

# AVEI NEWSLETTER



Earth Concrete Block production starts in Sri Lanka

## IN THIS ISSUE

- Training Courses for HfH in Sri Lanka ..... page 2
- Lime Plaster Research ..... page 3
- AVEI in the Press ..... page 4
- Arabic Translation of *Earth Construction* ..... page 5
- Hilary's Book Corner: *Argiles et Biopolymères* ..... page 6
- Bioclimatic Earth: A Design Workshop ..... page 7
- International Earth Festival in Ladakh ..... page 9
- New Team Member ..... page 9
- AVEI Training Course Schedule for 2017 ..... page 10

With the interruption of the newsletter for our five-year anniversary in March, we have much to share with you from these past four months.

Satprem and Ayyappan have been in Sri Lanka setting up production and training the local teams who will take on block production for the 'Homes Not Houses' project.

On the Earth Institute campus, lime expert Solène Delahousse applied several experimental lime plasters for further study, and Omar gave his first 'Bioclimatic Earth' design workshop in April.

Several new publications have come out in recent months, both physical and digital, including *Argiles et Biopolymères* from CRAterre Editions and an arabic translation of *Earth Construction*.

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

## Training Courses for HfH in Sri Lanka

Ayyappan and Satprem travelled to Sri Lanka in April and May to conduct training courses for the project "Homes not Houses, Building a Sustainable Future Together". Habitat for Humanity Sri Lanka (HfHSL) and World Vision Lanka (WVL) are implementing this project, under the aegis of the Delegation of the European Union to Sri Lanka & the Maldives, in order to promote homeowner-driven reconstruction of houses and the empowerment of sustainable local livelihoods in the zones affected by the war. This was the second phase of the training offered for HfHSL and WVL, after January's training of trainers course conducted at AVEI.

The first training was a 5-day course held in Kilinochchi, in the North, on the production of earth concrete blocks (ECB). Ayyappan and Satprem analyzed all test samples executed by the local teams and organized ECB production at the Thevipuram unit. ECB are composed of a cement-stabilized, gravely soil mix (1: 12) and the mix is vibrated in machines designed for cement sand blocks.

After setting up the various stages of production, the local team tried to increase the production speed, as the vibration time for the earth concrete mix is much longer than that for a cement

sand mix. Ayyappan and Satprem also met with government officers and various stakeholders to introduce the project and gave presentations to future beneficiaries in two community meetings.

The second training course was conducted in Batticaloa, in the East, on the production of CSEB with the Auram motorized machinery. Ayyappan and Satprem first met with government officers and various stakeholders to present the project, and then worked to finalize the preparation of the blockyard. Ayyappan started the course with the production of blocks using the manual press Auram 3000.

The last four days were focused on training with the motorized machines, the Auram Crusher, the Auramix 5000 and the Auram Press 4000. Trainees were hard

working and willing to learn, very attentive and keen to work well. They quickly picked up the various details of production and on the third day they achieved a good production speed of 280 blocks per hour (1,263 blocks in 4.5 hours). In Auroville, this press produces as an average of 350 blocks per hour.

There were a few problems with the Auram Press 4000, including some issues with the flow of the cement metering system for the cement in Sri Lanka and temperature control. Aureka, the manufacturer of the Auram equipment and partner in the design of these machines, will send a team to solve these two problems in early June.

Ayyappan and Satprem thank the local teams from HfHSL and WVL and all trainees for their hard work. ■



*Training course for ECB production in Kilinochchi*



**Lime Plaster Research**

Solène Delahousse, a French lime artisan who has spent the past twenty five years mastering plastering techniques such as stucco, Sgraffito, and Tadelakt, conducted a preliminary set of experiments on lime plasters at the Auroville Earth Institute in late January. Despite time constraints, she was able to test three types of lime using various ratios and techniques. She made three panels of varying samples of lime finishes, which will be evaluated for durability and water-resistance in this climate.

Three lime samples were obtained for these tests: an industrial lime, a shell lime (a quicklime produced in Kerala from burned shells), and a village lime (a coarse lime produced near Auroville containing a large

quantity of unbaked and over-baked aggregates). These were combined with sand, quarry dust, and/or marble powder in varying proportions and applied on exposed rammed earth wall surfaces in thicknesses three times that of the largest aggregates in the mix.

