



# THE FACULTY SENATE

June 10, 2003

## MEMORANDUM

**TO:** President Robert M. Gates

**SUBJECT:** Certificate Program in Computational Science (FS.21.06)

At its regular meeting on June 9, 2003, the Faculty Senate approved the following item from the Graduate Council and submits it for your approval. Attached is a copy of the material sent to our Senators.

**Certificate Program**  
**College of Science**  
**Department of Mathematics, Statistics and Computer Science**  
**Institute for Scientific Computation**  
**Computational Sciences**

Thank you for your time and consideration. Please inform me of your action on this matter.

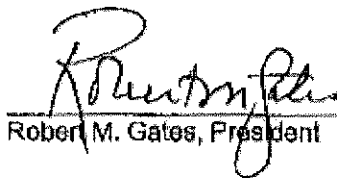


Martha Loudder  
 Speaker, 2003-2004

### Attachment

cc: Dr. David Prior  
 Dr. Karen Watson  
 Dr. Rick Giardino  
 Dr. Richard Ewing  
 Dr. Joe Newton

Approved:



Robert M. Gates, President

7-18-03  
 \_\_\_\_\_  
 Date



# INSTITUTE FOR SCIENTIFIC COMPUTATION

Texas Engineering Experiment Station, Texas A&M University System  
612 Blocker Building, 3404 TAMU, College Station, Texas 77843-3404  
ph. (979) 862-2716 fax (979) 845-5827 www.isc.tamu.edu

UCC/GC APR 10 2003  
FS June 9 2003  
Pres. App July 18 2003  
SIMS \_\_\_\_\_  
Catalog \_\_\_\_\_

March 18, 2003

## Memorandum

To: Graduate Council

From: Richard E. Ewing, Vice President for Research  
Director, Institute for Scientific Computation *Richard E Ewing*

Subject: Pursuit of a transcribed Computational Sciences Certificate Program

The Institute for Scientific Computation (ISC), in conjunction with the Mathematics, Statistics, and Computer Science departments, has created the Computational Sciences Certificate Program.

The Computational Sciences Certificate Program offers graduate students a broad-based multidisciplinary enhancement to their degree program. With the addition of a few courses from each of the three disciplines, this new certification program will add value and marketability to the graduates' degree.

We now request that the University reinforce its commitment to Imperative 2 of the Vision 2020 plan by granting the Computational Sciences Certificate Program the status of transcribed certification.

The attached page contains the curriculum outline of the additional classes that students in each discipline must complete to obtain a Computational Sciences Certificate.

With institutional support, this program can create some of the most marketable and best-qualified graduates in the nation. I hope that you can approve this request at your next meeting. Thank you.



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February 24, 2003

## Memorandum

To: Robert M. Gates, President

Through: Robert H. Strawser, Speaker, Faculty Senate

Through: Rick Giardino, Dean, Graduate Studies, Graduate Council

Through: G. Kemble Bennett, Dean, Dwight Look College of Engineering  
H. Joseph Newton, Dean, College of Science *H. Joseph Newton* *G. Kemble Bennett*

Through: James Calvin, Department Head, Statistics *James Calvin*  
Valerie Taylor, Department Head, Computer Science *Valerie Taylor*  
Albert Boggess, Department Head, Mathematics *Albert Boggess*

Through: Michael Longnecker, Statistics Representative *Michael Longnecker*  
Vivek Sarin, Computer Science Representative *Vivek Sarin*  
Thomas Schlumprecht, Mathematics Representative *Thomas Schlumprecht*  
*Richard E. Ewing*

From: Richard E. Ewing, Vice President for Research  
Director, Institute for Scientific Computation

Subject: Pursuit of a transcribed Computational Sciences Certificate Program

The Institute for Scientific Computation (ISC), in conjunction with the Departments of Mathematics, Statistics, and Computer Science, has created the Computational Sciences Certificate Program. We recently circulated a copy of this memorandum. We obtained suggestions and clarifications on several issues and would now like to submit this final version for your approval. The changes are 1) the certification program is now open to all TAMU graduate students and 2) the capstone project has been more clearly described. You can see the original circulated memo with signatures attached.

The Computational Sciences Certificate Program offers graduate students a broad-based multidisciplinary enhancement to their degree program. With the addition of a few courses from each of the three disciplines, this new certification program will add value and marketability to the graduates' degree.

We now request that the University reinforce its commitment to Imperative 2 of the Vision 2020 plan by granting the Computational Sciences Certificate Program the status of transcribed certification.

The attached pages contain the curriculum outline of the additional classes that students must complete to obtain a Computational Sciences Certificate.

With institutional support, this program can create some of the most marketable and best-qualified graduates in the nation.

## Computational Sciences Certificate Program

### **Motivation and Goals**

The development of a Computational Sciences Certificate Program is motivated by the increased use of computational techniques to help solve complex science and engineering programs. This program is targeted to science and engineering students enrolled in the graduate program. The goal of this certificate program is to provide formal documentation upon a student's transcript that he or she has taken additional courses focused on the computational aspects that supplement a given degree in science and engineering.

### **Computational Science Certificate Requirements**

A student must complete four courses, as described below, and a capstone project in his/her home department to fulfill the certificate requirements.

