# RUTGERS
## Center on Public Security

American Society of Criminology 68th Annual Meeting
November 14-17, 2012 in Chicago, IL (USA) at the Palmer House Hilton Hotel
**Risk Terrain Modeling Panels**

| SESSION TITLE: | THEORIES & METHODS OF RISK |
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**Title** — **Vulnerability and exposure to crime: Developing and testing a theory of risky places**

**Presenter(s)** — Leslie W. Kennedy (Rutgers University)

Joel M. Caplan (Rutgers University)

*Abstract*

Prior research has applied risk assessment and spatial analysis techniques to the study of crime outcomes. This paper builds on those results, tying the practical outcomes of spatial risk analysis methods to broader spatial issues on the articulation of risky places. We begin by conceptualizing key relationships in the theory of risky places, which considers the effects of many factors on creating distinct, identifiable areas that are conducive to crime. Propositions of the model of risky places are posed and then empirically tested using burglary data in an urban area. Given the current thinking about crime vulnerability based on concentration and spatial influence of features and events, this paper offers an analytical strategy to model risky places that combines the conceptual insights of crime emergence and persistence, advances in geo-spatial analytical techniques, and micro-level data.

**Title** — **Investigating place-based perceptions of risk**

**Presenter(s)** — Eon Kim (Rutgers University)

*Abstract*

Although place-based perceptions of risk are important for understanding people's fears of crime, few studies have investigated people's perceptions of risk at micro-level places. The key aim of this research is to understand where risk is perceived to be highest and lowest throughout the Rutgers Newark campus based upon perceptions of criminal victimization risk by members of campus community. Perceptions of environmental risk include information obtained by participants through normal human senses. Cartographic maps of perceived risk from the participants will be layered with crime hotspots map and Risk terrain modeling (RTM) to assess whether people's perceptions of risk on campus are, in fact, places where crime most often happens. Mapping perceptions of risk will yield a number of findings previously unknown to scholars, police, and administrators. The identification and better understanding of perceived risk places may improve RTM supporting different aspects which have not been considered before. In particular, it is expected that findings from this research will contribute to empirical strategies for campus safety.

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| **Title** | **Robbery risk as a co-function of place and time** |
| **Presenter(s)** | Yasemin Gaziarifoglu (Rutgers University) |
| | Leslie W. Kennedy (Rutgers University) |

*Abstract*

Concerns about the occurrence and consequences of armed robbery have permeated the criminological literature over the years. It is widely acknowledged that "place of offending" plays an important role in the offender's decision to engage in robberies. For both male and female robbers most of the time robberies are financial gain oriented (Miller 1998). Accordingly places offering less risk, more accessible targets and more rewards are more attractive to offenders in parallel with rational choice explanation of offending (Braga et al. 2010; Conklin 1972; Feeney 1986; Felson 2006; Jacobs 2000; Wright and Decker 1997). According to Grubesic and Mack (2008) although hot spots analyses rely on the basic tenet of the space and time convergence of the target and the offender in most of the studies the space and time interaction is either neglected or treated as independent entities rather than interdependent ones. With this foundation this research intends to advance knowledge and understanding of the importance of micro crime times and places in criminology by proving robbery risk as a co-function of place, time and situation. The researchers aim to contribute to the theory of crime places by suggesting a transformative definition of crime vulnerability of places via re-operationalizing the "crime generating", "crime attracting" and "crime enabling" nature of places.

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| **Title** | **RTM in Smaller Urban Areas: An Evaluation and Refinement** |
| **Presenter(s)** | Isaac Van Patten (Radford University) |
| | Andrew S. Foy (Radford University) |

*Abstract*

Risk Terrain Modeling (RTM) is a systematic method for modeling risk of crime based on the development of weighted overlays. The method was developed by Caplan and Kennedy (2010) and has been successfully validated in larger, densely populated urban ecologies with a relatively high occurrence of the outcome crimes. In this study we apply the RTM approach to modeling three crimes (felony assault, robbery, and burglary) in two small southern cities. The appeal of RTM is that it creates a risk surface from contextual variables in the environmental backcloth rather than relying solely on retrospective hotspot mapping. This selection of predictor variables from the environmental backcloth is both theoretically grounded and inherently more stable than predictive models built entirely on the basis of past crimes. However, retrospective hotspot mapping for prediction is a field-tested and proven methodology and has the added advantage of being easy to implement. The question is, can RTM models consistently outperform retrospective hotspot models in varied urban ecologies. We examine the RTM model as originally developed and then extend that by developing a modified method for generating the weighted overlay using a standardized metric rather than ordinal values. The results are compared in different urban ecologies.

