

6/6/2001

New Mexico Supercomputing Challenge 2001

**Summer Teacher Institute (STI)
New Mexico Tech
June 17 – 29, 2001**

Combined Syllabus and Schedule

Mission Statement

The mission of New Mexico Supercomputing Challenge is to improve students' understanding and use of technology by developing their skills in scientific inquiry, modeling, computing, communication, and teamwork.

Summer Teacher Institute Description

The Summer Teacher Institute (STI) is a two-week institute for teachers sponsored by NASA AMES in conjunction with New Mexico Tech, LANL/DOE and New Mexico Technet. Acquiring skills to support computational science for mid and high school students is the overarching goal of STI. Topics will include problem solving, science, math modeling, technology, programming, research, working with mentors, project management, time management, team management, presentations, gender equity, research ethics and technical writing.

Goal of STI

Teachers will learn how to sponsor a New Mexico Supercomputing Challenge team and how to help students complete an appropriate computational science project in keeping with the Challenge mission statement.

The computational project incorporates four components:

- Project Development
- Programming
- Math Modeling
- Internet Resources

Course Requirements

Students will attend two full weeks of classes covering core components of computational science: project development, programming, math modeling, and Internet resources.

Students will

- participate in a creating a team supercomputing computational project.
- present the project to a team of judges.
- take pre-test and post-tests to show progress.
- take part in an online collaborative tool and tutorial, which first assesses expertise in computational science topics and then offers individual tutoring. The tool identifies individual skills and resources within the community.
- learn about the 2001-02 Challenge timetable, milestones and expectations.

Credit

Attendees will receive three units of graduate credit in the Master of Science Teaching (MST).

Grading

Grading will be pass/fail. If a student fulfills the attendance, project, presentation, and assessment requirements, s(he) will pass.

Room, Board, and Stipends

Participants will receive \$200 on June 17 for meals. Lodging in Student Apartments is provided by STI. A stipend of \$500 will be awarded on June 29th.

Textbooks (Provided for Students)

Dale, Nell B., Weems, Chip, Headington, Mark. *Programming and Problem Solving with C++*. Jones & Bartlett Pub; ISBN 0-7637-1063-6.

Peek, et al. *Learning the UNIX Operating System*. O'Reilly. ISBN 1-56592-060-0.

Reference Texts

Afzal, Amir. *UNIX Unbounded, a Beginning Approach* ISBN# 0-13-020030-1.

Deitel and Deitel. *C++ How to Program, 3rd Edition*. ISBN is 0-13-089571-7.

Leibowitz, Marilyn. *Project-Based Learning: Developing Skills for the Workplace Tapes*. Stock Number: 297180S25. ASCD Online Store, 1703 North Beauregard Street, Alexandria, VA 22311-1714 Phone: 1-800-933-2723, Fax: (703) 575-5400

[Instructors](#)

Dr. Mike Topliff, New Mexico Tech, mtopliff@nmt.edu

Dr. Willard Smith, NASA AMES, TN State, smith@coe.tsuniv.edu

Mike Davis, Cray, u3186@cray.com

Celia Einhorn, New Mexico Technet, celia@nm.net

Gina Fisk, LANL/DOE, gina@lanl.gov

Betsy Frederick, New Mexico Technet, betsy@nm.net

David Kratzer, LANL/DOE, dhk@lanl.gov

David Olivas, LANL/DOE, dolivas@lanl.gov

Eric Ovaska, LANL/DOE, ovaska@lanl.gov



Day One - Sunday		June 17 th	
TIME	ROOM	ACTIVITY	FACILITATOR(S)
3:00	Lobby of Student Apartments	Dorm Check In	
4:45	SUB room 106	Registration and Material Distribution (Binder with syllabus, books, software, name tag, and food stipend)	Betsy Frederick/Celia Einhorn, New Mexico Technet
	Introductions of the Whole Group		The Consult
	Welcome		Peter Gerity, Vice President of New Mexico Tech Willard Smith, TN State, NASA AMES
	Overview		Mike Topliff. NMT
	Pre -Test		David Kratzer, Eric Ovaska, LANL/DOE
	Cooperative Learning Activity; Team Formation		Mike Davis, Cray, Gina Fisk, LANL/DOE
6 PM	Dinner Buffet		



