

April 25-26, 1986
Alderbrook Resort



Washington Community College Mathematics Conference

hosted by
north seattle
community college

1986 WASHINGTON COMMUNITY COLLEGE MATHEMATICS CONFERENCE
 Hosted by North Seattle Community College

FRIDAY, APRIL 25, 1986

	<u>EASTWOOD ROOM</u>	<u>CAPTAIN'S ROOM</u>	<u>LOFT</u>
10-12		Pete Ratener	
1:30	Stephen Hinthorne	Ed Morris (10 min) Earl Hamilton*	Elmar Zengalis*
2:45	Victor Keiser*	Ken Gamon* Philip Heft*	John Reay
3:30	John Johnson	Kathy Hoxit and Anne Cook	
4:30	Exchange		
6:00	Social Hour		
7:00	Dinner and keynote address, "Excursions into the World of the Improbable," Jerry Johnson, Western Washington University		

SATURDAY, APRIL 26, 1986

7:30	Breakfast buffet		
	<u>HAMMA HAMMA ROOM</u>	<u>TAHUYA ROOM</u>	<u>CAPTAIN'S ROOM</u>
8:30	Millie Johnson	Frank Edge	Sam Saunders
9:50	Dave Mitchell	Nick Nickoloff	Yves Nievergelt
11:10	Richard Levin*	Tyre Newton	Jerry Johnson*
12:00	Check out and lunch		

WAMATYC meeting following lunch in the Captain's Room.

Note: Coffee will be served Saturday at 9:20 and 10:40.

*25 minute presentation

FRIDAY PRESENTATIONS

From Pythagoras to Bach: The Arithmetic of Music

Stephen Hinthorne Central Washington University
Eastwood Room, Friday, 1:30

(1) Need for liberal arts topics in math curriculum; (2) Harmonic mean and musical scales of Pythagoras; (3) Pythagorean comma and its effect on musical composition; (4) Well-tempered Clavier: Bach's solution and its arithmetic. (50 min.)

A Literal Equation Worth Solving

Ed Morris Highline Community College
Captain's Room, Friday, 1:30

Discussion and development of the equation

$$G = C(1-F) + F \cdot S$$

where C = current percentage; G = grade percentage; F = weight of final exam (%); and S = final exam score in percentage. (10 min.)

Circular Approximations

Earl Hamilton North Seattle Community College
Captain's Room, Friday, 1:45

Students always ask about the geometric significance of second derivative. By the end of the second quarter of calculus, this question can be answered in a concise, self-contained manner. (25 min.)

Composite Functions: A Socratic Approach

Elmar Zengalis Highline Community College
Loft, Friday, 1:30

This is a problem that arose in a classroom discussion of composite functions in a precalculus class: How to characterize functions that are generated by the set $1/x$, $x - 1$, $x + 1$, using compositions? (25 min.)

The Scratch Equation in Plane Analytical Geometry

Victor Keiser Whitman College
Eastwood Room, Friday, 2:45

In finding the equation of the tangent to a conic C at a point (x_0, y_0) on C , we derive the "Scratch Equation." This equation itself then leads us to the discovery of further interesting properties of conics. (25 min.)

Math and the Stock Market

Ken Gamon Central Washington University
Captain's Room, Friday, 2:45

Some elementary mathematics can be used to enhance your chances of making a profit in the stock market. (25 min.)

Monte Carlo Methods for Computation of Pi

Philip Heft Green River Community College
Captain's Room, Friday, 3:10

Buffon's needle problem explained, plus another approach. (20 min.)

Pick's Theorem on Hexagonal Lattices

John Reay Western Washington University
Loft, Friday, 2:45

Pick's Theorem says the area of a polygon whose vertices have integer coordinates is always $A = b/2 + i - 1$, where b is the number of lattice points on the boundary, i is the number in the interior. A surprise version for the hexagonal lattice is given. (50 min.)

