

# CNI Sustainability Project Proposal | UCSF

(Please describe project in terms of details and depth of complexity appropriate for graduate student level with a defined end product)

**X Individual student**

☐ **Team (1-3 students)**

## **Brief Project Description: Validation for Medical Supplies Disinfection Using Ozone Technology**

Procurement accounts for a considerable fraction of the environmental impacts generated from the healthcare industry. These impacts include Greenhouse Gases (GHG) emission, natural resource depletion, and ecotoxicity from the production and transportation of medical supplies. Meanwhile, medical supplies that are unused and in perfect conditions are often discarded due to infection control regulations in hospitals. This practice generates a substantial amount of medical supply surplus that ends up in landfills or donations. A study that carried out life cycle analysis on the environmental impacts of hysterectomy performed in the U.S. indicated that the production of single-use surgical supplies accounts for 4~7% of the GHG emission and 30~40% of the smog formation potential.<sup>1</sup> Thus, the ability to recover medical surplus that would otherwise be discarded or donated generates significant environmental benefits, including reducing GHG emissions.

UCSF Health was approached by a company named Éclair Medical Systems. Éclair has developed and is commercializing *MD-PureClean* to recover unused and unopened, packaged medical supplies with cutting-edge ozone technology so they may be reintroduced to the inventory stream. This technology generated ozone in situ with ambient air, and destroy the ozone by converting them back to oxygen with a catalyst. No consumable is required, and no emission is generated throughout the process. The efficacy of the disinfection is substantiated by an EPA-certified laboratory against common microorganisms that cause Healthcare-Associated Infections (HAIs), including *Enterococcus Faecalis* (VRE) and *Staphylococcus aureus* (MRSA), etc. Nonetheless, more validation research is needed as UCSF Health is looking to implement a pilot program to disinfect and recover medical supplies surpluses.

We are seeking a fellow who is proficient in microbiology laboratory skills to validate the efficacy of the ozone disinfection devices provided by Éclair. The fellow will evaluate the antimicrobial efficacy and consistency against various common pathogens that cause HAIs on different packaging materials. The results of this study will provide further evidence to support a system-wide adoption of the ozone disinfection technology for medical supplies recovery. Review of Life cycle impact of the waste to carbon emissions is also needed to align with the intent of the CNI funding. Explore project barriers to implementation, help with pilot. \$4000 stipend for project completion.

### **Skills needed for the project:**

Microbiology laboratory skills, research

### **Skills desirable for the project:**

Strong communication skills

### **Time frame for completion/number of hours:**

Ten months Sept 2020 – June 2021 but may begin earlier

### **Description of specific on-site work necessary:**

Laboratory testings on HAIs-related pathogen growth on collected samples

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<sup>1</sup> Thiel, C. L., Eckelman, M., Guido, R., Huddleston, M., Landis, A. E., Sherman, J., ... & Bilec, M. M. (2015). Environmental impacts of surgical procedures: life cycle assessment of hysterectomy in the United States. *Environmental science & technology*, 49(3), 1779-1786.

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## **Description of specific optional off-site work:**

Meet with relevant procurement clinical staff or faculty for background, scope, and clarification on deliverables; produce reports on testing results and the antimicrobial efficacy.

## **Expected deliverables/value of the end product:**

Weekly meetings initially with the project sponsor and team. Two mid-course check-ins. Write up a scope of work for a follow-on project if appropriate. Final project poster for submittal to UCOP CNI Program, a 250-word article for our website. A peer review journal article submittal is desirable but not required.