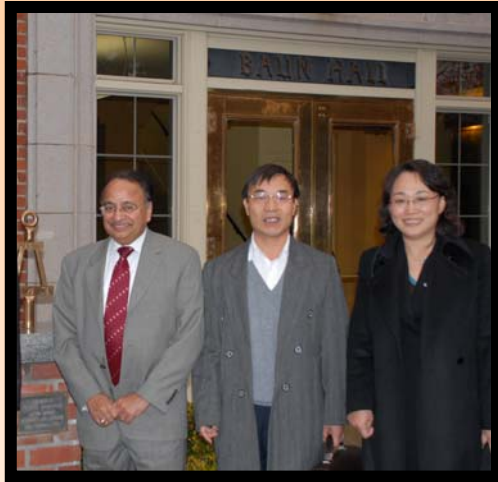


PRRC Leadership

The Pacific Resources Research Center (PRRC) is led by a cadre of accomplished science, engineering, and business professionals.



Shown Left to Right Above: Dr. Ravi Jain, Dean School of Engineering and Computer Science; Dr. Henghu Sun, Director of PRRC and Distinguished Professor; and Dr. Zengdi Cui, Assistant Professor and Director of Marketing.

Contact Information



For additional information about the Pacific Resources Research Center please contact the Office of the Dean:

(209) 946-3066 phone

(209) 946-3086 fax

Dr. Ravi Jain rjain@pacific.edu

Dr. Cindy Cui zcui@pacific.edu

UNIVERSITY OF THE PACIFIC

Resources Research Center

*Advancing the Construction
and Materials Industry
Through Sustainable Leadership
and Global Responsibility*

Global Environmental Challenges

With the benefits of rapid industrialization, there are inevitable problems such as depletion of resources and severe pollution of the environment – all roadblocks to sustainable development. Discovering sustainable production techniques has become a top priority. In particular, **global cement production has long been identified as a major contributor (over two billion tons) to the world's CO₂ emissions, a greenhouse gas which directly contributes to global climate change.**

Global Cement Economy – On the Rise

Cement production worldwide has made consistent gains in recent years, reaching 2.6 billion metric tons (2006) at a cost of approx. \$80 per metric ton. Respectively, approx. 1828 integrated production facilities and 421 dedicated grinding units are currently in production. **Demand in the global cement economy continues to rise.** North Asia is the fastest growing market and accounts for 52% of worldwide cement demand. In addition, North America, Western Europe, and the Indian Subcontinent remain critical markets (*Global Cement Industry Report, 7th Ed.*).

Addressing Environmental Challenges Through Sustainable Production Techniques

Resulting from over two decades of building material research, recent studies led by Dr. Sun, Director of the PRRC, indicate a dramatic change in the cement industry is on the horizon. Current findings and planned research **aim to revolutionize the manner in which cement has been traditionally produced and utilized.** This new technology, called “sialite technology,” will equal or exceed current cement performance and quality. **Sialite technology is grounded in simulation of rock formation theory with a production technique characterized by a clean and efficient milling process.**

The Pacific Resources Research Center (PRRC)

The Pacific Resources Research Center (PRRC) provides an intellectually rigorous environment for **cutting-edge research and development for the construction and materials industry.** PRRC aims to develop and further enhance the Sialite technology with a goal of markedly reducing waste generated by conventional cement processes, reducing energy consumption and cost per unit of production, improving the product quality, and fostering technology transfer and commercialization.

Research Foundation of Sialite Cement Technology

Sialite Cement Technology was pioneered by **Dr. Henghu Sun, a distinguished professor of engineering and internationally renowned scientist.** Depending upon the production process, in general, a metric ton (tonne) of cement production generates about **.75-.97 tonnes of CO₂** and other pollutants such as: **NO_x, SO_x, VOC, PM₁₀, and PM_{2.5}.** Sialite Cement Technology **eliminates or reduces markedly** all of these emissions. This process also reduces **energy consumption considerably** for the production process which normally ranges from 90-150 kwh per metric ton.

Sialite is a new kind of silica-alumina-based cementitious material, which was developed based on earth science, by simulation of the earth's natural diagenesis process. This material is produced by way of a clean, crystallitic dualization preparation technology. This new material consists of silica-alumina materials, the richest material on the earth, combined with rock-forming liquid comprising a variety of minerals. Conventional cement production requires considerable energy, emits significant greenhouse gases (including CO₂, NO₂, and other pollutants) and uses limestone (an increasingly rare resource) as its primary input. Sialite can utilize **industrial solid wastes as its main raw material** (such as tailing, slag, fly ash, and waste bricks, etc.) which can constitute up to 95% of the material's mass.

Conventional cement is comprised primarily of a calcium-based system, which causes it to be naturally less durable and stable than silica-alumina based materials. Sialite not only exploits a considerably greater abundance of source material without generating greenhouse gases, other pollutants and excessive energy use, it also has **better performance characteristics** than conventional cement.