# OCTC NASA MENTOR TEAM

Presented by Shawn Payne – Faculty Mentor
and OCTC NASA Student Team Members – Azlin Lewis, Hadley Shepherd, Tyler Ashton, and Sean Dysinger

# OVERVIEW OF PROJECT

- Each semester Faculty working on the project selected 3 – 4 students to Mentor youth in the community on robotics and STEM activities.
- Selection Criteria
  - Students must be in good academic standing in all classes
  - Students must have a faculty recommendation
  - Students must be majoring in a STEM related field

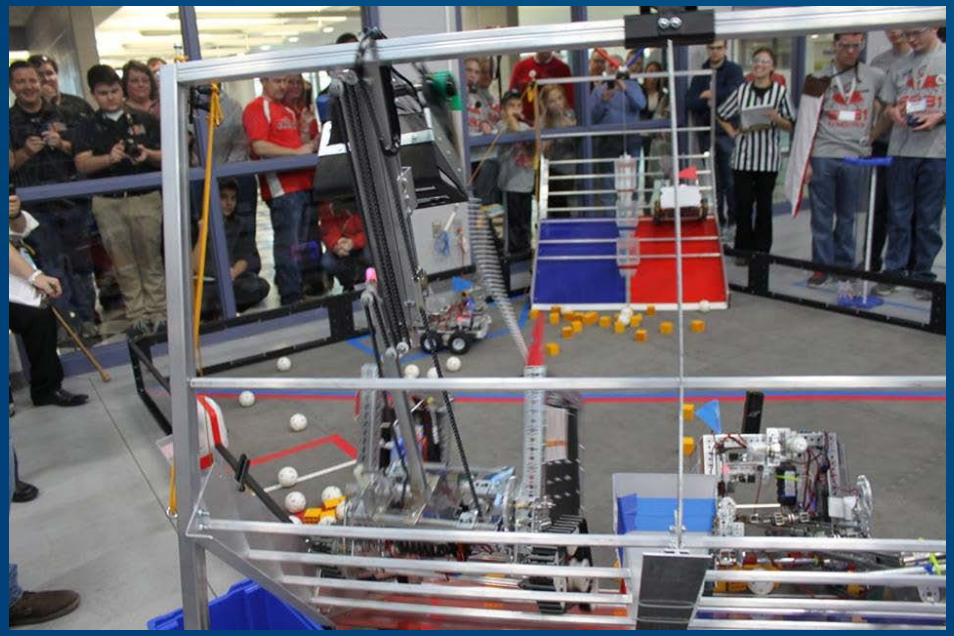
# STEM MENTORING

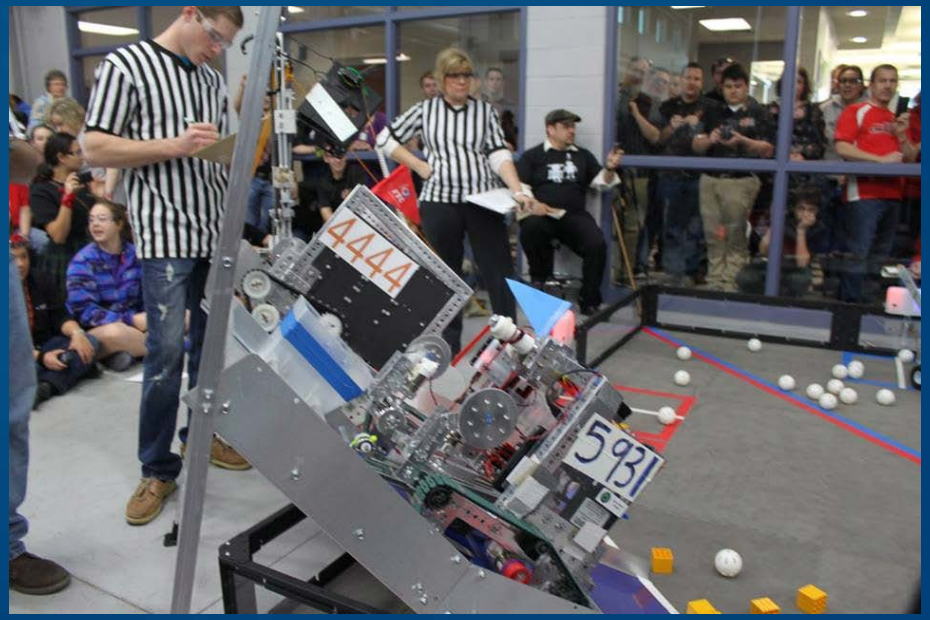
