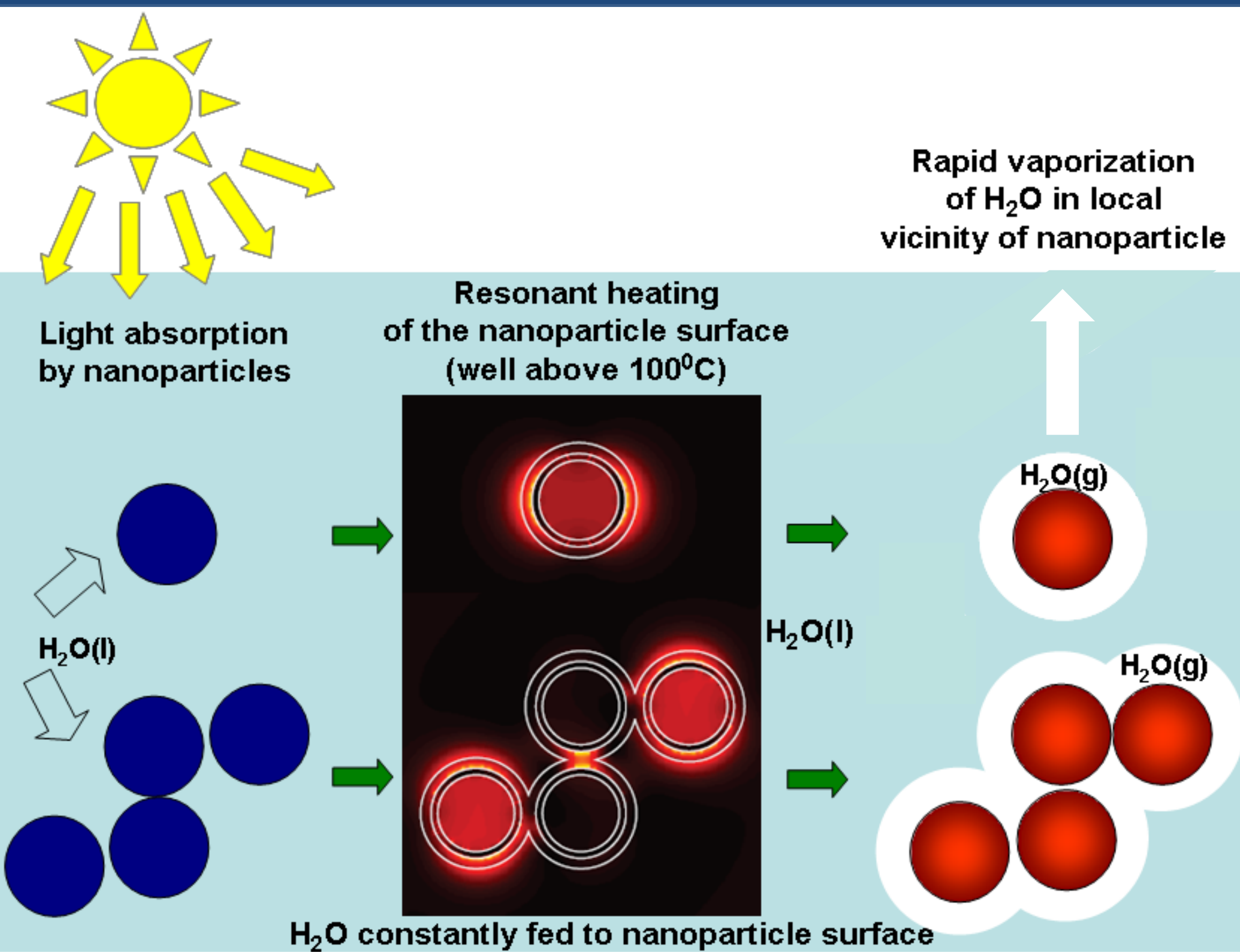


Oara Neumann,¹ Curtis Feronti,² Anjie Dong,³ Albert Neumann², Isadora Calderon,³ and Naomi Halas¹

