

*Partnership 2020: U.S.-India Higher Education Cooperation*  
Synopsis of 15 subgrantees' projects to include in UNO website and partnership2020.org website

**Project Title:** San Antonio-Coimbatore Workforce Center of Excellence Program

**Project Partners:**

- U.S. University: Alamo University
- Indian Universities: Hindustan University (and SNR Sons Engineering College)

**Project Goals:** The project is focused on the areas of advanced engineering, renewable energy, and business and innovation. Evaluation of workforce skill needs and planning for the delivery of training either by direct instruction through the India College partners or through virtual and "Train the Trainer" approaches based on method collaboratively agreed upon by the partners, best practice, and of most benefit.

**American PI Contact Information**

**Name:** Dr. Renee Drabier

**Email:** rdrabier@alamo.edu

**Project Title:** Growth of Renewable Energy Industries in India and US with Water Conservation

**Project Partners:**

- U.S. University: Boston University
- Indian University: Indian Institute of Engineering Science and Technology

**Project Goals:** The goal of the collaborative project is the development of a low-cost water-free method for cleaning PV modules using transparent hydrophobic anti-soiling coating (H/ASC) on Electrodynamic Screen (EDS) films for maintaining high efficiency solar-to-electricity conversion of solar plants in India and the US. There is a considerable energy-yield loss caused by dust accumulation on solar collectors and shortage of water in semi-arid and desert lands where most of the solar plants are located.

**American PI Contact Information**

**Name:** Dr. Malay Mazumder

**Email:** mazumder@bu.edu

**Project Title:** Vitamins and Latency in Tuberculosis

**Project Partners:**

- U.S. University: Boston University Medical School
- Indian University: Jawaharlal Nehru Institute of Postgraduate Medical Education & Research

**Project Goals:** This project explores whether vitamin deficiencies are driving tuberculosis risk – and whether this risk can be reversed. Reducing TB risks could have profound public health and

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economic benefits. This project directly addresses a critical public health problem in India. India's government has the laudable goal of eliminating TB by 2025. Tuberculosis is an infectious disease that affects more than 2.7 million Indians each year and has a significant economic impact on millions of impoverished individuals.

### **American PI Contact Information**

**Name:** Dr. Natasha Hochberg

**Email:** [nhoch@bu.edu](mailto:nhoch@bu.edu)

**Project Title:** Promoting Women's Family-based Entrepreneurship in West Bengal

### **Project Partners:**

- U.S. University: Claflin University
- Indian University: Visva Bharati University

**Project Goals:** The proposed Claflin University-Visva Bharati University project will address the small business development needs of women and their family members who work with them. There are six proposed activities of this project to be conducted over twelve months. These project activities will benefit the state of West Bengal in India in increasing women's entrepreneurship. The training programs should have tangible impacts on job creation and entrepreneurship. Claflin University staff will explore the prospects of offering a similar training program in North Carolina for women's family-based small businesses.

### **American PI Contact Information**

**Name:** Dr. Harpal Grewal

**Email:** [hgrewal@claflin.edu](mailto:hgrewal@claflin.edu)

**Project Website:** <https://bengalwomenproject.com/>

**Project Title:** Protecting public health and novel microbial indicators to monitor the performance of water reuse systems in India

### **Project Partners:**

- U.S. University: Drexel University
- Indian University: IIT-Delhi

**Project Goals:** The goal of this project is to design and perform a pilot study to evaluate the degree to which the conventional (i.e. bacterial) versus true pathogens (i.e. viruses and parasites) exist at three full scale wastewater treatment in New Delhi and Jaipur, Rajasthan. The specific objectives of this project are: (1) Compare the concentrations of bacterial indicators, pathogenic viruses, viral indicators, protozoan parasites, and helminth ova at different levels of wastewater treatment; (2) Develop a quantitative microbial risk assessment (QMRA) framework and provide exposure assessment.

