# A Year at Howard High School of Technology


John D. Shaw

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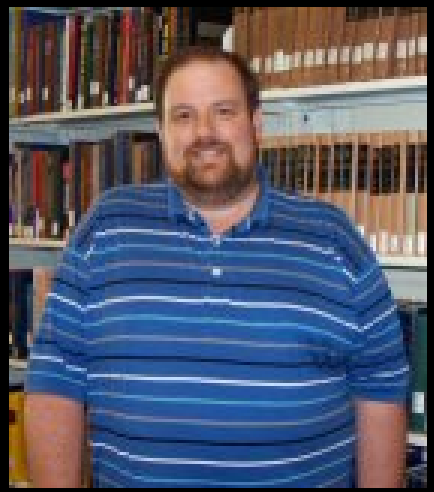
# Our Team

## Graduate Fellow + Teacher



### John Shaw
Physics and Astronomy
University of Delaware

### Dr. Ralph May
Chemistry and Integrated Science
Howard High School of Technology

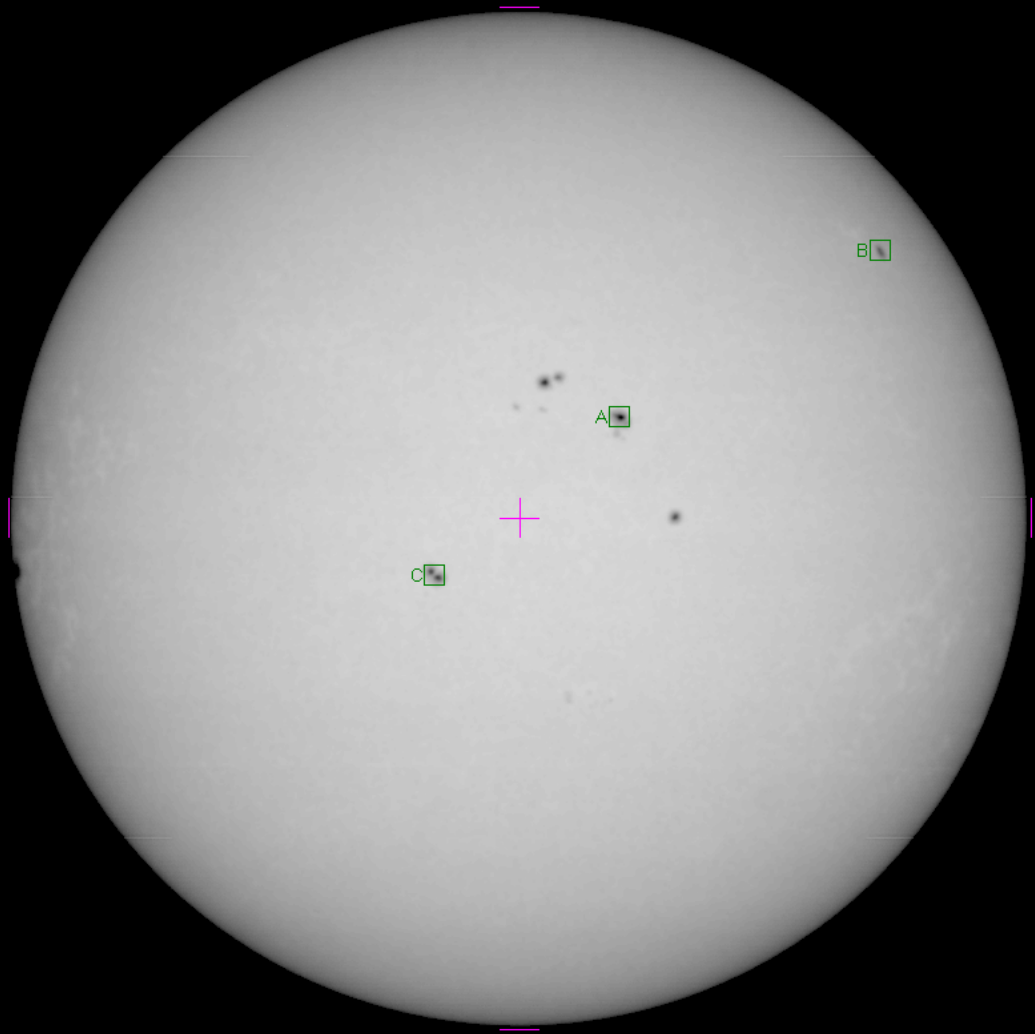
# Goals

- Develop innovative methods to convey ideas and scientific method.
- Emphasize universal nature of physical laws.
- Emphasize data taking and analysis.
- Emphasize deductive reasoning to generate predictions.
- Stimulate independent thought and research.