Mathematical Techniques for Real-Time Computations,
in Aerospace

John Johnson

Boeing Company

Eastwood Room, Friday, 3:30

In applying mathematics to real-time computation in aerospace, there are three main goals for choosing and adapting algorithms: (1) Minimize computational requirements--the calculations must be minimized to fit the time available (real-time or clock time); (2) Optimize accuracy requirements versus computational speed--only limited precision is available for a flight computer, and routines must be tailored for a specific word length; (3) Provide specific algorithms for special cases, such as singularities (most of these cases involve a near divide-by-zero). In this talk, Dr. Johnson will explore techniques that can be used to meet these requirements. (50 min.)

Outstanding Women in Math and Computer Science

Kathy Hoxit

Pacific Lutheran University

Anne Cook

Captain's Room, Friday, 3:30

Biographical survey and slide show. (50 min.)

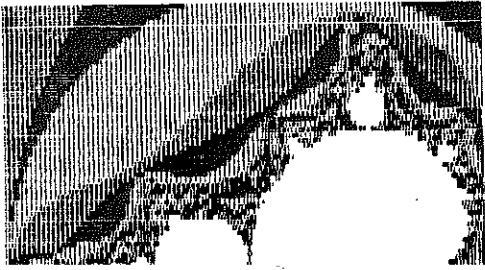
Information Exchange

Eastwood Room, Friday, 4:30

This time is intended to provide you an opportunity to share. Topics of interest include the University of Washington's MATH 107 course (Math, A Practical Art), software now being used in the community colleges, and any you have.

Ginger Warfield of the University of Washington will address the first topic; Ed Zimmerman will comment on the software survey he has conducted; Larry Runyan will discuss the calculus "tool kit" materials developed at Shoreline Community College; Berthe Habib will share some of Bellevue Community College's mathematics software. Bring your ideas and comments.

NOTES



SATURDAY PRESENTATIONS

What Does Roulette Have to do with a Soap Box Derby?

Millie Johnson Western Washington University
Hamma Hamma Room, Saturday, 8:30

Fun with geometry! In particular, a look at applications of roulettes in the history of clocks, trains, gears, and wheels. What is a roulette? Come and find out! (50 min.)

Poker Chip Algebra

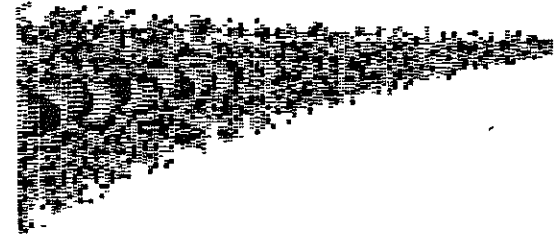
Frank Edge South Puget Sound Community College
Tahuya Room, Saturday, 8:30

I will give an overview of teaching introductory algebra using manipulatives (hands-on materials). These methods can give success in algebra to students who are unsuccessful with traditional symbol manipulation. (50 min.)

The Equation of a Sabre

Sam Saunders Washington State University
Captain's Room, Saturday, 8:30

An account of the historical evolution of curved sabres toward an optimal slope as determined empirically. The derivative of the evolution of this curve will be given, and comparisons between various swords and the optimal curve will be made. (50 min.)



The Interactive Effects of Student Ability and Sequencing of Calculus Instruction on Student Achievement

David Mitchell North Seattle Community College
Hamma Hamma Room, Saturday, 9:50

This presentation will examine the structural nature of learning outcomes for students with different ability who receive different instructional sequencing. A specific study which compared outcomes for students who received instruction on the derivative from a concrete to abstract approach with students who received the same instruction from an abstract to a concrete approach will be discussed. (50 min.)

Functional Sex and Other Relations

Nick Nickoloff Spokane Falls Community College
Tahuya Room, Saturday, 9:50

I will talk about telling stories to illustrate ideas in mathematics. Relations, functions, one-to-one functions, problem solving, and how new ideas are tied to old ideas. (50 min.)

