

Memo: Ocean Vision Launchpad Summary
Banyu Carbon and William Tarpeh
August 2024

Tarpeh has been consulting with Banyu Carbon since April 2024. Key areas of engagement include participating in monthly zoom calls, assisting with hiring, and helping design experiments for adsorption-based pH adjustment to support Banyu's core photoacid technology.

Assisting with hiring

Tarpeh reviewed Banyu's advertisement for an ion exchange expert, and sent it over 20 principal investigators who train students on ion exchange, adsorption, and related technologies. Several candidates emerged from this outreach, including a graduating Stanford PhD student with expertise in scaling up water treatment processes. More broadly, Tarpeh has facilitated Banyu interacting with several students, including undergraduate chemical engineers and graduate chemical and environmental engineers at Stanford. In particular and separate from the consulting relationship, Banyu participated with a case study in Tarpeh's capstone course on Chemical Engineering Plant Design. A team of four students (one of several teams working with multiple companies) investigated commercial options of carbon capture and separation from seawater in collaboration with Banyu, leading to a compelling final presentation and report. One student interviewed with Banyu as a candidate for a research position.

Designing Experiments

After discussion with Banyu on major challenges facing their ion exchange processes, Tarpeh wrote a document to outline protocols for designing and executing ion exchange experiments. He also screened several candidate materials that might exhibit improved performance over Banyu's current commercial resin. After several discussions Banyu purchased two of the materials suggested by Tarpeh and began developing a high-throughput workflow for characterization. Tarpeh has continued to help analyze data and propose next steps for experiments and scale up. Recent experiments have shown enhanced performance for some of the materials identified by Tarpeh compared to previous resins and operation.

Monthly Zoom Calls

Tarpeh and Banyu have met at least monthly to discuss experiments, opportunities to leverage input, and future technology development. At the beginning of the interaction, Tarpeh provided several foundational texts and papers from his own work and key reference texts focused on adsorption and ion exchange. Multiple references from this list are now consulted regularly by the Banyu team as they design and evaluate adsorption experiments.

In the future, Tarpeh and Banyu plan to continue meeting monthly and identifying key mutual areas of interest that leverage Tarpeh's expertise. Our focus continues to be on developing a robust workflow for characterizing promising materials for Banyu's application for carbon capture from seawater.