The first panel produced included 15 plaster samples made solely with industrial lime, but with various aggregate ratios and finishes. These samples demonstrated different levels of permeability, depending upon the finishing technique.

The second panel also made use of industrial lime, applied with the Marmorino technique, an Italian stucco which overlays three different mix ratios of diminishing aggregate size for a smooth and water-repellent finish.



*Shell lime before hydration*

The 8 samples on the third panel made use of the village lime and shell lime with a Tadelakt finish, a Moroccan technique in which the lime and aggregate mixture is compressed and polished with a burnishing stone for a very water-resistant surface. One Marmorino sample was also made with the shell lime. The village lime produced a result very similar to traditional Moroccan Tadelakt, whereas the shell lime can be more prone to cracking because of the fine granularity of the lime.

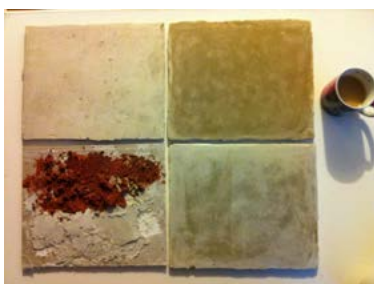


*Panel 3 (Left) - Shell and Village Lime Tadelakt | Panel 2 (Middle) - Industrial Lime Marmorino | Panel 1 (Right) - Industrial Lime Plasters*

The next steps will involve evaluating how these samples perform over time. Further testing may include finishes with pigments, black soap (the traditional olive oil-based soap used for Tadelakt in Morocco) or other natural waterproofing agents. ■

**Carlos Vagnières**

Swiss lime and pigments specialist Carlo Vagnières dropped by the Earth Institute shortly after Solène completed her testing. We discussed sourcing natural pigments and other additives for lime plasters in India. Many natural pigments originate in India (such as ochres), but these pigments are often processed only for export and use in cosmetics. We also discussed the extensive testing done by Carlos and his company Feinraum on lime plasters, natural pigments, and lime paints with chalk, casein and cellulose. We are pleased to add Carlos to the growing network of lime specialists working in India! See his work at: [feinraum.ch](http://feinraum.ch)



**AVEI in the Press**

**AV Today**

*AV Today*, a monthly digital and print periodical that does in-depth coverage, interviews, and editorials on the current topics affecting life in Auroville, included an article about the Kaza Eco-Community Center in its February issue. Against the backdrop of the unique Spiti Valley – at an intersection of cultures and geographical constraints – the article describes the Earth Institute’s challenging role in the design and construction of this innovative building . . . with the ultimate outcome of it being recognized by Construction 21 as the Low Carbon laureate at COP22, the UN Climate Change Conference in Marrakesh.

For the full article, see Issue No. 331 at: [www.auroville.org/contents/4223](http://www.auroville.org/contents/4223)

**Ecologik**

The French magazine *Ecologik*, which presents sustainable contemporary urbanism and architecture in France and abroad, also included a special on the Kaza Eco-Community Center after the building received the Low Carbon Award. Highlighting how ancestral rammed earth techniques had been coupled with reinforced CSEB and trombe walls for paraseismic



**Retour à la terre en Inde**

Les Green Building Solutions Awards, concours international lancé par le média social du bâtiment et de la ville *Avant de Construire*, viennent de récompenser le centre éco-communautaire Kaza dans la montagne himalayenne. L'édifice en terre, situé dans l'État du Himachal Pradesh, dans le nord de l'Inde, a été construit par l'ONG locale Auroville Earth Institute avec la collaboration des habitants et des artisans de la région. Le projet, technique de construction ancestrale, est le résultat de longues années d'expérimentation pour répondre aux exigences autochtones. L'installation de murs Trombe permet en outre d'assurer un confort thermique dépassant le cadre de mesure au chauffage par le bois dans une région où les températures hivernales sont régulièrement négatives.

**POUR ALLER PLUS LOIN**  
[www.auroville.org](http://www.auroville.org)  
[www.ecobuildingsolutions.com](http://www.ecobuildingsolutions.com)  
[www.greenbuildingawards.com](http://www.greenbuildingawards.com)

stability, thermal comfort, and environmental sensitivity, the article also featured beautiful images from the construction process.