Business Executives Learn Mathematics

Yves Nievergelt Eastern Washington University
Captain's Room, Saturday, 9:50

Senior business executives from the Seattle area spend their summer learning mathematics at the University of Washington. They occupy such positions as bank vice-presidents or top industrial managers. The talk will discuss what these executives want from their mathematics instructor. (50 min.)

Seemingly Valid Calculations That Produce Ridiculous Answers

Richard Levin Western Washington University
 Hamma Hamma Room, Saturday, 11:10

I have asked students in numerical analysis classes to write programs to solve a wide variety of problems, given them problems with known answers and then watched what happened when they could not get decent approximations to the answers. I'll present a few of these problems. (25 min.)

On What the Bolzano-Weierstrass Theorem Does Not Tell You About Bounded, Infinite Sequences

Tyre Newton Washington State University
 Tahuya Room, Saturday, 11:10

If F is a real valued function that maps the bounded interval I into itself, then the difference equation $X_{n+1} = F(x_n)$ defines an infinite sequence of points in I . This presentation will show how the investigation of such a sequence with the microcomputer can introduce the first or second year college mathematics student to the exciting world of strange attractors and chaos. Such difference equations are found in population biology, genetics, epidemiology, economics, learning theory, sociology, and weather analysis. (50 min.)

Graphics Tools

Jerry Johnson Western Washington University
 Captain's Room, Saturday, 11:10

The session will focus on the development of a graphics toolkit for doing, teaching, and learning mathematics. Comparisons with other software packages will be made. (25 min.)

PARTICIPANTS

Bellevue Community College

Marilyn Anderson
Larry Curnutt
Berthe Habib
Stanley Habib
Peter Hould
Betty Magnuson
Russell Magnuson
Helen Molvik
Nil Molvik
Jim Relf
Judie Relf
Caroline Shook
Paul Shook
Debby Ummel
Roberta Wheatley

Central Washington University

Fred Cuthlip
Bill Eberly
* Ken Gamon
Steve Hinthorne
Steve Perry

Clark Community College

Louise Dyson
Wes Orser
Bruce Ransom
Tom Reifenrath
Dennis Watson

Columbia Basin Community College

Paul Meier
Gary Olson
Jerry Selvig

Eastern Washington University

Yves Nievergelt

Edmonds Community College

David Chalif
Barbara Maly

Everett Community College

* Joyce Mansfield
Nancy Spears

Fort Steilacoom

Tom Jepsen
Helen Johnson
Leighland Johnson
Mike Lamka
John VanDruff

Green River Community College

Don Alexander
David Bender
Don Hallstone
Phillip Heft
Larry Larson

Highline Community College

Ron Burke
Ron Engstrom
Karen Frank
* Torgeir Haugland
Ruth Hendricks
Brian Hogan
Ed Morris
Ed Newell
Richard Plagge
Allan Walton
Elmar Zengalis

Lower Columbia Community College

Bob Carson
Dorothy Crepin
* Carol Wong Flakus
William Fuller
Martin Sherry
Lenore Vest

PARTICIPANTS

North Seattle Community College

Richard Davis
Barbara Dyer
Earl Hamilton
Sandy McArthur
David Mitchell
Barbara Poole
Vicky Ringen
Robert Tighe
Andrew Walker
Harry Watts

Olympic Community College

Mike Dodge
Martin Haines
Leo Maki
Scott Niven
Dave Sicks
Cathy Jo Swain
Stuart Swain
Peter Van Epps
Jerad Zimmermann

Pacific Lutheran University

✧ Anne Cook
Celine Dorner
✧ John Herzog
Margaret Herzog
Kathy Hoxit
Margie McBride

