

# Estimation Methods in a Magnetic Marking System for Cancer Surgery

Maia Werbos

**TREND**  

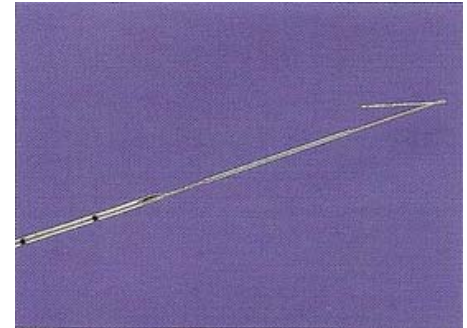
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**FAIR 2011**



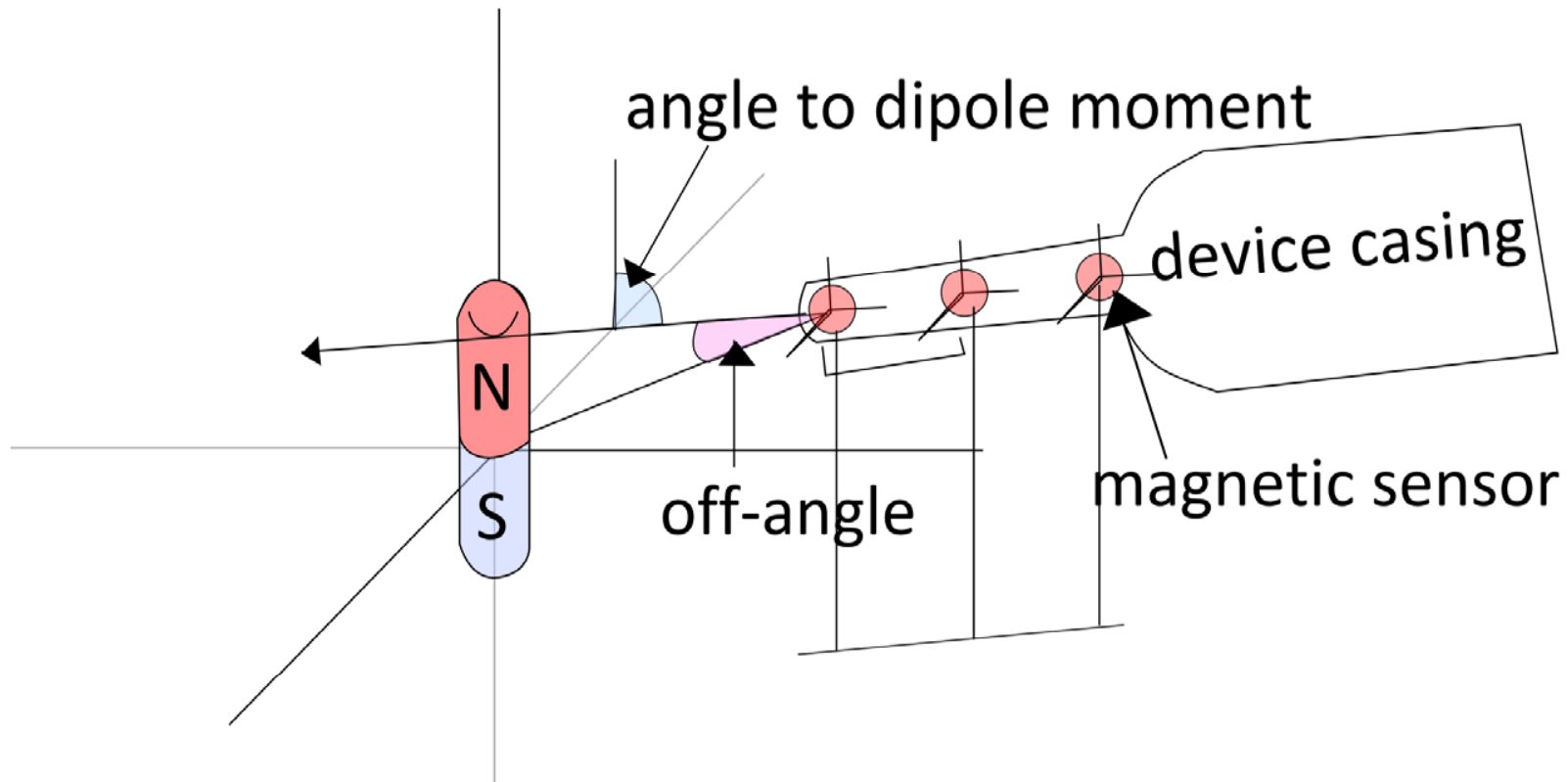
# Introduction

- Kopans hookwire typically used for lumpectomies, etc.
- New device: Magnetic sensing
  - Challenges: Noise, outside sources, calibration, sensor alignment
  - Need reliable algorithms for interpreting sensor data



