

NSF Pitch: This document resulted in an invitation to submit a full proposal for \$250,000 seed funding:

*Up to 500 words describing the technical innovation that would be the focus of a Phase I project, including a brief discussion of the origins of the innovation as well as an explanation as to why it meets the program's mandate to focus on supporting [research and development \(R&D\)](#) of unproven, high-impact innovations.*

The Innovation Bank:

The Innovation Bank (TIB) is a novel method of business related to the integration and capitalization of knowledge assets. TIB is an application of game theory, a simple proof-of-stake (native) blockchain, and actuarial math. The system aims to decentralize the engineering and scientific disciplines by incentivizing individual practitioners to form knowledge asset networks among themselves from which innovation and wisdom are antiderivatives. Specifically, a decentralized ledger is comprised of claims made by one practitioner immutably paired to corresponding validations of those claims by other practitioners in the network. Each pairing forms a single node with 2 branches constituting a “knowledge asset”. The aggregate network of knowledge assets forms independently of jurisdiction, corporations, or ontological silos thereby eliminating related brokerage and semantic friction. The intrinsic motivation of the practitioners is to accumulate a personal transaction record of validated claims and claim validations that would convert one’s résumé to form public key. For the non-practitioner, a network of sufficient density would yield extraordinary business intelligence upon which monetization may be based. As the game develops, the quantity and quality of the transaction records results in higher value rewards to the practitioners

The Innovation Bank meets the NSF program mandate as a systematic application of knowledge towards the production of useful products, processes and outcomes. TIB enables the formation of a research and development platform where "innovation circuits", tangential innovation, and comprehensive innovation ecosystems may be readily modeled and deployed algorithmically at scale. For example, analysis of the DL would reveal what combination of knowledge assets would have the best probability of executing a specific objective in a specific time or place. Analysis of the DL may reveal the concentration of knowledge assets, their rate of change (Integrals: innovation, wisdom) within a geographical or digital domain. The diverse components of commercialization may be systematically resolved, risk adjusted and diversified without bias or undue influence, at scale - and for which practitioners are compensated by the platform.

This project began nearly 25 years ago with the NAFTA Mutual Recognition Document for Engineering Professionals. The goal was to enable a global engineering profession able to respond to multinational production and infrastructure markets. The work was further developed at the Boeing Company as a means of closing the knowledge-age gap among engineers by creating a “market” between junior engineers and senior engineers. The work then inspired the formation of CoEngineers.com as a decentralized engineering firm deploying independent engineering practitioners. The work also initiated the Integrated Engineering Blockchain

Consortium (IEBC), which has now been disbanded after significant early success. CoEngineers.com and CoEngineers.io are the current repositories of whitepapers, international media, and GitHub records of the prototype blockchain that was built with IEBC.

Phase 1: A substantial iteration is required. This iteration would incorporate lessons learned to re-develop a prototype blockchain, user interface, minimum viable product, and marketing promotion of the concept as a means to attract additional practitioners, partnerships, corporate sponsors, academics institutions, banks and insurance companies.

*Up to 500 words describing the R&D or technical work to be done in a Phase I project, including a discussion of how and why the proposed work will help prove that the product or service is technically feasible and/or significantly reduce technical risk. Discuss how, ultimately, this work could contribute to making the new product, service, or process commercially viable and impactful. This section should also convey that the proposed work meets definition of R&D, rather than straightforward engineering or incremental product development tasks.*

The technical elements of Phase 1 would include:

- Resurrecting the old blockchain, expert technical review, and modifications required to release a minimum viable product.
- These components include user interface, AUPOT layer (anonymity until point of transaction), formation and award of tokens, 3<sup>rd</sup> party exchange of tokens, intake and retirement of tokens (demurrage), etc.
- Operational requirements include the governance of the proof-of-stake blockchain. Assignment of witness nodes, and the continued development of game mechanics that incentivize and regulate fair and productive interactions.
- Continued development of current algorithms – WIKiD Tools <sup>TM</sup>, The Value Game <sup>TM</sup>, Curiosumé <sup>TM</sup>, and the incorporation of proven tools in data analytics, AI, and public repositories.
- Finally, launch of the distributed ledger would likely be initiated on college campuses and technology communities for test, review, iteration, and expansion.

