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	Contact	Organization	Area of Technical		
Organization	Name	Туре	Expertise	Description of Capabilities	Contact Information
Organization	Michael	Туре	Life cycle assessment, Industrial ecology,	The Energy-Environmental-Economic (E3) Systems Analysis Group, sits within the Department of Environmental Engineering & Earth Sciences (EEES) at Clemson. The group's research focuses on building tools to reduce the environmental impacts of energy systems. The current group focus is on understanding energy and material requirements for renewable energy systems. Our approach includes building engineering- based bottom-up life cycle assessment (LCA) models to generate rigorous estimates of environmental impacts from energy extraction and conversion technologies. Also, developing techno-economic modeling tools to improve the energetic, environmental and economic performance of energy systems. Our methods are applied primarily to energy systems, in an effort to understand and reduce the environmental impacts of conventional thermoelectric generation and substitutes for conventional technologies (e.g., wind, photovoltaics). We are also currently developing optimization capabilities for combinations of electricity generation and storage technologies. A third area of interest is in the	160 Rich Lab, Computer Court, Clemson University, SC 29625
University	Carbajales-	KI PUDIIC	1 ecnno-economic	at the economic sector level using input-output techniques	madale@clemson.edu
Compact	Stuart	Greeth	An advanced materials company with a suite of membrane separation technologies applied to dissolved gas sensing, dehydration, solvent recovery, and olefin/paraffin and aggressive	Compact Membrane Systems (CMS) has developed a family of custom amorphous fluoropolymer (CAF) membranes with superb separation capability, for example, olefins (O) from paraffins (P). These CAF membranes have high flux (150 GPU of olefin), high selectivity (40), stable performance and poison resistance. Pilot testing in a refinery is planned for 4Q, 2016. These membranes can enhance refinery performance, dramatically reduce purge stream size and can be used to separate high value olefins produced from low value feed stream (e.g., shale gas). For details see H. Murnen, S. Majumdar, et al, "Stable Membrane Processes for Enhanced Olefin- Dependence of the processes of the processe	335 Water Street, Wilmington, Delaware 19804
Systems, Inc.	Ph.D.	Business	separations	Spring Meeting, Houston, April 11, 2016	<u>302-999-7996</u>

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Organization	Contact Name	Type	Expertise	Description of Capabilities	Contact Information
School of Chemical Engineering, Purdue University	Professor Nien- Hwa Linda Wang	Public University	Advanced Separation Technologies, which include mixed solvent extraction, adsorption, ion exchange, multi- component chromatography, reaction in chromatography systems, simulated moving bed chromatography, applied to the purification or separation of complex mixtures.	We have developed advanced separation and purification technologies for separating complex mixtures, including advanced simulation tools for multi-component chromatography systems with or without reactions and design and optimization tools for simulated moving bed (SMB) chromatography for the separation of three or more components. We developed the first SMB for insulin purification from a ternary mixture, the first five-zone SMB to recover six sugars from biomass hydrolysates (a complex mixture of 10 components), and the first SMB to separate two flame retardants from a polymer. These SMB processes are an order of magnitude more efficient and more economical than corresponding batch chromatography processes for large scale separation. We also collaborated with the Argonne National Lab in developing a new affinity adsorption process to capture Mo99 from the fission products of low-enriched uranium. Mo99 is the parent of Tc 99m, which is the most widely used medical isotope for diagnosis. This separation process will be used in the first medical isotope plant in the US to produce this isotope by 2019. We have also collaborated with industry in developing new separation processes to recover high-purity polycarbonates, flame retardants, and other polymers from electronic wastes. The separation methods are applicable to the recovery of high purity polymers and chemicals from other polymer wastes. For each polymer recovered from the polymer waste, we save raw materials for synthesis, reduce the energy of producing the polymer by 84%, and reduce CO2 emission by 3 to 6 tons per ton of polymer. We also developed economical ligand-assisted chromatography methods to purify rare earth elements. This new method uses recyclable, safe ligands. This method potentially can reduce the footprint of the purification process by two orders of magnitude and eliminate the environmental risk of disposal of toxic solvents used in conventional purification of rare earth elements. We are developing economical SMB methods to recover high-	School of Chemical Engineering 480 Stadium Mall Drive West Lafayette, IN 47907-2100 (765) 494-4081, (765) 494-0550 Fax: (765) 494-0805 wangn@purdue.edu