FIRST Robotics Programs

- FIRST Lego League (FLL) – ages 9 – 14
  - OCTC hosts a FLL Regional Competition the first Saturday of December yearly.

# STEM MENTORING

- FIRST Tech Challenge (FTC) – ages 14 – 18
  - OCTC hosts the Kentucky FTC Championship yearly in late January/early February



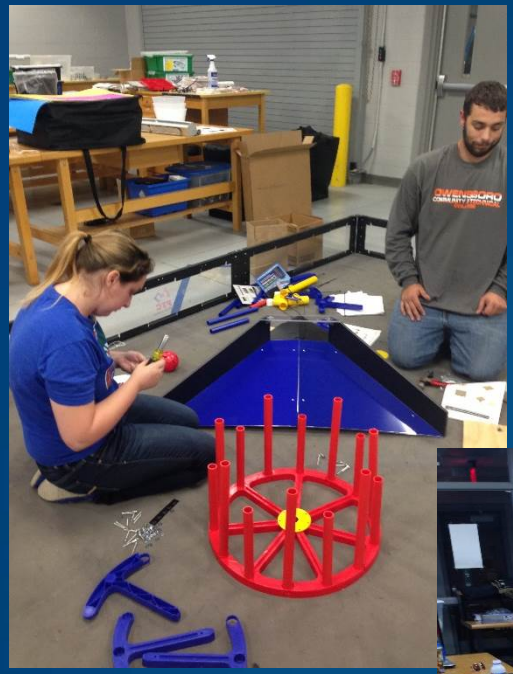


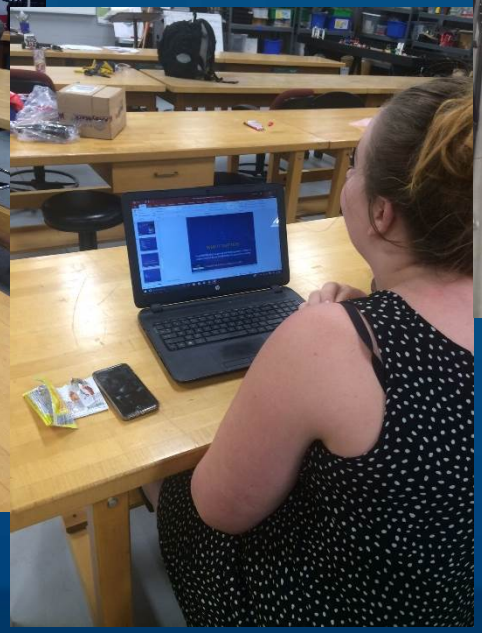
# OCTC NASA TEAM ACTIVITY TIMELINE

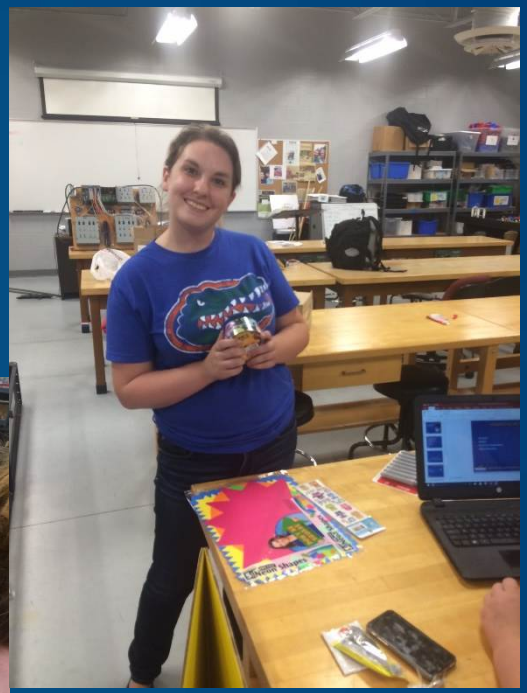
- KY FTC Championship – January 2015 & January 2016
  - Setup and Teardown Event
  - Served in Key Volunteer Roles – Judges and Referees
  - Constructed All Competition Fields

