

# Staff Researcher - Academic

**Ayo Omosebi**

University of Kentucky, Center for Applied Energy Research

Tel: (859)257-0346 Email: [Ayokunle.omosebi@uky.edu](mailto:Ayokunle.omosebi@uky.edu)

**August 29<sup>th</sup>, 2020**

# Staff Researcher – Typical Job Function

- Initiate, facilitate, perform, support, collaborate, and participate in research projects, grants, and activities
- Involved in trying solve a technical problem, provide answers to technical questions, understand mechanisms, move technology forward, provide alternative solutions for existing technology, provide optimization - -> background and expertise dependent
- Unlike faculty, there is a reduced to no requirement for student instruction
- Unlike industry, there is more freedom to pursue research direction

# My Research Background

- Chemical Engineering Undergraduate
  - Fundamentals – Reaction kinetics, Thermodynamics, Transport Phenomena, Math
- Chemical Engineering Master
  - Specialized
  - Research – two-phase transport
- Chemical Engineering PhD
  - Even more specialized
  - Research – Electrochemistry, Nanotechnology, Fuel Cells
- Researcher
  - Apply previous education (not just academic, include prior experience and hobbies) to solve emerging problems

# Example of Research Activity

## Opportunity

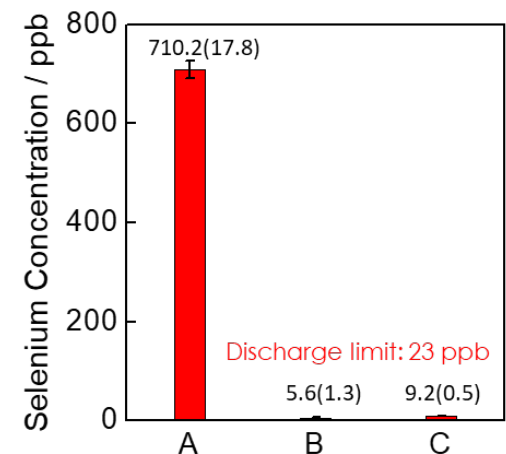
New Funding Opportunity to address EPA's new regulation for coal-fired power generation plants to limit concentration of selenium and arsenic to parts per billion level in discharge streams

## Propose a Solution

Develop a material that is able to selectively target selenium and arsenic from other ions

## Demonstrate Results

Material achieved 90+ % removal of target species



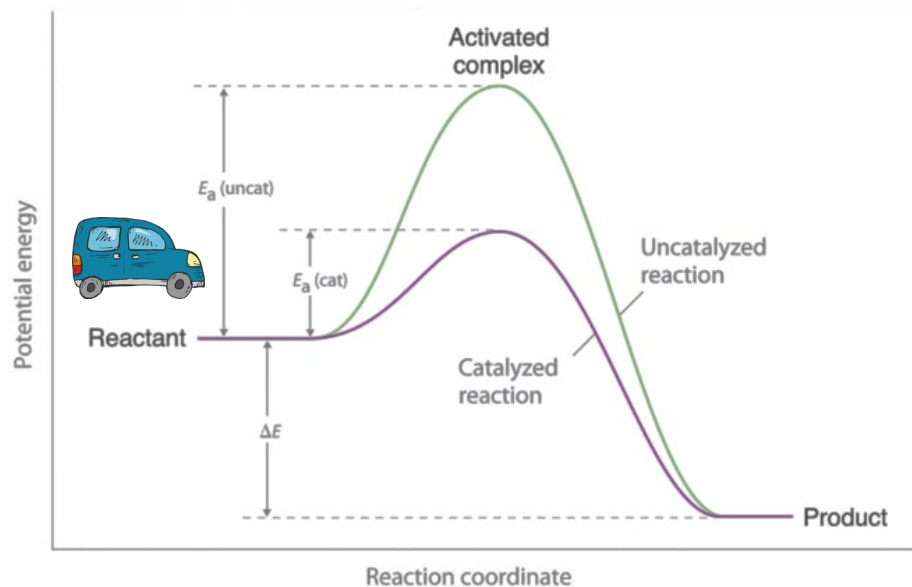
# General Research

## Research opportunities

- leverage STEM principles to address research questions

## Questions like how?, what?

- Advance state of the art
- Provide new insight on state of the art
- Provide improvements on rate, efficiency, cost, foot print (form factor), capacity

