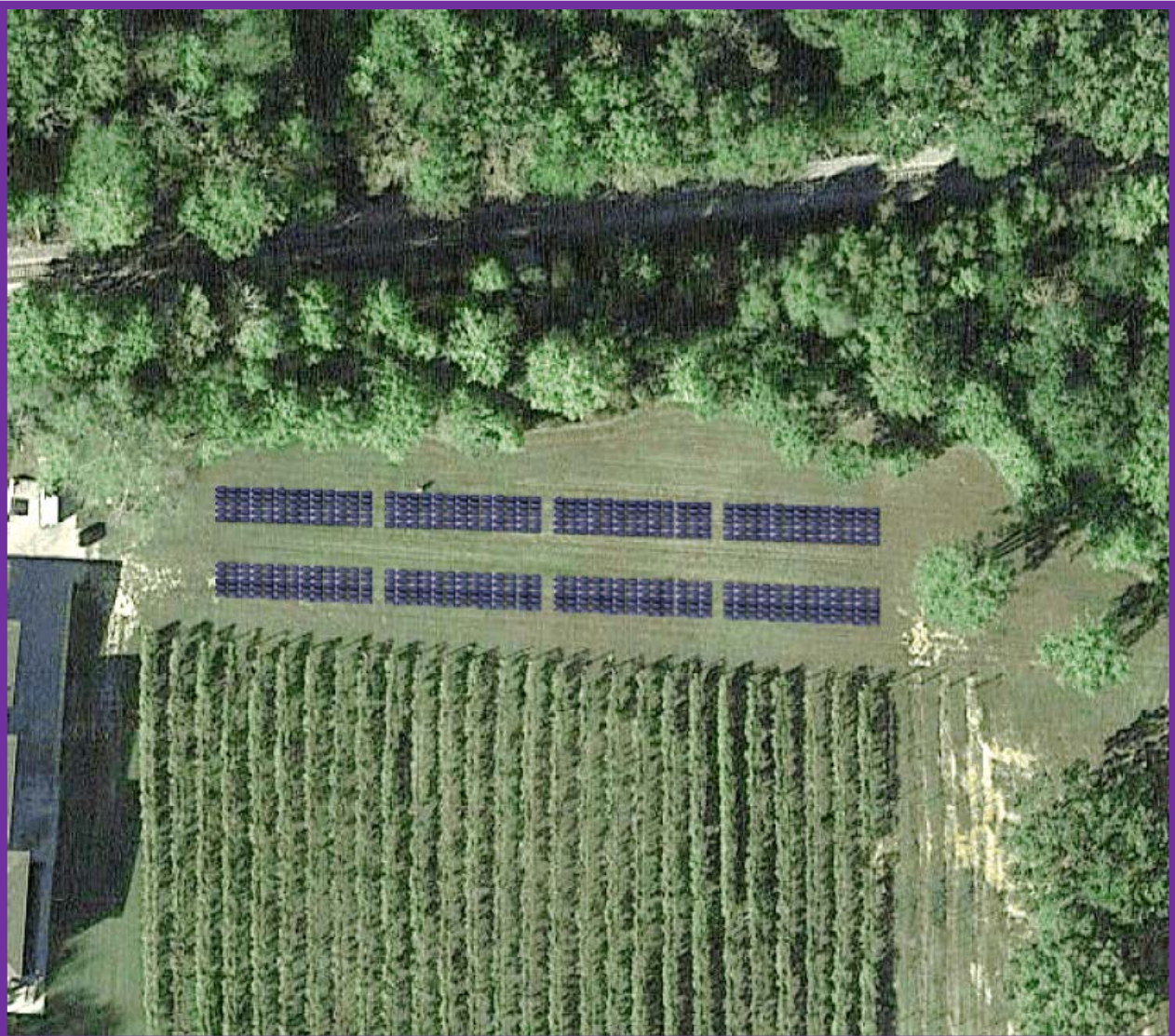
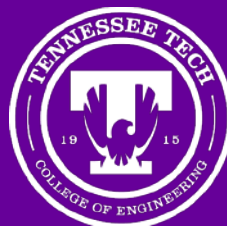


Center For Energy Systems Research Tennessee Tech University Annual Report for Fiscal Year 2017-2018



Assessment of Solar Potential on Farms

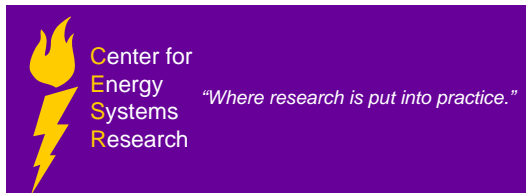


Annual Report for Fiscal Year

July 1, 2017 – June 30, 2018

Satish M. Mahajan, Director

www.tntech.edu/cesr



Tennessee
TECH

Center for Energy Systems Research

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Assessment of Solar Potential on Farms



The Center for Energy Systems Research project entitled “Solar Power Conversion on the Upper Cumberland” funded by the USDA REDA Program provided solar assistance surveys to 19 clients in the Upper Cumberland. Often multiple surveys were reported on for each client so that they would have choices moving forward with solar array installations.

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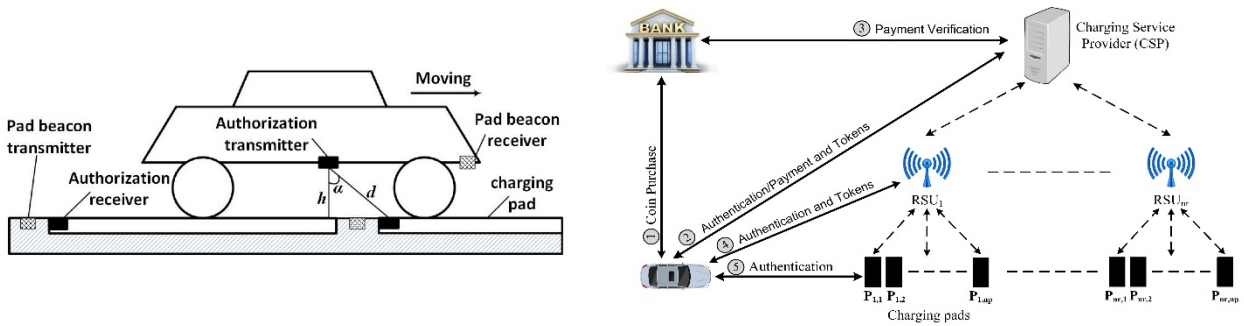
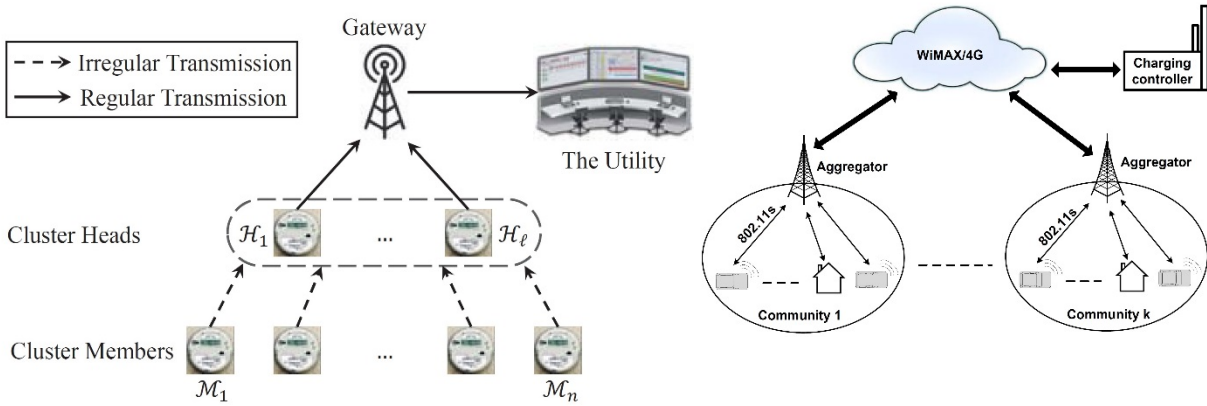
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Associate Professor Mohamed Mahmoud and graduate student working on the secure and privacy preserving schemes for dynamic charging of electric vehicles and smart grid automatic metering infrastructure'.

PROGRAMMATIC REPORT

MISSION

The Center for Energy Systems Research (CESR) was established to advance and apply scientific and engineering knowledge associated with energy systems and in particular with electric power while supporting the instructional program of Tennessee Technological University (TTU) in academic areas associated with energy systems. During the College of Engineering Strategic Planning of 2012-13, two strategic research areas, Smart Grid and Resilient Infrastructure, were assigned to the Center for Energy Systems Research as focus areas of research. Present research efforts, both theoretical and experimental, are focused on solving current and anticipated problems associated with energy and infrastructure systems. Special emphasis is given to the needs of the electric power industry by way of conducting research on Smart Grid.

VISION

The Center will be known and be recognized nationally for its research contributions in Energy Systems and Infrastructure areas.

The Center's vision is to enhance research and education in support of its mission. The Center will conduct advanced and applied research to enhance knowledge in currently needed and emerging technical areas of Energy and Infrastructure Systems. The Center also has major interests in the dissemination of knowledge and enhancing education in energy systems.

The Center draws upon the expertise from the faculty in the College of Engineering as well as from other faculty on campus. Participating faculty and faculty associates represent Basic Engineering, Chemical Engineering, Civil and Environmental Engineering, Computer Science, Electrical and Computer Engineering, Mathematics, Mechanical Engineering, Manufacturing and Engineering Technology, and Physics.

HISTORY

The State of Tennessee established the Center for Electric Power in 1985 in the College of Engineering at Tennessee Technological University. Reflecting the broadening of the activities of the Center, its name was changed to Center for Energy Systems Research. Over the years, research projects have been sponsored by more than 20 major electric utilities, EPRI, federal agencies such as DOE, NASA, NSF, and ONR, State agencies such as TDOT and Tennessee Department of Education, and industries such as Buswell Energy.

In the 2012-2013 academic year, the College of Engineering identified six strategic research areas in which to focus the research efforts of its faculty and students. Of the six areas, CESR chose two areas, namely, 1) Smart Grid and 2) Resilient Infrastructure to focus its research. Development of large collaborative research proposals will be encouraged in these areas.

To promote the research and innovation, CESR provides services of an R&D Engineer, Financial Analyst, Financial Associate, and Administrative Associate in support of the various research activities performed by faculty and students. The Center has set up laboratories and computational resources for the benefit of researchers.

The Center promotes international collaboration by hosting visiting scholars, scientists and engineers and establishing Memoranda of Understanding with international academic institutions and research organizations.

YEAR IN REVIEW



Satish M. Mahajan,
Director, CESR

Dr. Satish M. Mahajan continued as the Director of the Center for Energy Systems Research (CESR) for the fiscal year 2017-2018. The CESR continues to focus on two strategic research areas of the College of Engineering: Smart Grid and Resilient Infrastructure.

2017-2018 was a good year for the Center for Energy System's Research. Activations totaling \$1,414,229.80 reflect the extra energy put into invigorating faculty to produce proposals in the preceding years. In addition, the CESR associates submitted proposals over 12 million dollars. It is important to keep up these efforts even with the additional burden of performing the research funded by these projects. The meaningful improvements to the student's education by working on real-world problems is to be applauded and the benefit to the state and other eventual employers of these students directly reflect back on the investment in CESR by the State of Tennessee. As can be seen in the upcoming sections of this report, increased research activity put an extra burden on the CESR staff. Special thanks to each one of them for their efforts!

I am very proud of the CESR faculty associates whose diligent efforts on new proposals worth over \$12M led to an increase of ~ 12 % in the activations over this time last year. The increased proposal activity makes me very optimistic about sustaining a moderate growth in external funding of the CESR.

The center funded 14 M.S. Assistantships (6 on grants) and 18 Ph.D. Assistantships (9 on grants) in the 2017-2018 fiscal year reflecting an ongoing commitment to improved research at TTU. During the past year, CESR associated faculty and students published 50 journal papers 79 proceedings/ conference presentations, contributed to 4 book chapters, applied for 1 patent and contributed to 2 Standards.

Dr. Charles Van Neste, joined CESR as a Research Assistant Professor. He has already set-up the wireless power transmission laboratory that will have applications to the electric vehicle charging, agriculture, etc.

The Center also involved 48 undergraduate students in the research, a majority of them on the grants.



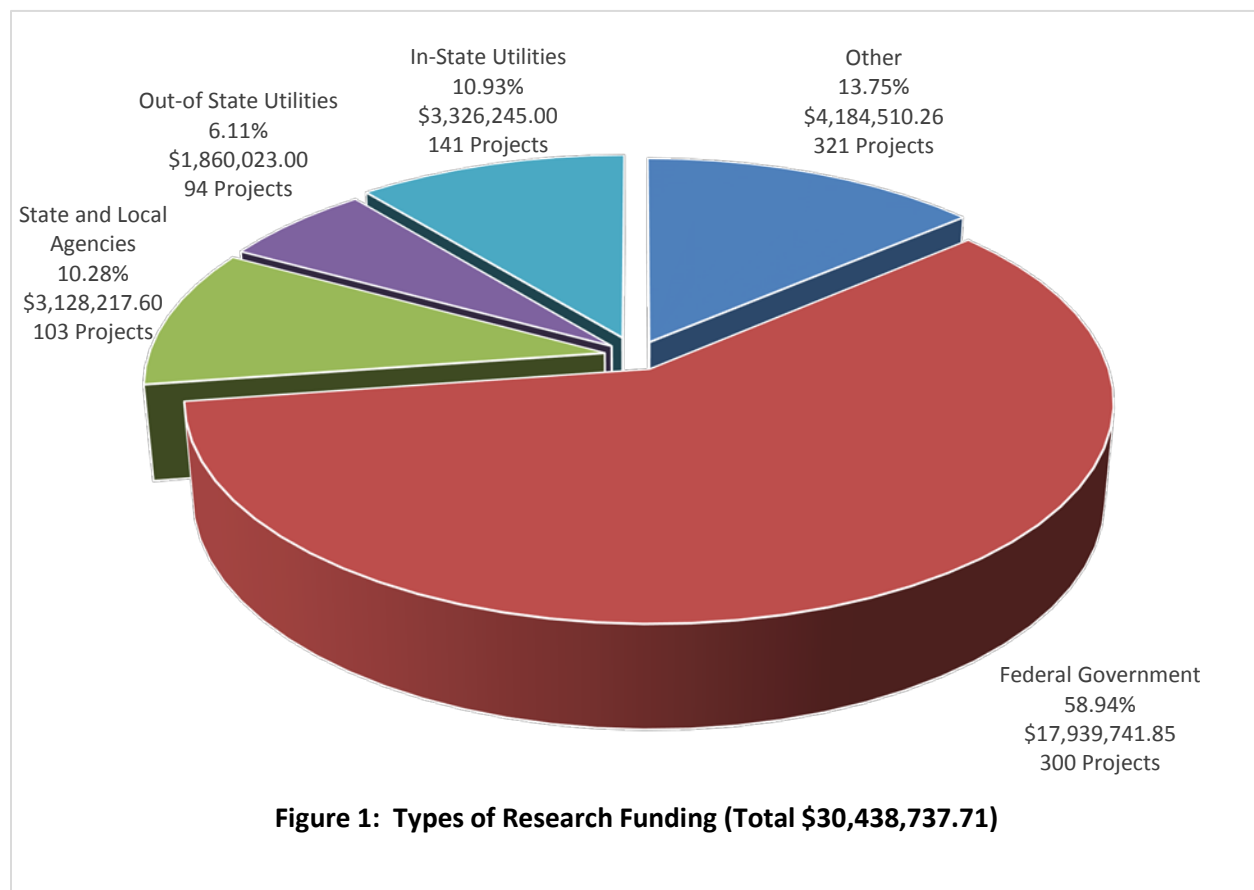
Maci Arms, Engineering a Future counselor, driving a personal mobility scooter that is wirelessly charged using the QWiC Power Transfer Technique.