Peninsula Community College

Kent Brauning
Rosemary Brauning
Marjorie Lindberg

Seattle Central Community College

Dick Benson
Sanford Helt
George Lewis
✧ Janet Ray
Bobby Righi

Seattle University

Mary Ehlers
Janet Mills
Ahmad Mirbagheri
Andre Yandi

Shoreline Community College

Helen Hancock
Betty Hawkins
Marilyn Kruck
Mark Parker
Larry Runyan
Judy Sanderman

Skagit Valley Community College

Howard Anderson
Elizabeth Huffman
Richard Huffman
John Indorf
Susan Indorf

South Puget Sound Community College

Frank Edge
Joe Mailhot
Sara Mailhot

South Seattle Community College

Susan Chin
Margaret Lane
Stephen Lane
Bill Langford
Jill Langford
Larry Vittum-Jones
Marjorie Vittum-Jones

PARTICIPANTS

Spokane Falls Community College

Charles Ainley
Penny Coffman
Glenn Daugherty
Joyce Daugherty
Susan Dimick
Kialynn Glubrecht
Midge Hamilton
Robert Hamilton
Curt Humphrey
Gary Isham
Paul LeCoq
Larry Neises
Nick Nickoloff
Van Stahley
Don Willingham

Tacoma Community College

Joe Betz
Dick Spangler
Ed Zimmerman

University of Washington

Virginia Warfield

Washington State University

James Cochran
Katherine Cochran
Donalyn Kallaher
Michael Kallaher
Eleanor Newton
Tyre Newton
Sam Saunders

Wenatchee Valley Community College

Michael Lavinder
John Murio
John Pappakostas

Western Washington University

Karen Clark
Ren Ding
Jerry Johnson
Millie Johnson
✧ Richard Levin
Norm Lindquist
John Reay