Day Two		Monday - June 18 th	
TIME	RM.	ACTIVITY	FACILITATOR (S)
8 AM		NASA Keynote	Dr. Marjory Johnson, Associate Project Manager, NASA Research and Education Network (NREN) Project Willard Smith, TN State, Introduction
9 AM		Detailed Overview Challenge Video - NMT Small Groups – Daily Schedule, Final Reports, Mission Statement, Strands, Goals, Requirements	Consult+ Mike Davis, Celia Einhorn, Gina Fisk, Betsy Frederick, David Kratzer, David Olivas, Eric Ovaska, Willard Smith, Mike Topliff,
9:30		Student Presentation of Final Project	Sandia Prep Winners
10		Coffee and Collaboration Break	
10:15	LAB Spear Rm. 4	NMT Server Intro	Mike Topliff
10:45	LAB	Collaborative Online Tool and Tutorials	Celia/Eric
11:15	LAB	Challenge Web Page	Eric
		Successful Supercomputing Projects	Celia/David O.
12		Lunch	
1	LAB	Explorers of the Universe	Willard
3 PM		Cookies and Comfort	
3:30		Abstract , TEAF , AUP	Betsy
4:30		Share Projects	Eric
4:45		Closings – Parking Lot and Quick Eval	Betsy/Celia
5 – 7		Supper	
7 PM		Optional Night Owl Lab – Tweak Abstracts	

Day 3		Tuesday – Kickoff Simulation	June 19th
TIME	RM	ACTIVITY	FACILITATOR (S)
7:30 AM		Optional Early Bird Lab	NMT Lab Aide
8 AM		Team and Individual Pictures Receive Handbook and T-shirts	David K.
8:30	LAB	Welcome to the Kickoff UNIX Class – Submit Abstract	David K./Eric
10		Coffee and Collaboration Break	
10:15	LAB	Glorieta C++ Class	David K. /Eric
11:15	LAB	Peeling the Onion	Celia/Betsy
12 - 1		Lunch	
1		Team Work Workshop	LANL Group
3:00		Cookies and Comfort	
3:15		Structured Design and Programming	Gina/Mike D.
4:45		Closings – Parking Lot and Quick Eval	Betsy/Celia
5 - 7		Supper	
7 PM		Optional Night Owl Lab	



Day 4		Second Day of Kickoff	Wednesday, June 20th
TIME	RM.	ACTIVITY	FACILITATOR (S)
7:30	LAB	Optional Early Bird Lab	
8 AM	LAB	Morning Messages	The Consult
8:15	LAB	Research on the Internet	Betsy/Celia)
10		Coffee and Collaboration	
10:15	LAB	Mentor Time E Groups	Celia Dwight Thompson
10:45	LAB	HTML - Abstract	Eric
12		Lunch	
1		Keynote – What is Supercomputing?	David Kratzer
1:30		Project Time, Research, Math Models	
3:00		Cookies and Comfort	
3:15		Structured Design and Programming	
4:45		Closings – Parking Lot and Quick Eval	Betsy/Celia
5 – 7		Supper	
7 PM		Optional Night Owl Lab	

Day 5			Thursday, June 21st
TIME	RM.	ACTIVITY	FACILITATOR (S)
7:30	LAB	Optional Early Bird Lab	
8 AM	LAB	Morning Messages Total solar eclipse will speed across the Southern Hemisphere	The Consult
8:15	LAB	Project Time	
10		Coffee and Collaboration	
10:15	LAB	Consult + Mentor Time	
11		Structured Design and Programming, Beginners and Advanced Tracks	Beginners – David K./Eric Advanced – Gina/Mike D.
12		Lunch	
1		Structured Design and Programming Lab	Beginners – David K./Eric Advanced – Gina/Mike D.
2	LAB	HTML	Eric
3 PM		Cookies and Comfort	
3:15		Project Time	
4:45		Closings – Parking Lot and Quick Eval	Betsy/Celia
5 – 7		Supper	
7 PM		Optional Night Owl Lab	



