



NUI Galway
OÉ Gaillimh



Georgia Institute
of Technology



UNIVERSITY of LIMERICK
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Technology Research Priorities

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Georgia
Tech  Ireland

A NEW PARTNERSHIP
IN TRANSLATIONAL RESEARCH

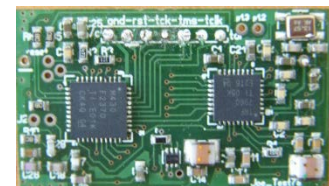
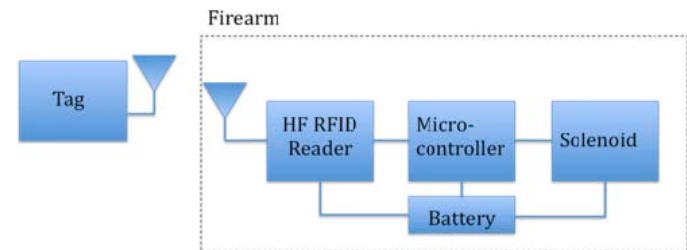
Georgia Tech Ireland

- Founded in 2006, GT-Ireland is a collaboration between the Georgia Tech Research Institute (GTRI) in Atlanta, and two Irish Universities in Galway (NUIG) and Limerick (UL).
- An applied research center, with a focus on the transition of research from academia to industry.
- Local expertise in the areas of wireless/RFID, software and cyber security.



Smart Guns / Personalized Firearms

- GT-Ireland developed a number of proof of concept smart guns in collaboration with Triggersmart, an Irish startup.
- Technology used is Radio Frequency Identification (RFID).
- A custom designed miniature RFID reader was developed and integrated into a number of different firearms, including handguns and assault rifles.
- Off-the-shelf RFID tags are used in wearable rings or bracelets. Implantation of tags under the skin is also possible.
- Locking mechanisms based on miniature solenoids and stepper motors.
- Technology is at the proof of concept stage, commercialization is possible within 1-2 years.

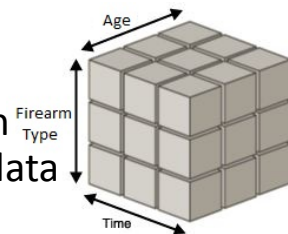
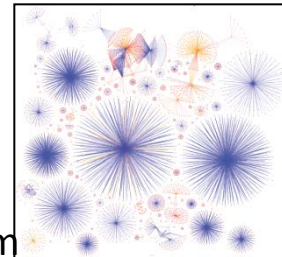


Research Priority #1: Smart Guns

- Areas of research:
 - Biometrics (fingerprint/palm/grip recognition)
 - Low power wireless integration (RFID and other)
 - 'Ruggedization' of electronics and locking mechanisms
 - Onboard power sources, including energy scavenging
- Additional 'smart' features:
 - Sensors to prevent accidental discharge
 - Sensors to predict and prevent/discourage suicide
 - Using wireless technologies to disable firearms in exclusion zones (schools, campuses, government buildings)
 - Automatic notification of safety and maintenance issues
- Reasons why smart guns can reduce firearm related violence:
 - Not a panacea, but can make a positive impact in certain areas
 - Reduce incidents where law enforcement officers are shot with their own gun
 - Child safety – decrease the number of child injuries and fatalities
 - Reduction in accidental discharges during cleaning and maintenance

Research Priority #2: Using Technology to improve epidemiology of fatalities/injuries

- There are a number of national and regional data sources available. Some prominent examples are;
 - National Violent Death Registry System (NVDRS), 16 states, 25% of gun deaths
 - CDC Web-based Injury Statistics and Reporting System (WISQARS)
 - National Electronic Injury Surveillance System (NEISS), sample of 100 hospitals
 - Weapons Related Injury Surveillance System (WRISS), limited national coverage
 - FBI Uniform Crime Reporting (UCR) & NIBRS systems, 17000 city and state law enforcement agencies
- The National Information Exchange Model (NIEM) could be used to collect and aggregate the information from the various databases
 - NIEM has been developed and deployed to overcome the challenges of exchanging information across state and city government boundaries.
 - All 50 states and 19 federal agencies are committed to using NIEM in some form
- Emerging data visualization and analytics techniques can significantly improve the usefulness of this data, particularly for large data sets
 - Taking advantage of research in computer graphics, image processing and high performance computing to gain a greater understanding and insight into the data
 - An example of this is data cubing, which allows exploration and analysis of a collection of data from many different perspectives



Research Priority #3: Technology to enhance gun safety education

- Use new media and the emerging technologies to reach a wider cross section of potential firearm users.
- Some examples are:
 - Social media
 - Online health and safety campaigns
 - Re-enforce firearm safety messaging
 - Sharing of gun safety tips from experts
 - Tablet/Smartphone apps
 - Augmented reality to illustrate safe gun use and maintenance
 - Video analysis of safe gun handling and usage

In Summary: Priority Research Topics

1. Smart Gun /Personalized Firearms
2. Using visualization and data analytics to improve gun violence epidemiology
3. Technology to enhance gun safety education

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