PROGRAMMATIC REPORT

Research contract and grant awards included in Matching from July 1, 2017 thru June 30, 2018 total \$1,139,618. Gifts and Other Awards included in Matching total \$6,070. Therefore, the 2017-2018 Match is \$1,145,688. Indirect costs of approximately \$268,541.80 were also received during the 2017-2018 Fiscal Year. The result is that the 2017-2018 Matching and Indirect Costs total \$1,414,229.80. The State Appropriation was \$916,600 for 2017-2018.

CESR continues to enjoy a broad base of support. The funding categories for 1985 thru 2018 as illustrated in Figure 1 are: in-state utilities, 10.93 percent; out-of-state utilities, 6.11 percent; state and local agencies, 10.27 percent; federal government, 58.94 percent; other, 13.75 percent. The “other” category includes a variety of national and international industries, universities and professional societies. Through June 2018, the cumulative research funding of the Center is \$30,438,737.71. State appropriations are compared to matching, on an annual basis, in Figure 2. Matching is divided into contracts and grants (without indirect costs); equipment; and all other items such as software, books and reports, and funding for faculty and student exchange programs. The 33-year match of about \$29.6 million represents 100.8% percent of the state appropriations of \$29.4 million. Indirect costs of approximately \$5.4 million were also received. A list of the projects conducted under the major research areas is given in SM-3 in this report.

CESR RESEARCH FUNDING 1985 THRU 2018



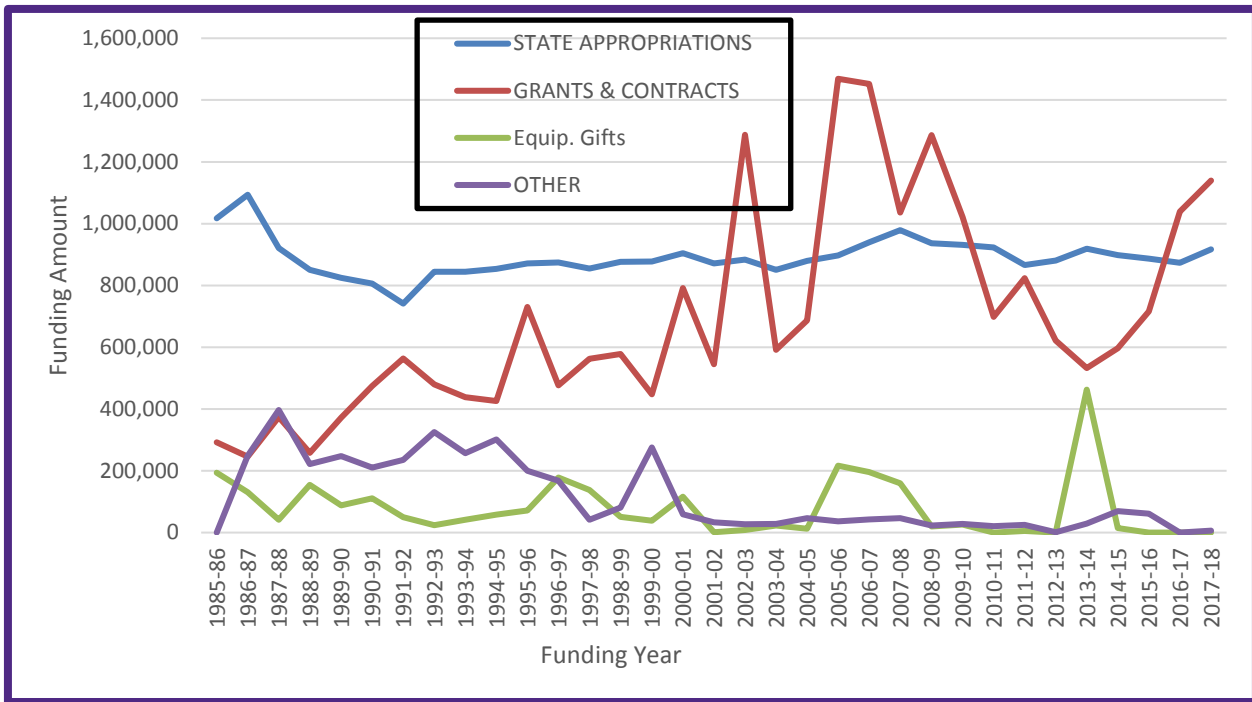


Figure 2: Historical State Appropriations and Matching 1985–2018 (Spring)

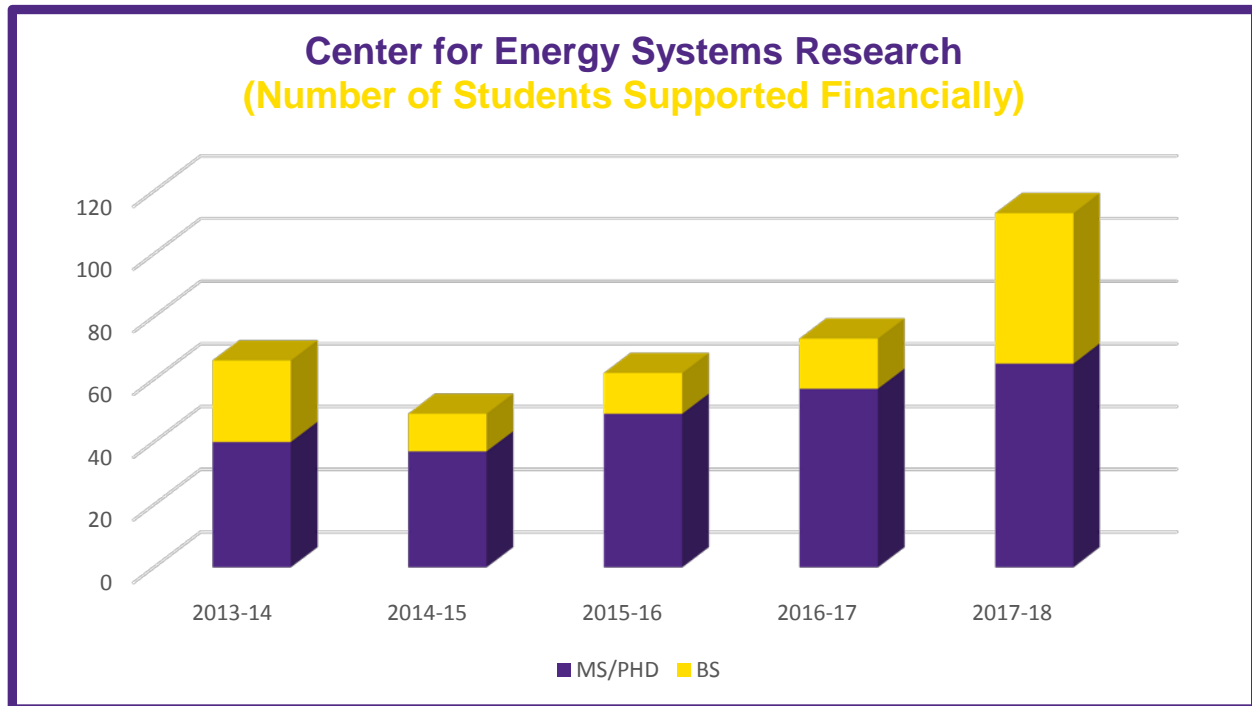


Fig. 3. Number of Students Supported

FACULTY AWARDS AND ACCOMPLISHMENTS 2017–2018

MAHMOUD RECEIVES THREE AWARDS FROM TENNESSEE TECH

Scholastic Research Award, TTU, 2017-2018. The award recognizes a tenure-track faculty member at TTU with outstanding accomplishments in sponsored research and scholarly activities.

Brown-Henderson Outstanding Engineering Faculty Award, TTU, 2018. The award recognizes an outstanding faculty member in the College of Engineering. This award will focus primarily on accomplishments, which most closely reflect the mission of the College of Engineering, to prepare our graduates through a blend of education, research and service. For more information, see <https://www.tntech.edu/engineering/welcome/awards/>

Kinslow Engineering Research Award, TTU, 2018. The Kinslow Engineering Research Award is given annually for the best paper written by a TTU engineering faculty member and published in a referred professional journal. The selection criteria include both research innovation and research applicability. For more information, please see <https://www.tntech.edu/engineering/welcome/awards/>



STUDENT ACCOMPLISHMENTS AND AWARDS 2017–2018



Parker Lusk, Ph.D. student, and advisor Dr. Holly Stretz, won the CISE (Creative Inquiry Summer

Experience) Excellence Award and CISE Undergraduate Research Mentor Award respectively. Parker was also the recipient of the AIChE national award. They are pictured here with Dr. Ed Lisic, Director of the CISE program.

THE 13TH ANNUAL RESEARCH AND CREATIVE INQUIRY DAY

Research and Creative Inquiry Day is an annual event designed to promote student research and creative inquiry and provide a venue for presenting that work. This event is open to undergraduate and graduate students from all departments who want to display their research and creative projects. Research projects and literature-based reviews will follow the standard poster format while the English Department has elected to use a paper presentation format.

AWARDS CEREMONY, APRIL 10, 2018

Winner—Civil and Environmental Engineering—Emily Reed

“Comparison of FEA and Analytical Methods for Determining Global Stability of a RAP Supported MSE Wall”, primary author: Emily Reed; Research Advisor: Daniel VandenBerge.

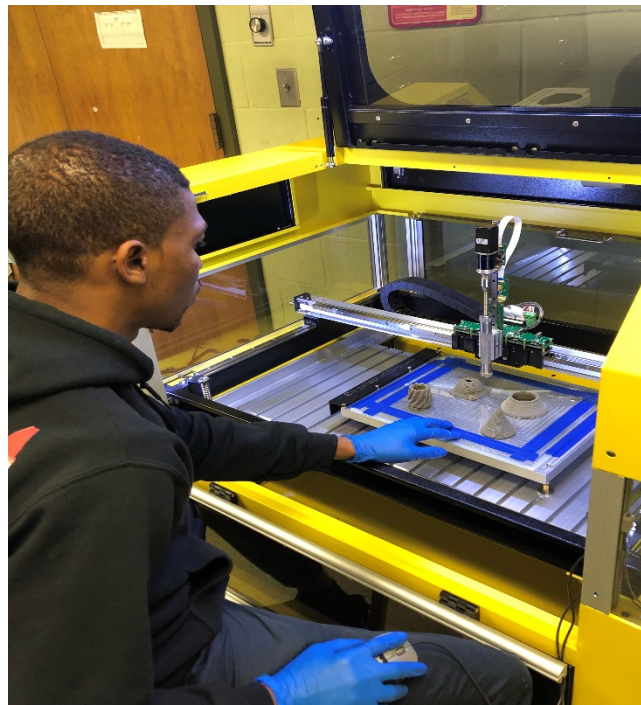
Winner—Computer Science—AHM Jakaria

“Safety Analysis for UAV Networks”, primary author: AHM Jakaria; Research Advisor: Mohammad Rahman.



REU IREST students, graduate mentors and participating faculty enjoying the trip to Oak Ridge National Laboratory.

FUTURE PLANS



Dr. Biernacki's student, Babajide Onanuga, using 3D printer to print concrete



Engineering a Future: Wireless Capacitive Power Transfer Workshop: Young middle school students hard at work building wireless systems based on electric field coupling during this year's Engineering a Future workshop hosted

PLANS FOR 2018-2019

1. Increase research activity in the areas of the center

This goal intersects the University Flight Plan's Multidisciplinary Research Innovation sub goal. The creation of the Smart Grid and Resilient Infrastructure focus areas is to foster multidisciplinary research efforts. Even if considered to be primarily one department; getting power engineers, communication engineers, cyber security researchers, etc. to focus on a common laboratory for collaborative efforts has resulted in several collaborative proposals being prepared.

The Center Focus Areas also intersect the University Flight Plan focus areas to Create Distinctive Programs and Invigorate Faculty. In addition to hosting meetings for each research area to promote collaboration and proposal writing, the Center has initiated several seminars to kick start collaborative research efforts and energize faculty efforts, these efforts will be continued in the next year.

2. Increase Student Research activity

Continue pursuing support to the MS and Ph.D. graduate students in the strategic research areas of the Center consistent with the level of external funding

Support at least two undergraduate research projects per year in the areas related to the energy systems.

This goal intersects the University Flight Plan's New Graduate Programs sub goal.

3. Increase Collaborative research

Continue pursuing the development and submission of two collaborative proposals with interdisciplinary focus. The number of collaborative proposals submitted should be at least two per year.

This goal intersects the University Flight Plan's Multidisciplinary Research Innovation sub goal. Efforts towards a food, energy, and water (FEW) nexus have already yielded positive results.

4. Add Laboratory Facilities

Dr. Charles Van Neste joined the CESR as a Research Assistant Professor. His research laboratory will be expanded to include earth transmission. The Geotechnical engineering laboratory will also be expanded with new equipment. This activity specifically supports the resilient infrastructure strategic area. Additional funding will be sought through proposals.

This goal intersects the University Flight Plan's Physical Infrastructure Priorities sub goal and the Technology Service to Students sub goal, and the Technology in Teaching sub goal. Better facilities in areas of national importance like the Smart Grid benefit research, education, and hire-ability of our graduates.

5. Increase outreach activities

Organize a minimum of two seminars by external speakers per year.

This goal intersects the University Flight Plan's Co-Curricular Undergraduate Program sub goal and the Multidisciplinary Research Innovation sub goal. By having research area experts from outside the university come teach seminars, workshops or short courses, the students will be exposed to a broader base of information and hopefully promote collaborative efforts from TTU researchers with those at other institutions.

SUPPORTING MATERIALS



Undergraduate Aaron Bain, Graduate student Vinit Prabhu, Geothermal contractor Jason Gentry, and Ch.E. Technician Perry Milton working on various stages of a project to heat the roots of tomato plants using solar thermal energy.

