

# Continuous sensing of addictive behavior

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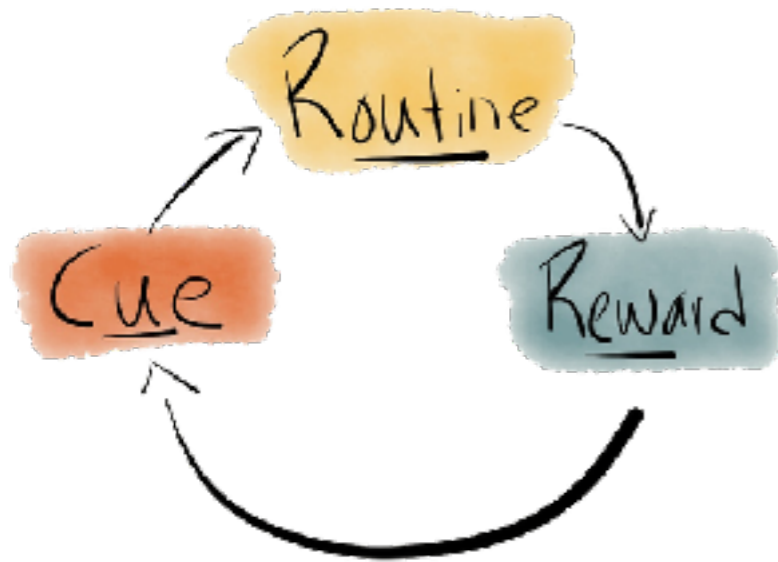




**Cognitive**



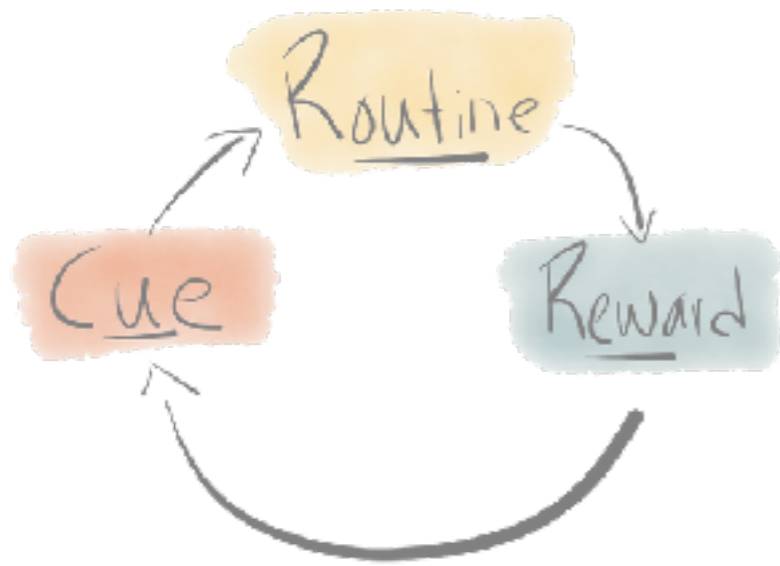
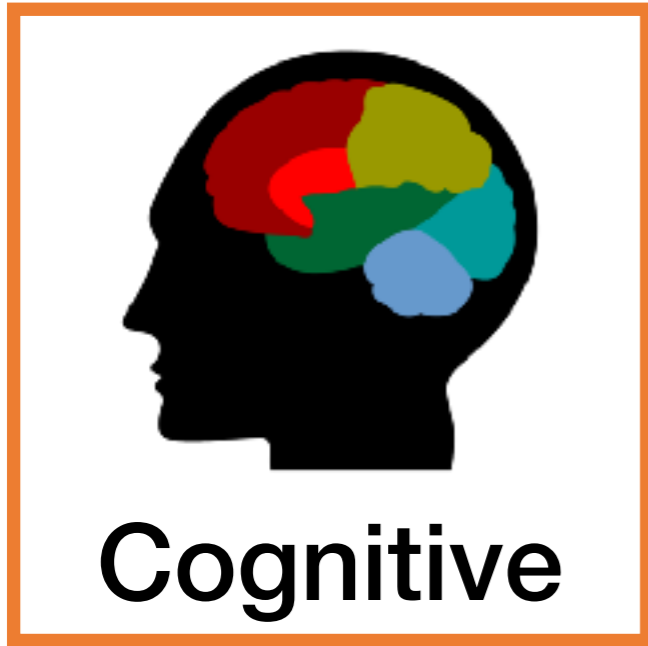
**Detection**