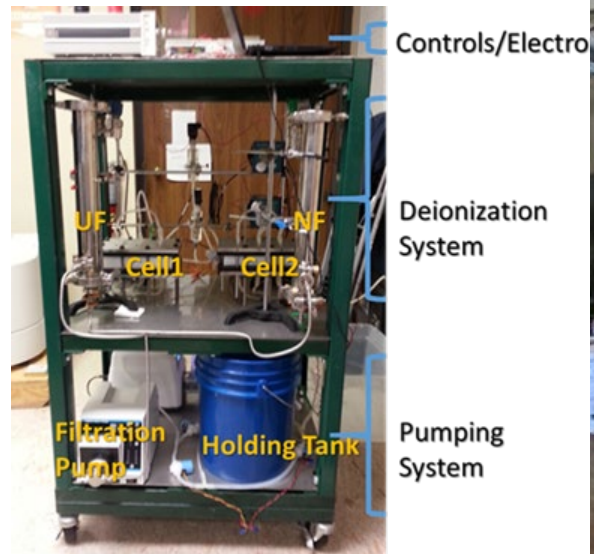


# Work Environment

- Laboratory, Fieldwork, Office
- Individual vs. team projects



Office – Report,  
Proposals, Data  
Processing



Lab - Single Researcher



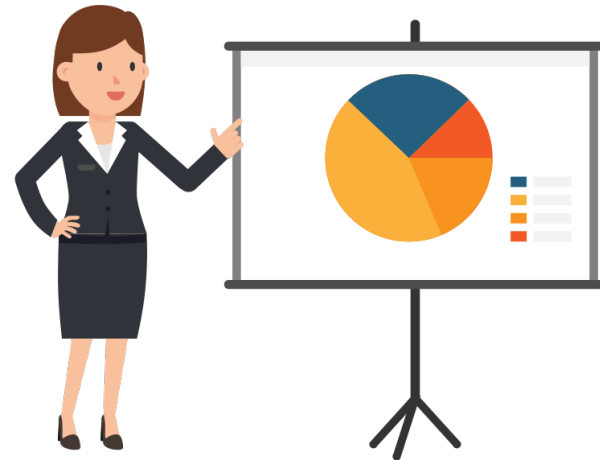
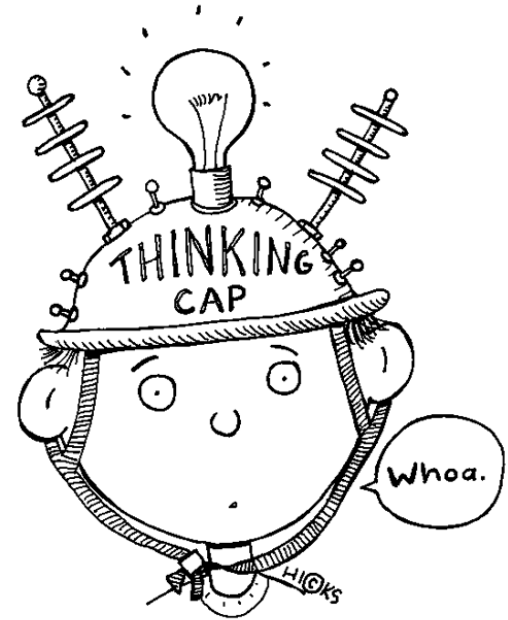
Lab- Multiple Researcher Required

# Requirements and Useful Skills

- Education – college, but advanced degrees are preferred (Training vs trained),
- Good demand for Postdocs
- Curiosity
- Flexibility to consider multiple viewpoints
- Dedication
- Detail-Oriented
- Excellent Record Keeping
- Analytical

# Some More Requirements

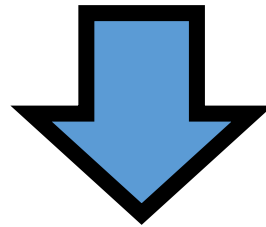
- Enjoy Learning
- Creativity
- Multi-disciplined
- Hand-on\*
- Think outside the box
- Communication\*\*



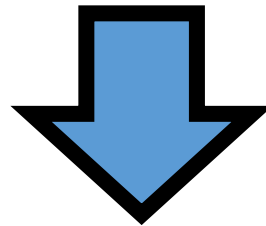


# Typical Job Progression

- Contribute to Research or Research Project



- Responsible for a Research Project



- Manage Research Project(s) and Project Staff

# Pros and Cons

## Pros

- Excellent working environment
- Freedom to work on your ideas
- Less hierarchical working environment
- Become a subject-matter expert
- Good benefits

# Pros and Cons

## Cons

- May need to continually secure competitive grants
- Research can depend on deliverables as stated on grants
- Develop poor work-life balance
- Can become too specialized
- May not be as financially rewarding industry

# Concluding Remarks

- Mentors are important
- Be especially sensitive to emerging research opportunities
- Role of STEM
- If just starting, don't just memorize – seek understanding of subject matter

# Concluding Remarks

- Don't be afraid of failure- research does not have to be a straight path
- Seek to work on problems you are genuinely interested in
- Develop skillsets for both in-lab and remote work
- Connect the dots in your experiences