

# AVEI NEWSLETTER



Bee Rowan giving a lecture on the properties of hydraulic and non-hydraulic lime

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The past two months have been a rich time of learning at the Earth Institute, with seven weeks of training courses, as well as valuable research projects taking off on the use of lime as a substitute for cement in stabilized earth construction and traditional Persian methods of adobe dome construction.

Lara traveled to the US for the IASS symposium at MIT, where she presented a paper about the structural analysis and construction of the Sharanam Conference Hall vault.

Now the Earth Institute is gearing up for a small construction project expanding a ceramic workshop in Auroville and continuing its work with the "Homes Not Houses" project in Sri Lanka.

Please feel free to share this newsletter with your friends and colleagues as we spread the knowledge of earth architecture to the world!

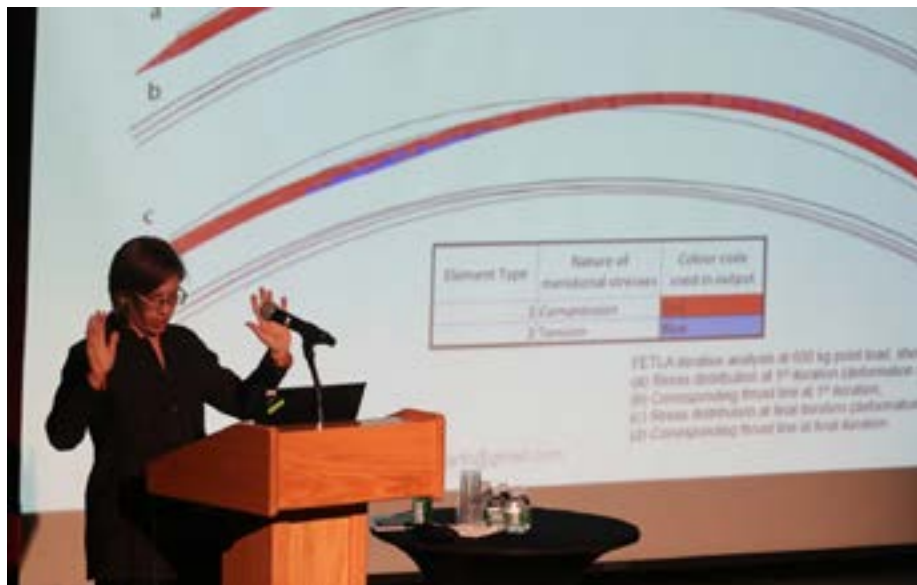
Earthily yours,  
The AVEI Team

**IASS Symposium  
at MIT**

In July, the annual Symposium of the IASS – International Association for Shell and Spatial Structures – took place on the campus of the Massachusetts Institute of Technology (MIT), the home of a rich culture of innovation in structural shell design. For decades, IASS has served as a global convening place for designers/research scientists working at the crossroads between architecture and structural engineering, in particular with lightweight structural systems such as tension, membrane and shell structures. In fact, it was the 2011 IASS symposium in London that turned Lara towards Auroville.

Lara presented one the first papers, entitled “Sharanam: Case Study of a 15m Span Earthen Conical Vault”. Co-authored with Mahesh Varma and Satprem, the paper describes the structural design and construction of the Sharanam shell, a 15 meter max. span, unreinforced earthen conical vault built for the Sri Aurobindo Society in Pondicherry. Built with low carbon CSEB, this structure required a high degree of precision in the analysis and shell construction.

The IASS symposium theme “Creativity in Structural Design aimed to “celebrate work in the built environment that pushes beyond the status quo and synthesizes across disciplines



*Lara presenting on the structural analysis of the Sharanam vault*

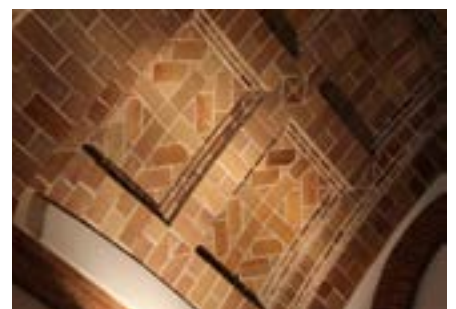
to solve important problems of today and the future” – a fitting theme for MIT’s legacy.

The conference venue was MIT’s Kresge Auditorium, an iconic thin-shell structure designed by Eero Saarinen in 1954. Some of the ‘greats’ in the field have visited or taught at the institute, including Buckminster Fuller, Felix Candela and Frei Otto. The symposium ended with a series of technical tours celebrating the

work of Fuller, Pier Luigi Nervi, and the Guastavino Company.

