method of Lines and its Effect on the ODE Solver", minisymposium, SIAM Annual Meeting, Summer 1989, San Diego. Speakers: Dr. J.M. Hyman, Los Alamos National Laboratories; Dr. A.C. Hindmarsh, Lawrence Livermore National Laboratory (LLNL), Dr. Linda Petzold, LLNL; Dr. J. Verwer, Centre for Mathematics and Computer Science, Amsterdam, Netherlands.

"A Matrix Free Implicit Runge-Kutta Method", Jeff V. Richard and Kris Stewart, 1989 SIAM Annual Meeting, San Diego [SDSU MS student]

"Secant Approximations in an Implicit Runge-Kutta Solver for Stiff ODEs", Gordon Shamblin and Kris Stewart, 1989 SIAM Annual Meeting, San Diego [SDSU MS student]

"Using Broyden Updates to Approximate Jacobians in a Semi-implicit BDF Code", Laura Knight and Kris Stewart, 1989 SIAM Annual Meeting, San Diego [SDSU MS student]

"Improved Stability for Low Order BDF Methods", 1988 Conference on the Numerical Solution of Initial Value Problems for ODEs, Toronto, June 1988.

"Semi-implicit Backward Differentiation Formulas: Accuracy and Stability", 1986 International Conference on Ordinary Differential Equations, Albuquerque NM, June [Stewart's PhD Dissertation Defense]

"Using Relative Error to Drive a BDF Code for Stiff Differential Equations", SIAM 30th Anniversary Meeting, Stanford University, July 1982.

"Efficient Handling of the Variable Step BDF Corrector Equation", SIAM Fall Meeting, Houston TX, November 1980.

Other Invited Presentations

"The Wild World of Supercomputers: It's Not Just FLOPS", Fourth Annual Computer and Computational Sciences Program for Minority Youth, California Institute of Technology, March 1996.
<<http://www.stewart.cs.sdsu.edu/crpc/>>

"HPC Curriculum Development: Web Browser for Developing, Presenting and Sharing Resources", Minority

University - Space Interdisciplinary Network (MUSPIN) Annual Users Conference, Morgan State University, October 1995. <<http://www.stewart.cs.sdsu.edu/muspin/>>

“High-performance Computing and Communications in Research and Education” panel, Seminars on Academic Computing [Touch Choices/Radical Opportunities], Snowmass, Colorado, August 1995. <<http://www.stewart.cs.sdsu.edu/snowmass/>>

“Education Issues in Scientific Computing”, Minisymposium organized and moderated by K. Stewart, International Conference on Scientific Computation and Differential Equations, Stanford University, March 1995. <<http://www.stewart.cs.sdsu.edu/scicade/>> Panel participants: Charles Swanson, Cray Research Inc.; Richard C. Allen, Sandia National Laboratories, Albuquerque; Dan Sulzbach, Genentech Corporation; Gary Johnson, George Mason University; Tom Marchioro, Ames Laboratory.

“An Ad Hoc Approach to Undergraduate Curriculum Development in Computational Science”, DOE High Performance Computing Education Conference, Albuquerque, NM, February 1994
<<http://www.stewart.cs.sdsu.edu/hpced/>>

Undergraduate Education Panel, Co-organizer (with Joan Francioni) DOE High Performance Computing Education Conference, Albuquerque, NM, February 1994

"Experiences in the Development of Undergraduate Curriculum in Computational Science", SIAM Visiting Lecturer Program, invited presentations on Curriculum Development in Computational Science at UCSD (January 1994), University of San Diego (January 1994), University of Houston Downtown, Houston TX (October 1994)

Scholarly Awards

NASA/ASEE Summer Fellow, Jet Propulsion Laboratory, Pasadena, CA, 1983 and 1984

Funded Research Grants

“Supercomputer Teacher Enhancement Projects (STEP)”, NSF/HER Research Grant with Don Anderson (PI), UCSD Extension and SDSC, 1993-96 (\$1,575,400). Provided full time support Spring 1993 and Summer Salary 1993-96 to perform duties as Program Coordinator.

"Undergraduate Curriculum Development in Advanced Computing", NSF/DASC Research Grant with Dan Sulzbach (PI), San Diego Supercomputer Center, 1990-93 (\$79,833).

