

# Bowler Vision

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Presented by: Bryan O'Keefe & Nicki Mours

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# Outline

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- ☐ Importance of biomechanics to the sport of bowling
- ☐ Eye tracking background
- ☐ How bowler vision works
- ☐ Points of interest
- ☐ Trends in skill levels
- ☐ Examples

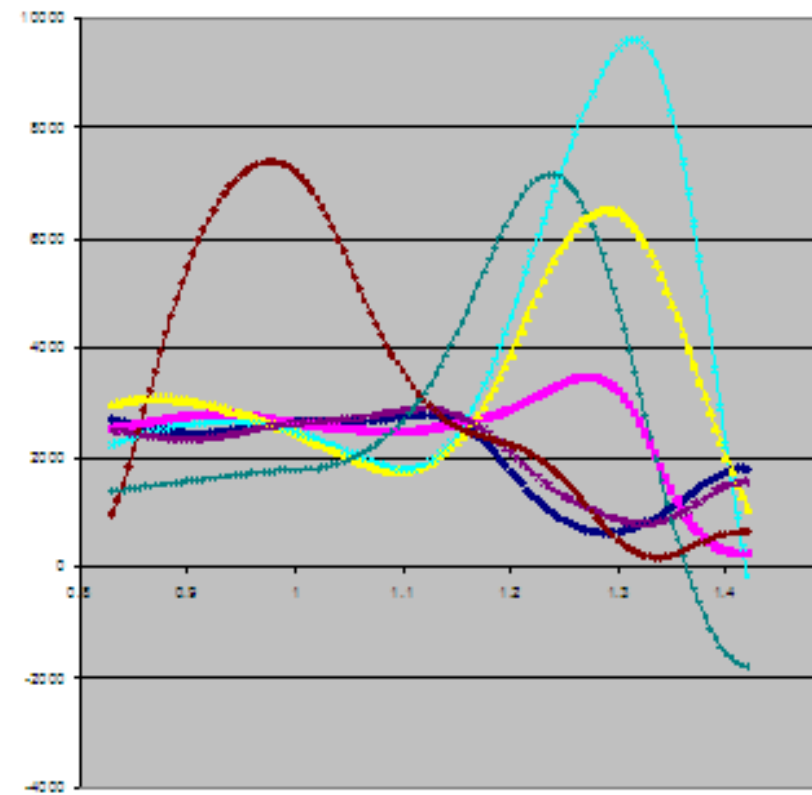
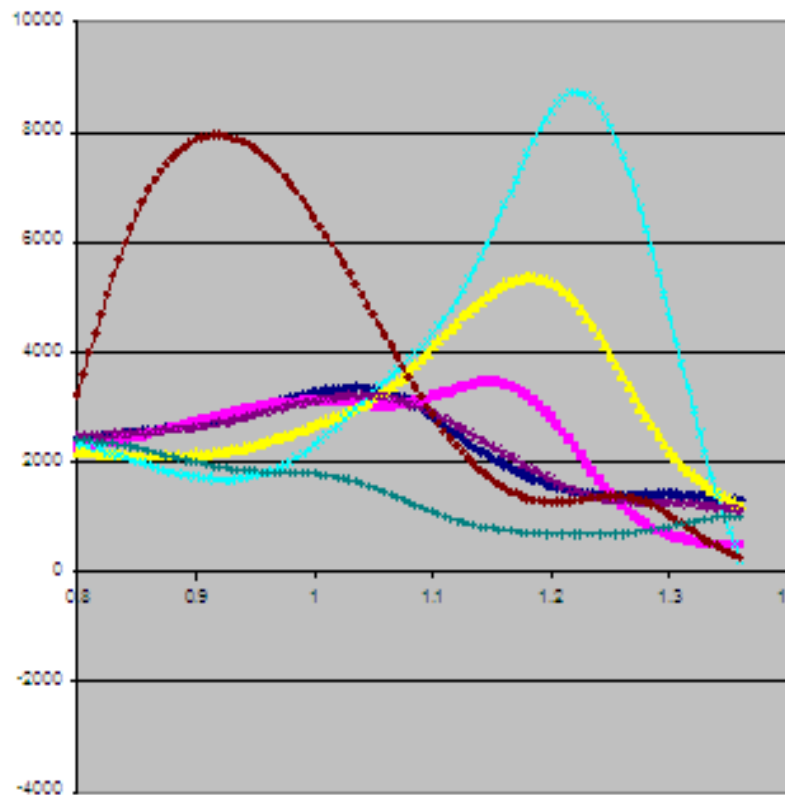
# Biomechanics & Bowling

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- ☐ Importance
  - Scientific support data
  
- ☐ Foot Pressure
  - Timing mechanism
  
- ☐ Kinematic Sequencing
  - Velocities of body segments

# Kinematic Sequencing

## KS Graphs



# Eye Tracking Background

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## □ Vision-in-Action Paradigm