The symposium proceedings will be available online at: [www.iass-structures.org](http://www.iass-structures.org)







## Model "Karbandi" Dome

The Earth Institute is pleased to be currently hosting two Iranian architects, Pouya Khazaeli Parsa and Behnaz Motarjem. Pouya, a graduate of CRAterre's DSA program in earthen architecture, has worked with Hadi Mirmiran, Bahram Shirdel, Shigeru Ban, Anna Heringer and Cameron Sinclair, and created award-winning

earthen constructions in his own right in Iran. Behnaz is a graduate of the Masters of Architecture program at Azad University in Tehran. Pouya and Behnaz are active in promoting earthen construction in Iran through the Esfahk Mud Center, which offers regular training courses on earth-building techniques. Along with their colleagues, they have led a number of noteworthy construction projects, including the Bamboo hut in Mazandaran,

the Shelter for Afghan Refugees in Kerman, the School for Syrian Refugees in Jordan, and the Observatory of Esfahk.

While enrolled in training courses at the Earth Institute, Pouya and Behnaz have undertaken a unique project in building a scale model of a "Karbandi" dome. Their account of the project follows:

*This model has been made to study a rare type of dome called "Karbandi", which is a Persian innovation for covering a rectangular space with a dome! This type of dome has been used for different functions in Iran, from homes to bazars and mosques.*

*To study the method of construction, we realized a "Karbandi" dome model at a scale of 1:10. To be as close to the real structure as possible, it was constructed with small mud bricks made from Auroville's red earth and joined together by a mortar of the same earth. →*



*Tiny adobes for the models ready for use; Behnaz working on the "Karbandi" dome formwork; Pouya testing out the adobes*

The geometry of a “Karbandi” dome can be shaped by dividing a circle (in plan) by 6, 8, 10, 12..., 36, or even more parts. Here we have used 12 arcs (a circle divided by 12), each having a span of 55 cm.

In reality, the formwork for a “Karbandi” dome is made of gypsum and the formwork is a combination of 12 similar arcs. However, sometimes instead of using a whole formwork, we can simply use a single formwork for one of the arcs and create the other arcs by rotating the same formwork. ■



For more information about Pouya and Behnaz’s work in Iran, see:

<https://monargile.org/>

<https://www.mud-esfahk.org/>



Behnaz and Pouya finishing up the formwork; a view of the “Karbandi” dome with the formwork still in place; the completed free-standing “Karbandi” dome





Materials testing, research and site visits during Bee's week in residency

Tests followed with three different locally available soils – two Auroville red soils and a yellow alluvial soil – and additives such as pozzolans, sand, straw, kaddukai seed juice, and cactus juice. Different earth-based techniques that were tested with lime included plasters, rammed earth foundations, adobe, and CSEB. The Earth Institute intends to expand this initial testing into a research program, to further explore the potential of lime as a waterproofing agent in flood-prone areas and to replace the use of cement as a stabilizer. ■

**Visit and Lime Research with Bee Rowan**

At the end of June, Bee Rowan, a British lime, earth and strawbale expert who first visited in 2016 (see **Newsletter 27**), returned to the Earth Institute to collaborate on a study of the locally available lime and its usability with different soils and additives. Bee is the founder of Strawbuild, a UK-based NGO that focuses on strawbale construction and earth and lime plasters.

During the week of Bee's stay at the Earth Institute, the team evaluated different sources of lime, visiting a shell lime kiln in Cuddalore, a heritage conservation site in Pondicherry employing traditional lime recipes, and a lime "chakki" at the Sacred Groves site in Auroville. Bee gave an in-depth "Theory of Lime" introductory session for the team, including the Earth Institute's masons. This work is laying the base for Bee to return with Stafford Holmes and Sraddha Basnyat to teach a course next year.



Visits to a Cuddalore lime kiln and a Pondicherry heritage renovation project where traditional lime recipes are used





