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## 07. Criminal Justice

University of Central Oklahoma

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## **Abstracts from the 2013 Oklahoma Research Day**

**Held at the University of Central Oklahoma**

### **05. Mathematics and Science**

### **07. Criminal Justice**

#### **05.07.01 Improving Crime Analysis Through an Examination of Auto Burglary: Edmond, Oklahoma**

**Emelia Chrisco,**

*University of Central Oklahoma*

The city of Edmond, Oklahoma presented with a problem of auto burglary. It is a crime that has gone unevaluated and not suitably dealt with due to a lack of resources within Oklahoma law enforcement. The Edmond Police Department currently has plans to expand into a new building with the possibility of developing the Crime Analysis Department, which currently consists of only one officer. It has come to the attention of researchers that there is a high potential for strategic growth that would bring a structured allocation of resources which would in turn boost efficiency, effectiveness of manpower, and productivity. A review of the literature suggests that police departments of all sizes benefit from having a dedicated crime analysis department. The literature stresses department effectiveness through educated individuals working with the proper tools. With the use of data mining and geospatial software, an educated Crime Analyst can create tactical strategies that are more efficient. Utilizing the Automated Tactical Analysis of Crime software (ATAC), which features custom filters and advanced data mining technology, researchers will locate the three main hot spots of auto burglary. Once those hot spots are identified, further geographical analysis will be conducted. Aspects of the environment will be evaluated to find trends that might promote or create the opportunity for auto burglary.

## **05.07.02 The Stillwater Auto Burglary Project: A Multidisciplinary Pilot Study**

**James Lofton, Emelia Chrisco,**

*University of Central Oklahoma*

Auto burglary is a major problem in Stillwater, OK. The problem is aggravated by a lack of prosecution, low victim awareness, unlocked vehicle doors, and personal property left in plain view of potential offenders. The Stillwater Police Department approached the University of Central Oklahoma's Center for Innovative Solutions seeking to mitigate this problem. Several studies of successful programs for reducing auto burglaries within individual cities have been reviewed. Primarily, these studies have shown that programs focused on a singular-discipline approach tackling the problem from one angle. Utilizing the Automated Tactical Analysis of Crime software, a total of three hot spots were identified as being the best option for implementing intelligence led crime prevention strategies. Numerous tactical solutions will be implemented to include directed patrol in hot spot areas, a system of Potential Economic Loss Prevented cards to track the monetary savings to the community, door hangers that describe the problem and provide awareness and prevention tips, and ultimately increased prosecution. Additionally the Center for Innovative Solutions has partnered with UCO's Mass Communication Department to implement community outreach programs that include modern social media outlets, a landmark solution to auto burglary. The hopeful outcome of this program will be a sustainable, multidisciplinary approach that appreciably reduces auto burglary in Stillwater, Oklahoma.

## **05.07.03 The Effects of Carbohydrate Concentrations on Heat Shock Protein Expression in *Daphnia magna***

**Crittell Charles, Charles Biles, Morgan Dickerson,**

*East Central University*

Individuals with diabetes mellitus, Type 1, often experience reduced expressions of chaperone proteins, most specifically heat shock proteins (HSPs). These proteins play a key role in the immune system's response to stress through the regulation of protein synthesis and folding patterns. The purpose of this study was to determine if *Daphnia magna* could be used as a vector to study the relationship between heat shock protein expression and diabetes. *Daphnia* underwent various heat treatments to determine the time and temperature in which suspected HSPs were expressed. A standard heat treatment was then performed on daphnia exposed to various glucose molarities to determine the effect of carbohydrate concentrations on the suspected HSPs expression. It was determined that a possible HSP with a molecular weight of 22.6 kD appeared after 15 min in 33 °C. Results also showed a positive correlation between total protein production in daphnia and increasing sugar molarities.