**Habituation**



**Intervention**



**Habituation**



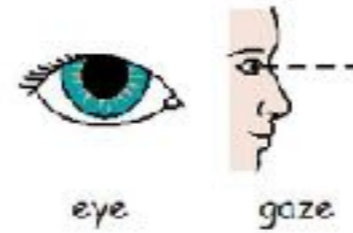
# iShadow: The Computational Eyeglass



Saccades



Pupil dilation



Gaze direction



Eye closures



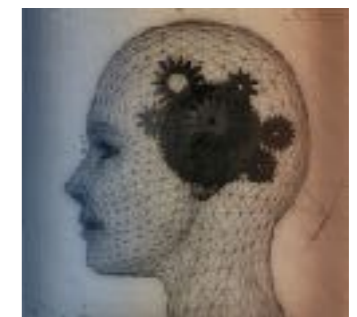
Dopamine



Fatigue

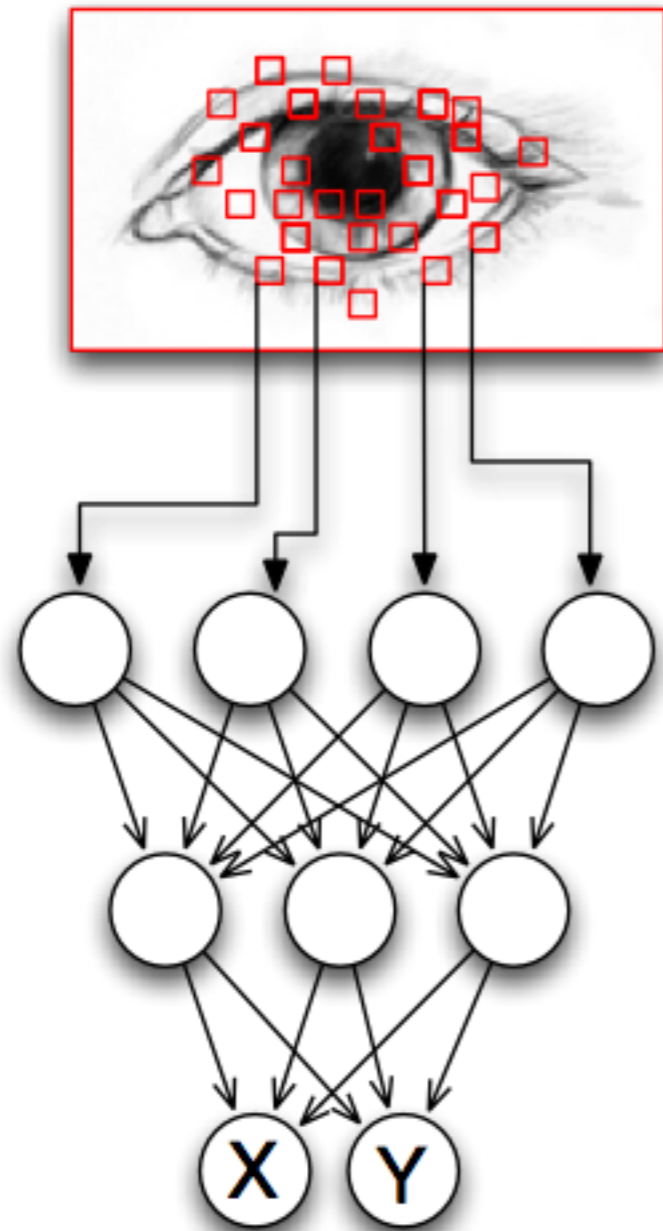


Craving



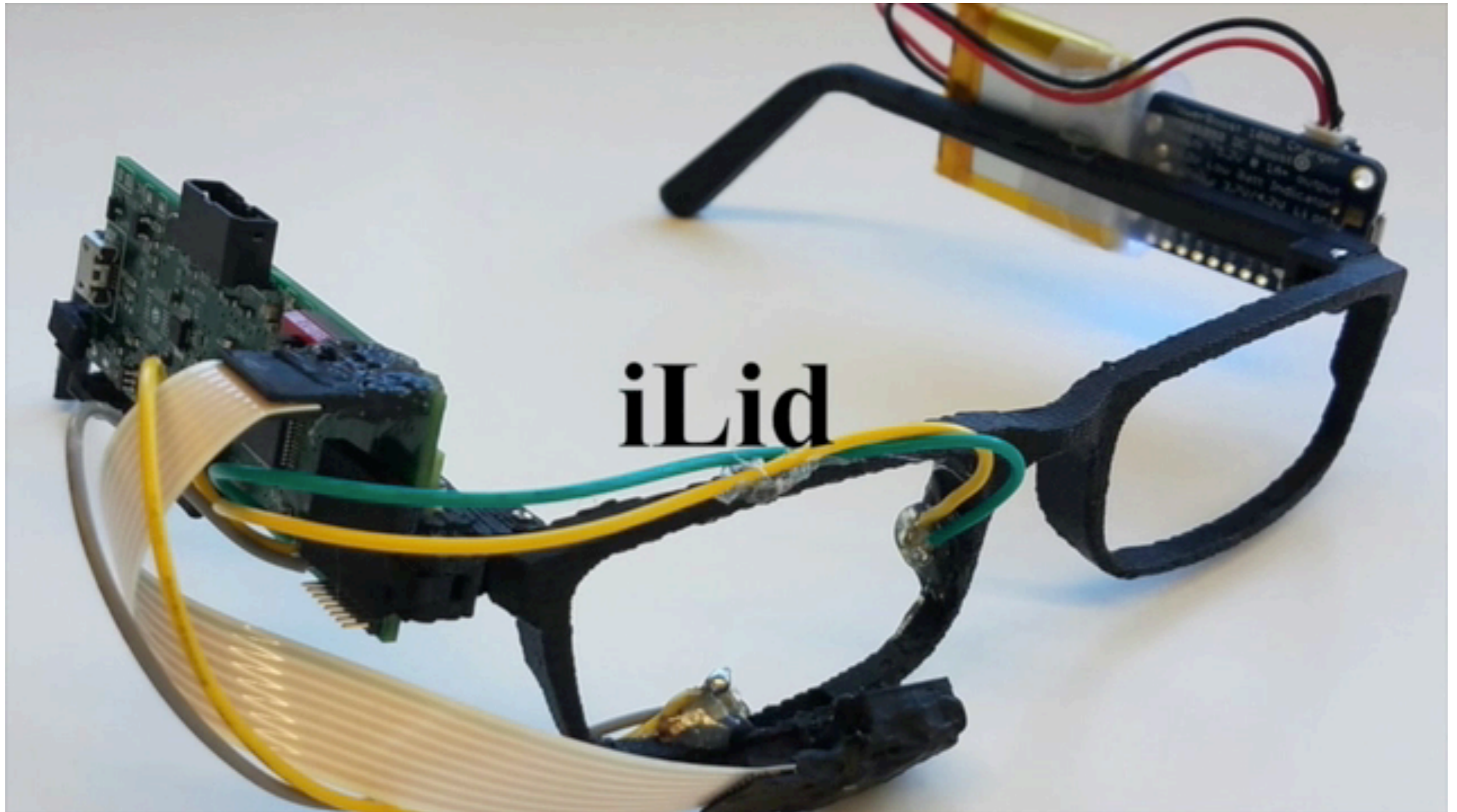
Cue-reactivity

# Real-time eye measures on a wearable eyeglass



Power consumption: < 30mW  
Pupil tracking accuracy: 0.6 deg  
Pupil Dilation accuracy: 0.25mm  
Frame rate: Up to 250 Hz