# Example Projects

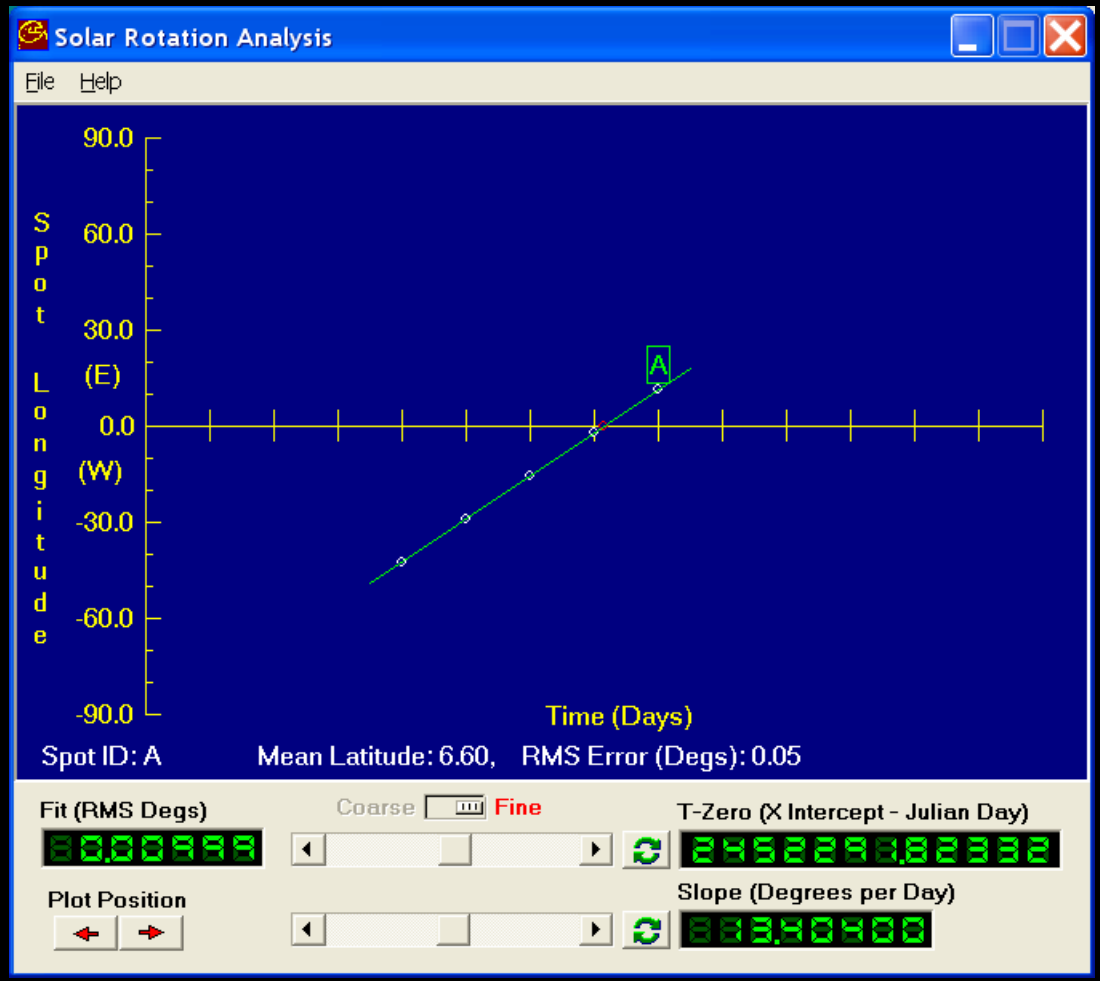
- The Rotation of the Sun
  - A Project CLEA computer based lab adapted for use in NCCVoTech.
  - Students observe *real* images of the sun and follow sunspots over several days