CESR FACULTY AND STAFF**2017-2018**

Center Director:	Satish M. Mahajan, Professor	Director, CESR
Center Faculty:	Charles Van Neste	Assistant Professor
Center Staff:	Robert Craven Linda Lee Tammy Martin (Part Time) Etter Staggs Anysa Milum	R&D Engineer Administrative Associate 3 Administrative Associate 3 Financial Analyst Financial Associate 6
Visitors:	Hossein Dehnavifard Jiazhi Liang	Visiting Scholar Visiting Scholar

Faculty participating in the Strategic Research of the Center are:

Smart Grid

Ali Alouani – ECE
Steven Anton – ME
Rabie Belkacemi – ECE
Indranil Bhattacharya – ECE
Robert Craven – CESR
Jie Cui – ME
Omar Elkeelany – ECE
Sheikh Ghafoor – CSC
Syed Rafay Hasan – ECE
Satish Mahajan – ECE
Mohamed Mahmoud – ECE
Joseph Ojo – ECE
Robert Qiu – CMR
Ghadir Radman – ECE
Mohammad Rahman – CSC
Ambareen Siraj – CSC
Charles Van Neste – CESR

Resilient Infrastructure

Daniel Badoe – CEE
Joseph Biernacki – CHE
Laura Arias Chavez – CHE
Stephen Canfield – ME
Steven Click – CEE
L. K. Crouch – CEE
Ahmed Elsayy – MET
Jerry Gannod – CSC
Craig Henderson – CEE
Timothy Huff – CEE
Sharon Huo – CEE
Stephen Idem – ME
Ethan Languri – ME
Jane Liu – CEE
Benjamin Mohr – CEE
Venkat Padmanabhan – CHE
Mustafa Rajabali - PHY
Holly Stretz – CHE
Daniel VandenBerge – CEE
Ahmad Vasselbehagh – ME
Liqun Zhang – CHE

**CONTRACT AND GRANT AWARDS
Activated Between July 1, 2017 and June 30, 2018**

Contract Number	Title	Source	Project Dates	Total Amount	Estimated Expendit.
531293	EAGER: Investigating Optical Characteristics, Doping Levels, and Current Matching in Perovskite/Si, Perovskite/GaAs/Si and Perovskite/III-V Ternary Semiconductors (Principal Investigator: Assistant Professor Indranil Bhattacharya)	National Science Foundation	7/1/17-6/30/18	30,047.00	30,043.95
539357	New High Resolution Neutron Detector for the Studies of Exotic Nuclei (NEXT) (Principal Investigator: Assistant Professor Mustafa Rajabali)	Subcontract through the University of Tennessee at Knoxville (Funding from the DOE National Nuclear Security Administration (NNSA))	6/4/17-6/3/18	53,367.00	52,976.49
533155	Expanding Diversity: Offering Mentoring and Resources for First-Generation Students (Principal Investigator: Assistant Vice President Robert Owens)	Tennessee Board of Regents	7/1/17-6/30/18	34,263.00	22,842.00
531291	TWC: Small: Collaborative: Multi-Layer Approaches for Securing Enhanced AMI Networks against Traffic Analysis Attacks (Principal Investigator: Assistant Professor Mohamed Mahmoud) (Co-Principal Investigator Professor Robert Qiu)	National Science Foundation (Collaboration with the University of Tennessee-Knoxville, Dr. Husheng Li)	9/1/17-8/31/18	130,176.00	108,294.82
SUB - TOTAL, GRANTS AND CONTRACTS				247,853.00	214,157.26

CONTRACT AND GRANT AWARDS

SM-3

CONTRACT AND GRANT AWARDS Activated Between July 1, 2017 and June 30, 2018

Contract Number	Title	Source	Project Dates	Total Amount	Estimated Expendit.
532060	Solar Power Conversion on the Upper Cumberland (Principal Investigator: Professor and Director Satish M. Mahajan) (Co-Principal Investigator Assistant Professor Ehsan Languri)	United States Department of Agriculture, Rural Energy for America Program, REDA	8/1/17-7/31/18	68,764.00	63,465.57
536317	Determine the Absolute Roughness of Phenolic Duct (Principal Investigator: Professor Stephen Idem)	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)	9/1/17-2/28/18	49,704.00	49,663.92
531294	CyberTraining: CDL: iPDC - Summer Institute for Integrating Parallel and Distributed Computing in Introductory Programming Classes (Principal Investigator: Associate Professor Sheikh Ghafoor) (Co-Principal Investigators Associate Professor Michael Rogers and Lecturer David Brown)	National Science Foundation	9/1/17-8/31/18	143,215.00	70,405.78
531288	Supplement to NSF CMMI-1563173: Collaborative Research: 3D Printing of Civil Infrastructure Materials with Controlled Microstructural Architectures (Principal Investigator: Professor Joseph Biernacki)	National Science Foundation	7/1/17-5/31/19	24,992.00	4,543.43

SUB - TOTAL, GRANTS AND CONTRACTS

286,675.00 188,078.70

CONTRACT AND GRANT AWARDS
Activated Between July 1, 2017 and June 30, 2018

Contract Number	Title	Source	Project Dates	Total Amount	Estimated Expendit.
532295	Rapid Distributed Sensing of Subsurface In-situ Stress (Principal Investigator: Assistant Professor Daniel VandenBerge)	Luna Innovations	9/1/17-8/1/18	49,988.00	41,942.17
534302	Incorporating the Preferences for Everyday Living Inventory into Ohio's Nursing Homes to Improve Resident Care (Principal Investigator: Chairperson and Professor Gerald Gannod)	Miami University (Funding from the Ohio Department of Medicaid)	7/1/17-6/30/18	60,205.00	55,006.21
531205	Tennessee Louis Stokes Alliance for Minority Participation (TLSAMP) Year 5 of 5 (Principal Investigator: Professor and Dean Darrell Hoy) (Co-Principal Investigators: Elizabeth Powell, Harry Ingle, and Tony Marable)	Tennessee State University (TSU) from the National Science Foundation	9/15/17-8/31/18	29,000.00	31,449.64
535260	Hybrid AC/DC Islanded Micro-Grids in Qatar: Planning, Operation, and Cyber Security (Year 2 of 3) (Principal Investigator: Assistant Professor Mohamed Mahmoud)	Texas A&M Engineering Experiment Station (TEES); Qatar National Research Fund	8/1/17-7/31/18	28,660.80	25,663.77
SUB - TOTAL, GRANTS AND CONTRACTS				167,853.80	154,061.79

**CONTRACT AND GRANT AWARDS
Activated Between July 1, 2017 and June 30, 2018**

Contract Number	Title	Source	Project Dates	Total Amount	Estimated Expendit.
532392	Southeastern Transportation, Research, Innovation, Development, and Education Center (STRIDE) (Principal Investigator: Associate Professor Steven Click)	Subcontract from the University of Florida; Funding from the U.S. Department of Transportation	1/19/17-11/30/18	63,245.00	14,486.91
535238	Comparing Strength and MOE for Prisms Constructed with Lightweight and Normal Weight Grout (Principal Investigator: Professor Craig Henderson) (Co-Principal Investigator: Chairperson and Associate Professor Benjamin Mohr)	The NCMA Education and Research Foundation	1/1/18-6/30/19	54,280.00	17,987.51
539369	Nuclear Hybrid Energy Systems: Desalination Case Study (Principal Investigator: Assistant Professor Laura Arias Chavez)	Oak Ridge National Laboratory	1/1/18-8/31/18	23,676.00	60,422.24
531295	I-CORPS: Passive Wastewater Processing System (PawPros) (Principal Investigator: Assistant Professor Ehsan Languri)	National Science Foundation	4/1/18-9/30/18	50,000.00	36,200.27
532392	Southeastern Transportation, Research, Innovation, Development, and Education Center (STRIDE), Amendment 3 (Principal Investigator: Associate Professor Steven Click)	Subcontract from the University of Florida; Funding from the U.S. Department of Transportation	1/19/17-11/30/18	30,212.00	-
SUBTOTAL, GRANTS AND CONTRACTS				221,413.00	129,096.93

CONTRACT AND GRANT AWARDS

SM-3

CONTRACT AND GRANT AWARDS Activated Between July 1, 2017 and June 30, 2018

Contract Number	Title	Source	Project Dates	Total Amount	Estimated Expendit.
531200	REU Site: Immersive Research in Energy Generation, Storage/ Conversion, and Power Transmission (Principal Investigator: Assistant Professor Indranil Bhattacharya) (Co-Principal Investigator Professor Joseph Biernacki)	National Science Foundation	3/1/18-2/28/19	107,080.00	51,655.17
531288	Collaborative Research: 3D Printing of Civil Infrastructure Materials with Controlled Microstructural Architectures (Year 3) (Principal Investigator: Professor Joseph Biernacki)	National Science Foundation (Collaboration with Vanderbilt University Dr. Florence Sanchez and with Purdue University, Dr. Pablo D. Zavattieri)	6/1/18-5/31/19	39,297.00	44,962.86
531272	CRII: CPS: Noninvasive Security Analysis for Smart Grid Energy Management System (Principal Investigator: Assistant Professor Mohammad A. Rahman)	National Science Foundation	5/15/18-4/30/19	88,479.00	18,360.23
532279	The Structure of Neutron-rich Deformed Nuclei Studied via Beta Decay (Year 2 of 3) (Principal Investigator: Assistant Professor Mustafa Rajabali)	The Department of Energy	2/1/18-1/31/19	46,000.00	31,831.74
SUB - TOTAL, GRANTS AND CONTRACTS				280,856.00	146,810.00

**CONTRACT AND GRANT AWARDS
Activated Between July 1, 2017 and June 30, 2018**

Contract Number	Title	Source	Project Dates	Total Amount	Estimated Expendit.
532318	Update of UFC 3-220-10N Soil Mechanics (DM7.1) (Principal Investigator: Assistant Professor Daniel VandenBerge)	Virginia Tech Subaward from the National Institute of Building Sciences	9/28/17-9/27/18	40,432.00	9,400.05
531205	Tennessee Louis Stokes Alliance for Minority Participation (TLSAMP) Year 5 of 5 (Principal Investigator: Professor and Dean Darrell Hoy) (Co-Principal Investigators: Elizabeth Powell, Harry Ingle, and Tony Marable)	Tennessee State University	2/1/18-3/31/18	20,000.00	20,000.00
539283	Development of Tennessee Travel Demand Model Users' Group (Principal Investigator: Professor Daniel Badoe)	University of Tennessee- Knoxville (Funding from the Tennessee Department of Transportation)	1/1/18-12/31/18	7,000.00	-
531304	Welding Application Development for High Mobility Manufacturing Robot (Phases I and II) (Principal Investigator: Professor and Chairperson Ahmed Elsayy)	Robotic Technologies of Tennessee, LLC (RTT)	4/10/17-3/31/19	24,503.00	-
SUBTOTAL, GRANTS AND CONTRACTS				91,935.00	29,400.05

**CONTRACT AND GRANT AWARDS
Activated Between July 1, 2017 and June 30, 2018**

Contract Number	Title	Source	Project Dates	Total Amount	Estimated Expendit.
535259	Energy Efficient Management System with Integrated Cybersecurity Measures in Qatar's Smart Grid (Principal Investigator: Assistant Professor Mohamed Mahmoud) (Co-Principal Investigator Associate Professor and Interim Chairperson Omar Elkeelany)	Texas A&M (Funding from the Qatar National Research Fund)	4/1/18-3/31/19	29,988.00	-
531279	Supplement to Tennessee Cybercorps: A Hybrid Program in Cybersecurity - Community College Inclusion 2017-2018 (Year 1) (Principal Investigator: Professor and Director Ambareen Siraj)	National Science Foundation	8/1/17-7/31/18	42,438.00	21,219.00
531279	Supplement to Tennessee Cybercorps: A Hybrid Program in Cybersecurity for TTU Cyber Bootcamp (Principal Investigator: Professor and Director Ambareen Siraj)	National Science Foundation	7/1/17-6/30/18	17,841.00	17,841.00
531279	Supplement to Tennessee Cybercorps: A Hybrid Program in Cybersecurity - Community College Inclusion (Principal Investigator: Professor and Director Ambareen Siraj) (Co-Principal Investigators Assistant Professor Mohammad A. Rahman and Associate Professor Doug Talbert)	National Science Foundation	8/18/17-8/19/18	19,217.00	19,217.00

SUBTOTAL, GRANTS AND CONTRACTS **109,484.00** **58,277.00**

CONTRACT AND GRANT AWARDS

SM-3

CONTRACT AND GRANT AWARDS
Activated Between July 1, 2017 and June 30, 2018

POWER-TEST-SERVICE ACCOUNT

Contract Number	Title	Source	Project Dates	Total Amount	Estimated Expendit.
538597	Power-Test-Service Account (Principal Investigators: Professor and Director Satish M. Mahajan and Professor L. K. Crouch)	Various	7/1/17-6/30/18	2,090.00	14,133.84
SUB-TOTAL				2,090.00	14,133.84
POWER-TEST-SERVICE ACCOUNT					
TOTAL CONTRACTS AND GRANTS DURING 2017-2018				1,408,159.80	934,015.57

CENTER FOR ENERGY SYSTEMS RESEARCH

STATUS OF PROPOSALS

Submitted Between July 1, 2017 through June 30, 2018

	TITLE	INVESTIGATORS	SOURCE	AMOUNT	STATUS
1.	CAREER: Study of Interfacial Evaporation under Heat Localization in Porous Media	Assistant Professor Ehsan Languri	National Science Foundation	503,713	Unfunded
2.	CAREER: Towards Secure and Privacy-Preserving Data-Driven Intelligent Transportation Systems	Assistant Professor Mohamed Mahmoud, Research and Development Engineer Terry Guo	National Science Foundation	432,623	Unfunded
3.	CAREER: Beyond Lithium: Next Generation Energy Dense, Safe and Cost-Effective Sodium based Batteries and Serving Society through Outreach Activities	Assistant Professor Indranil Bhattacharya	National Science Foundation	550,630	Unfunded
4.	Welding Application Development for High Mobility Manufacturing Robot	Professor and Chairperson Ahmed Elsayy	Advanced Technology International (ATI); PRIME: (Naval Sea Systems Command (NAVSEA) through NSRP ASE); RTT	24,503	Funded
SUBTOTAL, PROPOSALS FOR 2017-2018				1,511,469	

CENTER FOR ENERGY SYSTEMS RESEARCH

STATUS OF PROPOSALS

Submitted Between July 1, 2017 and June 30, 2018

TITLE	INVESTIGATORS	SOURCE	AMOUNT	STATUS
5. REU Site: Immersive Research in Energy Generation, Storage/Conversion, and Power Transmission	Assistant Professor Indranil Bhattacharya, Professor Joseph Biernacki, Professor and Director Satish M. Mahajan, Associate Professor Rabie Belkacemi, Associate Professor Cynthia Rice, Assistant Professor Steven Anton, Assistant Professor Dr. Ehsan Languri, Professor Holly Stretz, Assistant Professor Laura Arias Chavez, Associate Professor George Chitiyo	National Science Foundation	364,767	Funded at \$321,750
6. Cooling Devices for Agriculture Storage Application based on Nanostructured Thermoelectric Materials	Professor and Director Satish M. Mahajan, Assistant Professor Steven Anton	United States - India Science and Technology Endowment Fund (USISTEF)	237,583	Unfunded
7. Proactive Resiliency Threat Detection and Mitigation for Dependable Internet of Things	Assistant Professor Mohammad A. Rahman	Google Faculty Research Award	39,500	Unfunded
SUBTOTAL, PROPOSALS FOR 2017-2018			641,850	

CENTER FOR ENERGY SYSTEMS RESEARCH

STATUS OF PROPOSALS

Submitted Between July 1, 2017 and June 30, 2018

	TITLE	INVESTIGATORS	SOURCE	AMOUNT	STATUS
8.	REU Site: Interdisciplinary Research Experiences toward Smart and Dependable Manufacturing	Research and Development Engineer Terry Guo, Assistant Professor Mohammad A. Rahman, Assistant Professor Duckbong Kim, Associate Professor Syed Hasan, Assistant Professor Mohamed Mahmoud, Assistant Professor ChaBum Lee, Professor Ahmed Elsayy, Professor Ada Haynes, Director Kevin Liska	National Science Foundation	359,696	Unfunded
9.	CAREER: Promoting the Holistic Application of Engineering Judgment for Characterization and Design in Low Void Ratio Clays	Assistant Professor Daniel VandenBerge	National Science Foundation	512,206	Unfunded
10.	SaTC: CORE: Medium: Collaborative: Control- aware Dynamic Moves for Attack Resilient CPS	Assistant Professor Mohammad A. Rahman and Assistant Professor Rabie Belkacemi	National Science Foundation	414,999	Unfunded
SUBTOTAL, PROPOSALS FOR 2017-2018				1,286,901	
Center of Energy Systems Research		22	Annual Report 2017-18		

