Center for Innovation on New Energies

• Aims to:
  • Develop **radically better energy carriers** using low cost **solar energy** combined with novel technologies for **energy storage and conversion**;
  • Find **new pathways to convert methane to chemical products** (e.g. methanol, acetylene).
• The **Mission** of Cine is to perform world-class research in the areas of energy carriers, energy storage, methane to products and computational material science and chemistry.
• The **Vision** is to be a Worldwide Center of Excellence in Development and Design of Electrochemical Systems and New Materials for Renewable Energies

Leading research Institutions in Brazil

[Logos of UNICAMP, IFN, USP]

Founder sponsors:

[Logos of FAPESP, Shell]

Photos (from the top): 1. CINE Event Launch (May 2018), Opening Session with FAPESP Directors, Shell Brazil Country Chair and GM Brazil Technology; 2. CINE’s Principal Researchers presenting respective Research Divisions; 3. Official event photo - FAPESP, Shell and Research Institutes representatives.
Electricity /Biofuels/Chemicals – Solar sources

- Sustainable future for a better world will need more renewable energy
- By 2050 Electrical energy are expected to move from 18% to 50%
- CO₂ emissions must be reduced
- Solar Energy -Photo Voltaics (1st, 2nd, 3rd) generations and solar driven route to synthesize molecules
- Methane (Biomethane) to fuels.
- Energy has to be stored
### Research Areas

#### Dense Energy Carriers
- New functional materials for H₂ production from solar water splitting
- CO₂ Photoreduction to products with high added values
- Low cost high efficiency perovskite solar cells for Artificial Photosynthesis and solar-to-fuel conversion

#### Advanced Energy Storage
- Development of carbon-based (biocarn) materials for Supercapacitors
- Design and manufacturing of new electrodes for Li-O₂ batteries (carbon-based materials + noble metal nanoparticles)
- Design of Supercaps and Batteries

#### Methane Conversion to Products
- Formation of Methanol from CH₄ in Fuel Cells
- CH₄ conversion to high value added chemical products, coupled with H₂ from water splitting
- Ceria ceramic composites for high temperature (solar concentrator) CH₄ conversion

#### Computational Material Science & Chemistry
- Methane conversion to high density energy carriers based on porous and nanomaterials
- CO₂ capture and reduction based on porous and nanomaterials
- Conversion of solar energy into electricity using chalcogenides, perovskites and organic materials
- Multiscale computational approach for fundamental investigations of batteries and ultra(super)capacitors
Researchers distribution within Sao Paulo State, Brazil

224 researchers
9 research institutions
20 RESEARCH PROJECTS

240+ RESEARCHERS ENGAGED

10 MLN USD SHELL INVESTMENT

18+ MLN USD CO-INVESTMENT FROM FAPESP AND UNIVERSITIES

4 RESEARCH PROGRAMS

20+ GLOBAL RESEARCH COLLABORATIONS
Challenges and Opportunities

New energies - quick solutions are required and Technologies rely strongly in the coupling of Fundamental and applied Science. Sustainabiliy (economicaal, social and enviromental) is an issue that is mandatory.