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| **Title** | **Using Risk Terrain Modeling Methods to Assess the Spatial Distribution of Aggravated Assaults at Micro-Level Places Following a Place-Based Intervention** |
| **Presenter(s)** | Joel M. Caplan (Rutgers University) |
| | Jonas Baughman (Kansas City Police Department) |

*Abstract*

Certain criminogenic features of the landscape may attract and enable aggravated assaults above-and-beyond the activities of victims, offenders, and the police. This could explain the persistence of hotspots and recurring aggravated assaults at certain locations in Kansas City, Missouri, despite the two-day Violent Crime Initiative (VCI) during July 2010. In this quasi-experimental study, we hypothesized that: 1) Aggravated assaults, both before and after the VCI, were likely to occur at micro places most suitable for such crimes given the co-existence of certain environmental risk factors at those places, and 2) The locations of aggravated assaults post-VCI can be explained by the co-existence of environmental risks and pre-VCI hotspots at micro-level places. A weighted risk terrain model was used to operationalize Kansas City's criminogenic landscape. The evaluation strategy directly addressed the place-based nature of the VCI activities and was sensitive enough to assess the impact of the VCI on the spatial distribution of aggravated assaults without results being confounded by aggregation effects coming from the ecological fallacy. Results suggest that the spatial dynamics of aggravated assaults did not change in Kansas City over a six month period, despite activities of the VCI midway. The presence of environmental risk factors and past aggravated assaults had strong effects on the locations of new incidents, so pre- and post-VCI incidents tended to occur where they always did, in contextually similar types of places. The analysis demonstrates ways in which risk terrain modeling techniques can complement traditional macro-level evaluations of a targeted intervention's success or failure by taking into account micro-level place-based effect.

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| **Title** | **A Pilot Application of Risk Terrain Modeling: Aggravated Assault in Newark, NJ** |
| **Presenter(s)** | Victoria A. Sytsma (Rutgers University) |

*Abstract*

This research exhibits a pilot study employing the technique of Risk Terrain Modeling (RTM) to the offence of aggravated assault within the city of Newark, NJ. This pilot produces greater insight into the spatial intersection of a variety of environmental facets conducive to the outcome of aggravated assault; or what is termed a risk value. Based on logistic regression, the results of this study show that for every one unit increase in risk value, the odds of an aggravated assault occurring increases by 116%; these results were statistically significant. This research demonstrates that by spatially engaging potential risk factors favorable to the occurrence of a criminal event, one can provide strong explanatory conjecture without having to rely upon past criminal incidents.

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**Title**     <u>Using the Risk Terrain Modeling technique in an Italian city: Applying an innovative approach for preventing robberies.</u>

**Presenter(s)**   Marco Dugato (Transcrime, Università Cattolica, Milan, Italy)

*Abstract*

Robberies are probably one of the most relevant crime-problems still affecting contemporary cities. Indeed it is widely diffused and, although the usual targets are goods or money, it can often cause serious physical and psychological damages to the victims. Nevertheless, as stated by numerous studies, robbery is also a crime necessitating specific conditions to take place, in other words: it can be prevented. This study, one of the first applications of RTM outside US, tries to use this innovative method to analyze and condense the risk factors leading an urban area to concentrate a high number of robberies. These factors include various elements such as the analysis of previous events, the presence of crime enablers and the structural characteristics of the neighborhoods. Using spatial analysis tools the study results in a continuous map surface that expresses the diffusion of risk in the different areas of the cities. This map is used to forecast where future events are more likely to occur and the validity of the findings obtained is controlled using statistical tests. Data about robberies recorded in the Italian city of Milan from 2007 to 2010 are used.

**Title**     <u>Evaluating the Predictive Validity of Risk Terrain Modeling with Residential Burglary</u>

**Presenter(s)**   Megan Yerxa (Seattle University)

*Abstract*

Risk Terrain Modeling (RTM) assesses social and physical risk factors to aid in crime forecasting and prevention strategies (Caplan & Kennedy, 2010). This study assesses models founded on the RTM framework as a forecasting tool for residential burglaries in a mid-sized urban port city. Moreto (2010) outlined several spatial variables found to correlate with residential burglary underpinned by criminological research that include proximity to public housing, pawn shops, bus stops, police stations, fire stations, and hospitals. These variables, along with proximity to schools, code enforcement violations, near-repeat victimization patterns, and high-density areas of burglary offenders' last known addresses were selected. To-date, there are no other RTM studies that use cycle lengths shorter than six months. This study utilizes multiple 14-day, 28-day, 84-day, and 168-day length cycles with logistical regression to the test predictive validity of the models. It is hypothesized the shorter cycles lack the robustness to incorporate both dynamic patterns and more stable environmental factors but will still provide added benefit over kernel density hotspot mapping. The two longer cycles are hypothesized to be statistically stronger and indicate whether any lack of robustness is due to the specific crime type or cycle length.