

# UCR

Global Climate Change Workshop Series

# High School Science Fair Projects

University of California Riverside  
Dept. of Chemical & Environmental  
Engineering

**UCR** | College of Engineering- Center for  
Environmental Research & Technology

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# Alternative Fuels :

## Research – Sustainable Energy Systems

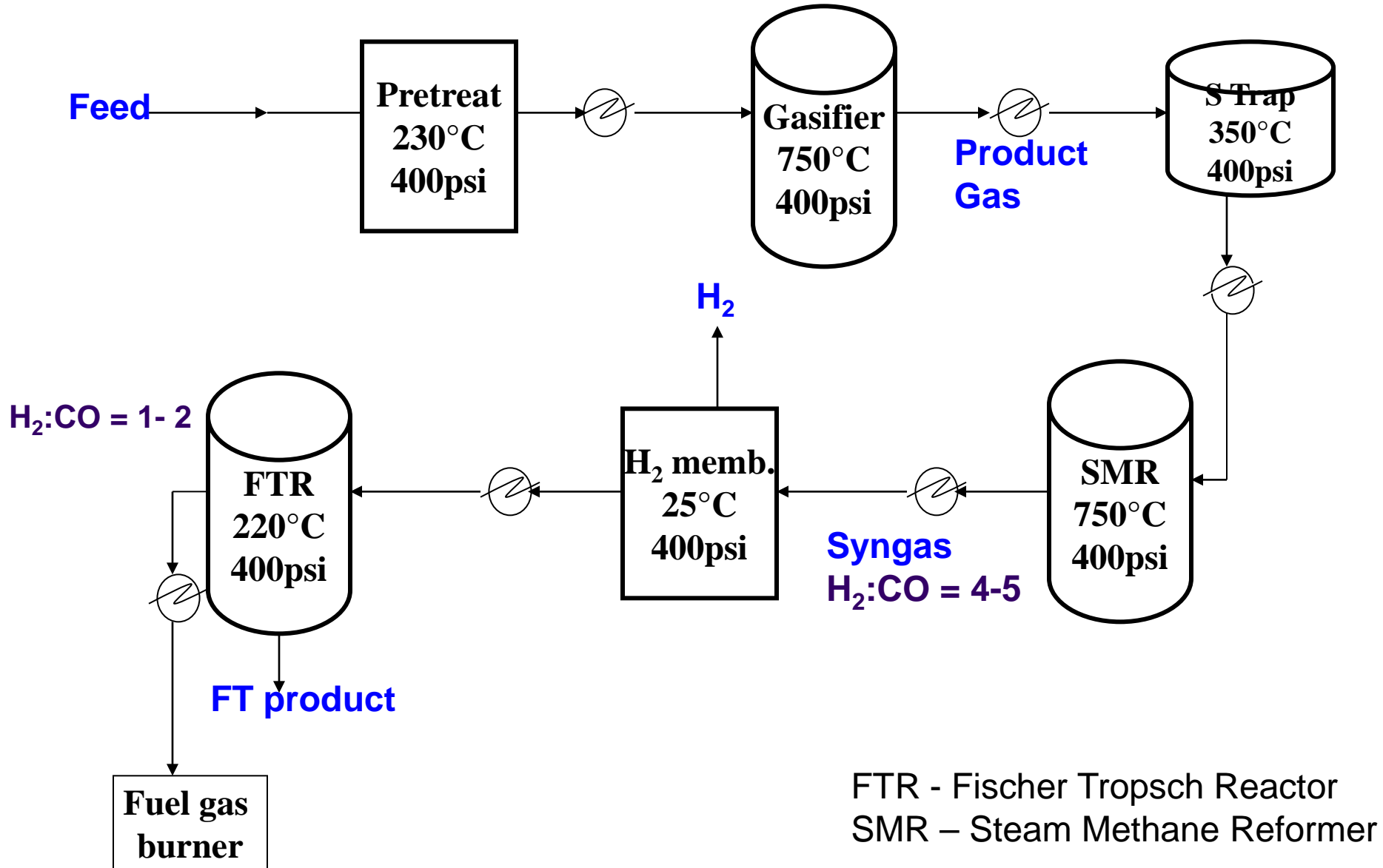


*Dr. Joe Norbeck*  
[norbeck@ucr.edu](mailto:norbeck@ucr.edu)



*Dr. Chan Seung Park*  
[cspark@cert.ucr.edu](mailto:cspark@cert.ucr.edu)

# Overall Feed-to-Fuel Process



# Candidate Feedstocks

- Biomass organic
  - Vegetable
    - Wood & crop waste
  - Animal
    - Enteric waste, poultry meat, liver & skin, food waste
- Petroleum organic
  - Plastic
  - Polymer
  - Paint residues
- Fossil organic
  - Coal & mine tailings

# Products

- › Fischer Tropsch (FT) liquids
  - › Ultra Clean FT Diesel
    - › Clean burning – No sulfur, Low aromaticity
    - › High cetane number – long chain paraffins
  - › Gasoline
  - › Jet Fuel
  - › Solvents and waxes

# Idea 1

- › Can a small community such as a cruise liner or naval aircraft carrier take all of the multiple waste streams and convert it to transport fuel and electricity?
- › Study would include how much and the types of waste available. Students to perform an analytical study.



## Idea 2

- › The hydrogasification process can make diesel fuel.
- › Can one make jet fuel?
- › What is the process to get jet fuel?
- › What is the effect of the syngas on jet fuel quality?



## Idea 3

- Determine the conditions to optimize the generation of product gas from hydrogasification of food waste from campus dining services.