CENTER FOR ENERGY SYSTEMS RESEARCH

STATUS OF PROPOSALS

Submitted Between July 1, 2017 and June 30, 2018

	TITLE	INVESTIGATORS	SOURCE	AMOUNT	STATUS
11.	GP-EXTRA: Engaging, Enthusing, and Equipping 21st Century Geo-Professionals through Karst-Region Field Experiences	Assistant Professor Daniel VandenBerge, Assistant Professor Joseph Asante, Professor Evan Hart, Associate Professor George Chitiyo	National Science Foundation	349,993	Unfunded
12.	RET Site: Energized Teachers	Professor Joseph Biernacki, Assistant Professor Indranil Bhattacharya, Professor and Director Satish M. Mahajan, Assistant Professor Rabie Belkacemi, Associate Professor Cynthia Rice, Assistant Professor Steven Anton, Assistant Professor Ehsan Languri, Assistant Laura Arias Chavez, Associate Professor George Chitiyo	National Science Foundation	595,186	Unfunded
13.	Coarse-Grained Molecular Dynamics Study of Asphaltene Aggregation	Assistant Professor Venkat Padmanabhan	American Chemical Society Petroleum Fund	110,000	Unfunded
SUBTOTAL, PROPOSALS FOR 2017-2018				1,055,179	

CENTER FOR ENERGY SYSTEMS RESEARCH

STATUS OF PROPOSALS

Submitted Between July 1, 2017 and June 30, 2018

	TITLE	INVESTIGATORS	SOURCE	AMOUNT	STATUS
14.	Collaborative Research: A Fundamental Study of Non-Equilibrium Water Foaming Process: Towards Economic and Environmental Benign Processing	Assistant Professor Liqun Zhang	National Science Foundation (Collaboration with Case Western Reserve University \$198,136)	232,753	Unfunded
15.	Synthesis, Characterization and Investigation of Diffusion Mechanisms in Layered Nano-Fiber Sodium ion Batteries	Assistant Professor Indranil Bhattacharya	National Science Foundation	302,952	Unfunded
16.	Collaborative Research: Simultaneous and Single Source SPR and Fluorescent Patterned Nanoparticle Sensors of Water-Based Plant Nutrients (with Tennessee State University \$150,000)	Professor Holly Stretz, Assistant Professor ChaBum Lee, Professor and Director Satish M. Mahajan	National Science Foundation	396,124	Unfunded
17.	Resiliency-Assured SDN Deployment in Supervisory Monitoring and Control Systems	Assistant Professor Mohammad A. Rahman, Assistant Professor Rabie Belkacemi	National Science Foundation	349,872	Unfunded

SUBTOTAL, PROPOSALS FOR 2017-2018

1,281,701

CENTER FOR ENERGY SYSTEMS RESEARCH

**STATUS OF PROPOSALS
Submitted Between July 1, 2017 and June 30, 2018**

	TITLE	INVESTIGATORS	SOURCE	AMOUNT	STATUS
18.	Nanofiber Based Next Generation High-Energy-Density Sodium ion Batteries for Electric Grid and Automotive Applications	Assistant Professor Indranil Bhattacharya	National Science Foundation	299,946	Unfunded
19.	Structural and Thermo-Mechanical Properties of Polymer Nanocomposites	Assistant Professor Venkat Padmanabhan	National Science Foundation	379,984	Pending
20.	Collaborative Research: Impacts of Wind and Solar Photovoltaic (PV) Plants on Each Other (with the University of Delaware at \$157,568)	Assistant Professor Ahmad Vasselbehagh	National Science Foundation	202,971	Unfunded
21.	SaTC: CORE: Small: Collaborative: Towards Secure and Privacy-Preserving Communications for Smart Grid Energy Storage Units (with Michigan Technological University and Tennessee State University)	Assistant Professor Mohamed Mahmoud, Research and Development Engineer Nan Terry Guo	National Science Foundation	257,867	Unfunded

SUBTOTAL, PROPOSALS FOR 2017-2018

1,140,768

CENTER FOR ENERGY SYSTEMS RESEARCH

STATUS OF PROPOSALS

Submitted Between July 1, 2017 and June 30, 2018

	TITLE	INVESTIGATORS	SOURCE	AMOUNT	STATUS
22.	I-CORPS: Passive Wastewater Processing System (PawPros)	Assistant Professor Ehsan Languri	National Science Foundation	50,000	Funded
23.	Collaborative Research: Secure and Enhanced Spectrum Utilization for Low-Power Wide Area Networks in White Spaces (with Wayne State University and Missouri University of Science and Technology)	Assistant Professor Mohammad A. Rahman	National Science Foundation	224,746	Pending
24.	A Reliable, Secure, and Privacy-Preserving Solution for Wireless Electric Vehicle Charging in Smart Grid	Assistant Professor Mohamed Mahmoud	Subcontract to Hamad Bin Khalifa University (Prime: Qatar National Research Fund QNRF)	119,999	Pending
25.	MRI: Development of a High-Resolution Neutron Detector for Decay and Reaction Studies with Exotic Nuclei	Assistant Professor Mustafa M. Rajabali	University of Tennessee - Knoxville/ National Science Foundation	233,264	Pending

SUBTOTAL, PROPOSALS FOR 2017-2018

628,009

CENTER FOR ENERGY SYSTEMS RESEARCH

STATUS OF PROPOSALS

Submitted Between July 1, 2017 and June 30, 2018

	TITLE	INVESTIGATORS	SOURCE	AMOUNT	STATUS
26.	NRT-INFEWS: Engendering the Spirit of Gadugi at the Food- Energy-Water Nexus (I- CORPS; EAGER)	Professor Pedro Arce, Assistant Professor Robby Sanders, Assistant Professor Laura Arias Chavez, Assistant Professor Tania Datta, Professor Ada Haynes, Professor and Director Hayden Mattingly, Assistant Professor Brian Leckie, Assistant Professor Troy Smith	National Science Foundation	3,000,000	Pending
27.	What do Engineers Do? Communicating the Diverse, Dynamic Field through Outreach	Assistant Director Elizabeth Powell, Director Harry Ingle, Coordinator Scott Eddins, Advisor Ahmed Abounassif	Tennessee Board of Regents	38,879	Funded at \$34,969 effective 7/1/2018
28.	Engineering Method for the Design of Un- tensioned Dowels for Rock Block Stabilization	Assistant Professor Daniel VandenBerge, Professor Evan Hart	Tennessee Department of Transportation	123,893	Unfunded
29.	Design of Geosynthetically Reinforced Aggregate Mats for Bridge Approach Slabs	Assistant Professor Daniel VandenBerge	Tennessee Department of Transportation	101,293	Unfunded

SUBTOTAL, PROPOSALS FOR 2017-2018

3,264,065

CENTER FOR ENERGY SYSTEMS RESEARCH

STATUS OF PROPOSALS

Submitted Between July 1, 2017 and June 30, 2018

	TITLE	INVESTIGATORS	SOURCE	AMOUNT	STATUS
30.	Molecular Dynamics Simulation on Wax Inhibition using Polymer Pour Point Depressants	Assistant Professor Liqun Zhang	American Chemical Society	110,000	Pending
31.	Secure and Informed Management of Energy Storage Systems Integrated with the Smart Grid	Assistant Professor Mohamed Mahmoud, Professor Olorunfemi Ojo	National Academy of Sciences-US Egypt Science and Technology Fund	200,000	Pending
32.	Development of Tennessee Travel Demand Model Users' Group	Professor Daniel Badoe	University of Tennessee - Knoxville	14,000	Funded
33.	Harvesting Vibration Energy from Tractor Suspension System for Supplementing Agricultural Energy Needs	Professor Satish M. Mahajan, Assistant Professor Ahmad Vasselbehagh	South Carolina State University (Funding from the United States Department of Agriculture)	200,000	Pending
34.	The Structure of Neutron-rich Deformed 98Rb and 98Sr Studied Via Beta Decay - A Supplemental Proposal	Assistant Professor Mustafa Rajabali	Department of Energy	29,294	Pending
SUBTOTAL, PROPOSALS FOR 2017-2018				553,294	

CENTER FOR ENERGY SYSTEMS RESEARCH

STATUS OF PROPOSALS

Submitted Between July 1, 2017 and June 30, 2018

	TITLE	INVESTIGATORS	SOURCE	AMOUNT	STATUS
35.	EAGER: SitS: Collaborative Research: A Multi-Sensor Probe Network for Continuous Monitoring of the Soil Health	Assistant Professor Charles Van Neste, Professor and Director Satish M. Mahajan, Assistant Professor Brian Leckie	National Science Foundation	175,000	Pending
36.	Advanced Metal Electrodes for Lithium Metal Secondary Batteries	Assistant Professor Liqun Zhang	Subaward to LiBAMA, LLC (Funding from the Department of Defense, Army)	21,500	Pending
37.	Planning Grant for Engineering Research Center for a Materials-Driven Infrastructure Revolution (AMDIR)	Professor Joseph Biernacki, Professor Stephen Canfield, Professor Ismail Fidan	National Science Foundation	99,814	Pending
38.	CICI: SSC: Data-driven and Model-based Generative and Adaptive Deployment for Secure Cyberinfrastructures	Assistant Professor Mohammad A. Rahman, Professor and Director Satish M. Mahajan	Subaward from Vanderbilt University (Funding from the National Science Foundation)	281,250	Unfunded
SUBTOTAL, PROPOSALS FOR 2017-2018				577,564	

CENTER FOR ENERGY SYSTEMS RESEARCH

STATUS OF PROPOSALS

Submitted Between July 1, 2017 and June 30, 2018

	TITLE	INVESTIGATORS	SOURCE	AMOUNT	STATUS
39.	FMitF: Collaborative Research: Formal Analysis for Real-Time Sensor-Actuator Network	Assistant Professor Mohammad A. Rahman	National Science Foundation	499,999	Unfunded
40.	Power-Test-Service Account	Professor and Director Satish M. Mahajan, Professor L. K. Crouch	Various Industries	2,090	Funded
SUBTOTAL, PROPOSALS FOR 2017-2018				502,089	
TOTAL, PROPOSALS FOR 2017-2018				12,442,889.00	

ALOUANI, ALI

Conferences:

- Uddhav Bhattarai and Ali Alouani, "Flexible Semi-Automatic Arm Design for Minimally Invasive Surgery," 2017 25th International Conference on Systems Engineering, Las Vegas, USA, August 22-24, 2017.
- Faisal Khaldi and Ali Alouani, "Systemic Design Approach to Reducing Rates of Unplanned Hospital Readmissions," 2017 19th International Conference on E-health Networking, Application & Services (HealthCom): The 2nd IEEE International Workshop on Emerging Technologies for Pervasive Healthcare and Applications (ETPHA 2017).
- Faisal Khaldi and Ali Alouani, "Systematic Platform Design of a Real Time Healthcare Management System: Minimizing Overall Patient Waiting Time," 2017 IEEE International Conference on Systems, Man, and Cybernetics (SMC) Banff Center, Banff, Canada, October 5-8, 2017.

ARIAS CHAVEZ, LAURA

Technical Presentations

- Arias Chavez, L. H.; Hornsby, S.B.; Ranjan, P.; Goans, B.J.; Sealy, K.T. Importance of Variability in Surface Morphology of Polyamide Selective Layers on Thin-Film Composite Membranes. In National Meeting of the American Chemical Society, New Orleans, LA, 2018. (Oral presentation)
- Arias Chavez, L. H.; Hornsby, S.B.; Ranjan, P. Variability in Surface Morphology of Polyamide Selective Layers on Thin-film Composite Membranes. In National Meeting of the American Chemical Society, New Orleans, LA, 2018. (Oral presentation)
- Arias Chavez, L. H.; Mohammad, A.S.; Biernacki, J.J.; Esfahani, M. R.; Languri, E. M. Limitations of the Structural Parameter for Understanding Forward Osmosis. In International Congress on Membranes and Membrane Processes, San Francisco, CA, 2017. (Oral presentation)

Posters Presented:

- Huttes, D.A; Ong, X.-Z.; Templeton, L.M.; White, H.D.; Arias Chavez, L.H. Separation of Inorganic Components from Industrial Wastewater Via a Hybrid Forward Osmosis-Reverse Osmosis System. In 27th Annual Meeting of the North American Membrane Society, Lexington, KY. (Oral)
- Ong, X.-Z.; Huttes, D.A; Templeton, L.M.; White, H.D.; Arias Chavez, L.H. Organic Transport and Fouling in the Reclamation of Industrial Wastewater with a Hybrid Forward Osmosis - Reverse Osmosis System. In 27th Annual Meeting of the North American Membrane Society, Lexington, KY. (Poster)

- Hornsby, S.B.; Goans, B.J.; Sealy, K.T.; Arias Chavez, L. H. Variability in Morphology of Polyamide Active Layers for Thin-film Composite Membranes, In International Congress on Membranes and Membrane Processes, San Francisco, CA, July 29-August 4, 2017. (Poster presentation)
- Huttes, D.A.; Ong X.-Z.; Templeton, L.M.; Arias Chavez, L. H. Separation of Inorganic Components from Industrial Wastewater via a Hybrid Forward Osmosis – Reverse Osmosis System, In International Congress on Membranes and Membrane Processes, San Francisco, CA, July 29-August 4, 2017. (Poster presentation)
- Ong, X.-Z.; Huttes, D.A.; Templeton, L.M.; Arias Chavez, L. H. Organic Transport and Fouling in Forward Osmosis Separation of Industrial Wastewater, In International Congress on Membranes and Membrane Processes, San Francisco, CA, July 29-August 4, 2017. (Poster presentation)
- Ranjan, P.; Hornsby, S.B. and Arias Chavez, L. H. The Role of Polyamide Morphology in Determining Contact Angle Variability, In International Congress on Membranes and Membrane Processes, San Francisco, CA, July 29-August 4, 2017. (Poster presentation)
- Schubert, K.E.; Arias Chavez, L.H. Use of Excess Energy from Nuclear Power Generation for Seawater Desalination via Forward Osmosis. In AIChE Southern Regional Conference, Baton Rouge, LA. (Poster)

BADOE, DANIEL

Journal Papers:

- Locum, J.T., Crouch, L.K., and Badoe, D.A. (2018). Universal and Excavatable Controlled Low Strength Material Using High Loss on Ignition Fly Ash and Limestone Screenings. *Coal Combustion and Gasification Products Journal*. Volume 10, pp. 8-14.
- Crouch, L.K, Smtih, C, Scott, W.C, Locum, J. , Badoe, D. A. and Hall, H.P. (2017/18) Going Past TDOT Specifications to Lower Concrete Permeability. Part 1: Take it to the Limit. *Tennessee Concrete*, Winter 2017/18 Vol. 31 NO. 3 pp 8-15
- Locum, James T., Crouch, L. K., and Badoe, Daniel, "Universal and Excavatable Controlled Low Strength Material Using High Loss on Ignition Fly Ash and Limestone Screenings", *CCGP Coal Combustion and Gasification Products*, journal homepage: www.coalcgp-journal.org, downloaded 4/06/18.

Conferences:

- Edwards, M., Badoe, D.A., and Lee, D. (2018). Comparison of Two Short Period Traffic Count Duration/Cycle Specifications in the Accuracy of their Predictions of Annual Average Daily Traffic at Coverage Stations. Presented at the 97th Annual Transportation Research Board Conference, January 7 – 11, 2018, Washington, DC.