*Earth & lime theory and applied tests on the Earth Institute campus*







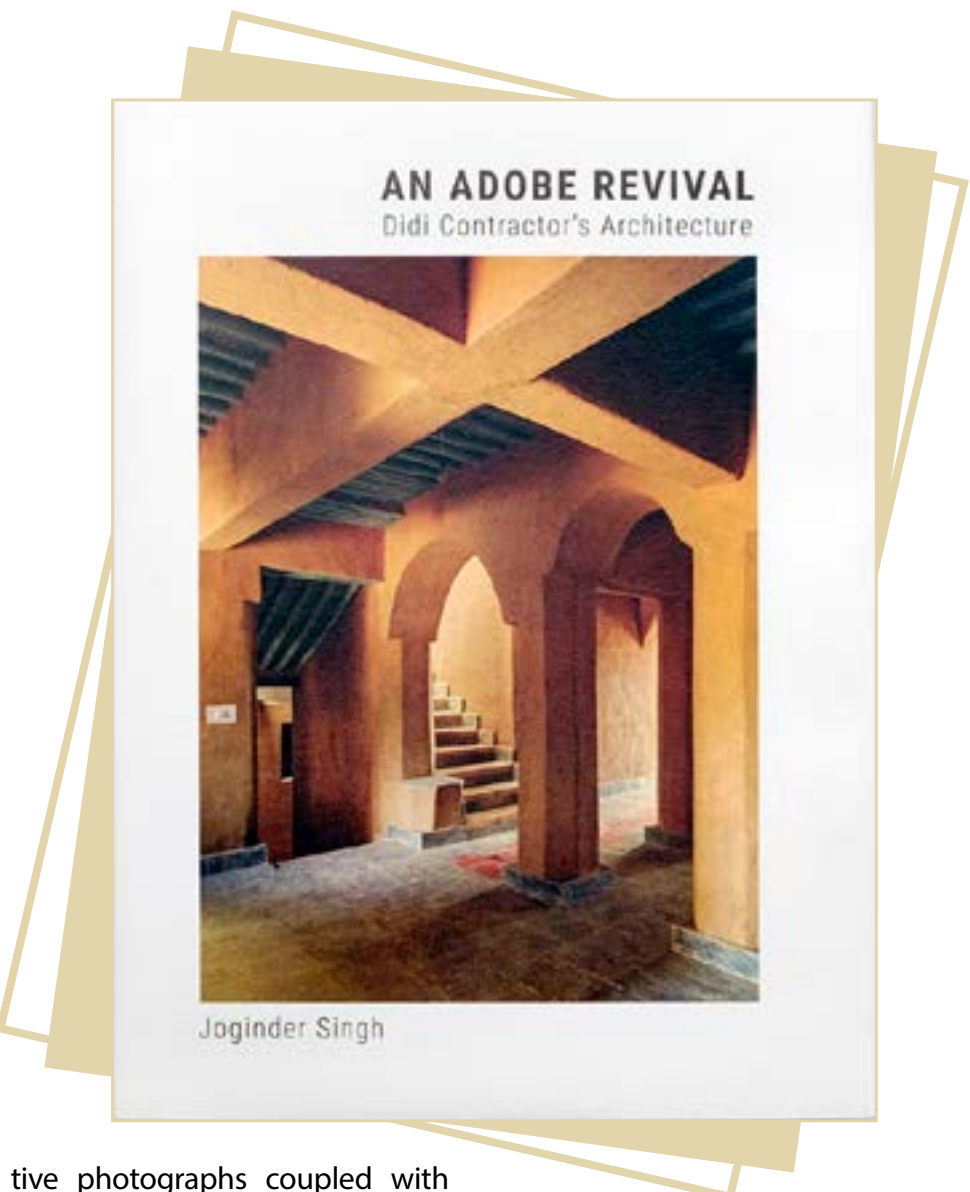


**Hilary's Book Corner**

Joginder Singh, architect and photographer, has recently published a book entitled *Adobe Revival*, which lyrically explores the decades of work of German-American architect Didi Contractor in natural building in the foothills of the Himalayas. Didi Contractor is a self-taught architect-builder whose designs incorporate adobe, stone, wood, and other locally sourced natural building materials. Now in her late eighties, she is still active in the field and an inspiration and mentor to generations of India's young architects.

In honor of this book launch, two events took place in the Auroville-Pondicherry area: a discussion with the author presented by People for Pondicherry's Heritage at Promenade Hotel on 28 June and a book launch and film screening of "Didi Contractor: Marrying the Earth to the Building" at DUSTUDIO in Auroville on 29 June.

This book represents a magnificent introduction to Didi Contractor's corpus of work, with evoca-



tive photographs coupled with quotations from Didi Contractor herself about her inspiration and principles.

The book is available online

through Immaterial Publishers:

<http://www.immaterialonline.com/an-adobe-revival/> ■



## Relaunch of ICOMOS-ISCEAH Website

ICOMOS-ISCEAH – the International Scientific Committee of Earthen Architectural Heritage – has recently relaunched its website. ISCEAH's mission is to contribute to the development of better practice and methods for the protection and conservation of the world's earthen architectural, archaeological and cultural landscape heritage. ISCEAH comprises over one hundred members and associated earthen architecture and heritage preservation specialists around the world, supporting efforts to further study conservation methods for earthen buildings and traditional earthen techniques. Its work valorizes intangible knowledge and material in earthen architectural, archaeological and cultural landscape heritage.

