



UNIVERSITY OF MIAMI

COLLEGE of
ENGINEERING

MIAMI INSTITUTE FOR CLEAN ENERGY (MInCE)

Quarterly Newsletter
MARCH, 2024, ISSUE 1



POWERING THE FUTURE, ENERGIZING INNOVATION

The **Miami Institute for Clean Energy (MInCE)**, developed based on the research activities and expertise of the College of Engineering faculty, aims to create a cross-disciplinary team of researchers to work on projects involving clean/sustainable energy research and innovation as well as to foster the next generation of energy leaders through educational initiatives and professional development opportunities. Through various research and educational activities, **MInCE** will foster a vibrant and dynamic research community in the field of Clean Energy and promote collaboration among students, professors, and other researchers within the College of Engineering as well as throughout the University of Miami.

WHAT'S INSIDE THIS ISSUE:

Main Faculty/Activities

Active Research Areas

MEAMI

Active Research Grants

Upcoming Events

Faculty Spotlight

<https://cleanenergy.coe.miami.edu>

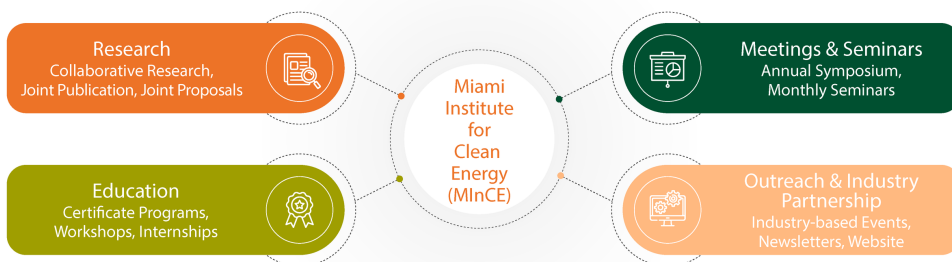
<https://www.coe.miami.edu>

MAIN FACULTY

Research Areas (Coordinator)	Faculty Members	Dept
Env Benign Energy Production (P. Biswas)	P. Biswas	CEM
	F. Rezaei	CEM
Climate Engineering (P. Suraneni)	P. Biswas	CEM
	A. Ghahremani	CAE
	H. Solo	CAE
	P. Suraneni	CAE
	L. Rhode Barbagros	CAE
	S. Ramanathan	MAE
Energy Storage and Utilization (X. Zhou)	J. Li	MAE
	P. Biswas	CEM
	G. Zha	MAE
	M.R. Wang	ECE
	L. Pestana	CAE
	S. Khizroev	ECE
Energy Environment Nexus (E. Andiroglu)	H. Liu	MAE
	G. Wang	CAE
	C. Luo	CEM
	E. Andiroglu	CAE
	P. Biswas	CEM
	M. Erkoc	ISE
	J. Li	MAE
	C. Wang	MAE
Energy Analytics (R. Moghaddass)	C.Y. Wu	CEM
	N. Celik	ISE
	C.B. Chen	ISE
	M. Erkoc	ISE
	R. Moghaddass	ISE
	G. Wang	CAE
Autonomous Mobility (G. Zha , S. Ramanathan)	M. Cheng	CAE
	Y. Hu	ISE
	G. Zha	MAE
Supply Chain Innovation & Resilience (M. Erkoc)	Q. Yang	MAE
	S. Ramanathan	MAE
	M. Erkoc	ISE
	R. Moghaddas	ISE