- Girl Scout Cricket Expo – Spring 2015 & Spring 2016
- Boy Scout Merit Badge University – Spring 2015 & Spring 2016
- Summer Academies – Voluntarily – Summer 2015
- FLL Regional Tournament – December 2015 & upcoming December 2016

# TODAY'S NASA TEAM







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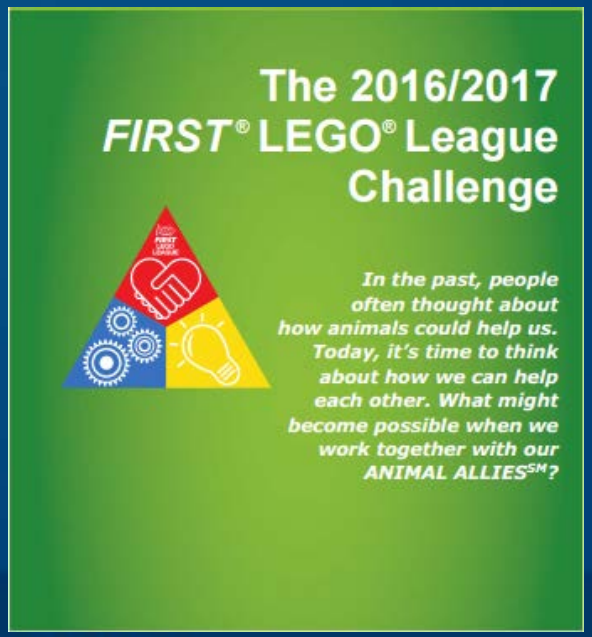
# ANIMAL ALLIES

- Humans and animals are allies in the quest to make life better
- Both humans and animals can coexist and benefit one another
- The mission: Make our interactions with animals better, hopefully better for all of us



# IDENTIFY THE ISSUE

- Humans and animals interact constantly, sometimes intentionally and sometimes unintentionally
- Identify a specific issue that occurs within an interaction of people and animals
- Ask yourself:
  - “Why does this problem exist?”
  - “Why aren’t the current solutions good enough?”
  - “What could be improved?”

Rosa lives on a farm in Syddanmark, Denmark. Rosa leads a pretty good life, for a cow. She eats grass, takes a nap, and – when she feels it's time – she visits the robotic milking machine. The machine uses lasers to find Rosa's udders, clean them, and then pump the milk. Rosa munches on special grain while the machine works. When it's done, Rosa feels better and leaves the milking machine to find some more tasty grass.

Randy loves to hike in the mountains of New Hampshire, USA. However, Randy lost his sight many years ago, so hiking mountains might be difficult and dangerous. Luckily, Randy has a friend who also likes to hike: Autumn. As a trained guide dog, Autumn knows how to identify obstacles that might harm Randy or her. Even through the winter, Autumn helps Randy find a safe path over snow-covered tree roots and boulders.

Elena carefully threads fruit onto a wire at the Omaha Zoo & Aquarium in Nebraska, USA. In the wild, fruit bats would generally eat fruit hanging from trees. Since fruit doesn't grow on the imitation trees in the jungle exhibit, Elena must think of creative ways to feed the bats. Instead of placing all of the fruit in a big pile, Elena hangs fruit from hooks or hides it somewhere unexpected in the exhibit. This way, breakfast is also an enrichment activity for the bats.

In the past, lions often attacked the livestock in Richard's village in Kenya. Residents hunted the lions to protect their homes and farms. After trying a few ideas, Richard discovered that moving lights could scare the lions away without harming them. He invented a system of flickering lights and installed them around the village. The lights kept the lions away from the livestock, so the people had no reason to hunt the lions.

