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## University trio creates lyrical approach to calculus instruction

Sanders, John; Daily, Hall; Foster, Catherine

Monterey, California. Naval Postgraduate School

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# News Release from the Naval Postgraduate School

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## University trio creates lyrical approach to calculus instruction

(Monterey, CA) At a time when many university students and mathematics professors are complaining that the general approach to calculus instruction is dull and uninspiring, Dr. Hal Fredricksen, chairman of the Naval Postgraduate School mathematics department, has created a gem that is sure to enliven calculus classrooms throughout the country.

His contribution, which appeared in the June 1988 issue of *Mathematics Magazine*, is a nifty little song entitled, "Hooray for Calculus." Set to the Johnny Mercer tune, "Hooray for Hollywood," this piece takes its listeners to the limit, reminding them of the importance of using calculus to find the tangent, "the straight line part of a curve."

The idea for the song began with University of Illinois mathematician Dr. Bruce Reznick, Fredricksen said. "I had heard vague rumors of such a song," he said. Prior to teaching calculus in 1985-86, he began to search for the lyrics.

Fredricksen found that only one line had been written by Reznick, with another crafted by Dr. Bob McEliece, an electrical engineering professor at the California Institute of Technology and Fredricksen's long-time personal friend.

With Fredricksen taking the lead, the three completed the song in time for him to use it in his class.

Before his first presentation of the song, Fredricksen explained to his students that one of the "fun parts" of teaching math courses came in simultaneously conducting research in the subject area.

But, he said, "when teaching calculus, you can't do too much advanced research. You're limited to developing a new approach to a problem, or finding either a better theorem or better approach to teaching," he said. Then he sang the song.

"I got applause and that was encouraging," Fredricksen said. Then last year, he sang the song while conducting a doctoral exam at the University of Lund in Lund, Sweden. "They decided to make singing a part of all of their Ph.D. exams," he said.

Fredricksen has written another song about the uninspiring portions of a faculty member's activities. Called "A Professor's Lot," the song will be published in *Mathematics Monthly*.

He notes that the songs "are not my only contribution to the field." An article, "Covering the de Bruijn Graph," will appear soon in the *Discrete Mathematics Journal*. Another article, "Divisors of n-Factorial and Related Properties," will be published within a few months.

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**About the artist:** Jeff Bacon is a lieutenant commander in the U.S. Navy currently stationed at the Fleet Numerical Oceanography Center in Monterey, Calif. His cartoons appear weekly in the commercial publication *Navy Times*. FNOC is the Navy's primary environmental forecasting center, developing global predictions of ocean and atmospheric conditions for fleet applications. Following his tour of duty at the oceanography center, Bacon will become a student in the air-ocean sciences program at the Naval Postgraduate School, a fully-accredited graduate institution specializing in science and engineering.

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# Hooray for Calculus!

Words: Bruce Reznick, Bob McEliece, Hal Fredricksen

Music: Johnny Mercer (Hooray for Hollywood)

Hooray for calculus  
Old Newton's rootin' tootin' calculus  
The class where letting  $\Delta x$  near zero  
can make a hero  
of students. Teachers will say,  
Just take that limit  
Be bright not dim, it's  
likely to be finite and you're on your way.

Hooray for calculus  
The single variable calculus  
It's mathematics where each lady and gent  
can find a tangent,  
the straight line part of a curve.  
Approximation  
and integration  
are easy for the student with a little verve.

So here's to calculus  
Three cheers for ordinary calculus  
And while we know at first our students hate it  
We still A rate it  
At least it's worth a B+  
Though it's not child's play  
With work they come to say  
Hooray for calculus.