Whatcom Community College

Susan Kaplan

Whitman College

Victor Keiser

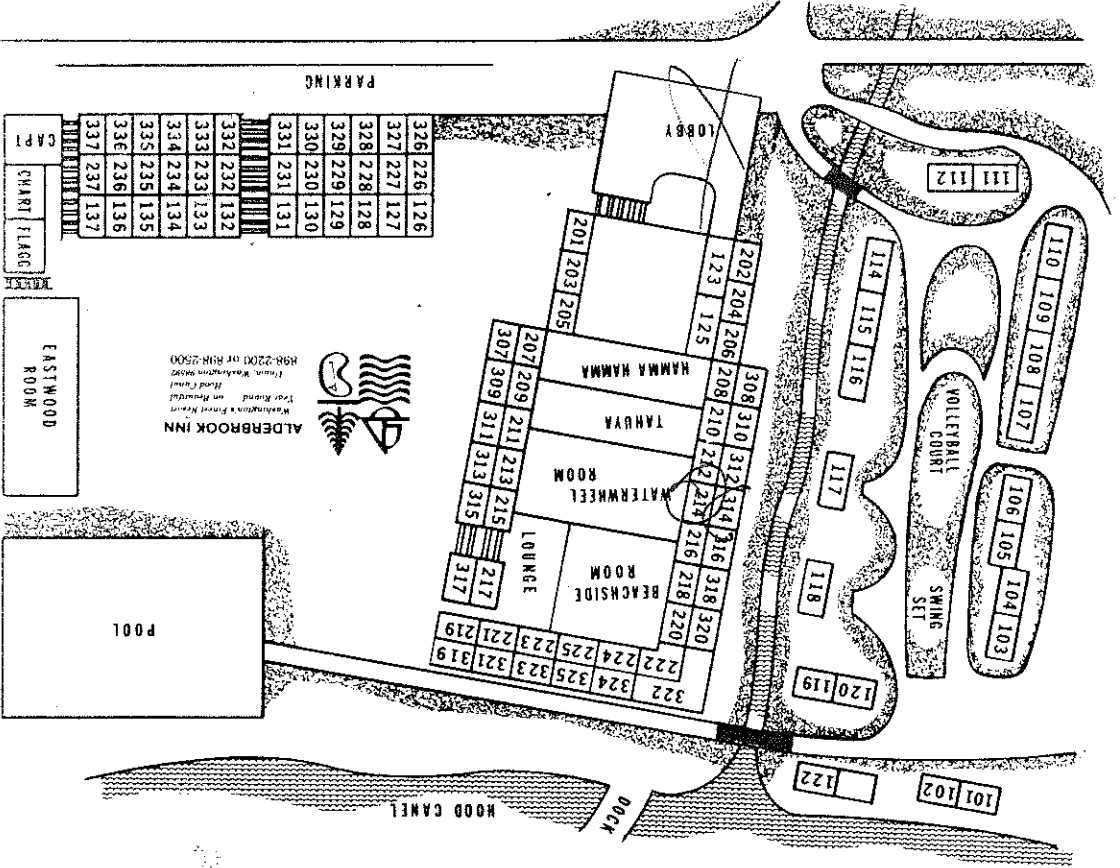
Yakima Valley Community College

Ibrahim Ayyoub
Aziz Jubran
Ellena Knobel
Roger Knobel

BRIEF HISTORY OF
WASHINGTON COMMUNITY COLLEGE MATHEMATICS CONFERENCES

<u>Year</u>	<u>Hosts</u>	<u>Location</u>
1989	Bellevue Community College	
1988	Olympic Community College	
1987	Lower Columbia Community College	24
1986	North Seattle Community College	Alderbrook
1985	Shoreline Community College	Sun Mountain
1984	Green River Community College	Alderbrook
1983	Olympic Community College	Port Ludlow
1982	Highline Community College	Chelan
1981	Spokane Falls Community College	Sun Mountain
1980	Spokane Falls Community College	Sun Mountain
1979	Olympic Community College	Port Ludlow
1978	Edmonds Community College	Providence Heights
1977	Shoreline Community College	Providence Heights
1976	Spokane Falls Community College	Providence Heights
1975	Shoreline Community College	
1974	Green River Community College	
1971		Lake Wilderness
1970	Spokane Falls Community College	Ashford-Mt. Rainier
1969	Green River Community College	Ashford-Mt. Rainier
1966	The first Washington Community College Mathematics retreat was organized by Phil Heft, Larry Larson, Jim Relf, and John VanDruff. Approximately 33 participants met at the "lodge" at Ashford with sleeping bags at a cost of \$16.68 each.	

THE MATH FACULTY AT NORTH SEATTLE COMMUNITY COLLEGE HAVE ENJOYED ORGANIZING THE 1986 WASHINGTON COMMUNITY COLLEGE MATHEMATICS CONFERENCE AND WISH THE BEST OF LUCK TO THE MATH FACULTY AT LOWER COLUMBIA COMMUNITY COLLEGE IN PLANNING AND HOSTING THE 1987 CONFERENCE.



ALDERBROOK INN
 1201 River Road on Puget Sound
 Hood Canal
 From Washington 9000
 RR-2200 or RR-2500

WASHINGTON COMMUNITY COLLEGE MATHEMATICS CONFERENCE
Alderbrook Inn Resort on Hood Canal
April 25-26, 1986

Due to a tremendous response to the call for speakers and many requests for a longer conference, this year's conference will also include a Friday morning workshop, Friday afternoon presentations, and a Friday afternoon information exchange.

SCHEDULE

Friday, April 25

9:00-10:00 **Registration**

10:00-12:00 **Workshop: Experimental Strategies**

This is a participatory workshop in which you will have an opportunity to assess your knowledge of the scientific method. You will conduct a simulated experiment and learn efficient experimental techniques. The concepts that are applied in scientific inquiry and experimentation in such fields as chemistry, physics, and engineering are discussed. The role of mathematics in this process will be reviewed.