Sufficient data would be gathered from this activity to demonstrate the utility of the platform to additional risk-sharing stakeholders such as entrepreneurs, banks, insurance, academic institutions, corporations, etc. In effect, commercial value would be derived by the formation of a market for intangible assets by measuring rates of change of knowledge, innovation, and wisdom in a network.

Based on the proven Duke University Lab2Market commercialization system, Coengineers, PLLC developed specifications for an Innovation Bank at a major US research university to help commercialize intellectual property developed in their research labs. An Innovation Bank was described (whitepaper) which would decentralize the commercialization steps (technology readiness, market readiness, IP readiness, Regulatory readiness, etc.) and distribute those steps across the relevant university departments – i.e., readiness assessment tasks would be distributed to the engineering school, business school, law school, etc., respectively, and used as practical learning for students and publishing opportunities for teachers. Given hundreds of readiness steps and a diverse subject matter, such a project could only be handled with a distributed ledger technology and precise allocations of knowledge assets. Existing processes are labor intensive, often biased, and exclusionary rather than comprehensive resulting in low yields and lack of ancillary innovation.

A very simple game is created in which it is in everyone's best interest to act with high integrity rather than low integrity in the accounting, exchange, and storage of knowledge assets. A great deal of efficiency arises when punitive systems can be removed and intellectual work production can be decentralized and incentivized.

*Up to 250 words describing the customer profile and pain point(s) that will be the near-term commercial focus related to this technical project.*

By example, a firefighter has little value until there is a fire, then the firefighter is worth millions of dollars per hour preserving life and property. By contrast, fire protection engineers can design buildings that will not burn. Unfortunately, their value is difficult to measure in the absence of the fire. As such, engineers and scientists are often relegated to the “intangible asset” column of the balance sheet. In reality, engineers and scientists remove risk from complex physical systems such as buildings and airplanes and computer programs – that is their superpower. In the right form, risk as a relatively simple quantity to measure and manage as a tangible financial instrument.

The near-term commercial focus will be:

“A fun and simple game where innovators and entrepreneurs are paid to replace their archaic résumé / CV system with a validated knowledge asset inventory”

From this position, applications may evolve to include most transactions where risk is transferred from one entity to another entity. This may include team formation, as well as transactions of real property, or commercialization of innovation. As the value of the network grows by Metcalfe's law, the utility of the interactions between and among practitioners will increase by

the square of the number participating practitioners. The value of the tokens will track with the value of the network becoming an important metric for assessing scientific and engineering value.

*Up to 250 words describing the background and current status of the submitting small business, including team members related to the technical and/or commercial efforts discussed in this Project Pitch.*

Community Engineering Services, PLLC (d.b.a., CoEngineers, PLLC) is a small engineering firm owned by this author, his spouse and the employment of independent contractors in a traditional engineering/business consultation practice. The company provides revenue to the owners and employees while also serving as a platform for research and development of The Innovation Bank.

Over 150 engineers and scientists have contributed to this project over the last 25 years. Prior iterations yielded multiple white papers, network formations, blockchain clones, and social experimentation with cryptographic tokens. Prior work has also been used in consultative products across international boundaries, within a large corporation, municipalities, community associations, the aerospace industry, the construction industry, and recently in university IP commercialization.

The work has been presented for peer review resulting in numerous publications, keynote presentations, innovation awards, and media exposure. Notable citations include NSPE, ASCE, NAIC, PLMx, NAFEMS, ARUP, IBM, SIBOS, Seattle Times, Engineering News Record, Digital Engineer Magazine, etc. From these experiences, successes and failures, a simple set of specifications has now been developed for advancement in this proposal.

The following team members may be counted as forward contributors:

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<https://Coengineers.com>

<https://Coengineers.io>

<https://IEBC.co>

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