“Time Discretization Schemes for Incompressible Navier-Stokes Equations”, NSF Research Grant, Co-PI with Tunc Geveci, 1987-89

Funded Training Grants

San Diego Supercomputer Center provided support to SDSU to fund half of my academic salary 1994/95 and 1995/96 to enhance my opportunities to do curriculum development in computational science.

Participation in Professional Associations

Member, Association for Computing Machinery (ACM), since 1979
Member, Society for Industrial and Applied Mathematics (SIAM), since 1980
Member, Institute of Electrical and Electronics Engineers (IEEE), since 1989
Member, Association for Women in Mathematics (AWM), since 1990

Reports or Non-refereed Publications

“The Numerical Analysis of the Rotational Theory for the Formation of Lunar Globules”, J. Ross, J. Basin and K. Stewart, Proceedings of the Second International Colloquium on Drops and Bubbles, NASA JPL Pub. 82-7, March 1982.

“SCRUNCH: Numerical Computations on Very Small Machines”, K. Stewart, CS Masters Project, published by California Software Co., El Cerrito, CA 1979 [Dr. Vernor Vinge, Chair]

VI. SERVICE FOR THE UNIVERSITY AND THE COMMUNITY

Service for the University

Undergraduate Advisor for Computer Science, Department of Mathematical and Computer Sciences, SDSU

Association for Computing Machinery, SDSU Student Chapter Faculty Sponsor

University Seminar for Freshman Success, Integrated curriculum to enhance retention of incoming freshman in computer science major, Fall 1996

“Learning with Technology: Exploring Future Alternatives”, SDSU Fall Showcase participant, September 1996

Chair, Trends and Opportunities Subcommittee of the Ad Hoc Committee on Emerging Technologies, Spring 1996

San Diego State University representative on the San Diego Supercomputer Center Steering committee since 1992. The Steering Committee has representative from the 27 member institutions and is the mechanism for SDSC to receive significant input from the academic community. This committee meets quarterly.

Service for the Community

Advisory Board for NSF funded “Maryland Virtual High School in Science and Mathematics”, Montgomery Blair High School, Silver Spring, Maryland, 1996

Education Advisory Committee, Supercomputing '95 Conference, San Diego, December 1995

NSF Scientific Advisory Review Panel on the “Undergraduate High Performance Scientific Computational Curriculum Development” project, University of Colorado, Boulder [Dr. Lloyd Fosdick and Dr. Elizabeth Jessup], final report on September 21, 1993.

Undergraduate Computational Engineering and Sciences (UCES) participant from September 1993 to present. This Department of Energy program encourages the development and sharing of undergraduate curricula in computational science. <<http://uces.ameslab.gov/>>

Updated curricula materials for "Supercomputing for the Sciences" made available via anonymous ftp from ftp.sdsc.edu, at San Diego Supercomputr Center, 1993

NSF Scientific Advisory Review Panel on the Undergraduate High Performance Scientific Computational Curriculum Development Group at the U. Colorado, Boulder (Fosdick and Jessup), began in 1992 - final report on Sept. 21, 1993.

Asked to be SDSC's Computational Science Curriculum Coordinator, Spring 1993. [This entails being the national spokesperson for SDSC and their outreach programs in computational science education.]

Attended the Summer Faculty Workshop on High Performance Scientific Computing, June 1992, at U. Colorado, Boulder. This workshop was presented by Dr. Lloyd Fosdick and Dr. Liz Jessup covering their NSF funded development of a senior year, undergraduate course in Scientific Computing.

Curricula materials for "Supercomputing and Undergraduate Education" made available world-wide via anonymous ftp from rohan.sdsu.edu , updated after 1992 summer workshop.

"Supercomputing and Undergraduate Education" SUE Faculty Workshop, one week workshop presented by Stewart at the San Diego Supercomputer Center for nation wide faculty from primarily undergraduate institutions (PUIs) interested in pursuing curriculum development in high performance computing using supercomputers, Summer 1992. [Note this attracted several faculty from Liberal Arts colleges in Minnesota and Wisconsin whose participation was funded by Cray Research Inc.]

Curricula materials for "Supercomputing for the Sciences" made available via anonymous ftp from rohan.sdsu.edu , 1991, on SDSU instructional computer for world access.

"Supercomputing and Undergraduate Education" SUE Faculty Workshop, one week workshop presented by Stewart at the San Diego Supercomputer Center for faculty from the CSU (California State University) system interested in pursuing curriculum development in high performance computing using supercomputers, Summer 1991