BELKACEMI, RABIE**Journal Papers:**

- R. Belkacemi, A. A. Babalola, and S. Zarrabian, "Real-Time Cascading Failures Prevention through MAS Algorithm and Immune System Reinforcement Learning," *Electric Power Components and Systems*, Taylor & Francis, Vol. 45, Pages 505-519, 2017

Conference Papers:

- R. Fatunmbi, R. Belkacemi, F.K. Ariyo, G. Radman, "Genetic Algorithm Based Optimized Load Frequency Control for Storageless Photo Voltaic Generation in a Two Area Multi-agent System," 2017 North American Power Symposium, NAPS 2017
- R. Belkacemi, P. Mitra, "Impact of Distributed Energy Resources (DER) Voltage Regulation and Ride-Through Settings on Distribution Feeder Voltage Recovery," *The International Council on Large Electric Systems (CIGRE)*, Paris, 2017

BHATTACHARYA, INDRANIL**Journal Papers:**

- B. Papari, C. Edrington, I. Bhattacharya, G. Radman, "Effective Power Management of Hybrid AC-DC Microgrids with Storage Devices" *IEEE Transactions on Smart Grid*, 2017.
- Micah Rentschler, Indranil Bhattacharya, "Decoupled Control of Wireless Power Transfer: Eliminating the Interdependence of Load Resistance and Coupling to Achieve a Simple Control Framework with Fast Response Times", *International Journal of Electrical Power & Energy Systems*, Volume 99, 2018, Pages 156-163,
- Bibek Tiwari, Indranil Bhattacharya, Layered P2- type Novel Na_{0.7}Ni_{0.3}Mn_{0.59}Co_{0.1}Cu_{0.01}O₂ Cathode Material for High-Capacity & Stable Rechargeable Sodium Ion Battery, *Electrochemical Act*, Volume 270, 2018, Pages 363-368.
- D. Durbar, M.R. Anilkumar, V. Rajagopalan, I. Bhattacharya, H.I. Elim, T. Ramakrishnappa, F.I. Ezema, R. Jose, M.V. Reddy, "Studies on Spinel Cobaltites, MCo₂O₄ (M=Mn, Zn, Fe, Ni and Co) and their Functional Properties", in *Ceramics International*, Volume 44, Issue 5, 1 April 2018, Pages 4630-4639.

BIERNACKI, JOSEPH J.**Journal Papers:**

- O. Chaudhari, J. J. Biernacki and S. Northrup, Effect of Carboxylic and Hydroxycarboxylic Acids on Cement Hydration – Experimental and Molecular Dynamics Study, *J. Mat. Sci.*, accepted (August 7, 2017).

Presentations/Posters

- Babajide Y Onanuga and J. J. Biernacki, Rheology of Cement-based Pastes for 3-D Printing Applications, 9th Advances in Cement-Based Materials, American Ceramic Society, (poster) June 11-12, 2018.
- Arias Chavez, L. H.; Mohammad, A.S.; Biernacki, J.J.; Esfahani, M. R.; Languri, E. M. Limitations of the Structural Parameter for Understanding Forward Osmosis. In *International Congress on Membranes and Membrane Processes*, San Francisco, CA, 2017. (Oral presentation)

CLICK, STEVEN

Conference Presentations:

- Evaluating The Tree-Year Rule for Retiming Coordinated Traffic Signals using Simulation with Real-World Traffic Data Conference: The 2018 Transportation Research Board Annual Meeting January 13-17, 2018 co-authors E. Burgess, and Dr. S. Click

CRAVEN, ROBERT

Journal Papers:

- Duong, S., Craven, R., Garner, S., and Idem, S. "A Novel Evaporative Cooling Tower Constructed From an Inflatable Fabric Duct," Science and Technology for the Built Environment, DOI: 10.1080/23744731.2018.1460146, 2018.

Conferences:

- Simulation of Load-sharing in Standalone Distributed Generation System," Titus O Ajewole, Robert P M Craven, Olakunle Kayode, and Olufisayo S Babalola, 2018 7th International Conference on Clean and Green Energy-ICCGE 2018, Paris, France, February 7, 2018

CROUCH, L. K.

Magazine/Journal Articles:

- "Going Past TDOT Specifications to Lower Concrete Permeability Part 1: Take It to the Limit", L. K. Crouch, Caleb Smith, William C. Scott, James Locum, Daniel Badoe, and Heather P. Hall, Tennessee Concrete, Vol. 31, No. 3, Winter 2017/18.
- Locum, James T., Crouch, L. K., and Badoe, Daniel, "Universal and Excavatable Controlled Low Strength Material Using High Loss on Ignition Fly Ash and Limestone Screenings", CCGP Coal Combustion and Gasification Products, journal homepage: www.coalccgp-journal.org, downloaded 4/06/18.

CUI, JIE

Journal Articles:

- Abounassif, A., and Cui, J., "Atomizing Flow Simulations Using a Eulerian Multiphase Model," European Journal of Advances in Engineering and Technology, Vol. 4, Issue 2, pp. 81-89, 2017

ELKEELANY, OMAR

Conference Publications:

- Alvaro Cintas Canto, Omar Elkeelany, "Integration of Fully Pipelined Rijndael 256 in a Reconfigurable Logic with an External Memory", 33rd International Conference on Computers and Their Applications CATA, 2018
- James Shelley, Hawzhin Mohammed, Lizzy Zink, Syed Rafay Hasan, Omar Elkeelany, "Covert Communication Channel Detection in Low-Power Battery Operated IoT Devices: Leveraging Power Profiles," IEEE SoutheastCon, 2018

GANNOD, JERRY**Journal Articles**

- Gerald C. Gannod, Katherine M. Abbott, Kimberly Van Haitisma, Nathan Martindale and Alexandra Heppner, "A Machine Learning Recommender System to Tailor Preference Assessments to Enhance Person Centered Care among Nursing Home Residents", *The Gerontologist* (special issue on Technology and Aging), Oxford University Press, May 2018, Impact Factor: 3.505, doi:10.1093/geront/gny056
- Katherine M. Abbott, Rachel, Kendall A. Leser, PhD, Jane Straker, Gerald C. Gannod, Kimberly Van Haitisma, "Delivering Person Centered Care: Important Preferences for Recipients of Long-Term Services and Supports", *Journal of the American Medical Directors Association (JAMDA)*, 2018. Impact Factor: 5.775

Conference/Workshop Papers

- Gerald C. Gannod, Katherine M. Abbott, Kimberly Van Haitisma, Nathan Martindale, Rachel A. Kaczka Jennings, and Chelsey Long, "Using Machine Learning to Facilitate the Delivery of Person Centered Care in Nursing Homes", in the Proceedings of the 31st Florida Artificial Intelligence Research Society (FLAIRS) Conference, AAAI, May 2018, pp. 305 – 310.

GHAFOOR, SHEIKH**Journal Papers**

- David W. Brown, Sheikh K. Ghafoor, and Stephen Canfield, "Instruction of Introductory Programming Course Using Multiple Contexts" in the proceedings of 23rd Annual Conference on Innovation and Technology in Computer Science Education (ITICSE 2018), Larnaca, Cyprus, June 30-July 4, 2018.
- Ryan Marshall, Sheikh Ghafoor and Michael Rogers, "A Software Abstraction Method for Efficient 2D Grid Computations in Heterogeneous HPC Environments" in the proceedings of The Programming Models and Algorithms Workshop (PMAW), International Parallel and Distributed Processing Symposium 2018, Vancouver, Canada, May 21-May25, 2018
- Ryan Marshall, Sheikh Ghafoor, Mike Rogers, Alfred Kalyanapu, Tigstu T. Dullo, "Performance Evaluation and Enhancements of a Flood Simulator Application for Heterogeneous HPC Environments", *International Journal of Networking and Computing*, Volume 8, No. 2, 2018, pp 388-407.

Conference Proceedings:

- David W. Brown, Mike Rogers, and Sheikh Ghafoor, "Integrating Parallel Computing in Introductory Programming Classes: An Experience and Lesson Learned", in the Proceedings of the Euro-EDUPAR 2017 workshop of 23rd International European Conference on Parallel and Distributed Computing, Santiago de Compostela, Spain, August 28-September 1, 2017
-
- Alfred J. Kalyanapu, Mike Rogers, Ryan Marshall, Sheikh K. Ghafoor, and Tigstu T. Dullo, "Performance Improvement of a Two-dimensional Flood Simulation Application in Hybrid Computing Environments" in the Proceedings of the Fifth International Symposium on Computing and Networking (CANDAR 17), Aomori, Japan, November 19-22, 2017

HASAN, SYED

Journal Papers:

- S. F. Mossa, S. R. Hasan, O. S. A. Elkeelany, "Hardware Trojans in 3-D ICs Due to NBTI Effects and Countermeasure", *Integration, The VLSI Journal*, Vol. 59, pp. 64 - 74, September 2017. DOI:<http://dx.doi.org/10.1016/j.vlsi.2017.03.009>
- F. K. Lodhi, S. R. Hasan, O. Hasan, F. Awwad, "Runtime Hardware Trojan Monitors Through Modeling Burst Mode Communication using Formal Verification", *Integration, The VLSI Journal*, Vol. 61, pp. 62-76, March 2018, <https://doi.org/10.1016/j.vlsi.2017.11.003>
- M. T. Hailesellasie, S. R. Hasan, "Intrusion Detection in PLC Based Industrial Controls Systems Using Formal Model of the System in Conjunction with Graphs", *Journal of Hardware and Systems Security*, Vol. 2, Issue 1, pp. 1-14, March, 2018 <https://link.springer.com/article/10.1007/s41635-017-0017-y>

Conference Presentations:

- A Y. Salik, M. U. Sardar, O. Hasan, S. R. Hasan, and F. Awwad, "Formal Verification of Demand Response Based Home Energy Management Systems in Smart Grids", accepted for publication in *Innovative Smart-Grid Technologies -Asia, 2017*
- O. Adegbite, S. R. Hasan, "A Novel Correlation Power Analysis Attack on PIC Based AES-128 without Access to Crypto-Device", in *IEEE International Midwest Symposium on Circuits and Systems, 2017*
- F. K. Lodhi, S. R. Hasan, O. Hasan, F. Awwad, "Behavior Profiling of Power Distribution Networks for Runtime Hardware Trojan Detection", in *IEEE International Midwest Symposium on Circuits and Systems, 2017*
- S. R. Hasan, P. B. Tangellapalli, "Area Efficient Soft Error Tolerant RISC Pipeline: Leveraging Data Encoding and Inherent ALU Redundancy", in *IEEE International Midwest Symposium on Circuits and Systems, 2017*
- J. Shelley, H. Mohammed, L. Zink, S. R. Hasan, O. Elkeelany, "Covert Communication Channel Detection in Low-Power Battery Operated IoT Devices: Leveraging Power Profiles", in *IEEE SouthEast Conference, 2018*
- M. T. Hailesellasie, S. R. Hasan, F. Khalid, M. Shafique, "FPGA-Based Convolutional Neural Network Architecture with Reduced Parameter Requirements", *International Symposium on Circuits and Systems, ISCAS'2018*
- F. Khalid, S. R. Hasan, S. Nanjiani, O. Hasan, M. Shafique, "Low Power Digital Clock Multipliers for Battery Operated Internet of Things (IoT) Devices", *International Symposium on Circuits and Systems, ISCAS'2018*
- M. T. Hailesellasie, S. R. Hasan, "A Fast FPGA-Based Deep Convolutional Neural Network Using Pseudo Parallel Memories", in *IEEE International Symposium on Circuits and Systems, 2017*
- K. T. Tanweer, S. R. Hasan, A. M. Kamboh, "Motion Artifact Reduction from PPG Signals During Intense Exercise Using Filtered X-LMS", in *IEEE International Symposium on Circuits and Systems, 2017*

- S. Kottler, M. Khayamy, S. R. Hasan, O. Elkeelany, "Formal Verification of Ladder Logic programs using NuSMV", in IEEE SouthEast Conference, 2017
- F. K. Lodhi, S. R. Hasan, O. Hasan, F. Awwad, "Power Profiling of Microcontroller's Instruction Set for Runtime Hardware Trojans Detection without Golden Circuit Models", in IEEE/ACM Conference on Design Automation and Test Europe (DATE), Lausanne, Switzerland, 2017

HUFF, TIM

Journal Papers:

- Inelastic Seismic Displacement Amplification for Bridges: Dependence upon Various Intensity Measures, ASCE Practice Periodical on Structural Design and Construction, February 2018, Volume 23, Issue 1.
- Elastic and Inelastic Behavior of Precast Concrete Piles and Cast-in-Shell Steel Piles in Reinforced Concrete Caps, Practice Periodical on Structural Design and Construction, May 2018, Volume 23, Issue 2.

IDEM, STEVE

Journal Papers:

- Sleiti, A., Salehi, M., and Idem, S., 2017, "Detailed Velocity Profiles in Close-Coupled Elbows – Measurements and CFD Predictions," Science and Technology for the Built Environment, Vol. 23, No. 8, pp. 1212-1223.
- Salehi, M., Idem, S., and Sleiti, A., 2017, "Experimental Determination and CFD Predictions of Pressure Loss in Close-Coupled Elbows," Science and Technology for the Built Environment, Vol. 23, No. 7, pp. 1132-1141.
- Duong, S., Craven, R., Garner, S., and Idem, S. 2018. "A Novel Evaporative Cooling Tower Constructed From an Inflatable Fabric Duct," Science and Technology for the Built Environment, DOI: 10.1080/23744731.2018.1460146

Conference Papers:

- Chittireddy, V., ElSawy, A., and Idem, S. 2018. "Study of a Flat Plate Solar Collector with an Air Conditioner Radiator as a Heat Absorber for a Domestic Water Heater," Proceedings of International Conference on Renewable Energies and Power Quality (ICREPQ'18), Salamanca, Spain

Reports:

- Paruchuri, A. and Idem, S. 2017, "Experimental Comparison of Pressure Loss in Typical Flexible and Sheet Metal Residential Duct Systems," Final Report, ADC.

LANGURI, ETHAN

Journal Papers:

- Bahraseman H., Languri E., A Numerical Modeling of Liquid-to-Vapor Phase Change inside a Porous Medium under Heat Localization, Heat Transfer Engineering, Volume 39, Issue 15, 2018.

- Babazadehrokni H., Languri E., Flow of Microencapsulated Phase Change Material Slurry through Planar Spiral Coil, Heat Transfer Engineering, Volume 39, Issue 11, 2018.
- Bahraseman H, East J., Languri, E., Fast Charging of Thermal Energy Storage Systems Enabled by Phase Change Materials Mixed with Expanded Graphite, International Journal of Heat and Mass Transfer, Volume 109, pp. 1052–1058, 2017.
- Esfahani M., Languri E., Exergy Analysis of a Shell-and-Tube Heat Exchanger using Graphene Oxide Nanofluids, Experimental Thermal and Fluid Science, Volume 83, (2017), pp. 100-106.
- Languri E., Rokni H., Alvarado J., Takabi B., Kong M., Heat Transfer Analysis of MPCMs in Helically Coiled Heat Exchanger: Numerical Model and Experimental Validation, International Journal of Heat and Mass Transfer, Volume 118, March 2018, Pages 872-878.
- Rashidi S., Bafekr H., Masoodi R., Languri E., EHD in thermal energy systems - A review of the applications, modelling, and experiments, Journal of Electrostatics, Volume 90, pp. 1-14, 2017.
- Rashidi S., Akbarzadeh M., Masoodi R., Languri E., Thermal-hydraulic and entropy generation analysis for turbulent flow inside a corrugated channel, International Journal of Heat and Mass Transfer, Volume 109 , pp. 812–823, 2017.
- Taherian H., Alvarado J., Languri E., Enhanced Thermophysical Properties of Multiwalled Carbon Nanotubes Based Nanofluids. Part 1: Critical Review, Renewable & Sustainable Energy Reviews, Volume 82, Part 3, February 2018, Pages 4326-4336.
- Taherian H., Alvarado J., Languri E., Enhanced Thermophysical Properties of Multiwalled Carbon Nanotubes Based Nanofluids. Part 2: Experimental Verification, Renewable and Sustainable Energy Reviews, Volume 82, Part 3, February 2018, Pages 4337-4344.