[www.ecologikmagazine.fr/boutique/magazine/ecologik-n-53-408](http://www.ecologikmagazine.fr/boutique/magazine/ecologik-n-53-408) ■

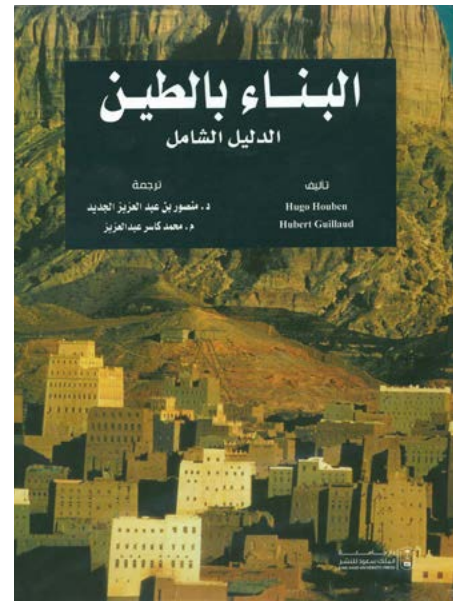
Earth Institute architectural intern Julie Maman has printed a wonderful research publication, *Pathologies: Understand your Building*. In this book, she examined common building pathologies in reinforced concrete, fired brick, and earthen constructions, and indicated best practice measures to avoid them, with descriptions complemented by illustrations and diagrams. ■

### Arabic Translation of Earth Construction

The Earth Institute library has recently received copies of an Arabic translation of Hugo Houben and Hubert Guillaud’s seminal work, *Earth Construction: A Comprehensive Guide*. This book, both in its original French (*Traité de construction en terre*) and in the later English version, has been a key publication for the earth building community as an introduction to the field and as a reference book. With thorough scope and technical detail, it covers soil science, the various techniques of earthen construction, as well as the design considerations necessary for their implementation.

This new Arabic translation was given to the Earth Institute by Mohamed Abdulaziz, a Syrian engineer who worked with Satprem on the construction of Al-Medy Mosque in Riyadh, Saudi Arabia in 2003. When Mohamed later went on to assist in the establishment of a center for earthen construction research at King Saud University (KSU), he noted a distinct lack of Arabic-language reference materials for earth building, compelling him to personally undertake the translation of certain crucial publications.

البناء بالطين : الدليل الشامل, as this Arabic translation is called, is the fruit of a collaboration between Mohamed and KSU professor Dr. Mansour Aljadeed.



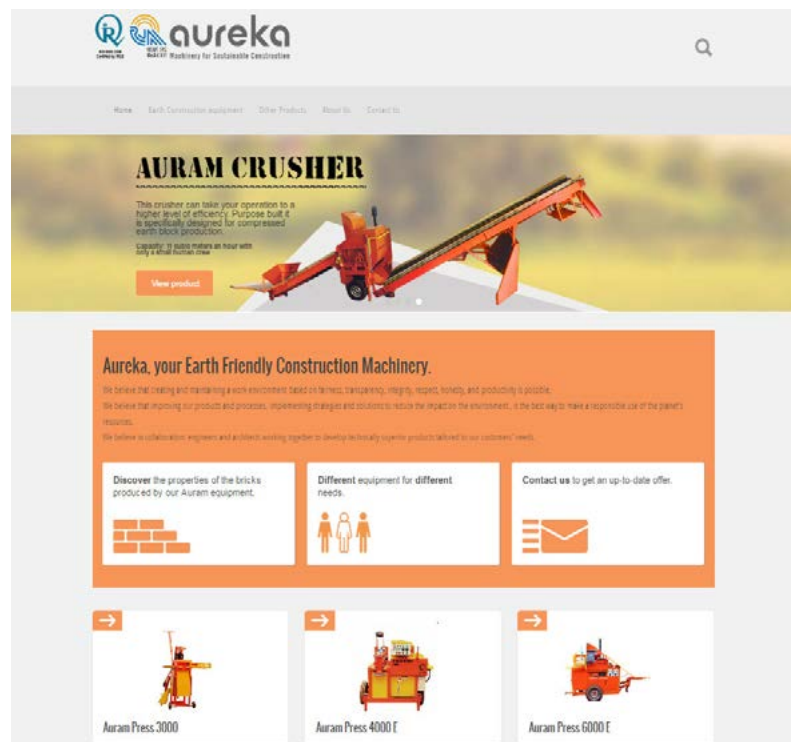
The book is available through the university’s bookstore: [smc.ksu.edu.sa/bookstore](http://smc.ksu.edu.sa/bookstore) (website in Arabic only)

### New Website for Aureka

Aureka has recently launched its fabulously redesigned website! An Auroville-based steel workshop, Aureka is the fabricator of the Auram earth construction equipment co-developed with the Earth Institute, and has been a key Earth Institute partner since 1989.