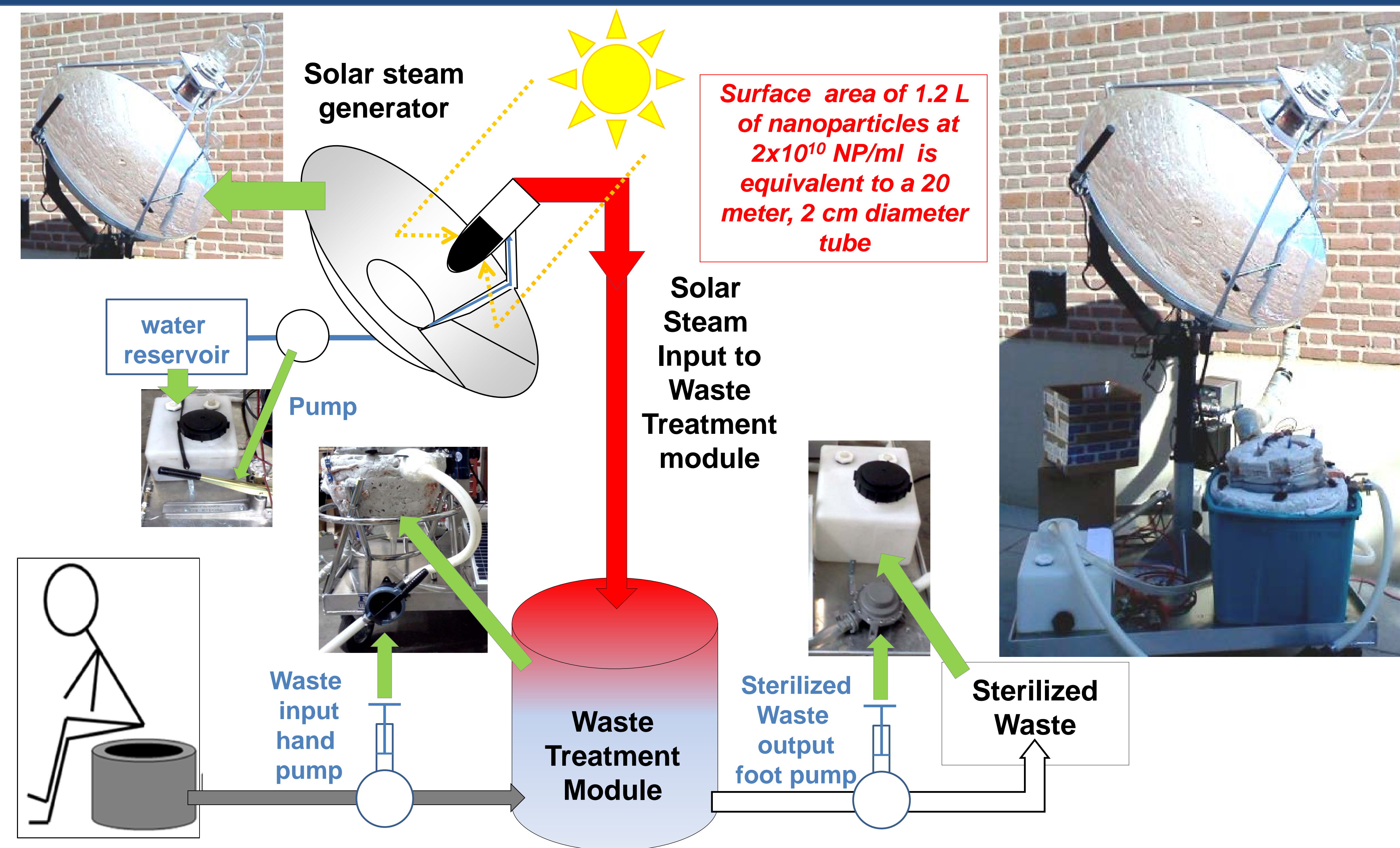
¹Department of Electrical and Computer Engineering, ²Department of Civil Engineering, ³Department of Mechanical Engineering, Rice University, Houston, TX 77005