# Example Projects



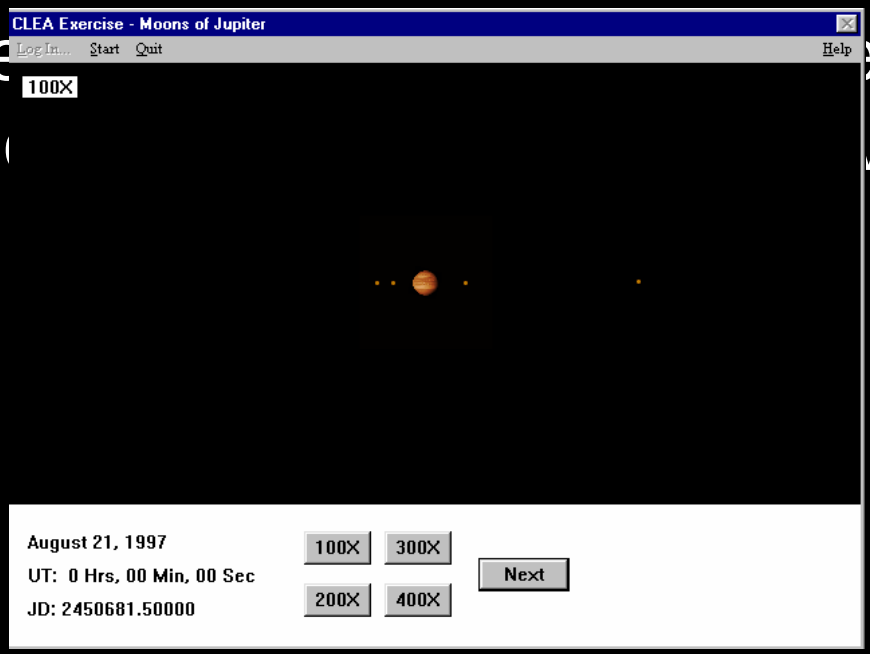
# Example Projects

- The Rotation of the Sun
  - Learn to take and analyze data.
  - Repeat observations for accuracy.
  - Compute synodic and sidereal rotation.
  - Importance of taking observing point into account.
  - Discover different rates of rotation depending on latitude.



# Example Projects

- The Moons of Jupiter
  - A Project CLEA computer based lab.
  - Students observe *simulated* images of the four Galilean moons of Jupiter.
  - Measure[illegible]er and periods [illegible]ves to data.



# Example Projects

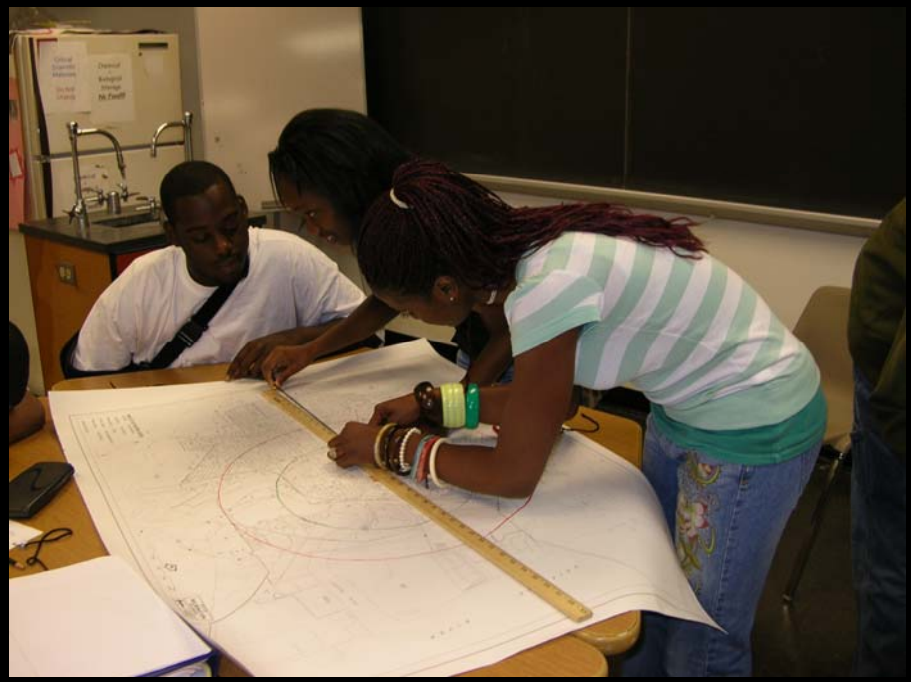
- The Moons of Jupiter
  - Find mass of Jupiter by using Kepler's Third law: Mass =(distance)$^3$/(period)$^2$.
  - Extend to Earth – moon system, and other bodies in the solar system.

