



UNIVERSITY OF MIAMI  
COLLEGE of  
ENGINEERING

# MIAMI INSTITUTE FOR CLEAN ENERGY (MInCE)

Quarterly Newsletter  
SEPT 2024, ISSUE 2



## MISSION

The Miami Institute for Clean Energy (MInCE) is actively seeking collaborative partnerships within the College of Engineering (COE), other departments at the University of Miami, and local industries to drive forward cutting-edge research in clean energy. Our institute is dedicated to advancing sustainable energy solutions through interdisciplinary cooperation, leveraging the diverse expertise across the university and the practical insights from industry partners. MInCE aims to play a pivotal role in this mission, focusing on key areas, such as renewable energy integration, energy production, energy storage technologies, and smart grid innovations and analytics. Our overarching goal is to contribute to the development of innovative, practical solutions that will lead to a cleaner, more sustainable future for all. Through this collaborative effort, MInCE aims to position the University of Miami and its local partners as leaders in the global transition to clean energy and as key innovators in the development of sustainable energy solutions for future generations.

## WHAT'S INSIDE THIS ISSUE:

Research Activities

Past Events

Research News

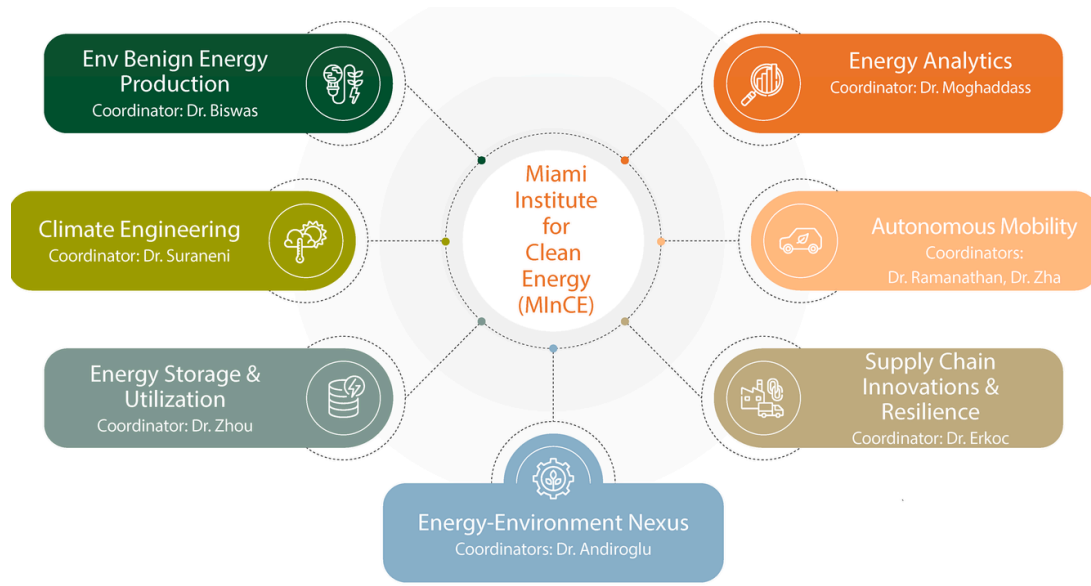
Upcoming Events

Faculty Spotlight

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

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

# RESEARCH ACTIVITIES



## The Miami Institute for Clean Energy (MInCE) focuses on the following key research areas:

- Environmental Benign Energy Production - Coordinated by **Dr. Biswas**, this area focuses on creating energy solutions that are environmentally friendly.
- Climate Engineering - Coordinated by **Dr. Suraneni**, this research area aims at developing engineering solutions to mitigate and adapt to climate change.
- Energy Storage & Utilization - Under the guidance of **Dr. Zhou**, this area explores efficient storage and utilization methods for clean energy.
- Energy-Environment Nexus - Coordinated by **Dr. Andiroglu**, this area examines the intersection between energy production and environmental impact.
- Energy Analytics - Led by **Dr. Moghaddass**, this area focuses on the analysis and optimization of energy systems.
- Autonomous Mobility - Coordinated by **Dr. Ramanathan** and **Dr. Zha**, this area explores the integration of clean energy in autonomous transportation systems.
- Supply Chain Innovations & Resilience - Coordinated by **Dr. Erkoç**, this area focuses on improving the sustainability and resilience of supply chains in the energy sector.

These research areas highlight MInCE's commitment to advancing clean energy solutions through interdisciplinary collaboration. Several groups are actively working on strategic initiatives in preparation for major grant opportunities like ERCs.

MInCE is pleased to offer **letters of support** for partnerships and collaborations related to projects that align with our key research areas. Please reach out to the **coordinators** of each team to discuss potential collaboration opportunities.

