# CHEN3600 – Computer-Aided Chemical Engineering Spring 2012

# Chemical Engineering Department CQ7

**T.D. Placek Auburn University**

 **CQ7 – Discrete Distributions**

DO NOT SUBMIT YOUR SOLUTION!

1. Uncle Jim hated flying. No matter how safe people told him it was, he was always worried that someone would have a bomb on the plane. His family doctor was little help so, in desperation, he visited a statistician. ‘Tell me,’ he asked, ‘what are the chances that someone will have a bomb on a plane?’ The statistician looked through her tables and said, ‘A very small chance. Maybe one in a hundred thousand.’ ‘So what are the odds of two people having a bomb on the same plane?’ ‘Extremely remote,’ she replied. ‘About one in ten billion.’ Uncle Jim nodded and left her office. And from that day on, every time he flew, he took a bomb with him.

Explain the fallacy of Uncle Jim’s decision. What probability distribution was being used and what distribution should have been used?

1. A telemarketing company gets on average 6 orders per 1000 calls. If a company calls 500 people, find the probability of getting 2 orders.
2. A crime study for a geographic area showed an average of one home invasion per 40,000 homes per year. If an area contains 60,000 homes, find the probability of exactly 3 home invasions on 3 successive years.
3. The average number of phone inquiries to a toll-free number for a computer help line is 6.3 per hour. Find the probability that for a specific hour, the company receives 10 or more calls.
4. A company receives on average 9 calls every time it airs its commercial. Find the probability of getting 20 calls if the commercial is aired four times a day.
5. A trucking firm experiences breakdowns for its trucks on the average of 3.3 per week. Find the probability that for a given month 20 or more trucks will experience breakdowns.