Conference Proceedings

- Esfahani M.R., Languri E.M., and Arias Chavez L.H., Limitations of the Structural Parameter for Understanding Forward Osmosis, 2017 International Congress on Membranes and Membrane Processes, July 29-August 4, 2017, San Francisco, CA, USA.

LIU, JANE

Journal Papers:

- "A Parametric Study of Linear and Nonlinear Models for Moisture Diffusion in Composite Sandwich Structures", with S. Paulson, J. Peddison, and Steve Mills, Journal of Composite Materials, Aug. 8, 2017
- Colin G. Perry and Y. Jane Liu "Geometrically Nonlinear Analysis of Thin Rectangular Plates on a Pasternak Foundation Using Groebner Bases," 6th Annual International Conference on Architecture and Civil Engineering, ACE 2018, Singapore, May 14 -16, 2018.

Conference presentations

- Colin G. Perry and Y. Jane Liu "Geometrically Nonlinear Analysis of Thin Rectangular Plates on a Pasternak Foundation Using Groebner Bases," Proceedings of 6th Annual International Conference on Architecture and Civil Engineering (ACE 2018), May 14 -16, 2018, Singapore.

MAHAJAN, SATISH

Journal Publications:

- “Optimal Perturbation Tolerance in VSC-Connected Hybrid Networks using an Expert System on Chip”; (With Brook Abegaz); IEEE Transactions on Power Electronics; Vol. 33(6); pp. 5442-5451; June 2018.

Conference Presentations/Proceedings:

- “Inductive Perturbation Tolerance Improvement of Hybrid Networks using an Integrated Expert System”, (With Brook Abegaz); IEEE Power and Energy Systems General Meeting (PES-GM), Chicago, July 2017.
- “Energy-Scavenging Possibilities in Vehicular Systems for Powering ULPT”, (With U.C. Ckukwu), IEEE Power and Energy Systems General Meeting (PES GM), Chicago, July 2017.
- “Dual Independent Control for Inductive Wireless Power Transfer”, (With Utkarsh D. Kavimandan, and C.W. Van Neste); IEEE International Conference on Industrial Electronics for Sustainable Energy Systems (IESES), Hamilton, New Zealand, Jan 31- February 2, 2018.
- “Luxating Inverter for Wide-band Wireless Power Transfer”; (With Utkarsh D. Kavimandan, and Charles W. Van Neste); IEEE PELS Workshop on Emerging Technologies: Wireless Power; Montreal, Canada, June 3-7, 2018.

MAHMOUD, MOHAMED

Journal papers:

- M. Pazos-Revilla**, A. Alsharif**, S. Gunukula*, N. Guo, M. Mohamed, and X. Shen, “Privacy-Preserving Physical-Layer-Assisted Charging Authorization Scheme for EV Dynamic Charging System”, IEEE Transactions on Vehicular Technology, published online, Dec. 2017.
- M. Mahmoud, N. Saputro, P. Akula*, and K. Akkaya, “Privacy-Preserving Power Injection over a Hybrid AMULTE Smart Grid Network”, IEEE Journal on Internet of Things (IoT), pp. 870- 880, vol. 4, no. 4, August 2017.
- K. Rabieh**, M. Mahmoud, K. Akkaya, S. Tonyali, “Scalable Certificate Revocation Schemes for Smart Grid AMI Networks Using Bloom Filters”, IEEE Transactions on Dependence and Secure Computing (TDSC), Vol. 14, No. 4, pages 420-432, July/August 2017.

Conference Proceedings/Presentations:

- M. Nabil**, M. Ismail, M. Mahmoud , M. Shahin, K. Qaraqe, and E. Serpedin, “Deep Recurrent Electricity Theft Detection in AMI Networks with Random Tuning of Hyper-parameters”, International Conference on Pattern Recognition (ICPR), China, Beijing, 2018
- A. Alsharif**, M. Nabil**, M. Mahmoud, and M. Abdallah, “Privacy-Preserving Collection of Power Consumption Data for Enhanced AMI Networks”, IEEE International Conference on Telecommunication (ICT), France, June 2018.
- A. Sherif**, A. Alsharif**, M. Mahmoud, M. Abdallah, and M. Song, “Efficient Privacy-Preserving Aggregation Scheme for Data Sets”, IEEE International Conference on Telecommunication (ICT), France, June 2018.

- M. Nabil**, A. Alsharif**, A. Sherif**, M. Mahmoud, and M. Younis, "Efficient Multi-Keyword Ranked Search Over Encrypted Data for Multi-Data-Owner Settings", IEEE International Conference on Communications (ICC), Kansas City, MO, USA, June 2018
- Sherif**, A. Alsharif**, M. Mahmoud, and J. Moran/\, "Privacy-Preserving Autonomous Cab Service Management Scheme", Proc. of the Third Africa and Middle East Conference on Software Engineering (AMECSE'17), Cairo, Egypt, 2017.
- Z. Haddad", A. Alsharif**, A. Sherif**, and M. Mahmoud, "Privacy-Preserving Intra- MME Group Handover Via MRN in LTE-A Networks for Repeated Trips", IEEE 86th Vehicular Technology Conference (VTC2017-Fall), 24-27 September 2017, Toronto, Canada.
- Sherif**, A. Alsharif**, J. Moran/\, and M. Mahmoud, "Privacy-Preserving Ride Sharing Organization Scheme for Autonomous Vehicles in Large Cities", IEEE 86th Vehicular Technology Conference (VTC2017-Fall), 24-27 September 2017, Toronto, Canada.
- N. Saputro, S. Tonyali, K. Akkaya, M. Cebe, and M. Mahmoud, "Efficient Certificate Verification for Vehicle-to-Grid Communications", The 3rd International Conference on Future Network Systems and Security (FNSS), 31 August - 2 September 2017, Gainesville, Florida, USA.

MOHR, BEN**Journal Papers:**

- Mohr, B.J. Kurtis, K.E., Shekar, Y. "Nanoscale Pore Analysis of Mortars Subject to Delayed Ettringite Formation" Cement and Concrete Composites Oct 2017
- Mohr, B.J., Hood, K.L. "Factors Influencing Mitigation Strategies for Autogenous Shrinkage." ASTM Advances in Civil Engineering Materials, Special Issue on Advances in Internal Curing of Cementitious Materials, in press, May 2018. <https://doi.org/10.1520/ACEM20170139>
- Esfahani, A.R., Reisi, M., Mohr, B.J. "Investigation of the Effect of Magnetized Water on Compressive Strength and Amount of Superplasticizers and Water in Self-Compacting Concrete." ASCE Journal of Materials in Civil Engineering, 2018; 30(3). <https://ascelibrary.org/doi/10.1061/%28ASCE%29MT.1943-5533.0002174>

Conferences:

- Brockwell, J., Mohr, B.J., Datta, T. "Reducing Stormwater Pollution from Urban and Farm Runoff Using Reactive Pervious Concrete." (Poster presentation), TTU CISE Program, August 2017.

OJO, JOSEPH**Journal Papers:**

- Charles Odeh, Emeka Obe, Olorunfemi Ojo, Topology for Cascaded Multilevel Inverter, IET Power Electronics, vol. 9, no. 5, pp. 921-929, 2017

Conference:

- Josiah Haruna, Olorunfemi Ojo and Rere Fatumbi, Switching Function Based Analysis of the Modular Converter for Low/medium Voltage Applications, IEEE Energy Conversion Congress and exposition (ECCE), 2017

- Kuseo Onai and Olorunfemi Ojo, Vehicle-to-grid Technology Assisted Microgrid in Ghana: Opportunities and Challenges, IEEE PES Power Africa, 2017
- Akshatha Shetty, B. G. Fernandes, Olorunfemi Ojo and J. A. Ferreira, Low-voltage PV Power Integration for Variable Frequency Drives Applications, 19th European Conference on Power Electronics and Applications (EPE), 2017
- Sanjeeth Sewchurran, Innocent Davidson, Olorunfemi Ojo, Drivers, Barriers and a Method for Evaluating the Feasibility of Residential Rooftop Solar PV in Durban Part I, IEEE-PES Power Africa, 2017
- Sanjeeth Sewchurran, Innocent Davidson, Olorunfemi Ojo, Drivers, Barriers and a Method for Evaluating the Feasibility of Residential Rooftop Solar PV in Durban Part 2, IEEE-PES Power Africa, 2017
- A. S. Ogunjuyigbe, T. R. Ayodele, Olorunfemi Ojo, Effect of Lamp Technologies on the Power Quality of Electrical Distribution Network, IEEE-Pes Power Africa, 2017.

PADMANABHAN, VENKAT

Journal Papers:

- Mohd. Ibrahim, Nafisa Begam, Venkat Padmanabhan, and J. K. Basu, Correlation Between Grafted Nanoparticle-matrix Polymer Interface Wettability and Slip in Polymer Nanocomposites, Soft Matter, 2018, DOI: 10.1039/C8SM01072B

Conference Presentations:

- Venkat Padmanabhan*, Rimpa Chatterjee, Soumendu Bisoi, and Susanta Banerjee, Nanocomposites Containing Aromatic Polymers with Bulky Pendant Groups and C60 for Gas Separation Applications, APS March Meeting 2018, Monday–Friday, March 5–9, 2018, Los Angeles, CA.
- Koteswararao Medidhi and Venkat Padmanabhan, Nanoparticle Diffusion in Polymer Nanocomposites, APS March Meeting 2018, Monday–Friday, March 5–9, 2018, Los Angeles, CA.
- V. Padmanabhan*, Nanocomposites Containing Aromatic Polymers with Bulky Pendant Groups and C60 for Gas Applications, APS March Meeting, Los Angeles, CA, March 5-9, 2018.

QIU, ROBERT

Journal Papers:

- Y. H. Zhang, R. C. Qiu, X. He, Z. N. Ling, and X. Shi, "A Short-term Load Forecasting Based on Lstm Neural Network," ELECTRIC POWER ICT (in Chinese), 2017.
- X. He, Q. Ai, R. C. Qiu, J. Zhang, and X. Y. Xu, "A Primary Study on the Situation Awareness of Power Systems Using Random Matrix Theory," Power System Technology (in Chinese), vol. 41, no. 4, pp. 11651173, 2017.
- X. Xu, X. He, Q. Ai, and R. C. Qiu, "A Correlation Analysis Method for Power Systems Based on Random Matrix Theory," IEEE Trans. Smart Grid, Vol. 8, No. 4, pp. 1811-1820, July 2017.
- F. Wen, P. Liu, Y. Liu, R. C. Qiu, and W. Yu, "Robust Sparse Recovery in Impulsive Noise via lp-11 Optimization," IEEE Transactions on Signal Processing, Vol. 65, No. 1, pp. 105-118, 2017.

- X. He, L. Chu, R.C. Qiu, Q. Ai and Z. Ling, "A Novel Data-Driven Situation Awareness Approach for Future Grids—Using Large Random Matrices for Big Data Modeling," IEEE Access, vol. 6, pp. 13855-13865.
- F. Wen, P. Liu, H. Wei, Y. Zhang and R.C. Qiu, "Joint Azimuth, Elevation, and Delay Estimation for 3-D Indoor Localization," IEEE Transactions on Vehicular Technology, vol. 67, no. 5, pp. 4248-4261.

RADMAN, GHADIR

Journal Papers:

- Waheed Ayinla Oyekanmi, Ghadir Radman and Titus Oluwasuji Ajewole "Transient stability based dynamic security", Cogent Engineering (2017), 4: 1295506.
- R. Sai Lakshmi Surya, R. Neela and Ghadir Radman "Multi-Objective Optimization of DG Sizing and Placement using BBO Technique", International Journal of Engineering Research & Technology (IJERT), ISSN: 2278-0181, Vol. 6 Issue 07, July-2017.
- Behnaz Papari, Chris S. Edrington, Indranil Bhattacharya, and Ghadir Radman I "Effective Energy Management of Hybrid ACDC MicroGrids with Storage Devices" DOI 10.1109/TSG.2017.2736789, IEEE, Transactions on Smart Grid, 2017.

RAHMAN, MOHAMMAD

Conference Presentations:

- Madhukrishna Priyadarsini, Padmalochan Bera, and Mohammad Ashiqur Rahman, "A New Approach for Energy Efficiency in Software Defined Network," in the Fifth International Conference on Software Defined Systems (SDS), Apr 2018.
- Bahman Rashidi, Carol Fung, and Mohammad Ashiqur Rahman, "A Scalable and Flexible DDoS Mitigation System Using Network Function Virtualization," IEEE Workshop on Security for Emerging Distributed Network Technologies (DISSECT) in association with IEEE/IFIP NOMS, Apr 2018.
- AHM Jakaria*, Mohammad Ashiqur Rahman, and Carol Fung, "Automated Synthesis of NFV Topology: A Security Requirement-Oriented Design," in the 13th International Conference on Network and Service Management (CNSM), Short Paper, Nov 2017.
- Amarjit Datta* and Mohammad Ashiqur Rahman, "Cyber Threat Analysis Framework for the Wind Energy Based Power System," in the ACM Workshop on Cyber-Physical Systems Security & Privacy (CPS-SPC) in conjunction with the 24th ACM CCS, Nov 2017.
- Bata Tripathy, Ashray Sudhir, Padmalochan Bera, Mohammad Ashiqur Rahman, "Formal Modelling and Verification of Requirements of Adaptive Routing Protocol for Mobile AdHoc Network," in the 41st IEEE Computer Society International Conference on Computers, Software, and Applications (COMPSAC), Torino, Italy, Jul 2017.

SIRAJ, AMBAREEN

Conference Posters/Abstracts/Other Publications:

- Ambareen Siraj, Eric Brown and Zach Wallace, "From Rural Appalachia to Washington DC: Feeding the Pipeline of our Nation's Cyber Defenders", (Abstract) ACM Mid SouthEast Conference held in Gatlinburg, TN November, 2017.
- Presentation, "Cyber Defense Against the Dark Art", National K12 CyberSecurity Education Conference, December, 2017, Nashville, TN.
- Presentation, "Capture The Flag Unplugged", National K12 CyberSecurity Education Conference, December, 2017, Nashville, TN.
- Organizer, Annual CReST Workshops: NSF Supported Workshop for University Faculty to Integrate Security into Traditional Computer Science courses, Olympia, WA, July, 2017.
- Organizer, Gen Cyber Camp: NSA/NSF Supported K-12 High School Camps in Cybersecurity Education, held at Tennessee Tech. July, 2017.
- Organizer, SFS BootCamp: NSA/NSF Supported New Scholar Bootcamp, held at Tennessee Tech. August, 2017.
- Organizer: Exploring Cybersecurity Workshop: Introduction, Careers, Landscape, Path, and Resources, held at Tennessee Tech. August, 2017.

STRETZ, HOLLY

Conferences

- Mohammadizadeh, M., Stretz, H. A., Mu, R., IR Fluorescent Probe for Water-Based Agricultural Nutrients, 255th American Chemical Society National Conference, New Orleans, March 18, 2018.
- Tallapudi, Sashanka, Massingill, J., Stretz, H. A., "Synthesis of Monodisperse Lithium Carbonate Nanoparticles Using an Upscaled Microfluidic Reactor," American Chemical Society National Conference, Washington, D. C., Aug 20, 2017.
- Tallapudi, S., Stretz, H. A., Massingill, J. Jr., "Synthesis of Lithium Carbonate Nanoparticles Using an Upscaled Microfluidic Reactor," AIChE Annual Proceedings, Minneapolis, MN, 10-30-2017.
- Spreeman, M, Stretz, H. A., "Role of Compatibilizer in 3D Printed Objects," AIChE Annual Proceedings, Minneapolis, MN, 10-30-2017.