# Eye closures for fatigue & dopamine level sensing

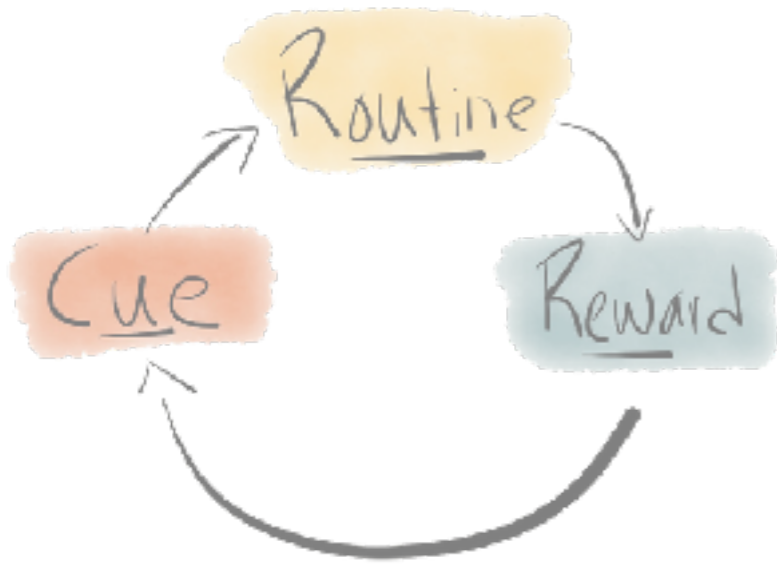




**Cognitive**



**Detection**

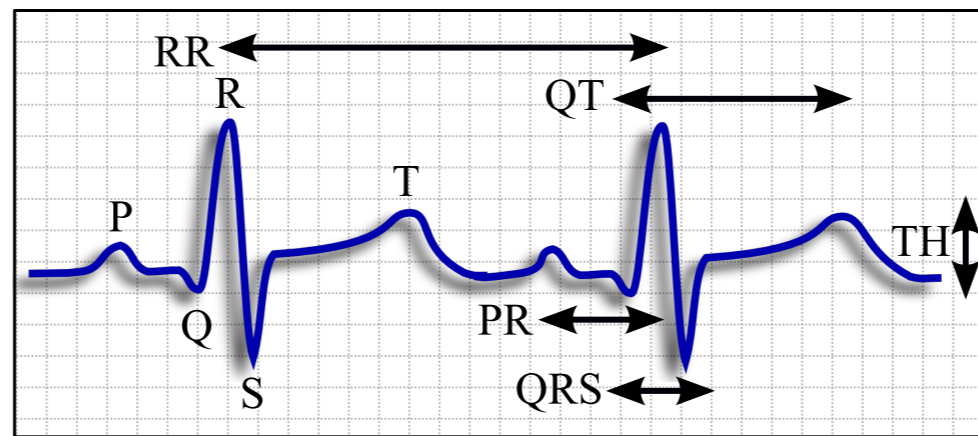


**Habituation**

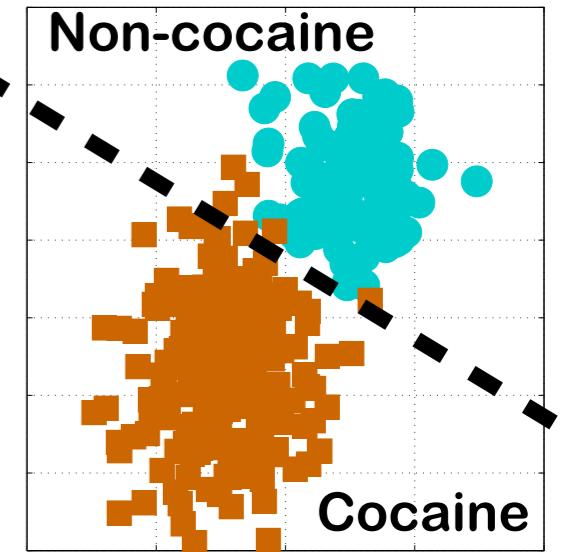


**Intervention**

# Detecting drug use from wearable ECG



ECG Features



