

Mathematics Department

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**Profile of the Month
 Assoc. Prof. Alexis Alevras**

Alexandros Alevras was born in Athens, Greece, and grew up about 300 yards from the site of Plato’s Academy. Following in the footsteps of his father, Ioannis, a high school math teacher, Alevras studied mathematics at the University of Athens. As in most Euro-

pean universities, his curriculum was highly focused—“about 40 math classes and 3 physics classes”. He graduated first in his class.
 In 1989, Alevras entered the graduate program in mathematics at UC Berkeley. He earned his Ph.D. in 1995. The topic of his dissertation was E_0 -semigroups, the mathematics of “irreversible quantum dynamical systems”. After graduation, he held positions at Penn. (2 years), the University of Oslo (2 years), and UC Santa Barbara (3 years).

Prof. Alevras arrived at USNA in the Fall of 2002. Since then he has taught a wide variety of courses (from the Calculus sequence to honors courses in real analysis and abstract algebra). He has earned a reputation among midshipmen as an excellent teacher. In particular, he is famous for



his evening EI sessions (which he holds three times per week) and for poking fun at his students during class. Regarding the former, Alevras says that “the logistics of evening EI are better both for me and them”. Regarding the latter, Alevras says that his comments are “so over-the-top that you can’t take them seriously”. Apparently, this holds outside of the classroom as well. Take, for example, his review of Troy, the 2004 Hollywood adaptation of Homer’s Iliad: “It hurt to see our beautiful poem defiled like that.”

Prof. Alevras’ contributions to USNA extend well beyond the classroom. This academic year alone, he is a plebe advisor, the Math Club advisor, and supervises Midn. 1/c Marjorie Drake’s honors project on the “Kakeya Needle Problem”.

In his spare time, Alevras enjoys playing soccer and reading—Greek history, American foreign policy, and anthropology. (He notes with ridiculous satisfaction that Greece is the reigning European soccer champion.) He is also an aspiring ship modeler, a pursuit which “requires a lot of patience, which helps with teaching.”

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Math News

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MATH AND WRESTLING

By Prof. T. S. Michael

The Eastern Intercollegiate Wrestling Association (EIWA) faces an interesting mathematical problem at the league tournament every year: How can the first-round byes be distributed fairly among the individual wrestlers and teams?

The table illustrates the crux of the scheduling problem using data from the 2006 EIWA tournament. Each of the 13 teams in the league enters a wrestler in each of the ten weight classes. If there were 16 teams in the league, then the 16 wrestlers in a weight class could be paired up---like a regional bracket for the NCAA basketball tournament. However, with 13 teams there will have to be three byes in each weight class in the first round. By tradition the byes are distributed at random among the top eight seeds in each weight class.

Team	Seeds	Byes expected	Byes 1st try	Byes 5th try
Lehigh	10	4.125	1	5
Navy	10	4.125	5	4
Penn	9	3.75	6	4
Cornell	9	3.75	5	3
Army	9	3.625	7	3
American	7	2.875	1	5
Harvard	5	2.125	1	3
Columbia	5	2.125	1	1
ESU	5	2.125	3	2
Brown	5	2	2	2
Rutgers	4	1.625	0	1
F&M	1	0.375	0	0
Princeton	1	0.375	1	0

MATH AND WRESTLING (Cont.)

The stronger teams (e.g., Lehigh and Navy) have many seeded wrestlers and therefore expect to receive more byes in the random draw. The fourth column shows the actual number of byes received by each team when the random draw was made. By chance, Lehigh received only 1 bye (with 4.125 byes expected) while Army received a whopping 7 byes (with only 3.625 byes expected). Thus Lehigh would have an inordinate advantage in the team competition through the 'bonus points' earned by wrestlers who pin their opponents in the first round.

However, a new method of selecting the draw was in effect for the 2006 tournament. The method uses ideas from statistics, operations analysis, and discrete mathematics to compute a number N for the entire configuration of randomly selected byes. If N is too large, then the configuration is rejected, and a new random selection of byes is made. The process is repeated until a satisfactory assignment of byes is achieved, as shown in the last column of the table. One surprising consequence of the theory: A 'quota method' that assigns the number of byes to each team in advance will necessarily treat some individual wrestlers unfairly. The new method avoids this unfairness to individuals, while eliminating most of the unfairness to teams.

The method was devised by Dr. T. S. Michael of the USNA Math Dept. More information can be found at his website: <http://www.usna.edu/Users/math/tsm/>

'Random sampling' could change your life*

By Tash Reddy

Tata ma chance, tata ma millions - R42.50 is how much it will cost to stand a very good chance of completely changing your life. Recently a syndicate of university professors in the UK used their mathematical expertise and scooped a £5,3-million (about R68-million) Lotto jackpot and we asked local math guru Kristie Naidoo to comment. Their method was simple. The syndicate, made up of 17 staff mem-

'Random sampling' (Cont.)

bers at Bradford University and College, won the big prize by using two boxes, 49 pieces of paper and a large amount of brainpower. Naidoo, who is the head of the Department of Mathematics at the Durban Institute of Technology, said the method was not as far-fetched as one might think.

"In order to win their Lotto they used the method of random sampling without replacement. They placed the 49 numbers in a hat and drew 6 each time. After eight draws, one was left. They started the new draw with this number and continued the process using 49 numbers from another hat. After another 8 draws, 2 numbers were left. They started with these two numbers and repeated the process for one draw only, to give a total of 17 draws (because 17 people were part of the syndicate)," said Naidoo.

Basically, all 49 numbers had an equal chance of being drawn and they had two full sets of the representation plus one more line. "For the South African Lotto, 17 draws like this would cost R42.50," he said. Uthingo spokesperson Yogin Devan said that the KwaZulu-Natal man who won the R26,8 million jackpot on November 11 had done so with a R28 ticket, choosing numbers at random.

*Independent Online, South Africa - Nov 25, 2006

Answer for last issue question: Ans. If amoebas double the volume every minute and it takes 40 minutes to fill a jar, it takes 39 minutes to fill half the jar. MIDN 4/C Christopher D. Cady and MIDN 4/C J Blake are last month's winners. Please stop by the Mathematics Department to claim your prizes.



Question of the Month

What is my house number ? It is less than 40 000. The 4 is next to the 3 but not the 2. The 6 is between the 2 and the 3. The 1 is not next to the 4.

E-mail your answer to Prof. Garcia smg@usna.edu. Among those with the right answer, a randomly chosen midshipman will get to choose between a fantastic math water bottle or a cool koozie.

The symbol used on the head of Math News is one of the Platonic Solids. Ref. <http://mathworld.wolfram.com/PlatonicSolid.html>.