Day 6			Friday, June 22nd
TIME	RM.	ACTIVITY	FACILITATOR (S)
7:30	LAB	Optional Early Bird Lab	
8 AM	LAB	Morning Messages	The Consult
8:15	LAB	Project Time	
10		Coffee and Collaboration	
10:15	LAB	Consult + Mentor Time	
11		Structured Design and Programming, Beginners and Advanced Tracks	Beginners – David K./Eric Advanced – Gina/Mike D.
12		Lunch	
1		Structured Design and Programming Lab	Beginners – David K./Eric Advanced – Gina/Mike D.
2	LAB	Math Modeling Non Software Teacher Resources for Math Modeling	Eric
3 PM		Cookies and Comfort	
3:15		Collaborative Online Tool and Tutorials	
3:30		Submit Interims – Project Time	
4:45		Closings – Parking Lot and Quick Eval	Betsy/Celia

Field Trip - Saturday	June 23 rd
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9:00 Optional [VLA Field Trip](#)

Open Lab ?

Field Trip - Sunday	June 24 th
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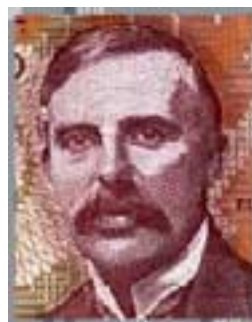
Optional [Bosque del Apache](#) on your own; figure out car-pooling.



Day 7		Regional Workshop Day	Monday, June 25th
TIME	RM.	ACTIVITY	FACILITATOR (S)
7:30	LAB	Optional Early Bird Lab	
8 AM		Morning Messages	The Consult
8:15		Feet to the Fire, Interim Project Presentation	Betsy/Celia
10		Coffee and Collaboration	
10:15	LAB	Security Presentation	Gina
11	LAB	Visualization Tools	Eric
12		Lunch	
1		Presentation How to Think	Celia
1:30		Presentation Skills	Gina
2:30		Technical Writing Conversation	Betsy and Friends
3		Cookies and Comfort	
3:15		Siemens Westinghouse Competition	Betsy
3:45		The Rest of the Challenge	David
4		Project Time	
4:45		Closings – Parking Lot and Quick Eval	Betsy/Celia
5 – 7		Supper	
7 PM		Optional Night Owl Lab	



Niels Bohr



Sir Ernest Rutherford

Day 8			Tuesday, June 26th
TIME	RM.	ACTIVITY	FACILITATOR (S)
7:30	LAB	Optional Early Bird Lab	
8 AM		Morning Messages Technical Guide	The Consult/Eric
8:15		Project Time	
10		Coffee and Collaboration	
10:15		Here Comes the Judge!	Mike T.
10:45		Where Are All the Girls?	Betsy/Celia
12		Lunch	
1		Fair Use Copyright Quiz	Betsy/Celia
1:30		Structured Design and Programmng	
3		Cookies and Comfort – Cookies and Browsers	Betsy
3:15		Open Lab	
4:45		Closings – Parking Lot and Quick Eval	Betsy/Celia
5 – 7		Supper	
7 PM		Optional Night Owl Lab	

Day 9			Wednesday, June 27th
TIME	RM.	ACTIVITY	FACILITATOR (S)
7:30	LAB	Optional Early Bird Lab	
8 AM		Morning Messages	Consult
8:15		Project Time	
10		Coffee and Collaboration	
10:15		Structured Design and Programming	
12		Lunch	
1		Awards Day Explanation	David K./Eric
1:30		Structured Design and Programmng	
3		Cookies and Comfort	
3:15		Back to Fundamentals – Simplicity, Math Modeling	Consult +
4:45		Closings – Parking Lot and Quick Eval	Betsy/Celia
5 – 7		Supper	
7 PM		Optional Night Owl Lab	



Sandia Prep First Place Winners!

Judges' Special Recognition Team
Picacho Middle School

Day 10			Thursday, June 28th
TIME	RM.	ACTIVITY	FACILITATOR (S)
7:30	LAB	Optional Early Bird Lab	
8 AM		Morning Messages	Consult
8:15		Structured Design and Programming	
10		Coffee and Collaboration	
10:15		"Gaussian Elimination: Learning how to bridge mathematics and computation"	Guest – Shaun Cooper, NMSU
12		Lunch	
1		Open Lab	
3:15		Cookies and Comfort	
3:30		Presentations and Final Reports due on Friday	Consult +
4:45		Closings – Parking Lot and Quick Eval	Betsy/Celia
6	Road-Runner Steak house	Dinner and Speaker	Sandra Begay - Campbell , UNM Regent, Sandia National Lab Civil Engineer, and Former, AISES (American Indian Science and Engineering Society) Executive Director
9 PM		Optional Night Owl Lab ?	



