Session 7	Emerging innovative technologies for the bioeconomy
Pitch Title	Using the power of biology to convert underutilized waste such as crop or forest residues into fuels and chemicals.
Company	Celluol
Speaker	Tom Wilding-Steele
Keywords feedstock	Lignocellulose, agricultural residues
Keywords technology	Consolidated bioprocessing
Keywords End-Product	Sustainable aviation fuel, cellulosic ethanol

Abstract:

Waste biomass, such as agricultural residues, has unrealized potential to be a critical feedstock in the production of net-zero fuels and chemicals. Current solutions for the conversion of these residues have faced technical challenges due to the difficulty and cost in the crucial step of degrading this biomass into utilizable free sugars.

Celluol has engineered a bacterium that can directly degrade and ferment waste biomass into ethanol using a one-step process with no need to add any extra enzymes. This was achieved by engineering our bacteria to produce synthetic cellulosomes – multienzyme complexes 10-times more active than the fungal enzymes currently used. We subsequently reprogramed its metabolism to convert all sugars to ethanol. As our cellulosomes are more active this crucially also allows us to use a cheaper, milder pre-treatment step.

Our breakthrough directly addresses the challenges encountered by current cellulosic conversion technologies, simplifying the process and making it significantly less expensive. We envision that Celluol's simpler and cheaper process can be rapidly deployed, starting by co-locating at first generation ethanol plants that currently use corn or sugarcane and have abundant biomass wastes. By further capturing and further converting the CO2 produced during the fermentation process into ethanol, Celluol's technology has the potential to decrease the amount of land required for sustainable biofuel production by up to three times.