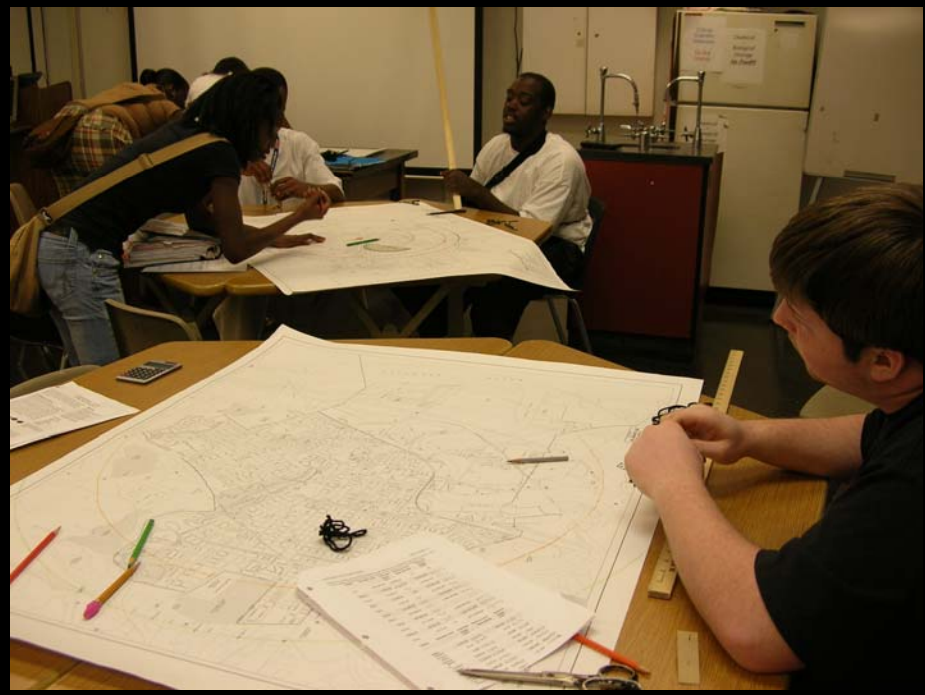
# Example Projects

- Scale Model of the Solar System
  - Students calculate distances and planet/moon sizes if the Earth were 1 cm, 1 inch or 1 foot in diameter.
  - Plot orbits on 40”x36” map of Wilmington.
  - Determine location of planets today and plot.
  - Compute and plot location of planets in one years time.

