TECHNOLOGY COLLABORATION CENTER

2019 Collaboration Concierge Service

Open Collaboration Requests

Innovating Solutions through Collaboration

The TCC is seeking potential collaboration partners for the following open requests

The TCC's mission is to solve difficult technology problems through innovative solutions connecting collaboration partners across technology sectors.

The Collaboration Concierge Service is the TCC's program for helping organizations with unmet technical challenges find potential partners and providing assistance in the formation of new collaboration partnerships.

This program is open to any organization – to submit Collaboration Requests (looking for partners) or Collaboration Responses (proposing solutions).

Organizations submit Collaboration Requests (using a supplied form) to the TCC. The request describes the problem to be solved, along with critical items such as the potential for sharing of Intellectual Property or how the collaboration could be funded. While collaborations created by Requests may be fully funded by the submitting organization, responders may also be asked to include a proposal for how the collaboration could be funded as part of their Response.

New Requests are submitted for review by the TCC, which will provide advice on improvements on the request before the request is accepted by the TCC. The Request will then be posted on the TCC's website and included in a TCC News announcement. The TCC may also form an expert panel to review new Requests and provide advice on potential solutions or partners. Presentations on open Collaboration Requests may be made at relevant TCC workshops.

Any organization can submit a Collaboration Response (using a supplied form). The TCC will review submitted responses, provide advice on improvements, and then forward the proposal to the Requesting organization. The TCC will work with the Requesting organization on forming an effective partnership, that will both find solutions to the challenges and establish a path to market for those solutions.

Requests without Response Deadlines

Request: AROT – Augmented Reality (AR) for Operations and Training

- Requesting Organization: NASA Johnson Space Center
- Summary: NASA JSC seeks to advance Augmented Reality (AR)-based operations and training capabilities. Successful NASA JSC human spaceflight missions depend on execution of well-defined operational plans. Astronaut and ground control teams receive extensive training in the procedures required to carry out those plans and then execute those procedures during the mission. As electronic procedures replace paper checklists and longer duration missions are considered, there is a need for software technology to lead the way. Specific domain expertise and interest areas include: AR technology combined with electronic procedures; Electronic procedures and AR authoring tools for training and performance support; Just-In-Time Training (JITT); Distributed AR team training; AR system architecture development for distributed computing paradigms; Machine vision for registration; Radio Frequency Identification (RFID) localization and logistics management; Wearable computing and sensor fusion technology for Automation and Robotics (A&R); and A&R interactive control of virtual and real objects with gesture, voice and haptic devices.

Request: CMWE – Complex Multi-Wearable Environments

- Requesting Organization: NASA Johnson Space Center
- Summary: As interest in wearable technology has increased in the consumer marketplace, numerous commercial products have become available that meet NASA's human monitoring needs without requiring expensive in-house development. As a result, NASA and its research partners are using a variety of wearable devices to collect long duration physiological data in ground analogs and on the International Space Station. Taken alone, these wearables provide a valuable function in a relatively unobtrusive form factor, but when the number of simultaneous research studies grows, test participants are asked to wear more and more devices. This poses unique challenges from technical and human factors perspectives. With many standalone devices in a small dynamic environment, how can we ensure reliable data transmission, limit network complexity, and synchronize data steams? How do we ensure user comfort, eliminate performance impacts, and ultimately support user compliance? As the research, workplace, and consumer environments continue to see more adoption of wearable technologies, these challenges will need to be addressed.

Request: EXOR – Exoskeleton for Rehabilitation

- Requesting Organization: NASA Johnson Space Center
- Summary: NASA JSC seeks parties interested in co-developing technology associated with its X1 exoskeleton to include additional powered degrees of freedom and increased sensing capability. NASA JSC has been the leader in space-based humanoid robots for several years and seeks to leverage this position to advance NASA JSC's current X1 Exoskeleton for rehabilitation. By co-developing this dual-use technology, NASA JSC and interested parties may be able to extend and enhance the current capability in the areas of overall performance, controls modeling and safety, in addition to biofeedback and sensing, thereby creating a more advanced exoskeleton with capabilities that mitigate muscle atrophy in space, as well as strengthen muscle function for persons suffering from paresis and other motor function pathologies.

Request: EXW – Exercise Wearables

- Requesting Organization: NASA Johnson Space Center
- Summary: NASA JSC seeks to understand exercise forces, motions, and performance aboard the International Space Station (ISS). Knowledge of the forces and motions permits calculation of joint and muscle forces during microgravity exercise on orbit. Traditional video-based motion capture is limited on ISS by the number of available cameras and the tight space available to position the cameras. A wearable system gets around these constraints. Additionally, there is considerable need to monitor and record astronauts' biometric data (i.e. exercise intensity, energy expenditure, tissue oxygen saturation, body temperature) during daily exercise sessions and EVA or other mission critical activities. Historically, biometric medical data collected during exercise or in a spacesuit is limited to heart rate and is prone to motion artifact and poor quality. Additional and improved biometric assessments would enhance astronaut health monitoring capabilities.