Those interested can now find new pictures, technical specifications, and details about the range of manual and motorized block presses, crusher, and mixer.

We invite you all to take a look at: [www.aureka.com](http://www.aureka.com)





Hilary's Book Corner

CRATerre Editions has introduced a new publication this year, *Argiles & biopolymères : les stabilisants naturels pour la construction en terre*. A summary of the research done under the PaTerre+ project, this field of research presents traditional techniques of stabilization using additives of plant or animal origin in earthen heritage buildings. This book combines the technical expertise of the authors, with the wealth of documentation from CRATerre, the on-going field research of its experts, and the testing protocols that have been developed in its laboratories.

The book divides biopolymers into 4 categories: polysaccharides, lipids, proteins, and others (primarily tannins). It explains the properties of each group and how it acts on an earth plaster—making the mixture more workable, improving water impermeability, strengthening the structure between clay particles, etc. Using data and reports from the CRATerre archives, it details

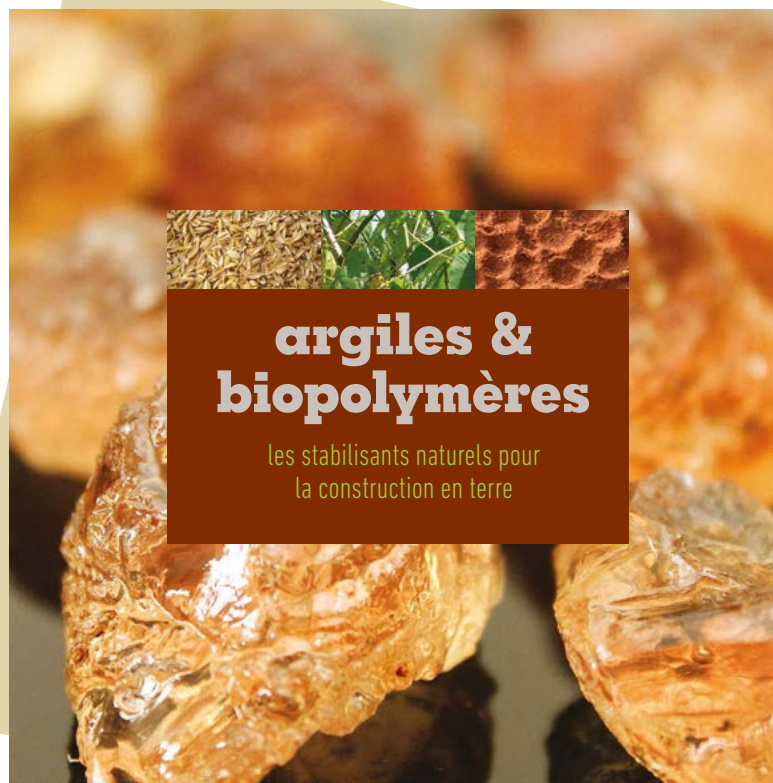
different examples of biopolymers that have been documented in usage around the world, giving also simple recipes for their implementation in earth plasters.

The following section goes into the field and laboratory tests that can be used for earth-based protective coatings to measure the workability of the mixture, the effectiveness to protect against

water incursion and abrasion, the compatibility with the base, and the durability of protective coating. Finally the book ends with a case study of protective earthen plasters on an archaeological site in Tajikistan.

With its in-depth descriptions of the physico-chemical mechanisms of the biopolymers at a molecular level, and the vivid images that accompany the traditional recipes, this book invites the reader to experiment and expand upon this traditional knowledge.