# Example Projects

- Scale Model of the Solar System



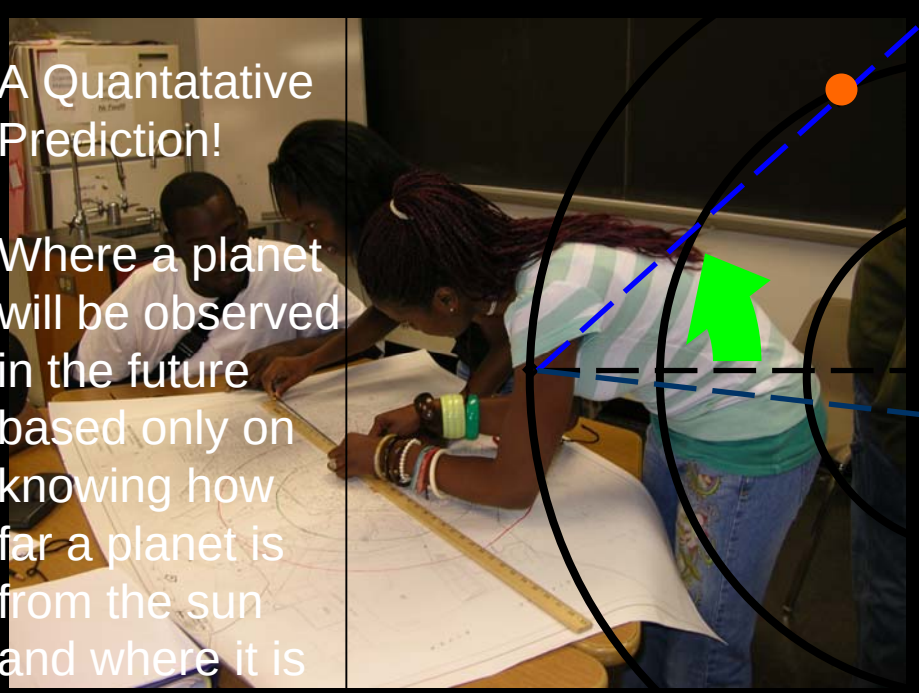


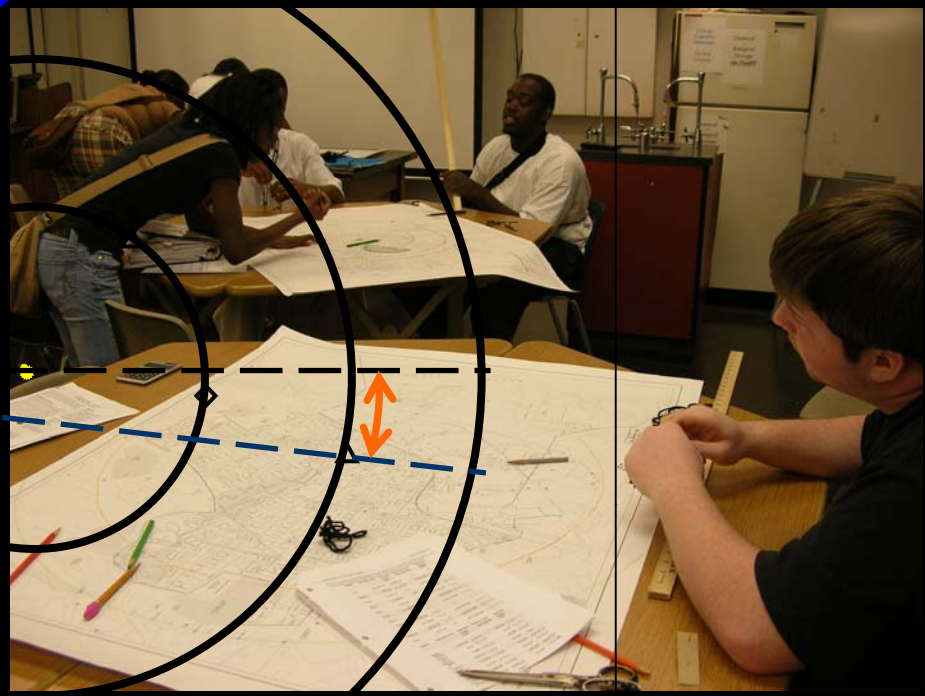
# Example Projects

- Scale Model of the Solar System

A Quantatative Prediction!

Where a planet will be observed in the future based only on knowing how far a planet is from the sun and where it is observed to be now.





# Other Duties

- Assist with Chemistry lab experiments
- Observe student successes and problems with traditional studies and new projects.

# Conclusions

- Use of “hands-on” materials were most effective in conveying ideas.
- Greatest problems are engaging students and students’ false preconceptions.
- Improved my ability to better communicate scientific knowledge and my own research to a broad audience.