



The Mathematical Association of America

**Math Department Colloquium/
Math Club/MAA Student Chapter presents
Chain Partitions of Subset and Subspace Lattices
Shahriar Shahriari (Pomona College)**

**Wednesday, Apr. 18, 2007
3 – 4 pm, Simpson Tower 213
Refreshments 2:30 - 3**

Consider all 8 subsets of $\{1, 2, 3\}$ and organize them into the following “chains”:

$$\begin{aligned} \emptyset \subseteq \{1\} &\subseteq \{1, 2\} \subseteq \{1, 2, 3\} \\ \{2\} &\subseteq \{2, 3\} \\ \{3\} &\subseteq \{1, 3\} \end{aligned}$$

You have now partitioned the subset lattice $2^{[3]}$ into chains with sizes 4, 2 & 2. But could you partition the 1024 subsets of $\{1, \dots, 10\}$ into 16 chains of size 5 and 236 chains of size 4?

In 1985, Füredi asked if the subset lattice, $2^{[n]}$, can be partitioned into $\binom{n}{\lfloor n/2 \rfloor}$ chains of roughly equal size. In 1988 Griggs conjectured a generalization that identifies precisely the possible chain sizes of any partition of $2^{[n]}$ into chains. Both of these conjectures remain open. In this talk we survey what is known including some recent results that construct chain partitions of $2^{[n]}$ into $\binom{n}{\lfloor n/2 \rfloor}$ chains of relatively uniform size. We then generalize the Füredi and Griggs conjectures to more general lattices and report on recent results on the chain decompositions of the lattice of subspaces of a vector space over a finite field.

For more information, contact Mike “Quimby” Krebs at mkrebs@calstatela.edu or Tony Shaheen at ashahee@calstatela.edu.

Math Club website: http://www.calstatela.edu/academic/math/Math_Club/mathClub.htm

Upcoming events:

5/2	Liana Dawson (grad student, UCSB) Alethea Barbaro (grad student, UCSB)	We will have two speakers this day. They will split the time (each give 30 minute talks). Topics TBA.
5/9	Dylan Kohler (Electronic Arts)	TBA
5/23	Tony Shaheen (CSULA)	Ramanujan graphs and zeta functions of graphs