Sandra Begay - Campbell

"As an American Indian, I fondly refer to myself as an injuneer."

Day 11		Awards Day	Friday, June 29th
TIME	RM.	ACTIVITY	FACILITATOR (S)
7:30	LAB	Optional Early Bird Lab	
8 AM		Morning Messages	Consult
8:15		Wrap Up Projects	
10		Coffee and Collaboration	
10:15		Presentations, Final Reports	
12		Lunch	Do we want to do something special here/
1		Post Test, Collaborative Tool and Tutorials, Final Evaluation	
1:30		Awards Ceremony	Consult+
2:30		Closing	
		Farewell! See you online!	See you in Glorieta in October.



Free Resources

Hands On! Newsletter Hands-on Math and Science Learning – TERC –
<http://www.terc.edu>

Teaching Tolerance Magazine from the Southern Poverty Law Center –
<http://teachingtolerance.org>

T.H.E Journal (Technological Horizons in Education) – Professional
Development, Distance Learning, Curriculum - <http://www.thejournal.com>

The Magazine of Design & Technology Education, ties – Resources, Multimedia,
Literature – good ideas for projects – <http://www.tcnj.edu/~ties>

Web Resources

Bad Science
<http://www.ems.psu.edu/~fraser/BadScience.html>

Bosque Del Apache
<http://www.friendsofthebosque.org/>

Challenge Acceptable Use Policy
<http://www.challenge.nm.org/Archive/99-00/aup.stm>

Collaborative Tool and Tutorials
<http://pt3.profiler.org>

Copyright Quiz
<http://www.halldavidson.net/Quiz%20.pdf>

Copyright Quiz Answers
<http://www.halldavidson.net/Quiz%20Answers%20.pdf>

Explorers of the Universe
<http://explorers.tsuniv.edu/>

Good Projects –

 Computational Science Projects
<http://c-prog.k12tn.net/projects>

 Evaluating the Sustainability of the Albuquerque Water Supply
<http://www.challenge.nm.org/FinalReports/013/>

 Compression Springs
<http://www.challenge.nm.org/FinalReports/028/>

Computer Literacy

<http://www.challenge.nm.org/FinalReports/043/>

Gas Diffusion

<http://www.challenge.nm.org/FinalReports/051/051.pdf>

Analyzing a New Technique for Synthesizing Organic Superconductors
Using Rotating Electrodes

<http://www.challenge.nm.org/Archive/99-00/FinalReports/062/>

Cost Minimization through Flight Scheduling

<http://www.challenge.nm.org/FinalReports/027/>

Cipher This

<http://www.hhs.aps.edu/~jkraloff/>

Evolution of Hive Intelligence Using Genetic Programming

<http://www.challenge.nm.org/Archive/98-99/finalreports/006/>

Neural Modeling

<http://www.challenge.nm.org/Archive/97-98/finalreports/070/>

Completed Projects and Starter Projects

http://www.krellinst.org/AiS/textbook/unit2/example_projects/proj_menu.html

How to Think

<http://www.challenge.nm.org/Regionals/howtothink.htm>

Mathematical Models

<http://www.krellinst.org/AiS/textbook/unit2/projdev2.3.5.html>

Model of Modeling

<http://www.nsca.uiue.edu/Edu/SuperQuest/sqt/modeling.html>

Non-software Teacher Resources to Support Modeling

<http://www.ecsu.k12.mn.us/envision/gradrule/additional.html>

New Mexico Supercomputing Challenge

<http://www.challenge.nm.org>

Siemens Westinghouse Competition

http://www.siemens-foundation.org/science/science_and_technology.htm

Popular Science Books

http://news.bbc.co.uk/hi/english/sci/tech/newsid_1332000/1332164.stm

Technical Guide

<http://www.challenge.nm.org/ctg/>

Total Solar Eclipse

<http://www.exploratorium.edu/eclipse/live01.html>

Visiting the Very Large Array

<http://www.aoc.nrao.edu/tourist/visit.vla.html>

Writing the Final Report

<http://www.challenge.nm.org/FinalReports/writing.shtml>