

Session #1 (7th March): Research and Innovation

- Industrial scale Additive Manufacture (3D printing; 8 – 20 mm nozzle diameters) of PHAs and PLAs into which SCGs could be formulated (Ed Cant presentation).
- Using cell factories (microbes from soil) to (i) digest plastics (100 g “clean” plastic → 1 L bioreactor) and (ii) make PHAs (+ muconic acid) (TingLu presentation).
- Using AI to create food formulations that can create an ink that can be 3D printed (increased sustainability?) – already using upcycled SCGs (stored in the fridge) in their formulations (incorporating fibre, antioxidants in cookie/bread doughs) (Changmau Xu presentation)
 - SCGs to be stored in the fridge (question from community member who worked in numerous coffee shops)? Starbucks have industrial scale SCGs production – they would have space for fridges.
- Spore cycle (Jasper Nord) using SCGs to grow mushrooms (small scale footprint) – food yes (using the coffee shop plastic cups as plant pots), but could also be used for foam/insulation. Personal pickups from local coffee shops, drying for 12h low heat (oven in apartment). If scaling up, could look to use passive solar dryers. SCGs could require additional treatment (if mouldy) i.e. requiring autoclave (pasteurisation vs. sterilisation – depends on what you intend to grow). Biggest limitation = availability of labour.
 - Jasper Nord (was a previous winner of the UIUC re-imagine competition) – fund Jasper to keep CAPPUCCINO forum going?

If using by-products in new product formulations, potentially food, what does that look like for the gut microbiome (Japhia and Rui)?

Follow on (impact) ideas/intentions, related to session:

- Follow up with Illinois Sustainable Technology centre (Beth Meschewski) on what research collaboration could look like in this SCG upcycling space.
 - a. Follow on funding options?
- How best to link SCGs research in food to/with Japhia’s project/work concerning gut microbiome?
 - a. Follow on funding options?
- Instead of Brazil, we are going to SRI (June 16th – 19th)
 - a. Jasper Nord possibly moving back to Chicago & will be at SRI – need to meet up with him!
- Apply for [UNICAMP/USP](#) Internal seed funds (+ 3rd country collaboration(s)) to build the Brazilian collaboration for CAPPUCCINO.
- Follow up on identified opportunities with Vietnam (2nd biggest coffee producer)
 - a. Follow on project proposal & funding options?

Session #2 (26th March): Education

> What are the education initiatives we can badge under “sustainability” and/or “circular economy” related to CAPPUCCINO? How does the re-imagine competition (limited to undergrads) fit with what we are doing (and vice versa) – we have PGRs/CDTs that are interested.

> Eric Shiu (Business School) – has an Innovation MSc - in 1 module is planning to give his students a new product development opportunity = possibility of co-teaching with engineering (as critical friends/advisory group). You’d have peer to peer co-developed feasibility assessments of the new products & business models. Should aim to make it competitive (how fund?) & include reflection piece.

> Samantha from BiFoR had great ideas for outreach and public engagement – they hand out basic tree measurement tools (easy to use) to schools (via project sign-up sheet) and get the schools to periodically report the data back. We could do something similar. E.g. a SCGs upcycling pack? PGRs could deliver the “how to” training in schools? We’ve done bath bombs... could also look at a face scrub? Keep tangible LOs in mind/at the forefront. I.e. Focus on where the product (SCGs) has come from (and where it ends up) and build around that. To get traction, it’s all about participatory mini projects for sustaining civic engagement. How do include indigenous knowledge in this?

Follow on (impact) ideas/intentions, related to session:

- Additional session to be hosted at UoB (during UoB Xtra in June) specifically for Undergrads
- Using [Enatus](#) model/competition format - we provide the SCGs (as raw materials) and get them to innovate around this
 - a. We have a bit of UoB budget remaining to give a prize
 - b. Can we fund Jasper to support this sort of initiative? Follow up with Enterprise – Ilija mentioned student fellowship possibilities.
- Follow up on the cross-campus teaching (business + engineering/met & mat) & outreach (using SCGs) opportunities identified.