Request: IAD – Innovative Air Drying Via Lightweight Structure Coating

- Requesting Organization: NASA Johnson Space Center
- Summary: As NASA ventures from Low Earth Orbit into deep space, longevity and air scrubbing concerns for astronauts increase. Lightweight structures have been developed that can support thin films of coatings for increased air drying. The challenge arises in developing and testing surface coating materials with dehumidifying capabilities for various lightweight structures.

Request: ISCLTP – Improving Safety & Convenience of Liquid Tabs Packaging

- Requesting Organization: P&G
- Response Deadline: June 15, 2018
- Summary: P&G's laundry team is looking for innovative new ways to improve the safety, child-proofing (0-5 years) capabilities of the Ariel Pods packaging (Europe) at affordable costs, while continuing to delight consumers and improving the sustainable profile of the packaging.

Request: NEDML – New Energies – Digitalization: Machine Learning

- Requesting Organization: Shell GameChanger
- Summary: Shell seeks AI proposals, focused on machine learning, with one or more of the following agent capabilities: reason - use strategy, solve puzzles, judgments under uncertainty; represent knowledge; plan; learn drawing models and things learned in other domains to apply to a different domain; communicate in Natural Language; and integrate above skills towards a common goal. In addition to the above we welcome total new and step change approaches in ways of abstracting the right data from large data sources supporting many different data types. Ideal proposals are early stage technology and/or from companies working to derisk technology and/or business models. The GameChanger program offers non-diluted pre-seed/seed funding, subject matter expertise, and connections to assist with industry understanding and uptake. The funding opportunity will be in the range USD 150,000 - 300,000 to progress a "proof of concept" in a phased approach over a period of no more than 12 months. Further development may be supported and or facilitated by Shell depending on the overall outcome of the initial award.

Request: NEGOTF – New Energies – Grids of the Future

- Requesting Organization: Shell GameChanger
- Summary: Shell seeks proposals in all three areas: electrification – vehicle to grid/ home, energy storage (grid and mobile); decentralization – technology related to distributed energy resources (DERs) such as distributed storage, distributed generation, microgrids, demand flexibility and energy efficiency management; and digitalization – automated control, integration and management systems providing the ability to manage and predict demand/ generation - potential solutions related to the grid (smart metering, smart sensors, automation and digital network technologies) or behind the meter (Internet of Things (IoT), Artificial Intelligence (AI)). Ideal proposals are early stage technology and/or from companies working to derisk technology and/or business models. The GameChanger program offers non-diluted pre-seed/seed funding, subject matter expertise, and connections to assist with industry understanding and uptake. The funding opportunity will be in the range USD 150,000 - 300,000 to progress a "proof of concept" in a phased approach over a period of no more than 12 months. Further development may be supported and or facilitated by Shell depending on the overall outcome of the initial award.

Request: NENROI – New Energies – New Route to Oxygenated Intermediates

- Requesting Organization: Shell GameChanger
- Summary: Shell seeks proposals that can demonstrate and bring to 'proof of concept' novel routes to oxygenated intermediates which have the potential to supplant existing commercially applied processes, based on superior carbon and energy efficiency. Topics of interest include novel routes to alcohols, esters or aldehydes which are currently produced in bulk by the chemical industry. The funding opportunity will be in the range USD 150,000 - 300,000 to progress a "proof of concept" in a phased approach over a period of no more than 12 months. Further development may be supported and or facilitated by Shell depending on the overall outcome of the initial award.

Request: NESFI – New Energies – Solar Fuel Innovations

- Requesting Organization: Shell GameChanger
- Summary: Shell seeks proposals that can demonstrate and bring to "proof-of-concept" novel approaches to convert solar energy into electrons and/or molecules for use in liquid fuel engines without overall net addition of CO2 to the atmosphere. For doing so, stretch solutions are needed to be able to combine renewable H2 generation with environmental CO2 capture to generate renewable hydrocarbons. Proposals can also address parts of the challenge and or requirements. Topics of interest include conversion of sunlight into renewable electrons or renewable energy carriers; "environmental" CO2 capture as hydrocarbon feedstock; and (photo)-electrochemical conversion of H2 and CO2 into hydrocarbons. The funding opportunity will be in the range USD 150,000 - 300,000 to progress a "proof of concept" in a phased approach over a period of no more than 12 months. Further development may be supported and or facilitated by Shell depending on the overall outcome of the initial award.