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	Contact	Organization	Area of Technical		
Organization	Name	Туре	Expertise	Description of Capabilities	Contact Information
Organization	Contact Name	Organization Type	Area of Technical Expertise	Description of Capabilities The research facilities at SRI include more than 1 million ft2 of laboratory and office space and contain a wealth of advanced scientific equipment, including unique instrumentation developed by the staff. The technical library at SRI has about 60,000 technical books, 6400 pamphlets, 133,000 U.S., Canadian, and California State government publications, and 45,600 internally generated research reports. SRI has working arrangements for the use of Stanford University libraries and the United States Geological Survey library. As a member of the Research Libraries Information Network (RLIN), SRI's library staff can access on-line the holdings of over 200 major libraries. SRI has a hollow-fiber spinning line that has the capacity to spin over 1 km per day. We also have fully equipped laboratories with tools that allow for post-treatment of fibers using cross-linking, potting, and module fabrication techniques. SRI also has complete fiber characterization equipment including optical and electron microscopes, tension analyzers and porosity meters. SRI has a custom-built hollow fiber test stations to conduct fiber performance analysis for various applications (e.g., liquid and gas separation applications). SRI has a well-equipped machine shop staffed by expert machinists and welders experienced in prototype fabrication. The shop has automated lathes and milling machines for cost-effective fabrication and has working relationships with local companies that specialize in glass-blowing, ceramic machining, and plasma and thermal spraying techniques. Several CO2 capture test systems (solvent testing, membrane testing, and sorbent testing) are also testing and scale-up testing. Test equipment for high-pressure/high- temperature processing (e.g., hydrothermal test loops for organic conversion and corrosion test systems) is also available. SRI has a state-of-the-art analytical laboratory facility that includes infrared CO2 analyzers, a chemiluminescent ammonia analyzer, ga	Contact Information
				Macroscope, Nikon metallograph); SRI's Fracture Surface Topography Analysis (FRASTA) instrument to visualize failure modes; a surface profilometer and research ellipsometer; TA Associates differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), differential thermal analysis (DTA) equipment; a Netsch high- temperature dilatometer; an Instron mechanical tester with a high- temperature of the hermore the field tester in the product of the sector	Jayaweera, Sr. Staff Scientist and Program Manager Company Name: SRI International
				temperature attachment; high- temperature creep testers; Rockwell and Vickers hardness testers, and a Vickers microhardness tester.	Address: 333 Ravenswood Avenue Menlo Park CA
				(computer interfaced PAR 280, 273); a full range of instrumentation for in-situ measurements of corrosion rates using small amplitude cyclic polarization potential	94025
	Indira			step polarization, and rotating ring disc techniques; and Solartron 1250, 1255, and 1260 impedance analyzers for ΔC impedance characterization of solid and	Phone: 1-650-859-4042 E-mail:
SRI International	Jayaweera	nonprofit		interfaces.	Indira.jayaweera@sri.com