- Field of view is determined by the athlete
- Orientation of the head and gaze are function of task and skill level of the athlete
- Athlete acquires information in all three dimensions

# Eye Tracking Background

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- ☐ Ice Hockey Goaltending
- ☐ Basketball Shooting
- ☐ Baseball Hitting
- ☐ Pistol Shooting
- ☐ Badminton
- ☐ Golf Putting

# Eye Tracking Background



# Bowler Vision

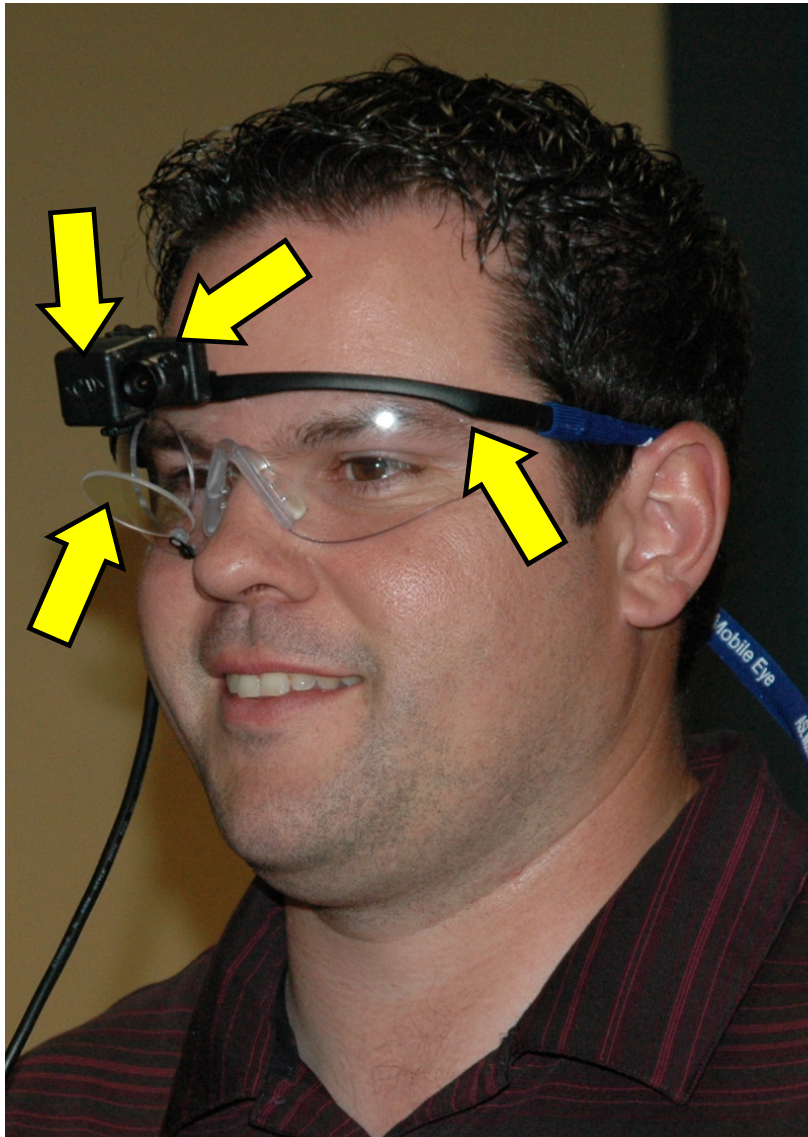
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- ☐ Light weight optics
- ☐ Recording device located on a waist pack
- ☐ Eye image and scene image are interlaced
- ☐ Data is saved to DVCR tape – DVCR is battery operated
- ☐ Sample rate of 30 frames per second



# Bowler Vision

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- ☐ Glasses
- ☐ Eye Camera
- ☐ Scene Camera
- ☐ Monocle

# Bowler Vision

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- ❑ 3 near infra-red LEDs
- ❑ Reflected by the cornea
  - Appears as a triangular pattern of 3 dots
- ❑ Pupil moves relative to the head
- ❑ Corneal Reflection approximately same position



# Bowler Vision

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## □ Scene Image Calibration



# What we're looking for

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## ☐ Trends

- Shot to shot repeatability
- What bowlers of different skill levels look at
- Balance related to targeting issues
- Lane visualization
  - ☐ Side to Side
  - ☐ Back to Front

# Trends in skill levels

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□ Beginner



# Trends in skill levels

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## ☐ Beginner





# Trends in skill levels

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□ Intermediate



# Trends in skill levels

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□ Advanced





# Trends in skill levels

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□ Advanced



# Trends in skill levels

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□ Elite



# Trends in skill levels

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□ Elite



# Trends in skill levels

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□ Elite



# Final Thoughts

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- ☐ Insight into athlete's individual targeting system
- ☐ Understanding of how stable the head is
- ☐ Where and when ball motion is observed by the athlete
- ☐ Lane visualization

# Thank You!

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# Questions?

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