# Simulation Setup

- 9 sensor inputs
- Various parameters of interest

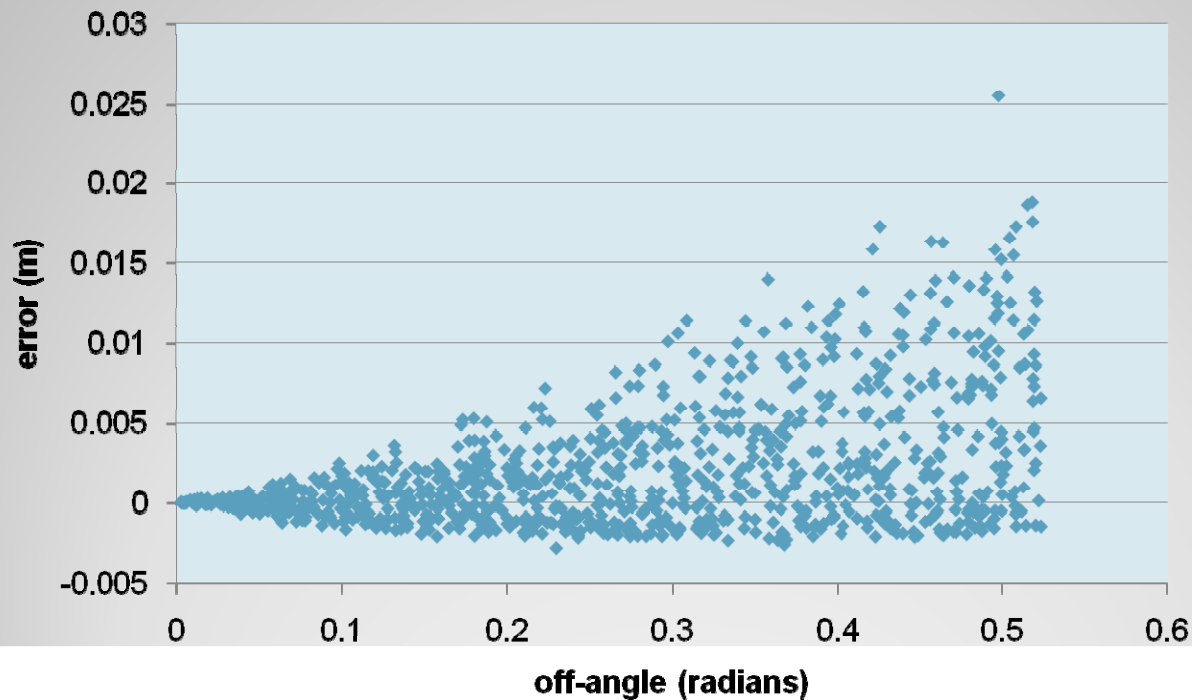


## Methods

- Simulations performed at random points in space
- Algorithm performed on data & compared to desired result
  - Distance algorithm
  - Angle to dipole moment algorithm

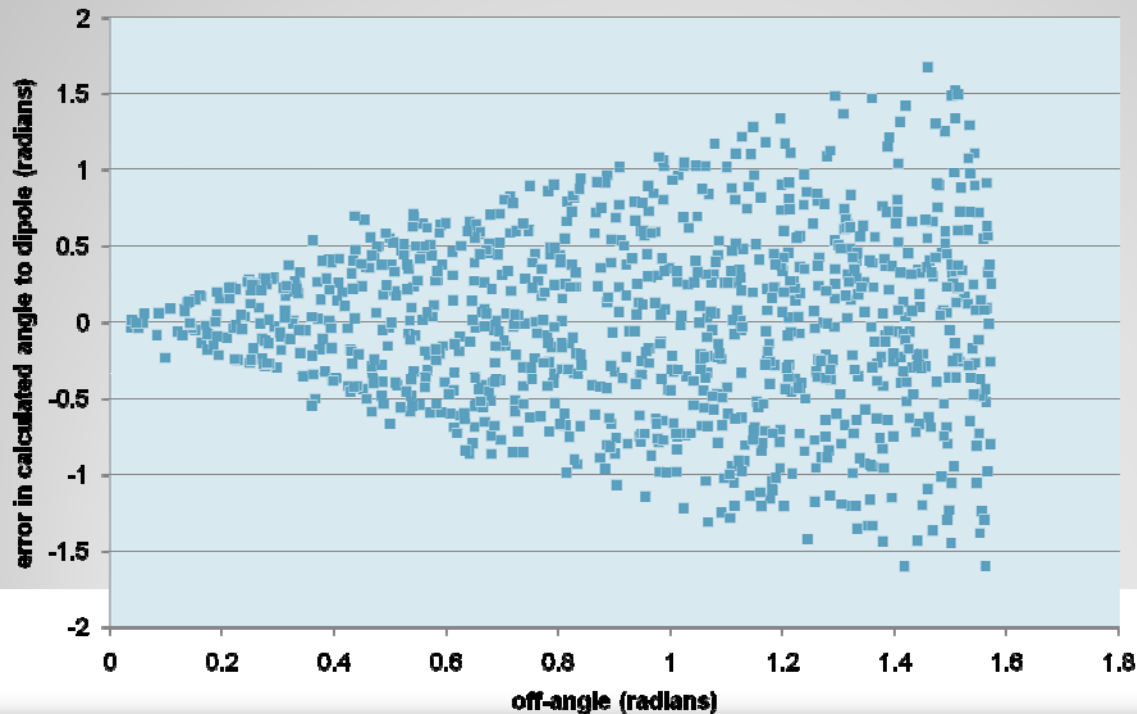
# Results

- Iterated formulas work very well when detector is pointing directly at magnet



## Results (cont.)

- Iterated angle formula easily confounded by outside magnetic sources
- Second-order difference formula is too variable



# Implications

- Other possibilities still in early stages (neural networks, optimization)
  - Could be modeled on previous approaches
- Simple algorithm for finding off-angle could make more complex approaches unnecessary

# Acknowledgements

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