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### **American PI Contact Information**

**Name:** Dr. Rajveer Singh

**Email:** rs443@drexel.edu

**Project Title:** Extending the Christ-Miami Partnership: Training in Innovation to Address Global Health and Economic Disparities

### **Project Partners:**

- U.S. University: Miami University (Ohio)
- Indian University: Christ University

**Project Goals:** This partnership strengthens training in innovation and health by achieving the following three objectives:

- i. Review and adapt curricula for training in systems of innovation and health through exchange of theory and methods between faculty at both institutions to address the specific training needs of students and needs of local communities
- ii. Promote capacity building of faculty and students at Christ and Miami through project-based winter and summer institute in innovation and health held at Christ and Miami campuses, respectively
- iii. Promote capacity building of larger cohorts of students through development and offering of a certificate on innovation and health to be offered at Christ University

### **American PI Contact Information**

**Name:** Dr. Vaishali Raval

**Email:** ravalvv@miamioh.edu

**Project Website:** <https://www.miamioh.edu/news/top-stories/2019/08/partnership-2020-grant.html>

**Project Title:** Fire-Resistance Guidelines for Hybrid FRP Structural Components made of Cellulosic Fibers derived from Agricultural Waste

### **Project Partners:**

- U.S. University: Michigan State University
- Indian Universities: Birla Institute of Technology & Science (and IIT-Delhi)

**Project Goals:** This project deals with the application of advanced engineering processes, techniques and models for extraction of cellulosic fibers from the agricultural wastes/residue and/or general biomass stubble for the development of low-cost fire-resistant fiber reinforced polymers (FRP). Such FRP, in the form of rebars, strips, sandwich panels, and other decorative face-sheets strips, will be attractive for structural applications in buildings and built infrastructure. In addition, panels made of FRP could be used for thermal and sound insulation as well as for exterior applications in the form of retrofitting of deteriorated structural elements in buildings. Other important benefits of this project include: reduce air pollution caused due to

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burning of stubble (agricultural wastes), employment generation in the rural sector, sustainable development of materials for bio-based FRP, energy savings in housing sector.

### **American PI Contact Information**

**Name:** Dr. Venkatesh Kodur

**Email:** kodur@egr.msu.edu

**Project Title:** Flood Hazard Map to Water Management & Planning

### **Project Partners:**

- U.S. University: Michigan Technological University
- Indian University: University of Kerala

**Project Goals:** The project aims to develop a "Flood Atlas for Kerala" to support water management and sustainable agriculture by mapping the flood hazard zones of the state with each drainage basin as a cardinal area. Last two years, Kerala experienced heavy rains and flooding that led to more than 500 deaths. Performing flood hazard assessment is critical for saving lives and to carry-out water management and sustainable agriculture in Kerala. The project's output will be of great value for government agencies and policymakers to reduce flood hazards by improving drainage at flood-prone areas and developing water management strategies to help sustainable agriculture.

### **American PI Contact Information**

**Name:** Dr. Thomas Oommen

**Email:** toommen@mtu.edu

**Project Title:** Establishing a Blockchain-based Financial Information Sharing Ecosystem with Intelligent Automation

### **Project Partners:**

- U.S. University: Missouri University
- Indian University: Jawaharlal Nehru Technological University

**Project Goals:** The aim of this project is to bring new advances in blockchain, artificial intelligence and machine learning for information sharing use cases in financial technology sector. The new knowledge on intelligent automation from this project will positively impact economic development, job creation, and commercial links between the US and India. The framework developed will use blockchain technology with smart contracts/chain codes, AI-based methods involving natural language processing, and a cloud architecture (involving Python, Spark and Machine Learning tools).

### **American PI Contact Information**

**Name:** Dr. Prasad Calyam

**Email:** calyamp@missouri.edu

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**Project Title:** Ensuring optimal utilization of solar water pumps in rural Chhattisgarh

**Project Partners:**

- U.S. University: North Carolina State University
- Indian University: National Institute of Technology (Raipur)

**Project Goals:** To empower the vibrant farming community of rural Chhattisgarh, India, the state government has launched a wide-scale deployment of solar water irrigation pumps under a government program titled *Saur Sujala Yojna*. Thousands of pumps have already been distributed and, over the next two years, 51,000 farmers across the state are expected to benefit from the program. We plan to compile the results of this project into a report for key government organizations in Chhattisgarh, which will include technical and policy recommendations.

**American PI Contact Information**

**Name:** Dr. Jeremiah Johnson

**Email:** jjohns24@ncsu.edu

**Project Title:** Gravity and Remote Sensing Observational System for Water Resources Management in India: GO-Water India

**Project Partners:**

- U.S. University: The Ohio State University
- Indian University: Forest Research Institute of India

**Project Goals:** Water resources in India are adversely impacted by urban population growth and exacerbated by climate change. Along with our Indian partners – university, entrepreneurial and government agencies – we propose to aid water management in India by building a novel prototype satellite-based gravity and radar remote sensing observing system to efficiently and timely monitor ground and surface water resources in selected regions in India, and to train stakeholders and entrepreneurs for potential commercialization of the technology for effective water resources management.