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	Contact	Organization	Area of Technical		
Organization	Name	Туре	Expertise	Description of Capabilities	Contact Information
				UTRS has been actively engaged in titanium extraction research since 2003	Universal Technical Resource
				in Butte, Montana. We have developed a patent-pending system and	Services, Inc.
				method for extracting and refining titanium that makes use of domestic,	Name: Lowell Seward
				non-traditional ore sources to lower costs and reduce pollution. This	Address: 950 N. Kings Hwy.
Universal				process is accomplished in two major processing steps: the underlying	Suite 208 Cherry Hill, NJ 08034
Technical				technology integrates innovative extraction techniques as well as electro-	Email: lseward@utrs.com
Resource			Metals, Fibers and	refining and metal processing practices that have been adapted to produce	Contact Phone: 856-667-6770
Services, Inc.	Lowell Seward	Corporation	e-waste	titanium directly from titanium-bearing ores.	x116
	Lowen beward	corporation		ITN Energy Systems. Inc. is an innovative technology incubator. R&D accelerator.	
				and product development company. We identify and develop next generation clean	
				and emerging technologies. We use smart science and extensive manufacturing and	
				commercialization experience to bring next-generation products to the marketplace.	
				ITN's core technological competencies arise from our experience with thin-film	
				multilayer devices, nanotechnology, and high-volume roll-to-roll manufacturing	
				enhanced by intelligent process controls. From the beginning, ITN established a	
				culture and process to support efficient commercialization of emerging and clean	
				canabilities include:	
				Advanced Materials and Processes	
				Thin film processing of solid-state multilayer device structures	
				Nanoscale engineered materials and patterned devices	
				Flexible electronics	
				Engineered polymers and ceramics	
				Energy Devices and Clean Technology	
				Energy generation	
				Solar, fuel cells, and energy harvesting (plasmonics)	
				Energy storage (i.e., batteries)	
				Energy efficiency Window films (active and passive)	
				Integrated Systems for Clean Technology	
				Complete system design and implementation	
				Integrated sensor and controls for autonomous operation	
				Integration of multiple functions	
				Combination of energy generation, storage, and control electronics	
				Roll to Roll Processing with Intelligent Process Controls	
				Unique high-volume, low-cost manufacturing platform	
			ITN Engrav	Custom vacuum tool design and fabrication	Organization Names ITN
				Process optimization and scale up	
			Systems, Inc. 1s an	Monolithic integration into devices	Energy Systems, Inc
			innovative	Technology Commercialization	Contact Name: Neelesh Ullal
			technology	From laboratory to fabrication	Contact Address: 8130
			incubator, R&D	Manufacturability a primary concern from day 1	Shaffer Parkway, Littleton,
			accelerator, and	Extensive infrastructure and strong technology team to rapidly develop and	CO, 80127
			product	commercialize technology	Contact Email:
ITN Energy			development	From technology to marketplace	nullal@itnes.com
Systems Inc	Neelesh IIIlal	Small Rusiness	company	Enabling technology solutions to create market pull, cost modeling, and strategic	Contact Phone: 303 420 1141
Systems, me	incelesii Ullal	Siliali Dusilless	company.	parmersmps	Contact F none. 303.420.1141

	Contact	Organization	Area of Technical		
Organization	Name	Туре	Expertise	Description of Capabilities	Contact Information
					NU-ROCK TECHNOLOGY
					USA LLC
					Name: MRS MARTINA
					RAHME
					Address: UNIT 90/5
					WOODLANDS AVENUE,
					BREAKFAST
					POINT NSW 2137
					SYDNEY AUSTRALIA
					(WE ARE IN THE
					PROCESS OF SETTING
				ABILITY TO COMPLETELY UTILISE ALL MAJOR WASTE	UP AN ADDRESS IN THE
				STREAMS GENERATED BY COAL FIRED POWER	UNITED STATES,
		TOTAL		STATIONS, STEEL MILLS, NON FERRIS METAL	THROUGH THE
		WASTE		SMELTERS, ALUMINA PLANTS AND MINE TAILINGS	COMPANY THAT IS
		UTILISATION		DAMS AND WE CONVERT THIS WASTE INTO BUILDING	SETTING UP ALL OUR
		TECHNOLOGY		MATERIALS AND OR CONCRETE REPLACMENT USING	COMPANY IN THE USA)
		AND		THE NU-ROCK TECHNOLOGY. THE PRODUCTS WE USE	Email: martina.rahme@nu-
NU-ROCK		COMPLETE	MAJOR WASTE	ARE 100% SUSTAINABLE AND USE LESS THEN 2% OF	rock.com
TECHNOLOGY	MARTINA	SITE	STREAM	THE EMBODIED ENERGY TO MAKE ANY PRODUCT	Contact Phone: +612 409
USA LLC	RAHME	REMEDIATION	UTILISATION	EQUIVALENT TO A CONCRETE PRODUCT	883 336

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