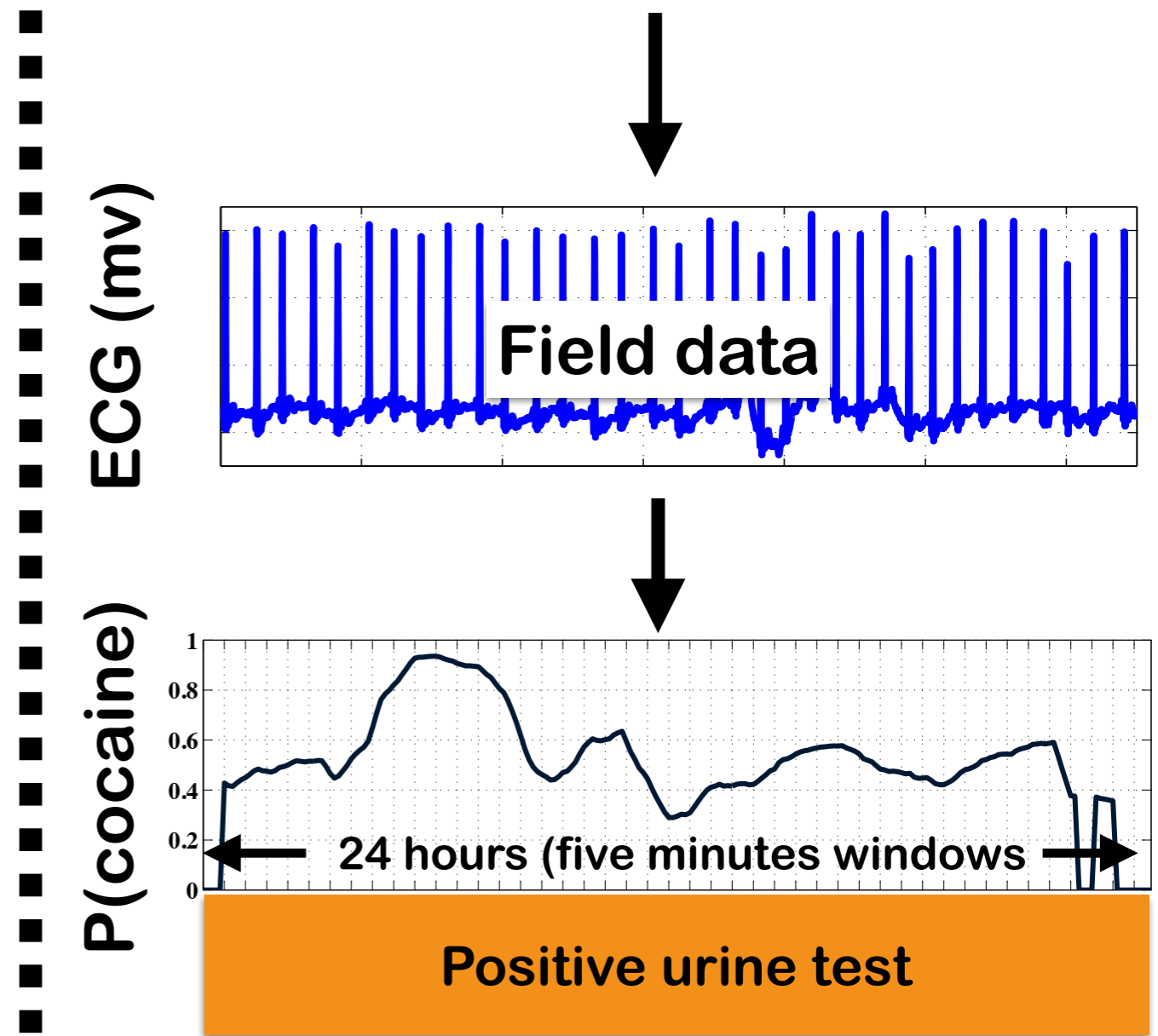
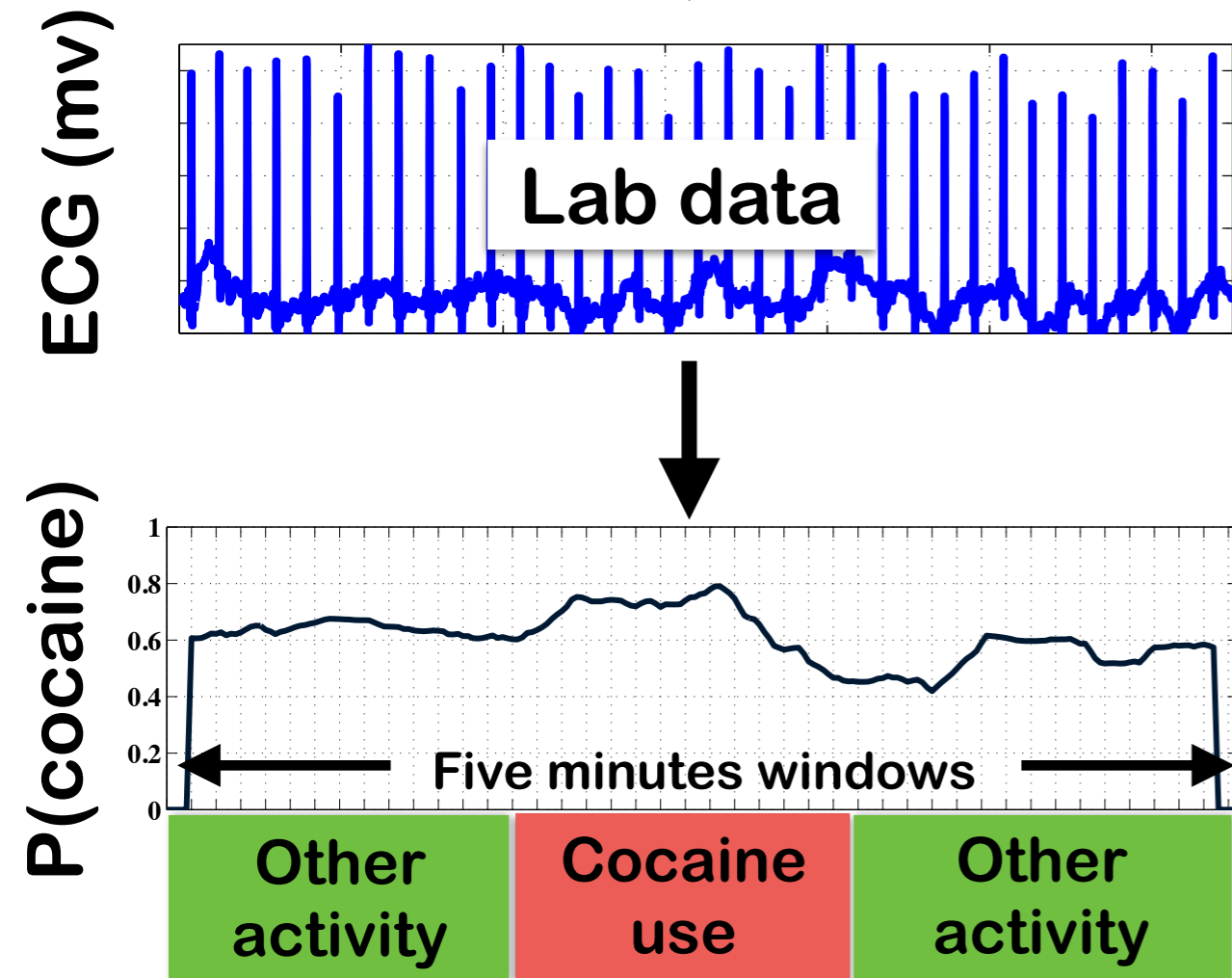


# Detecting cocaine use from wearable ECG

Lab Cocaine  
Detection Model

Domain  
Adaptation

Field Cocaine  
Detection Model



# Challenges

- **Devices:** How can we get towards 24/7 monitoring of addictive behavior?
- **Data:** Lot of raw data but very limited labels in the wild => difficult to use “big data” methods
- **Markers:** How can we leverage wearables + imaging + genomics to obtain precise biomarkers?
- **Intervention:** Design more subtle intervention mechanisms than in-your-face notifications