Currently only available in French, the print version is available through CRATerre and the digital edition is at amàco's website: [www.amaco.org/spiral-files/download?mode=inline&data=3510](http://www.amaco.org/spiral-files/download?mode=inline&data=3510)



## Bioclimatic Earth: A Design Workshop

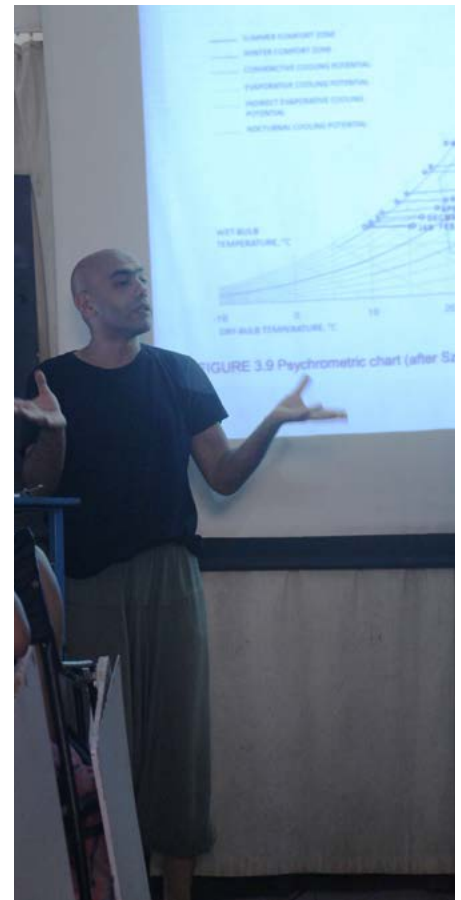
In April, the first Bioclimatic Earth design workshop was held at the Earth Institute, led by long-time Earth Institute researcher and associate Omar Rabie. Building on the idea of bioclimatic architecture being the oldest form of architecture, the course looked at vernacular forms of architecture to study the ways in which architectural forms and materials have evolved to meet climatic conditions, material constraints, and cultural values.

With its new and innovative curriculum, this two-week course combined lectures by Omar on bioclimatic architecture, by Lara and Satprem on earthen architecture, as well as guest lectures and reviews by Mona Doctor-Pingel, Fabian Ostner, and Poonam Mulchandani. The course also incorporated field trips and interactive design sessions. The second week was primarily devoted to group projects where

students conceptualized a bioclimatic building responsive to an assigned location and its climate zone. The student groups presented their buildings at the end of the course before a jury.

The course investigated different design strategies and processes to explore earthen architecture's ability to adapt to varied bioclimatic regions (cold, hot/dry, hot/humid, temperate, and composite climates). Students learned the universal design principles for different climatic zones as well as how to use software for climate analysis to pinpoint the exact climatic conditions of a particular site. At the end of the two weeks, the concepts of the course were manifest in the beautiful physical models and diagrams demonstrating the bioclimatic principles that had been implemented in the designs.

The course will be offered again in October. See the website for further information: [www.earth-auroville.com/training\\_dates\\_and\\_info\\_en.php](http://www.earth-auroville.com/training_dates_and_info_en.php)