VANDENBERGE, DANIEL

Conference Proceedings

- Poston, K., Turkson, P., and VandenBerge, D. R. (2018). "Parametric Study of Levee Saturation for Undrained Rapid Drawdown Analysis," Proc. of USSD 2018, 15 pp.
- McGuire, M. P., Sloan, J. A., and VandenBerge, D. R. (2018). "Application of Reliability Analyses for Serviceability Design of Column-Supported Embankments," Proc. of IFCEE 2018, 10 pp.

VAN NESTE, CHARLES

Journals

- Amirreza Sohrabi, Ghazaleh Haghghat, Parmiss Mojir Shaibani, Charles William Van Neste, Selvaraj Naicker, Mohtada Sadrzadeh, Thomas Thundat, "Elimination of Pharmaceutical Contaminants Fluoxetine and Propranolol by an Advanced Plasma Water Treatment." Desalination and Water Treatment, Vol. 113, 346-353, (2018).

Conferences

- C. W. Van Neste, Utkarsh D. Kavimandan, Satish M. Mahajan, "Luxating Inverter for Wide band Wireless Power Transfer," IEEE PELS Workshop on Emerging Technology: Wireless Power, Montreal, Canada (2018).
- Utkarsh D. Kavimandan; Satish M. Mahajan; C. W. Van Neste, "Dual Independent Control for Inductive Wireless Power Transfer," 2018 IEEE International Conference on Industrial Power Electronics for Sustainable Energy Systems (IESES), Hamilton, New Zealand (2018).

VASELBEHAGH, AHMAD

Journal Articles:

- Vasel-Be-Hagh, A.R., Iakovidis, F., "The Effect of Wind Direction on the Performance of Solar PV Plants", Energy Conversion and Management, 153, 455-46, 2017.

MAHMOUD, MOHAMED

Book Chapters:

- A. Sherif**, M. Ismail, M. Pazos-Revilla**, M. Mahmoud, K. Akkaya, E. Serpedin, and K. Qaraqe, "Privacy Preserving Power Charging Coordination Scheme in the Smart Grid", Book chapter in book titled "Transportation and Power Grid in Smart Cities: Communication Networks and Services", Published by John Wiley, UK, 2018.
- M. Nabil**, M. Bima**, A. Alsharif**, W. Johnson^, S. Gunukula*, M. Mahmoud, M. Abdalla, "Priority-based and Privacy-preserving Electric Vehicle Dynamic Charging System with Divisible E-Payment", Book chapter in book titled "Smart Cities Cybersecurity and Privacy", Elsevier, In press, 2018.

QIU, ROBERT

Book Chapters:

- Robert C. Qiu, L. Chu, X. He, and A. Ai "Spatio-Temporal Big Data Analysis for Smart Grids Based on Random Matrix Theory", in Transportation and Power Grid in Smart Cities: Communication Networks and Services, Editors: M. Rehman, John Wiley, 2017.

VASELBEHAGH, AHMAD

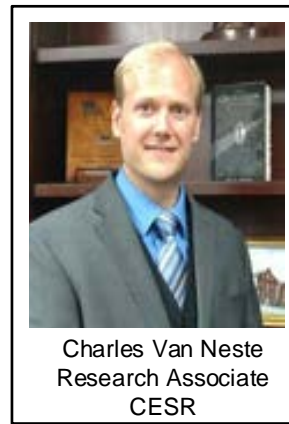
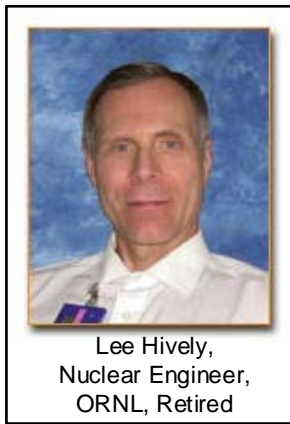
Book Chapters:

- Vasel-Be-Hagh, A.R., "Optimization of Wind Farms for Communities", In: Wind and Solar Based Energy Systems for Communities, Editors: Rupp Carriveau, David S.-K. Ting, The Institution of Engineering and Technology (IET), London, UK, 2018; Chapter 3, 27-61, 2017.

Utility Patent:

- Ali Alouani and Brandon England, Apparatus, System, and Method for Integrated Real Time Low-Cost Automatic Load Disaggregation, Remote Monitoring, and Control. submitted to USPTO Nov. 30. 2017.

1. **LEE HIVELY**, Ph.D., Nuclear Engineer-ORNL (Retired), presented seminar titled, “Novel Energy Applications of Revised Electrodynamics”, in Prescott Hall 225, October 17, 2017.
2. **CHARLES VAN NESTE**, Ph.D., CESR, presented seminar titled, “Quasi-Wireless Capacitive Power Transfer and Its Applications, in Prescott Hall 225, November 7, 2017.
3. **Mithat Kisacikoglu**, Ph.D., University of Alabama, presented seminar titled, “EV-Grid Integration: Challenges and Recent Solutions, in Prescott Hall 225, March 15, 2018.
4. **Joshua W. Shultz**, Tennessee Valley Authority (TVA), presented seminar titled, “TVA Transmission System Operations Overview today and the next 10 years”, in Prescott Hall 225, April 3, 2018.



GRADUATE THESIS/DISSERTATIONS AND OTHER STUDENT PUBLICATIONS**MASTERS****JNANA DEEPIKA BALA**

Summer 2017
Computer Science

STEVEN YANG DUONG

A Semi-Passive Evaporative Cooling Tower Constructed from an Inflatable Fabric Duct
Summer 2017
Professor Stephen Idem
Mechanical Engineering

RERELOLUWA FATUNMBI

Photo Voltaic Integration on Transmission and Distribution Grids with Reduced Storage
Spring 2018
Professor Ghadir Radman and Assistant Professor Rabie Belkacemi
Electrical and Computer Engineering

CHRISTINE GUY-BAKER

Developing a Toposwat Model and Water Quality Index Framework for the Karst-Dominant
Falling Water River Watershed
Spring 2018
Assistant Professor Tania Datta and Associate Professor Alfred Kalyanapu
Civil Engineering

CHAITANYA SAI KODALI

Numerical Simulations of Batch Nanofluid Aggregation/Fragmentation
Spring 2018
Professor John Peddieson
Mechanical Engineering

MD GOLAM MOULA MEHEDI HASAN

Protection by Detection: A Signaling Game Approach to Mitigate Co-Resident Attacks in Cloud
Fall 2017
Assistant Professor Mohammad Ashiqur Rahman
Computer Science

GRADUATE THESIS/DISSERTATIONS AND OTHER STUDENT PUBLICATIONS**MASTERS** (Continued)**MAMAA MONNEY**

Alternative Methods for Estimating Seasonal Factors and Their Accuracy in Prediction of Annual Average Daily Traffic from Short Period Traffic Counts

Spring 2018

Professor Daniel Badoe

Civil Engineering

BRITTANY MURPHY

Fall 2017

Civil Engineering

COLIN PERRY

Application of Groebner Bases to Geometrically Nonlinear Analysis of Rectangular Composite Plates Resting on a Pasternak Foundation

Spring 2018

Professor Jane Liu

Civil Engineering

EMILY REED

Comparison of FEA and Analytical Methods for Determining Stability of a RAP Supported MSE Wall

Spring 2018

Assistant Professor Daniel VandenBerge

Civil Engineering

ARJAN RIMAL

NERC Compliant Adaptive Immune Based Load Frequency Control with Varying Wind Penetrations

Fall 2017

Associate Professor Rabie Belkacemi

Electrical and Computer Engineering

WYATT PATRICK SHERRY

Determination of Intrinsic Stresses Using the Hole-Drilling Method

Summer 2017

Assistant Professor Matthew Yarnold

Civil Engineering

GRADUATE THESIS/DISSERTATIONS AND OTHER STUDENT PUBLICATIONS

MASTERS (Continued)

CHRISTOPHER STEPANICK

Fall 2017
Mechanical Engineering

SASHANKHA TALLAPUDI

Synthesis of High Throughput Lithium Carbonate Nanoparticles in a Scalable Microfluidic Reactor
Fall 2017
Professor Holly Stretz
Chemical Engineering

ALLEN UHLIK

Modeling, Analysis and Control of a PV Supplied Multibus DC Microgrid with Battery Bus Regulation
Summer 2017
Professor Joseph Ojo
Electrical and Computer Engineering

PhD

There were no Ph.D. graduates during 2017-2018 that were funded through the CESR.

Number of Students	M.S. 15	Ph.D. 0
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MS STUDENTS

Name	Dept.	Source of Support	Anticipated Graduation Date	Advisor
Bewermeier, Niclas	ECE	CESR, ECE	Fall 2018	Assistant Professor Mahmoud
Bhattarai, Anshu	CSC	CESR	Fall 2018	Director/Professor Siraj
Datta, Amarjit	CSC	NSF, CSC	Fall 2018	Assistant Professor Rahman
Himes, Joseph Hunter	CHE	ORNL	Fall 2019	Assistant Professor Chavez
Hossain, Md Mosharaf	CSC	ORNL, UNC/ NASA, NSF, CESR	Fall 2018	Associate Professor Ghafoor
Kelley, Alex	CEE	CESR, CEE	Spring 2019	Professor Crouch
Onanuga, Babajide	CHE	CESR	Fall 2018	Professor Biernacki
Reed, Emily	CEE	Luna Innovations, Inc.	Spring 2018	Assistant Professor VandenBerge
Rentschler, Micah	ECE	NSF	Fall 2018	Assistant Professor Bhattacharya
Rikli, Daniel	CEE	NCMA, CEE	Spring 2019	Professor Henderson
Sigler, Meghan	CEE	CESR Cost Sharing for STRIDE Project	Fall 2018	Associate Professor Click
Sonibare, Kolawole	CHE	CESR, CHE	Summer 2019	Assistant Professor Zhang
Stansfield, Noah	CEE	TDOT	Fall 2018	Associate Provost Huo
Turkson, Prince	CEE	CESR, CEE	Fall 2018	Assistant Professor VandenBerge
Ullah, Mohammad Arman	CSC	UNC/NASA, CESR	Fall 2018	Associate Professor Ghafoor

PHD STUDENTS

Name	Dept.	Source of Support	Anticipated Graduation Date	Advisor
Alsharif, Ahmad	ECE	CESR, CEE, TEES/Qatar	Fall 2018	Assistant Professor Mahmoud
Amro, Nadia	CHE	NSF, CESR	Spring 2020	Professor Biernacki
Bima, Muhammad E.	ECE	NSF, CESR, TEES/Qatar	Spring 2021	Assistant Professor Mahmoud
Darbar, Devendrasinh	ECE	CESR	Spring 2021	Assistant Professor Bhattacharya
Enahoro, Oriero	ECE	CMR, ICT Fund, CESR Cost Sharing for ICT Fund	Spring 2020	Associate Professor Hasan
Fagbohunge, Omobayode	ECE	CESR, EPRI	Summer 2021	Associate Professor Belkacemi
Feng, Qing	ECE	NSF	Spring 2020	Professor Qiu
Haruna, Josiah	ECE	CESR, ECE	Fall 2020	Professor Ojo
Jakaria, AHM	CSC	Office of Research, CESR	Spring 2020	Assistant Professor Rahman
Jaladi, Divya	ME	NSF, CESR	Fall 2020	Assistant Professor Languri
Kavimandan, Utkarsh	ECE	CESR	Spring 2020	Director/Professor Mahajan
Li, Xuebin	ECE	NSF	Fall 2020	Professor Qiu
Marshall, Ryan	CSC	CESR	Fall 2018	Associate Professor Ghafoor
Mohammad, Abdul Salam	CHE	NSF, CESR	Fall 2020	Professor Biernacki
Mohammad, Hawzhin	ECE	CESR	Fall 2020	Associate Professor Hasan
Paruchuri, Venkata Avinash	ME	ASHRAE	Spring 2019	Professor Idem
Prabhu, Vinit	ME	CESR	Fall 2020	Assistant Professor Languri

ASHRAE American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.
CEE Civil and Environmental Engineering (Tennessee Technological University)
CESR Center for Energy Systems Research (Tennessee Technological University)
CHE Chemical Engineering (Tennessee Technological University)
CMR Center for Manufacturing Research (Tennessee Technological University)
CSC Computer Science (Tennessee Technological University)
EPRI Electric Power Research Institute
ECE Electrical and Computer Engineering (Tennessee Technological University)
ICT Fund (Information and Communication Technology Fund, United Arab Emirates University)

ME Mechanical Engineering (Tennessee Technological University)
MIT Massachusetts Institute of Technology
UNC University of North Carolina at Chapel Hill
NASA National Aeronautics and Space Administration
NCMA National Concrete Masonry Association Foundation
NSF National Science Foundation
ORNL Oak Ridge National Laboratory
STRIDE Southeastern Transportation, Research, Innovation, Development and Education Center
TDOT Tennessee Department of Transportation
TEES/Qatar Texas A&M Engineering Experiment Station (Funding from Qatar National Research Fund QNRF)

HOURLY STUDENT PERSONNEL

DEGREE AND MAJOR

UNDERGRADUATE STUDENTS

Mary A. Adkisson	B.S. ME
Aaron T. Bain	B.S. ME
Jasmin Baniya	B.S. CSC
Whitley E. Battles	B.S. Nursing
Kalen L. Berry	B.S. EE
Shritesh Bhattarai	B.S. CSC
Alec D. Brenner	B.S. CE
Hannah M. Burns	B.S. Engineering Technology
Donald Zachary Chaney	B.S. ME
Trevon J. Covington	B.S. BIOL
Connor M. Gannon	B.S. CSC
Caleb B. Goodson	B.S. ME
Stephanie A. Hare	B.S. Early Childhood Education
Andrew J. Harris	B.S. CSC
Dylan A. Heath	B.S. Physics
Mason M. Hilliard	B.S. Political Science
Cole W. Howell	B.S. Physics
Jordan A. Johnson	B.S. CSC
Jacob L. Jurkiewicz	B.S. ME
Brandon T. Kemp	B.S. CSC
Jana B. Lack	B.S. BIOL
Chelsey N. Long	B.S. CSC
Amelia B. Lowe	Bachelor of Fine Arts
Benjamin K. Luna	B.S. Physics
Dennis L. Lyle	B.S. CHE
Gabriel Marinescu	B.S. CSC
Nathan A. Martindale	B.S. CSC
Samuel A. Mathews	B.S. CE
Lotte N. McNane	B.S. Chemistry
Sara C. Monteen	B.S. CSC
Leonard D. Mostella	B.S. Physics
Jeffrey S. Neikirk	B.S. CSC
John P. Nelms	B.S. ME
Joseph W. Owens	B.S. EE
Alexander T. Palentyn	B.S. ME
Joseph R. Robinson	B.S. MATH
Marlana R. Smith	B.S. Secondary Education
Nikolas A. Smith	B.S. EE
Trejon C. Spratling	B.S. ME
Jonathan W. Stephenson	B.S. ME
Leif M. Templeton	B.S. CHE
Kristin H. Tilson	B.S. CHE
Layton S. Wells	B.S. ME
Alexander N. West	B.S. CSC
Kaley E. White	B.S. CSC
Ethan T. Williams	B.S. CSC
Andrew P. Worley	B.S. CSC
Cayleigh G. York	B.S. Engineering Technology