**American PI Contact Information**

**Name:** Dr. C.K. Shum

**Email:** shum.3@osu.edu

**Project Title:** Chain of Change Program: Innovating through peer-to-peer networks for entrepreneurial advancement

**Project Partners:**

- U.S. University: Crummer University's Rollins College

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- Indian Universities: University of Calcutta, North Bengal University, Tezpur University, Gauhati University

**Project Goals:** The Chain of Change program empowers students and small business owners living in underserved communities to improve business success and economic livelihood. Throughout the program, Rollins College and Calcutta University students and faculty collaborate with universities in West Bengal and Assam Tier 2 cities, including North Bengal University (NBU), Tezpur University (TU), and Gauhati University (GU) to generate innovative solutions for small businesses.

1. Develop 21st century skills in a new generation of Indian entrepreneurs through applied learning and peer-to-peer leadership
2. Provide entrepreneurs in underserved communities with tools needed to establish a foundation for long-term business sustainability and profitability.
3. Energize students in rural/underserved areas of West Bengal and Assam
4. Reinforce the entrepreneurial ecosystem through cooperation of government, educational institutions, and citizens

### **American PI Contact Information**

**Name:** Dr. Mary Conway Dato-On

**Email:** [mconwaydato-on@rollins.edu](mailto:mconwaydato-on@rollins.edu)

**Project Website:** <https://crummer.rollins.edu/global-links/global-links-ripple-effect-transforming-lives-in-brazil-india/>

**Project Title:** Deep Learning Approaches for Cardiovascular Image Analysis for Improved Patient Care

### **Project Partners:**

- U.S. University: University of Illinois Urbana-Champaign
- Indian University: IIT-Delhi

**Project Goals:** Cardiovascular disease is one of the leading causes of death in India. The current clinical evaluations of Echocardiogram and MRI images is time consuming and suffers from inter-observer variability. This makes it imperative to develop digital approaches for patient assessment. In this proposal, a world class engineering school and the leading engineering based medical institution of the US (UIUC) will collaborate with a leading technology focused institution (IIT-Delhi) and local hospitals to acquire cardio images, build deep learning, and improve health of Indians. Models for digitally segmenting images and building regression models to predict patient outcomes will be outcomes.

### **American PI Contact Information**

**Name:** Dr. Rohit Bhargava

**Email:** [rxb@illinois.edu](mailto:rxb@illinois.edu)

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**Project Title:** Indo-US Consortium for Cybersecurity Research and Education

**Project Partners:**

- U.S. University: University of Nebraska at Omaha
- Indian Universities: Jaypee Institute of Information Technology (and IIT-Kharagpur)

**Project Goals:** The grant propose is to lay the foundation for a new public-private Indo-US Consortium for Cybersecurity Research and Education. While the existing MoUs, between University of Nebraska at Omaha, Jaypee Institute of Information Technology in Noida, and IIT-Kharagpur, lay down the framework for cooperation, the time is ripe to take this to the next level. The importance of cybersecurity has never been greater and shortage of cybersecurity professional in US and India never been more acute as in today's information age.

**American PI Contact Information**

**Name:** Dr. Abhishek Parakh / Dr. Deepak Khazanchi

**Email:** aparakh@unomaha.edu / khazanchi@unomaha.edu

**Project Title:** US-India Partnership for Manufacturing of Advanced Metallic Bio-implants and Local Economic Development

**Project Partners:**

- U.S. University: University of North Texas
- Indian University: Shiv Nadar University

**Project Goals:** The aim of current project is to develop high performance Bulk Metallic Glasses (BMGs) for superlative performance in bio-implant applications. Technical objectives of the project include: (1) Design and develop amorphous alloys with superior strength-to-weight ratio together with elastic modulus comparable to that of human bone; (2) Tailor the surface morphology by thermoplastic processing to improve cell adhesion; (3) Determine the effect of surface morphology on bio-corrosion behavior; (5) Cellular activity, cell-interface behavior and its influence on biophysical signals.

**American PI Contact Information**

**Name:** Dr. Sundeep Mukherjee

**Email:** Sundeep.Mukherjee@unt.edu