### Course Options

As the focus of this certificate is on providing students with the computational aspects, students are required to take courses from the list given below. Two of the courses must be \* courses from two different departments, and exclusive of one's home department. The remaining two courses can be any courses from the given list, as long as they are not from the student's home department. Outside courses listed on the student's degree plan can be used to satisfy the four course requirements.

- Mathematics (Each of the following courses will be offered once a year):
  - 609 Numerical Analysis (\*)
  - 610 Numerical Methods in PDEs
  - 660 Computational Linear Algebra (cross-listed with CPSC 660)
  
- Statistics (Each of the following courses will be offered once a year)
  - 604 Special Problems in Statistical Computation and Analysis (\*)
  - 605 Advanced Topics in Computational Statistics
  - 608 Least Squares and Regression Analysis
  - 626 Methods in Time Series Analysis
  - 636 Methods in Multivariate Analysis
  
- Computer Science (Each of the following courses will be offered once every two years)
  - 603 Database Systems and Applications
  - 654 Supercomputing
  - 659 Parallel/Distributed Numerical Algorithms and Applications (\*)  
[Note: Math 609 will satisfy the CPSC 653 prerequisite]
  - 660 Computational Linear Algebra (cross-listed with MATH 660)

### Capstone Project

The goal of the capstone project is to provide students with experience in the area of computational science. The intended length of the project is one semester. This project may be fulfilled by

- 1) an independent study graduate course in the home department, or
- 2) an independent study graduate course outside the home department, or
- 3) as part of a MS thesis or project required by the home department, or
- 4) as part of a PhD dissertation.

To fulfill this requirement, the faculty member supervising the capstone project must write a memo describing the project and certifying the project's computational component; this memo must be placed in the student's file in the home department.



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January 27, 2003

## Memorandum

To: Graduate Council

From: Richard E. Ewing, Vice President for Research  
Director, Institute for Scientific Computation

Subject: Pursuit of a transcribed Computational Sciences Certificate  
Program

The Institute for Scientific Computation (ISC), in conjunction with the Graduate Advisors from the Mathematics, Statistics, and Computer Science departments, has created the Computational Sciences Certificate Program.

The Computational Sciences Certificate Program offers graduate students in the Mathematics, Statistics, and Computer Science departments a broad-based multidisciplinary enhancement to their degree program. With the addition of a few courses from each of the three disciplines, this new certification program will add value and marketability to the graduates' degree.

We now request that the University reinforce its commitment to Imperative 2 of the Vision 2020 plan by granting the Computational Sciences Certificate Program the status of transcribed certification.

The attached page contains the curriculum outline of the additional classes that students in each discipline must complete to obtain a Computational Sciences Certificate.

With institutional support, this program can create some of the most marketable and best-qualified graduates in the nation. I hope that you can approve this request at your February 13, 2003 meeting. Thank you.

## Computational Sciences Certificate Program

### Committee Members:

M. Longnecker (Statistics), V. Sarin (Computer Science), T. Schlumprecht (Math)

### Computational Science Certificate Option

A minimum of 14 credit hours of your degree plan must come from this list of interdisciplinary courses to receive a Certificate in Computational Science.

### Required Courses

684 Internship  
Project/Capstone

### Core Course Options

The course options listed below represent the minimum level of courses required to complete this track. Students may take courses of a higher level to fulfill these requirements if suggested by their advisor.

#### Math Option

CPSC Courses  
STAT Courses

#### Computer Science Option

STAT Courses  
MATH Courses

#### Statistics Option

CPSC Courses  
MATH Courses

#### Mathematics

*Each of the following courses will be offered once a year.*

609 Numerical Analysis (3-3) 4 credits

610 Numerical Methods in PDEs (3-3) 4 credits

660 Computational Linear Algebra (3-0) 3 credits, *cross-listed with CPSC 660.*

#### Statistics

*Each of the following courses will be offered once a year.*

601 Statistical Analysis (3-2) 4 credits

608 Least Squares and Regression Analysis (3-0) 3 credits

636 Methods in Multivariate Analysis (3-0) 3 credits

#### Computer Science

*Each of the following courses will be offered once every two years.*

603 Database Systems and Applications (3-0) 3 credits

654 Supercomputing (3-0) 3 credits

659 Parallel/Distributed Numerical Algorithms and Applications (3-0) 3 credits

660 Computational Linear Algebra (3-0) 3 credits, *cross-listed with MATH 660.*





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November 15, 2002

## Memorandum

To: Robert M. Gates, President

Through: Robert H. Strawser, Speaker, Faculty Senate

Through: Rick Giardino, Dean, Graduate Studies, Graduate Council

Through: G. Kemble Bennett, Dean, Dwight Look College of Engineering *G. Kemble Bennett*  
H. Joseph Newton, Dean, College of Science *H. Joseph Newton*

Through: James Calvin, Department Head, Statistics *James Calvin*  
Donald Friesen, Acting Department Head, Computer Science *Donald Friesen*  
Albert Boggess, Acting Department Head, Mathematics *Albert Boggess*

Through: Michael Longnecker, Statistics Representative *Michael Longnecker*  
Vivek Sarin, Computer Science Representative *Vivek Sarin*  
Thomas Schlumprecht, Mathematics Representative *Thomas Schlumprecht*

From: Richard E. Ewing, Vice President for Research *Richard E. Ewing*  
Director, Institute for Scientific Computation

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