

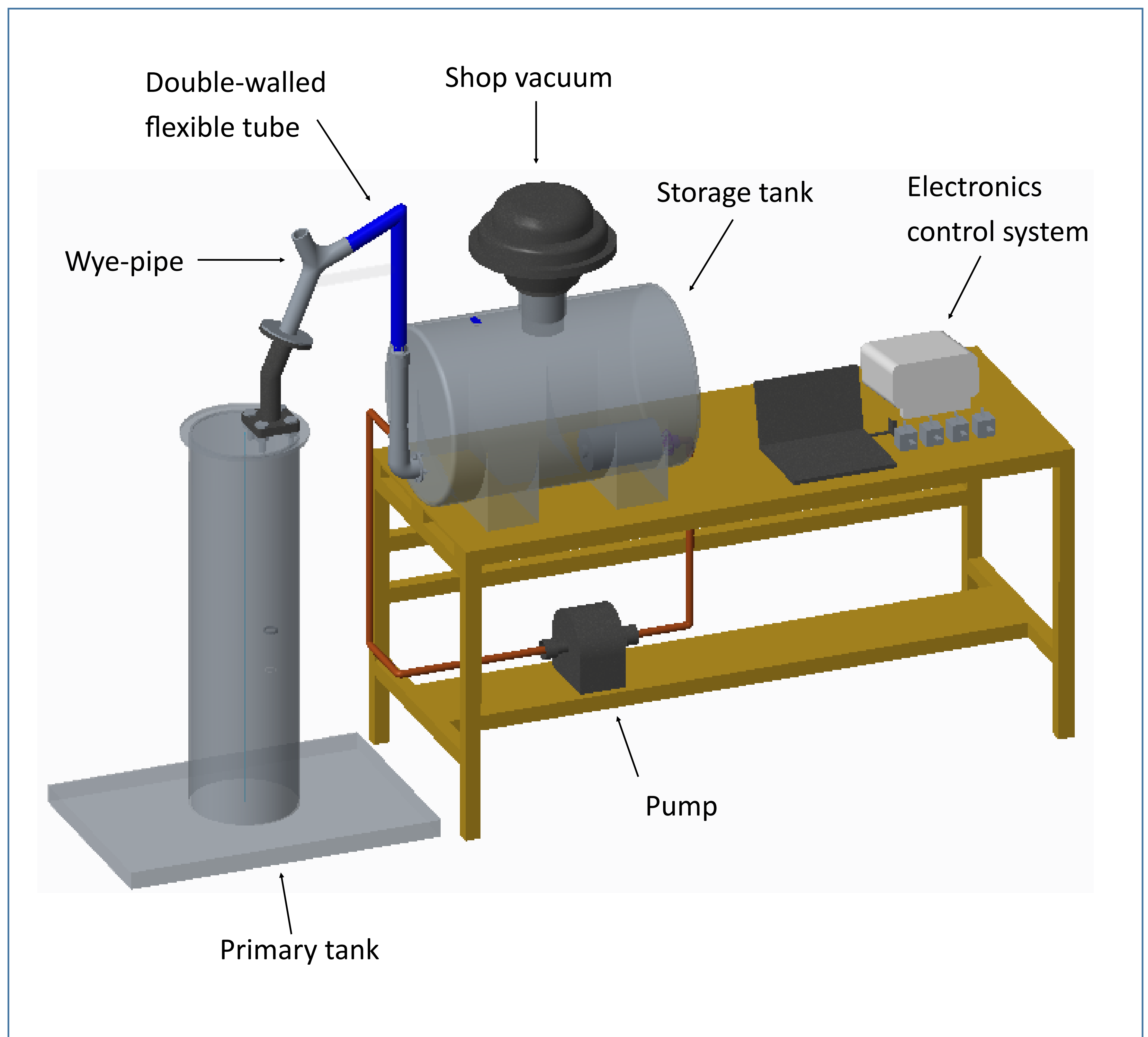


## PROBLEM STATEMENT

Develop and test a new system to remotely remove old resin slurry from the ion exchanger (primary tank) and visually inspect the inside of the exchanger to ensure the resin has been removed.

### THE PROCESS

- 1 The operator attaches the wye-pipe onto the primary tank.
- 2 The operator inserts the double-walled flexible tube into the primary tank.
- 3 The operator turns on the shop vacuum. The resin slurry is sucked into the storage tank.
- 4 The operator turns on the water pump, the resin slurry is filtered, and the clean water is pumped back to the primary tank.
- 5 The process continues until the primary tank is empty.
- 6 The operator inserts a snake camera into the inlet tube to verify the tank is clean.



## PROTOTYPE REQUIREMENTS

- ◆ Primary tank: 12" diameter, 44" height, opaque walls
- ◆ Inlet pipe: 2" schedule 80 flanged pipe, extends at least 10" above the top of the tank, offset 3" from the center of the tank
  - ◆ Resin beads: 0.02-0.05" diameter water softener beads make up 40-60% of the volume of the resin slurry
  - ◆ No more than 1/4" of liquid with minor resin particle remnants at the bottom
  - ◆ Seal: no loss of water via leakage or spillage



### THE TEAM

Dr. Vern Ulrich (Faculty Advisor)

FROM LEFT TO RIGHT

Jonathan Bernhardt

Maccrae Monteith

Jacob Zeigler

Samantha Carey

Spencer Garborg

Caleb Plugge

Richard Klimek

Daniel Wilson