Session #3 (28th April): Civic Engagement

- Three main themes, using SCGs discussed identified for discussion (i) Food – focus in our respective local communities, (ii) Engagement – beyond our local communities, (iii) Enterprise – we also added (use of SCGs in) art/creative industries (including clothing/fashion).
 - Filza A from Illinois Sustainable Technology centre made the case for interrogating the sustainability of systems vs. products through the lens of tourism and how important community stakeholder engagement is in enabling and maintaining eco-tourism. Give the community your idea/product and let them try and break it! Co-create and serve as stewards for coffee + eco/nature-based tourism. Case was made that eco/nature-based tourism is STEM based tourism, i.e. you must have/give full visibility of the entire system. Some stats: Indonesia ~ 88 coffee shops per sq mile; New York ~ 6 coffee shops per sq mile.
 - Really interesting to compare Indonesian coffee model (where ~ 50 % of the coffee that is grown is retained and drunk in Indonesia. More distributed manufacture – you can approach growers/producers directly as a citizen) + culture (there is a big coffee culture, citizen's value it, and social interest to do something circular with it) vs. Brazilian coffee model (mostly massive/centralised farms catering for a global export market) and culture – do citizen's value it less?
 - Case made for need to change the language – SCGs is not “waste”. If we stop calling it waste, people will need to think differently about it. Although there needs to be different approaches for commercial (CSR is focussed on training rather than investment, so most SCGs ends up as compost, for small scale mushroom growing. Grower's inclination is to stay small and distributed) vs. non-commercial (domestic). Also, a case for ethical use/fully understanding the sustainability of new “circular” systems being proposed (especially if diverting resources away from food production) e.g. mushrooms for food vs. mushroom mycelium for products (Sporecycle currently doing reverse engineering of some mycelium-based products on the market to test this).
 - Challenges – energy efficient sterilisation &/or biochar formation (from SCGs), preventing moisture ingress (biobased resins) to maintain product function and safety.
 - Nappies? Feasible to combine SCGs (activated carbon adsorbent) and mushroom (based material coating and resin for the exterior)?
 - It's not just SCGs – it's not just 1 “waste” stream, we have many and should be looking to combine multiple to yield better results. We will never reach net zero without shifting to using sustainable feedstocks.
 - Unexplored avenues in creative arts: SCGs use in textiles, art etc...

Follow on (impact) ideas/intentions, related to session:

- Follow up conversation with Illinois Sustainable Technology centre (Filza Armadita – psychologist looking at sustainable tourism in Indonesia (4th biggest coffee producer), previously in Cambodia (3rd biggest coffee producer)), what would research collaboration look like in this SCG upcycling space?
 - a. Inclusion of the community and indigenous knowledge and voices. Seek Indigenous creative arts installation @ UoB Barber? Using SCGs in art installations (e.g. SCGs formulated poles for geodesic domes).
 - b. Follow on funding options?
- Building the COP – have a website (distribution list + information repository/resources, also a blog? Jasper could support?)
 - a. Visiting fellowship options (for grad students – for Jasper Nord)? Ask the enterprise team/Enactus contact.
- Apply for [UNICAMP/USP](#) Internal seed funds (+ 3rd country collaboration(s)) to build the Brazilian collaboration for CAPPUCCINO.
- Look at bean to cup (and beyond!) system models and coffee cultures for where we have contacts/in roads: Vietnam, Columbia & Indonesia. What about Jamaica?
 - a. Look for global funds/foundations/internal funds to support CAPPUCCINO initiatives in these spaces. We are building a global network after all.
 - b. What about Horizon/EU funding? A colleague pointed me to [C4CEC: The Center for Circular Economy in Coffee](#): a precompetitive “global” platform (started in Italy) for enhancing the circular economy in the coffee sector: <https://www.circulareconomyincoffee.org/> not 100% sure how it actually works... Existing members: <https://www.circulareconomyincoffee.org/c4cec-members/>