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



# PAST EVENTS

## MIAMI CLEAN ENERGY SUMMIT (APRIL 15, 2024)

The 2nd Annual Miami Clean Energy Summit held on April 15, 2024 highlighted cutting-edge research, fostered partnerships, and explored actionable strategies to enhance the energy landscape in South Florida and beyond. The Clean Energy Summit, hosted by the University of Miami's College of Engineering, brought together industry leaders, government officials, and academic experts to discuss advancements in clean energy and the role of technology in addressing climate change. Key discussions included the challenges and opportunities in transitioning Miami's energy infrastructure, with a focus on collaboration between businesses, utilities, and government. Highlights included innovations in solar energy, battery storage, clean hydrogen, and autonomous mobility, along with FedEx's efforts to reduce carbon emissions. The newly established Miami Institute for Clean Energy is leading research in sustainable technologies, including energy-efficient systems and carbon capture, fostering collaboration to advance clean energy solutions. The summit provided ample opportunities for networking, enabling participants from various sectors to exchange ideas and forge partnerships aimed at accelerating clean energy initiatives. Attendees included representatives from major companies like Siemens Energy, MasTec, and Florida Power and Light, along with academic researchers and local government officials, all working together to tackle Miami's unique energy challenges.



Pratim Biswas, dean of the College of Engineering, discusses the future of clean energy solutions with panelists Jose Mas, CEO of MasTec; Richard Voorberg, president of Siemens Energy North America; Ajit Sapre, president of Reliance Industries Ltd.; and Tim Oliver, vice president of development at Florida Power and Light, during the Miami Clean Energy Summit in Miami.

For more information about the event, please visit [here!](#)

# MIAMI CLEAN ENERGY SUMMIT

## APRIL 15, 2024

### Technical Sessions



Over 28 poster presenters from multiple universities in Florida and various UM departments showcased their work related to clean energy during the poster session.



### WINNERS

#### Best Poster Award Winners

1. C-MEMS Platforms for Miniaturization of Energy Storage and Power Generation Devices by Kepei Miao; Yunhe Zhao; Chunlei Wang
2. Particle Formation in Plasma-Assisted Combustion by Chanakya Bagya Ramesh; Daoru Han; Yang Wang
3. Single-Step Aerosol Methods for Lignin Valorization by Sujit Modi, Pratim Biswas
3. Network Anomaly Detection with Topological Features Utilizing Graph Neural Networks by Ibrahim Ahmed; Ramin Moghaddass

#### Best Technical Presentation Award Winners

1. Waste Concrete and Seawater for Green Carbon Capture and Utilization by Abhishek Ratanpara; Myeongsu Kim
2. Mechanochemical activation of basaltic fines to produce low-carbon cement replacement materials by Sofiane Amroun; Luca Galli; Wasiu Alimi; Prannoy Suraneni



# RESEARCH NEWS

## NEW GRANTS RECEIVED THIS QUARTER

**Title:** Evaluation of Sargassum Recycling Options through Risk-Based Approaches, **Amount:** \$55,000

**Recipients:** Dr. Helena Solo (hmsolo@miami.edu)

**Notes:** This proposal will be evaluating BioChar, Compost, and Biofuel at Recycling Options for Sargassum Seaweed.

**Title:** NSF Grants: 1) Digital Network Twins: Mapping Next Generation Wireless into Digital Reality, 2) Towards Secure, Resilient, Privacy-enhancing Digital World Experiences, **Amount:** \$300,000 (first grant), \$200,000 (second grant)

**Recipients:** DR. Ming Zhe (mingzhe.chen@miami.edu)

**Title:** DOE Limestone Calcined Clay Cement Project, **Amount:** \$460,968 (UM share), \$61,000,000 (total)

**Recipients:** Dr. Prannoy Suraneni (suranenip@miami.edu)

**Notes:** Roanoke Cement Company is the lead.

**Title:** EDA Tech Hubs Phase II, **Amount:** \$2,280,997 (UM share), \$19,500,000 (total)

**Recipients:** Dr. Prannoy Suraneni (suranenip@miami.edu)

**Notes:** Miami-Dade County is the lead. The College of Engineering and the Climate Resilience Academy are leading a project to advance concrete technologies as part of a \$19.5 million grant for the South Florida ClimateReady Tech Hub.

**Title:** Argonne National Lab, **Amount:** \$72,000

**Recipients:** Dr. Chao Luo (cxl1763@miami.edu)

**Notes:** A sub-award from Argonne National Lab.

**Title:** NSF Grant, **Amount:** \$546,366

**Recipients:** Dr. Chao Luo (cxl1763@miami.edu)

**Notes:** Chao Luo is the Lead PI.

For more information on the College of Engineering News, please visit [here!](#)



Miami-Dade County Mayor Daniella Levine Cava, second from left, and U.S. Assistant Secretary of Commerce for Economic Development Alejandra Castillo, third from right, with recipients of federal grant funding for the South Florida ClimateReady Tech Hub, which was announced at Florida International University recently. Prannoy Suraneni, associate professor of civil and architectural engineering at the University of Miami, is pictured second from the right. Photo: Courtesy of Miami-Dade County.