1:00-1:30 **Registration**

1:30-4:30 **The afternoon session includes the following.**

From Pythagoras to Bach: The Arithmetic of Music	Stephen Hinthorne Central Washington University
Composite Functions: A Socratic Approach	Elmar Zemglais Highline Community College
Pick's Theorem on Hexagonal Lattices	John Reay Western Washington University
The Scratch Equation in Plane Analytical Geometry	Victor Keiser Whitman College
A Literal Equation Worth Solving	Ed Morris Highline Community College
Math and the Stock Market	Ken Gamon Central Washington University
Using Manipulatives in Beginning Algebra	Frank Edge South Puget Sound Community College
Circular Approximations	Earl Hamilton North Seattle Community College
Applications of Mathematics within Boeing	Ron Hebron Boeing

4:30 **Information Exchange**

This time is intended to provide you an opportunity to share. Topics of interest include the University of Washington's MATH 107 course (Math, A Practical Art), software now being used in the community colleges, and any you have. Ginger Warfield of the University of Washington will address the first topic; Ed Zimmerman will comment on the software survey he has conducted. Bring your ideas and comments.

4:00-6:00 **Registration and check into rooms**

6:00 **No-host cocktail hour**

7:00 **Dinner and keynote address: "Excursions Into the World of the Improbable," Jerry Johnson, Western Washington University.**

Following the keynote address there will be an informal get together and possibly a practical demonstration of the applications of chance. There is also at Alderbrook Inn a covered, heated pool and large spa.

Saturday, April 26, Morning Session

Business Executives Learn Mathematics	Yves Nievergelt Eastern Washington University
Perturbation Method of Solution of Non-Linear ODE	Richard Thomassen Whitman College
Functional Sex and Other Relations	Nick Nickoloff Spokane Falls Community College
Seemingly Valid Calculations That Produce Ridiculous Answers	Richard Levin Western Washington University
On What the Bolzano-Weierstrass Theorem Does Not Tell You About Bounded, Infinite Sequences	Tyre Newton Washington State University
The Equation of a Sabre	Sam Saunders Washington State University
Graphics Tools	Jerry Johnson Western Washington University
What Does Roulette Have to do with a Soap Box Derby?	Millie Johnson Western Washington University
The Interactive Effects of Student Ability and Sequencing of Calculus Instruction on Student Achievement	David Mitchell North Seattle Community College

WAMATYC meeting following lunch.

COST

The total cost is \$69, which includes Friday's dinner, Saturday's breakfast, coffee break, and lunch, and Friday night's lodging (double occupancy). There are a few single rooms available at an additional \$34.

DRIVING DIRECTIONS

From the Seattle area, the easiest route to Alderbrook is to take the ferry from downtown Seattle to Bremerton, follow the signs for Highway 304 to Hood Canal/Shelton/Belfair out of Bremerton. Then follow Highway 3 south from Bremerton to Belfair; beyond Belfair, turn right onto Highway 106 (sign reads Union & Twanoh State Park). Follow Highway 106 approximately 13 miles to Alderbrook Inn. (Ferry ride takes approximately 1 hour; 26 miles of driving from Bremerton.)

From Tacoma, follow Highway 16 over Narrows Bridge toward Bremerton. Turn left at Gorst on Highway 3 to Belfair; beyond Belfair, turn right onto Highway 106 (sign reads Union & Twanoh State Park). Follow Highway 106 approximately 13 miles to Alderbrook Inn.

From Olympia, follow Highway 101 north from Olympia beyond Shelton. Turn right on Purdy Cut-off Road (Detour Highway 106 across from fish hatchery); follow Highway 106 for seven miles to Alderbrook Inn Resort.

Please send your check made payable to Washington Community College Math Conference **before March 11, 1986**. Please send the attached form and your check to:

Christine Coulter
Science & Mathematics Division
North Seattle Community College
9600 College Way North
Seattle, Washington 98103

If you have questions, contact Vicky Ringen at 206-634-4705 (SCAN 446-4705)