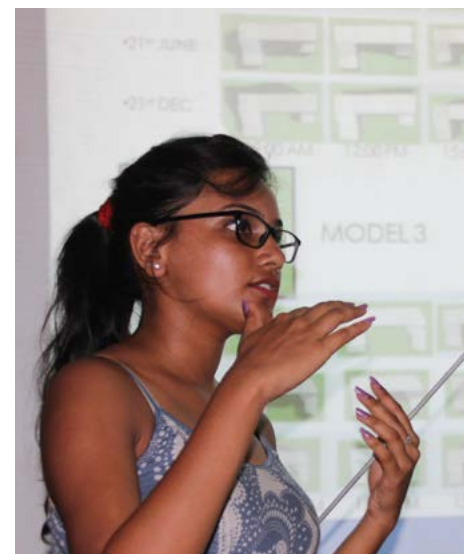
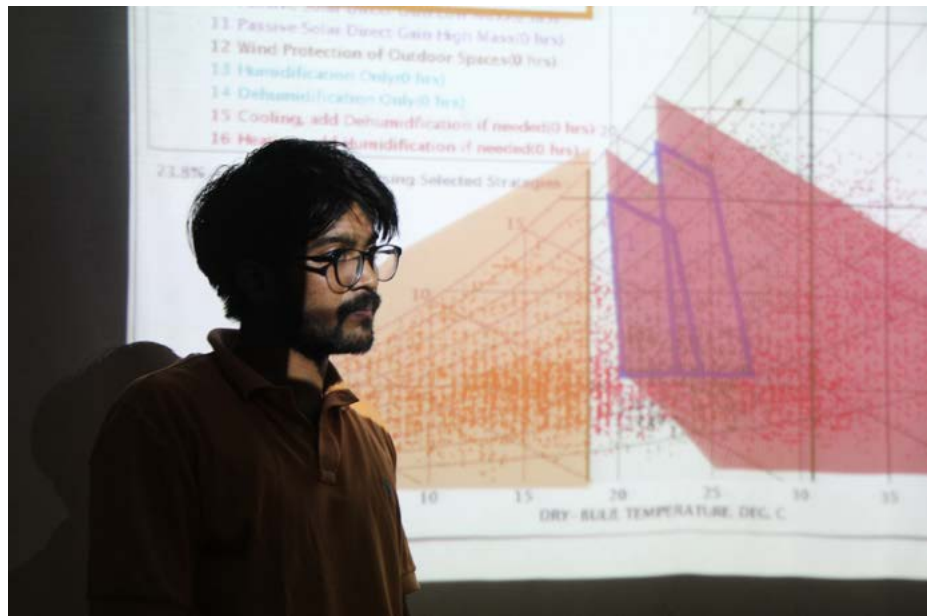
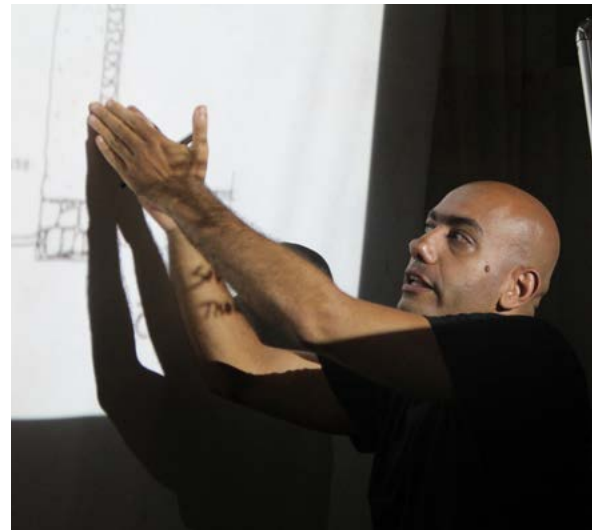
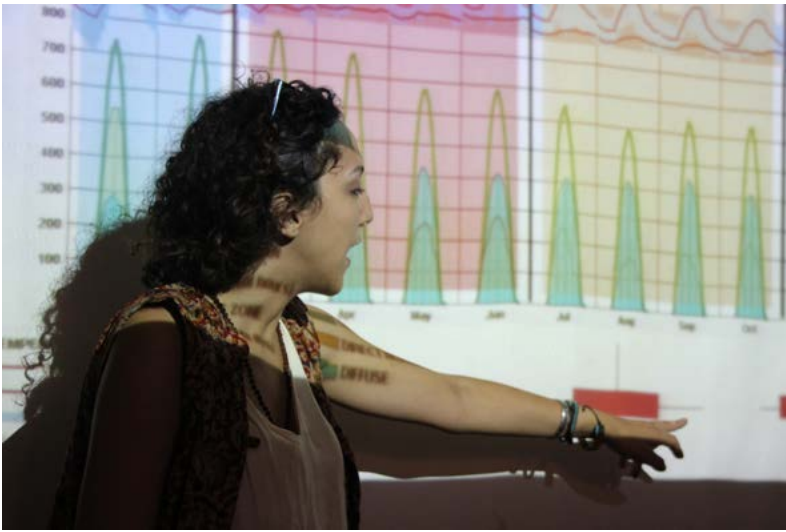


Final review presentation



Lectures, field trips, and model air flow testing





Final student presentations from the Bioclimatic Earth workshop



## International Earth Festival in Ladakh

The Himalayan Institute of Alternatives, Ladakh (HIAL) is organizing the 12-day Sun and Earth Natural Building Festival for the end of July, set amidst the culturally rich heritage of the Ladakh region with its millennia-old traditions of earthen architecture.