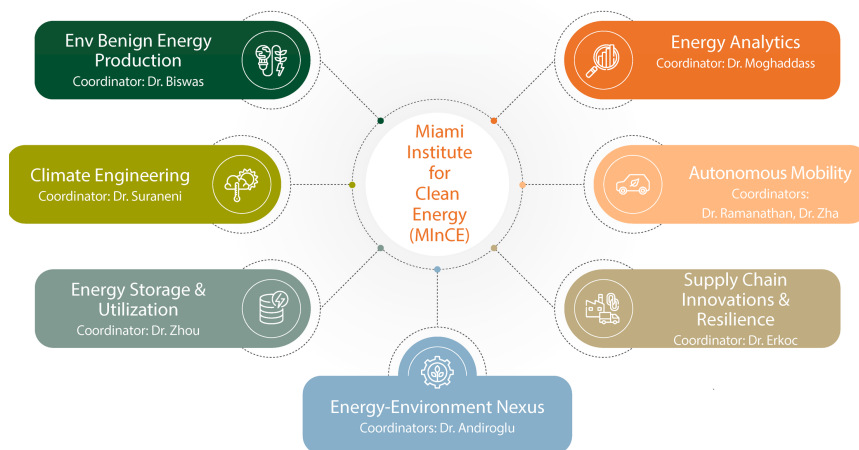
ACTIVITIES

The Miami Institute for Clean Energy, developed based on the research activities and expertise of the College of Engineering faculty, aims to create a cross-disciplinary team of researchers to work on projects involving clean/sustainable energy research and innovation as well as to foster the next generation of energy leaders through educational initiatives and professional development opportunities. Through various research and educational activities, **MinCE** will foster a vibrant and dynamic research community in the field of Clean Energy and promote collaboration among students, professors, and other researchers within the College of Engineering as well as throughout the University of Miami.



FOCUS AREAS

The Miami Institute for Clean Energy is committed to driving the advancement of clean energy technologies and tackling crucial challenges in sustainable energy production. Through extensive research, **MinCE** focuses on various interdisciplinary fields that contribute to the clean energy landscape. These fields include renewable energy integration, energy storage technologies, energy analytics, climate and environment, carbon capture, and utilization. Additionally, **MinCE** places significant emphasis on energy efficiency analysis and optimization, smart grid analytics, and sustainable fuel production. The goal of these research endeavors is to foster the development of groundbreaking solutions for clean and efficient energy generation, leading us toward a more sustainable and environmentally friendly future.



ACTIVE RESEARCH AREAS

MinCE research activities span a wide range of topics focused on the intersection of energy, environment, and sustainability. Key areas include the development of sustainable materials and technologies for energy efficiency and carbon capture, the assessment of environmental impacts and life cycle of products, and innovations in renewable energy integration within supply chains. It also delves into advanced energy storage solutions, smart grid analytics, and autonomous mobility systems to promote energy efficiency and reduce environmental footprints. **MinCE** aims to foster climate resilience, decarbonization, and environmentally benign energy production through its multidisciplinary research efforts. Research areas covered by **MinCE** are determined based on the interests and expertise of the faculty at the College of Engineering that together can address some of the major challenges facing the energy industry today. **MinCE** currently has **seven** key focus areas. Each faculty member belongs to at least one of these 7 focus areas. A high-level list of ongoing research topics within each of the seven focus areas of **MinCE** is presented below.



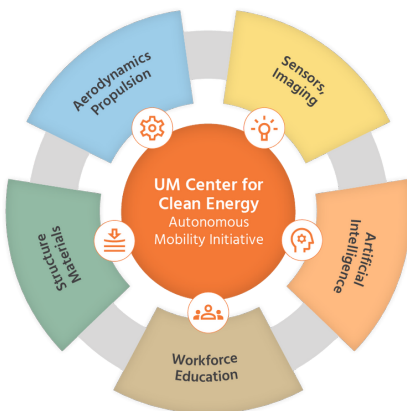
MinCE invites University of Miami researchers to collaborate with our faculty in various clean energy focus areas. Interested parties are encouraged to contact relevant faculty members to discuss potential joint proposals, publications, and other activities. We are open to new and innovative ideas to advance our mission. This is a call to unite our expertise and creativity for a sustainable energy future. Let's make a difference together.

MIAMI ENGINEERING AUTONOMOUS MOBILITY INITIATIVE (MEAMI)

A UNIVERSITY – INDUSTRY – GOVERNMENT CONSORTIUM

Vision

Establish a world-class consortium of academia, industry, and government to advance technological developments and resolve social challenges of autonomous mobility (AM) and make it a reality.



