



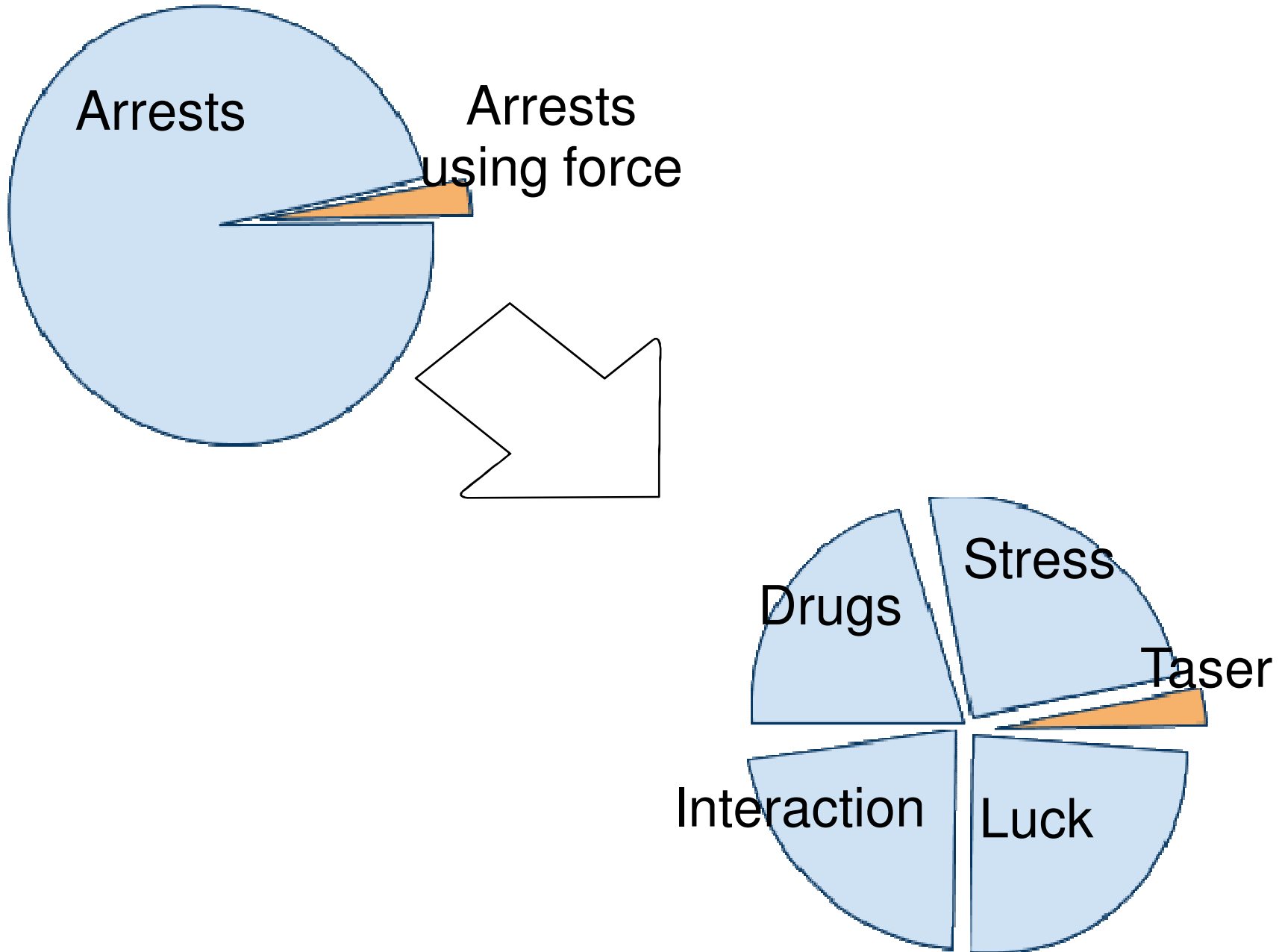
**Carleton**  
UNIVERSITY

# ***CEW Workshop:*** **Themes from Day #1**

Andy Adler

Professor, Canada Research Chair  
Systems and Computer Engineering  
Carleton University

# Theme: ***Complex / Multifactorial***



# Theme: *Trust*

- Population / Police
- Police / Weapons
- Police / Training

# Theme: *Risk*

- "Safe" is wrong word
- Taser's have a *relative risk*
- Taser's are best choice is many situations

# Theme: *Research*

- Expectations of scientific justifications
- "Evidence Based" policing
- Police initiated research questions
  - Lack of funding, except for crisis
- Need to improve academic / police collaboration