HOURLY STUDENT PERSONNEL**DEGREE AND MAJOR****M.S. GRADUATE STUDENTS**

Wesam Al Amiri	M.S. ECE
Brandon L. Anderson	M.S. CE
Niclas Bewermeier	M.S. ECE
Sudipto Chakraborty	M.S. CE
Brandon J. Childress	M.S. ECE
Marco A. Gonzalez Rivas	M.S. ECE
Zachery T. Grigg	M.S. CE
Surya Teja Gunukula	M.S. ECE
Joseph Hunter Himes	M.S. CHE
Thomas M. Hines	M.S. CSC
Md Mosharaf Hossain	M.S. CSC
Kristina Jevtic	M.S. CHE
William A. Johnson	M.S. CSC
Alex H. Kelley	M.S. CE
Miguel P. Lastres	M.S. ECE
Farzin Mashali	M.S. ME
Rahat Masum	M.S. CSC
Mamaa Grant Monney	M.S. CE
Brittany R. Murphy	M.S. CE
Guillermo F. Neumer-Hernandez	M.S. CE
Babajide Y. Onanuga	M.S. CHE
Robert Ponder	M.S. ME
Micah D. Rentschler	M.S. EE
Daniel C. Rikli	M.S. CE
Megan A. Sigler	M.S. CE
Kolawole A. Sonibare	M.S. CHE
Clifton Dillon Tubb	M.S. CE

PH.D. GRADUATE STUDENTS

Ismael K. Abdulrahman	Ph.D. ECE
Cephas N. Ablakwa	Ph.D. Exceptional Learning
Ahmad H. Alsharif	Ph.D. EE
Mohamed I. Baza	Ph.D. ECE
Muhammad E. Bima	Ph.D. ECE
Bo Bonning	Ph.D. CHE
Brandon S. England	Ph.D. ECE
Josiah O. Haruna	Ph.D. EE
A H M Jakaria	Ph.D. CSC
Divya S. Jaladi	Ph.D. ME
Utkarsh Kavimandan	Ph.D. EE
Chaitanya Sai Kodali	Ph.D. ME
Ryan J. Marshall	Ph.D. CSC
Koteswara Rao Medidhi	Ph.D. CHE
Mahmoud Nabil Mahmoud	Ph.D. ECE
Abdul Salam Mohammad	Ph.D. CHE
Mahdi Mohammadizadeh	Ph.D. CHE
Kuseso Onai	Ph.D. EE
Venkata Avinash Paruchuri	Ph.D. ME
Vinit Prabhu	Ph.D. ME

HOURLY STUDENT PERSONNEL

SM-10

HOURLY STUDENT PERSONNEL

DEGREE AND MAJOR

PH.D. GRADUATE STUDENTS (CONTINUED)

Rani V. Penumaka
Md Bulbul Sharif
Bibek Tiwari
Haley D. White

Ph.D. ME
Ph.D. CSC
Ph.D. ECE
Ph.D. CHE

WORK STUDY/WORK SCHOLARSHIP

Jacob T. Epley

B.S. CSC

2017 – 2018

Undergraduate Student	Sponsor	Program	Faculty Advisor
Mary A. Adkisson	Oak Ridge National Laboratory	Nuclear Hybrid Energy Systems: Desalination Case Study	Assistant Professor Laura Arias Chavez
Aaron T. Bain	United States Department of Agriculture	Solar Power Conversion on the Upper Cumberland	Assistant Professor Eshan Languri; Professor and Director Satish M. Mahajan
Jasmin Baniya	Miami University, funding from the Ohio Department of Medicaid	Incorporating the Preferences for Everyday Living Inventory into Ohio's Nursing Homes to Improve Resident Care	Chairperson Gerald Gannod
Whitley E. Battles	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Kalen L. Berry	Tennessee State University funding from the National Science Foundation	Tennessee Louis Stokes Alliance for Minority Participation	Dean Darrell Hoy
Shritesh Bhattarai	Oak Ridge National Laboratory	Benchmark and Analyze Numerical Libraries on HPC Architectures for Performance Prediction	Associate Professor Sheikh Ghafoor
Alec D. Brenner	Luna Innovations, Inc.	Rapid Distributed Sensing of Subsurface In-Situ Stress	Assistant Professor Daniel VandenBerge
Hannah M. Burns	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens

UNDERGRADUATE RESEARCH PROJECTS

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2017 – 2018

Undergraduate Student	Sponsor	Program	Faculty Advisor
Donald Zachary Chaney	Department of Energy	The Structure of Neutron-rich Deformed Nuclei Studied via Beta Decay	Assistant Professor Mustafa Rajabali
Donald Zachary Chaney	Center for Energy Systems Research, Tennessee Technological University	Quasi-Capacitive (QWiC) Power Transfer for Charging a Mobility Scooter and 3D Printing of an Electric Generator for Decoupling of Rotor/Stator Drag Forces	Assistant Professor Charles W. Van Neste
Trevon J. Covington	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Connor M. Gannon	National Science Foundation	CyberTraining: CDL: iPDC - Summer Institute for Integrating Parallel and Distributed Computing in Introductory Programming Classes	Associate Professor Sheikh Ghafoor
Caleb B. Goodson	Center for Energy Systems Research, Tennessee Technological University	Designing a Multipurpose Decay Station	Assistant Professor Mustafa Rajabali
Stephanie A. Hare	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens

UNDERGRADUATE RESEARCH PROJECTS

SM-11

2017– 2018

Undergraduate Student	Sponsor	Program	Faculty Advisor
Andrew J. Harris	National Science Foundation	CyberTraining: CDL: iPDC - Summer Institute for Integrating Parallel and Distributed Computing in Introductory Programming Classes	Associate Professor Sheikh Ghafoor
Dylan A. Heath	Department of Energy	The Structure of Neutron-rich Deformed Nuclei Studied via Beta Decay	Assistant Professor Mustafa Rajabali
Mason M. Hilliard	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Cole W. Howell	Subcontract through the University of Tennessee at Knoxville (funding from the DOE National Nuclear Security Administration)	New High Resolution Neutron Detector for the Studies of Exotic Nuclei (NEXT)	Assistant Professor Mustafa Rajabali
Jordan A. Johnson	Miami University, funding from the Ohio Department of Medicaid	Incorporating the Preferences for Everyday Living Inventory into Ohio's Nursing Homes to Improve Resident Care	Chairperson Gerald Gannod
Jacob L. Jurkiewicz	American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE)	Determine the Absolute Roughness of Phenolic Duct	Professor Stephen Idem
Brandon T. Kemp	Miami University, funding from the Ohio Department of Medicaid	Incorporating the Preferences for Everyday Living Inventory into Ohio's Nursing Homes to Improve Resident Care	Chairperson Gerald Gannod

UNDERGRADUATE RESEARCH PROJECTS

SM-11

2017– 2018

Undergraduate Student	Sponsor	Program	Faculty Advisor
Jana B. Lack	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Chelsey N. Long	Miami University, funding from the Ohio Department of Medicaid	Incorporating the Preferences for Everyday Living Inventory into Ohio's Nursing Homes to Improve Resident Care	Chairperson Gerald Gannod
Amelia B. Lowe	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Benjamin K. Luna	Department of Energy	The Structure of Neutron-rich Deformed Nuclei Studied via Beta Decay	Assistant Professor Mustafa Rajabali
Dennis L. Lyle	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Gabriel Marinescu	Miami University, funding from the Ohio Department of Medicaid	Incorporating the Preferences for Everyday Living Inventory into Ohio's Nursing Homes to Improve Resident Care	Chairperson Gerald Gannod
Nathan A. Martindale	Miami University, funding from the Ohio Department of Medicaid	Incorporating the Preferences for Everyday Living Inventory into Ohio's Nursing Homes to Improve Resident Care	Chairperson Gerald Gannod

UNDERGRADUATE RESEARCH PROJECTS

SM-11

2017– 2018

Undergraduate Student	Sponsor	Program	Faculty Advisor
Samuel A. Mathews	Tennessee Concrete Association; Center for Energy Systems Research, Tennessee Technological University	Testing of Beneficiated Fly Ash Comparison of Beneficiated Mixtures with SEFA CC Mixtures	Professor Lewis K. Crouch
Lotte N. McNane	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Sara C. Monteen	Miami University, funding from the Ohio Department of Medicaid	Incorporating the Preferences for Everyday Living Inventory into Ohio's Nursing Homes to Improve Resident Care	Chairperson Gerald Gannod
Leonard D. Mostella	Subcontract through the University of Tennessee at Knoxville (funding from the DOE National Nuclear Security Administration)	New High Resolution Neutron Detector for the Studies of Exotic Nuclei (NEXT)	Assistant Professor Mustafa Rajabali
Jeffrey S. Neikirk	Miami University, funding from the Ohio Department of Medicaid	Incorporating the Preferences for Everyday Living Inventory into Ohio's Nursing Homes to Improve Resident Care	Chairperson Gerald Gannod
John P. Nelms	Center for Energy Systems Research, Tennessee Technological University	Designing a Multipurpose Decay Station	Assistant Professor Mustafa Rajabali
Joseph W. Owens	Subcontract through the University of Tennessee at Knoxville (funding from the DOE National Nuclear Security Administration)	New High Resolution Neutron Detector for the Studies of Exotic Nuclei (NEXT)	Assistant Professor Mustafa Rajabali
Alexander T. Palentyn	Luna Innovations, Inc.	Rapid Distributed Sensing of Subsurface In-Situ Stress	Assistant Professor Daniel VandenBerge

UNDERGRADUATE RESEARCH PROJECTS

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2017– 2018			
Undergraduate Student	Sponsor	Program	Faculty Advisor
Joseph R. Robinson	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Marlana R. Smith	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Nikolas A. Smith	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Trejon C. Spratling	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Jonathan W. Stephenson	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Leif M. Templeton	Oak Ridge National Laboratory	Nuclear Hybrid Energy Systems: Desalination Case Study	Assistant Professor Laura Arias Chavez
Kristin H. Tilson	Oak Ridge National Laboratory	Nuclear Hybrid Energy Systems: Desalination Case Study	Assistant Professor Laura Arias Chavez
Layton S. Wells	American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE)	Determine the Absolute Roughness of Phenolic Duct	Professor Stephen Idem
Alexander N. West	Miami University, funding from the Ohio Department of Medicaid	Incorporating the Preferences for Everyday Living Inventory into Ohio's Nursing Homes to Improve Resident Care	Chairperson Gerald Gannod

UNDERGRADUATE RESEARCH PROJECTS

SM-11

2017– 2018

Undergraduate Student	Sponsor	Program	Faculty Advisor
Kaley E. White	Miami University, funding from the Ohio Department of Medicaid	Incorporating the Preferences for Everyday Living Inventory into Ohio's Nursing Homes to Improve Resident Care	Chairperson Gerald Gannod
Ethan T. Williams	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Andrew P. Worley	National Science Foundation	CyberTraining: CDL: iPDC - Summer Institute for Integrating Parallel and Distributed Computing in Introductory Programming Classes	Associate Professor Sheikh Ghafoor
Cayleigh G. York	Tennessee Board of Regents	Expanding Diversity: Offering Mentoring and Resources for First Generation Students	Assistant Vice President Robert Owens
Total Count:	48		

ACTUAL, PROPOSED, AND REQUESTED BUDGETSCHEDULE 7

Schedule 7

CENTERS OF EXCELLENCE ACTUAL, PROPOSED, AND REQUESTED BUDGET

	FY 2017-18 Actual		FY 2018-19 Proposed			FY 2019-20 Requested			
	Matching	Appropri.	Total	Matching	Appropri.	Total	Matching	Appropri.	Total
Expenditures									
Salaries									
Faculty	\$210,725	\$247,789	\$458,514	\$88,183	\$296,971	\$385,154	\$82,267	\$231,506	\$313,773
Other Professional	\$17,640	\$127,716	\$145,356	\$5,351	\$195,882	\$201,233	\$0	\$181,918	\$181,918
Clerical/ Supporting	\$0	\$65,933	\$65,933	\$0	\$127,570	\$127,570	\$0	\$91,905	\$91,905
Assistantships	\$276,493	\$173,548	\$450,041	\$66,005	\$295,000	\$361,005	\$115,313	\$130,000	\$245,313
Total Salaries	\$504,858	\$614,986	\$1,119,844	\$159,539	\$915,423	\$1,074,962	\$197,580	\$635,329	\$832,909
Fringe Benefits	\$202,776	\$217,742	\$420,518	\$44,055	\$400,000	\$444,055	\$82,514	\$275,000	\$357,514
Total Personnel	\$707,634	\$832,727	\$1,540,361	\$203,594	\$1,315,423	\$1,519,017	\$280,094	\$910,329	\$1,190,423
Non-Personnel									
Travel	\$98,425	\$19,422	\$117,847	\$49,893	\$55,000	\$104,893	\$14,954	\$20,000	\$34,954
Software	\$3,824	\$3,097	\$6,921	\$3,000	\$2,000	\$5,000	\$2,000	\$3,000	\$5,000
Books & Journals	\$617	\$0	\$617	\$0	\$500	\$500	\$0	\$300	\$300
Other Supplies	\$64,310	\$40,376	\$104,686	\$45,163	\$134,960	\$180,123	\$38,217	\$45,101	\$83,318
Equipment	\$15,500	\$32,988	\$48,488	\$10,000	\$50,000	\$60,000	\$0	\$10,000	\$10,000
Maintenance	\$0	\$3,606	\$3,606	\$0	\$2,000	\$2,000	\$0	\$2,000	\$2,000
Scholarships	\$25,000	\$0	\$25,000	\$0	\$0	\$0	\$0	\$0	\$0
Consultants	\$43,381	\$4,574	\$47,955	\$0	\$1,000	\$1,000	\$0	\$1,000	\$1,000
Renovation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Other (Specify):	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Participant Support Costs	\$186,997	\$0	\$186,997	\$160,600	\$0	\$160,600	\$160,600	\$0	\$160,600
	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Non-Personnel	\$438,054	\$104,064	\$542,118	\$268,656	\$245,460	\$514,116	\$215,771	\$81,401	\$297,172
GRAND TOTAL	\$1,145,688	\$936,791	\$2,082,479	\$472,250	\$1,560,883	\$2,033,133	\$495,865	\$991,730	\$1,487,595
Revenue									
New State Appropriation	\$916,600	\$0	\$916,600	\$944,500	\$0	\$944,500	\$0	\$991,730	\$991,730
Carryover State Appropriation	\$636,574	\$0	\$636,574	\$616,383	\$0	\$616,383	\$0	\$495,865	\$495,865
New Matching Funds	\$1,145,688	\$0	\$1,145,688	\$472,250	\$0	\$472,250	\$0	\$0	\$0
Carryover from Previous Matching Funds	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Revenue	\$1,145,688	\$1,553,174	\$2,698,862	\$472,250	\$1,560,883	\$2,033,133	\$495,865	\$991,730	\$1,487,595

Institution: Tennessee Technological University Center: Center for Energy Systems Research

JUSTIFICATION FOR 2019 — 2020 APPROPRIATIONS REQUEST

The Center for Energy Systems Research (CESR) is requesting a 5% increase in the Appropriations Request for 2019-2020. The Administrative Associate retired in June 2018 and that position will be filled soon. Several projects are already being approved for the 2018-2019 Fiscal Year. It is planned to hire additional personnel to assist with the office duties and computer operations and the addition of a second Research Assistant Professor would be helpful in bringing in additional research projects and in assisting with the work for the projects that are currently being funded. In addition, the CESR has committed to provide funding toward several proposals that are expected to be funded, including Graduate Student Funding and Equipment purchases. Also, the CESR receives many requests each year for graduate research assistantship funding, and it is expected that the Graduate Research Assistants stipends will increase.