CHEM 489 – Spring 2020
Advanced Environmental Chemistry
Introduction to Green Chemistry
Dr. Brush

February 11 (Tuesday):

- **Worksheet-2 due today**
- **Journal Club-3 article due today**
- **Journal Club-3 presentations Thursday**
- **Class Presentation Project – Topic due Feb 18**
- **Introduction to Green Chemistry (continued):**
  - **UN Sustainable Development Goals**

How does Green & Sustainable Chemistry "fit" with Sustainable Development?

- **Sustainable Development: Meeting the Economic, Environmental and Social needs of the present without compromising the ability of future generations to meet their own needs.**

Risk = Hazard x Exposure x Vulnerability

- **Green & Sustainable Chemistry: maximize efficiency & minimize hazardous effects on human health and the environment.**

Green & Sustainable Chemistry:
Sustainability at the Molecular Level

12 Principles of Green Chemistry

1) Prevention
2) Atom Economy
3) Safe Processes
4) Safer Chemicals
5) Safer Solvents
6) Energy Efficiency
7) Renewable Feedstocks
8) Reduce Derivatives
9) Catalysis
10) Bio-degradation
11) Real-time analysis
12) Accident Prevention

- Efficient use of raw materials
- Waste management
- Limit negative impacts on health, safety and the environment

What are some of the pressing global challenges in the world today?

What role can chemistry play in addressing these challenges?

What are the UN Sustainable Development Goals?

- ***The World's "to-do" list.*** An agenda for all countries to address world-wide challenges of poverty, protecting the planet and ensuring prosperity.
- Chemists have more to do with making the world more sustainable than any other profession.

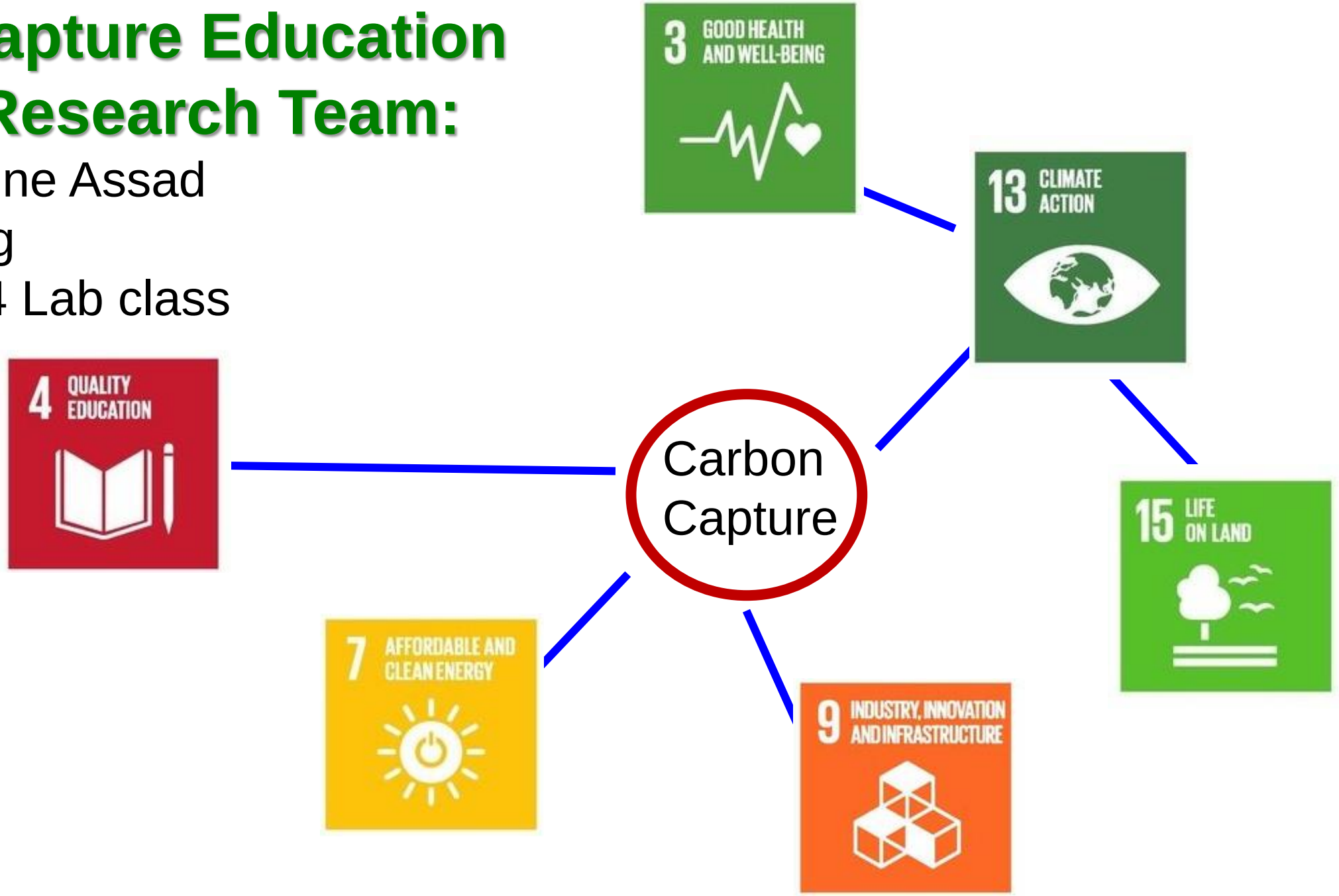
- **Unique learning experience for students to study and address global issues from a <u>multidisciplinary</u> perspective.**

UN SDGs: Carbon Capture

- Green chemistry technologies touch many aspects of the environment and human welfare.

Carbon Capture Education Project - Research Team:

- Claurry-Anne Assad
- Ziqin Wong
- CHEM 244 Lab class



UN SDGs: Global Warming: Katharine Wilkinson: “How empowering women and girls can help stop global warming” -

Global Warming – Gender Equality?

- Climate impacts hit women and girls hardest:
  - greater risk of displacement
  - higher odds of being injured or killed during a natural disaster
  - prolonged drought precipitates early marriage - families contend with scarcity.
- Women are the primary farmers of the world, producing 60 to 80 percent of food in lower-income countries.
  - Women have less access to resources, including land rights, credit and capital, training, tools and technology.
  - Climate change - Women produce less food on the same amount of land.
  - Obvious implications for hunger, for health, for household income.
- If, due to global warming, existing farms don’t produce enough food, then forests are often cleared to supply land for farming.
  - emissions from deforestation.
  - Estimated that addressing inequity in agriculture could prevent two billion tons of emissions between now and 2050.