

The MCM Experience at the University of Alaska Fairbanks

J.P. Lambert

Dept. of Mathematical Sciences
University of Alaska Fairbanks
Fairbanks, AK 99775-6660
ffjpl@aurora.alaska.edu

Introduction

The University of Alaska Fairbanks has had a vibrant relationship with the MCM. From interpolating hydrographic data in 1986 to designing a faculty compensation plan in 1995, eighteen UAF teams have faced the MCM weekend and have without exception thrilled to the challenge. A special highlight came in 1990, when a UAF team's paper on snow-plow routing was judged Outstanding. Another Outstanding team followed the next year (the first all-woman Outstanding MCM team, with all three students, it happens, graduates of the same Fairbanks public high school); there have been two more since then, in 1993 and 1995.

The MCM has indeed been good for UAF. Ben Fusaro's inspiration more than a decade ago has proved a superb educational experience for our students. They have learned to work and think and produce a substantial report in close collaboration with others under a strict time constraint; they have learned new mathematics and new applications of mathematics. As faculty advisor to UAF teams each year except 1991—when I was on sabbatical in Ireland and present at the start of now vigorous MCM traditions at Trinity College Dublin and University College Galway—I will try to share some thoughts about what happens here in Fairbanks.

Finding and Training the Teams

Team selection and composition are of course important. We seek balance and breadth of expertise, and compatibility. Computer and writing skills are essential; statistical knowledge is valued if available. Students have come to MCM teams from a variety of majors: physics, geology, engineering, chemistry, economics, statistics, biology, computer science, and

mathematics. A number have had double majors. Nearly all have taken at least one upper-division mathematics course, especially from among mathematical modeling (which most have taken), linear algebra, numerical analysis, discrete structures, and advanced calculus. Often prospective participants have first become known to us in such courses. Also, an announcement about the MCM is posted on a bulletin board, inviting inquiries; I am always interested in discussing the contest with students enticed in this way. So far, there has been no dearth of eager talented students available, many of whom were attracted to UAF in the first place by its strengths in the sciences and by the uniqueness of Alaska (including some from abroad: Russia, Sri Lanka, Greenland). Most of our MCM participants have in fact been from within the state.

We try to identify prospective teams (usually two) early on, by the first of December in the semester preceding the contest, and to establish a weekly or biweekly meeting routine. It is crucial to get together with the students regularly, especially in the period after semester break leading up to the competition. Students are given copies of past MCM problems, and solution papers are available to them; they are encouraged to identify with each other as teams and to meet separately to discuss problems, strategies, and division of responsibility. Ideally, it would be nice to set up a dry run of the overall MCM weekend; but no one has time for that sort of commitment. At our collective meetings each week, we talk about the nature of applied mathematics and about problem solving; but much of the time, we talk also about computer facilities and software, library and departmental facilities, MCM rules, and the importance of a well-written summary. Sometimes we have guest speakers. A department head once proposed that MCM preparation and participation be formalized as a course with credits, an idea that (despite some appeal) was rejected. One participant warned that this would eat at the special nature of the MCM and lead to a class-like situation, with “professors giving stuffy lectures, and grades,” as he indelicately put it to this professor.

The Long-Awaited Weekend . . .

The weekend of the MCM is always exciting. There is a charged air of anticipation when the envelope is finally opened just past midnight on Friday and the two problems compete for attention. By this point, various details have been attended to. Each team has been issued a key to the Chapman building (which houses the Dept. of Mathematical Sciences), to the departmental office, and to my office. Accounts have been set up on computers; campus security has been alerted to the likelihood of goings-on at all hours.

Over the years, a strong tradition of faculty support for the MCM effort

has evolved at UAF: Teams are given the run of much of the building; and as the weekend unfolds, pizzas, sandwiches, fruit, Chinese food, cookies, juice, and soft drinks appear in the faculty lounge at regular intervals. So sustained, the teams forge on through setbacks and disagreement, breakthroughs and discovery, sleep becoming a diminishing commodity as the weekend advances. On Monday, sometimes perilously close to deadline, a solution paper always materializes. Two copies are produced for COMAP, one for each team member, and one for me; and the MCM is concluded for another year.

. . . and After

But not really concluded. The annual MCM undertaking at UAF does not quite end with the contest itself on a February weekend. There is a special event in late April, tied in when feasible with Mathematics Awareness Week, at which teams are honored and invited to give short presentations of their solutions. Student attendance is encouraged and pizza is provided. More than one future participant's interest in the MCM was first sparked by this event, through seeing what other students could accomplish and being witness to their enthusiasm.

About the Author



Pat Lambert was educated at Xavier High School in Cincinnati, the University of Cincinnati (B.S.), the University of New Mexico (M.A.), and the Claremont Graduate School (Ph.D.). He has taught at a Nigerian secondary school, at Ahmadu Bello University in Nigeria, and at University College Cork in Ireland, and has worked at a government research lab in Maryland. Since 1982, he has been at the University of Alaska Fairbanks, where he is Professor of Mathematics, and has had visiting positions at Trinity College Dublin and University College Galway in Ireland. His interests include quasi-Monte Carlo methods, voting theory, and mathematical modeling.

