Mathematical Contest in Modeling

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The mathematical contest in modeling will be held on February 6-10, 2014.

My website, `http://www.math.washington.edu/~morrow/mcm/mcm.html`, has a lot of local information. The MCM website is `http://www.comap.com/undergraduate/contests/mcm/`. You can find past problems on this site. The MCM Prep website is `http://www.math.washington.edu/~morrow/mcm/mcmprep.html`

As you can see, a winning paper has several characteristics.

- It has a precise statement of a mathematical problem that rephrases, at least partially, a vaguely stated question.

Then it has a solution of the problem. Solutions often involve combinatorics, graph theory, discrete mathematics, probability, differential equations, linear algebra, and calculus of one and several variables – mostly second and third year mathematics; and often they involve first or second year physics. It helps to be a double major as you get a good feel for the uses of mathematics and how to deal with uncertainty.

Then there is the exposition of the solution.

- You will need to learn LATEX.

An introduction can be found in `http://www.ams.org/tex/short-math-guide.html` or also `http://www.math.washington.edu/Computing/Tex/`. You will get computer accounts at MSCC which give you access to the LATEXsoftware.

- It is important that the salient items be highlighted (as with this bullet).

Don't bury important items inside lengthy paragraphs. Use graphics and tables to illustrate your points. That means you need to be prepared with LATEXtemplates in which to include the text and figures. The UMAP journal includes many comments and recommendations by judges. In particular they point out that there are few judges and hundreds of papers. There is a triage system. Each paper is given an quick (5-15) minute reading. You must make the first cut. Then a more careful reading is made. To make the "finals" your paper must be very good. The judges recommend that you not spend precious space deriving a known mathematical or physical result. Give a reference and procede. Don't include computer code; at most include simple pseudo-code. Explain your methods in direct simple terms.

- Be ready to write programs in Matlab. Think of Matlab as a calculator where the data type is a matrix. Lots of documentation is available on-line.

- Use the Internet. You will have to find data and such search engines as Google are very useful.