# Theme: *Lessons*

Reality: we've invested \$\$\$ in Tasers

- Manage current "crisis"
- Learn lessons for next police technology

# Theme: *Testing*

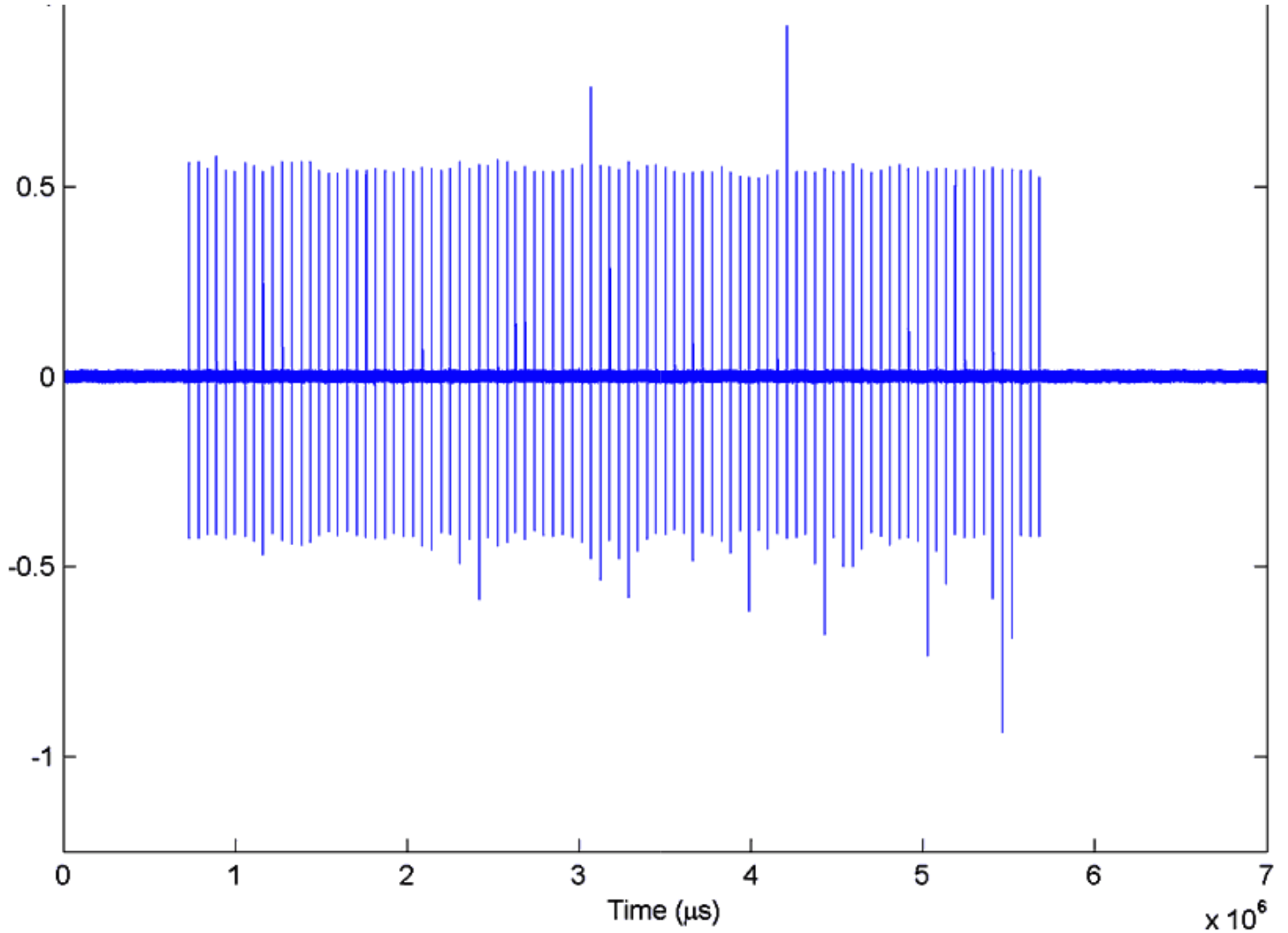
- Performance measurement  
*Is **this** weapon reliable?*
- Risk measurement  
*how should we use **these** weapons?*
  - Are there subject groups that are especially vulnerable?
  - Does risk increase dramatically after 15s?
  - What should officers be looking for?

# Theme: *Reliability*

- What are the failure modes?
  - Gas discharge tube aging?
- What is weapon life span?
- Can we identify problem serial numbers?
- How often should we test?



# Some of our tests



# Some of our tests

Weapon    Battery(%)    Length(s)    PRF(1/s)

X00145121	56	4.9255	18.2724
X00145121	55	4.9547	17.1553
X00145121	54	4.8949	15.1176
X00145121	54	4.9184	17.8921
X00145121	54	4.9507	18.3811
X00145121	53	4.9434	18.4083
X00145121	53	4.9536	18.3705
X00145121	52	4.9573	18.3568
X00145121	52	4.9270	18.2668
X00145121	52	4.9448	18.4030

# Theme: *Standard*

We need a standard for testing. It doesn't need to be complicated. It does need to be done soon.

- Standard load
  - 600Ω - parallel network precision resistors
  - connected via cartridge
  - Firing sequence - multiple (10) shots
- Parameters
  - Pulse repetition freq
  - Main phase charge
  - Max current
- Measure all pulses, take maximum



# Theme: *Research Plan*

- Theme #1: models
  - animal models of excited delirium
  - Electrical models and sensitivity
- Theme #2: retrospective analysis
  - regression analysis of police data
- Important issues
  - Need to improve trust police/academics
  - Research can't just focus on Taser. Goal has to be broad use of force.