# DESIGN A SOLUTION

- Find a solution to your issue
- The ultimate goal is to a design a solution that adds value to society
- You can do this by:
  - Designing a solution that improves something that already exists
  - Designing a solution that uses something that exists in a new way
  - Designing a solution that invents something totally new

# SHARE

- Share your solution with other people!
- Who would be interested in your idea?
- Present your work to people who own, sell, or care for animals.

# SPECIAL CHALLENGES IN THE FIELD

# RANDY AND AUTUMN

- Randy is a visually impaired man, but he's always loved hiking the mountains, so now he has Autumn, a trained guide dog.
  - She helps him to navigate through the trees and the snow so he can still do the things he enjoys.
- Challenge for Randy: He quickly learned how to navigate the streets, but he still finds it hard to know when to stop for oncoming traffic.
- Mission: Drive past Randy and Autumn. When you do so, it will knock down a Warning Fence that will make Autumn stop and sit, which is his cue to wait.

# ROSA THE COW

- Rosa lives in Syddanmark, Denmark
  - Visits the milk machine as needed
    - Lasers find Rosa's udders, clean them, and pump her as she eats special grains
- Mission on the Field: Guide the cow to the milking machine. Once she's there, spin the machine until milk comes out.
  - If you spin the machine just a little too far, manure comes out. Lose five points.

# THE CHALLENGE THAT STANDS OUT

The Manure/Milk Merry Go Round

# OBJECTIVES

- Contact the push bar
- Push the bar 270 degrees
- The lever will then release the milk
- If the bar is pressed beyond that mark manure is released in which points are dropped from the score.

# DIFFICULTY OF THE CHALLENGE

- Precision to obtain all possible points
- Programming to find lever
- More than just a motion

# DIFFERENT OUTLOOKS AND DECISIONS

- How they approach the challenge?

1. Is time an issue?
   - Time Management
2. Will it conflict with other challenges?
   - Prioritizing
3. Take the chance?
   - Risk Management
4. Tweak and adjust until it is right?
   - Attention to Detail

# WHY IT MATTERS

Programs like this are getting kids thinking about a career in robotics in time to start PREPARING for a career in robotics.

# ROBOTICS IN THE WORKPLACE

- Industrial
- Medical
- Driverless Transportation
- Space Exploration

# INDUSTRIAL

- Robots have been common in the industrial environment for over 20 years.
- 2015 was the largest year for Industrial Robot sales ever.
- Projected to be $135 Billion market by 2020

# MEDICAL

- Used in manufacture of medical appliances
- Tele-presence devices which allow doctors to perform everything from housecalls to surgery from 1000's of miles away
- Soon Robots designed to perform surgery with minimal oversite will enter the environment
- "Service Robots" will help the disabled and elderly in everyday tasks
- Even 3D printed organs to meet the need for transplants

# DRIVERLESS TRANSPORTATION

- Fewer, safer, more efficient cars on the road
- “smart” mass transit

# SPACE EXPLORATION

- Space Robots will go where it is too, “Dark, Dirty, or Dangerous”
- Mine the Asteroid Belt
- Explore Lunar Lava Tubes

# *ROBOTS NEED US, WHEREVER THEY GO!*

- Teleoperation
- Telemetry
- Repair
- Maintenance
- Rapid Upgrade Prototyping

# WHERE ARE THEY NOW?

NASA Team Members continue to be successful

- Joel Campbell – Transferred and Graduated from WKU – currently in his first year as a Science Teacher at Webster County Middle School – 8th Grade

# JOEL CAMPBELL

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# WHITNEY MAYES

Transferred to WKU – Student teaching in Spring 2017 – Elementary Math and Science

# SHELBY BURDEN

Transferred to University of Kentucky – Chemical Engineering

# SYDNEY RICE

Transferred to WKU – Middle School Math

# CAMERON ROWELL

Currently enrolled in Advanced Manufacturing Technician program at OCTC – Graduating May 2017 – Currently Working at Kimberly Clark

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