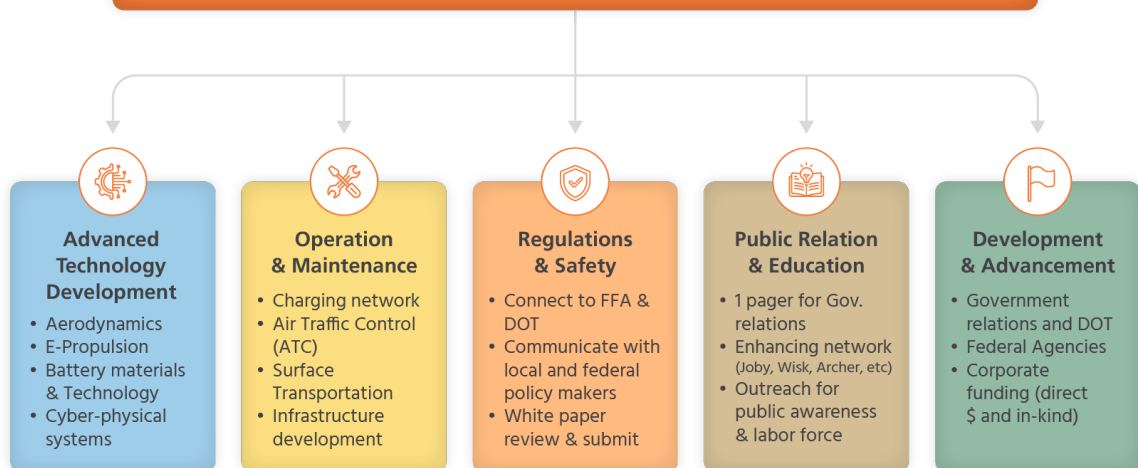
Mission

- Holistically address various aspects of autonomous mobility.
- Advance full electric vertical/short takeoff landing (eV/STOL) aircraft technology with ultra-high transportation productivity, low noise, and high safety for public acceptance in an economically viable manner.
- Development of diversified workforce of future engineers and scientists to support the AM industry and realize economic benefits.

Execution Verticals and Activities

Miami Engineering Autonomous Mobility Initiative (MEAMI)

A university—industry—government consortium to advance technological developments and resolve social challenges of autonomous mobility (AM) and make it a reality.



Founding Partners



ACTIVE RESEARCH FUNDING

Current research of researchers in **MinCE** is advancing a portfolio of innovative projects including the engineering of sustainable batteries, the exploration of advanced nanomaterials for solar energy, the development of smart HVAC systems for energy-efficient buildings, and data-driven energy analytics. Efforts also encompass enhancing infrastructure resilience with bio-inspired materials and high-performance construction technologies. Collaboration in multifield device research, windstorm resilient coastal defenses, and dynamic system monitoring further illustrate the **MinCE's** commitment to integrating sustainability and cutting-edge technology in its research endeavors. Below is a list of some of the externally funded research grants in which members of **MinCE** are actively engaged.