Nanoparticles can harvest solar energy and produce steam

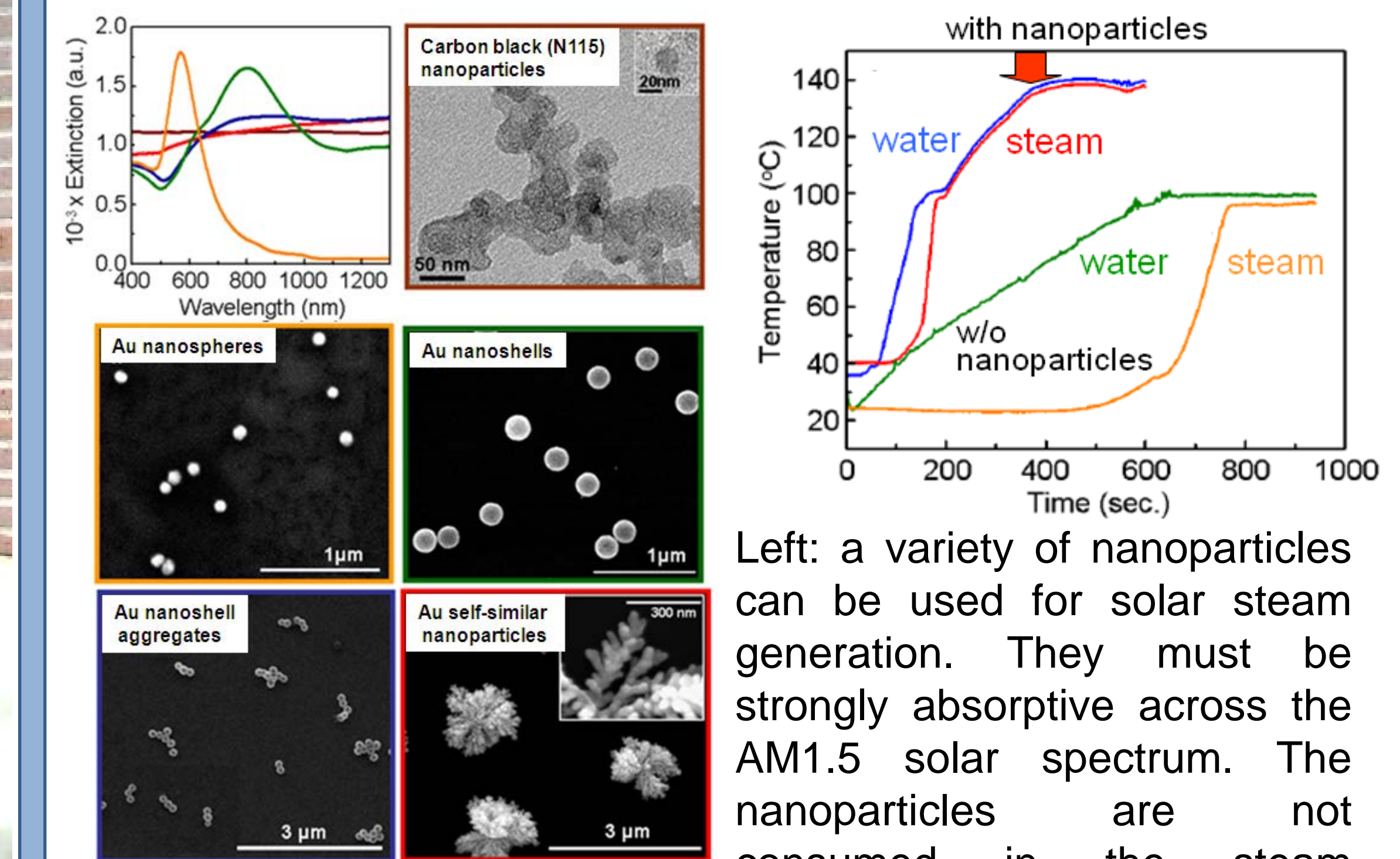


Initially, light is absorbed by resonant nanoparticles, raising their surface temperature above the boiling point of the fluid. The nanoparticle surface serves as a boiling nucleation site. Vapor is formed around the nanoparticle surface and the complex moves to the liquid-air interface where the steam is released. New liquid is continuously replenished at the hot nanoparticle surface, and the process is repeated.