## SELECTED PUBLICATIONS

- Zhao W., Wang L., Zhang Z., Fan H., Zhang J., Mirjalili S., Khodadadi N., Cao Q., Electric Eel Foraging Optimization: A New Bio-Inspired Optimizer for Engineering Applications (2024) Expert Systems With Applications, 238, art. no. 122200.
- Lou Y., Ye Y., Yang Y., Zuo W., Wang G., Energy Modeling of Typical Commercial Buildings in Support of ASHRAE Building Energy Quotient Energy Rating Program (ASHRAE RP-1771) (2024) Science and Technology for the Built Environment, 30 (2), pp. 101 – 133.
- Gómez P., Shaikh N.I., Erkoc M., Continuous Improvement in the Efficient Use of Energy in Office Buildings Through Peers Effects (2024) Applied Energy, 360, art. no. 122646.
- Xu K., Zha G., Distortion Elimination for Serpentine Duct at Various Mach Numbers Using Co-Flow Jet Active Flow Control (2024) Aerospace Science and Technology, 144, art. no. 108776.

# UPCOMING EVENTS



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## ENGINEERING RESEARCH DAY (HIGHLIGHTING PHD STUDENT RESEARCH) ENERGY TRACK

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Nov 15, 2024

11:00 a.m.

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## University of Miami 3rd Clean Energy Summit

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April 25, 2024

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

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## MEAMI SUMMIT

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Feb 14, 2025

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

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## CLEAN ENERGY SEMINAR SERIES (FALL 2024)

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Sept 27, 2024 (Dr. Antonio Campello, AAMAX)

11:00 a.m.

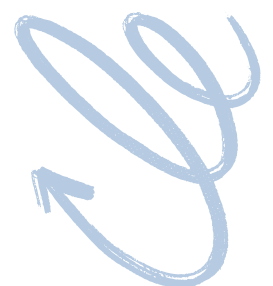
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October 14, 2024 (Dr. Shawn Sheng, NREL)

1:00 p.m.

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Nov 21, 2024 (TBD)



# FACULTY SPOTLIGHT

**Dr. Fateme Rezaei**

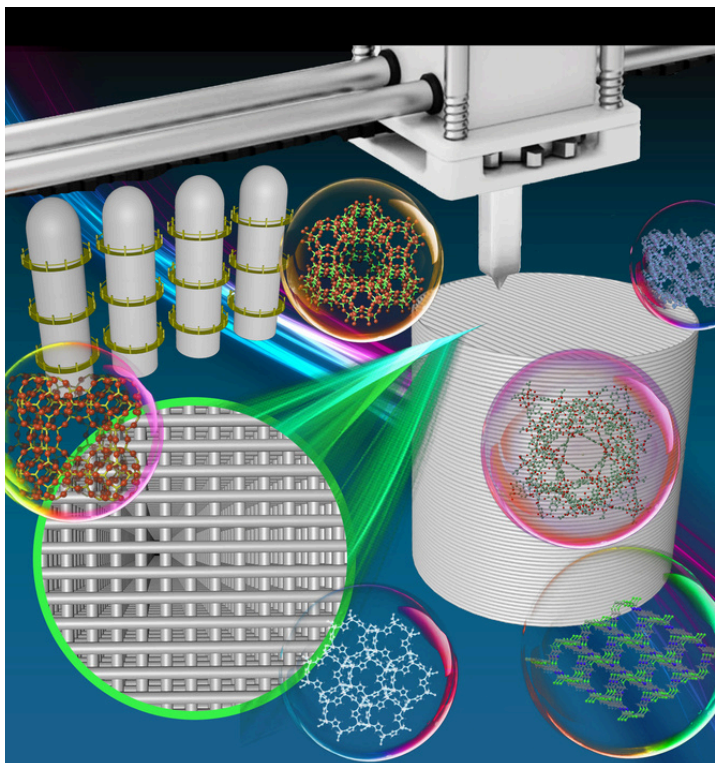
**Professor**

**Environmental, and Materials Engineering Department**

**Faculty Profile [Webpage](#)**



Dr. Rezaei is a Professor of Chemical Engineering in the Chemical, Environmental, and Materials Engineering Department at the University of Miami (UM). Before joining UM, she held Linda and Bipin Doshi Endowed Professor of Chemical Engineering at Missouri S&T. She obtained her PhD degrees in Chemical Engineering from Monash University in Australia and LTU in Sweden in 2011. She worked as a postdoctoral fellow at Georgia Tech. Her research focus broadly lies at the interface of chemical, materials science, and environmental engineering, and the overall goal of her research group is the development of advanced materials and processes for separation, purification, and storage applications. She is the author of over 150 peer-reviewed journal articles and has received several awards including the 2021 ACS Women Chemists Committee (WCC) Rising Star Award; the 2020 UM System President's Award for Career Excellence-Early Career; 2018 Energy & Fuels Award for Excellence in Publication; as well as 2021 and 2018 Missouri S&T Faculty Research Award. She is the Associate Editor of *ACS Energy & Fuels* journal and an editorial member of the *Journal of CO<sub>2</sub> Utilization* and *Frontiers in Energy Research*.



**Description:** The cover highlights shape engineering of porous solids such as adsorbents and catalysts via additive manufacturing (3D-printing) into structured configurations that can exhibit comparable performance to that of powder parents, while addressing the drawbacks associated with the traditional configurations when operated at large-scale. These structured configurations can be used in a wide variety of energy and environmental applications such as separation & purification, sustainable chemical production, carbon capture and utilization, among others.

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