Faculty Name	Dept	Project Name (External Projects led by COE Faculty)	Source
Luo	CEM	CAREER: Organic Structure and Interphase Engineering for Fast-Charging, High-Temperature and Sustainable Batteries	NSF
		Collaborative Research: Catholyte Molecular Design For Non-aqueous	NSF
		CAS: Understanding the Electrochemistry of Carboxylate Compound-Based Organic Anodes in Rechargeable Sodium and Potassium Batteries	NSF
Solo	CEM	Feasibility Study of a Full Scale Seaweed Compost	Hinkley
		Evaluating Compost as a Means to Recycle Sargassum Macroalgae	Hinkley
Biswas	CEM	Pressurized Combustion for Carbon Dioxide Control	DOE
		Nanomaterials for Solar Energy Application to Power PM Sensors	NSF
		MRI Grant – Setting up Aerosol Instrumentation	NSF
Kizroev	ECE	GOALI: Magnetoelectric Nanoparticles As Multi-Field Controlled Devices	NSF
Wang	MAE	AccelNet-Implementation: Broadening Carbon Ring	NSF
		Tuning the Frequency Response of Fractional-Order Microsupercapacitors	NSF
		IRES Track 1: US-Japan Collaborative Research and Education Effort for Synthesis and Applications of Functional Nanomaterials	NSF
Li	MAE	Methane sensing (Integrating Multi-Source Data for Landfill Methane Emission Quantification)	NSF
Wang	CAE	Intelligent HVAC Load Management for Energy Efficient and Disaster Resilient Building Operations	DoD ESTCP
		Performance demonstration of an integrated water-source heat pump water heater system to meet simultaneous heating and cooling demands at military installations	DoD ESTCP
		Demonstration of a Solar-Geothermal District Heating and Cooling System with a Single Pipe Loop in Citizen Potawatomi Nation	DOE
Wang & Andiroglu	CAE	Advanced HVAC Load Management using Cascade Controls Integrating Chillers, Air Handling Units, and Terminal Boxes (2024-2028)	DoD ESTCP
Ghahremani	CAE	Bio-Inspired Rational Design of Bio-Based Inhibitors for Mitigating Internal Corrosion in Metal Pipelines	USDOT
		Bio-Inspired Genetically Engineered Self-Healing for Sustainable Cementitious Materials	NSF
		Naval infrastructure Resilience Research	ONR
		MRI: Acquisition of a High Resolution X-Ray Micro-Computed Tomography System for Multidisciplinary Research & Education	NSF
		REU Site: Coastal Infrastructure Resilience Research (CIRR)	NSF
Pestana & Suraneni	CAE	Multiscale mechanisms of dissolution and reactivity of calcium aluminosilicate glasses	NSF
Suraneni	CAE	Enhancing windstorm resilience of coastal communities through ultra-high performance glass fiber reinforced concrete seawalls	NSF
Rhode Barbarigos, Andiroglu	CAE	Large-scale CoPe: Reducing Climate Risks with Equitable Nature-based Solutions: Engaging Communities on Reef-Lined Coasts	NSF
Andiroglu	CAE	Electrohydromodulation – Residential Scale Reactor	FDEP
		Development of a Standard for Next Generation Pipe Sizing; 4 year project funded	ICC
		Development of a Standard for Onsite Wastewater Treatment, Reclaim Reuse	ICC
		Water, Energy and Carbon Reduction benefit analysis for adaptation of 2021 International Water Conservation Code Provisions	IWCCP
Moghaddass	ISE	Energy Analytics for Residential and Commercial Buildings	MDC
		Department of Energy Industrial Research and Assessment Center	DOE
		CAREER: A Sensor-Driven Framework for Real-time Monitoring & Control in Dynamic Systems	NSF
Moghaddass & Erkok	ISE	Southeast Building Training, Research, and Assessment Center	DOE
Celik	ISE	PECASE Award on Smart Energy Systems	DOD



UPCOMING EVENTS



COLLEGE TOWN HALL

CLEAN ENERGY – BATTERY TECHNOLOGY, ENERGY ANALYTICS, MEAMI

March 22, 2024

11:00 a.m.

CLEAN ENERGY SUMMIT

April 15, 2024

8:00 a.m. - 5:00 p.m.

MEAMI SUMMIT

April 16-17, 2024

7:30 a.m. - 5:00 p.m.

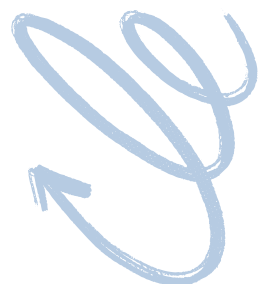
CLEAN ENERGY SEMINAR SERIES

April 26, 2024

1:00 p.m.

May 17, 2024

1:00 p.m.