<http://isceah.icomos.org>

## New Team Members

The Earth Institute has welcomed three new team members!

### *Aakrity*

Practicing architecture for three years has allowed me various reflections on the impact an architect can have on life. The lives of the dwellers of the builds we've made, the lives of the people



who we work with to make these buildings and the lives of the creatures who previously inhabited (and sometimes continue to inhabit) the lands we build on.

With each building we construct, our impact is greater than just the completed structure. The traces we leave behind set about a series of responses from everyone and everything around us. Thus, comes a time when we have to step up and hold ourselves accountable.

This heightened awareness has steered me on a quest to learn about earthen building practices

and gain insights into the working of earth as a building material. So far, this has led me to explore various natural building materials and techniques and seek out like minded individuals and organisations. In April of 2018, I attended the AVD and Bioclimatic Earth workshops at AVEI. The plethora of knowledge about earth that I was exposed to stimulates me and I am now back here, assisting the Institute with a research on the role of lime in stabilisation for flood resilient building elements and structures. I hope that this collaboration can be a mutual exchange of some great ideas and work and can become a highly





motivational learning curve in my own career path!

### Meenakshi

Meenakshi is an architect from Mumbai. She completed a two year fellowship with Teach For India in 2017 and then travelled for a year, to learn more about building with earth. After participating in workshops and volunteering in Ladakh, Himachal Pradesh and Kutch, she has joined the Earth Institute and will be taking over the ElemenTerre demonstration from Isis. She plans to develop workshops around ElemenTerre for architecture schools in India. She hopes to spread awareness about the many advantages of building with earth and introduce earthen construction techniques to students and propagate more sustainable architecture in the future.

### Anshika

I'm Anshika, an architecture student, and I am currently interning at Auroville Earth Institute, developing a sense of earthen building techniques, learning more about sustainable architecture and exploring a step further towards my interests in the field.

Having an opportunity to come to Auroville, work and explore is becoming a learning experience in itself and the workshops at the Institute add a lot of fun to it. ■

## Publication of *Building Owning & Belonging*

*Building Owning & Belonging: From assisting owner-driven housing reconstruction to co-production in Sri Lanka, India and beyond* has just been published by the European Union Publications Office. This publication, edited by Jaime Royo-Olid and Shailaja Fennell, includes peer-reviewed articles by key individuals in various key reconstruction initiatives.

*Building Owning & Belonging* encompasses lessons learned from housing reconstruction, focusing particularly on cases where

communities were not just passive recipients, but empowered as proactive change agents and leaders in their own rehabilitation processes.

Lara also assisted with the editing and peer review process. Both she and Satprem contributed chapters for the book on the topics of CSEB technology, building with earth and sustainable resource management in owner-driven reconstruction.

This important work is certain to set the benchmark, elaborating the lessons learned from the *People's Process*, and hopefully transform present thinking in the field of development studies and development work. ■

# Building owning & belonging

From assisting owner-driven housing reconstruction to co-production in Sri Lanka, India and beyond



The European Union



**Recent Training Courses**

June and July were busy months on the Earth Institute campus with a total of seven weeks of training courses taking place, including Ferrocement, AVD (Arches, Vaults & Domes) Theory, AVD Masonry, CSEB (Compressed Stabilized Earth Block) Design, CSEB Production, CSEB Masonry, and Bioclimatic Earth. Ferrocement had 26 students, AVD Theory & Masonry had 33 students, CSEB Design had 28 students, CSEB Production & Masonry had 42 students, and Bioclimatic Earth had 25 students. While the bulk of the trainees came from around India, the USA, Jordan, Bangladesh, Gambia, Germany, and Iran were also represented. ■

**AVEI Training Course Schedule for 2018**

September

3rd to 8th: CSEB Production  
 10th to 15th: CSEB Masonry  
 17th to 22nd: AVD Theory  
 24th to 29th: AVD Masonry

**NEW DATES!**

October

8th to 13th: Ferrocement  
**8th to 22nd: Bioclimatic Earth**

November

12th to 17th: Wind Generator

December

3rd to 8th: CSEB Intensive  
 10th to 15th: AVD Intensive

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*Aurovilian Priya Sundaravalli's 'Blossoming - Being all of them She stands there' is a work crafted from the Matrimandir discs and covered with more than 3,000 ceramic flowers and tesserae.*