From 20th to 31st July, participants will be initiated to rammed earth, cob, adobe, straw clay, earth finishes and flooring, and passive design principles through hands-on workshops led by international experts from India and abroad. The event will culminate with two days open to the public and a conference for policy makers.

For more information, visit the HIAL website at : [hial.co.in](http://hial.co.in)

Or email [natbuild.festival@hial.co.in](mailto:natbuild.festival@hial.co.in)

## New Team Member

The Earth Institute has welcomed a new intern!

### Salomé

Currently, I am a student at the Ecole Nationale Supérieure d'Architecture de Grenoble (EN-SAG). I have finished my Bachelor's degree, including one year of Erasmus in Switzerland focusing on architectural detailing.

I believe that for architecture to be sustainable, it has to be humane; integrated in a holistic multilayered (cultural, economic, social, and ecological) ecosystem. I have acquired such understanding and sensitivity through my own ongoing reflections elicited by the courses of Patrice Doat, a founder of CRATerre, on Earth Architecture, which have impacted me fundamentally.

My fascination with the natural environmental aspects of earth-en architecture, has led me to the Auroville Earth Institute. As an AVEL intern, I am acquiring both theoretical knowledge and practical skills on different earth construction techniques. Moreover, since I work on a construction site with Tamil workers, I am offered a unique chance to discover first hand the special culture of the Tamil village.

### Welcome Back, Isis!

The Earth Institute is thrilled to have Isis Roux-Pagès back and collaborating with the team again! After being trained by the CRATerre team in France to use the ElémenTerre kit, she will be developing this pedagogical material for the Indian context, most particularly for young viewers. ElémenTerre is a kit which presents fascinating scientific experiments on granular material for a wide audience.

Having seen a sneak preview of her magical demonstrations and experiments at the end of May, we are all looking forward to seeing the future of this project! Thanks Alba and Nathalie!!



  
**Sun and Earth Natural Building Festival. LADAKH**  
20th July- 31st July, 2017

**Why build GREY when you can build GREEN BUILDINGS with Sun and Earth...**  
Learn the essentials of mud and solar construction and celebrate the Sun and Earth in this 12-day International festival. Learning from world leaders, hands-on practical experience, music, fun & festivities and a field trip to hidden architectural treasures of Ladakh highlight the event. Do not miss this unprecedented opportunity to network with experts from all over the world and experience Ladakh's rich cultural heritage!

For the last five years SECMOL with its 23 years of experience in natural building construction has been organizing the earth and solar courses with participants from around the world. This year the event will be celebrated as an International Festival at the upcoming university, Himalayan Institute of Alternatives, Phyang, Ladakh, from 20th July to 31 July, 2017.

World leaders like Patrice Doat and team from CRATerre France, master plasterers Kinya Maruyama from Japan & Sylvie Wheeler from France, renowned potter Angad Vohra from Auroville and bioclimatic engineers and architects like Robert Celaire from France, Sanjay Prakash and Sonam Wangchuk from India and many more would lead a series of hands-on workshops on earth building techniques like rammed earth, cob, adobe, strawclay, earth finishings, floorings, roofings and passive design principles for climate responsive buildings.

Registrations for the 12-day Sun and Earth Festival closes on 20th June 2017.  
Course investment: INR 36,000/- (highly subsidised, true fee comes to INR 72,000/-)  
This includes training fee, course material, traditional homestays, food and a 2 day field trip. Ladakhi participants will be assisted with need based scholarships.

To apply or for further details please send email to:  
[natbuild.festival@hial.co.in](mailto:natbuild.festival@hial.co.in)  
Faiza Khan- +91 9426530236  
Michelle Pavri- +91 9820380948



**AVEI Training Course  
Schedule for 2017**

June

5th to 10th: Ferrocement  
12th to 17th: AVD Theory  
19th to 24th: AVD Masonry

*newly added!*

July

3rd to 8th: Ferrocement

September

28/8 to 2nd: CSEB Production  
4th to 9th: CSEB Masonry  
11th to 16th: AVD Theory  
18th to 23rd: AVD Masonry

October

16th to 28th: Bioclimatic Earth

December

4th to 9th: CSEB Intensive  
11th to 16th: AVD Intensive

**AVEI Newsletter**

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*Isis demonstrating to the Earth Institute team the strength of interlocking grains*