Making breakthroughs in distributed energy.

We collaborate to solve key technical challenges that are holding back distributed-energy storage and generation, and accompanying power-management systems.

We research and develop higher-performance and lower-cost materials and devices for energy generation, storage and conversion.

We partner with innovators on electric vehicles, microgrids, photovoltaic panels, wind turbines, wearable power devices and more.

UC San Diego’s world-renowned microgrid serves as a real-world test bed for our work, which is rooted in thoughtful analyses of the economics of distributed energy.

**Collaborate with us.**

FROM THEORY TO MICROGRID, WE INNOVATE.

- **THEORY AND COMPUTATION**
- **SYNTHESIS AND FABRICATION**
- **CHARACTERIZATION AND DIAGNOSIS**
- **MANUFACTURING AND INTEGRATION**
- **MICROGRID TESTING**
- **ECONOMIC EVALUATION**

Your Energy Workforce

We train and mentor our students to become tomorrow’s workforce for green and advanced energy.

Engage and recruit students working at the cutting edge of materials genome computation and design, real-time monitoring of energy devices, scalable nanomaterials manufacturing methods, microgrid design and control, and economic analysis of disruptive new technologies in microgrids.
Interfaces: Demons in Energy Devices

“Devices for energy storage and conversion live and die at materials interfaces – and yet – materials behavior at crucial interfaces is often a mystery. Our research teams have developed unique expertise to design, control and characterize energy-materials interfaces like never before. We work from the atomic level up through nano, micro and macro scales. Through the synergy of interfacial science and engineering, we are uniquely positioned to design, predict and characterize what is occurring – sometimes in real time – at key materials interfaces.”

— Shirley Meng, Ph.D.
Sustainable Power and Energy Center Director

NANOENGINEERING
Shaochen Chen
3D printing of porous materials with nanoscale designer architecture

David Fenning
Defect engineering for high efficiency solar cells and solar-to-fuels

Darren Lipomi
Ultra-flexible and stretchable solar cells and inexpensive, large-area graphene

Ping Liu
Materials and architectures for energy conversion and storage systems

Jian Luo
Novel materials processing methods and interfacial engineering of materials for energy-related applications

Shirley Meng
Electrochemical energy storage and conversion materials, advanced diagnosis for battery materials

Shyue Ping Ong
Data-driven computational design of materials

Andrea Tao
Colloidal synthesis, low dimensional materials for energy storage, plasmonic nanoparticles for photovoltaics and photocatalysis

Joseph Wang
Wearable energy harvesting devices, porous electrodes and electrocatalysis

Sheng Xu
Soft inorganic materials for energy harvesting and storage devices

Kesong Yang
High-throughput computational design and property optimization of functional materials

PHYSICS
Oleg Shpyrko
Advanced X-ray microscopy of ionic, magnetic and electronic materials

CHEMISTRY AND BIOCHEMISTRY
Michael Sailor
Silicon nanotechnology, surface chemistry and coatings, silicon-lithium anodes, photonic crystals

COMPUTER SCIENCE AND ENGINEERING
Tajana Rosing
Modeling and control of distributed energy resources, Internet of Things infrastructure

ELECTRICAL AND COMPUTER ENGINEERING
Eric Fullerton
Ultra-low-energy memory, processing elements and architectures

MECHANICAL AND AEROSPACE ENGINEERING
Renkun Chen
Materials and devices for thermal energy transport and conversion

STRUCTURAL ENGINEERING
Yu Qiao
Low-grade heat, energy harvesting, green cement, energy efficiency, thermal runaway in batteries

ECONOMICS
Graham Elliott
Market specific algorithms to construct realistic estimates of the direct economic value of the energy storage device

UC SAN DIEGO MICROGRID
Byron Washom
Director of Strategic Energy Initiatives

JOIN US
We welcome industry partners, faculty members and researchers to join the Sustainable Power and Energy Center.