MIAMI CLEAN ENERGY SUMMIT

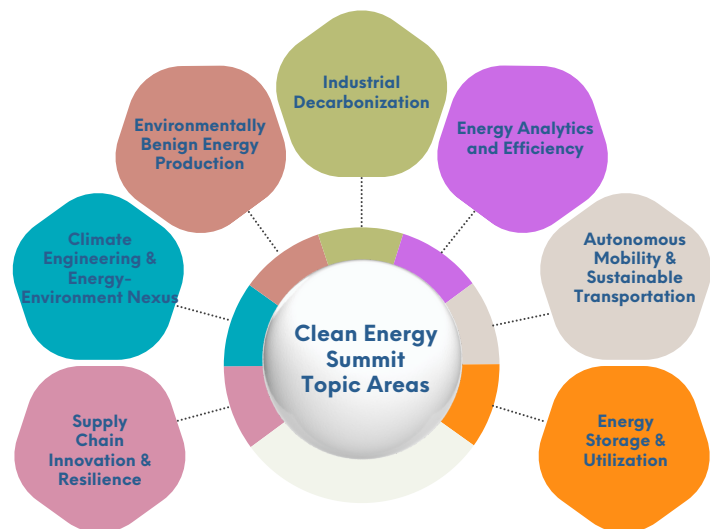
Innovations in Energy Transitions

April 15, 2024 | 8:00 a.m. - 5:00 p.m.

University of Miami

Shalala Center

The **University of Miami Clean Energy Summit** is poised to be a pivotal event, underscoring Miami's growing role as a hub for clean energy innovation, sustainable practices, and resilience against climate change. The summit will bring together a diverse array of participants from academia, state and federal governments, local community stakeholders, and the energy sector, all converging in Miami. The event will shape the future of clean energy innovations and contribute to the global move towards cleaner, more sustainable energy solutions. We will go beyond theory and academic considerations to catalyze real-world change and establish collaborations that leverage Miami's unique and critical position in the clean energy landscape.



SUMMIT HIGHLIGHTS

- ✓ INDUSTRY, COMMUNITY, AND CEO PANELS
- ✓ TECHNICAL SESSIONS
- ✓ NETWORKING SESSIONS

TENTATIVE SCHEDULE

8:00 am - 8:30 am	Registration and Breakfast
8:30 am - 9:00 am	Welcome and Introduction
9:00 am - 10:30 am	CEO/CXO Panel 1 (Investing in the Green Future: Opportunities & Challenges)
10:30 am - 10:45 am	Coffee Break/Poster Session
10:45 am - 12:00 pm	Community/Federal Agency Panel 2 (Community-Driven Clean Energy Initiatives)
12:00 pm - 1:00 pm	Networking and Lunch + Poster Session
1:00 pm - 2:00 pm	Industry Panel 3 (Decarbonization and Electrification in U.S. Industries)
2:00 pm - 3:15 pm	Technical Sessions 1&2 (Analytics, Supply Chain, Carbon Capture, Utilization, Storage)
3:15 pm - 3:30 pm	Coffee Break/Poster Session
3:30 pm - 4:45 pm	Technical Sessions 3&4 (Climate & Environment Engineering/Autonomous Mobility)
4:45 pm - 5:00 pm	Award Ceremony

**REGISTRATION CLOSES
ON APRIL 1, 2024
Register Here!**

**SUBMIT POSTER/ABSTRACT BY
MARCH 29, 2024**

FACULTY SPOTLIGHT

Dr. Gang Wang
Associate Professor
Civil and Architectural Engineering



Dr. Wang, an Associate Professor at Civil and Architectural engineering, is an expert in heating, ventilation, and air conditioning systems. Professor Wang is the director of the HVAC laboratory at the University of Miami. He has published more than 100 peer-reviewed articles. He was selected as one of five finalists in the 2011 ConocoPhillips Energy Prize and the recipient of 2021 ASHRAE Crosby Field Award.

His research focuses on design, modeling, control, optimization, and fault detection and diagnosis of building mechanical and power systems, especially VFD-motor-fan/pump systems, and advanced engineering controls.

Dr. Ali Ghahremani
Associate Professor
Civil and Architectural Engineering



Dr. Ali Ghahremaninezhad is an Associate Professor in CAE and director of the Advanced Materials Research Lab at the University of Miami. His expertise is in the area of low-carbon and green infrastructure materials, advanced and smart cementitious materials, and bio-inspired self-healing infrastructure materials. He has been the recipient of the prestigious 2019 National Science Foundation CAREER award. He has conducted research supported by federal, state, and local agencies, and industry including NSF, Office of Naval Research, NASA, Federal Highway Administration, Florida Department of Transportation, Miami-Dade County, and Ocean Technology Groups.

Please share your research stories and news with us for the opportunity to be featured in our next newsletter.