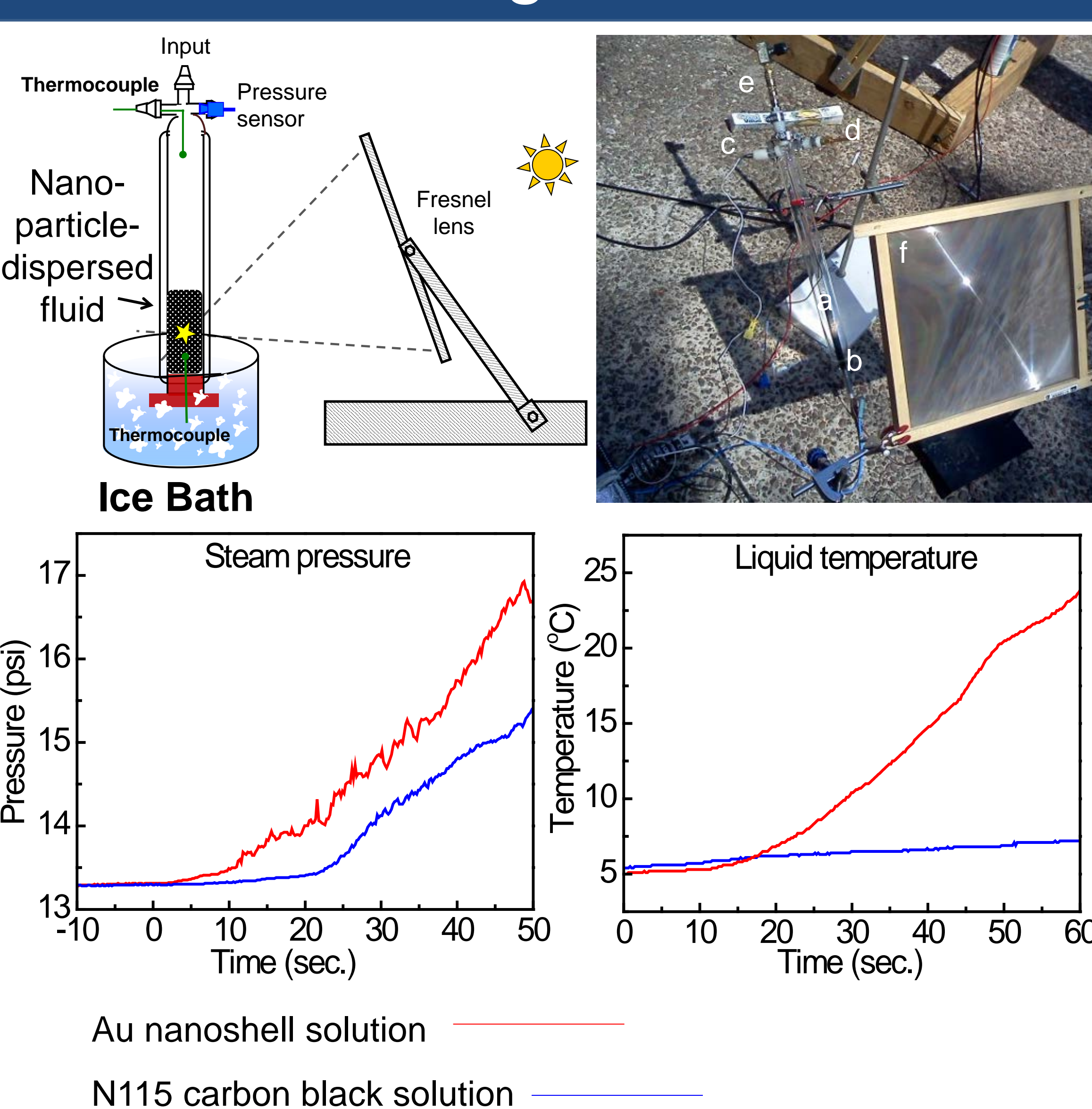
Solar Steam-Powered Toilet Design



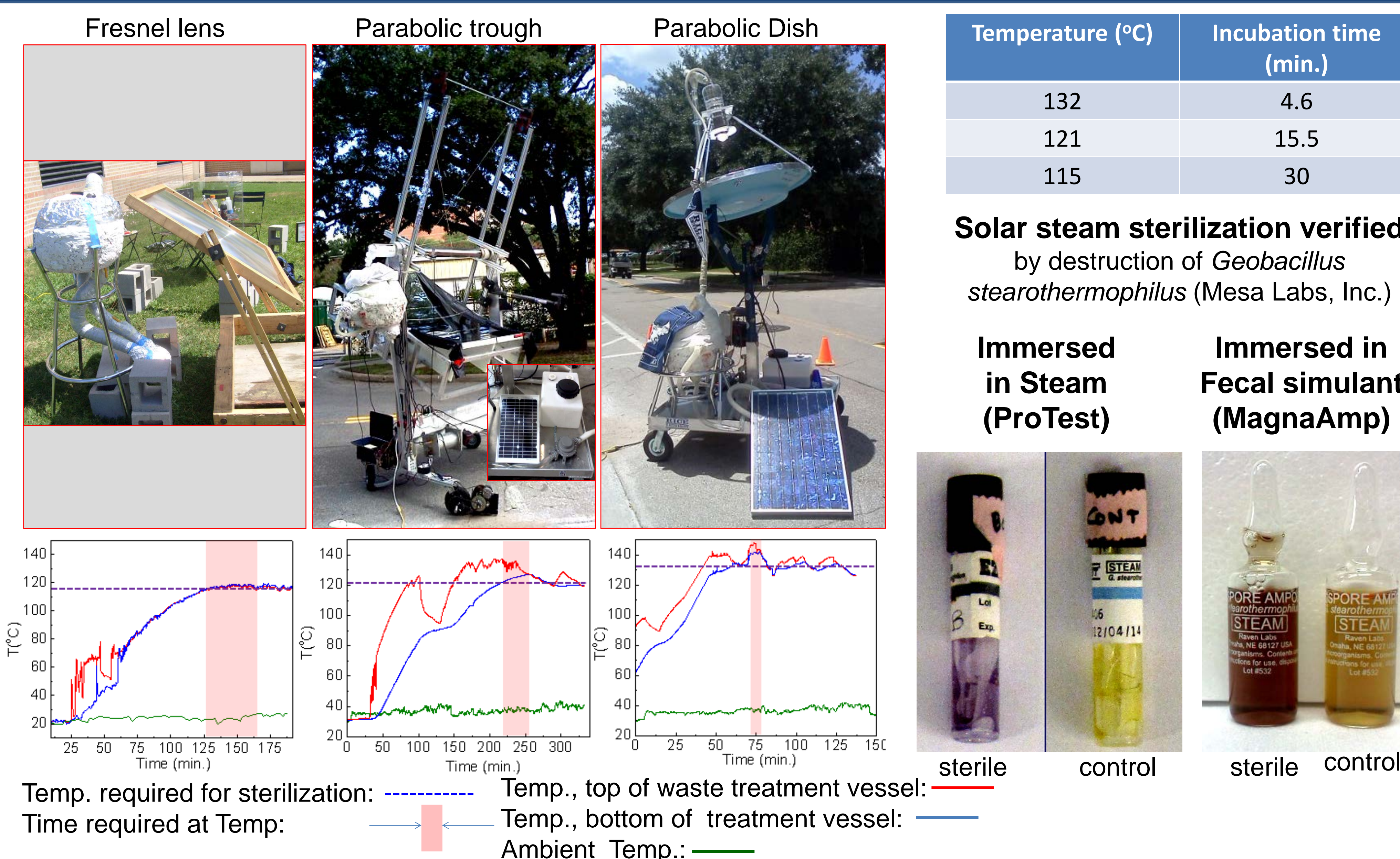
A rapid source of high-temperature steam



Generating steam without boiling water:



Solar Steam Sterilizer Designs and Performance



Potential Solar Steam Applications:

- Water purification/desalination (distillation)
- Food Preparation
- Absorption refrigeration, air conditioning
- Solar processing of bioethanol, chemical separations
- Sanitizing medical waste, dental instruments
- Electricity generation (turbine)

Funding